Rapid Retention Survey Toolkit: Designing Evidence-Based Incentives for Health Workers

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ACRONYMS

CAPI	Computer-aided personal interview
CBC	Choice-based conjoint (analysis)
DCE	Discrete choice experiment
FBO	Faith-based organization
FGD	Focus group discussion
GHI	United States Global Health Initiative
HR	Human resources
HRH	Human resources for health
IRB	Institutional review board
NGO	Nongovernmental organization
USAID	United States Agency for International Development
WHO	World Health Organization
WTP	Willingness to pay

EXECUTIVE SUMMARY

Determining the "Right" Incentives to Attract and Retain Health Workers

Health worker retention represents a major challenge to the delivery of high-quality health services (United States Global Health Initiative 2009, World Health Organization 2006). Although almost one half of the global population lives in rural areas, they are served by a small minority of the total nursing and physician workforce (World Health Organization 2010). Driven by the lure of economic and social opportunities in urban areas, health workers tend not to accept jobs in rural and remote areas, leaving rural populations with little access to quality health care. Governments have attempted to counteract this troubling trend by using retention incentive packages. However, many of these packages have been formed on the basis of what the ministry of health thinks health workers want or what may have worked in another setting rather than necessarily on sound evidence using rigorous methodologies to find out what motivates health workers. As a result, many retention incentive packages have been unsuccessful.

The 2010 ***WHO Global Policy Recommendations: Increasing Access to Health Workers in Remote and Rural Areas through Improved Retention*** describes various strategies that countries can pursue to increase access to health workers in remote and rural areas. Incentives are one of several interventions available to policy-makers; others include expanding rural medical training, establishing return-of-service contracts, and recruiting rural students. There is growing interest in rural incentive packages in both low- and high-income countries. However, given their logistic and financial costs, it is essential to choose the correct mix of incentives that will attract and retain health workers in rural clinics. 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 health workers. Given the large menu of incentive options available, how does an organization know which are the "right" incentives or interventions, and in which combination?

A formal planning process supported by local information on the potential impact of particular strategies as well as the estimated costs of those strategies is required. A labor market analysis to better understand the labor market context and issues in the urban and rural areas of the country will also be useful in determining whether incentives or other retention interventions will be most appropriate.

A Solution: The Discrete Choice Experiment

One approach to creating an incentive package is the discrete choice experiment (DCE), a powerful research method to determine the relative importance health workers place on different job characteristics 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 to attract and retain them to work in health facilities in rural and remote areas. It is important to note that health professional students and currently practicing health workers may have different motivations based on how far along they are in their career, and their data should be analyzed separately.

The Rapid Retention Survey Toolkit

Although DCEs have been carried out in many countries, it is only relatively recently that the methodology has been applied to the health sector in general and to assess human resources for health (HRH) issues in particular. As such, the pool of international DCE experts is small and until now the majority of DCEs in the health field have required the assistance of international senior health economists or experienced academicians to lead the process. Capacity***Plus***, the USAID-funded flagship project on strengthening the health workforce, intends to operationalize the DCE methodology in such a way that the use of the survey method can be facilitated by human resources managers or other laypersons instead of high-level research experts.

Using a very prescriptive formula of stages and steps, the ***Rapid Retention Survey Toolkit: Designing Evidence-Based Incentives for Health Workers*** employs the Rapid DCE, a simplified but reliable version of the stringent DCE methodology, to guide users through the survey process to rapidly assess health worker preferences and better pinpoint the bundle of incentives and interventions that could more effectively attract and retain health workers in rural and remote areas. Capacity***Plus*** developed this toolkit based on experiences in Uganda. It was then further field-tested in Lao People's Democratic Republic (PDR) with the Ministry of Health, in partnership with the WHO, and in Namibia in collaboration with the Ministry of Health and Social Services and the University of Namibia. The toolkit uses simulated as well as actual data to demonstrate how users should interpret results.

The ***Rapid Retention Survey Toolkit*** consists of a step-by-step guide with detailed instructions, sample formats, and examples that can easily be adapted to the country context to lead the user through all phases of the Rapid DCE in a simple and straightforward manner, including:

- Planning for the Rapid DCE survey
- Survey design
- Survey instrument development using a specialized software program
- Survey administration
- Data analysis and interpretation
- Presentation of results to stakeholders.

Using the ***Rapid Retention Survey Toolkit***, more countries will be able to design evidence-based packages and update their packages more frequently to maintain retention effectiveness, as economic and country conditions and health worker preferences change over time. With its focus on self-reliance, the Rapid Retention Survey Toolkit promotes country ownership, increases self-sufficiency of country stakeholders in making and acting on health workforce decisions, and empowers stakeholders to develop evidence-based retention strategies.

Furthermore, when the ***Rapid Retention Survey Toolkit*** is used in conjunction with iHRIS Retain, the software tool created by Capacity***Plus*** and the WHO to cost retention interventions, the result is the development of an affordable, cost-effective retention package designed by country stakeholders to meet health worker needs within their specific context, and ultimately contribute to more health workers serving rural communities.

Intended users

The target audience for the ***Rapid Retention Survey Toolkit*** includes managers, program planners, and other stakeholders responsible for HRH management and/or those tasked with providing evidence for effective selection and development of HRH retention incentive packages. The toolkit is relevant to the public sector and private, nonprofit, and faith-based organizations. In order to help policy-makers understand the challenges in and importance of addressing retention issues and the use of a DCE for designing evidence-based incentive packages, please refer to the World Bank's ***Guidance Note on How to Recruit and Retain Health Workers in Rural and Remote Areas in Developing Countries*** (Araújo and Maeda 2013). We do not expect toolkit users to necessarily have experience in conducting studies, research or statistical analyses, although this would be helpful. If the prescriptive instructions in the toolkit are carefully followed, the user should be able to successfully implement a Rapid DCE survey. That said, it would be ideal to enlist a researcher from a local university or other organization to take part in the Rapid DCE survey or to provide additional technical support.

Another group of users are researchers and students beginning work in DCE. For this group, this toolkit offers practical guidance on implementing a Rapid DCE that complements existing theoretical research articles and books on DCEs.

Resource requirements

Before beginning the process it is important to consider the resource requirements needed to carry out the Rapid DCE survey using this toolkit. Although the exact inputs will depend on a country's situation and specific context, this toolkit can serve as a guide to gather the following resources:

- Stakeholders with decision-making authority to determine the need for development of health worker retention strategies, define the Rapid DCE characteristics (cadres of focus, possible incentives), and give approval to conduct a Rapid DCE

- A study team to carry out the Rapid DCE—the number of individuals who comprise the team will depend on the selected sample size and their geographic distribution, but it can average from six to 16 persons. With a higher number of study team members, the data collectors can divide into sub-teams to administer surveys at more schools and health facilities and complete the survey in a shorter timeframe or reach a larger number of survey respondents.

- Vehicles, fuel, and drivers—the number will depend on the geographical distribution of the sample size as well as the number of data collection teams

- Per diem for data collectors to cover meals and lodging during survey administration in the field

- Purchase of the recommended software license(s). At a minimum the Sawtooth Software package is needed to develop the survey instrument and the license can be obtained at a reduced rate for humanitarian/nonprofit use[1]. Statistical analyses are described using STATA.

- Equipment rental or photocopy expenses—if access to university computer labs for computer-based survey administration is limited, it could be recommended to rent or purchase a few laptops. For conducting paper-based surveys, the costs for printing and photocopying should be considered and will depend on the sample size and number of surveys to be administered.

- Ideally, the study team should have access to a researcher to assist with study design and troubleshooting. S/he should have some experience with DCE or, at a minimum, experience with survey design and statistical analyses.

Timeframe

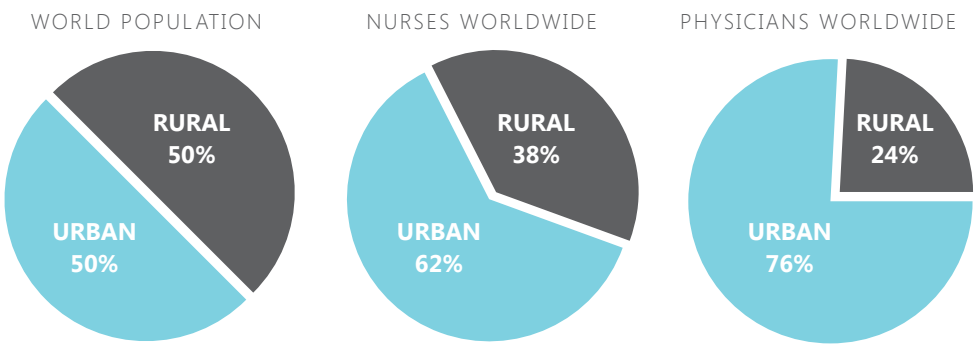
As the name implies, the ***Rapid Retention Survey Toolkit*** is meant to be carried out quickly, as it relies on local human, financial, and logistical resources. The actual time required to complete each stage and step of the Rapid DCE will depend on the priority given to the activity, other competing tasks and activities, the number of individuals available to participate in carrying out the study, and financial and logistical considerations, among other factors. In an ideal situation of concentrated effort, the Rapid DCE should take approximately three to eight weeks from start to completion. However, if the organization is not able to dedicate consecutive weeks to advance from one stage to the next, but instead needs to do one step in one week, followed by later steps a few weeks later, the overall Rapid DCE study timeframe will expand accordingly.

[1] When contacting the Sawtooth Software Company to purchase a software license (see Stage 3), please make reference to IntraHealth International and this Capacity***Plus*** toolkit so that the discounted rate may be applied as appropriate.

Background

Countries throughout the world are struggling to meet the health needs of their populations. Human resources constraints in the health sector in both developing and developed countries often hinder the appropriate and timely provision of basic health services. These constraints have been a challenge to resolve in low-resource settings. The 2006 *World Health Report* recognizes retention of health workers as a major challenge to the delivery of high-quality health services worldwide (World Health Organization 2006). Skilled health care providers frequently leave the government health service for jobs in the private sector, exit the health sector entirely, or pursue careers overseas. As a result, in some developing countries vacancy rates in the public health sector may be as high as 60% (Uganda Ministry of Health 2009). Many times, urban postings offer higher compensation or more alternative income-generating opportunities than rural postings. However, there is increasing evidence suggesting that health workers are interested in more than just salary when deciding where they will work (Kruk et al. 2010; Blaauw et al. 2010). They also seek postings at facilities with good physical infrastructure, reliable equipment, drugs and supplies, and a supportive management environment. Often, urban facilities in low-income countries perform better with regard to these factors than do rural facilities. In addition, the social characteristics and weak infrastructure in rural areas, which may lead to personal and professional isolation, may deter health workers from remaining at these posts for extended periods of time. As a result, the urban/rural distribution of doctors and nurses is disproportionate (see Figure 1).

FIGURE 1



Source: World Health Organization 2010

It is important to note that rural service incentives are just one of a large set of possible policy solutions to the geographic maldistribution of health workers. While this document focuses on determining incentive packages, governments may be interested in other solutions as well—such as expanding rural medical education, recruiting rural students to the health professions, and revisiting regulations on return of service contracts. These are discussed in detail in the *Global Policy Recommendations: Increasing Access to Health Workers in Remote and Rural Areas through Improved Retention*, published by the World Health Organization in 2010, which provides useful background reading for the *Rapid Retention Survey Toolkit*.

The Challenge: Determining the "Right" Incentives

To address high vacancy rates in rural health facilities, governments have attempted to implement various incentive packages to improve the attraction and retention of health workers. However, many of these packages may have been formed on the basis of what the ministry of health or other organizations think health workers want or what may have worked in another setting rather than on sound evidence using rigorous methodologies to find out what motivates their health workers. As a result, many retention incentive packages have been unsuccessful.

While the challenges are complex, they also suggest a way forward in addressing this issue. The question of how to attract and retain health workers to postings in rural and underserved areas in developing countries is essentially a question of what strategies the public sector (or private, in the case of faith-based organizations) can pursue to make those rural postings more attractive to health workers. Several strategies have been developed over the past decade to provide the right incentives and environments to more effectively attract and retain health workers to postings in rural areas. Indeed, the WHO global policy recommendations describe various strategies that countries can pursue to increase access to health workers in remote and rural areas (World Health Organization 2010). They include 16 different examples across four categories of retention incentives or interventions: regulation, education, financial incentives, and professional and personal support (see Table 2 for a full listing).

Furthermore, the policy recommendations contend that a single intervention is not enough to motivate health workers, but rather **a bundle or combination of well-selected incentives or interventions is needed**. The attraction and retention of health workers depends on many broad factors, which can vary by country, geographical region within a country, cadre type, and a health worker's career stage, as well as other cultural, social, and economic factors. Given this and the large menu of incentive options available, how does an organization know which bundle of interventions to choose? Which mix of incentives will health workers find more attractive and motivate them to work in rural and remote areas? A formal planning process supported by local information on the potential impact of particular strategies as well as the estimated costs of those strategies is required.

A labor market analysis to better understand the labor market context and issues in the urban and rural areas of the country will also be useful in determining whether incentives or other retention interventions will be most appropriate.

A Solution: The Discrete Choice Experiment

One well-documented solution to this challenge is the use of the discrete choice experiment (DCE)—a powerful research method that determines the relative importance health workers place on different characteristics or attributes related to employment options and predicts decision-making using hypothetical choice data. The DCE systematically polls health workers regarding what package of incentives (both financial and nonfinancial) would be most effective to motivate the health workers to practice in underserved areas. **It is important to note that health professional students and currently practicing health workers may have different motivations based on how far along they are in their career, and DCE surveys for each group should be developed and analyzed separately.** Through the polling process, the DCE identifies the trade-offs that health workers are willing to make between specific job characteristics as well as the probability of accepting a job post. Unlike qualitative methods such as focus group discussions and in-depth interviews, DCE data allow you to estimate the strength of preference for a job characteristic or attribute relative to other attributes and the probability that an individual will take up a job with specified characteristics (World Bank, WHO, Capacity*Plus*, 2012). This assists policy-makers to more effectively pinpoint an appropriate combination of incentives or benefits.

The Rapid Retention Survey Toolkit

Although DCEs have been carried out in many countries, it is only relatively recently that the methodology has been employed in the health sector in general and to assess human resources for health (HRH) issues in particular. As such, the pool of international DCE experts is small. To date, the majority of DCEs in the health field have required the assistance of international senior health economists or experienced academicians to lead the process. Capacity*Plus*, the USAID-funded flagship project on strengthening the health workforce, intends to operationalize the DCE methodology in such a way that the use of the retention survey tool can be facilitated by human resources managers or other laypersons instead of technical research experts. Using a very prescriptive formula of stages and steps, the *Rapid Retention Survey Toolkit* employs a simplified but reliable version of the stringent DCE methodology to guide users (with the assumption they have little to no research background) through the Rapid DCE process to assess health worker preferences to better pinpoint the bundle of incentives and interventions that could more effectively attract and retain health workers in rural and remote areas.

The results of the survey are used to create evidence-based incentive packages (both financial and nonfinancial) and to advocate with policy-makers regarding the most favorable retention strategies for implementation. Capacity*Plus* developed the *Rapid Retention Survey Toolkit* based on assistance to the Ministry of Health to conduct a Rapid DCE among 700 health workers and students representing the physician, nurse, pharmacist, and laboratory technician cadres in Uganda. We then subsequently field-tested the toolkit in Lao PDR with the Ministry of Health, in partnership with the WHO, through a Rapid DCE survey of approximately 1,500 students and health workers representing physicians, medical assistants, and nurses/midwives.

Read more about how the DCE results supported the Lao PDR health worker retention policy[2]. In addition, the toolkit is being used to conduct Rapid DCEs among supply chain professional cadres in Namibia.

Using the ***Rapid Retention Survey Toolkit***, we expect that more countries will be able to design evidence-based retention packages and then periodically conduct the surveys again to update their packages in order to maintain retention effectiveness, as economic and country conditions and health worker preferences change over time. With its focus on self-reliance, the ***Rapid Retention Survey Toolkit*** promotes country ownership, increases self-sufficiency of country stakeholders in making and acting on health workforce decisions, and empowers stakeholders to develop evidence-based retention strategies. In addition, the toolkit provides an important resource to support the professionalization of the HR management cadre and to further aid them in fulfilling their responsibilities to plan, manage, and support human resources for health.

Furthermore, when the ***Rapid Retention Survey Toolkit*** is used in conjunction with iHRIS Retain[2], the software tool developed by Capacity***Plus*** and the WHO to cost retention interventions, the result is the development of an affordable, cost-effective retention package designed by country stakeholders to meet health worker needs within their specific context, and ultimately contribute to more health workers serving rural communities.

Aim of the toolkit

The toolkit consists of a step-by-step guide with detailed instructions for conducting a health worker retention survey using the Rapid DCE methodology. The toolkit will guide you, the user, through all phases of the Rapid DCE in a simple and straightforward manner, including:

- Determining the focus cadres
- Conducting focus groups and stakeholder discussions to select job attributes and levels
- Using software to develop the survey questionnaire; preparing for and conducting data collection
- Analyzing, interpreting, and presenting the results.

The toolkit contains sample formats and examples for each step, including focus group discussion guides, survey questionnaires, data run files, and analysis frameworks, among others, which can be easily adapted to your country or institution's specific context.

The methodology described in this toolkit makes use of a specific computer software package: Sawtooth Software. The DCE methodology does not require that this particular software be

[2] Buchan et al. 2013. www.who.int/bulletin/volumes/91/11/13-119008.pdf
[3] iHRIS Retain can be accessed at http://retain.ihris.org/retain

used. Rather, several software programs now exist that can be used to assist with the planning and implementation of a DCE survey. We have chosen to utilize the Sawtooth Software because we believe that the Sawtooth package provides a user-friendly, graphical interface for developing and administering the Rapid DCE survey instrument. Should you not want to apply the recommended Sawtooth Software, you should consult the reference material developed by the World Bank, WHO, and Capacity*Plus* (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***. However, please note that it targets individuals with high-level research backgrounds.

Intended users

The target audience for the ***Rapid Retention Survey Toolkit*** includes HR managers, program planners, and other stakeholders responsible for HRH management and/or those tasked with providing evidence for effective selection and development of HRH retention packages. The toolkit is relevant to the public sector and private, nonprofit, and faith-based organizations. In order to help policy-makers understand the challenges in and importance of addressing retention issues and the use of a DCE for designing evidence-based incentive packages, please refer to the ***Guidance Note for World Bank Task Team Leaders*** (World Bank 2013). Toolkit users like you are not required to have experience conducting studies, research or statistical analyses, although this would be helpful. We believe that if the prescriptive instructions in the toolkit are carefully followed, you should be able to implement a Rapid DCE survey.

Of course, it would be ideal if you could enlist a researcher from a local university or other organization to be part of the Rapid DCE survey team or provide additional technical support. For increased capacity building in the use of this toolkit, Capacity*Plus* has developed an online course as part of the HRH Global Resource Center's eLearning program. It is recommended that members of the Rapid DCE survey team take the course in addition to using this step-by-step tool. The course, ***Designing Evidence-Based Incentives to Attract and Retain Health Workers Using the Rapid Retention Survey Toolkit***, can be accessed at: www.hrhresourcecenter.org/elearning/course/view.php?id=14.

Another group of potential users of the ***Rapid Retention Survey Toolkit*** are researchers and students beginning work in this area. For this group, this toolkit offers practical guidance on implementation of a Rapid DCE that complements existing theoretical research articles and books on DCE.

Resource requirements

Before beginning the process, it is important to consider the resource requirements that you will need to carry out the Rapid DCE survey described in this toolkit. Although the exact inputs will depend on your country's situation and specific context, the following list can serve as a guide to gather resources, which include:

- Stakeholders with decision-making authority to determine need for development of health worker retention strategies, define Rapid DCE characteristics (cadres of interest,

possible incentives), and give approval to conduct a Rapid DCE

- A survey implementation team to carry out the Rapid DCE—the number of individuals will depend on the selected sample size and their geographic distribution, but it can average from six to 16 persons. With a higher number of study team members, the data collectors can divide into sub-teams to administer surveys at more schools and health facilities and complete the survey in a shorter timeframe or reach a larger number of survey respondents.
- Vehicles, fuel, and drivers—the number will depend on the geographical distribution of the sample size as well as the number of data collection teams
- Per diem for data collectors to cover meals and lodging during survey administration in the field
- Purchase of the recommended software license(s)—at a minimum the Sawtooth Software package is needed to develop the survey instrument and the license can be obtained at a reduced rate of USD$1,000 (in 2014) for humanitarian/nonprofit use[4]. While other statistical analyses software can be used, the individual license for the STATA/IC package described in this tool is available for approximately USD$600 (in 2014).
- Equipment rental or photocopy expenses—if access to university computer labs for computer-based survey administration is limited, it could be recommended to rent or purchase a few laptops. For conducting paper-based surveys, the costs for printing and photocopying should be considered and will depend on the sample size and number of surveys to be conducted.
- Ideally, you and your team should have access to a researcher to assist with study design and troubleshooting. S/he should have some experience with DCE or, at a minimum, experience with survey design and statistical analyses.

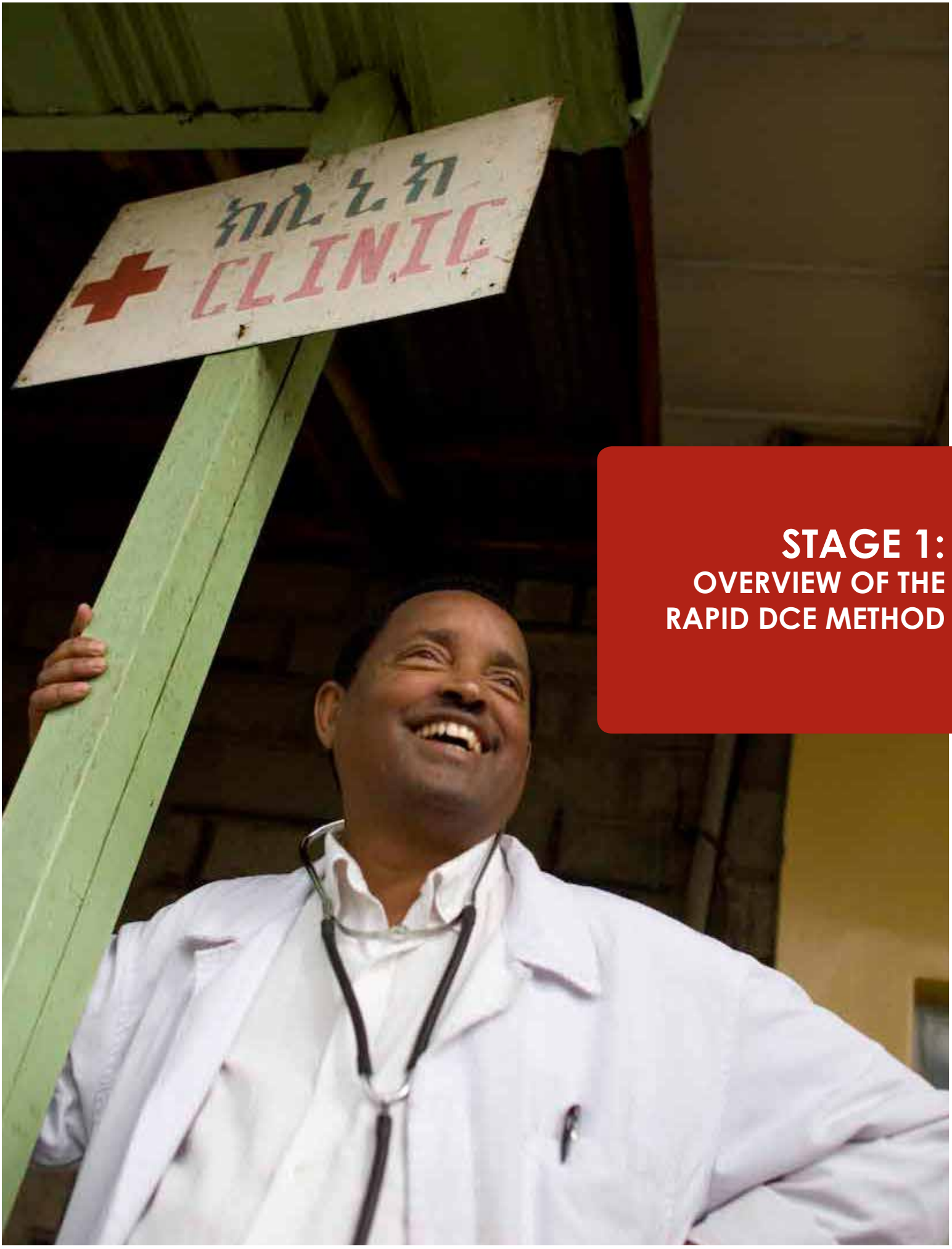
Sample timeline of stages and steps

As the name implies, the Rapid Retention Survey Toolkit is meant to be carried out quickly, as it relies on local human, financial, and logistical resources. The actual time required to complete each stage and step of the Rapid DCE will depend on the priority given to the activity, other competing tasks and activities, the number of individuals available to participate in carrying out the study, and financial and logistical considerations, among other factors. Table 1 can help you to establish an estimated timeline for applying this toolkit to conduct a Rapid DCE, from the planning and preparation phases to the presentation of results to stakeholders. In an ideal situation of concentrated effort, the Rapid DCE should take approximately three to eight weeks from start to completion. However, if the organization is not able to dedicate consecutive weeks to advance from one stage to the next, but instead needs to do one step in one week, followed by later steps a few weeks later, the overall Rapid DCE study timeframe will expand accordingly.

[4] When contacting the Sawtooth Company to purchase the software license (see Stage 3), please make reference to IntraHealth International and this Capacity***Plus*** toolkit so that the discounted rate may be applied as appropriate.

Table 1. Estimated Timeline for Rapid Retention Survey Implementation

Phase	Stages and Steps	Estimated Time Required
Planning	**Stage 1: Overview of the Rapid DCE Method** Step 1: Determine health worker cadres of interest Step 2: Decide to address attraction and/or retention	1-2 days
Survey Design	**Stage 2: Designing the Rapid DCE Survey** Step 1: Select job attributes Step 2: Determine job attribute levels Step 3: Conduct focus group discussions to determine job attributes and levels Step 4: Construct job preference pairs Step 5: Include demographic and other supplemental questions to inform retention strategies	2-5 days
Survey Tool Development	**Stage 3: Using Sawtooth Software to Develop the Rapid DCE Survey Instrument** Step 1: Include general introduction and informed consent Step 2: Add supplemental questions section Step 3: Develop the job preference pair section Step 4: Organize the survey instrument **Stage 4: Preparing Files for Survey Administration** Step 1: Prepare file for computer or paper-based survey	2-5 days
Data Collection	**Stage 5: Planning Logistics for Data Collection** Step 1: Plan logistics for target sample of students Step 2: Plan logistics for target sample of health workers **Stage 6: Collecting Data** Step 1: Set up for computer or paper-based survey administration Step 2: Pretest the survey instrument Step 3: Introduce the Rapid DCE survey and obtain consent Step 4: Administer computer or paper-based survey	7-15 days
Data Analysis and Results Presentation	**Stage 7: Preparing and Managing Data** Step 1: Prepare data from computer or paper-based survey administration **Stage 8: Analyzing the Data** Step 1: Obtain software and license Step 2: Set up the software Step 3: Import a data file Step 4: Analyze data from the supplemental questions Step 5: Analyze data from the job preference pair questions Step 6 (Recommended): Analyze DCE and supplemental data together **Stage 9: Interpreting the Rapid DCE Results** Step 1: Determine weighted ranking of preferences **Stage 10: Determining Preferred Retention Incentive Packages for Presentation to Stakeholders** Step 1: Determine the preferred incentive packages using the preference impact measure Step 2: Calculate the predicted preference impact measure Step 3: Determine potential retention strategies Step 4 (Recommended): Costing retention incentives	5-10 days



STAGE 1:
OVERVIEW OF THE RAPID DCE METHOD

STAGE 1: OVERVIEW OF THE RAPID DCE METHOD

At its core, the theory of DCE methodology is rather simple: we learn about health workers' preferences for attraction and retention strategies by asking them to consider hypothetical scenarios for future job postings. These scenarios describe various important attributes, or characteristics, of a possible job posting—for example, the quality of the health facility, support from the facility manager, housing, and salary, among others. Survey respondents consider the attributes of the hypothetical job posting and decide how attractive the posting is based on their own preferences for the various attributes. In determining the attractiveness of a scenario, respondents trade off high preferences for certain attributes with low preferences for other attributes. Some respondents may most prefer a posting in a health facility with good infrastructure and consistently reliable supplies and equipment and would therefore be willing to accept less salary for such a posting. Others may be willing to work in somewhat more constraining environments if, at the end of the given time period, they are rewarded with career advancement or the opportunity for specialized training or other continued education. Other respondents may most prefer a high salary. When determining the attractiveness of a presented scenario, respondents will consider all relevant attributes to arrive at their final decision.

In the Rapid DCE survey, respondents are presented two hypothetical job posting scenarios at a time, known as "preference pairs." Respondents are asked to consider each scenario in the preference pair, and select which scenario they would most prefer if they were hypothetically looking to accept such a posting. The specific characteristics of each scenario in the preference pair (e.g., the level of salary, whether the facility is good quality or poor quality, housing, continued education opportunity, etc.) are determined randomly by a computer to make certain that all possible combinations of incentives are included. Each respondent views up to 12 preference pairs and identifies which scenario within each pair they most prefer.

Then, it is possible to fit statistical models to the data collected from these surveys, and determine which job posting attributes or incentives respondents most preferred (the instructions for using the software to analyze the data are clearly described later in this document). The preferences for these attributes can then be used to determine which bundles of incentives or interventions would be most preferred by health workers.

You and your stakeholders should determine whether the Rapid DCE and accompanying survey meet the criteria for "research." If so, you should obtain ethical clearance for the study. On its website, the US Department of Health and Human Services defines research as "systematic investigation, including research development, testing, and evaluation, designed to develop or contribute to generalizable knowledge." If the results are meant to inform health system managers solely, ethical clearance is not generally necessary. However, if you plan to use and disseminate the Rapid DCE findings more broadly, then you must obtain ethical clearance from your national institutional review board (IRB). The latter requires informed consent and a range of other measures to protect human subjects.

Step 1: Determine Health Worker Cadres of Interest

The first step is to determine which cadres of health workers will be included in the Rapid DCE. While all cadres of health workers are important to the performance of a health system, the **Rapid DCE methodology requires that the job preferences of each cadre of interest be investigated separately**. This is because each cadre likely has unique preferences for job postings and may require unique strategies for attraction and retention. Indeed, what motivates a doctor is likely to be different from what motivates a nurse. In addition, as stated previously, there should be separate investigations of health professional students of each cadre alongside the currently practicing health workers of the same cadre. As such, each cadre that is included in a Rapid DCE requires its own set of resource inputs for data collection. You should first decide how many cadres (considering both students and currently practicing workers) can be investigated given the resources available (i.e., human, financial, and time). This tool should provide enough information to make a context-specific estimate.

When deciding which cadres to include in the Rapid DCE, you should determine how many respondents from each cadre can be reached for data collection. **For a cadre to be included in the Rapid DCE, you will need to survey at least 50 representatives, or respondents, from that cadre (counting students and currently practicing health workers separately; i.e., you will need to survey 50 students and 50 currently practicing health workers for each cadre).** Having at least 50 representatives provides the minimum statistical power to make valid conclusions based on their preferences. However, for improved statistical power, if you have the resources available, it is preferable to survey as many respondents within a given cadre group as is feasible. At a minimum you should plan to survey a few additional respondents beyond the minimum of 50 to accommodate for any nonresponders or possible missing data from any unanswered survey questions.

It is usually easier to obtain more students for a sample as they generally can be gathered in larger numbers in lecture halls, classrooms, or computer labs at their respective schools. Certain cadres may be difficult to survey because representatives of these cadres are usually fewer in number (e.g., pharmacists), because they reside in remote areas that would require additional resources to reach (i.e., in terms of logistics, time, or human and financial resources), or because of challenges in organizing the representatives to take the survey.

You will need to facilitate stakeholder discussions to determine which cadres will be the focus of the Rapid DCE. In making this decision, ask fellow stakeholders to consider the following:

- Which cadres are most needed for the adequate functioning of the local health system in rural areas? This likely requires clarifying the level of health facility—whether a health post, health center, or district or other higher-level hospital—and then assessing the type and number of personnel required at such facilities.

- Which cadres have the highest vacancy or turnover rates at these facilities? Clearly, if a given cadre is well-represented at rural health facilities, there is no need to pursue strategies to make rural postings more attractive to that cadre.

- Which cadres may be most effectively targeted with potential attraction and retention interventions? For some cadres there may simply not be enough qualified members in the entire country to staff urban and rural health facilities. In this case the problem may not be one of attraction or retention but instead be a production issue, for which a more effective solution may be strengthening preservice education. The results of an HRH labor market analysis should also be used to understand how workforce supply and demand issues in the specific country context affect health worker attraction and retention.

Step 2: Decide to Address Attraction and/or Retention

Next, you need to decide whether selected cadres will be surveyed for the purpose of developing strategies for attraction or strategies related to retention in rural postings or both. Attraction strategies relate to interventions that motivate trainees or recently graduated health workers or health workers who have been working in other environments or locations (e.g., urban areas, private sector) to take up a rural job posting. Rural retention strategies incentivize health providers already working in rural facilities to continue practicing in rural areas. This decision must be made irrespective of which particular cadres of health workers are to be included in the Rapid DCE.

The Rapid DCE methodology requires that the preferences for attraction and the preferences for retention in rural postings be investigated separately. When looking at attraction, a Rapid DCE surveys students of the selected cadres. When retention is the focus, the Rapid DCE assesses currently practicing health workers. The resources and logistics needed to assess students and/or health workers can vary greatly depending on how the Rapid DCE is carried out (e.g., survey students at their school, travel to individual health facilities to survey health workers, take advantage of gatherings/meetings of health workers, etc.) and whether both students and currently practicing health workers are included in the Rapid DCE study sample. This tool should provide enough information to make a context-specific estimate. If resources are available, you and your organization may want to investigate preferences for both attraction and retention strategies.

To answer the question of whether strategies related to attraction, retention, or both are of primary interest, stakeholders should consider the following:

- Among the selected cadres of interest, is the primary challenge to fill postings in rural areas due to:

    - Insufficient interest among recent graduates (**attraction**)?

  - Too many health workers leaving those postings after having worked in them for a short period of time (**retention**)?

  - Or is it a combination of both?

- The results of an HRH labor market analysis should also be used to understand how workforce supply and demand issues in the specific country context affect health worker attraction and retention.

For each cadre that you decide to include in the Rapid DCE, you should assess whether you would like to investigate attraction and/or retention policies. It is acceptable to investigate preferences related to both attraction and retention for certain cadres, while perhaps only investigating attraction strategies for other cadres.

STAGE 2:
DESIGNING THE RAPID DCE SURVEY

STAGE 2: DESIGNING THE RAPID DCE SURVEY

Once you have defined the general scope of the Rapid DCE survey, you will follow steps to design the characteristics of each survey questionnaire for each health worker cadre of interest.

There are many potential strategies for attracting and retaining health workers in rural areas. The WHO has compiled policy recommendations for the development of retention strategies (World Health Organization 2010). The full list of recommended interventions is provided in Table 2. Alongside other decision-makers in your organization, you must determine which of these interventions could be appropriate and effective for your organization, country context, and HRH labor market. Note that not all of the interventions listed in Table 2 are incentives or conditions of practice, and are thus not suitable for a Rapid DCE. Examples of strategies that are not suitable for inclusion in the Rapid DCE are: selecting students from rural backgrounds, more rural electives, mandatory rural placements (which preclude choice), and task shifting to different health workers, among others. Instead, the Rapid DCE should focus on characteristics of the job that can be improved to attract or retain health workers (these are highlighted in blue in Table 2).

Table 2. Interventions Used to Improve Attraction, Recruitment, and Retention of Health Workers in Remote and Rural Areas (WHO 2010)

Note: The examples highlighted in color below represent characteristics of the job that can be improved to attract or retain health workers and can be investigated with a Rapid DCE study.

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

Step 1: Select Job Attributes

Your next step in the Rapid DCE process is to define the job attributes that will be included in the survey questionnaire for each cadre. Job attributes are characteristics of a job such as salary, allowances and other benefits, and opportunities for career advancement and continuing education, among others. Survey respondents will choose among these job attributes and make trade-offs regarding what they are willing to accept or forego when taking a job.

It is recommended that **no more than six job attributes be used**. Research has shown that as the number of attributes increases, respondents' ability to clearly choose among the different choices becomes more difficult, which increases the potential for inconsistent data (Louviere et al. 2008). When there are too many attributes to choose from, respondents may fall back on simple decision-making techniques, such as always selecting the job with the highest salary (World Bank, WHO, Capacity***Plus*** 2012), rather than making a critical analysis of job preferences.

For each cadre to be included in the Rapid DCE, you should conduct a separate process to decide on the job attributes for that cadre. However, within a given cadre, the attributes can be the same whether investigating attraction or retention. For example, medical student respondents (attraction) and currently practicing doctor respondents (retention) could both be administered the same survey questionnaire if the attributes of interest are identical. Where attributes may differ—for example, graduating students may be motivated by being offered specialty training much more than practicing physicians—different questionnaires are required. If time and resources allow, it would be ideal to conduct the qualitative information gathering (i.e., focus group discussions) with both students and currently practicing members of each cadre of interest, and then to analyze the information to develop the Rapid DCE survey questionnaires.

The following steps will help you to determine which job attributes should be included in the survey questionnaires for each cadre:

1. Refer to the available literature in your context and/or country. Your Rapid DCE should include an independent literature search with particular focus on strategies that may have greater relevance to the local setting, especially studies related to health worker motivation, retention, and job satisfaction, HRH strategic plans, and HRH labor market analyses conducted in your country. The last decade has seen a dramatic expansion in scholarly work related to issues of attraction and retention of health workers in rural areas. The HRH Global Resource Center has also compiled a substantial library of resources on retention, which can be found at http://www.hrhresourcecenter.org/taxonomy_menu/1/109. In addition, the 2010 WHO document of global policy recommendations to increase retention in rural, remote and underserved areas is especially useful. The full document can be accessed at http://www.who.int/hrh/retention/guidelines/en/index.html.

2. Conduct focus group discussions (FGDs) to gain input from health workers (or students) representing the selected cadres of interest. FGDs provide a unique opportunity to probe for in-depth information on potential job attributes. Specific guidance on how to conduct FGDs for the Rapid DCE is presented in Stage 2, Step 3.

3. Consult with key stakeholders to assess which incentives or interventions are most likely to have political support and be feasible based on current health system capacity, resources, and policy. Key stakeholders often include, but are not limited to: the Ministry of Health, Ministry of Public Service, Ministry of Finance, professional organizations that represent the cadres of interest, universities and schools for the health professions, and faith-based and nonprofit organizations. If an incentive is deemed completely infeasible because of cost or regulatory barriers, it should not be included as a job attribute in the Rapid DCE survey.

Box 1 provides a fairly comprehensive list of some of the most common job attributes that you may consider and adapt to your specific country context for inclusion in the Rapid DCE survey.

BOX 1

Job attributes representing common components of strategies to attract and retain health workers in rural areas include, but are not limited to:

- Salary
- Allowances, e.g., for travel, children's education
- Bonuses
- Housing accommodation, e.g., house provided, housing allowance
- Physical work environment, e.g., workplace safety, health facility infrastructure
- Reliability of equipment, supplies, and drugs
- Management support
- Workload, staffing at facility, and job responsibilities
- Scope of practice, i.e., ability to practice specific skills
- Continued education, e.g., tuition support, study leave
- In-service training opportunities
- Opportunities to generate extra income, such as dual practice (working in both the public and private sectors)
- Length of commitment to work at the health facility
- Possibilities for promotion

Step 2: Determine Job Attribute Levels

Once you have selected the job attributes for each cadre, your next step is to decide on the most appropriate levels for these attributes. By level, we mean specific values that describe the job attribute. For many job attributes, deciding on the appropriate levels will be easy because the attribute is essentially "yes" or "no." For example, the level of an attribute that describes the "quality of the health facility" may be "basic" (e.g., unreliable electricity and equipment; drugs and supplies not always available) or "advanced" (e.g., reliable electricity and equipment; drugs and supplies always available).

However, for other attributes there may be more than two levels. A salary attribute is a good example. We can learn more about health workers' salary preferences if we present a range of salary levels in different scenarios to several respondents. Focus group discussions with representatives from the selected cadres of interest can be useful to determine the appropriate attribute levels to use. Discussions with stakeholders will also help ensure that the levels used in the Rapid DCE are potentially politically and financially feasible or acceptable (especially in regard to levels of salary, allowances, or bonuses).

The following should be used to guide selection of the levels for each job attribute:

1. The minimum number of levels for an attribute is two. The most basic example is one where a characteristic is provided or not. For example, if the attribute is tuition assistance for continued education, the levels can be "no tuition support" (level 1) and "full tuition support provided" (level 2). A housing attribute can be categorized as "no housing provided" (level 1) and "basic house provided" (level 2). Some job attributes can have more than two levels, such as "no housing provided" (level 1), "housing allowance provided" (level 2), and "basic housing provided" (level 3).

2. We recommend that you always list the job attribute levels in a logical, incremental order, as this will make it easier to keep things straight while designing the survey instrument using the software program and during data management and analysis (described in later steps). For the above housing example, as shown in Table 3, we have level 1 represent the minimal option proposed, whereas level 3 represents the maximum option. Another example: a transport attribute can be listed with three levels: "no transport provided" (level 1), "transport for official use" (level 2), and "transport provided for official and personal use" (level 3). If you are not sure how to order the attribute levels, then make your best judgment about the ordering. Ultimately, the "ordering" of the attribute levels in the surveys is randomly chosen by the software, and your assigning of level numbers does not influence the experience of the respondents or the choices they make when answering the survey.

3. Do not specify more than five levels of a particular attribute because this makes the survey too complicated and makes a respondent's decision-making process prone to error and thus unreliable. You should use focus group discussions with cadres and discussions with stakeholders to decide the levels. For example, the salary attribute could have the following five levels: $100, $200, $300, $400, $500 (expressed as a monthly, yearly [or other period] salary as per common usage in country). This allows us to learn more than we would have if we only asked about $100 and $500, without making the survey design too complicated. The cadre's current salary should be one of the levels listed. The other levels should represent an incremental increase over the current salary level. Again, please be sure that these levels are listed in incremental order. This is especially important in the case of the salary variable as salary is a cardinal variable. A cardinal variable is one in which the values of the levels are ordered and the increments between levels are meaningful. For example, salary levels 1 through 5 would be from the minimum salary option proposed ($100 = level 1) to the maximum salary option (highest level, $500 = level 5, depending on how many salary levels you include [but no more than five]).

Table 3 illustrates examples of Rapid DCE job attributes and their levels.

Table 3. Sample Rapid DCE Survey Job Attributes and Levels

Job Attribute	Attribute Levels (Ugandan medical officers example*)	Attribute Levels (Tanzanian clinical officers example*)	Attribute Levels (Namibian pharmacists example**)
Facility quality	Level 1: Basic (e.g., unreliable electricity and equipment; drugs and supplies not always available) Level 2: Advanced (e.g., reliable electricity and equipment; drugs and supplies always available)	Level 1: Availability of equipment and drugs is insufficient Level 2: Availability of equipment and drugs is sufficient	Not applicable
Housing	Level 1: None Level 2: Housing allowance is provided Level 3: House is provided	Level 1: No house is provided Level 2: Decent house is provided	Level 1: No housing allowance Level 2: Housing allowance provided Level 3: Well-maintained government housing provided
Length of commitment	Level 1: Two years Level 2: Five years	Not applicable	Not applicable
Study assistance	Level 1: No support (no financial assistance for further study after your commitment is over) Level 2: Full support (government will pay your full tuition for further study [e.g., specialty training] after your commitment is over)	Level 1: No education is offered Level 2: Education is offered after six years of service Level 3: Education is offered after four years of service Level 4: Education is offered after two years of service	Not applicable
Salary	Level 1: 700,000 USH/month Level 2: 1,000,000 USH/month Level 3: 1,500,000 USH/month Level 4: 2,000,000 USH/month	Level 1: 200,000 TZS/month Level 2: 350,000 TZS/month Level 3: 500,000 TZS/month Level 4: 650,000 TZS/month	Level 1: No additional salary Level 2: 10% additional salary Level 3: 20% additional salary Level 4: 30% additional salary
Management support	Level 1: Not supportive Level 2: Supportive	Not applicable	Not applicable
Facility staffing	Not applicable	Level 1: 50% understaffed Level 2: 25% understaffed Level 3: Fully staffed	Not applicable
Infrastructure	Not applicable	Level 1: The facility has unreliable mobile coverage and no electricity or water Level 2: The facility has mobile coverage, electricity, and water	Not applicable
Living conditions	Not applicable	Not applicable	Level 1: Availability and access to basic amenities (running water, electricity) Level 2: Always good availability and access to amenities (running water, electricity, supermarkets, Internet)

Job Attribute	Attribute Levels (Ugandan medical officers example*)	Attribute Levels (Tanzanian clinical officers example*)	Attribute Levels (Namibian pharmacists example**)
Children's education	Not applicable	Not applicable	Level 1: No good schools close by Level 2: Good schools close by
Career advancement	Not applicable	Not applicable	Level 1: Eligible for promotion after two years Level 2: Eligible for promotion after one year
Scope of practice with available resources	Not applicable	Not applicable	Level 1: Narrow scope of practice with limited opportunity to apply skills due to lack of resources (human, supplies, equipment, infrastructure) Level 2: Wide scope of practice and opportunity to apply skills due to availability of resources (human, supplies, equipment, infrastructure)

* World Bank, World Health Organization, and Capacity***Plus*** 2012
** Titus, Vieira, Rockers, and Deussom 2013

Step 3: Conduct Focus Group Discussions to Determine Job Attributes and Levels

In the Rapid DCE, focus group discussions (FGDs) are used to gather information from the cadres of interest to determine which job attributes and corresponding levels to include in the survey. An FGD is a qualitative method to obtain in-depth information from a target group regarding their knowledge and/or perceptions about a topic area. A facilitator guides a discussion among the participants using a semi-structured questionnaire.

You should conduct individual focus group sessions with each of the cadres that will be surveyed with the Rapid DCE. For example, if your Rapid DCE will assess doctors, nurses, and pharmacists, you should hold separate FGDs with each of these cadres. The cadres cannot be mixed in an FGD since their perspectives and preferences may vary greatly. At a minimum, you should conduct two to three FGDs with each cadre of interest.

If the Rapid Retention Survey will look at attraction and retention, then ideally you should conduct two to three focus groups per cadre type: two to three for each student cadre and two to three for each currently practicing health worker cadre.

If time and resources allow, conducting some additional discussion sessions with each group will help you confirm the general trends and common themes in the responses. This will help you to select the most relevant attributes and levels to include in the survey for each cadre.

Planning for focus group discussion sessions

To plan effective focus groups, first identify institutions where the discussions will take place (e.g.,

health worker training schools, rural health facilities). Next, you should identify focal persons at each of those sites. It is critical to have a meeting with the institution's focal person to plan for the FGD sessions and obtain information on logistics and/or protocols to be followed. The focal person should assist the study investigators with introduction of all the relevant authorities at the institution and, in the case of training schools, student leaders. The approval letter from the organization (e.g., Ministry of Health) and a brief concept note about the study are useful during this initial engagement.

When coordinating the schedule of the FGD sessions with students and/or practicing health workers at selected institutions or facilities, be sure to consider facility or class schedules, holiday leave, and examination periods. The focal person should be able to advise on student or health worker availability and can assist in securing venues and contacting potential participants.

Be sure to provide the following basic information about the FGDs to the focal person:

- Cadres of interest and the types of participants that you seek (i.e., students, currently practicing health workers, or both)
- Period of time that you would like to conduct focus groups. Remember to consider facility or class schedules, holiday leave, and examination periods.
- Length of a focus group discussion (each session may take approximately 45 minutes to 1.5 hours)
- Size of each focus group discussion (approximately 8-10 participants per session; a smaller group is fine if you cannot get 8-10 individuals)
- Total number of focus groups that you would like to conduct at the institution (at a minimum 3-5 per student cadre for attraction, and 3-5 per practicing health worker cadre for retention)
- Kinds of questions that will be asked during the session (focus group discussion guide)
- Informed consent, including mention of confidentiality, and any compensation that participants may receive.

Developing the focus group discussion guide

The goal of the focus group discussion is to provide insights on which strategies for health worker attraction and retention may be effective. Each focus group session should be considered an opportunity to gather information related to the participants' perspectives about what is important to them in choosing where they want to work. This information regarding job attributes and levels will then be used to inform development of the Rapid DCE survey questionnaire. Appendix 1 includes a sample focus group discussion guide. You can download a modifiable version at www.capacityplus.org/rapid-retention-survey-toolkit. The literature review and discussions with key stakeholders, as described in earlier sections, will help you adapt the sample discussion guide to your country's specific context.

Research ethics and preparing the informed consent form

Research ethics are an important component of any research endeavor. If the Rapid DCE is determined to be a research study, ethical review and clearance must be sought from your national IRB (see discussion in Stage 1) before initiating the focus group discussions (and before administering the Rapid DCE survey, described in subsequent sections).

In addition, before conducting any focus group sessions, you must obtain each participant's consent to be a part of the study and take part in the focus group discussion. In order to consent, the participants must be informed about the purpose of the study, what their role will be, how the data will be used, issues of confidentiality, and any benefits or risks involved. This is called obtaining "informed consent." To do this you should develop an informed consent form and have each participant read it and sign the form, confirming they agree to participate. A sample informed consent form is provided in Appendix 2. You can download a modifiable version at www.capacityplus.org/rapid-retention-survey-toolkit.

Conducting focus group discussions

If you and/or an institution's focal person are not familiar with focus groups, additional resources should be consulted before conducting the session. Please refer to the following links for some additional references and more detailed information related to FGDs:

- http://pdf.usaid.gov/pdf_docs/PNABY233.pdf
- www.eiu.edu/~ihec/Krueger-FocusGroupInterviews.pdf
- http://pdf.usaid.gov/pdf_docs/PNAAL088.pdf
- www.rowan.edu/colleges/chss/facultystaff/focusgrouptoolkit.pdf

If you are an HR manager, supervisor, or otherwise influential person, you should consider carefully how your presence at a focus group could affect a discussion. Discussion participants should feel at ease and be able to speak freely without concern that their responses will be taken out of context or used against them to their disadvantage.

It is ideal for each discussion to have a note taker so that the facilitator can focus on managing the discussion and not simultaneously taking notes. There is no required number of participants in a focus group, although a group of eight to ten individuals is recommended. It is essential that the facilitator be able to manage the flow of conversation among the participants.

As facilitator and note taker, begin by introducing yourselves and the purpose of the study, and then welcome everyone. Pass out the informed consent form and ask all participants to read it and, if they agree to participate, to sign the form. Collect all signed copies, and then facilitate the discussion among participants following the questions in the guide. Ask follow-up questions, as appropriate, to obtain more information, get examples, or clarify any relevant points. Depending on the dynamics of the session, try to engage the quiet participants and respectfully limit those who are more vocal. This will ensure more even participation and help you get the perspectives of all the participants. Immediately after the FGD, review the notes and add any additional observations or information. If the notes are handwritten, make sure they are transcribed as soon as possible into a legible document and shared with the rest of the team. It is critical to have the notes in a legible format, especially if the transcriber/note taker is not the one who will be analyzing them.

After the focus groups are conducted, you will have a wealth of data to better inform you about which job attributes and attribute levels should be included in the Rapid DCE survey questionnaires for each cadre. The sample focus group discussion guide provided on the last page of Appendix 1 includes a job factor ranking form, which can be used for focus group participants to select the top four job factors that they think are the most important. You may choose to calculate which job factors are the highest ranking and consider this quantitative information alongside your qualitative analysis of the discussions.

NOTE: We recommended asking respondents about their top four job factors—even though there will likely be more than four job attributes in your Rapid DCE survey—so that they will be required to focus on what they consider to be the most important. If you were to ask them selecting many more additional priority job factors, then there is the possibility that respondents may be overwhelmed with choice and begin selecting attributes at random. For a focus group of at least six people, you will also have adequate quantitative information from ranking the top four choices to consider when finalizing which job attributes will be included in the Rapid DCE survey.

Step 4: Construct Job Preference Pairs

Ultimately, the selected job attributes and their corresponding levels for each cadre of interest will be combined to construct the hypothetical job posting scenarios from which the survey respondents will select. Figure 2 depicts an example job preference pair question from the Namibia pharmacist Rapid DCE survey (see Appendix 4).

FIGURE 2: EXAMPLE JOB PREFERENCE PAIR QUESTION

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	Housing allowance	Well-maintained government housing provided
Living Conditions	Always good availability and access to amenities (running water, electricity, supermarkets, internet)	Availability and access to basic amenities (running water, electricity)
Monthly Salary	30% additional salary	10% additional salary
Children's Education	No good schools close by	Good schools close by
Career Advancement	Eligible for promotion after 1 year	Eligible for promotion after 2 years
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)	Wide scope of practice and opportunity to apply skills due to availability of resources (human, supplies, equipment, infrastructure)
	○	○

Each preference pair that you will construct will be comprised of two scenarios, differentiated by their locations in the header, which should represent a rural job post and an urban job post. You should adapt this header according to how rural and urban posts may best be distinguished in your context. In Figure 2, the specific facility types used in the header are district hospital and national tertiary hospital.

You should construct preference pairs that have no more than six job attributes. The job attributes that you define will be presented in the survey in bold in the left column. In the example in Figure 2, they are: housing, living conditions, monthly salary, children's education, career advancement, and scope of practice with available resources. In each of the shaded columns—one column with the rural job posting, and the other column with the urban job posting—a particular level for each of the attributes will be described. These levels differ between the two columns. In the example in Figure 2, the career advancement attribute level for the district hospital (rural) job posting is "eligible for promotion after 1 year," while for the national tertiary hospital (urban) job posting, this attribute level is "eligible for promotion after 2 years." The details for constructing job preference pairs in the Rapid DCE survey in Sawtooth software SSI Web will be described in Stage 3.

The survey respondents are asked to read and understand the different values for these levels between the two scenarios of job postings (i.e., rural and urban) and then decide which scenario they prefer based on that information. It is in this way that we learn about their preferences for various attraction and retention incentives and interventions.

The Rapid DCE survey consists of each respondent providing an answer to 12 job preference pair questions. The attributes for each question will always remain the same (i.e., the left column will be identical for all job preference pairs). However, each question will contain a different combination of the attribute levels for each posting mixed and matched in such a way as to provide a maximum amount of information. Additional examples of job preference pair scenarios can be found in Appendix 4. You can download this appendix at www.capacityplus.org/rapid-retention-survey-toolkit.

Step 5: Include Demographic and Other Supplemental Questions to Inform Retention Strategies

The job preference pair questions component of the Rapid DCE survey will provide information about the importance of job characteristics. To gather additional information to determine the health worker features, such as age, gender, and rural origin, which may influence uptake of rural jobs, and as such suggest other strategies for addressing retention or other HRH challenges in rural areas, you can include a general questionnaire preceding the job preference pairs section of the survey. In general, the types of information gathered may include:

1. Demographics: These include questions related to age, gender, socioeconomic status, marital status, ethnicity, and religion. They may also include questions related to childhood setting, whether urban or rural, as well as parents' education and socioeconomic status. These data may provide insights as to how health workers' preferences have been shaped by their social environment. For example, health workers who spent their childhood in a rural area may be more likely to return to a rural area for work.

2. Educational experience: These include questions related to levels of formal training and school environment, whether urban or rural. These data may provide insights as to how health workers' preferences have been shaped by their educational environment. For example, health workers whose preservice training included short-term field work in a rural area may be more likely to return to a rural area for full-time posting.

3. Professional experience: These include questions related to length of time as a practicing health worker, satisfaction with past work-related experiences, and aspirations for future professional development. These data may provide insights as to how health workers' preferences have been shaped by their work environment. For example, health workers who are more satisfied with their posting may be more likely to stay in that posting regardless of future retention strategies.

However, to make certain that the survey does not take too much time for respondents to complete, the number of non-job preference pair questions (i.e., demographic and educational and professional experience questions) should not exceed 25. This should ensure that the full survey takes no longer than 30 minutes. Example sets of questions related to demographics, education, and professional experience for students and health workers are presented in Appendix 3 and Appendix 4, respectively. You can download modifiable versions of these appendices at www.capacityplus.org/rapid-retention-survey-toolkit.

STAGE 3:
USING SAWTOOTH SOFTWARE TO DEVELOP THE RAPID DCE SURVEY INSTRUMENT

STAGE 3: USING SAWTOOTH SOFTWARE TO DEVELOP THE RAPID DCE SURVEY INSTRUMENT

Obtain software

Once the list of attributes, attribute levels, and any supplemental demographic and background questions are finalized, the next step is to develop the survey instrument to be administered. The first step in this process is to determine whether the instrument will be administered to participants on a computer or using paper. Computer-based administration has a number of advantages over paper-based administration: the data are automatically coded by the software; data are compiled in electronic form and do not need to be entered manually; and it does not require a high volume of photocopying and paper-file storing.

However, computer-based administration is not always feasible due to the lack of available resources (e.g., multiple computers either in a computer lab or through laptop rentals) and/or the logistics of administration. In some cases, your respondents may be more at ease filling out a paper questionnaire. For these reasons, conducting a paper-based survey is also a viable option. This stage explains the steps necessary to develop the survey instrument regardless of administration mode, and many of the steps involved in paper-based administration will be the same as those for computer-based administration. Where there are differences, they will be highlighted by either a green computer icon, or a yellow paper icon, as shown here.

Computer-based survey administration

Paper-based survey administration

A computer software package is used to develop the survey instrument. The *Rapid Retention Survey Toolkit* presents and uses the software package known as SSI Web (the conjoint-based [CBC] module), developed by the Sawtooth Software Company. Learn more about the software at www.sawtoothsoftware.com/products/conjoint-choice-analysis/cbc. This software can be used to develop and administer the survey if respondents will be taking the survey on computers. If you will administer paper surveys to respondents, you will at a minimum need to use the Sawtooth Software to develop the survey questionnaires (i.e., job preference pair questions in randomized combinations), and you can then print paper versions to photocopy and administer to respondents. Please note that the software will only work on a Windows operating system.

Always check at www.sawtooth.com to download the most recent version of the SSI Web software.

Note: This toolkit aims to be explicit with prescriptive recommendations for conducting a Rapid DCE with the Sawtooth Software. There are alternative software packages and alternative means for developing and administering a DCE. A user with a research background who is interested

in learning of these should consult the more general and technical DCE user guide (World Bank, WHO, Capacity*Plus* 2012).

If you are administering the survey on a computer, you should develop all sections of the Rapid DCE survey with the Sawtooth Software program. You will also need to download two free Sawtooth software programs that accompany SSI Web: the CAPI module and the SMRT.[5]

NOTE FOR INTERNET-HOSTED COMPUTER-BASED SURVEYS

If you are interested in administering computer-based surveys on the Internet, the Sawtooth Software's web hosting service may be an option to consider. While instructions for administering computer-based surveys on the Internet are beyond the scope of this toolkit, this five-minute video introduces you to the Sawtooth Software Hosting Service and explains how to upload a survey from SSI Web: www.sawtoothsoftware.com/support/videos/survey-hosting-service. For more information, you may contact Sawtooth: www.sawtoothsoftware.com/about-us/contact-us.

If you will be administering a paper-based survey, you may opt to develop the introductory, informed consent, and supplemental questions sections (Stage 3, Steps 1 and 2) using Microsoft Word or another word processing program. However, to develop the job preference pair questions section of the Rapid DCE (Stage 3, Step 3), you must use the Sawtooth Software program. Use of such a software package is necessary because of the need to present the random combinations of the various job attributes and levels across the multiple job choice questions a respondent will answer. The SSI Web software can be downloaded at the following web address: www.sawtoothsoftware.com/download/info/ssiweb.php.

While the software can be downloaded for free, it will not work without a license. To use the software, your organization will need to purchase a license for the CBC module. The software company has agreed to offer a discounted rate of USD$1,000 (in 2014) for "humanitarian use" to organizations working in the nonprofit sector in developing countries. If this describes your organization, please be sure to inform Sawtooth of this by contacting them at support@sawtoothsoftware.com, and be sure to make reference to IntraHealth International and this Capacity*Plus* toolkit so that the discounted rate may be applied as appropriate.

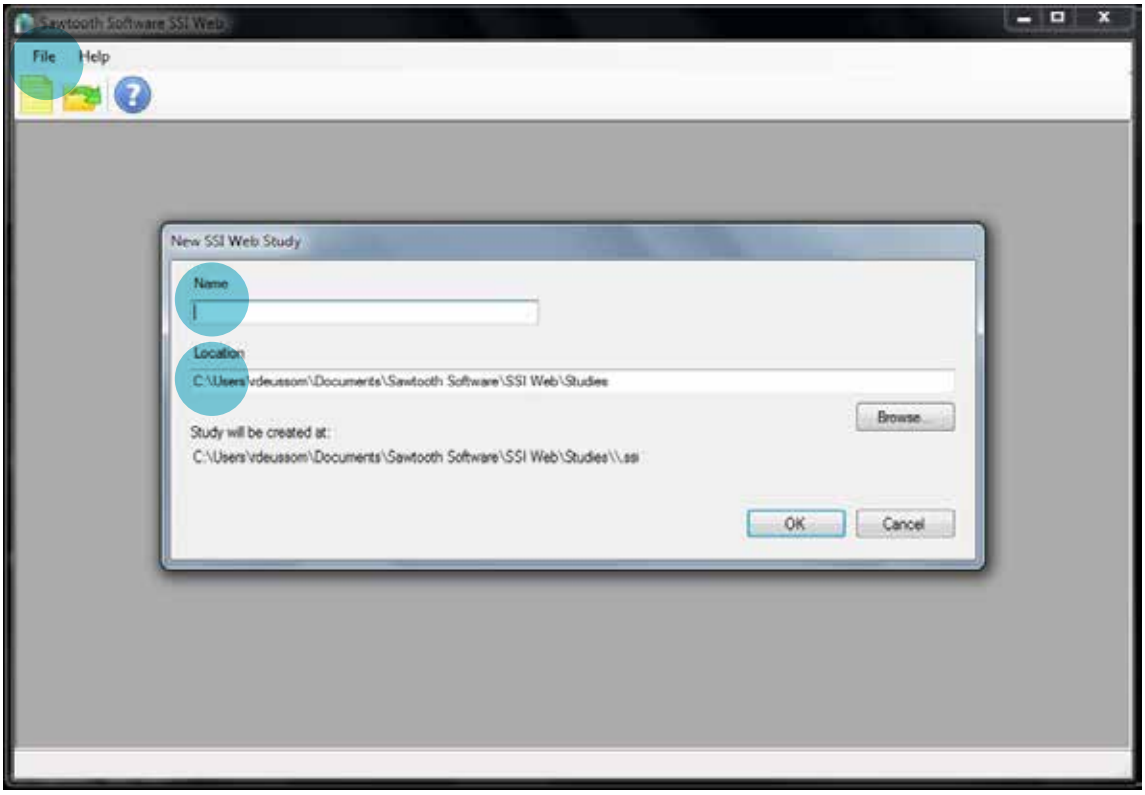
For further assistance through the use of video clips to demonstrate how to design the survey instrument using the software program, please refer to the online course Capacity*Plus* has developed as part of the HRH Global Resource Center's eLearning program. The ***Rapid Retention Survey Toolkit*** course can be accessed at www.hrhresourcecenter.org/elearning/course/view.php?id=14.

[5] Capacity*Plus*'s agreement with Sawtooth also allows for free web hosting for online survey administration.

Begin instrument development

To develop a new Rapid DCE survey questionnaire, using the Sawtooth Software, open the SSI Web software, and click File > New Study. File is located on the upper left side of the program (see top left circle in the figure below).

You will see this:



- Remember, as described earlier, if the Rapid DCE survey will include different job attributes and/or levels for different cadres, you will need to create a separate survey instrument for each selected cadre. For example, if your survey will include doctors, nurses, and pharmacists, and the job attributes you identified in Stage 2 are different for each—perhaps, if quality of the facility was identified as important by doctors and pharmacists but not by nurses who instead stressed the need for transport—then their survey questionnaires will be different, and you will need to go through the following steps three separate times (once for each cadre).

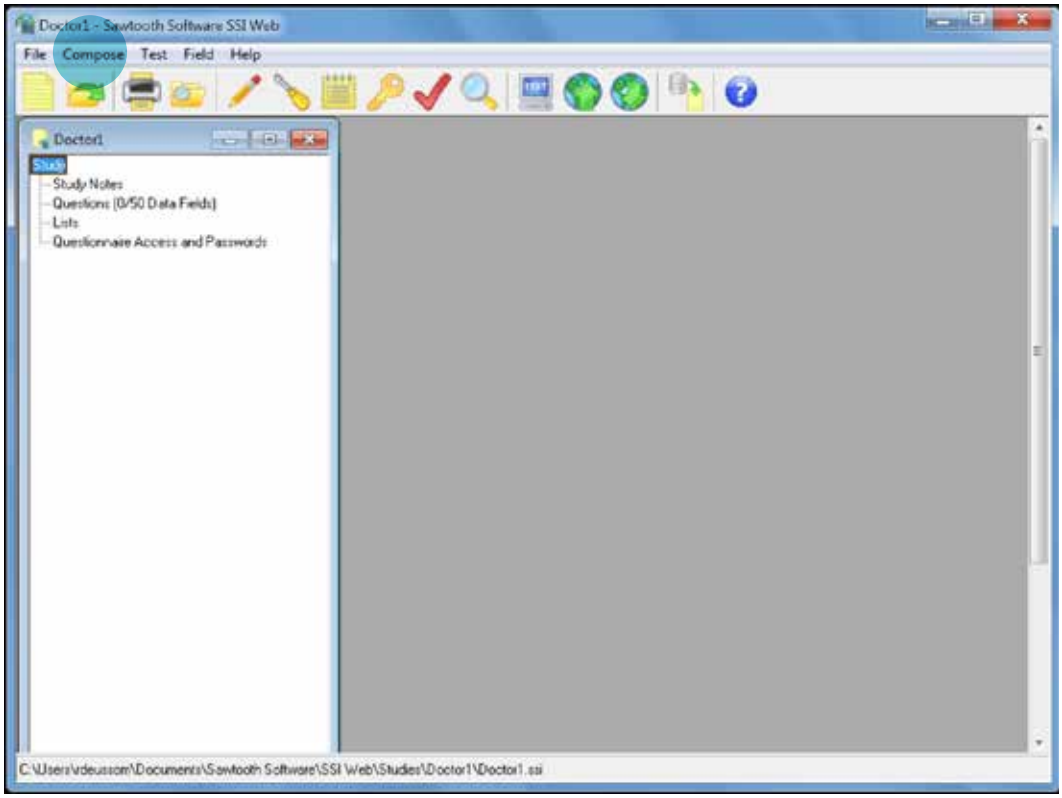
- Complete the questionnaire process for one cadre. Then return back to this first step of naming a study and do it over again for the next selected cadre(s) until you have a survey instrument made for each cadre.

- In the Name cell (see first middle circle in the figure above), give the study file a name. For example, you can name it after the cadre (e.g., `Doctor, Nurse`).

- For Location (see second middle circle in the previous figure): Save the file to a location on the computer that will be easy to access, such as your desktop or documents folder. You will note that the software recommends a location as well. Be sure to make note of the location so that you can easily find it again on your computer.

- Click OK.

You will see this:

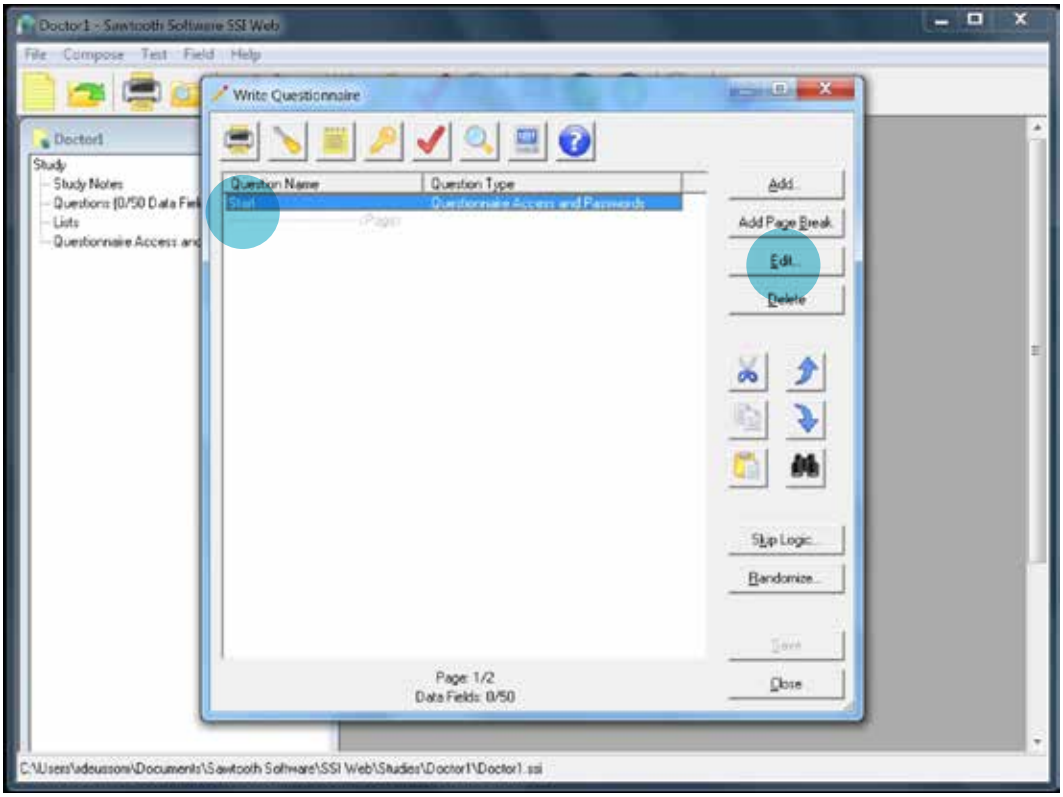


Step 1: Include General Introduction and Informed Consent

As with any survey, the Rapid DCE should begin with a general introduction to describe to the respondents the purpose of the survey. In addition, an informed consent section should detail their role in the survey, how the data will be used, and confidentiality issues. If you will administer a paper-based version of the Rapid DCE survey, you may instead choose to develop the introduction and informed consent sections using Microsoft Word or another word processing program. Appendices 3 and 4 provide a sample text. If so, then you can attach the general introduction section to the job preference pair questions section of the survey, which you must use the Sawtooth Software to develop (see Stage 4, Step 1 [alternate] on how to print the surveys for paper-based administration).

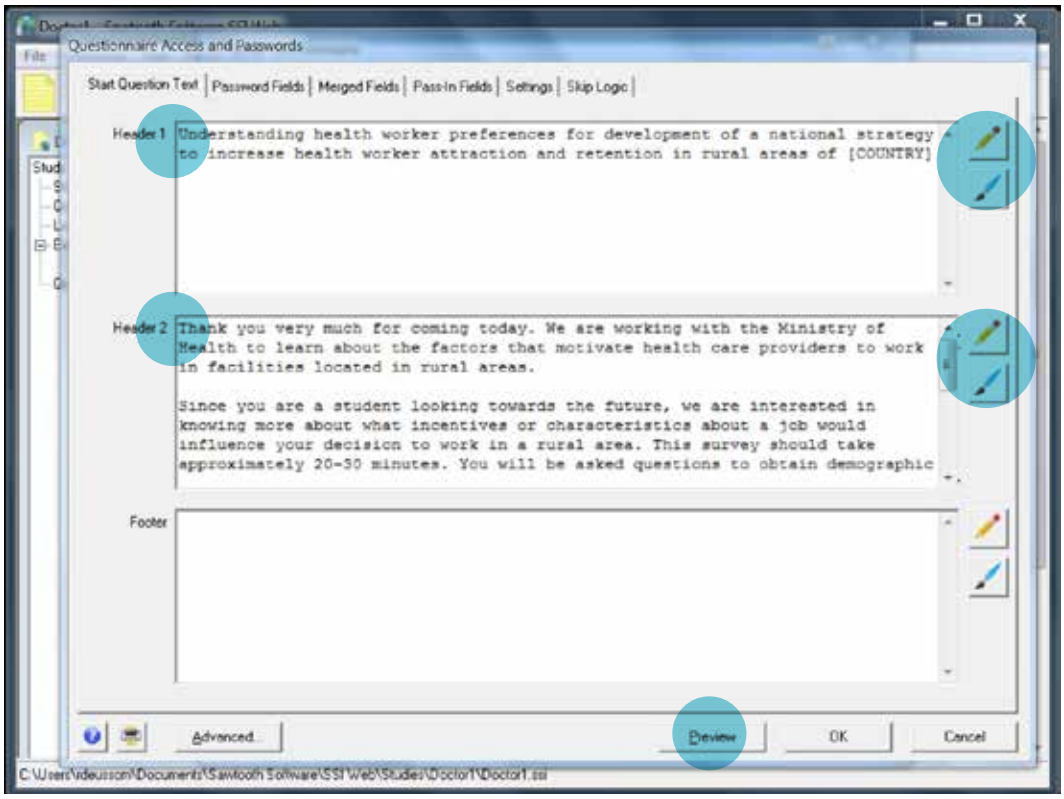
Adding the general introduction page to the survey

- To create the survey introduction using the Sawtooth Software, click on Compose on the upper left side of the program window (see circle in the figure above) and select Write Questionnaire from the drop-down menu. This will open the following Write Questionnaire window:



- Under the column titled Question Name, click to highlight the row that says Start (see the top left circle in the figure above).
- Click Edit on the right side of the window (see the circle on the right in the figure above).

You will see something like this:



The information you will include here will be the first thing that respondents see when they begin the survey. This page should introduce the respondents to the study with an overview of the purpose and a general description of the study. Appendices 3 and 4 provide sample text you can adapt for your study. Note that it may not be recommended that you refer to the survey as a discrete choice experiment, as this term may not be very well understood by a majority of your respondents.

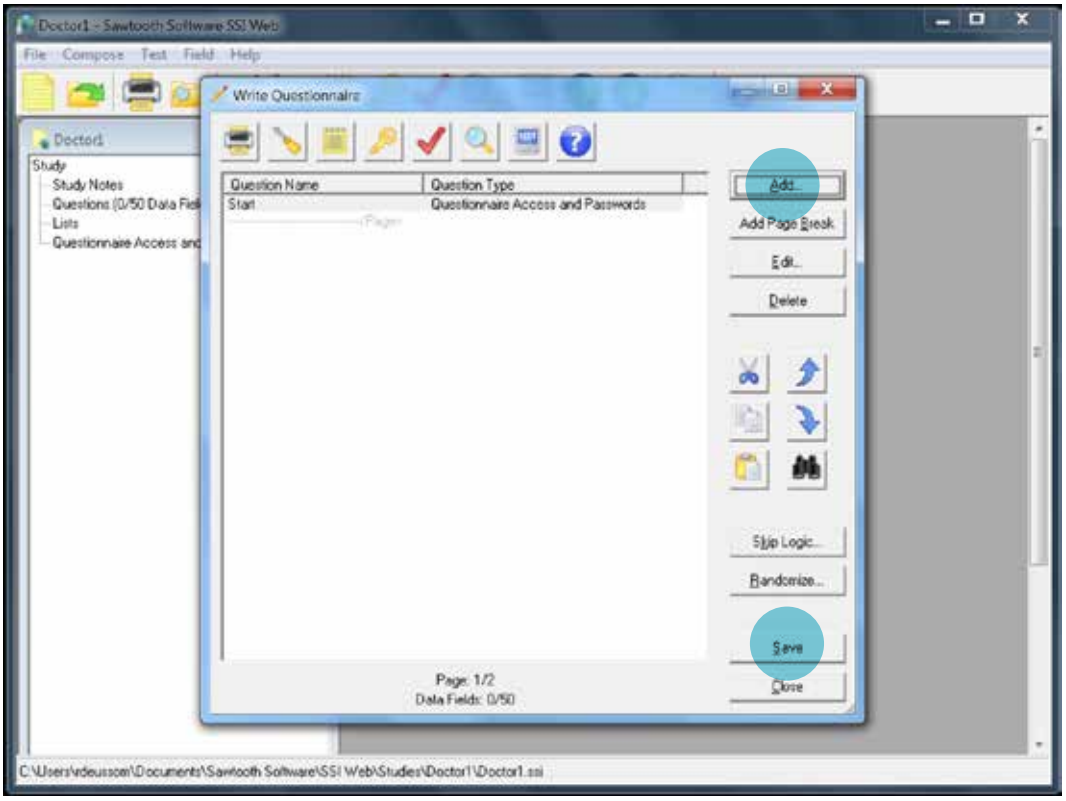
- Type the title of the study into the area next to Header 1 (see top circle on the left in the figure above). (***Optional:*** If you would like to include your institution's name and logo on this page, you can upload them by clicking on the pencil icon to open the Text Editor, then clicking on the camera icon to insert an image.)

- Then, type the introduction you would like to include into the area next to Header 2 (see second circle on the left in the figure above).

- You can preview how the introduction page will look by clicking on the Preview button on the bottom right (see bottom circle in the figure above) and return to the Header window to make adjustments. You can also change the layout and font of the information by clicking the pencil and paintbrush icons (see circles on right side in the figure above) next to each Header text box area.

- When you are done inserting the text into Header 1 and Header 2, click OK.

This will take you back to the Write Questionnaire window as shown below:



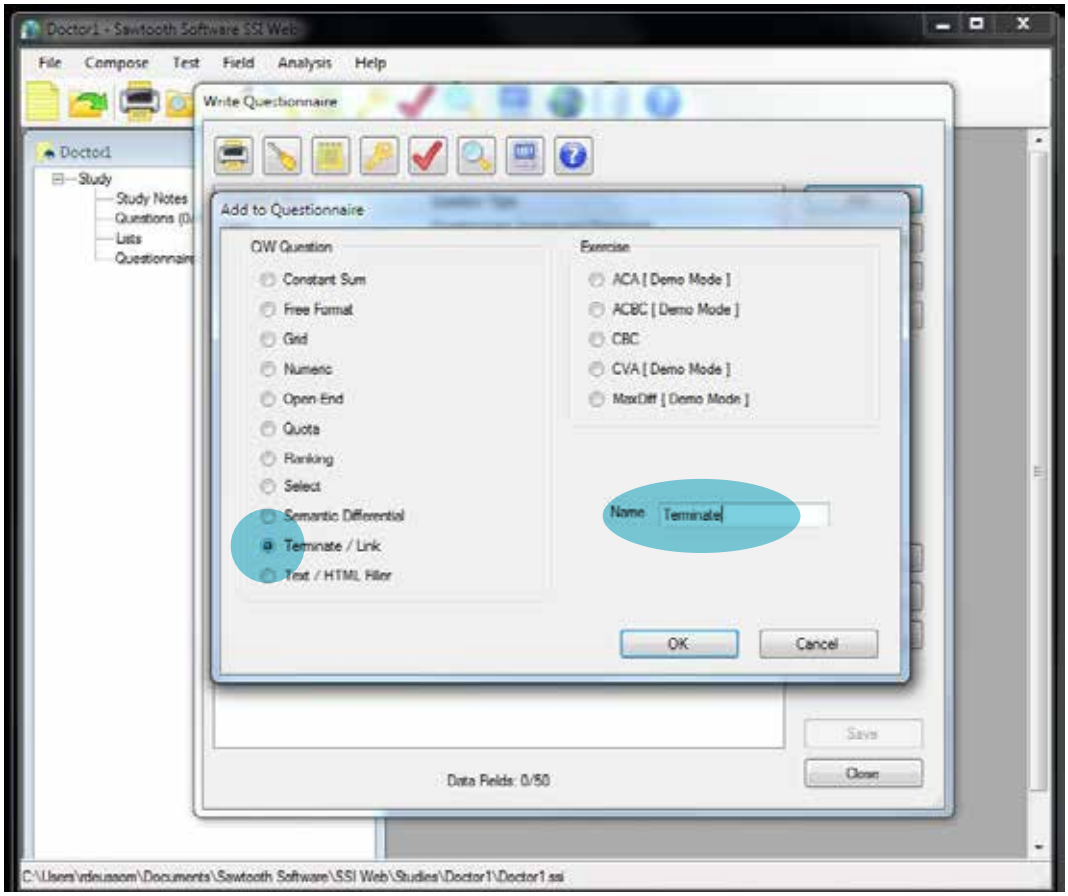
- Click on Save (see lower circle in the figure above) on the bottom right of the Write Questionnaire window to save your recent work. It is recommended that you save often throughout development of the survey using the software program.

Mark end of the survey

In order to add the informed consent section you must first include a terminate question, which will take the respondents to the end of the survey should they decide not to provide their consent to participate. The terminate question will also mark the end of the questionnaire, after all the questions are answered, to tell respondents that they have completed the survey. To do this:

- In the Write Questionnaire window click Add (see upper circle in the figure above) to add the terminate question to the survey questionnaire.

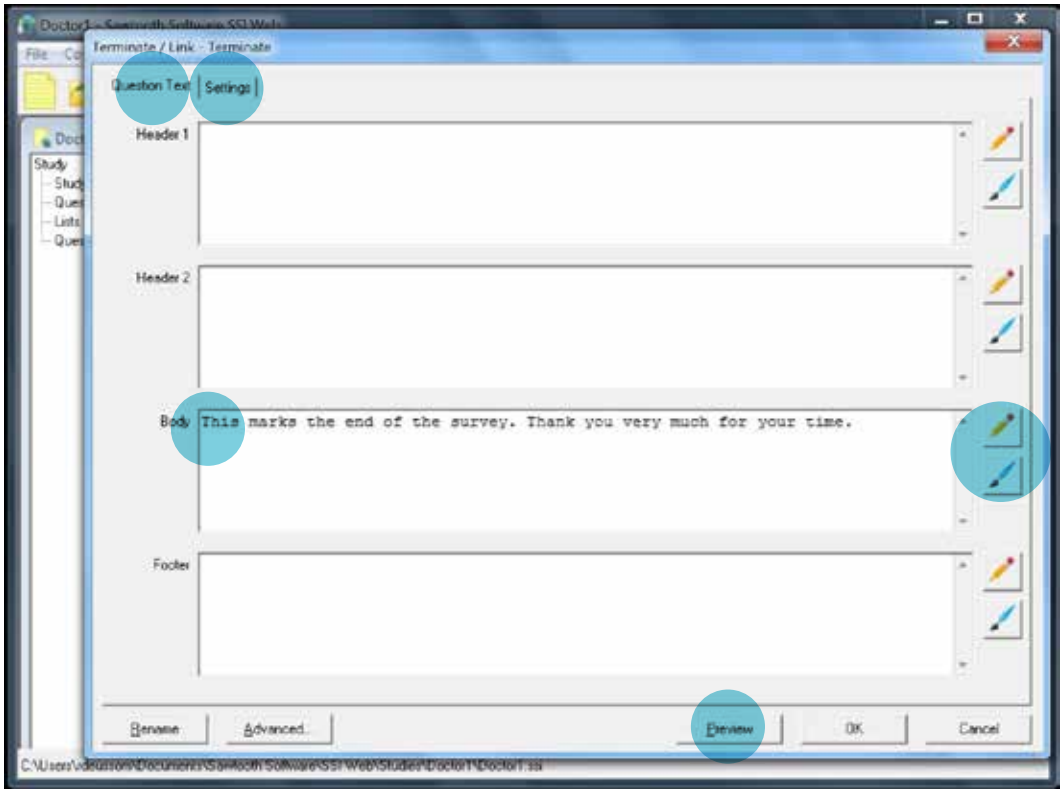
You will see this:



- Under the CiW Question column, select the Terminate/Link button (see left circle in the figure above).
- To the right of the Name box, type `Terminate` to label the question that you are adding (see right circle in the figure above).
- Click OK.

A window titled Terminate/Link will open.

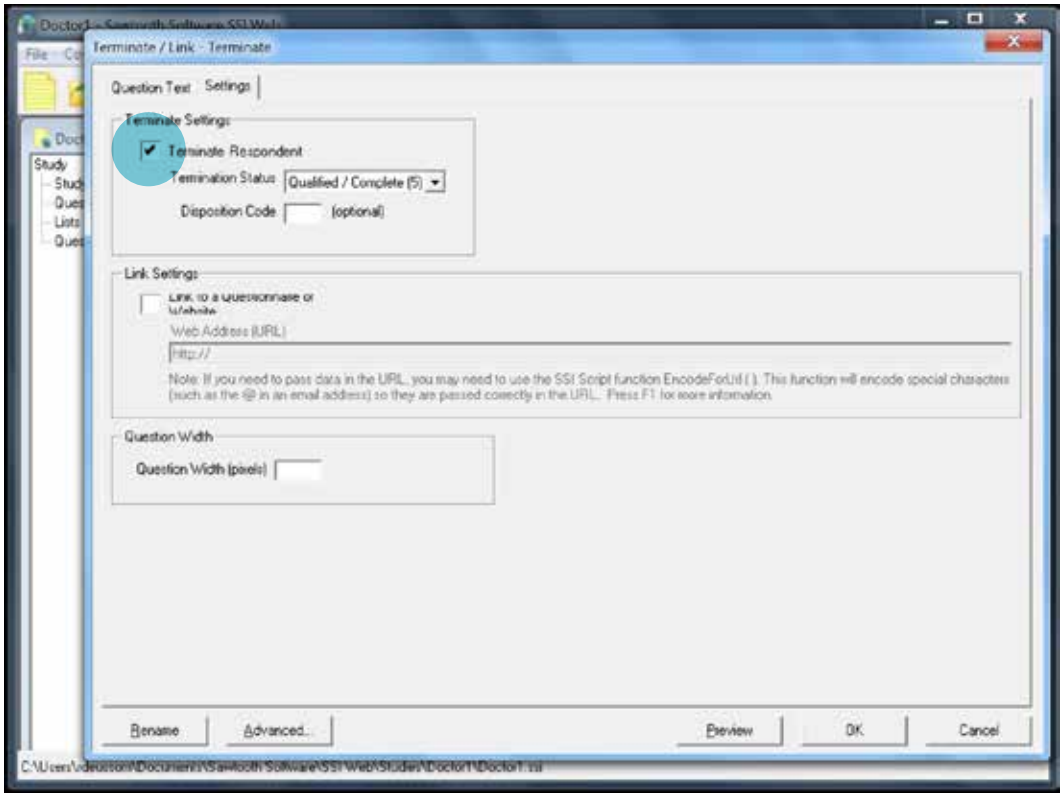
You will see something like this:



- Within the Question Text tab (see top left circle in the figure above) and in the Body dialog box (see left middle circle in the figure above), type text that informs the respondents that they have finished the survey. This closing statement could say: `"This marks the end of the survey. Thank you very much for your time."` You can change the font and look of the text by clicking on the pencil or paintbrush icons (see right middle circle in the figure above) to the right of the Body box, and you can see how the text will look by clicking on the Preview button (see bottom circle in the figure above) on the bottom right of the window.

- Click on the tab labeled Settings (see top right circle in the figure above) to specify additional aspects of this question.

You will see this:



In the Terminate Settings box:

- Click to check the box next to Terminate Respondent (see circle in the figure above).
- Click OK. This will take you back to the Write Questionnaire window.
- Click Save on the bottom right of the Write Questionnaire window to save your recent work.

Add informed consent section

Before starting the survey, all respondents must complete an informed consent form. This will ensure that the respondents are fully aware of what they should expect when they agree to complete the survey, that their participation is voluntary, and that they have a right to decline taking the survey if they so choose (see discussion in Stage 2). A sample informed consent form is provided in Appendix 2. You can download a modifiable version at www.capacityplus.org/rapid-retention-survey-toolkit.

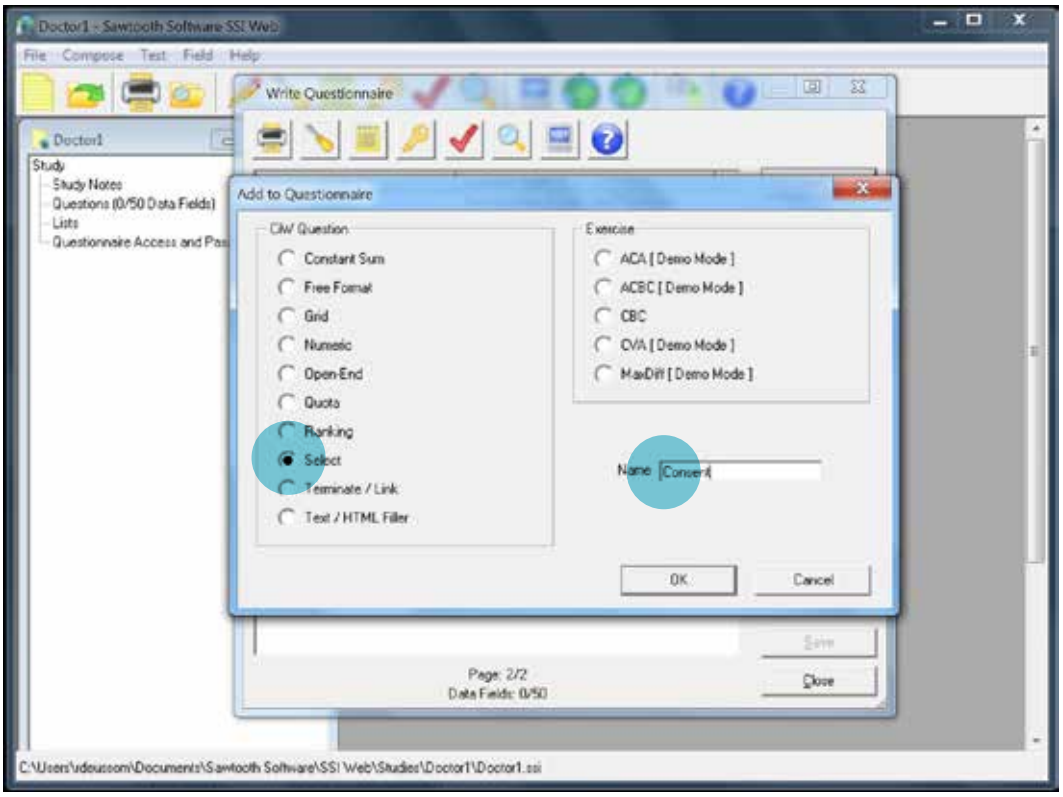
If you plan to administer a paper-based survey, you may instead choose to develop the informed consent form using Microsoft Word or other word processing program. If so, then you

can attach the informed consent form to the job preference pair questions section of the survey for which you must use the Sawtooth Software to develop (see Stage 4, Step 1 [alternate] on how to print the surveys for paper-based administration).

If you are administering a computer-based survey, create the informed consent section using the Sawtooth Software by following these steps:

- If you don't already have the Write Questionnaire window open, click Compose, then click on Write Questionnaire.
- Click Add on the right side of the window.

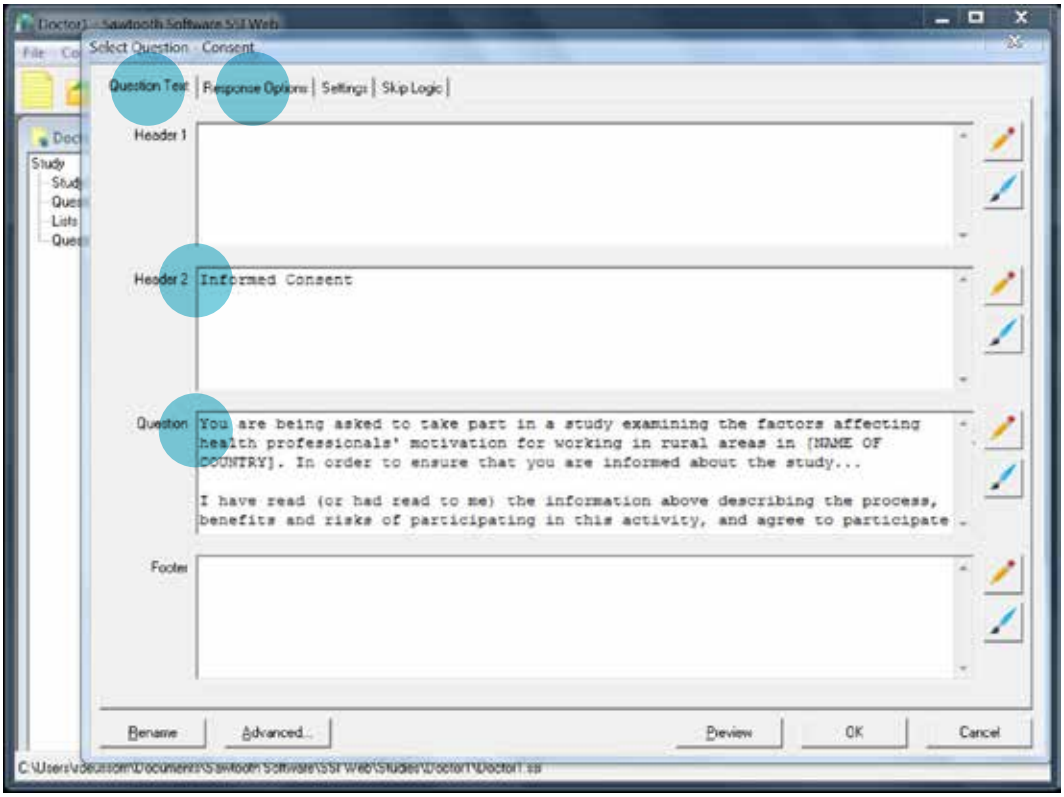
You will see this:



The informed consent should be created as a multiple-choice question (since the respondent can either agree or decline to participate in the survey). To do this:

- In the CiW Question column, mark the Select button (see left circle in the figure above).
- Next to Name, type the word `Consent` (see right circle in the figure above).
- Click OK.

You will see something like this:



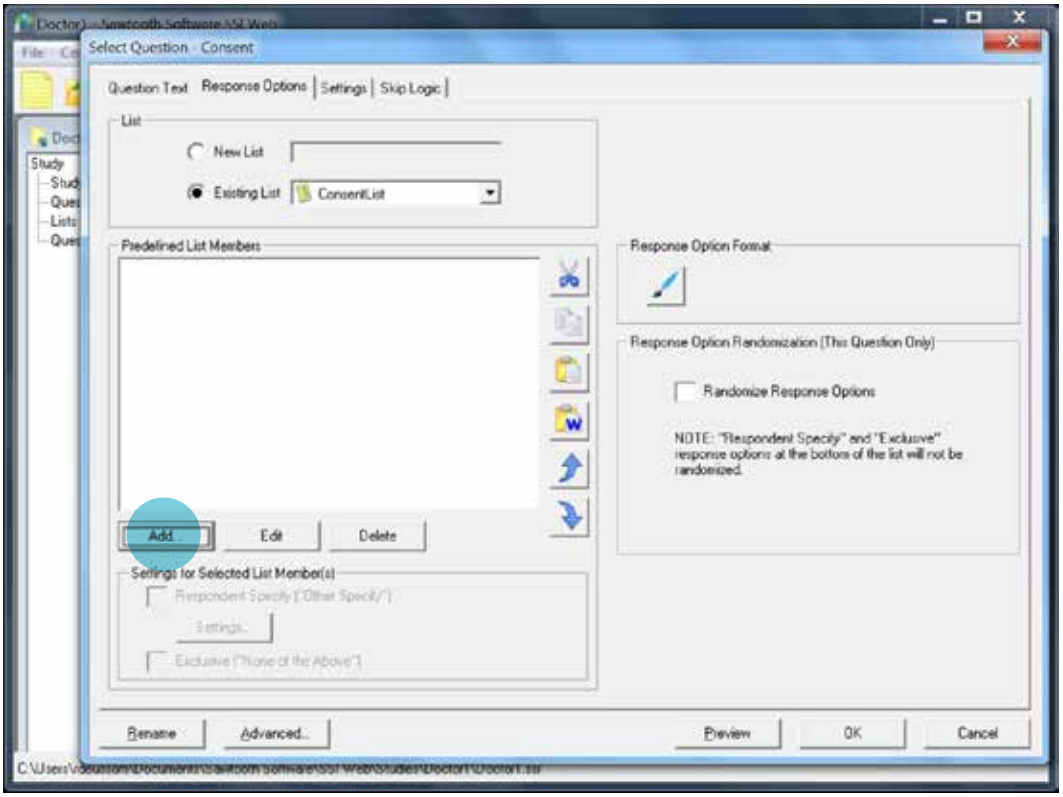
- Within the tab labeled **Question Text** (see top left circle in the figure above) and next to the **Header 2** box (see upper middle circle in the figure above), type `Informed Consent` to label the page.

- Next to the **Question** dialog box (see lower middle circle in the figure above), type the full text of the consent form. An example of informed consent text is included in Appendix 2, which you may adapt for your survey. Make sure that the final part of the informed consent statement says something like:

  `"I have read (or had read to me) the information above describing the process, benefits, and risks of participating in this activity, and agree to participate in this study."`

- When you have finished typing in the informed consent text, click the tab labeled **Response Options** (see second top circle in the figure above).

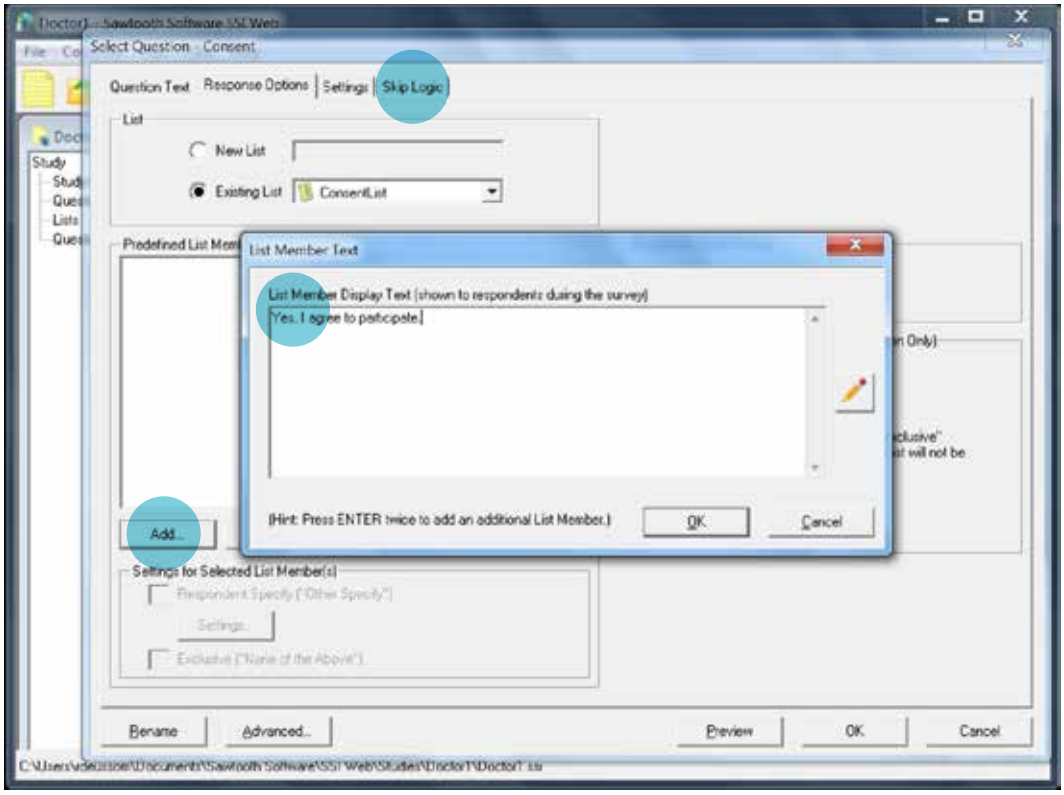
You will see this:



In the **Predefined List Members** box:

- Click **Add** (see circle in the figure above) to specify the response options for the informed choice question.

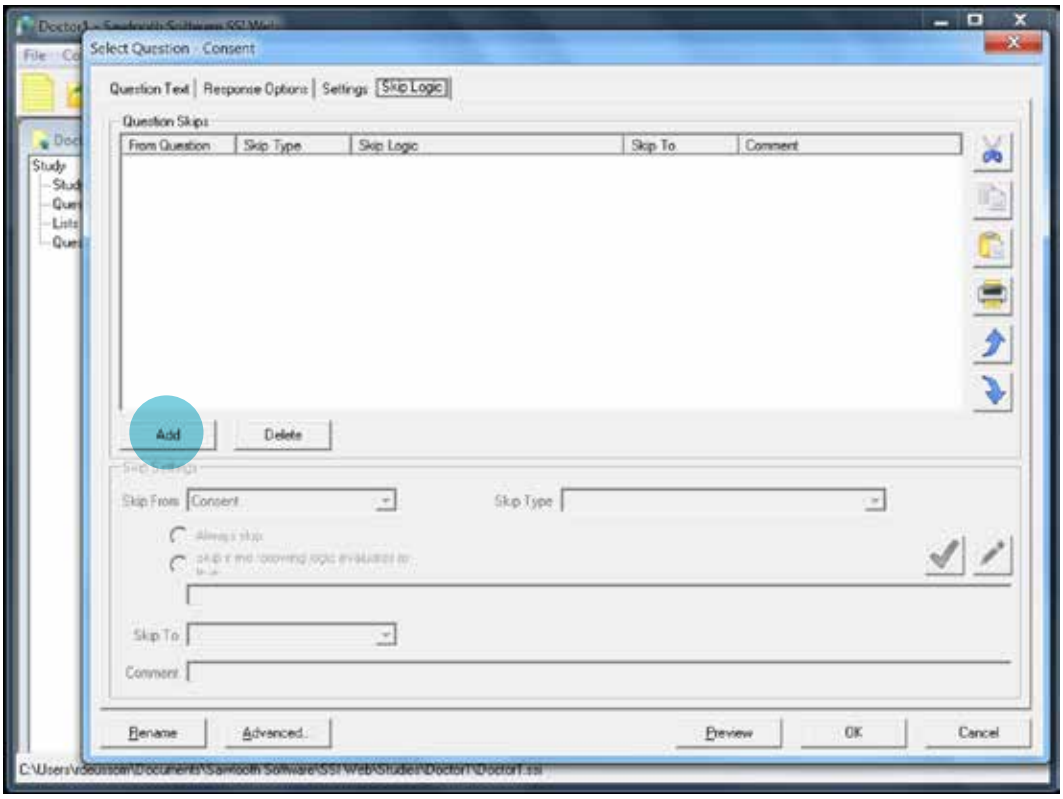
You will see this:



In the List Member Display Text window that opens up (see middle circle in the figure above):

- Type the first response option: `Yes, I agree to participate`.
- Click OK in the List Member Text window to close the window.
- Again, click Add (see bottom left circle in the figure above) at the bottom left of the Predefined List Members box.
- Type the second response option: `No, I do not agree to participate`.
- Click OK.
- Click the tab labeled Skip Logic (see top circle in the figure above).

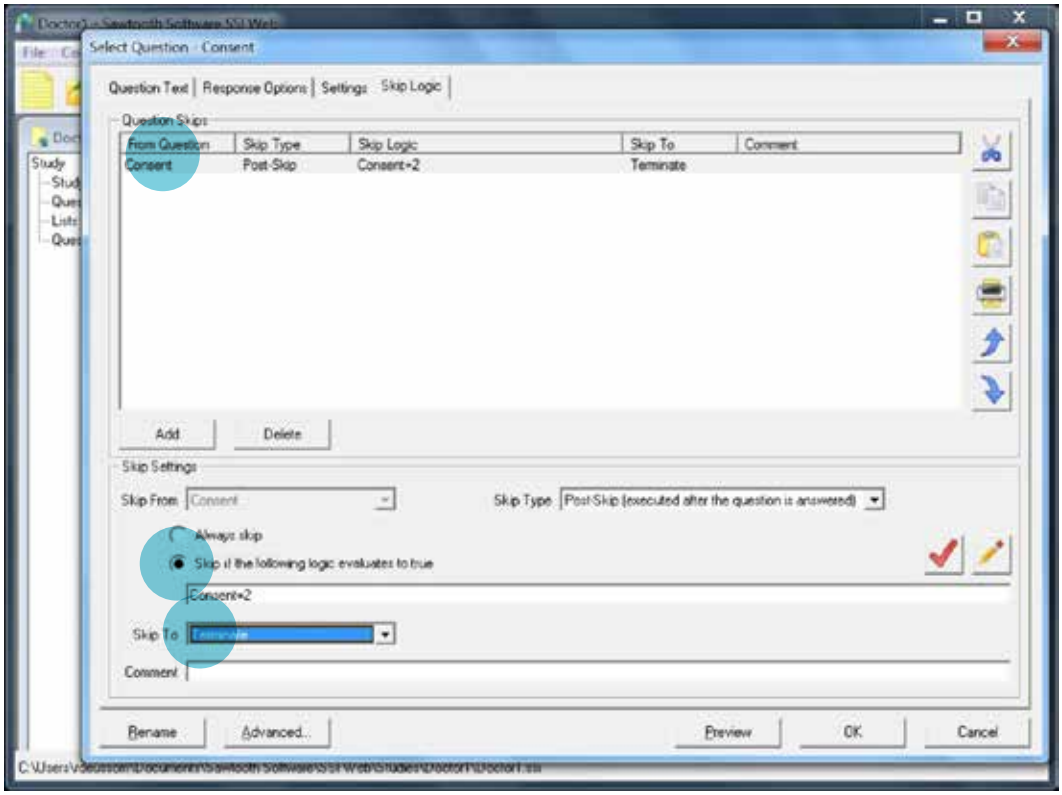
You will see something like this:



Under the **Question Skips** box:

- Click **Add** (see circle in the figure above).

This will add a new row of information in the **Question Skips** box (see top circle in the following figure) which includes the terms **Consent** and **Post-Skip**. Make sure that this row of information is highlighted. If it is not highlighted, then click on the row to highlight it.



Then, in the Skip Settings box:

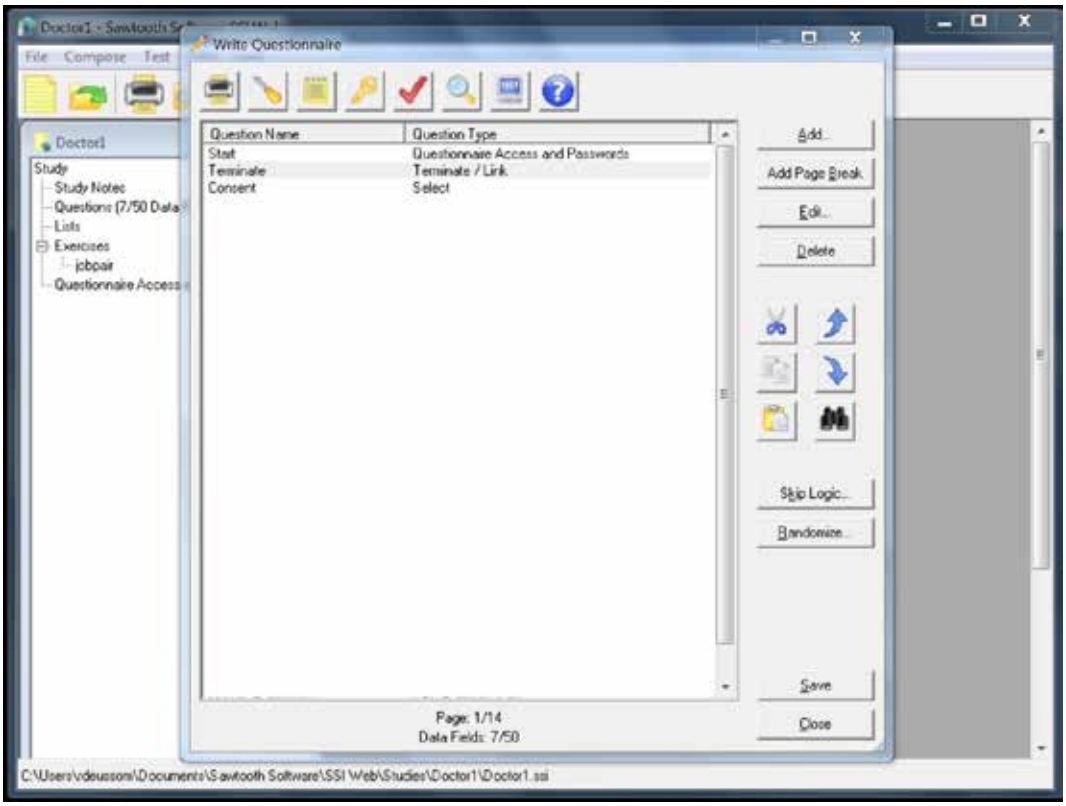
- Select Skip if the following logic evaluates to true and under that, type `Consent=2` (i.e. "No, I do not agree to participate."—See middle circle in the figure above).

- Then, next to Skip To (see bottom circle in the figure above), select from the drop-down menu the option Terminate, or the name of the termination page you created in the previous section (Terminate question). This will ensure that if the respondent indicates that s/he does not want to take the study, then the computer will automatically skip to the end of the survey instrument.

- Click OK. This will take you back to the Write Questionnaire window.

- Click on Save on the bottom right of the Write Questionnaire window to save your recent work.

- At the end of this step, you will have a questionnaire that looks something like this:



Step 2: Add Supplemental Questions Section

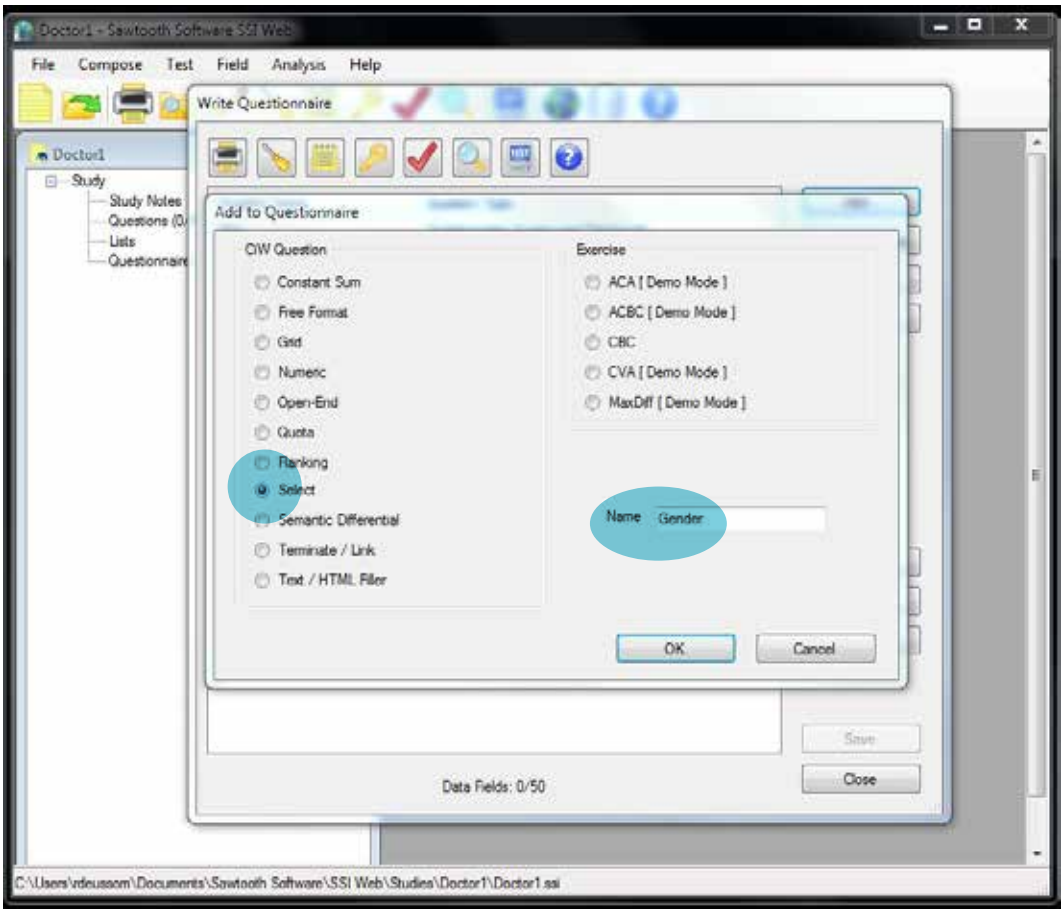
As described in Stage 2, Step 5, you can add supplemental questions (i.e., demographic, educational, or professional background) to enrich your study. (If you will be administering a paper-based version of the Rapid DCE survey, you may instead choose to develop the supplemental questions section using Microsoft Word or other word processing program.) Examples of supplemental questions are provided in Appendices 3 and 4, which you can adapt to your context.

To create the supplemental questions using the Sawtooth Software, complete the following steps:

- If you do not already have the Write Questionnaire window open, click Compose and then Write Questionnaire.

- Click on Add on the right side of the Write Questionnaire window.

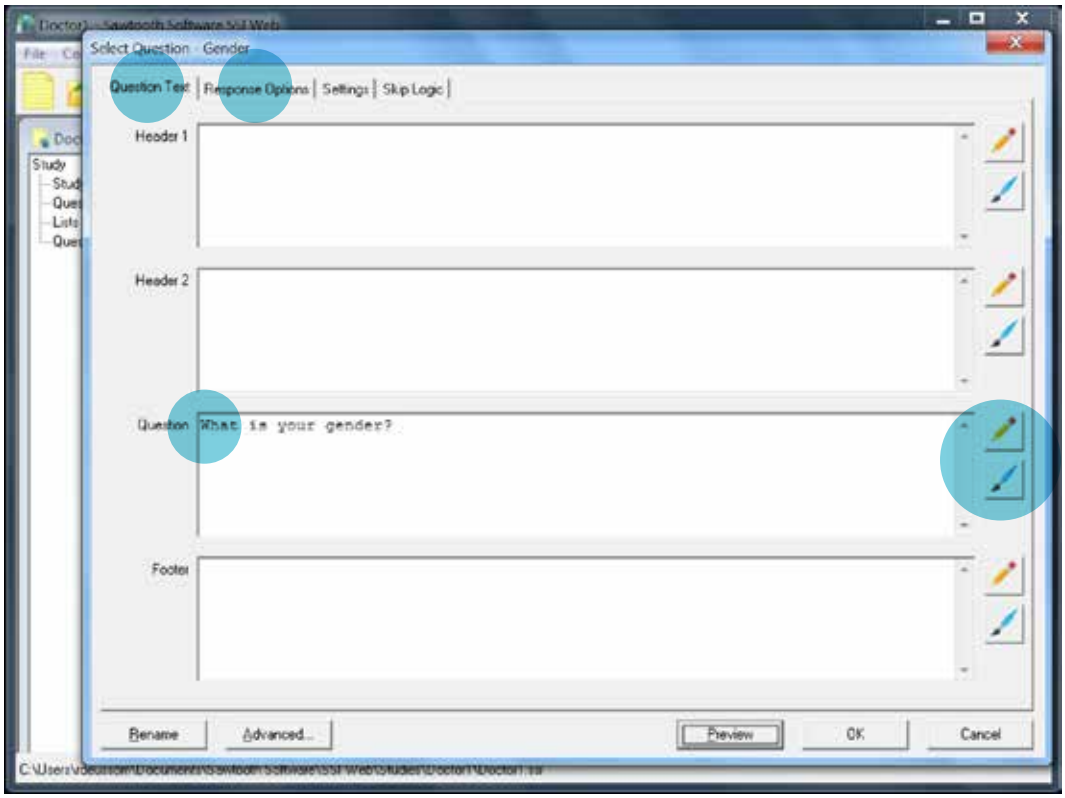
You will see this:



If the supplemental question is multiple-choice (i.e., possible responses are provided from which respondents select their answer):

- In the CiW Question box, click Select (see left circle in the figure above).
- Next to Name (see right circle in the figure above), type a short name to identify the question. For example, if you are asking about the gender of the respondent (multiple-choice answer of male and female), you can assign the name `Gender` to the question. This will be the name of the variable you will see later during the analysis stage. Do not use spaces in the name, as the software program will not allow it. If you want to use more than one word, you will need to write the words with no spaces in between, such as in the example `YearsWork` for the question: `"How long have you worked as a doctor?"`
- Click OK.

You will see this:

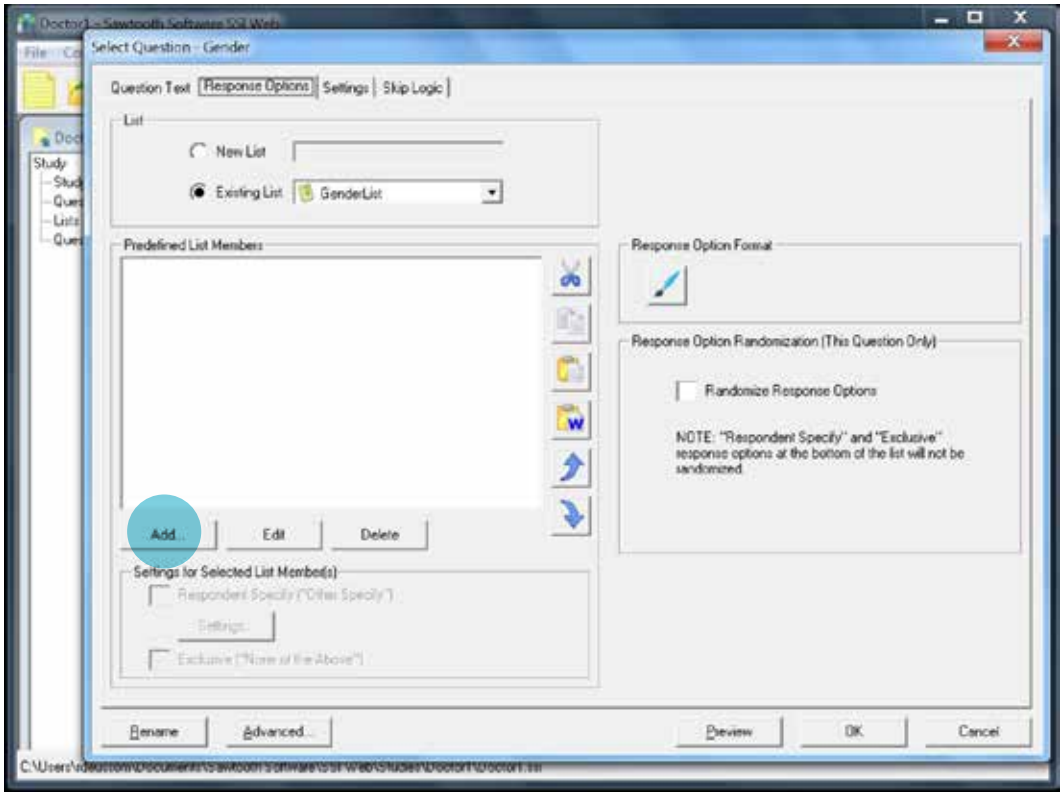


- Within the tab labeled Question Text (see top left circle in the figure above), and next to the Question dialog box (see middle left circle in the figure above), type the question text. Continuing the gender example, this could be `"What is your gender?"`

- If you want to adjust the font, size, and layout of the question, you may click on the pencil or paintbrush icons (see middle right circle in the figure above) to the right of the Question box. You will not be able to preview what the question looks like until you type the response options for the question.

- To enter possible responses to the question, click the tab across the top labeled Response Options (see second top circle in the figure above).

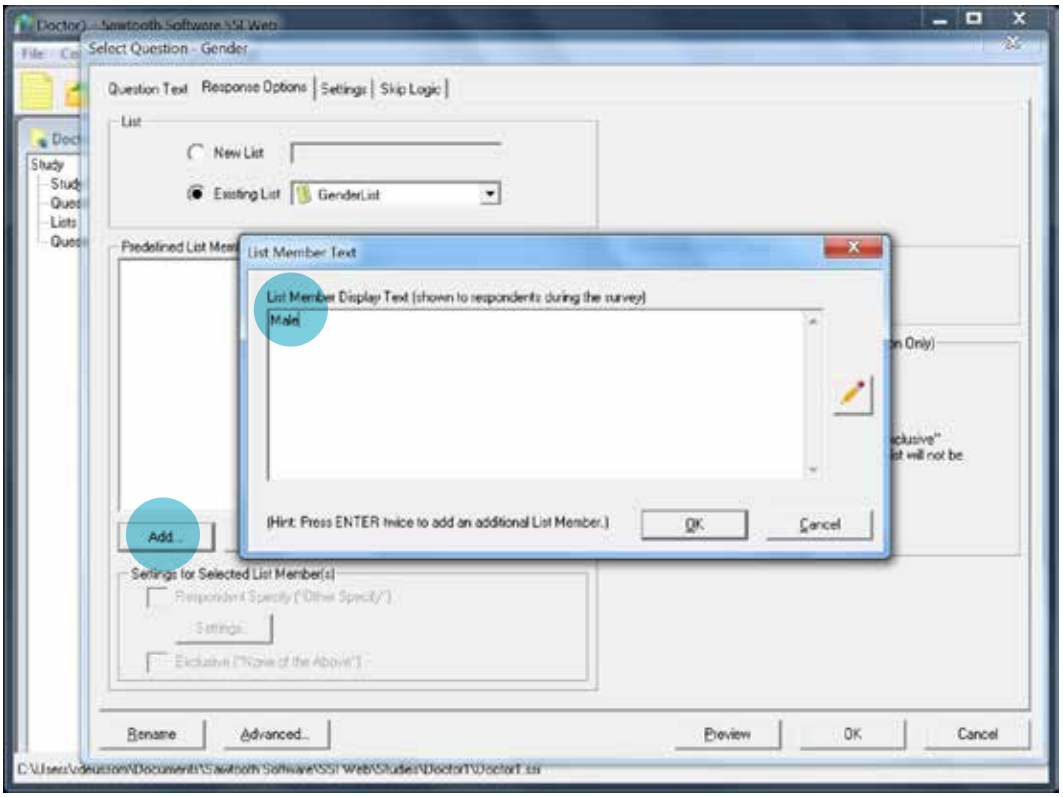
You will see this:



Under the **Predefined List Members** box:

- Click **Add** (see circle in the figure above).

You wll see this:

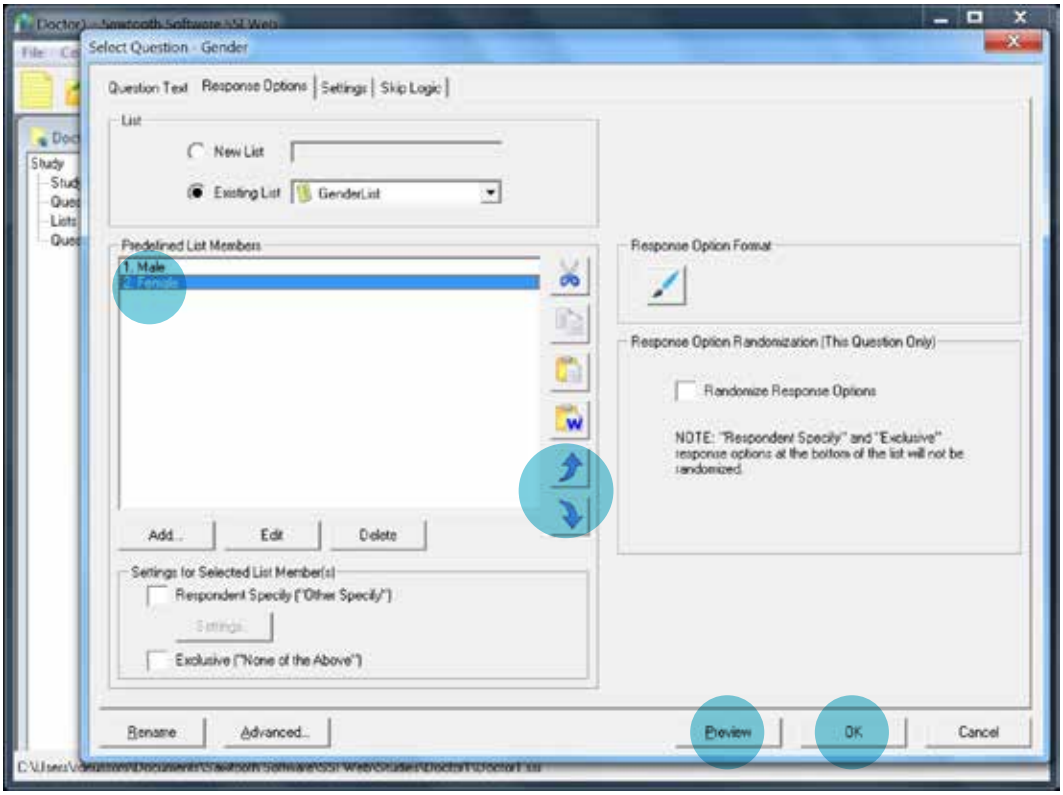


- In the List Member Display Text box (see top circle in the figure above), type the first option for responses to the question. For example, the first response to the question `"What is your gender?"` may be `Male.`

- Click OK in the List Member Text window to close the window.

- Again, click Add (see bottom circle in the figure above) under the Predefined List Members box, and type the second option for responses to the question. For example, the second response to the question `"What is your gender?"` would be `Female.`

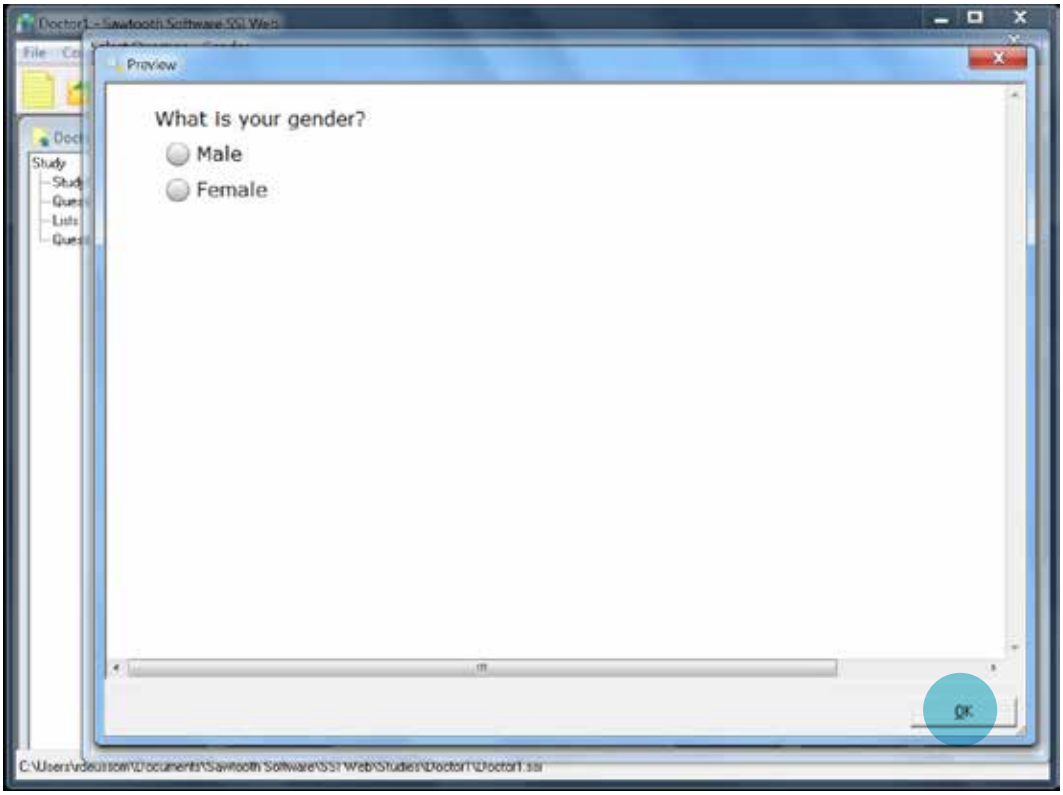
- Repeat these steps until all possible response options to a multiple-choice question are included. When you have completed a question, you will see something like this:



- The numbers in front of the response options (see top left circle in the figure above) represent the numeric coding the software will use to code that response in the database. For example, a response of `Male` will be given a code of "1" while `Female` will be represented by a code of "2." This will also be the order in which the responses will appear in the survey. Should you want to change the ordering, you can move the response options by clicking on one of the responses to highlight it in color and then clicking the up or down arrow to the right of the dialog box where the responses are listed (see middle circle in the figure above) to move it up or down in the list.

- To preview what the question will look like in the survey, click on Preview (see bottom left circle in the figure above) at the bottom right of the Select Question window.

You should see something like this:



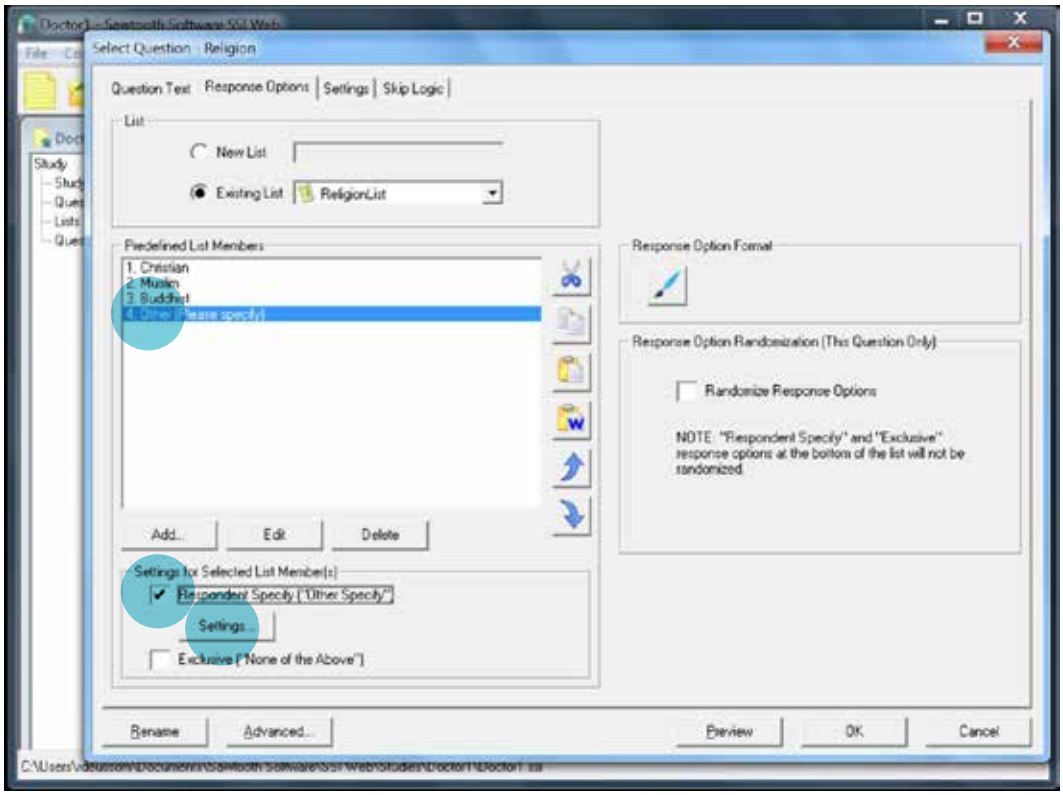
- Click OK on the bottom right of the preview window (see circle in the figure above) to return to the Select Question window.

- If you would like to edit the response options, click once on a response option to highlight it in color and then click the Edit button under the Predefined List Members box. This will open the List Member Display Text dialog box so you can adjust the response as desired. Click OK to return to the Select Question window.

- If the multiple-choice question will also include an Other (Please specify) response option, continue with the steps. However, if you have finished adding responses to a question (such as the gender one above where male and female are the only possible answers), then click OK to finish and go to the Write Questionnaire window to continue adding other questions.

- We can illustrate how to add an Other (Please specify) response option to a multiple-choice question by using an example question such as, "What is your religion?" with multiple-choice responses Christian, Muslim, Buddhist, and Other (Please specify). To add the precoded religion responses, follow the steps as in the previous gender question example. Once that is done, click the Add button at the bottom of the Predefined List Members box and in the List Member Display Text box, type `Other (Please specify)`. Click OK.

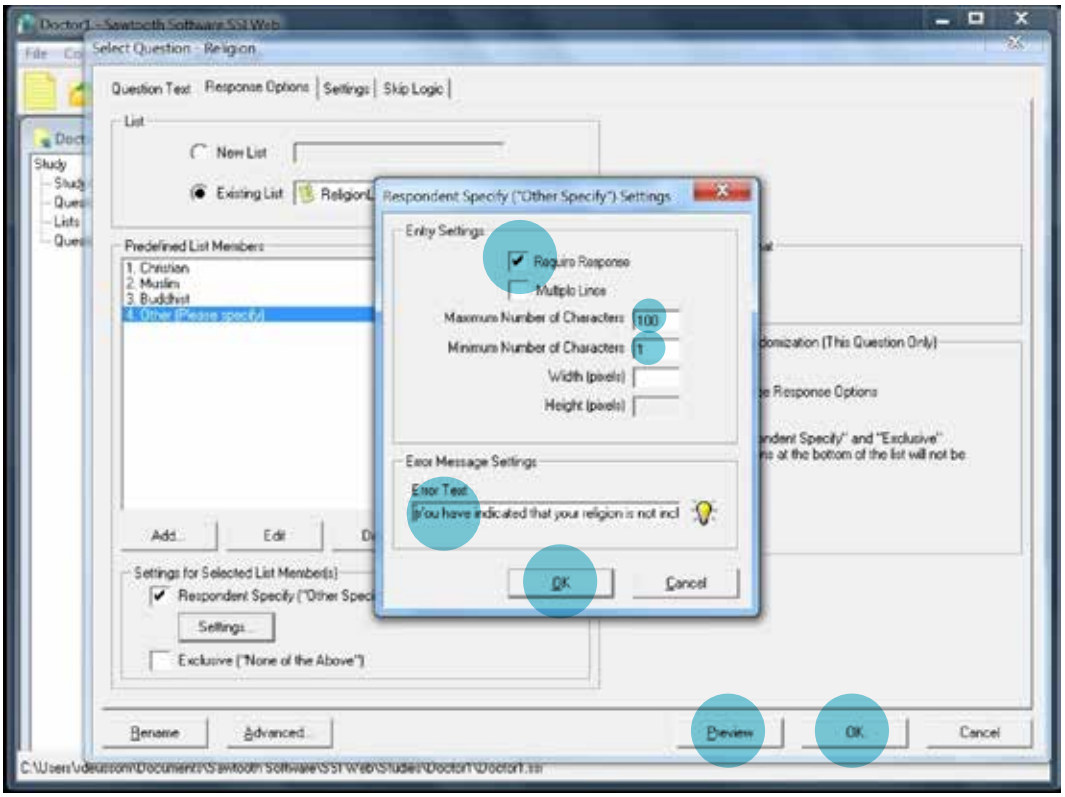
You will see this:



- Click on the Other (Please specify) line in the Predefined List Members box to highlight it in color (see top circle in the figure above). With the Other (Please specify) response option highlighted, check the box labeled Respondent Specify ('Other Specify') (see middle circle in the figure above) in the Settings for Selected List Member(s) section.

- Click the Settings button (see bottom circle in the figure above).

You will see this:



- In the box called Entry Settings, click Require Response (see top circle in the figure above) so that respondents must specify their "Other" response selection in order to continue to the next question.

- Next to Maximum Number of Characters, type `100` (see upper smaller circle in the figure above). If the question is one in which Other (Please specify) responses may be quite long, you can increase the maximum number of characters (for example, to 500) to allow more space for the response.

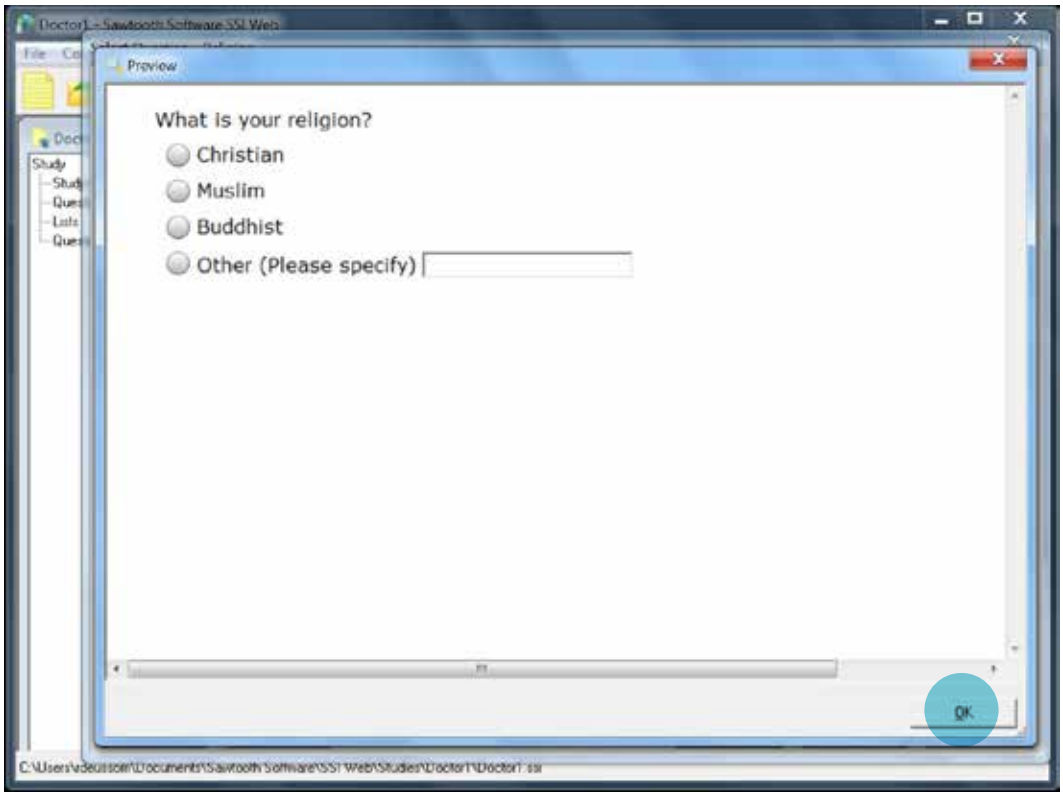
- Next to Minimum Number of Characters, type "1" (see lower smaller circle in the figure above).

- Under Error Text, type `"You have indicated that your religion is not included on the list. Please specify your religion."` (See left middle circle in the figure above.) For other questions, you should rephrase accordingly. This message will be displayed if a respondent tries to move to the next question in a computer-based survey without specifying an alternative response option after having selected Other (Please specify) to answer the question.

In other words, the respondent will be required to respond in order to proceed to the next question.

- Click OK (see right middle circle in the previous figure) in the Respondent Specify ('Other Specify') Settings dialog box.
- To see what a question will look like on a computer-administered survey, click Preview (see bottom left circle in the previous figure), and a new window will open.

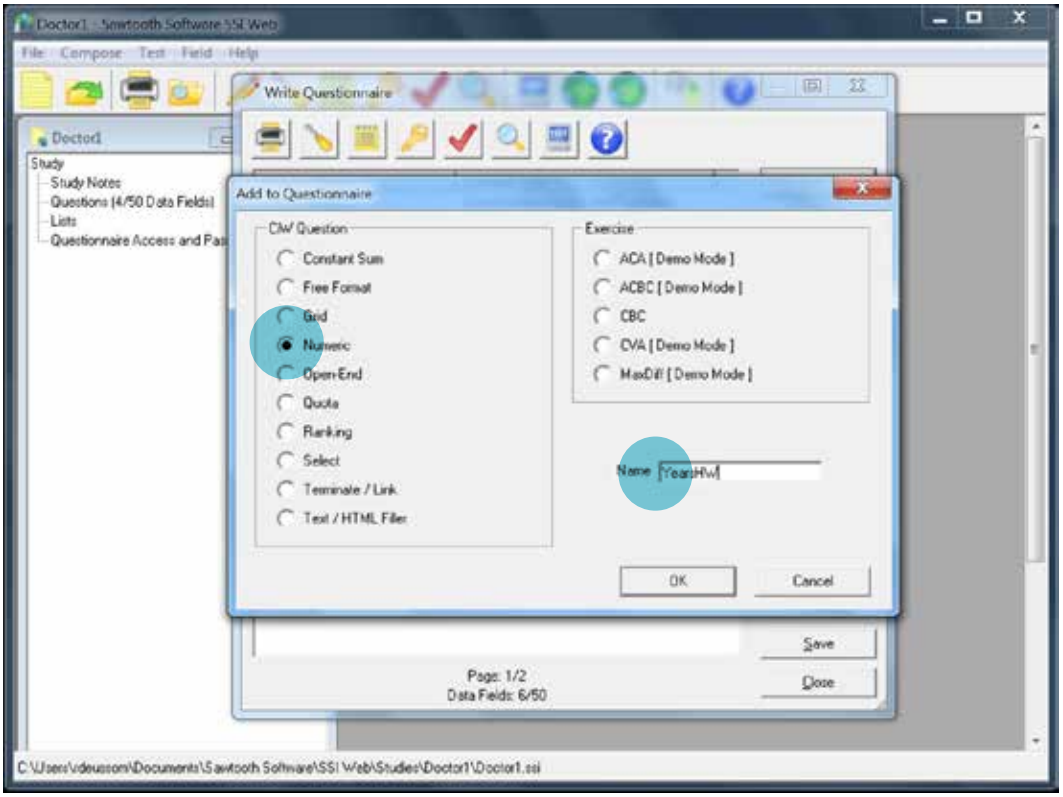
You will see something like this:



- Click OK (see circle in the figure above) to return to the Question Text or Response Options tab to make any adjustments.
- Click OK again (see bottom right circle in the previous figure on page 55), to go back to the Write Questionnaire window to continue adding more supplemental questions.
- Click on Save on the bottom right of the Write Questionnaire window to save your recent work. You should save often as you go through the steps in the software.

Similar steps should be taken to add other types of questions. If the question requires a numerical response—for example, "What is your age in years?" or "For how many years have you worked as a health professional?"—click the Add button on the top right of the Write Questionnaire window.

You will see this:



- In the CiW question column, mark Numeric (see left circle in the figure above) and next to the Name cell (see right circle in the figure above), give the question a name to identify the variable (in this example it could be `Age` or `YearsHW`, as shown in the image above).

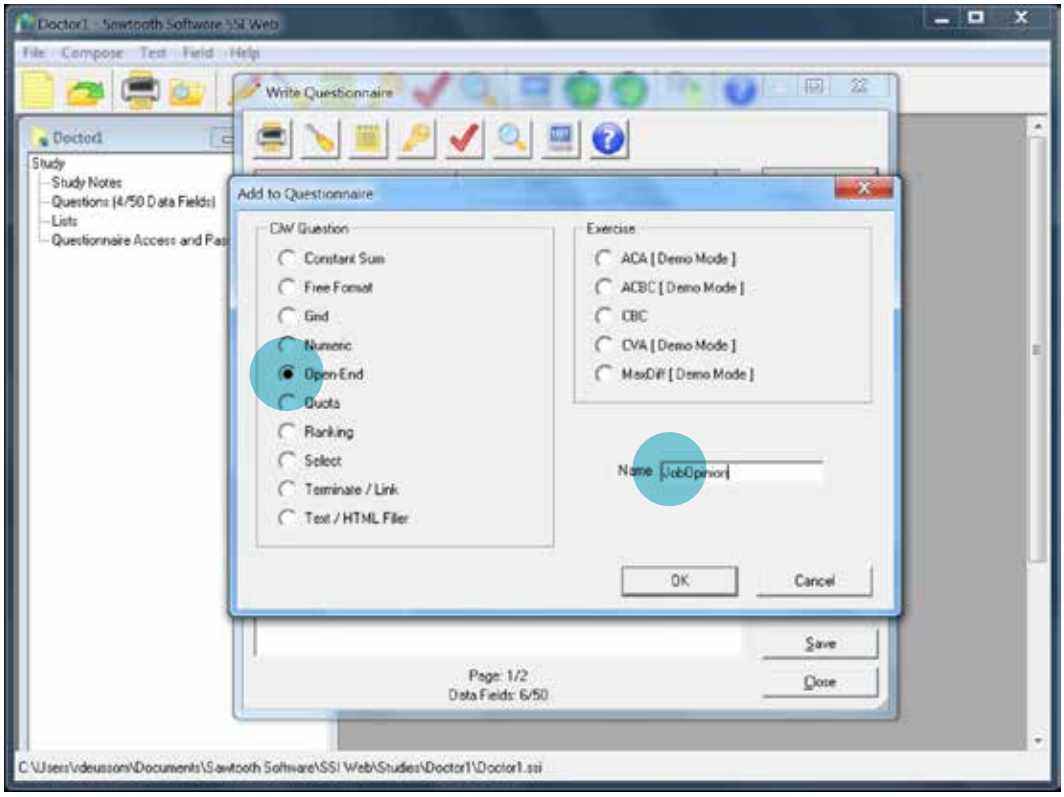
- Click OK, and write in the text of the question in the Question box (e.g., `"What is your age in years?"` or `"For how many years have you worked as a health professional?"`)

- For numeric questions if you would like to allow decimal answers (i.e. to enter nine months, or 0.75 years, for the `YearsHW` question), click on the Settings tab and check the Allow Decimal Answers box

- Click OK. You do not need to specify any responses, as there will be a box for the respondents to fill in their age or the number of years they have been a health worker. You can see what this will look like by clicking on the Preview button.

If the question requires a free-form text response—for example, "How do you feel about your job?"— click the Add button on the top right of the Write Questionnaire window.

You will see this:



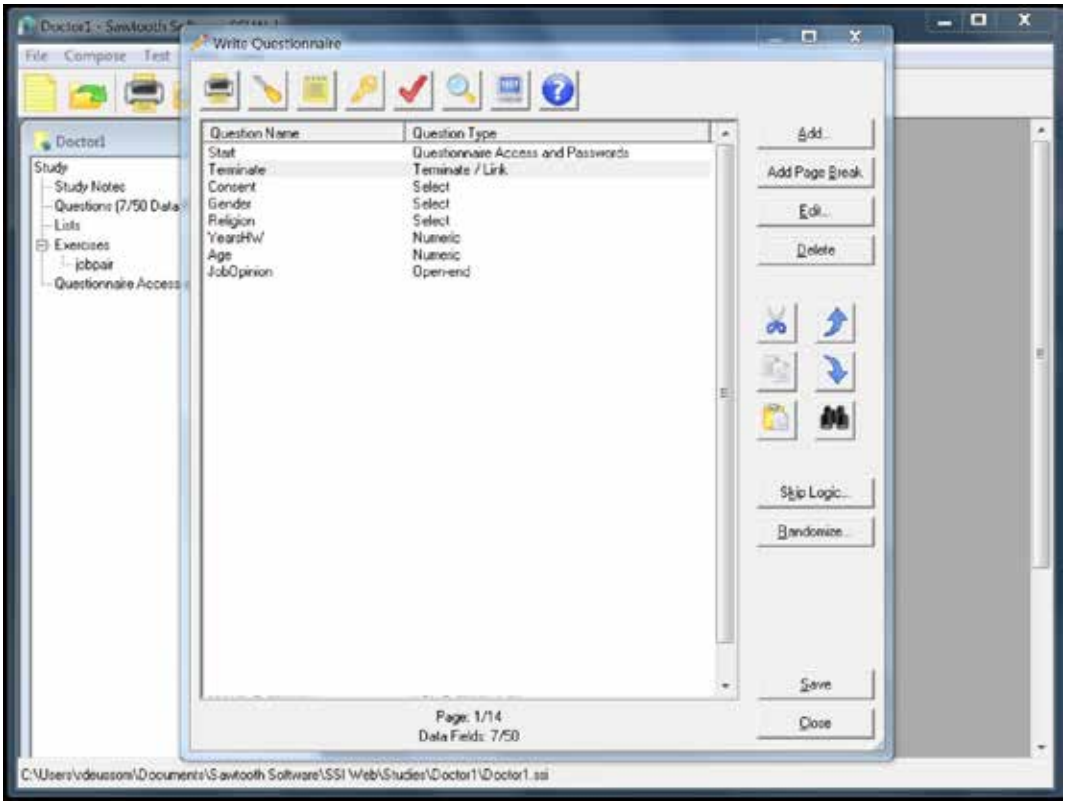
- In the CiW question column mark Open-End (see left circle in the figure above) and next to the Name cell (see right circle in the figure above), give the question a name to identify the variable (in this example it could be JobOpinion).

- Click OK, and write in the text of the question in the Question box (e.g., "How do you feel about your job?"), and click OK.

Again, you do not need to specify any responses, as there will be a box for the respondents to fill in their qualitative responses.

Continue the above steps until you have entered all the supplemental demographic, background, experience, or other questions to the survey.

At the end, you should have a questionnaire that looks something like this:



Step 3: Develop the Job Preference Pair Section

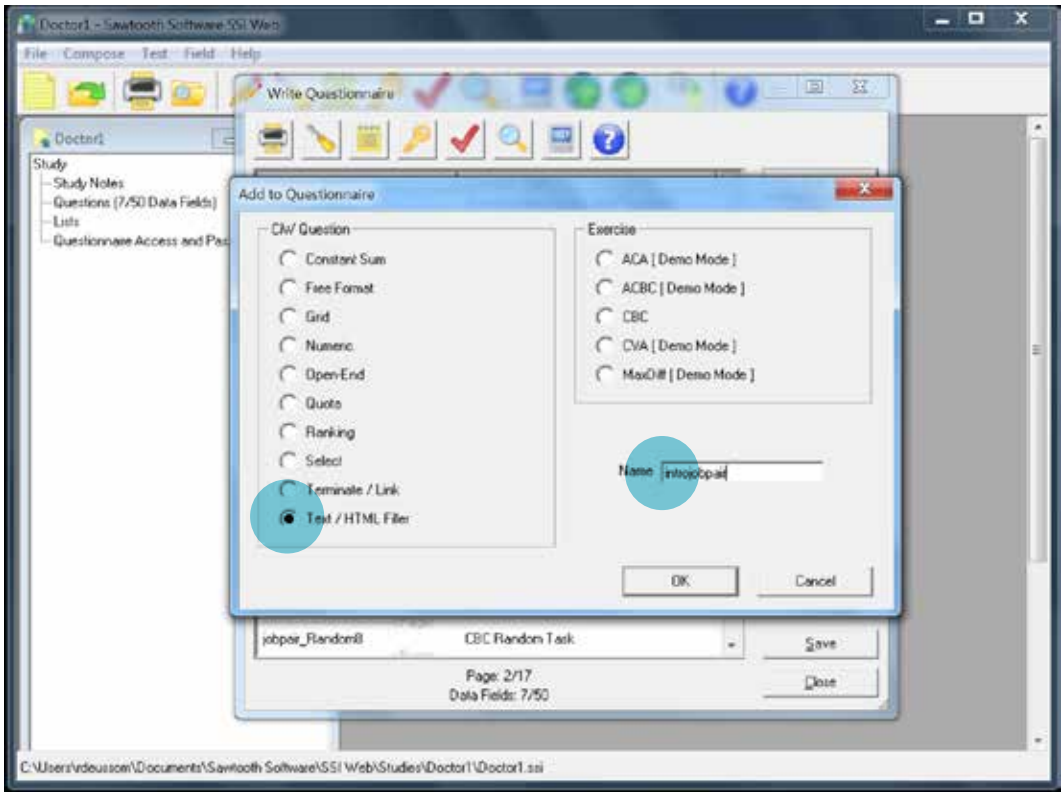
This step will describe how to use the Sawtooth Software to develop the job preference pair questions section of the Rapid DCE survey. Regardless of whether your survey will be computer-based or paper-based, you ***MUST*** use the Sawtooth Software program to develop the job preference pairs section so that random combinations of the job attributes can be compiled across the 12 questions pertaining to job preferences.

Introducing the job preference pair questions section

To help respondents understand the job preference questions, you should add an introduction page immediately before them. If you will administer a paper-based version of the Rapid DCE survey, it may be easiest to develop the introduction to the job preference pair questions section in Microsoft Word or other word processing program. An example of an introductory paragraph is provided in Section B of Appendix 4. However, remember that inputting the job attributes and levels to develop the job preference pair questions described in the following section ***MUST*** be done with the Sawtooth Software.

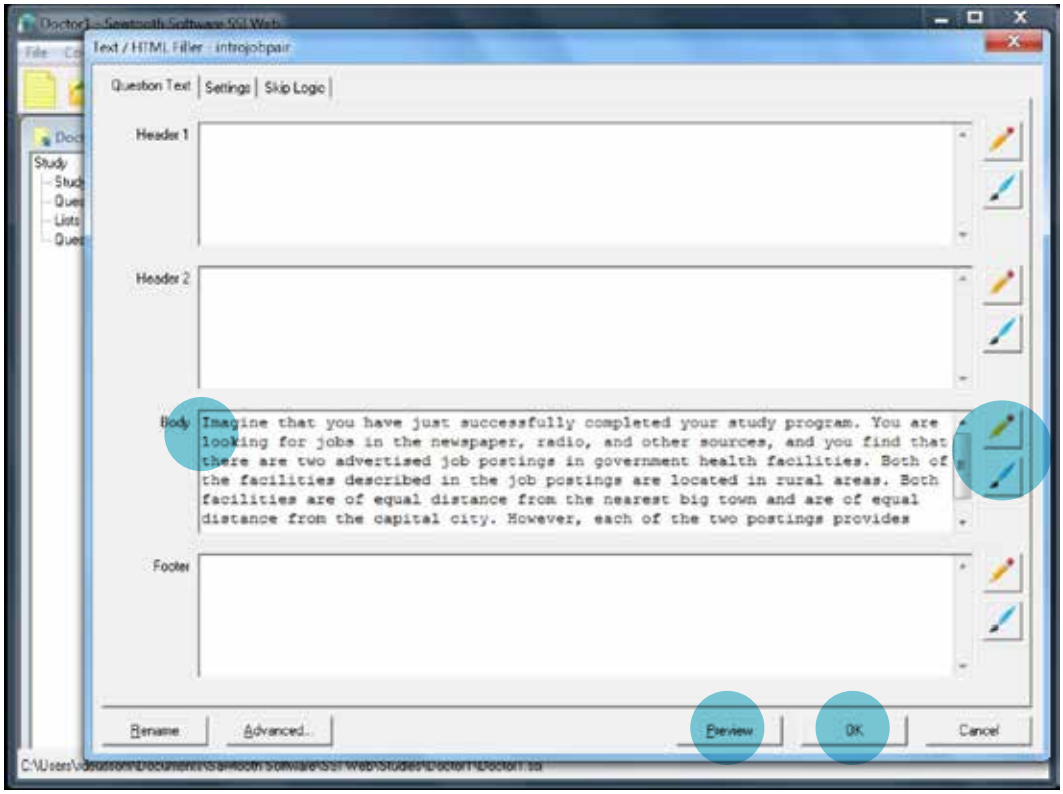
To create the introduction to the job preference pair questions using the Sawtooth Software:

- If you don't already have the Write Questionnaire window open, click Compose and then Write Questionnaire.
- In the Write Questionnaire window, click the Add button on the top right. This will open the following window:



- In the CiW Question box, select Text/HTML Filler (see left circle in the figure above).
- Next to Name, type `introjobpair` (see right circle in the figure above). Remember that the program will not accept spaces in the name.
- Click OK.

This opens the following window:



- Next to Body (see left circle in the figure above), type your own text to introduce the job preference pair questions section of the survey to the respondent, based on the relevant context or setting in which the Rapid DCE is carried out. An example, which you may adapt to your country context, can be found in Section B of Appendix 4.

- You can change the layout and font of the text by clicking the pencil and paintbrush icons (see right circle in the figure above) to the right of the Body text box area. You can see what the introduction will look like by clicking on the Preview button (bottom left circle in the figure above).

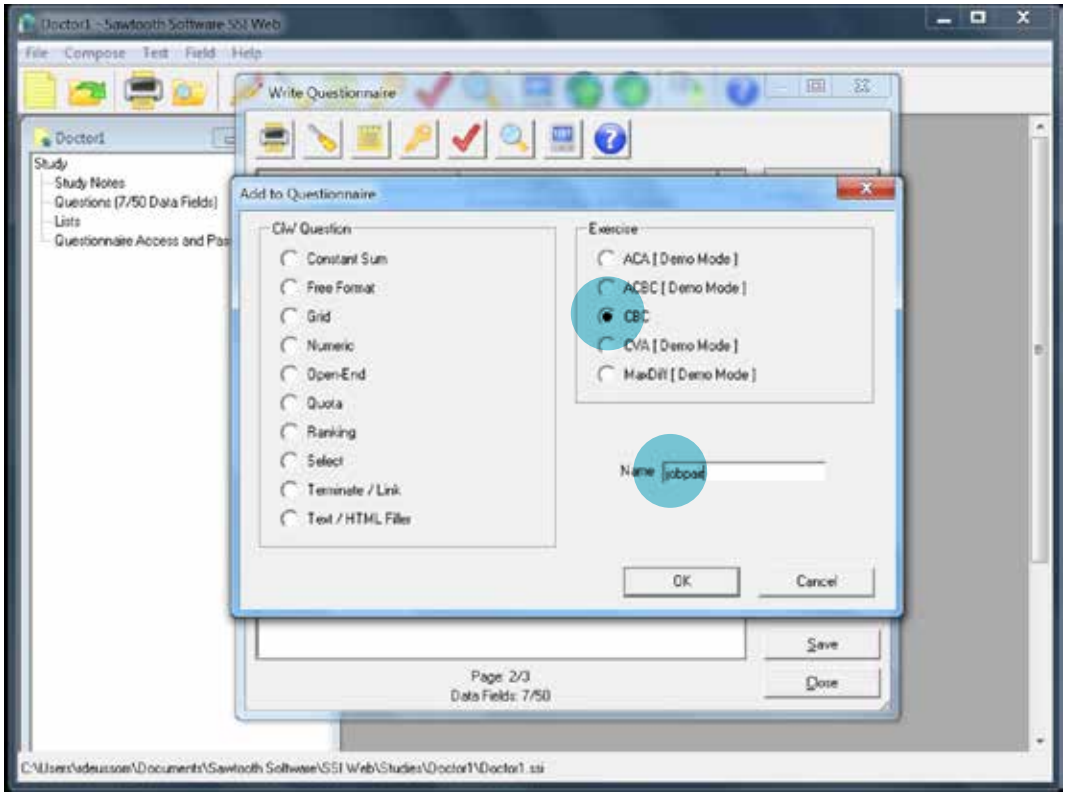
- Click OK (see bottom right circle in the figure above). You will be taken back to the Write Questionnaire window.

- Click on Save on the bottom right of the Write Questionnaire window to save your recent work.

Input the job attributes and levels to develop the job preference pair questions

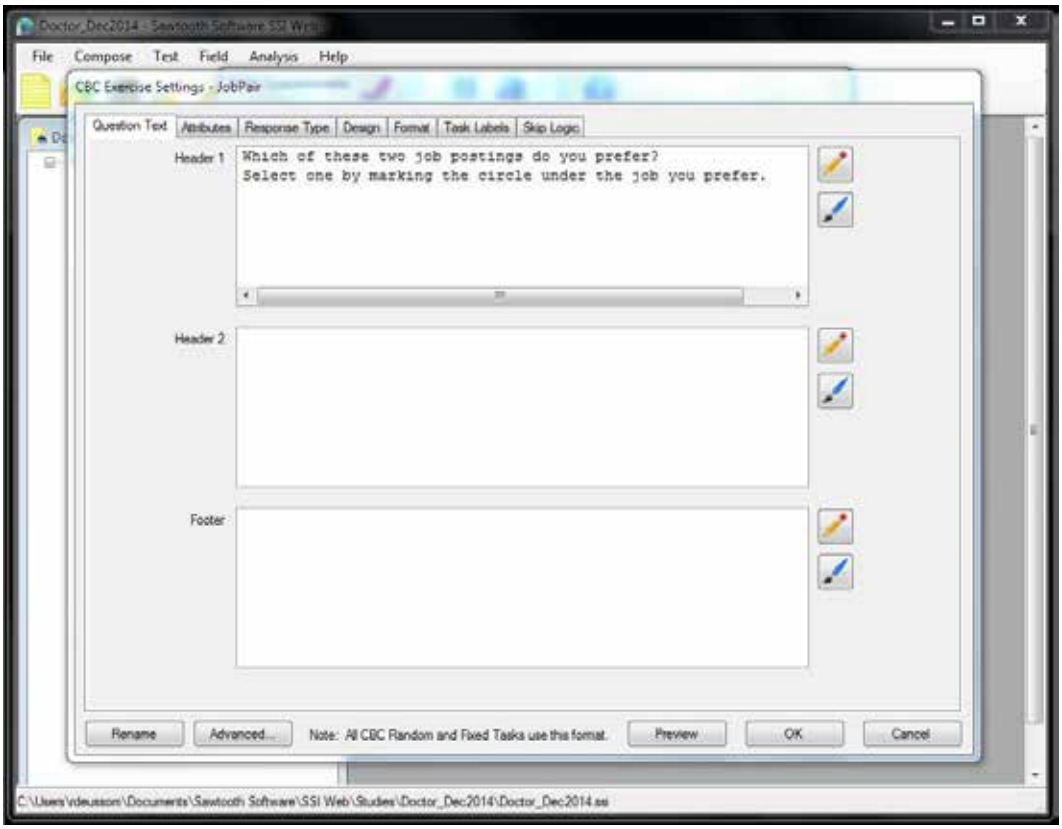
Remember, if you are conducting a paper-based survey, you MUST complete this step using the Sawtooth Software. If you do not already have the Write Questionnaire window open, click Compose and then Write Questionnaire.

- In the Write Questionnaire window, click the Add button on the top right. This will open the following window:



- In the right-hand box labeled Exercise, select CBC (see top circle in the figure above).
- Enter a name for the job preference pair questions next to Name (see bottom circle in the figure above). For example, you can call it `jobpair`.
- Click OK.

You will see something like this:

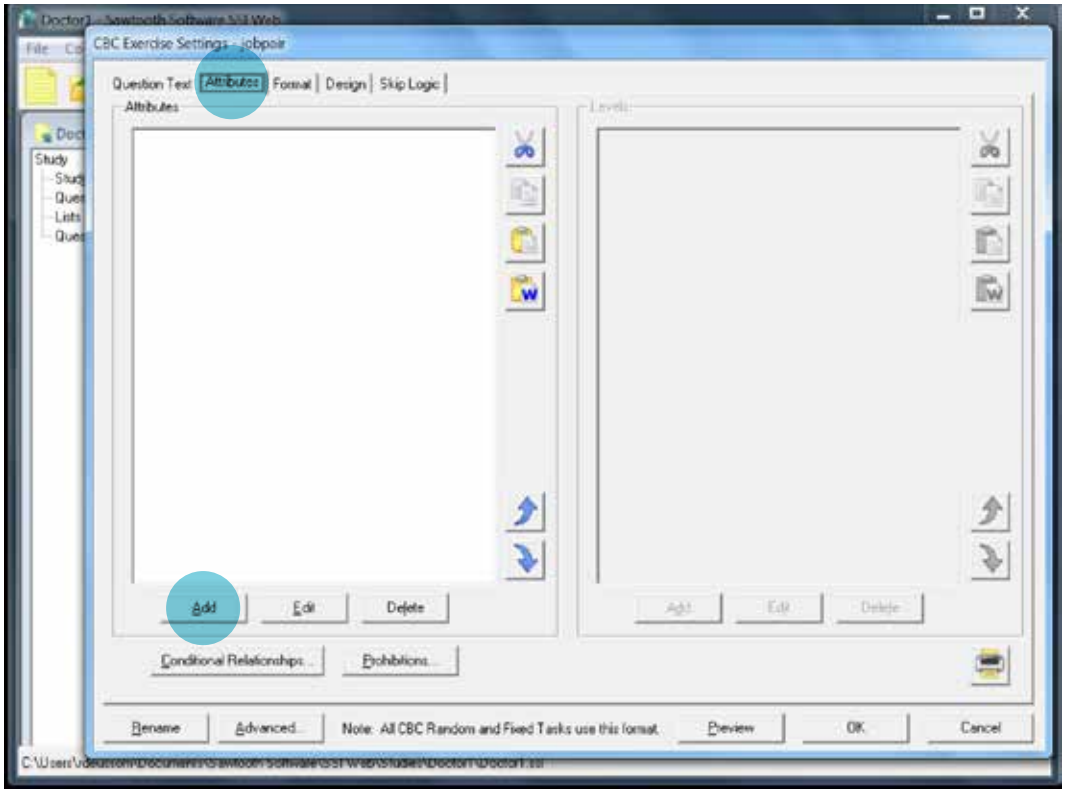


- In the Header 1 text box, type: `Which of these job postings do you prefer? Select one by marking the circle under the job you prefer.`

Add job attributes and levels

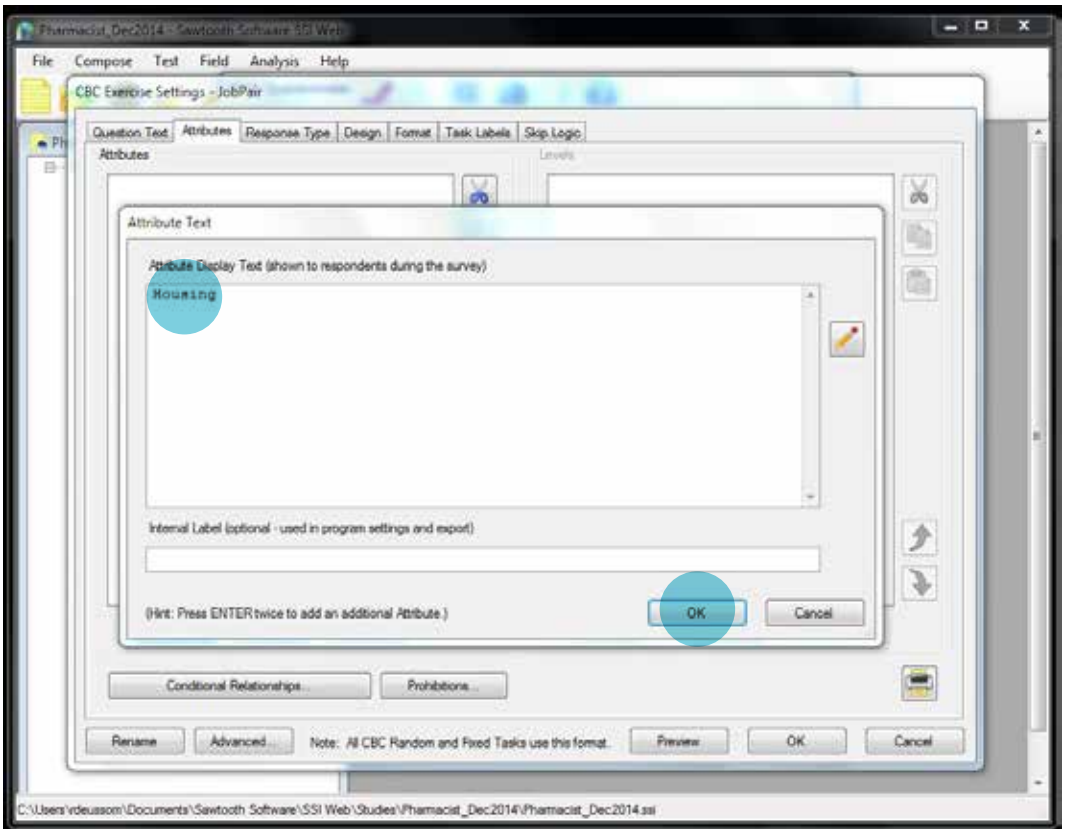
- Within the CBC Exercise Settings window, click on the Attributes tab (see top circle in the figure below).

You will see this:



- Click Add (see bottom circle in the figure above) at the bottom of the Attributes column.

You will see this:



- Type the name of the first attribute you would like the respondents to see when they are presented with job preference pairs in the cell Attribute Display Text (see top circle in the figure above). In the Namibia example job preference pair on Table 4 on the following page, this would be: `Housing`. Please note that what you write here is exactly how the text will appear to the respondents taking the survey, so you will want to be sure that it is clearly understood (the survey pre-test will help you to ensure this). We recommend you do **not** put the salary attribute first so that respondents do not assume a priority ordering of the attributes or become distracted only by the salary figure and not give due consideration to the other attributes.

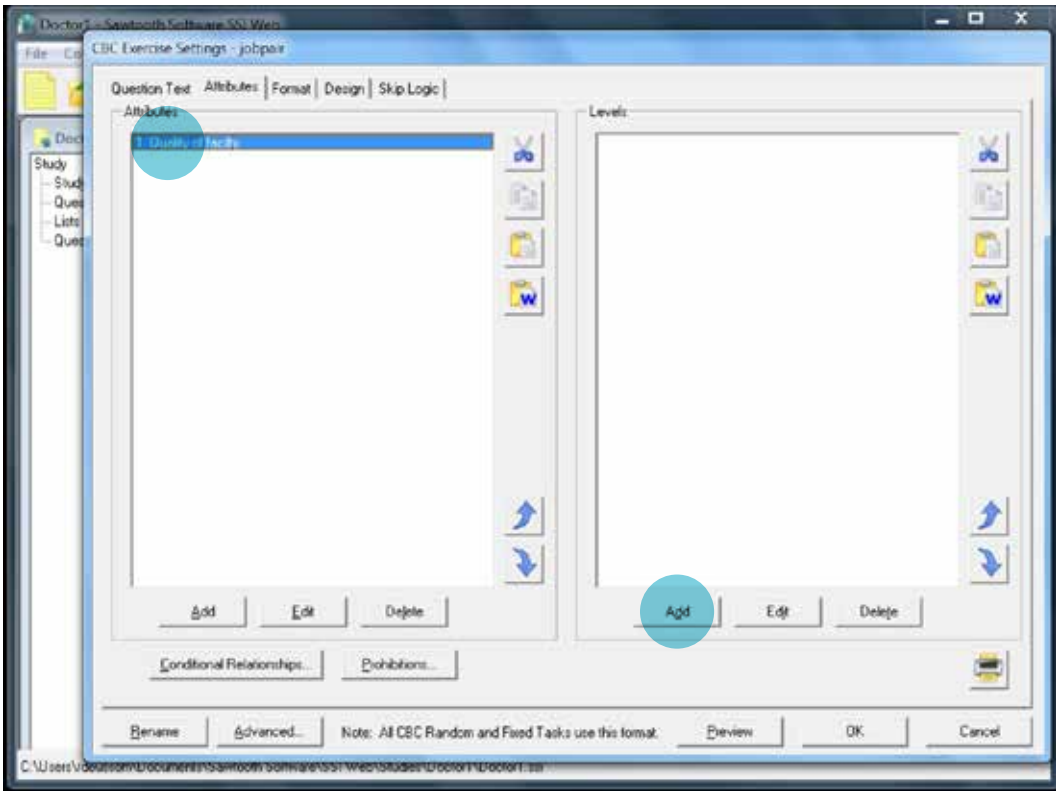
Table 4. Namibian Pharmacists Example: Job Attributes and Levels

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

Source: Titus, Vieira, Rockers, and Deussom 2013

- Leave the cell Internal Label blank.
- Click OK (see bottom circle in the figure on page 65) in the Attribute Text window.

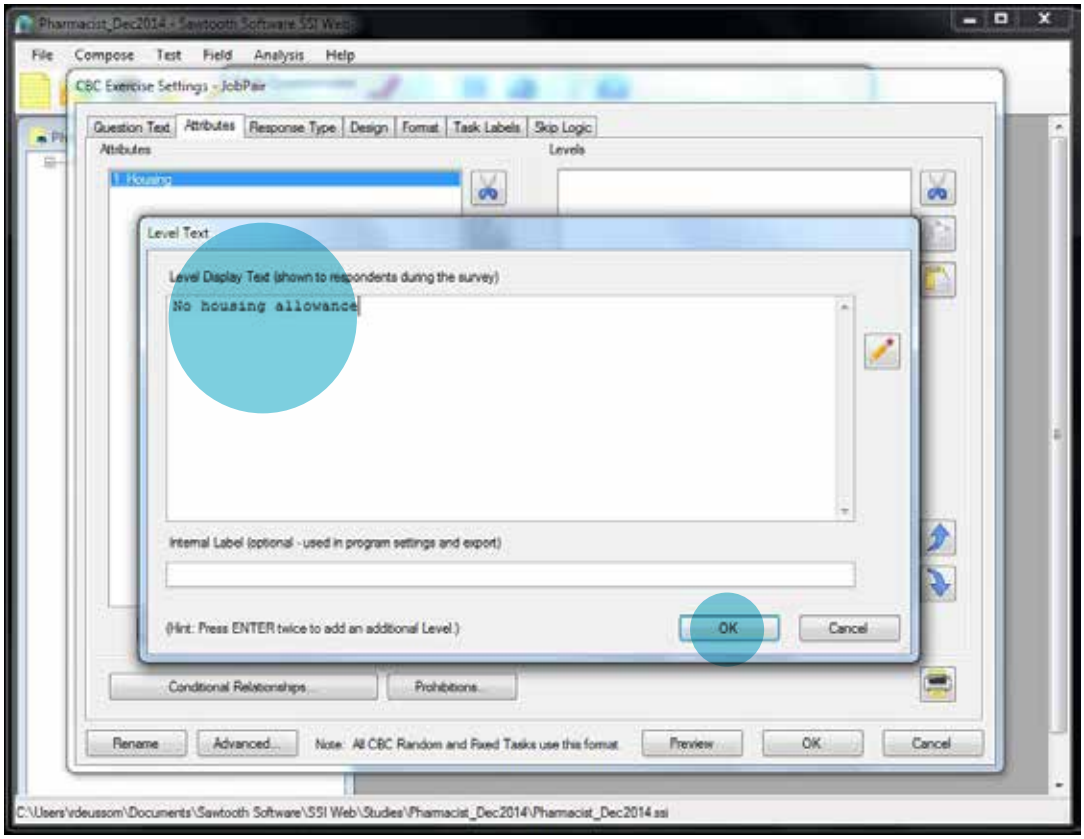
You will see this:



The first attribute you entered (in this example, `Housing`) will be highlighted at the top of the Attributes column (see first circle in the figure above).

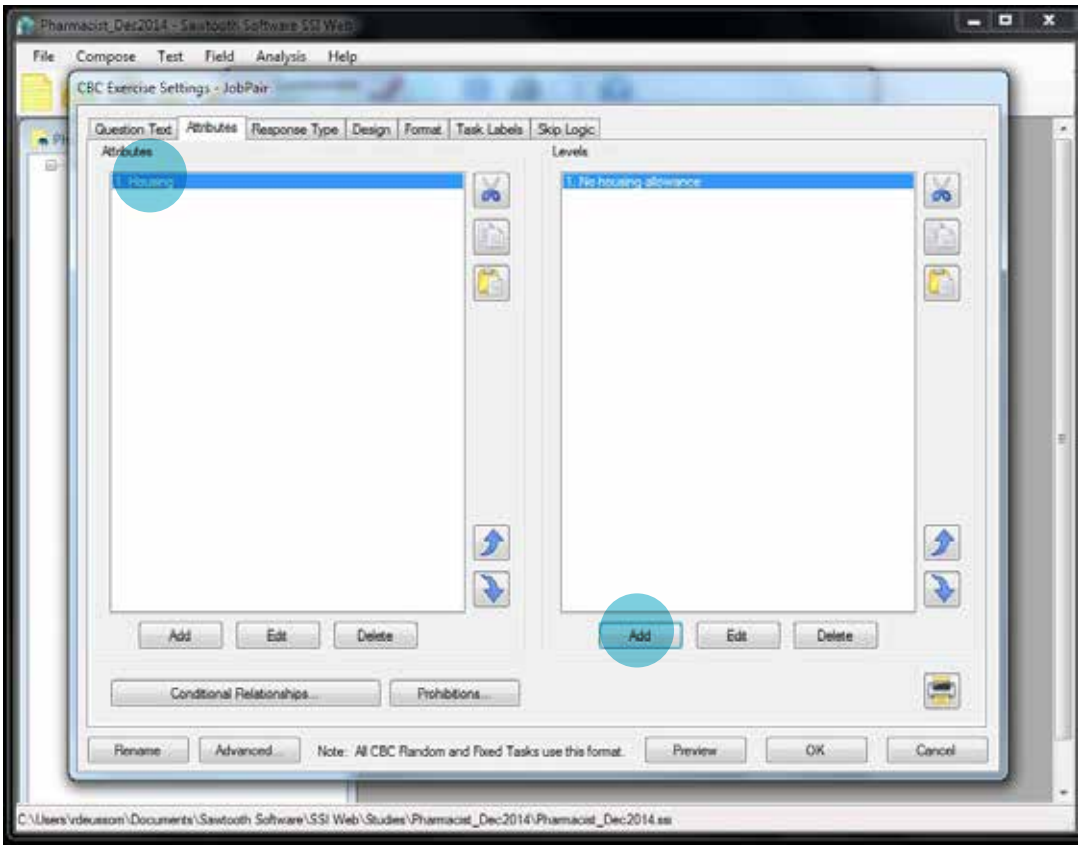
- Click Add at the bottom of the Levels column (see second circle in the figure above).

You will see this:



- Type the first level of the first attribute `(Housing)` in the cell Level Display Text (see top circle in the figure above). This will be the wording that the respondent will see in the survey. In the example preference pair in the figure above, this is: `No housing allowance.`
- Leave the cell Internal Label blank.
- Click OK (see bottom circle in the figure above).

You will see this:



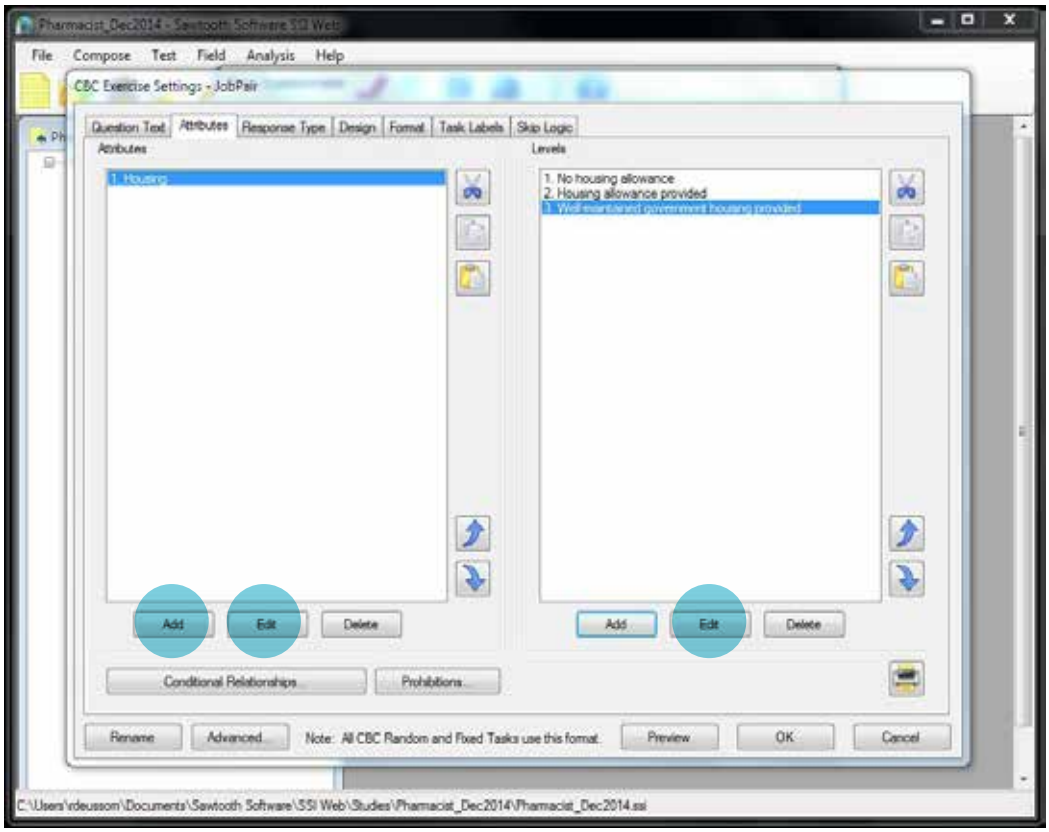
- Then, again with the first attribute highlighted at the top of the Attributes column (see top left circle in the figure above), click Add at the bottom of the Levels column (see bottom right circle in the figure above).

- Type the second level of the first attribute (`Housing`). Continuing with the Namibia example in Table 4, this is: `Housing allowance provided.`
  Leave the cell Internal Label blank.

- Click OK.

- Follow this step to add all levels of the selected attribute. For example, if an attribute (such as salary) has four levels (i.e., four different salary options), continue this process until you have added all four figures corresponding to the four levels for the salary attribute. As mentioned earlier, salary is a cardinal variable, meaning that the values of the levels are ordered. Therefore, you should list the levels in incremental order from lowest to highest salary option (i.e., from level 1 as the lowest salary option proposed through to level 4 or 5—depending on how many salary levels you will include in the survey—as the highest

level). For the first attribute of the Namibia example in Table 4, you will see something like this:



- To add the second job attribute (`Living Conditions` from Table 4), click Add (see left circle in the figure above) at the bottom of the Attributes column on the left.

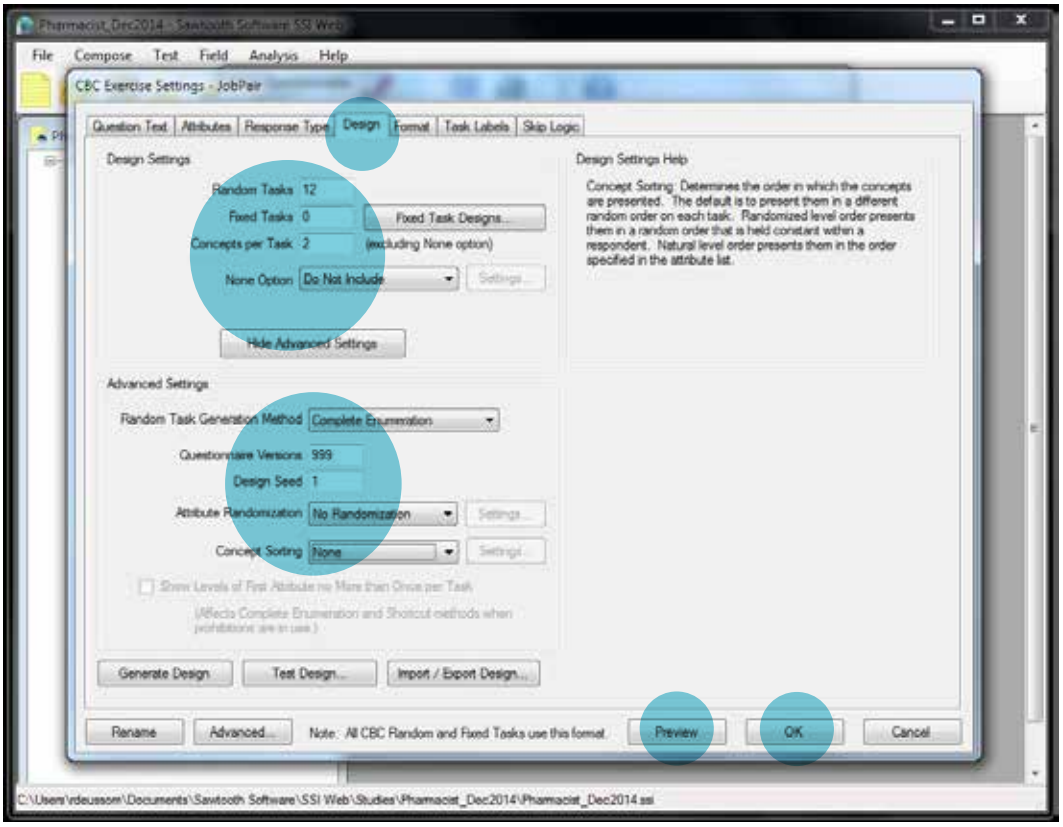
- If you want to make any changes to an attribute, click on the job attribute you want to correct to highlight it, then click on Edit (see middle circle in the figure above) under the Attributes column, and the Attribute Text box will open again, allowing you to revise the text you had entered. If you want to make any changes to a level, highlight the specific level you want to correct, click on Edit (see right circle in the figure above) under the Levels column, and the Level Text box will open again, allowing you to revise the text you had entered.

- Repeat these steps for all job attributes (remember that the recommended maximum is six attributes) and their corresponding levels (remember that the recommended maximum is five levels) to be included in the Rapid DCE survey.

Generate the design of the job preference pairs section

- In the CBC Exercise Settings box, go to the Design tab (see top right circle in the figure on the following page).

You should see a window similar to this:



- Next to Number of Random Choice Tasks, type 12.
- Next to Number of Fixed Choice Tasks, type 0.
- Next to Number of Concepts per Choice Task, type 2.
- Next to None Option, select Do Not Include.

(For all the steps above, see top large circle in the figure above.)

- Next to Random Task Generation Method, select Complete Enumeration from the drop-down menu.
- For computer-based survey administration ONLY: Next to Questionnaire Versions, type 999.
- For paper-based survey administration ONLY: Next to Questionnaire Versions, type 5.
- Next to Design Seed, type 1.

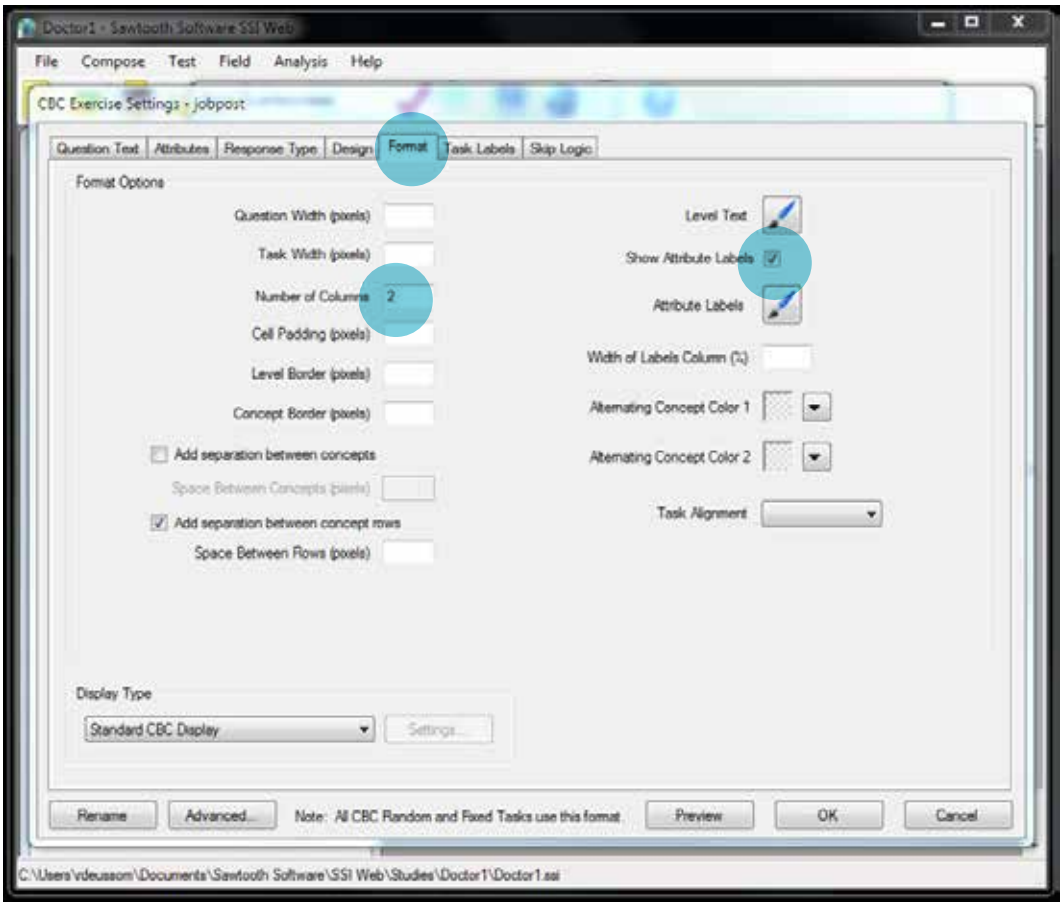
(For all the steps above, see middle circle in the figure on the preceding page.)

- In the box labeled Attribute Randomization (see bottom left circle in the figure on the preceding page), ensure that No Randomization is selected from the drop-down menu.
- In the box labeled Concept Sorting, ensure that None (see bottom left circle in the figure on the preceding page) is selected.

Format the job preference pair questions

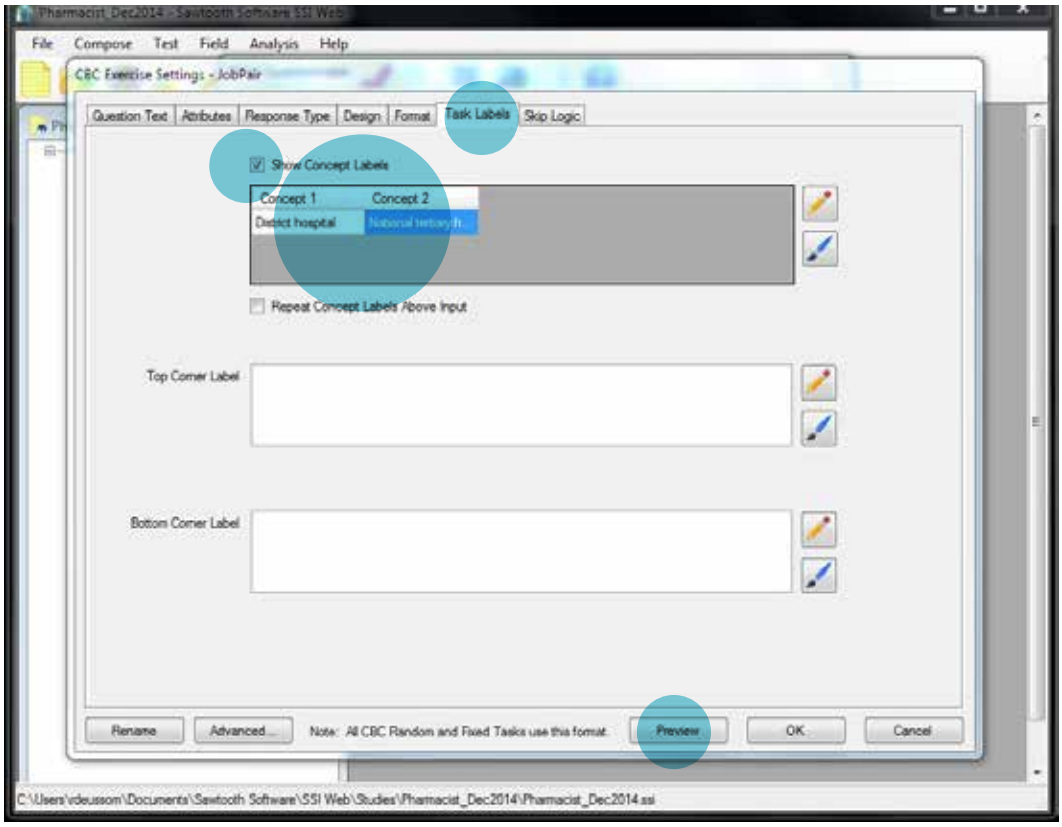
- Within the CBC Exercise Settings box, go to the Format tab (see top circle in the figure below).

You will see this:



- Next to Number of Columns, type 2 (see upper middle circle in the figure above).
- Check the box next to Show Attribute Labels (see middle right circle in the figure above).

- Click on the Task Labels tab (see top right circle in the figure below).



- Click to check the box next to Show Concept Labels (see top left circle in the figure above). Two columns labeled Concept 1 and Concept 2 will appear in the dark gray box below it. In the Rapid DCE, the concept is the type of job. Since we are interested in job preferences between urban and rural postings, the concept is a header to describe the job location. When you check the box, a window may open with a message such as: "Warning: Concept labels must be generic labels for concepts (such as "Option 1", "Alternative B", etc)..." Click OK.

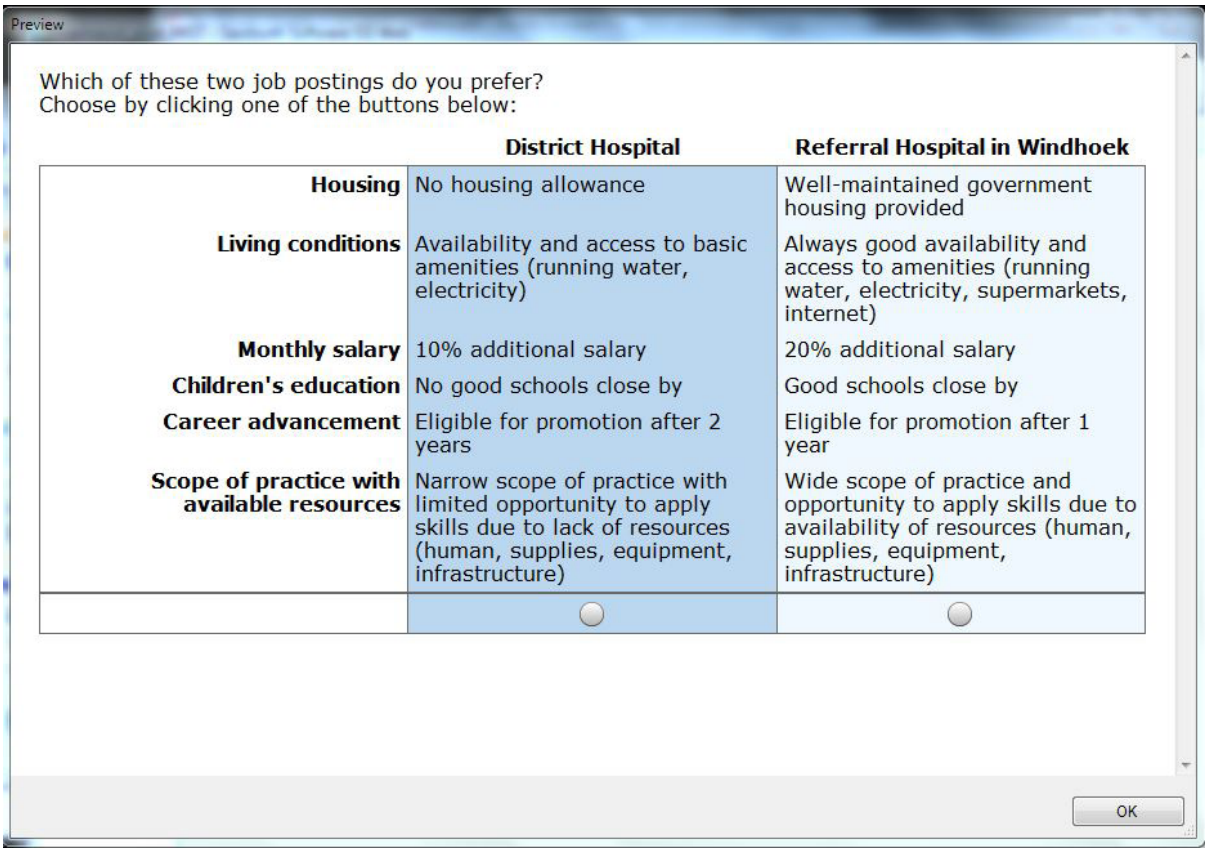
- Type the two different headers of the job postings under the Concept column headings, which represent each job's location or setting.

    - Under Concept 1, type the rural job posting header. In the Namibia example from Table 4, this is: `District hospital`.

    - Under Concept 2, type the urban job posting header. In the Namibia example from Table 4, this is: `National tertiary hospital` (see large circle in the figure above).

- Click the Preview button (see bottom circle in the figure above) to view what the job preference pair questions in the survey will look like. This will open the Preview window showing how the question format and wording will be displayed to respondents.

You will see something like this:



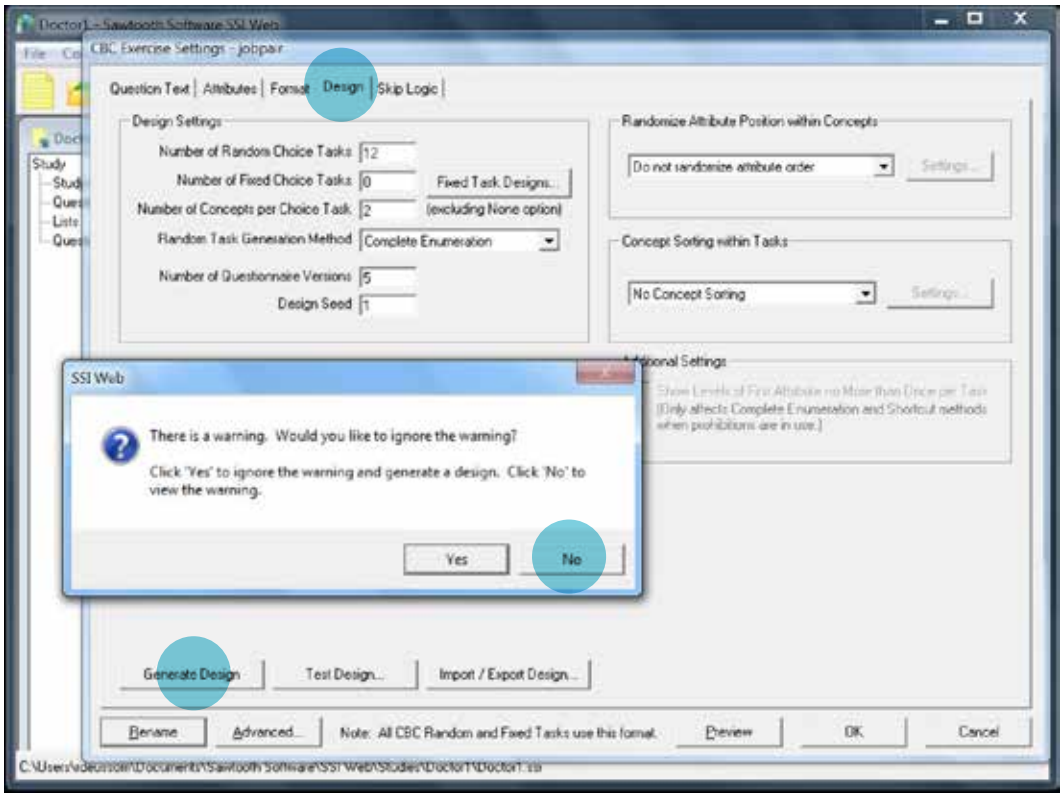
- Click OK on the bottom right of the Preview window when you are done. You can make any changes by going back to the Question Text, Attributes, or Task Labels tabs and adjusting your text entries.

Only when you have finished all the above steps:

- Return to the Design tab.

- .Click the Generate Design button (see bottom left circle in the figure below) at the bottom left of the Design tab (see top circle in figure below) tab of the CBC Exercise Settings window. **IMPORTANT: If you do not generate the survey design, then the combinations of job levels will not be correct, and the questions within your survey will not be meaningful.**

For paper-based administration ONLY: You may see this warning:



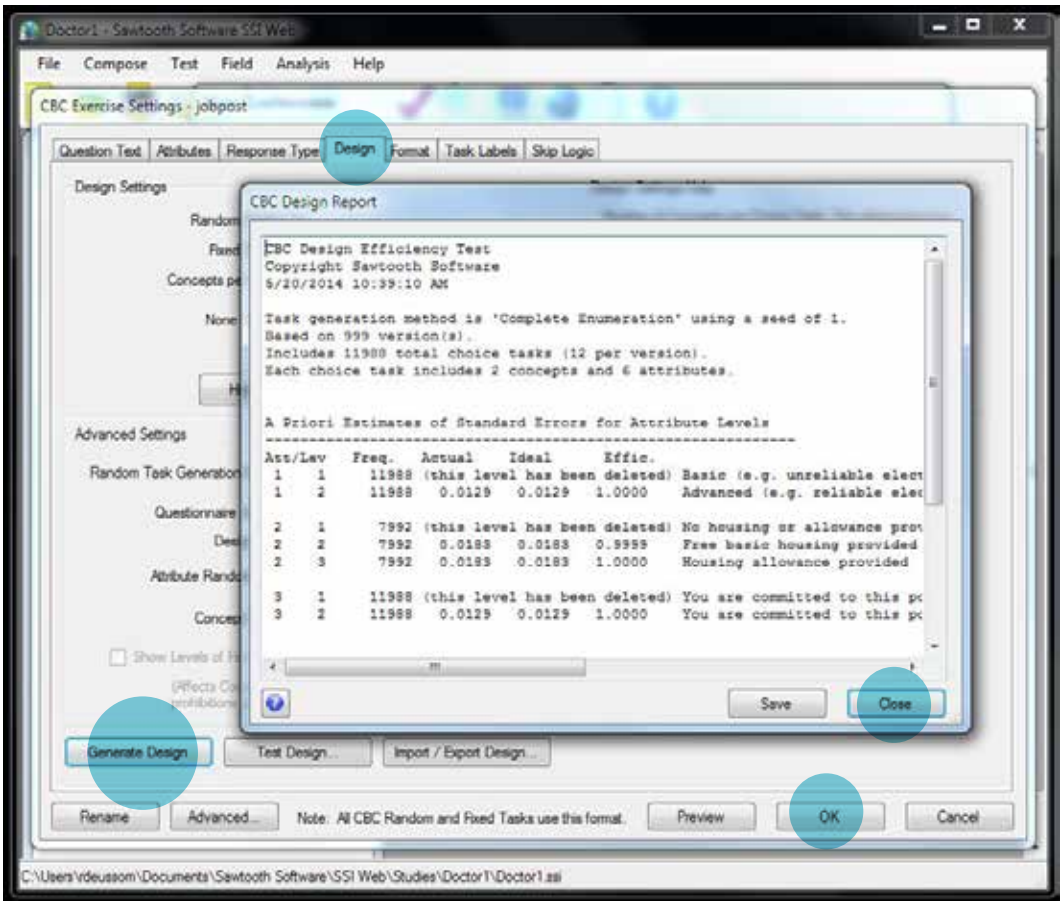
- Click No (see middle circle in the figure above) to view the warning to verify that it is only the following message:

Warning: CBC Exercise 'DCEMD' - The number of questionnaire versions you have selected (5) is potentially too low. If using standard computer interviewing, you may want to generate many more versions. If you plan to use paper-and-pencil interviewing, you should carefully consider the tradeoff between the benefits of more questionnaire versions and the extra work of managing many versions in the field. Depending on your study design, few versions may actually be needed to estimate main effects efficiently. In any case, we recommend you test the design to ensure at a minimum that you can estimate main effect part-worth efficiently. To test the ability of the design to estimate interaction effects, you may want to use the advanced test procedure to generate "dummy" data, run logit, and examine the standard errors of the interaction effects. (Please look in the help documentation for more guidance on testing designs and paper-and-pencil design strategies.)

- You may ignore and close the warning message window (by clicking on the red X in the upper right hand corner of the dialog box) because five versions of a survey will be sufficient to obtain results in the Rapid DCE. If you received another warning, read the description carefully so you can go back and try to fix any other identified errors.

- Click Generate Design (see bottom left circle in the figure above).

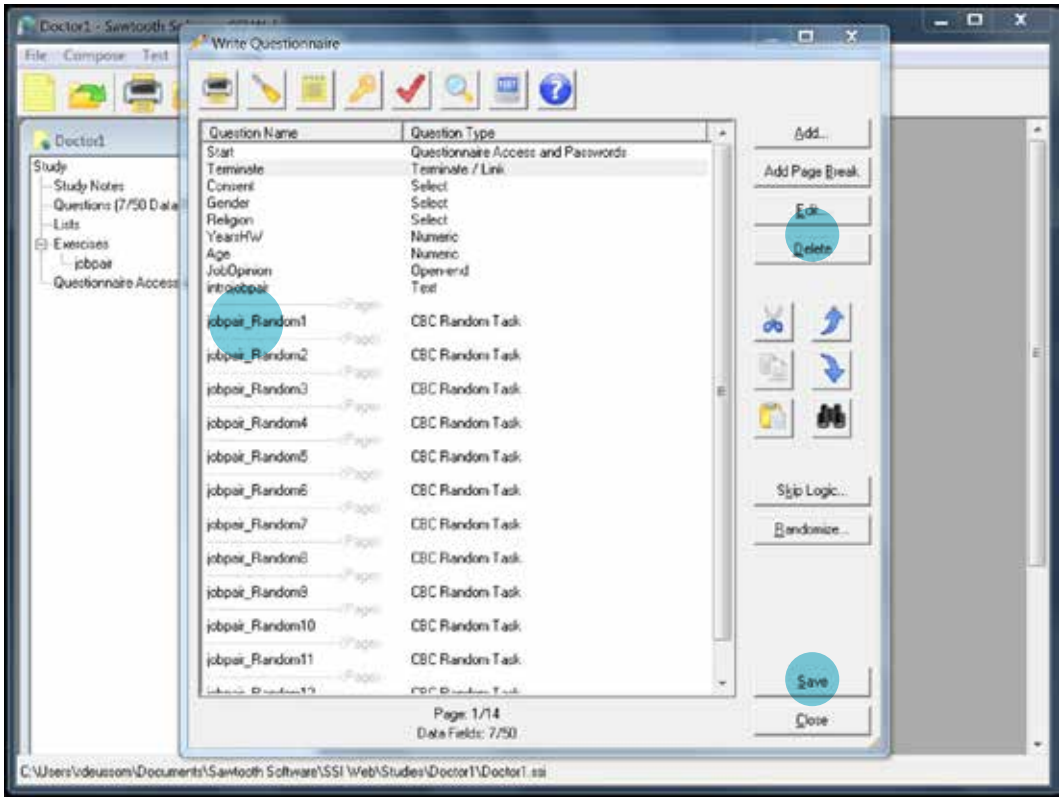
The software will generate a CBC Design Report. You will see something like this:



- There is no need to save this; the report is explaining tht the job attribute levels will be randomized in the various versions of the survey. Click Close (see top right circle in the figure above) and the window will disappear. Then, click OK (see bottom right circle in the figure above) at the bottom right of the CBC Exercise Settings window.

If you later return to the Sawtooth Software program to make any changes to the job preference pairs section of the Rapid DCE survey—that is to say, if you go back through any of the steps in Stage 3, Step 3 and make adjustments to the job attributes or levels—the Generate Design button should be clicked again as a final step. However, if you have begun administering your survey in the field and are collecting data, you should not make changes to the format or design, as this may affect your study results.

The Write Questionnaire window should now show the job preference pair questions, like this:



- Click Save (see bottom right circle in the figure above) on the bottom right of the Write Questionnaire to save your work.

- If you would like to revise a supplemental question, click on that question's variable name (e.g., Gender) to highlight it and click the Edit button (see top right circle in the figure above). This will take you back to that question's entry screen. If you want to make changes to an attribute or level, click on any of the job preference pair question names (e.g., jobpair_Random1 in the figure above) to highlight it (see left circle in the figure above) and click the Edit button (see top right circle in the figure above). This will take you back to the CBC Exercise Settings window with the various tabs.

- If you make any adjustments to a job attribute or level, remember to go to the Design tab and click Generate Design on the bottom left. An SSI web dialogue box may pop up stating: "Making this change will invalidate the current CBC design file for the CBC exercise named 'jobpair.' If you are currently fielding your survey or have already collected data using this design, we recommend that you NOT make this change. Would you like to continue and delete the design file for the CBC exercise named 'jobpair'?" If you have not already begun data collection, click Yes to generate a new Rapid DCE survey design.

- **Remember, do not make any changes to the survey for a particular cadre if you have already begun collecting data from that cadre.**

Step 4: Organize the Survey Instrument

Once you have created the general introduction, informed consent, supplemental questions, introduction to the job preference pairs, and the job preference pair questions in Sawtooth's SSI Web software program, you should spend some time organizing the instrument so that the sections are ordered in an appropriate manner for either computer or paper-based surveys. Using the steps described below, you will arrange the survey instrument so that ultimately all the sections will be in the following order:

1. General introduction (labeled Start under the Question Name column and designated as Questionnaire Access and Passwords under the Question Type column of the Write Questionnaire window)

2. Informed consent (listed as Consent)

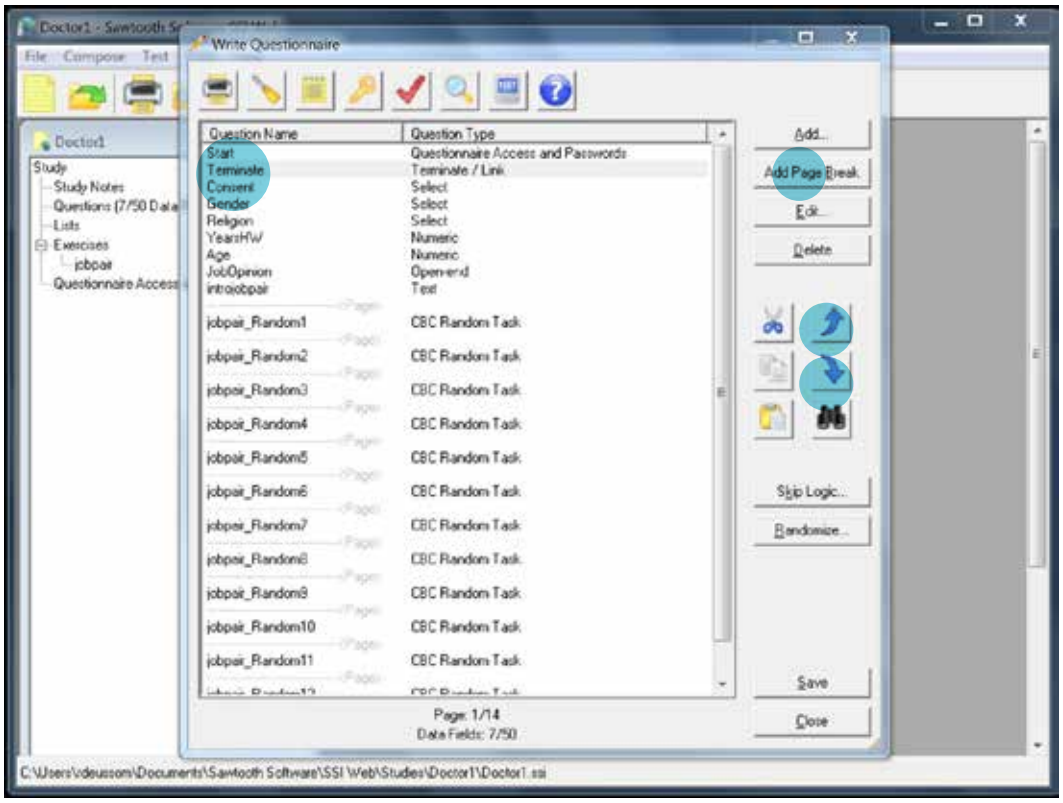
3. Supplemental questions (listed as Gender, Religion, Age, Opinion based on the example questions used in the previous steps)

4. Introduction to job preference pair questions (labeled introjobpair)

5. Job preference pair questions (listed as jobpair_Random 1 thru jobpair_Random 12)

6. Terminate question (called Terminate, this is the closing statement we had created earlier saying This marks the end of the survey. Thank you for your time.)

You can organize the survey instrument from the Write Questionnaire window, which at this stage should look something like this:



If you have followed the steps in the order they are presented in Stage 3, then most of the sections and questions in the Rapid DCE survey should be in the proper order. One change you must make is to move the Terminate question (see top left circle in the figure above) to the end of the list as it should be the last page of the survey. As you recall, we developed the Terminate question prior to including the informed consent section so as to allow a respondent to opt out of participating in the survey.

You can move the Terminate question and any other questions (for example, if you want to change the order of the supplemental questions) with the following steps:

- Click on the Terminate question (see top left circle in the figure above) under the column Question Name in the Write Questionnaire window to highlight it.

- Click the downward-pointing blue arrow (see lower right circle in the figure above) to move the question down to the end. You will need to press the arrow several times until you have moved the Terminate question to the end of the list.

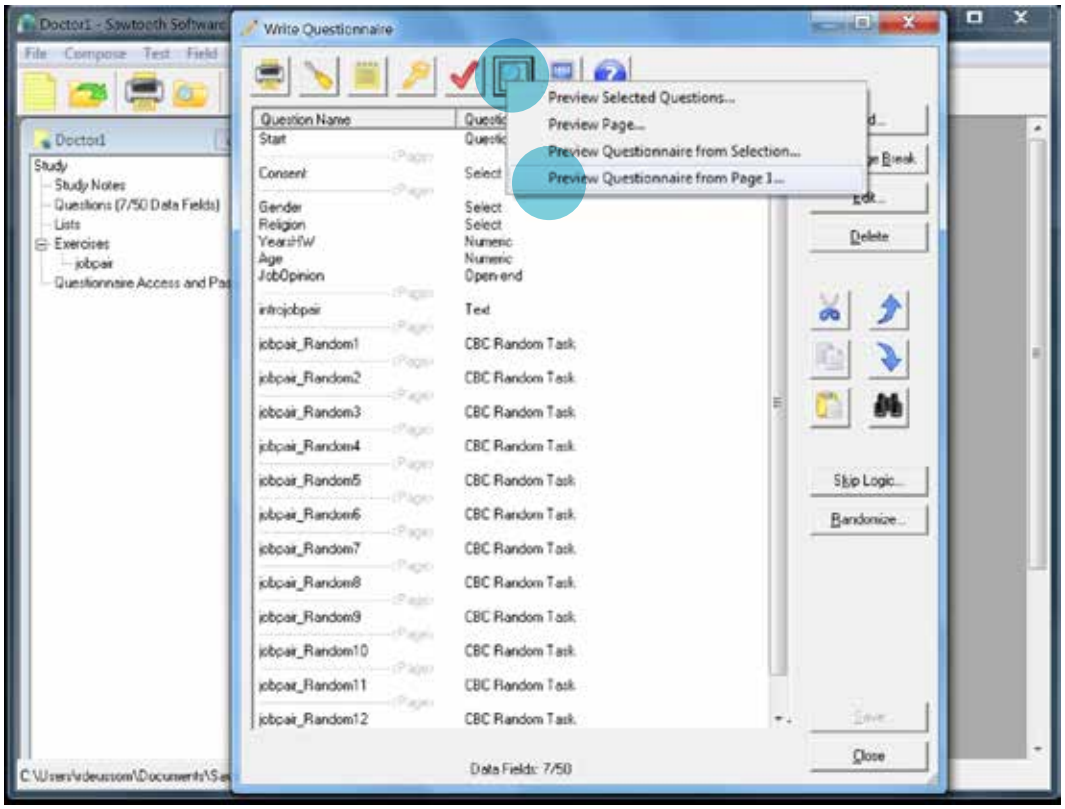
- If you want another question (for example, a supplemental question), to appear higher in the question order, you can move it up by clicking the upward-pointing blue arrow on the right side of the window (see middle right circle in the figure above).

You will note that the software already generated page breaks between certain sections and questions (e.g., between introjobpair and all jobpair_Random questions). You should also add page breaks so that different sections and questions will appear on different pages. For example, the introduction to the overall survey (represented by the Start line item under the column Question Name) should be on its own page; this should be followed by the informed consent on its own page since respondents should not be able to see any of the survey questions until after they have provided consent.

For ease of computer-based survey administration it is recommended that you add a page break between each supplemental question so that the respondent only sees and answers one question per page. (However, in a paper-based survey the supplemental questions should be grouped as many as fit on a page so as not to waste paper unnecessarily). The introduction to the job preferences (represented by introjobpair in the example above) should be on its own page. Likewise, the Terminate question cannot be on the same page as a job preference pair question—it must be on a separate page or you will get an error message when you go to prepare the file for computer administration in Stage 4.

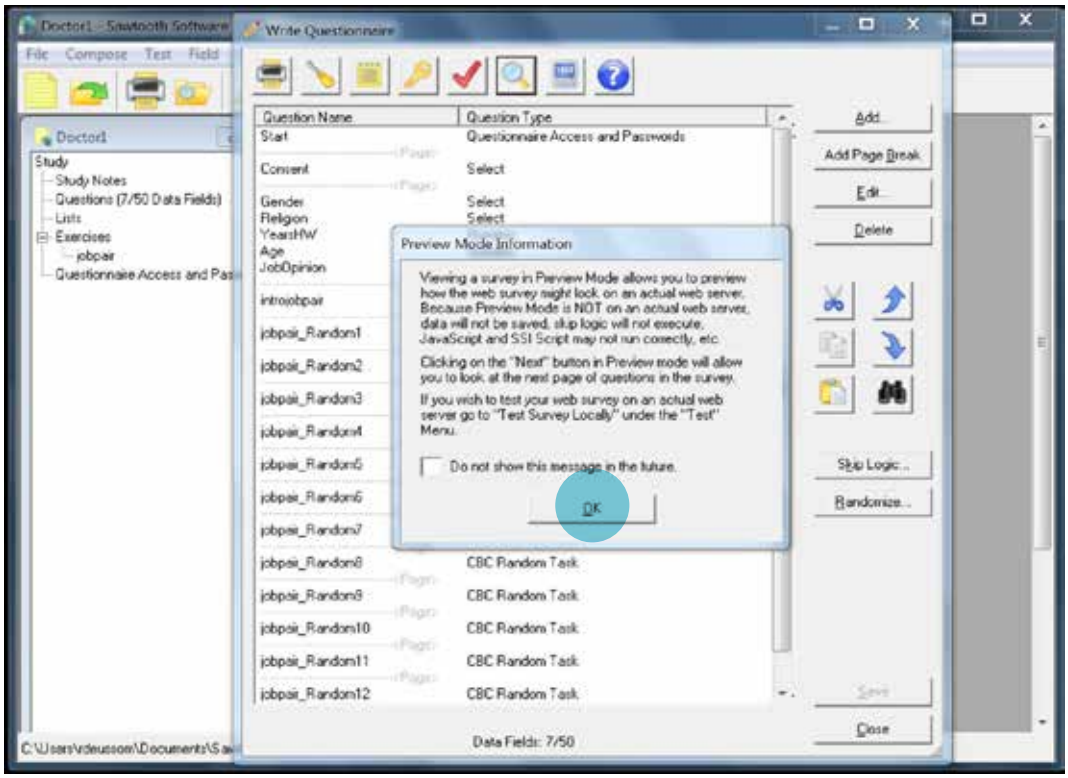
- To add page breaks after a question, click on the specific question in the Question Name column to highlight it, and then click the Add Page Break button on the right side of the window (the top right circle in the figure on previous page). If you are administering a computer-based survey, then it is recommended that you add a page break between every demographic question in the survey so that the survey respondents will only see one question at a time.) Since you have moved the Terminate question to the end of the question list, you need to add a page break immediately before it. To do this, click on jobpair_Random12 under the Question Name column to highlight it in color. Then click Add Page Break as noted above.

- Be sure to click Save on the bottom right of the Write Questionnaire window to save the changes you are making to the order of the sections of the survey instrument.

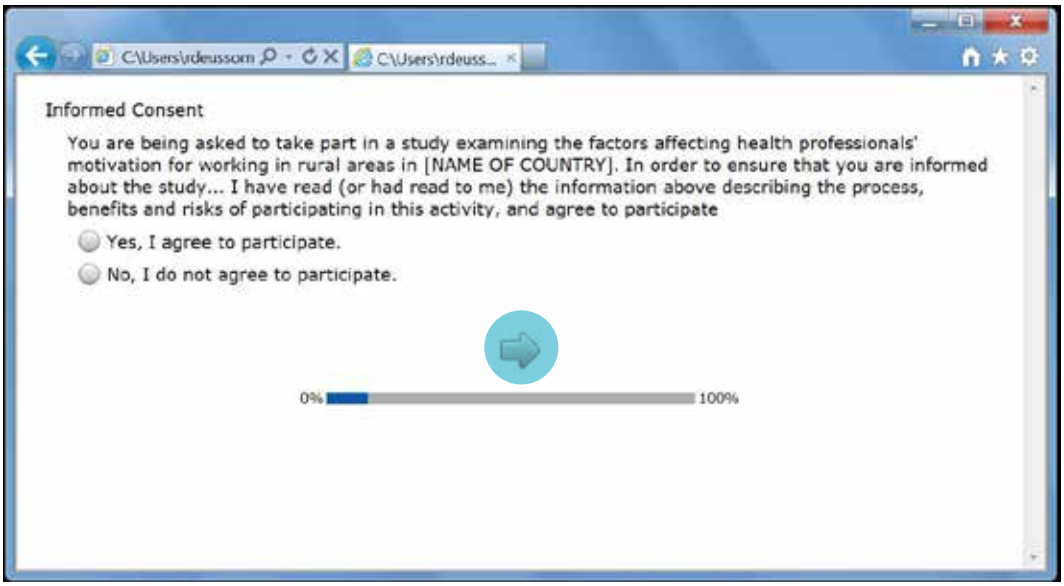


- You can see how the survey will look on the computer screen (if computer-based) or on each page of the printed paper-based surveys by clicking the Preview button (an icon of a magnifying glass) on the top of the Write Questionnaire window (see top middle circle in the figure above), and then selecting Preview Questionnaire from Page 1 (see bottom circle in the figure above) from the drop-down menu. This will allow you to view the survey instrument as it will look to respondents.

- A message window will open to inform you that any data that you input into this Preview mode survey will not be saved (see figure below). Click OK (see circle in the figure below) in the Preview Mode Information dialog box.



- The survey questionnaire will then appear in a new window on an Internet browser (see figure below). You do not need an Internet connection to view the survey in Preview Mode.



- You can move from page to page by clicking on the arrow on the bottom of each page (see circle in the figure above). Then, if you recognize changes that need to be made to the instrument, you can go back in to the Write Questionnaire window and make edits by clicking on the specific Question Name to highlight it and clicking on the Edit button on the far right of the Write Questionnaire window.

- If you make any changes to the questions or any of the other components of the survey, remember to generate the design again. The Generate Design button is located in the Design tab of the CBC Exercise Settings window.

STAGE 4:
PREPARING FILES FOR SURVEY ADMINISTRATION

As you prepare files for survey administration, remember to follow the color-coded icons to distinguish the steps for computer-based versus paper-based survey administration. The computer-based section starts on this page. The paper-based section starts at the bottom of page 88.

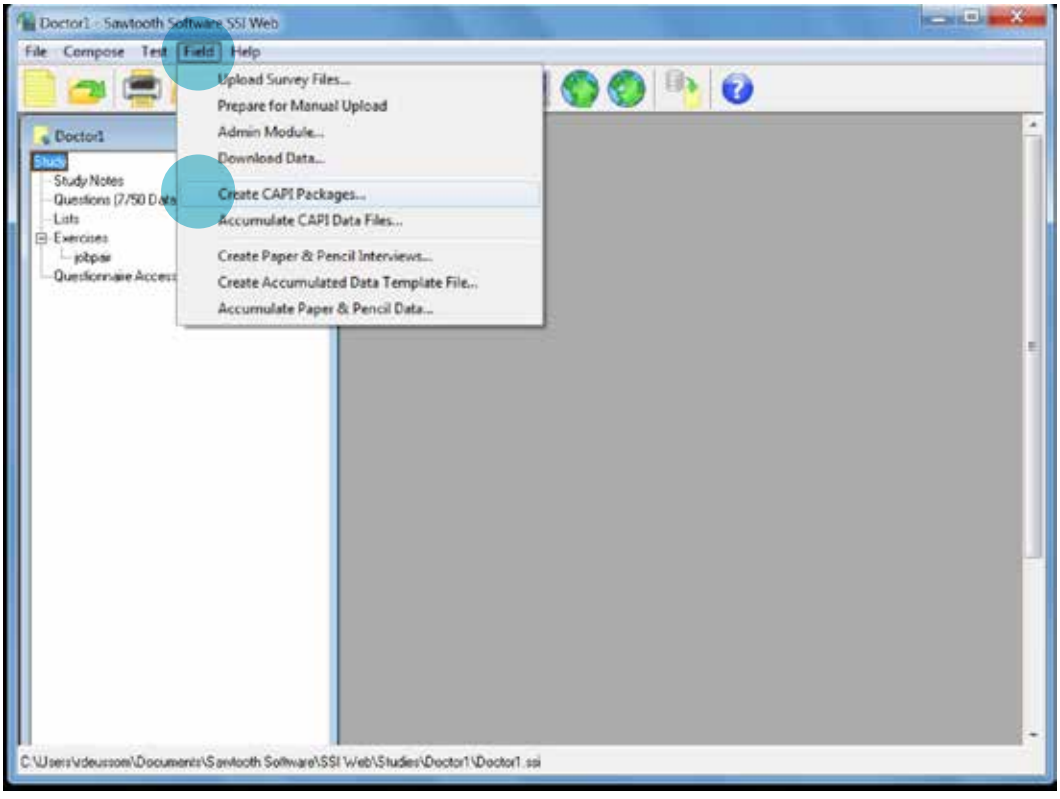
Step 1: Prepare File for Computer Survey (ONLY for Computer-Based Survey Administration)

Once the survey instrument has been successfully created in the Sawtooth SSI Web software, the next step is to prepare the file for administration on the computer. Complete this step only if you are conducting a computer-based survey. If you will be administering the survey on paper questionnaires, do NOT complete this step. Instead, follow the instructions outlined in Step 1 (alternate) below.

The Sawtooth Software refers to the files used to administer the survey as CAPI (the acronym stands for "computer-aided personal interview") files.

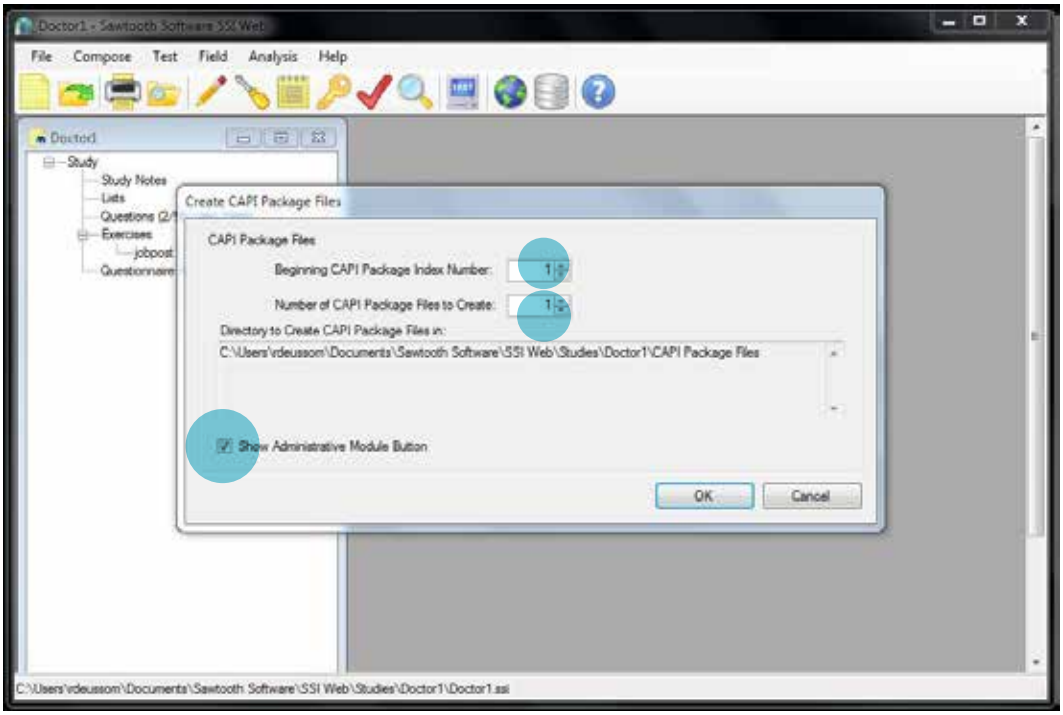
- To prepare the final CAPI file, save your work in the Write Questionnaire window by clicking on the Save button on the bottom right of the window, and then click the Close button.

- Across the top tab of the window, click Field > Create CAPI Packages… (see top and bottom circles in the figure below).



If there are any errors in the instrument, a window will open that tells you what the errors are and what needs to be fixed. You should pay close attention to this message. **You cannot finalize the instrument until all of these errors are fixed.**

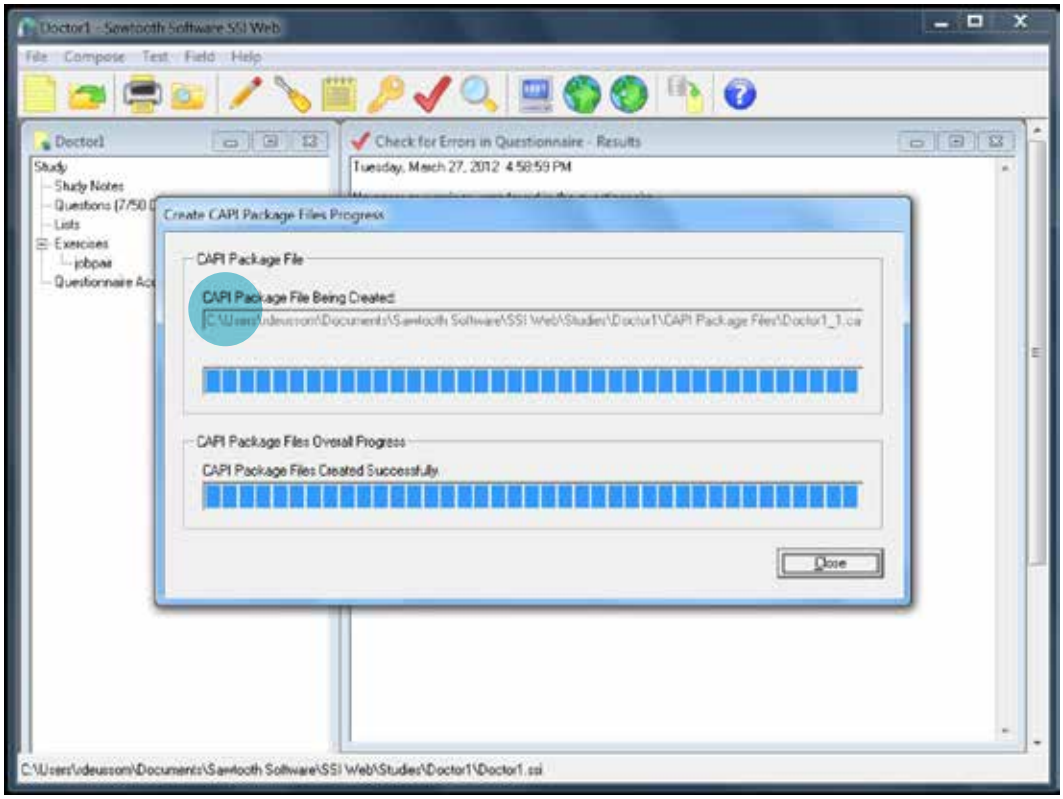
When you click Create CAPI Packages… and there are no errors, you will see this:



- Next to Beginning CAPI Package Index Number, type `1` (see top circle in the figure above).
- Next to Number of CAPI Package Files to Create, type `1` (see middle circle in the figure above).
- Click on the arrow to the left of the Show Administrative Module Button (see bottom left circle in the figure above). This will allow you to view all data entered on each computer.
- Click OK.

A SSI Web dialog box will open to say "The directory specified to create files in does not exist. Would you like to have it created?" Click Yes.

The software will create a file with the extension .CAPI and save it to the location on your computer that you have previously identified as the SSI Web project directory. You will see this:



Write down the name and location where this ".CAPI" file is being stored on your computer (see circle in the figure above) so you can find it easily later. You will need to use this file to administer the survey. A full explanation of how to use this file to administer the survey is provided in Stage 6, Step 1.

- Click Close.

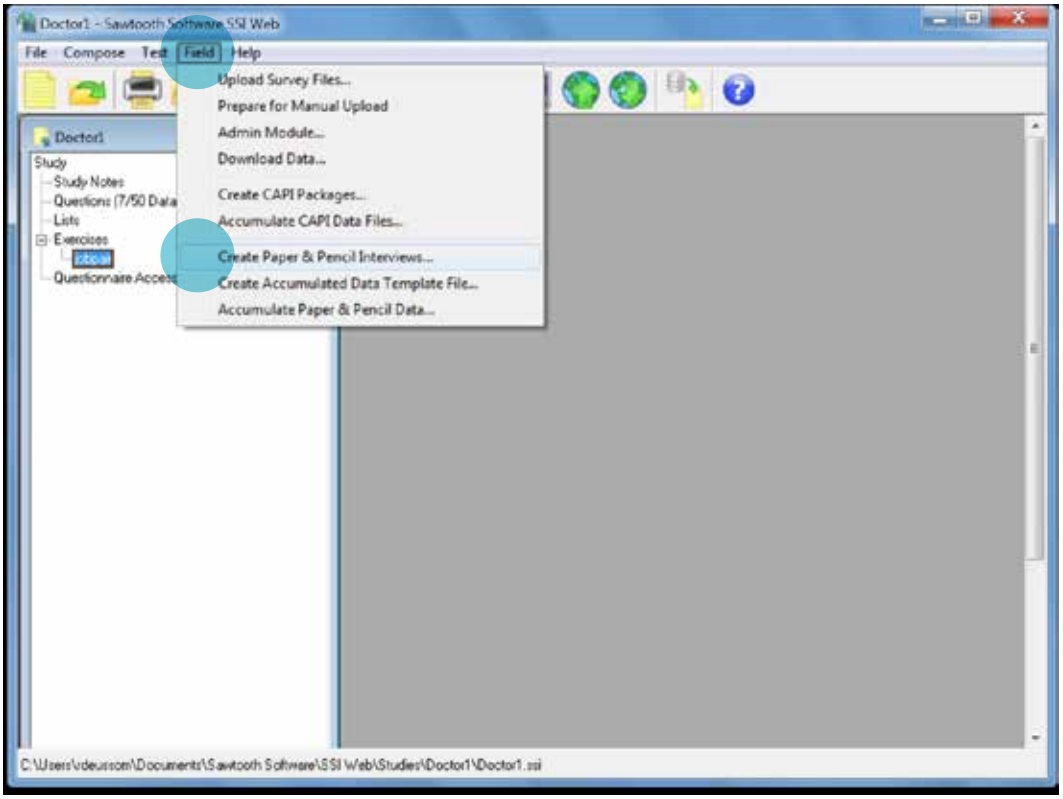
Step 1 (Alternate): Prepare Paper-Based Survey (ONLY for Administration with Paper Questionnaires)

If you are not able to administer the survey to respondents on computers, you can produce paper-based surveys using the Sawtooth SSI Web software for respondents to complete. If you are doing a computer-based survey, do NOT complete this step (you should follow Step 1 above instead), as it only applies to paper-based survey administration.

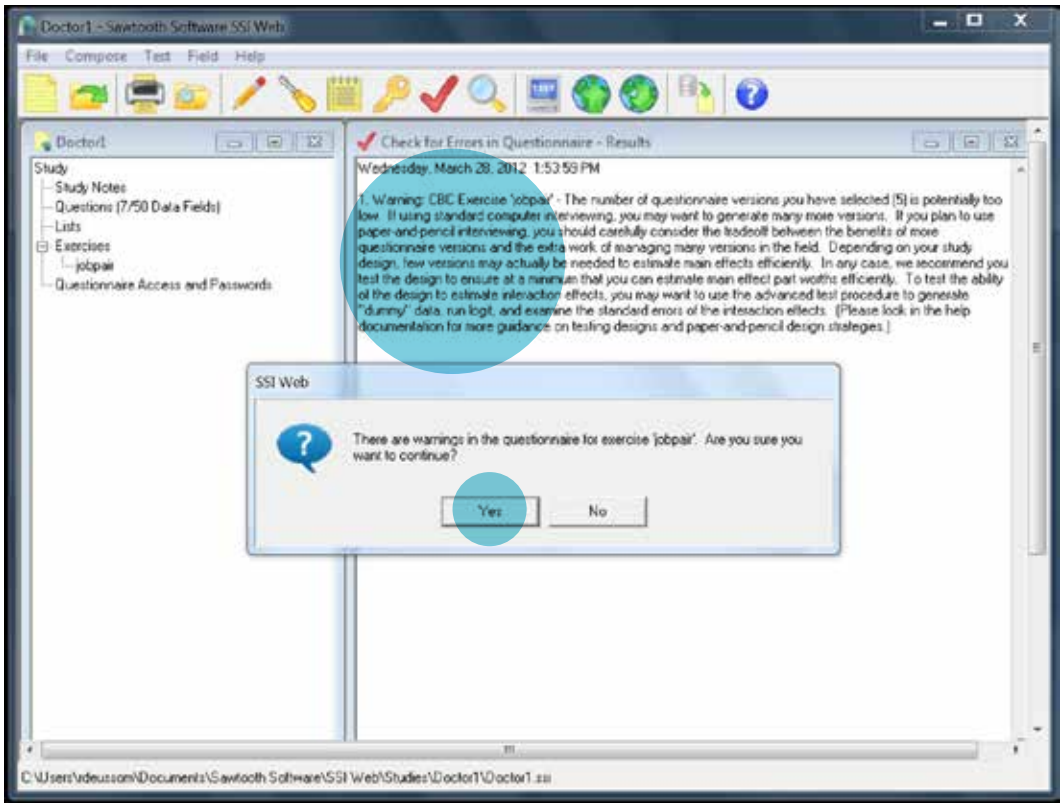
As you recall, in Stage 3 we generated a Rapid DCE survey design for a selected cadre stipulating a total of five different questionnaire versions of randomized job preference pair question combinations. Now you need to print out the five versions of the survey questionnaire so that

you can have them photocopied to administer to respondents (further instructions regarding administering them in the field are provided in Stage 6, Step 1 [alternate]). To do this:

- Across the top of the Sawtooth Software window, click the Field tab (see top circle in the figure below) > Create Paper & Pencil Interview (see bottom circle in the figure below). If you have the Write Questionnaire window open, you will need to close it first (by clicking on the Close button on the bottom right of the Write Questionnaire window). Be sure to first save your work (by clicking on the Save button located above the Close button).

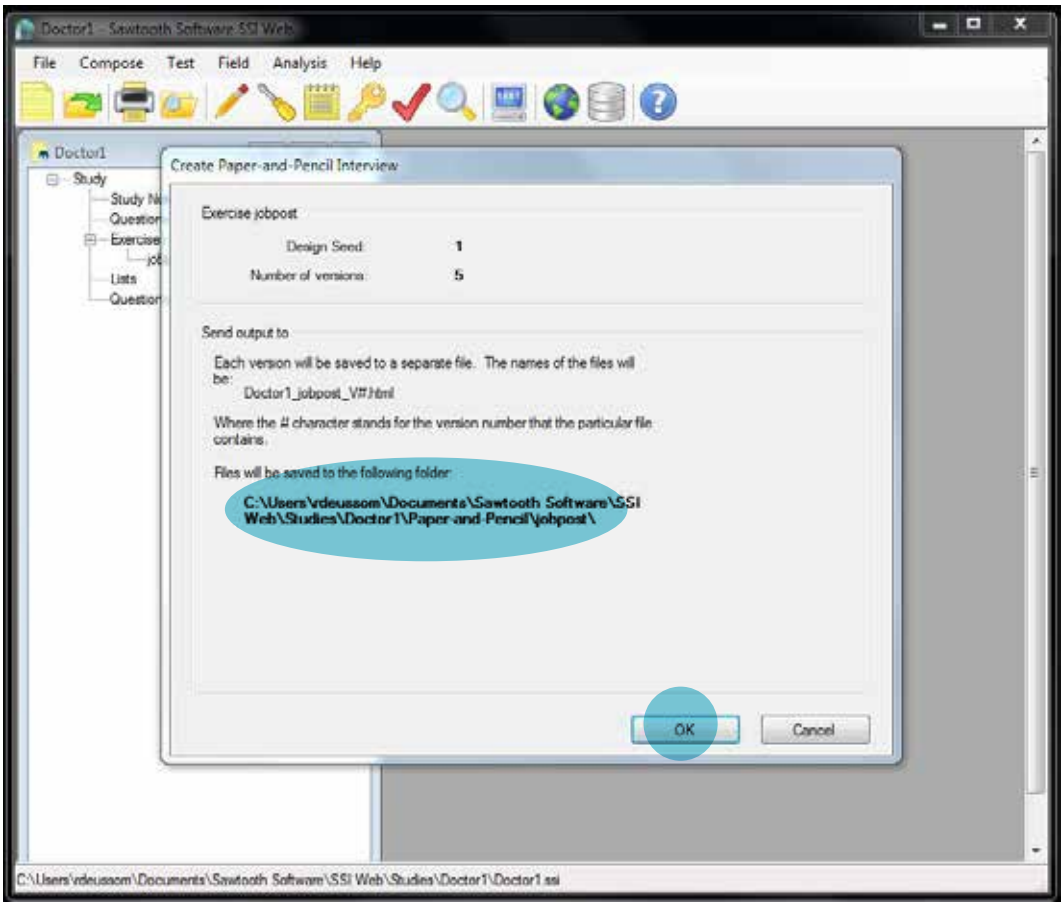


A window may appear with the following warning (see large top circle in the figure below), which we have described earlier:



- Click Yes (see bottom circle in the figure above) as five versions is an appropriate amount for statistical relevance.

A window titled Create Paper-and-Pencil Interview will open and will look like this:

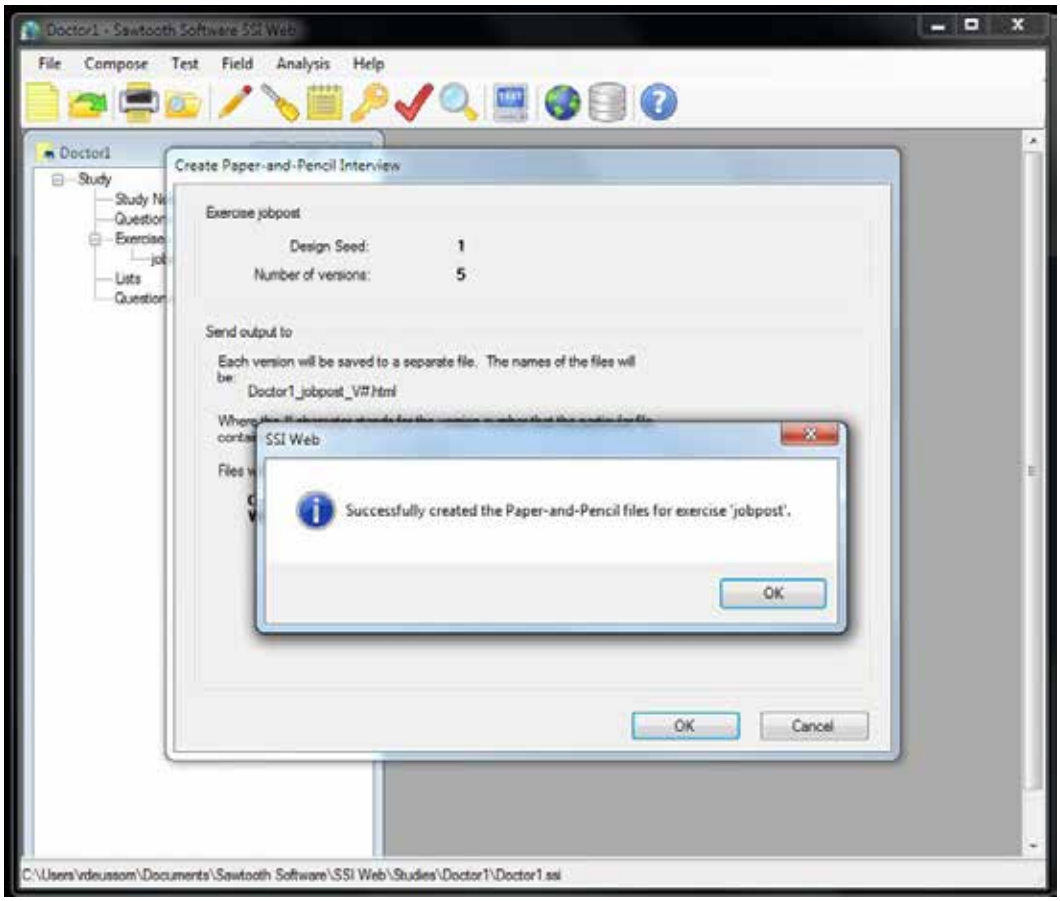


The software will create five files with the extension ".html" and save them to the location on your computer that you have previously identified as the SSI Web project directory.

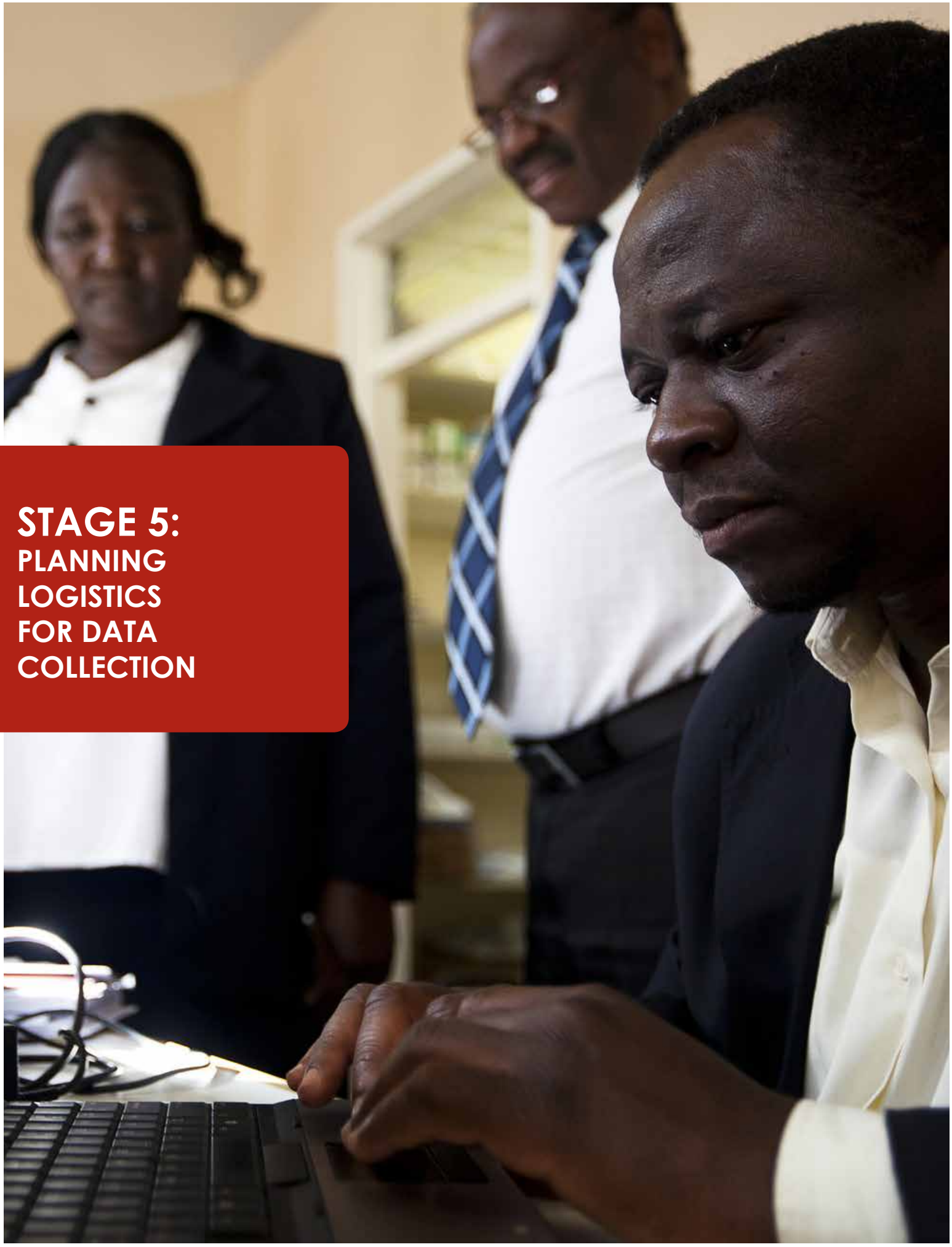
Please make note of the location of these ".html" files on your computer (see top middle circle in the figure above) so you can find this folder to then print and photocopy these files to administer the paper-based survey. A full explanation of how to use these files to administer the survey is provided in Stage 6, Step 1 (alternate).

- Click OK (see bottom right circle in the figure above).

You will see the following, notifying you of your successful creation of the job preference pair questions section for the paper-based surveys:



- Click OK to close the window.



STAGE 5:
PLANNING LOGISTICS FOR DATA COLLECTION

As noted in Stage 1, prior to conducting any data collection, ensure that you have obtained any needed ethical clearance from your national IRB.

Step 1: Plan Logistics for Target Sample of Students (to Identify Attraction Strategies)

Identifying the most appropriate strategies for attraction of health workers to rural and other underserved areas involves surveying students who will soon finish their training programs. In particular, the preferred target population for a Rapid DCE aimed at understanding preferences for attraction strategies is **students in the final year of their training program**. However, depending on circumstances, you may need to survey students in their second-to-last year of the program, ideally if they have already experienced clinical practice to give them an idea of what their future potential work settings may be. For example, if students in their sixth and final year of their medical training are dispersed throughout the country doing a clinical practice semester, you should target the fifth-year medical students due to time, logistical, and resource challenges for obtaining a large enough sample size. The general principle is that you should include the population that most closely resembles the target group for the actual incentives.

The first step in planning the logistics of interviewing these students is identifying the particular schools or universities where the cadres of interest are taught. Once the schools are identified, it will be necessary to set appointments and meet with representatives from the universities and programs of interest.

Setting appointments

The meeting can be planned and scheduled over the phone based on the availability of the university or school administrator. The university or school contacts can be obtained from the Ministry of Health or from another organization that has been working closely with the university or school. It is very useful if the contact person from the Ministry of Health or other organization calls and introduces the Rapid DCE study team to the university or school administrator (i.e., dean, registrar, or principal). In some instances e-mail can be utilized to send the Rapid DCE survey documents that include the letters of approval from the Ministry of Health and/or the national IRB and a brief concept note of the proposed activity. A checklist of the points to be discussed should be prepared, and, if possible, shared beforehand with all those invited to the meeting. This will ensure that the meeting is precise and is focused on the issues at hand.

Meeting with administrators

During the meeting, explain the study and which groups of students you are interested in including in the Rapid DCE survey. Share with meeting participants the concept note for the study, as well as the letter of support from the Ministry of Health and/or the national IRB's approval, as appropriate.

By the end of the meeting make sure you have obtained the following:

1. A contact person designated by the senior administration to be the focal person for the Rapid DCE survey activities. Ask for the mobile number of the focal person. It will be helpful if you can meet him/her in person during or after the meeting to plan further logistics of the study.

2. A list of all the students who fit the criteria of the study. This list will assist in preparing an efficient schedule for administering the surveys.

3. (If the survey will be computer-based) permission to use the institution's computer lab (if available). With the help of the focal person, visit the computer lab and meet the person in charge of the computer lab to explain the activity. Inquire about the number of functional computers. Explain that software will need to be installed onto the computers (and will be removed at the end of the activity). The installation process will usually require the system administrator password, and arrangements need to be made for this. It is ideal if the person in charge of the computer lab can be available during survey administration for any necessary troubleshooting. Ask if there is anything that needs to be done beforehand to ensure the availability of the computer lab.

4. Agreement on the convenient date and time to conduct the survey. This should factor in holidays, students' clinical and rural placements, and examination periods to ensure minimal disruptions to school activities.

Scheduling with students

In addition to meeting with university administrators, it is very important to make contact with the student population representing the selected cadres. Administrators can provide general information and give invaluable support, but the students themselves must agree to any scheduled meeting time if high response rates are to be expected.

To schedule specific meeting times with students, you may work directly with designated student leaders. Administrators can help provide the names and contact information of the student leaders. It will be important to contact student leaders directly, as early as possible, to better understand class schedules and free periods. Determine with student leaders when a free period in the class schedule occurs, and schedule a block of time during this free period for students to take the survey in the computer lab or other designated location (e.g., classroom or other quiet meeting room) where a paper-based survey can be administered.

When you are working with student leaders to schedule a time for students to take the survey, it is important to consider the following points:

1. Student schedules are often inflexible, so it will be necessary for the survey implementation team to be flexible and work around student schedules.

2. Computer lab availability may also be relatively inflexible, so it will be necessary to coordinate both the computer lab schedule and student schedules to find a time when both are available.

3. Explain that the survey should take approximately 20-30 minutes to complete.

4. Depending on the local context, you may consider providing participants with a small incentive to ensure high response rates. The type of incentive should be appropriate in the local setting and fit within available resources.

5. It is likely that not all students in the cadre population of interest will present themselves to take the survey at the agreed-upon time. As such, time for rescheduling should be factored into the schedule from the start.

Step 2: Plan Logistics for Target Sample of Health Workers (to Identify Retention Strategies)

Identifying the most appropriate strategies for retention of health workers in rural and other underserved areas involves surveying currently practicing health workers. In certain settings it may be appropriate to schedule health workers to travel and meet at a central location for survey administration. However, it is more likely that the survey implementation team will have to travel to health facilities where these workers can be found. The remainder of this step describes a process to address the latter situation.

The first step in planning the logistics of interviewing these health workers is identifying the particular districts of the country where an appropriate sample of potential respondents can be found. Once the districts have been identified, it will be necessary to set appointments and to meet with representatives from these districts.

Setting appointments

It will be important to plan in advance a meeting with the administrative head of a selected district's health team. Ideally, meetings should be held in all districts in the selected sample. However, time and logistical constraints may make this difficult. The meeting can be planned and scheduled over the phone based on the availability of the head administrator. Information regarding how to reach these district administrators may be obtained from the Ministry of Health or from another organization that has been working closely with the district. It is very useful if the contact person from the Ministry of Health calls and introduces the team to the district health director. The Rapid DCE study documents can be sent ahead of time via e-mail (if available). As district managers have multiple commitments, follow up on the appointment at least two days before the appointment. Again, a checklist of the points to be discussed should be prepared and distributed beforehand. This will ensure that the meeting is precise and focused on the issues at hand.

Meeting with district administrators

It is helpful if an official from the relevant department from the organization you are working with (i.e., Ministry of Health, faith-based organization, or nongovernmental organization [NGO]) accompanies you when you meet with the district health administrator. During the meeting, explain the activity and the selected cadres of interest and provide a copy of a brief concept note and a letter of support from the organization conducting the study (i.e., Ministry of Health, faith-based organization, or NGO).

By the end of the meeting make sure you have obtained the following:

1. Names and locations of nearby health facilities and the number of health workers within each cadre of interest. The number of health facilities to be included will depend on the resources available (financial, human, time). Remember that the minimum sample size for the Rapid DCE must be at least 50 respondents within each cadre of interest. However, if you have the resources available, we recommend surveying additional respondents beyond the minimum of 50 since a higher sample size increases the statistical rigor and accommodates any nonrespondents or possible missing data.

2. Approval from the district administrator to conduct the survey with district health workers. The administrator can provide information on the best way to communicate with the appropriate health facilities any protocols that will need to be observed in order to access the selected health workers at these facilities, and how best to incorporate health workers in the survey so as to have as little interruption in health service provision as possible.

Team travel

If the survey implementation teams will be traveling to health facilities where health workers are employed (rather than bringing health workers to a central location), the Rapid DCE survey can include extensive travel, depending on the distance between districts as well as between facilities within a district. It may be helpful to have two to three teams of four to six members with each team covering a specific geographical region. Then each team can be subdivided into smaller teams of two to three (depending on the availability of vehicles) to visit the selected health facilities across the district or region.

Each team should have a designated leader. The ideal team leader will be the most senior member of the team or the member with the most extensive knowledge and experience with the country's health system. Team leader responsibilities include:

- Facilitating meetings at health facilities
- Coordinating the travel schedule
- Ensuring that the target sample size is reached
- Troubleshooting challenges that occur during field work
- Managing the overall work of the rest of the team
- Assisting to administer the survey to respondents.

STAGE 6:
COLLECTING DATA

You are now ready to collect data. Please remember to follow the correct steps according to whether you are administrating a computer-based or paper-based survey, respectively. You will note the computer and paper icons on the margins to guide you.

NOTE FOR INTERNET-HOSTED COMPUTER-BASED SURVEYS

If you are administering an Internet-hosted survey, please skip to Stage 7 as Stage 6 is not applicable. Please refer to www.sawtoothsoftware.com/support/videos/survey-hosting-service for additional information.

Step 1: Set Up for Computer-Based Survey Administration

If respondents will take the survey on a computer, it is necessary to use the Sawtooth Software SSI Web CAPI module. **The CAPI module is a basic software program that is only used to administer the survey on the computer.** You have already seen how the SSI Web CBC software is used to create the instrument and produce the .CAPI file with the instrument information (Stage 4, Step 1). The CAPI module will use the .CAPI file the Sawtooth Software produced during the survey instrument design process to provide the respondent with the screens needed to complete the survey on the computer.

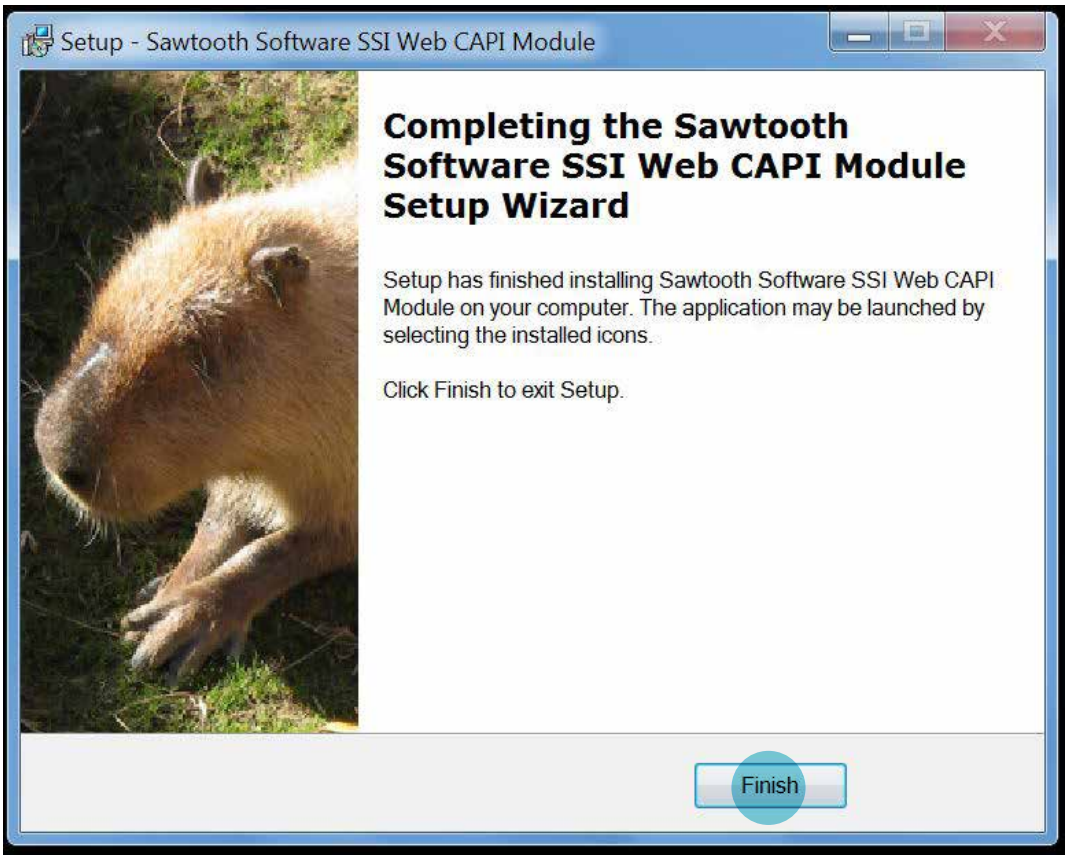
Once you have completed developing a questionnaire for each cadre you will survey (for example, if you are targeting three cadres in the Rapid DCE—doctors, nurses, and pharmacists—you should have a total of three different questionnaires, one per cadre), you should download the CAPI module. The CAPI module can be downloaded as many times as necessary for free by copying and pasting the following link into a web browser:
www.sawtoothsoftware.com/download/ssiweb/capi/Capi_3_0_0_Setup.exe
(This is the version in the year 2014. Please note that in the future the program may be upgraded with a new version number. You should always download the most current software version available).

The link will prompt you to download a software file called "Capi_3_0_0_Setup.exe." Once the file has downloaded, click Run or Open (this process will vary depending on your computer) to complete the download so that the software will function on your computer.

Every computer that will be used to administer the survey will need to have this software loaded on it. Depending on how many computers will be used and their location (e.g., rented laptops taken from site to site or on-site computers in computer labs at colleges or universities), you can either run the application directly from the website to be installed in the computer directly and/or save the file to a flash or pin drive so you can copy it on multiple computers later). If on-site computers in computer labs or facilities will be used, every data collector should carry a copy of the file "Capi_3_0_0_Setup.exe" at all times, on a flash or pin drive.

To prepare the computer for survey administration:

- Load the CAPI software onto the computer by inserting the flash or pin drive with the file "Capi_3_0_0_Setup.exe" and running that file.

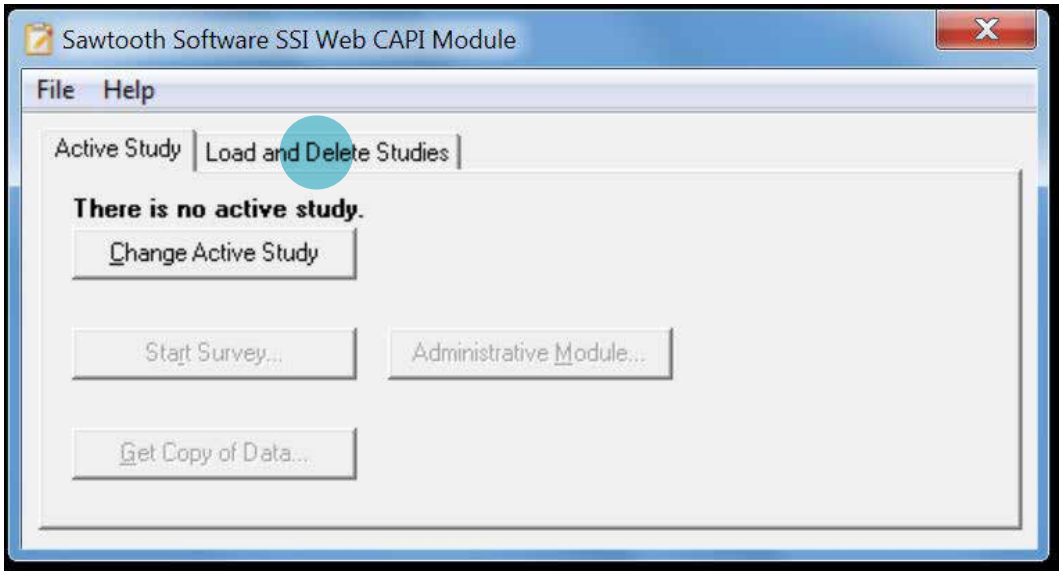


- Click Next until the software installation is complete, then click Finish (see circle in the figure above) to exit the setup process. Make certain you note where the software is located so that you can easily open it.

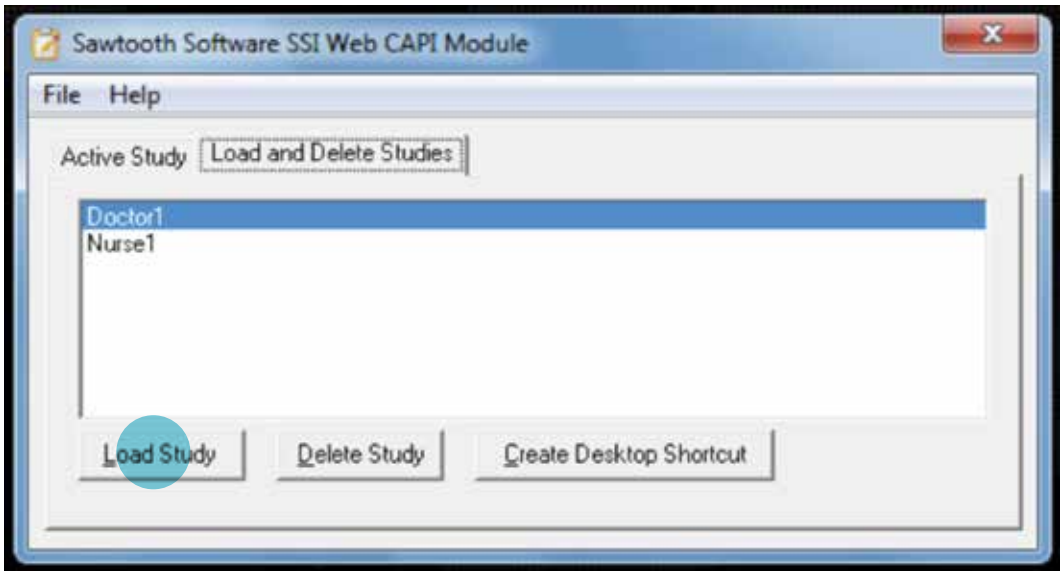
Once the CAPI software is loaded onto the computer, it will be necessary to load the .CAPI files with the instrument information you created in Stage 3.

- To do this, open the SSI We ftware by clicking on the icon, which looks like this:

You will see this:

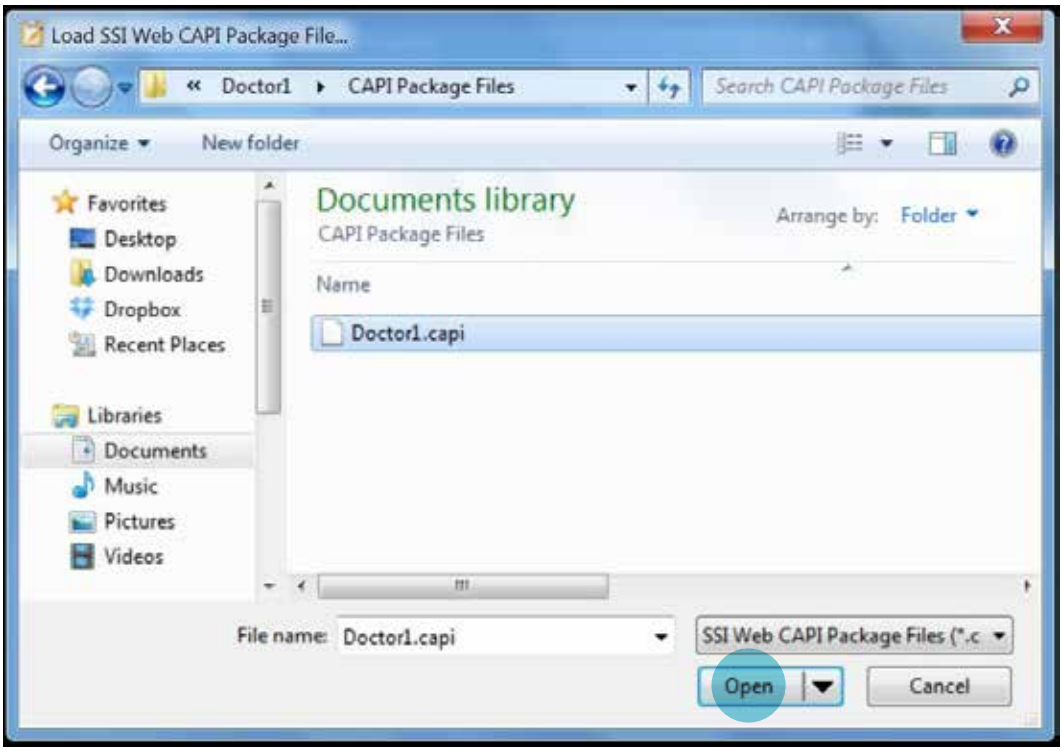


- Click the tab labeled Load and Delete Studies (see circle in the figure above). You will see this:



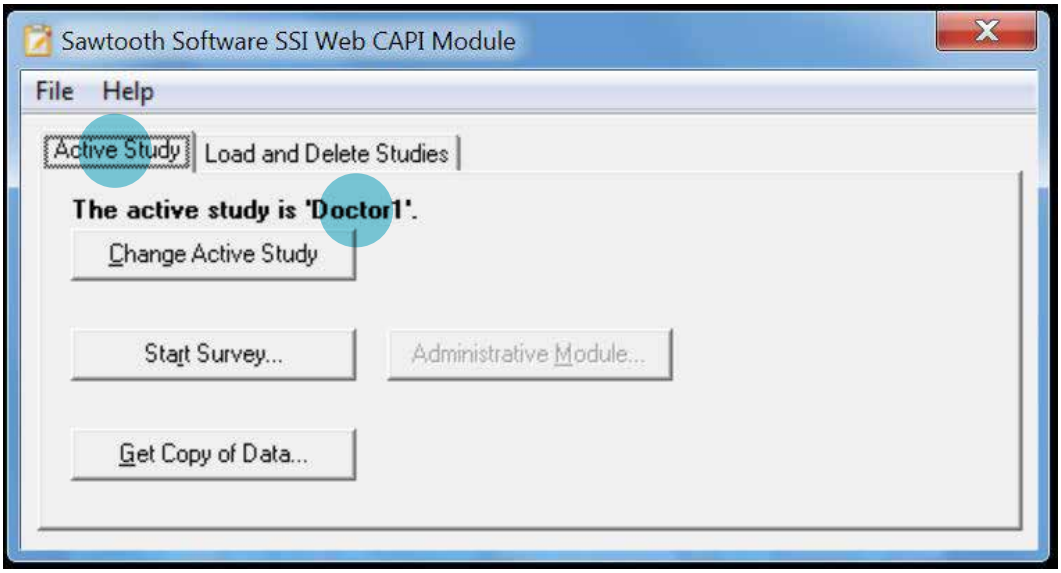
- Highlight the study you would like to open (for example, Doctor1) and click Load Study (see circle in the figure above).

- Navigate to the location where you have saved the .CAPI files of the survey instruments you created in Stage 4, Step 1. The window that opens and the file will look something like this:



- Load all the saved .CAPI files by highlighting each one and clicking Open (see circle in the figure above). You should have one for each cadre for which you developed a separate survey questionnaire. A window showing load study progress will open. When you are notified that the file loaded successfully, click Close to close the window and return to the Sawtooth Software SSI Web CAPI Module window showing the Active Study and Load and Delete Studies tabs.

- Click the tab labeled Active Study (see top left circle in the figure below). You will see something like this:



- Make certain that at the top of the Active Study window it says, "The active study is [name of your study]" (see middle right circle in the figure above) showing one example of a study (Doctor1 in this example) to ensure that the studies were indeed loaded.

Complete the above steps for every computer on which you will load the survey (i.e., all the computers in a computer lab or all laptops used by the survey implementation team).

Step 1 (Alternate): Set Up for Paper-Based Survey Administration

If a paper-based Rapid DCE survey will be used, it will be necessary to collect and manage the data in a different way than computer-based survey data. Conducting a paper-based Rapid DCE survey is very similar to conducting any survey, with some exceptions.

The survey implementation team will need to travel with paper copies of each of the five versions of the survey instrument per cadre to be surveyed. The team should have one paper copy of the instrument for each potential respondent in the selected sample, as respondents will write their responses directly on the paper copy and submit them to the survey implementation team. To print paper copies of the five versions of each cadre's survey instrument, locate the "paper and pencil" .html files on your computer that were created by the Sawtooth Software (see Stage 4, Step 1 [alternate]). These files can be opened in any Internet browser program, and an Internet connection is not needed. Open each of the files and print them out. **Note that the .html files include only the job preference pair questions for the instrument. It will be necessary to print the rest of the survey components separately**

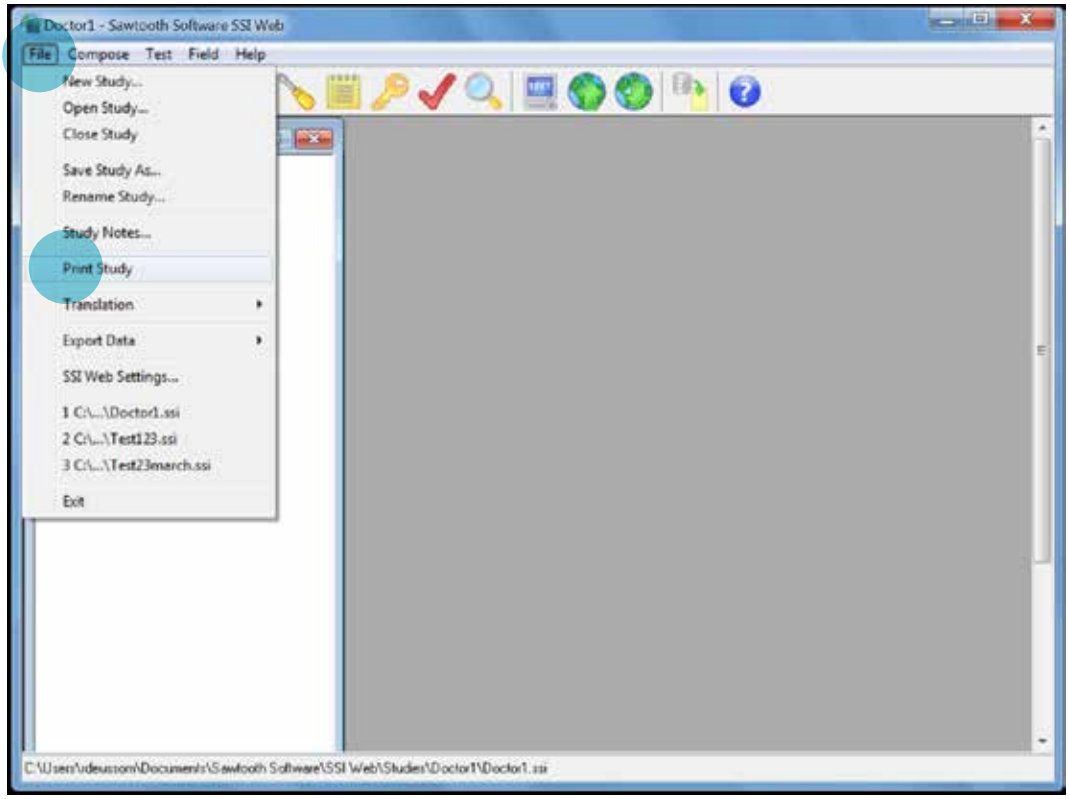
(i.e., general introduction, informed consent, supplemental questions, and introduction to job preference questions) and combine the printings to create the full paper-based survey instrument.

It is important that you note on a cover page of each survey the version number (1-5), as the 12 job preference pair questions show different combinations of job attributes and levels, corresponding to a different coding (this will be described in Stage 7). See Appendices 3 and 4 for a sample cover page.

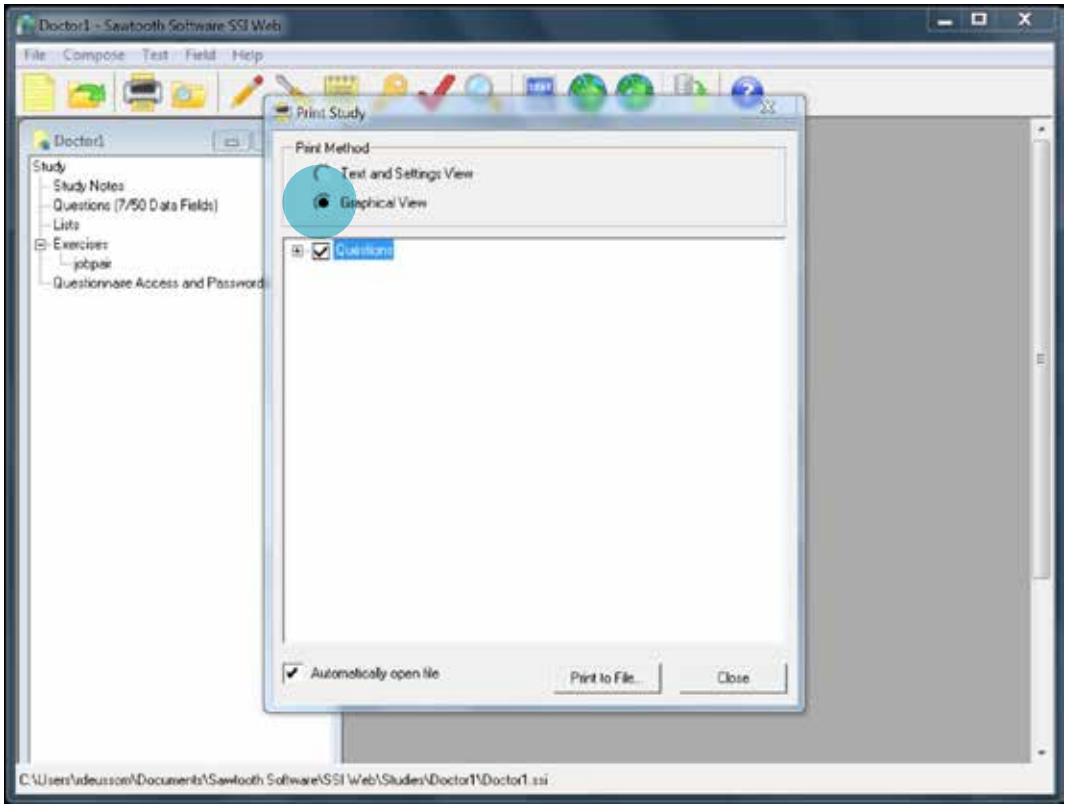
If you developed these other components of the Rapid DCE survey (i.e., general introduction, informed consent, supplemental questions, and introduction to job preference questions) in Microsoft Word or another word processing program, you should print them out directly from that program and combine them with each of the five .html files to prepare a complete questionnaire of each of the five versions.

If you developed the other survey components (i.e., general introduction, informed consent, supplemental questions, introduction to job preference questions, and terminate question) using the Sawtooth Software, you can print them out with the following steps:

- Click File (see top circle in the figure below) on the upper left of the Sawtooth Software window, and select Print Study (see bottom circle in the figure below) from the drop-down menu.

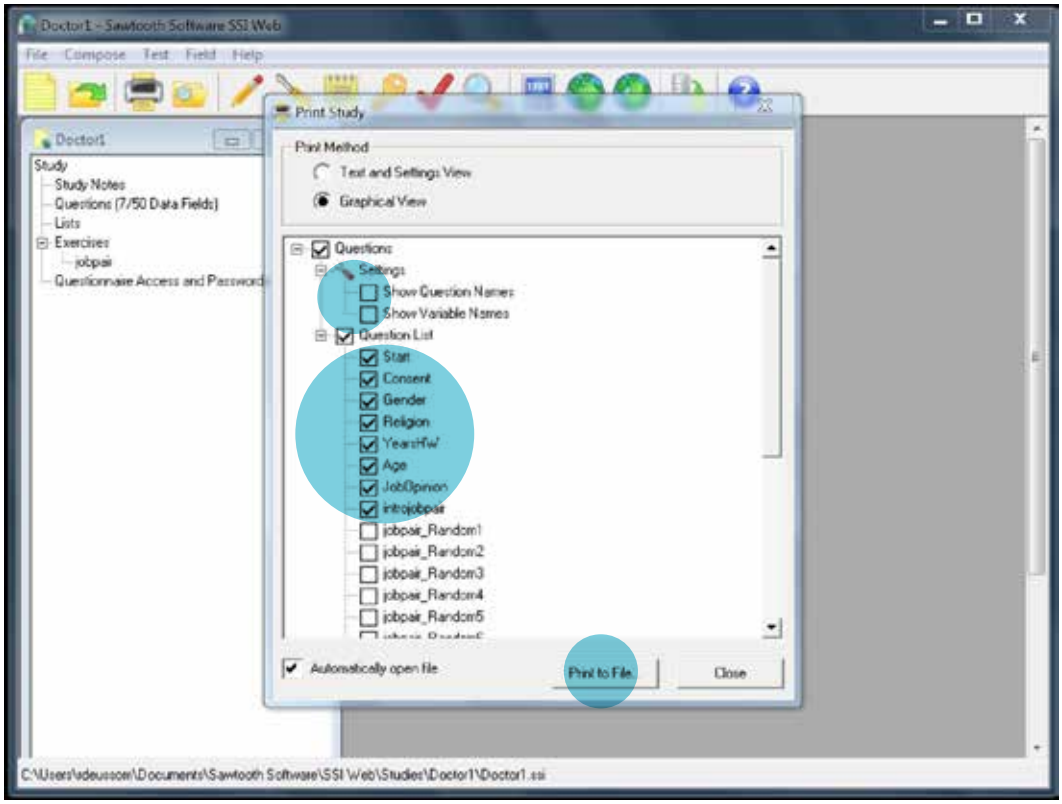


You will see this:



- In the Print Method box select Graphical View (see circle in the figure above). This will then show you the Questions component.

- Click the plus sign (+) in front of Questions to expose the Settings and Question List sections and their components. You will see this:



- Under Settings uncheck the boxes in front of both Show Question Names and Show Variable Names (see top circle in the previous figure).

- Under Question List, uncheck the job preference pair questions (jobpair_Random1 through jobpair_Random12), but make sure all other questions have a check next to them (see large middle circle in the previous figure). This is because printing the job preference pair questions as part of this step will NOT provide the five different versions of the survey questionnaires that you need to administer to respondents. This is why you created these five versions as .html files in the earlier step. You will combine the sections of the survey you are printing in this step here (i.e., general introduction, informed consent, supplemental questions, and introduction to job preference questions) with those five .html versions.

- Click on Print to File (see bottom circle in the figure on previous page). Make note of the name of the file and the location on your computer where the file will be saved.

This will create a .pdf file that includes all non-job preference pair questions (i.e. general introduction, informed consent, supplemental questions, and introduction to job preference pair questions).

- Print this file and combine one copy with each of the five .html files you created under the step to Create Paper-and-Pencil Interview (Stage 4, Step 1 [alternate]). Make certain the printings are combined in the correct order: general introduction, informed consent, supplemental questions, introduction to job preference pair questions, 12 job preference questions, and terminate question.

- Label each questionnaire with a unique numeric identifier. This can simply be a number from 1 through the number of questionnaires needed to obtain the desired sample size for that cadre. For example, if the study will target a total sample of 425 doctors and nurses, then the unique identifiers can range from 1, 2, 3…424, and 425. For ease of data entry it is best not to repeat the unique numeric identifier across cadres (even though the data will be entered into separate data files). This way the data cannot be accidentally entered into the wrong dataset. **NOTE: the questionnaires labeled with the unique identifiers will only be used with the target cadre population, not for pretesting (see Step 2 below).** You do not use identifiers for pretesting, as the results from the surveys pretested by a small group of individuals will **NOT** be included in the Rapid DCE results.

Step 2: Pretest the Survey Instrument

As with any survey or data collection instrument, it is important to pretest the questionnaire to be sure the questions are comprehensible, and language and word choices are well understood and fit the overall context. Pretesting should be conducted with students or health workers who will not be included in the target sample of the Rapid DCE survey. For example, you could pretest the survey with students in an earlier year of their training program or with health workers from a health facility that will not be surveyed. Depending on availability and logistics, a pretest sample of approximately 10-20 respondents from each selected cadre should be adequate.

After the respondents complete the survey (whether computer-based or paper-based), you should ask them the following questions (World Bank, WHO, Capacity***Plus*** 2012):

1. Did you understand the instructions?

2. Were any of the questions unclear?

3. How well do you understand the definitions of the selected job attributes and levels? Is it clear what the attributes and levels are? Are any job attributes not relevant?

4. Are any important factors missing that would motivate you?

5. How did you make your job choice? Why did you choose that job? What influenced your choice? (Note: This is another way to see if the respondents understand the directions for the job preferences section. The respondents should talk about the analysis they made in determining their job preference. For example, they could mention how they tended to lean toward the job that provided for career promotion or study assistance even if the salary was lower because they placed high value on continued education. In this way we see that they are making tradeoffs between different incentives or characteristics of a job posting.)

The team should discuss the responses and reactions from the pretesting and make any relevant adjustments to the survey as needed before finalizing the instruments in preparation for data collection with the target survey population.

Step 3: Introduce the Rapid DCE Survey and Obtain Consent

Whether the survey is administered on a computer or on paper, it will be necessary to give a brief introduction to respondents and obtain their consent to participate prior to beginning the survey. If a large group of respondents is going to take the survey at the same time (i.e., many students in a computer lab or health workers in a meeting room), the data collector can give this introduction to all respondents at the same time. The data collector should, however, make certain that all respondents are listening to the introduction and that they do not begin taking the survey until the introduction is complete.

The aims of the introduction are:

1. To provide respondents with a brief description of the study. However, to avoid taking too much time, background should be limited to the basic information that is necessary.

2. To ensure the respondents understand that their participation in the survey is voluntary and confidential. If they agree to participate, they will be asked to provide their consent.

3. To provide respondents with a general idea as to what they will see when they begin the survey. Provide a brief description of each section of the survey.

4. To provide respondents with a thorough explanation, in particular, of the job preference questions section. This explanation is very important and will ensure that the information collected by the Rapid DCE is valid and useful.

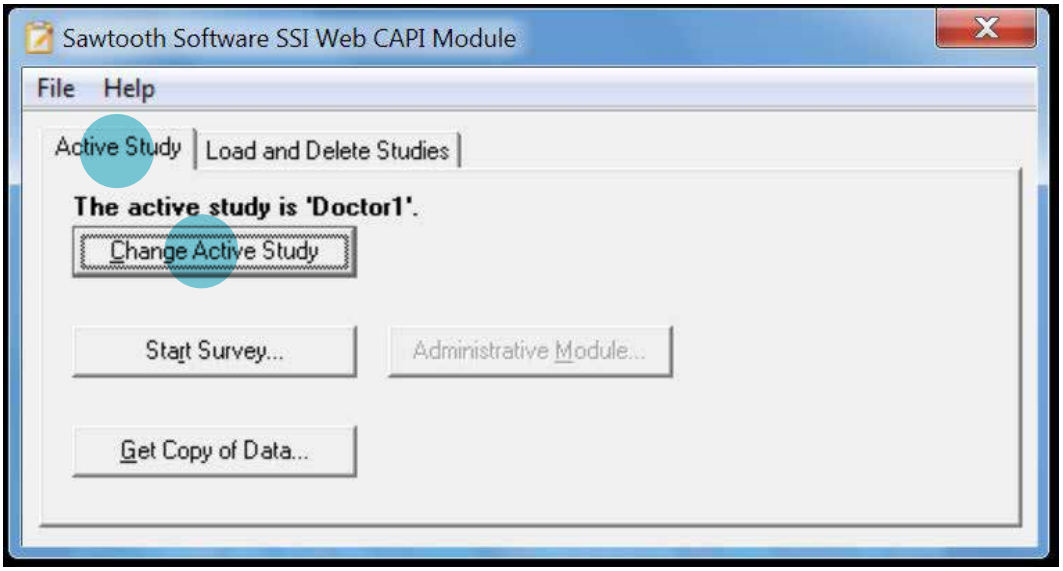
The introduction should take no longer than five minutes to present. A sample introduction script is provided in Appendices 3 and 4.

If the survey is administered on a computer, the informed consent page is included at the start of the survey (see Stage 3, Step 1 for using the software to develop the informed consent page). If the survey is administered on paper, you should give respondents a copy of the informed consent form. A sample of an informed consent form is provided in Appendix 2. You should then only provide a survey to respondents once you have received their signed copy of the informed consent form. If respondents do not sign the consent form and do not want to participate, you should thank them for their time and allow them to leave the room.

Step 4: Administer Computer-Based Survey

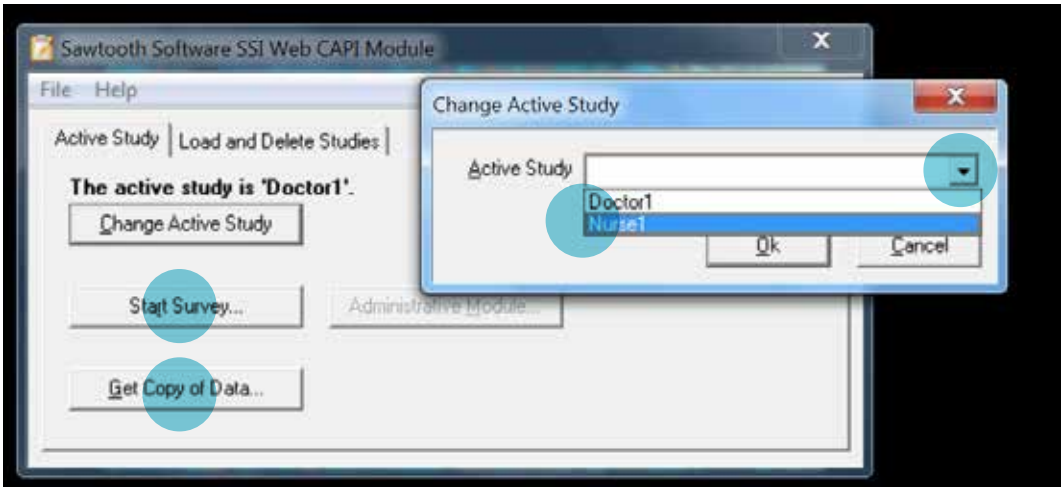
After you have given a brief introduction, you are ready to administer the survey to the respondents. To do this, continue from the last instruction described in Stage 6, Step 1.

- Open the Sawtooth Software SSI Web CAPI Module. You will see a window like this:



- Make certain the Active Study tab (see top circle in the figure above) is selected.
- Click the button labeled Change Active Study (see bottom circle in the figure above).

This will open a dialog box as in the figure below.



- Click on the downward-facing arrow (see top right circle in the figure above) to select from the drop-down menu of loaded studies (see middle circle in the figure above) the appropriate study for the cadre of health worker or student who will take the survey (e.g., Nurse1 in the example above).

- Click OK to close the Change Active Study window.

- Click the button labeled Start Survey (see top left circle in the figure above). You will note that this opens the computer's default web browser (such as Internet Explorer). You do not need an Internet connection to run the survey.

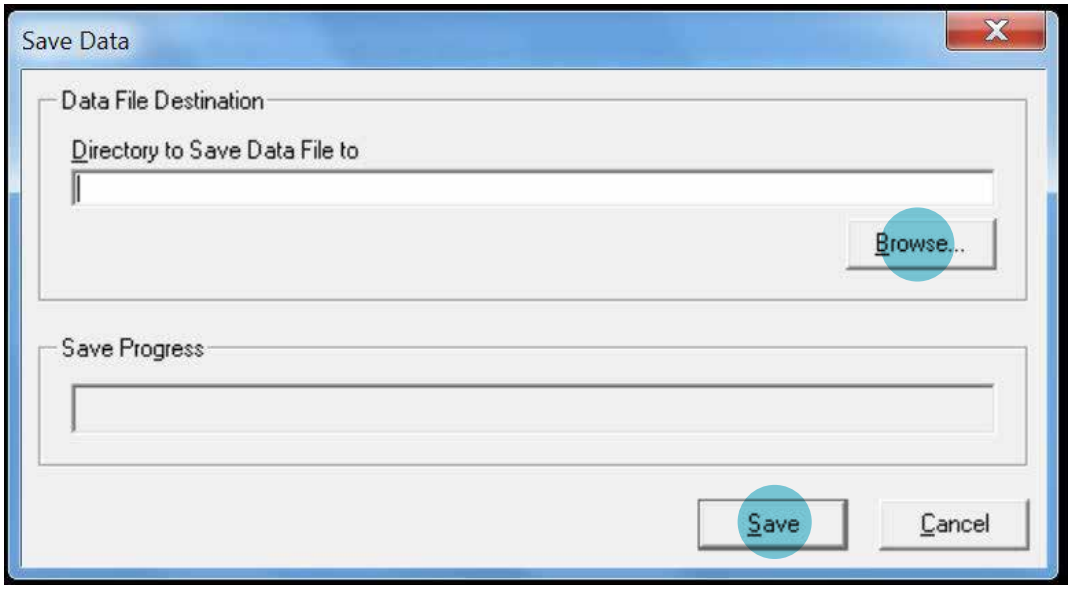
- Allow the respondents to complete the survey on their own. Answer any questions they may have.

Please note that depending on the computer skills of the respondents, you may need to give a brief explanation on how to use the mouse to answer the questions and move through the survey.

Saving and backing up the data

Once each respondent has completed the survey, a member of the survey implementation team should save the data, which will be in the form of a ".CSV" file, to the computer's hard drive by following these steps:

- Close the web browser (e.g., Internet Explorer) window by clicking the X in the upper right corner. Do not worry, the data will not be lost.
- The Sawtooth Software SSI Web CAPI Module window will still be open.
- Click the button labeled Get Copy of Data (see bottom left circle in the figure on previous page). You will see this:



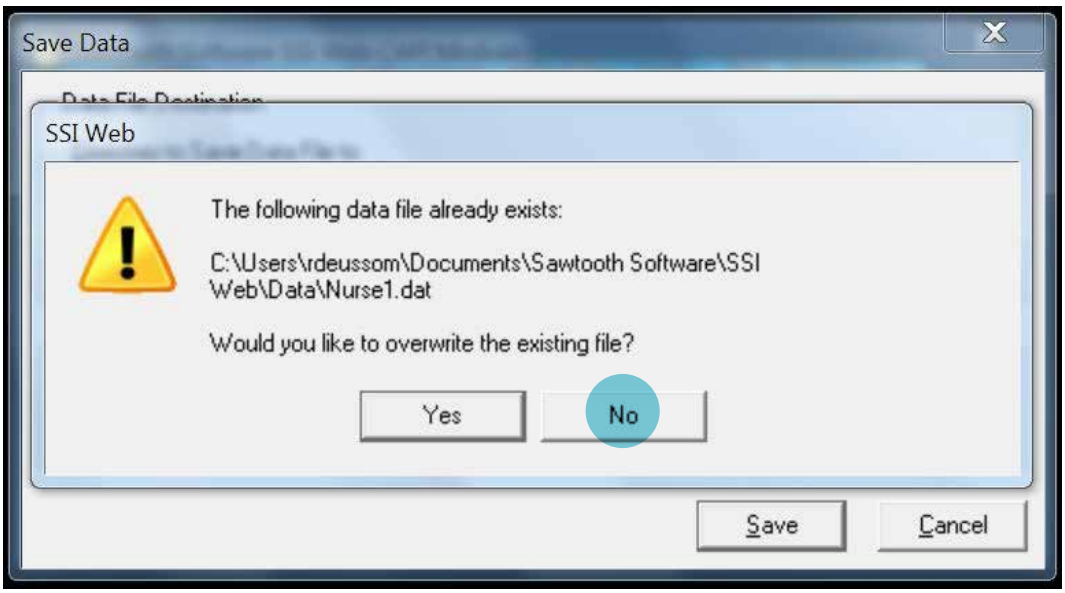
- In the Data File Destination box, click on the Browse button (see top circle in the figure above) to select a Directory to Save Data File to. This will open a window where you can navigate the computer's folders. You should save the file to a flash drive and then transfer the saved file to a project computer as soon as possible.)
- Click Save (see bottom circle in the figure above).

- You will see a prompt that says, "The file [file location and name] was successfully saved."

- Click OK.

- Before you go to the next computer to save data from completed surveys, you should rename the data file that you just saved. This is because when you go to the next computer, you will be asked to save a new data file that has the same name as the file you just saved. To avoid overwriting the first data file, open the location where it is saved and append a number to the end of the name of the file. You will have to append a number after each data file you save, so begin with 1 and go up sequentially from there.

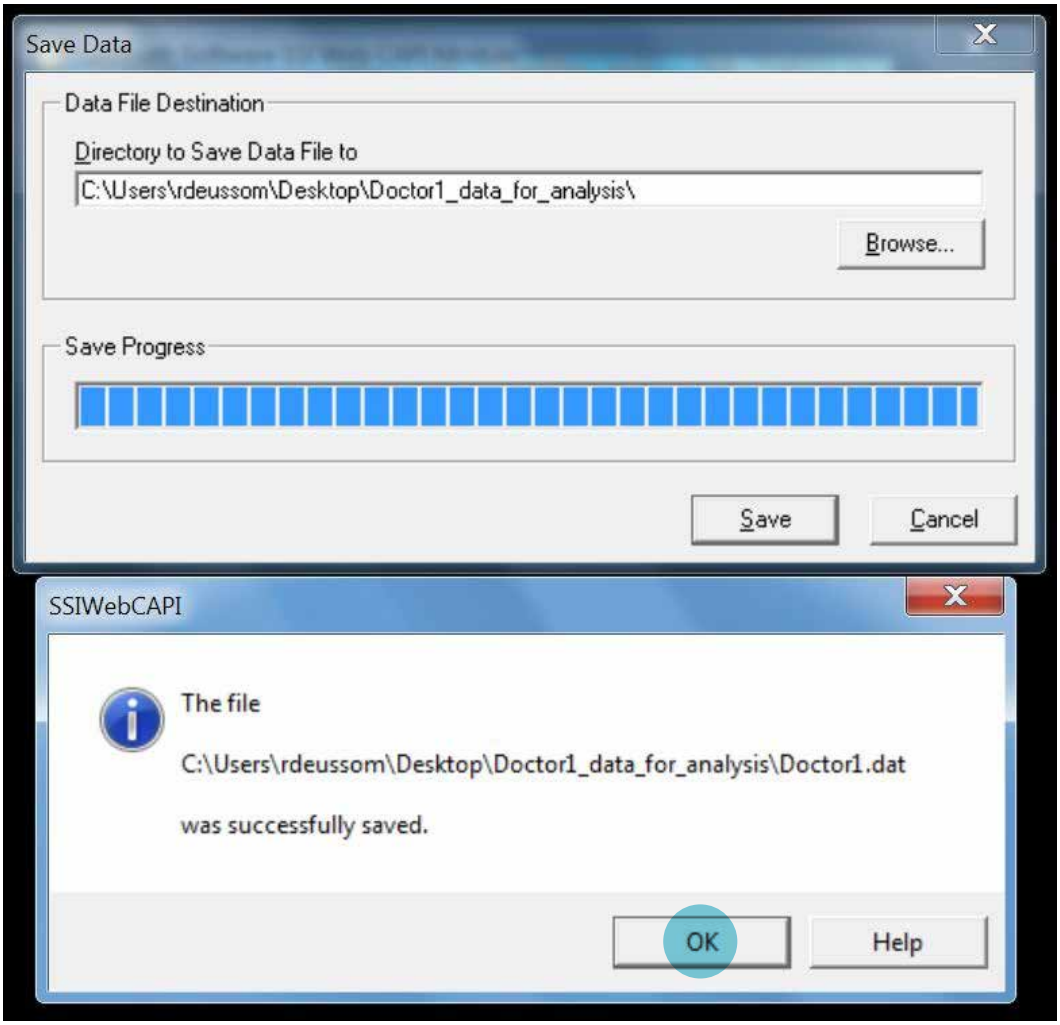
- If you do not change the name of a saved data file and attempt to save an additional data file, then you will see a prompt that says, "The following data file already exists. . .Would you like to overwrite the existing file?" as in the figure below:



- If this happens, you should click No (see circle in figure above). Instead, go back to the originally saved data file and append a number as described above, and then go back and again save the new data file.

- You will see the progress for saving the data as well as a prompt when it is completed that says, "The file [file location and name] was successfully saved." (See the figure below.)

- Click OK (see circle in the figure below).



In addition to saving the data to the computer hard drive, the data collector should also **save the data to a flash or pin drive**. This will ensure that if something happens to the computer, the collected data will not be lost. This should be done **as soon as the respondents complete their individual surveys**.

Step 4 (Alternate): Administer Paper-Based Survey

Once the survey has been introduced and a signed informed consent form has been received, provide the respondent with a copy of the paper-based survey. As described in Stage 4, Step 1 (alternate), paper-based administration involves using five different versions of the Rapid DCE instrument for each cadre. It is important that the five versions of the survey be used as evenly as possible. Data collectors should do their best to ensure that each time a new respondent is surveyed that s/he uses the "next" version of the Rapid DCE instrument. So, if you are implementing the survey and have just surveyed a respondent with version 1, you should give the next respondent survey version 2. If you have just surveyed a respondent with version 5, you should give out survey version 1 to the next respondent. If you have ten respondents in a room, you should give out two copies of each of the five versions. You should continually cycle through the versions until all fieldwork is complete. Data collectors should make certain to track, on paper, which version of the survey each respondent (according to the unique identifier) completed.

Also, keep track of each survey respondent as well as individuals who decline to take part in the survey. Each team's leader should keep a spreadsheet of eligible persons selected to take part in the survey and then indicate next to each person's name whether that person: a) has yet to take part in the survey, b) completed the survey, or c) declined to take part in the survey. Make certain that completed surveys are collected from each respondent and are kept in a safe place to prevent any loss of data.

If there are several teams working to collect the Rapid DCE survey data, and the data collection is planned to occur over an extended period of time (perhaps a few weeks), it may be appropriate for the Rapid DCE study coordinator to schedule meetings in the field with each team every few days. This will allow the manager to collect the data from the teams and ensure the data are safely held at a central location, rather than risk possible data loss in the field due to unforeseen conditions.

STAGE 7:
PREPARING AND MANAGING DATA

As you are preparing and managing data, please remember to follow the correct steps according to whether you are administrating a computer-based or paper-based survey, respectively. You will note the computer and paper icons on the margins to guide you.

Whether your Rapid DCE survey data are collected with computers or with a paper-based survey, the data will eventually have to be converted to the same format for analysis. As previously mentioned, each cadre included in the Rapid DCE survey should be analyzed individually. Therefore, the methods and processes described below for organizing datasets and analyzing the data should be conducted for each cadre and type of respondent (i.e., student or health worker) separately. For example, if your Rapid DCE targets doctors and nurses and surveyed both practicing health workers and final-year students, you must complete the following steps four times—once each for the data collected from medical students, practicing doctors, nursing students, and practicing nurses—in order to create four separate datasets.

Step 1: Prepare Data from Computer-Based Survey Administration

This step should be completed only if you administered a computer-based Rapid DCE survey. If you conducted a paper-based survey, go to Step 1 (alternate) on page 135.

Preparing the data from the job preferences section

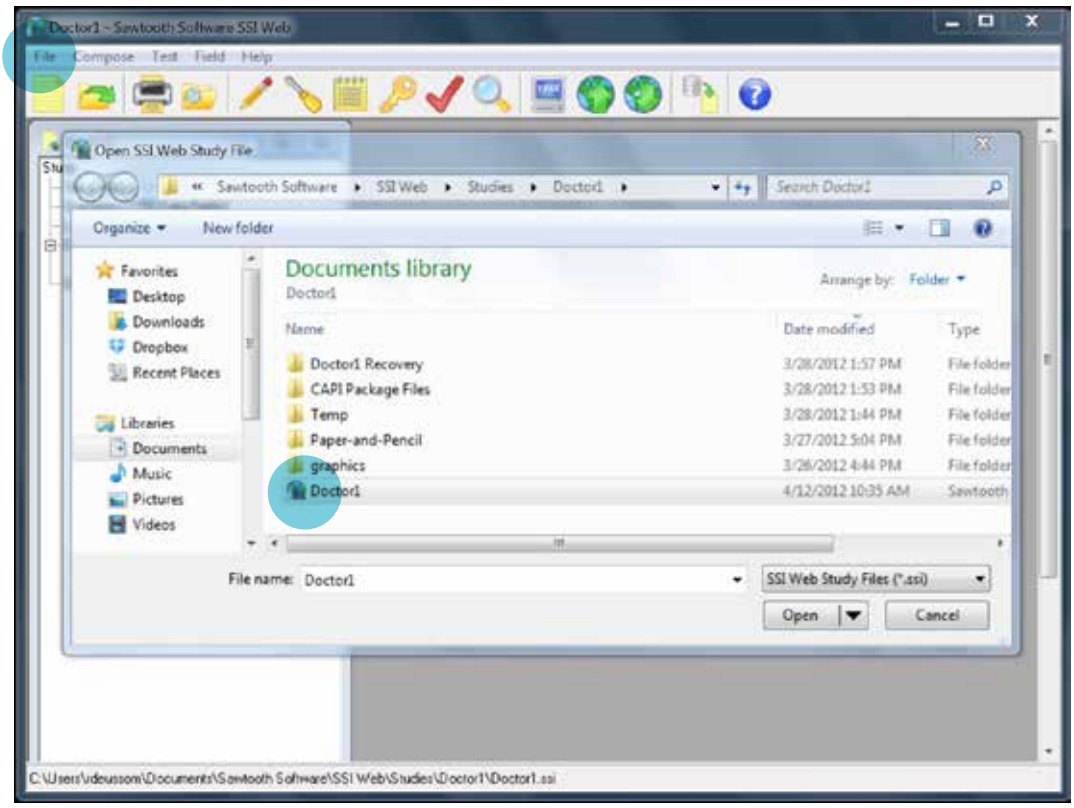
To retrieve and prepare the data from the job preference pair questions section of the computer-based surveys, you should take the following steps:

1. Create a file folder on your computer where you will compile all saved .CSV files that will be included in analysis in a single folder on your computer. (See Stage 6, Step 4 for instructions on how to save .CSV files after administering surveys.)

2. Accumulate the data into the Sawtooth Software.

    - Open the same Sawtooth Software SSI Web program that you used in Stage 3 to develop the survey instrument. It is the one with an icon of a lighthouse and planet Earth:

- Under the File drop-down menu of the top bar (see top circle in the figure below), click Open Study… to retrieve the saved .SSI file that was used to develop the survey instrument for the cadre now being analyzed (e.g., Doctor1.ssi). (See bottom circle in the figure below.) You must open the same .SSI file that was used to develop the survey instrument, because if you do not, then the software will not be able to correctly organize the data that you will be retrieving. Click on the file to highlight it, and then click OK to close the window.

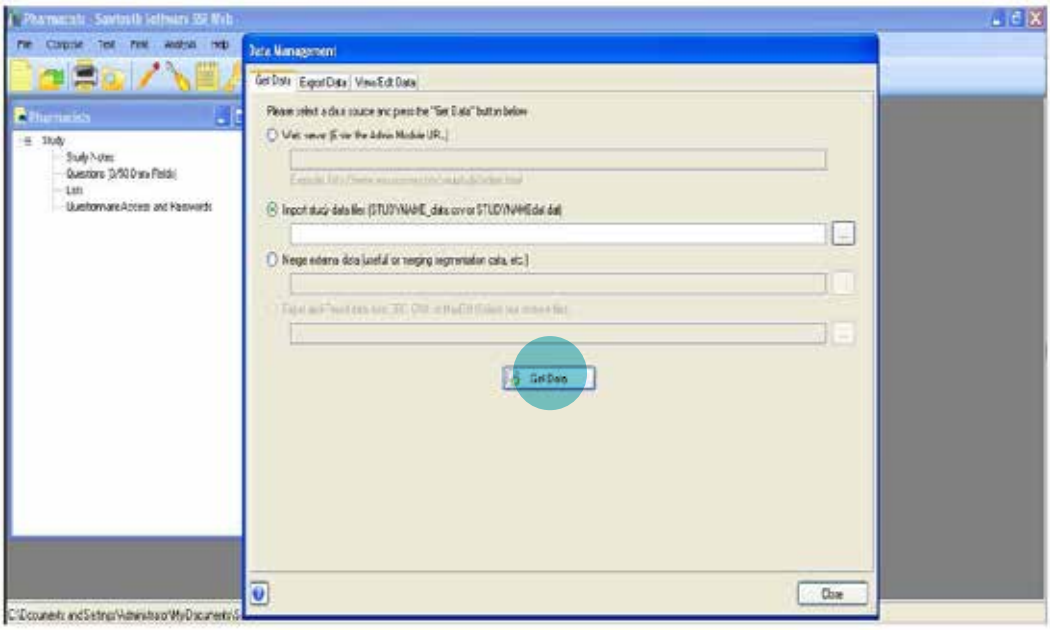


- Under the Field drop-down menu on the top bar, click Accumulate CAPI Data Files.
- On the Accumulate CAPI Data Files window, click Accumulate.
- A box will open that will ask if you want to Append the data, or Overwrite the data. Click Overwrite.
- When the accumulation is complete, click OK.

- In the Data Management window, make sure that you are viewing the Get Data tab (see figure below).

- In the field below Import study data files, enter (or find by clicking on ". . .") the location and name for the folder that you created to compile and save all of the .CSV files in Step 1 above.

- Click Get Data (see middle circle in the figure below).

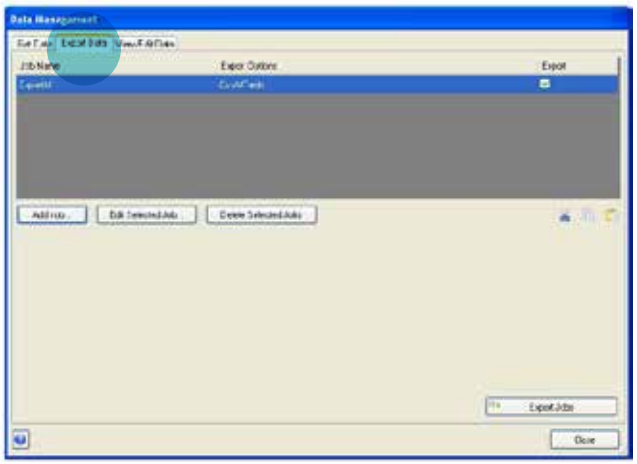


- An accumulation report summarizing the total number of respondents and data records will open in a separate window. Check to confirm that the total number of respondents and data records in this report matches with the number of surveys that your team administered. When the accumulation is complete, click OK.

3. Export the accumulated data. In this step, you will export the data to two separate files. The first file will contain the information from the DCE part of the survey. The second file will contain the information from the demographic part of the survey. The data from the DCE part of the survey will require additional processing steps before it is ready to analyze, while the data from the demographic part of the survey will be immediately ready to analyze.

a. Prepare to export the data from the DCE part of the survey:

- In the Data Management window, click to view the Export Data tab (see figure below).



- If there is already an entry in main field (as there is in the figure above), delete it by clicking Delete Selected Jobs.
- Add a new job by clicking Add Job (see left circle in the figure above).
- In the Export Job window (see figure below):

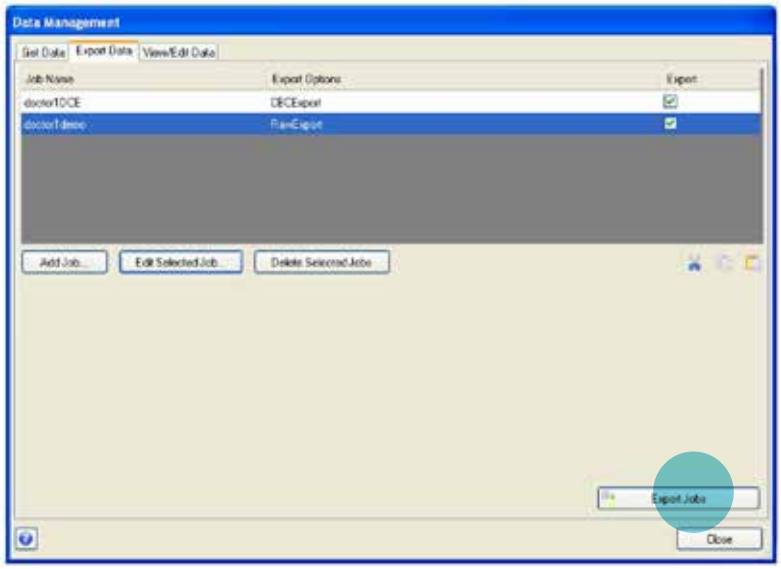
- Name the job something that is appropriate (e.g., doctor1DCE)
- Delete the default entry in the Export Action field. Then, add a new entry. After clicking on Add, you will be given the option of Raw Data or CBC. For the DCE data, click CBC. Export all data variables; you will have the opportunity to clean and manage exported data later in Stage 7.

- Under File Formats, select .cho/.chs, .att. (If you administered the survey using the internet, then select Single Format .CSV)
- Make sure that the Respondents to Include box shows All Respondents, and that the Respondent Numbering box shows sys_RespNum.
- Click OK.

b. Prepare to export the data from the demographic part of the survey:

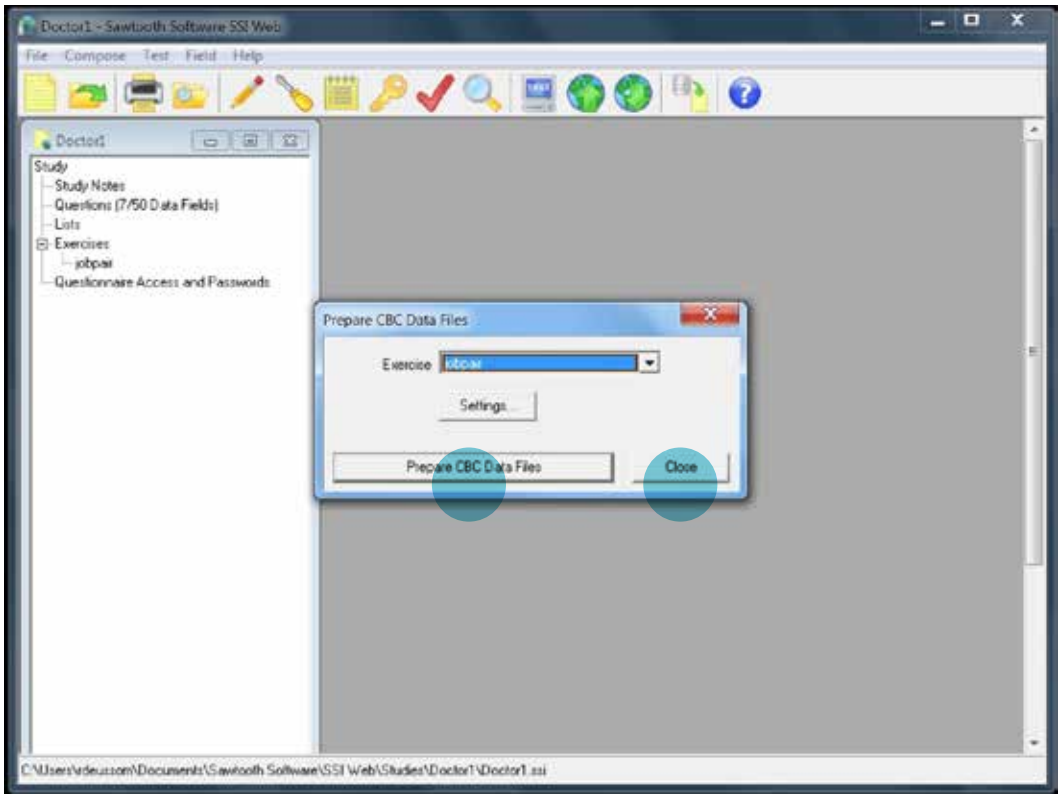
- In the Data Management window, add a new job by clicking Add Job. You can do this while the DCE export job that you created above is still there in the Data Management window. You can finalize the export of both of these jobs at the same time.
- In the Export Job window:
  - Name the job something that is appropriate (e.g., doctor1demo).
  - Delete the default entry in the Export Action field. Then, add a new entry. After clicking on Add, you will be given the option of Raw Data or CBC. For the demographic data, you should click Raw Data.
  - Make sure that the Respondents to Include box shows All Respondents, and that the Respondent Numbering box shows sys_RespNum. Export all data variables; you will have the opportunity to clean and manage exported data later in Stage 7.
  - Make sure that the File Formats is .csv.
  - You can edit the fields that will be included in the exported data file by clicking on Export Fields and including or excluding fields as appropriate.
- Click OK.

c. Back in the Data Management window, finalize the export by clicking Export Jobs (see bottom right circle in the figure below).



4. Prepare the DCE data for analysis.

Before the DCE data can be imported into STATA for analysis, two formatting steps are required.



a. Open the .CHO file in the Sawtooth Software SMRT program.

- You'll first need to download the SMRT program and install it onto the computer that you will use for analysis. The same license that was purchased to use the SSI Web CBC module can be used for SMRT. Follow the instructions below to download and install the program:

  - Go to the website: www.sawtoothsoftware.com/support/downloads/94-support/software-downloads/870-download-smrt

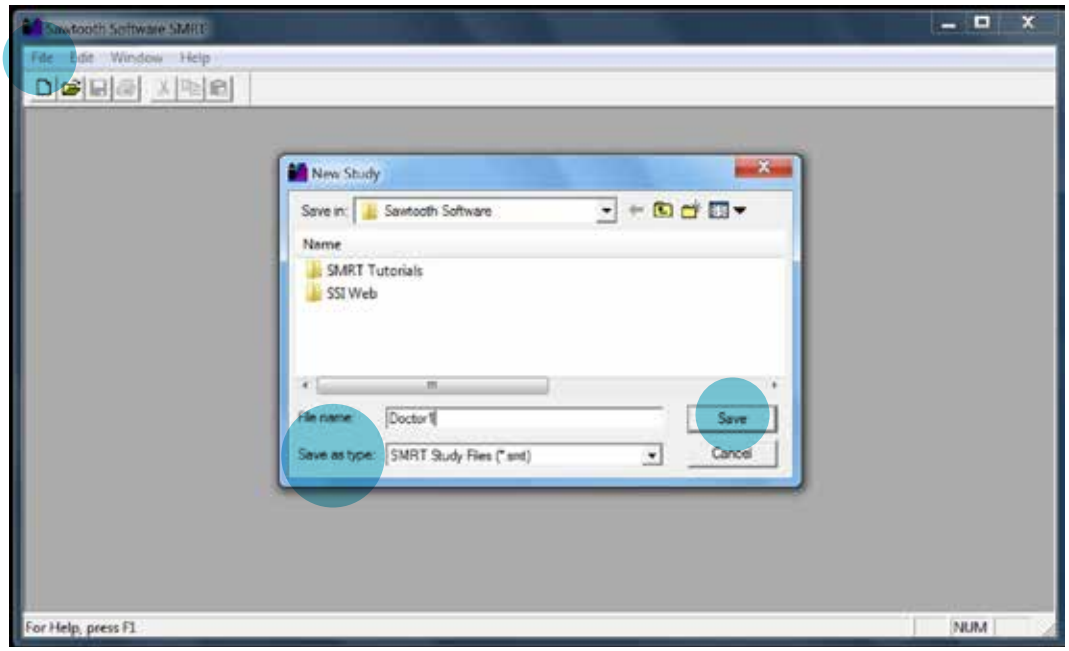
  - Click on the Download button to download the software file, which is named SMRT_v4_23_0. (This is the version in the year 2014. Please note that in the future the program may be upgraded with a new version number. You should download the current version available at the time).

  - When prompted to either run or save the software, click Save. Save the software to your computer desktop. Once the software is downloaded, right click on the file and select Run…. An installation window will open.

- On the first Setup welcome window, click **Next** (see circle in the figure above) to proceed with installation.
- On the second window, review and accept the terms of the software license by selecting the button labeled **I accept the agreement**.
- On the third window, review the text and click **Next**.
- On the fourth window, confirm the location that the SMRT software should be installed. The default location of **Program Files** is acceptable, so unless you know a specific alternative location, do not change anything. Please note that the SMRT software requires that you have at least 21.9 MB of free disk space. Click **Next**.
- On the fifth window, check the box to **Create a desktop icon** if you would like the SMRT icon to appear on your desktop. This is recommended so that you can access the software easily. Then click **Next**.
- On the sixth window, click **Install**. The final window will confirm that you have completed installation. Click **Finish** to complete setup.

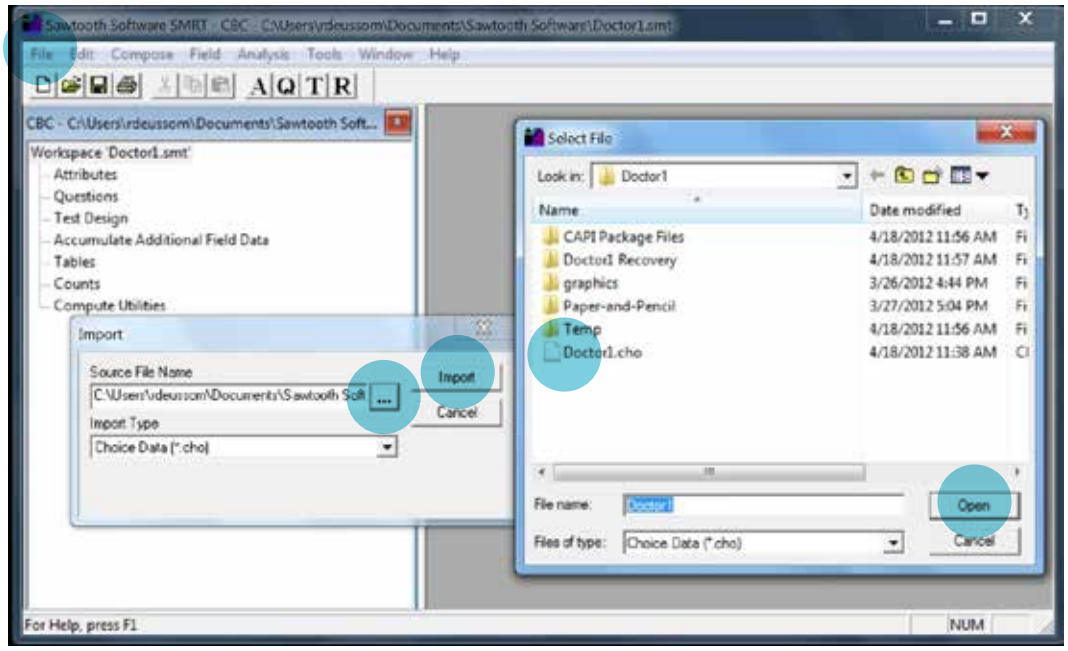
• Open the Sawtooth SMRT program (see icon at right) and begin a new study file.

- Under the **File** drop-down menu (see top left circle in the figure on page 125), click **New**.
- Name the study after the cadre of interest and save it to an appropriate location. Be sure to note the name and location of the file. Under **Save as type** (see bottom left circle in the figure on the following page) select **SMRT Study Files** (.smt) from the drop-down menu (downward-facing arrow) to save the file as an SMRT file (*.smt). Click **Save** (see bottom right circle in the figure on page 125).



- Import the .CHO file into the new study.
    - Under the File (see top left circle in the top figure on page 126) drop-down menu, click Import. The Import window will now open.
    - In the Import window, select the button to the right of Source File Name that shows ". . ."(See left circle in the middle of the Import window in the top figure on page 126.)
    - Within the Select File window, locate and click on the folder where you previously exported the .CHO file (i.e., the job preference pair file) earlier in Stage 7, Step 1 above. (See circle in the left of the Select File window in the top figure on page 126) and click Open (see bottom right circle in the Select File window). This will close the Select File window and you will return to the Import window.
    - Click Import. (See right circle in the Import window in the top figure on page 126.)
    - A window indicating the total number of respondents imported will appear. Click OK.

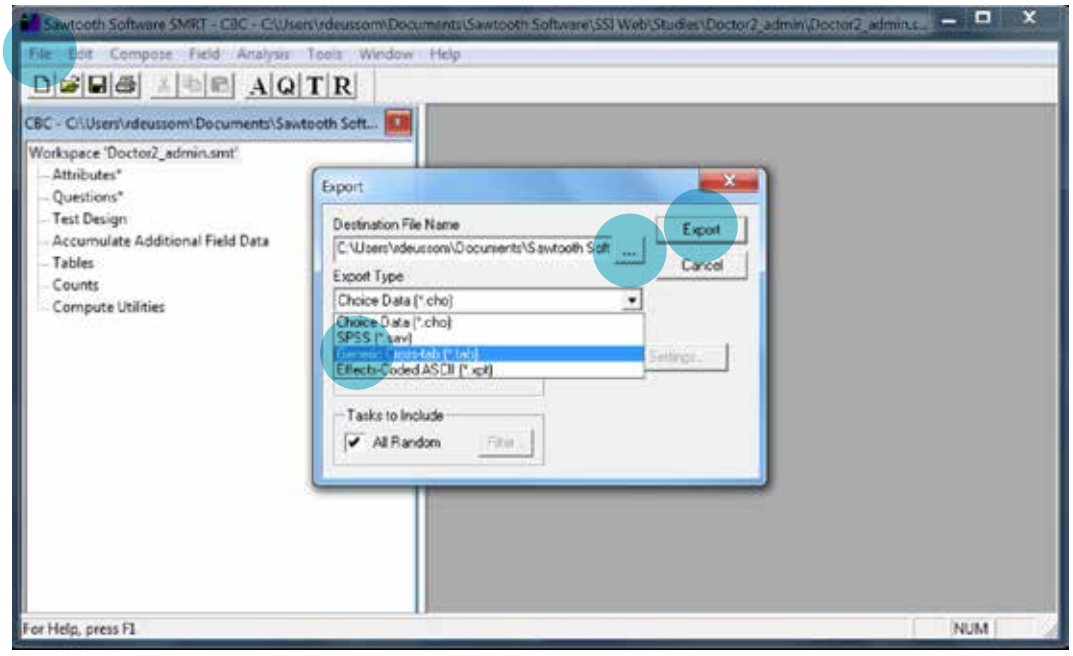
5. Export the job preferences data to a spreadsheet.
    - Under the File (see top left circle in the bottom figure on page 126) drop-down menu, click Export. An Export window will open.
    - In the drop-down menu under Export Type, select Generic Cross-tab (*.tab). (See bottom center circle in the bottom figure on page 126.)



- Under Destination File Name, click on the "..." (see middle circle in the figure below) to select the location that the file will be exported to. Make sure to take note of this location so that you can find your exported location.

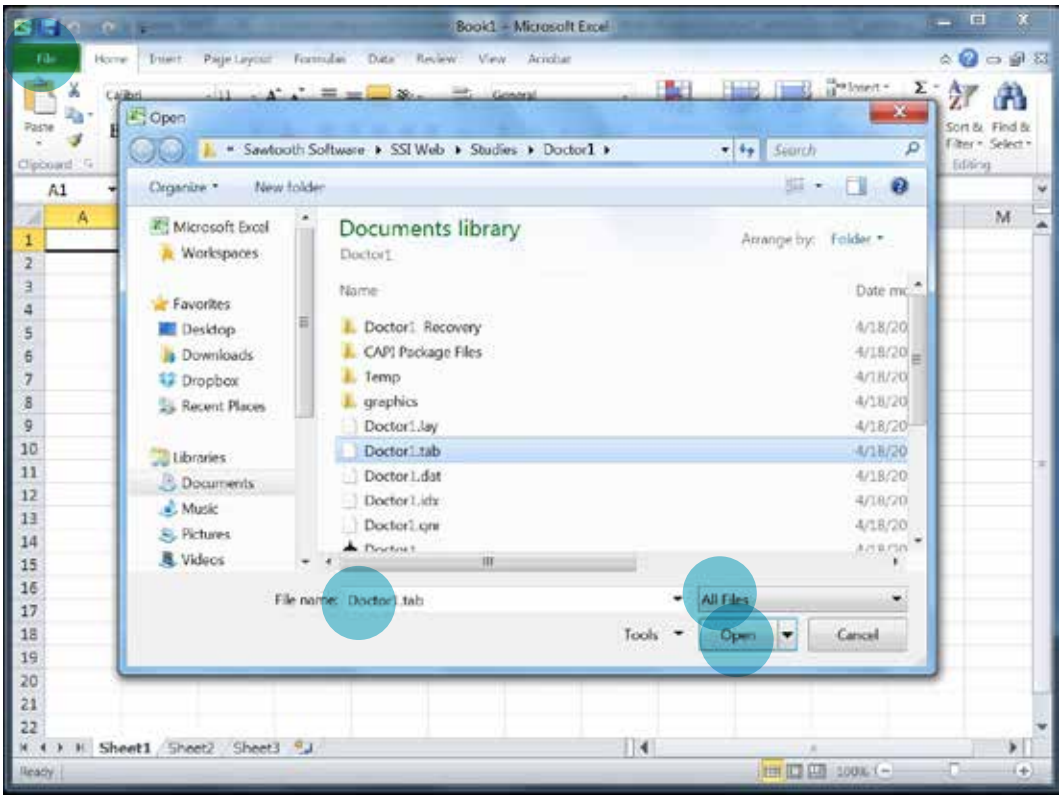
- Click Export. (See middle right circle in the figure below.)

- This action will produce a file with the extension .TAB in the folder you specify under Destination File Name.

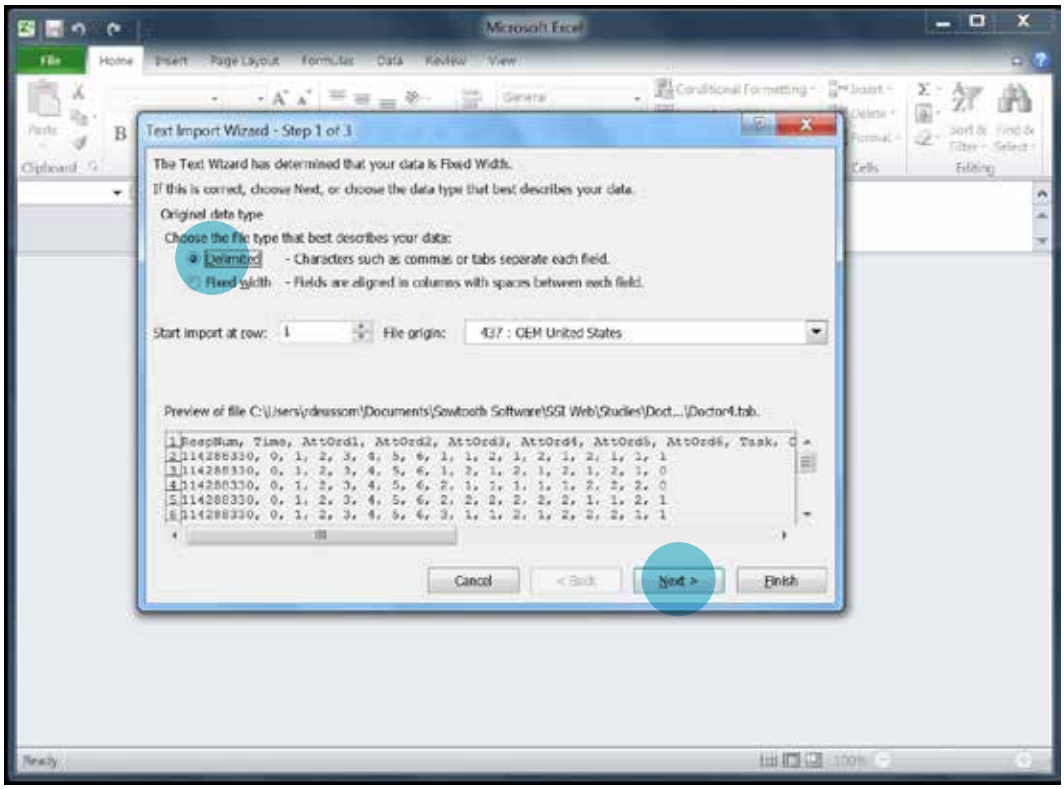


6. Convert the .TAB file to an Excel .CSV file.

   - Open the Microsoft Office Excel program.
   - Under the File (see top left circle in the figure below) drop-down menu, click Open.
   - In the Open window that will appear, select the .TAB file you saved in Stage 7, Step 1, which in this example is Doctor1_admin.tab (see bottom left circle in the figure below). You may need to select All Files (see upper bottom right circle in the figure below) from the drop-down menu above the Open button so that all files, including your .TAB file, can be seen.
   - Click Open (see lower bottom right circle in the figure below).

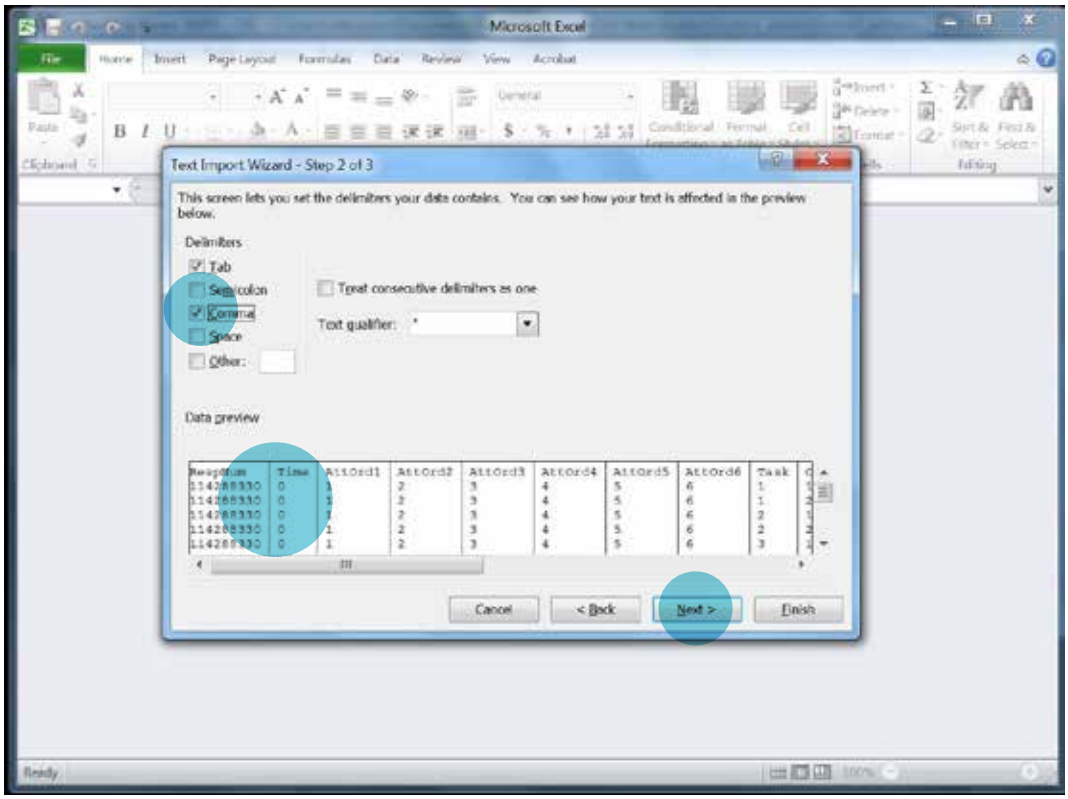


- A Text Import Wizard –Step 1 of 3 window will open. It will look something like this:



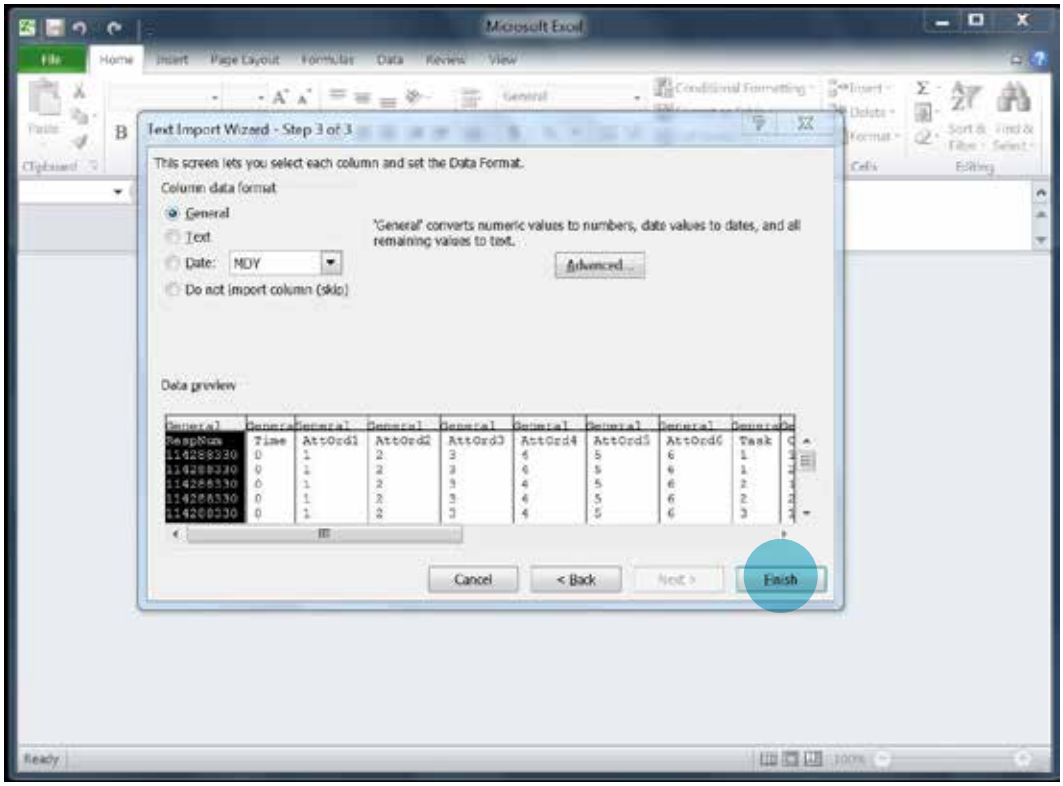
  - Under Original data type, select Delimited (see top left circle in the figure above).
  - Click Next (see bottom right circle in the figure above) to move to Step 2 of 3.

- In the Delimiters column, click Comma (see top left circle in the figure below). Under Data Preview, you will see that columns appear (see large middle left circle in the figure below.)



- Click Next to move to Step 3 of 3 (see bottom right circle in the figure above).

- You do not need to make any changes to the default settings in Step 3 of 3. Click Finish (see circle in the figure below).



7. When you click Finish, the new file will open automatically in Microsoft Excel. In Excel, you will now clean the data so that they can be properly analyzed.

   - When renaming columns, use lowercase letters, not capitalized letters for the variables. As the software analysis program will convert your variables to lowercase in the end, this will avoid any confusion during the analysis phase.

     - Change the name of column A (sys_RespNum) to `respond_id`, as this variable is the individual identifier of each respondent.

- Revise the names of your job attribute variables (Columns K-P, if six attributes were included in the survey) for ease in the data analysis stage. You will note that the program shortened many of your variable names to approximately an eight character length (e.g., if `length of commitment` was converted by the software to `length` you should correct it back to the full variable name for easier comprehension).

- Change column R heading (currently called CodedAns) to `choice`. This represents the job posting (Rural Job Posting [i.e. District Hospital in the Namibia example] or Urban Job Posting [i.e. Tertiary Hospital in the Namibia example]) choice the respondent selected from the job preference pair presented in the question.

- Now delete unnecessary columns named:

  - Time (Column B)
  - AttOrd1 (Column C)
  - AttOrd2 (Column D)
  - AttOrd3 (Column E)
  - AttOrd4 (Column F)
  - AttOrd5 (Column G)
  - AttOrd6 (Column H)
  - Answer (Column Q)

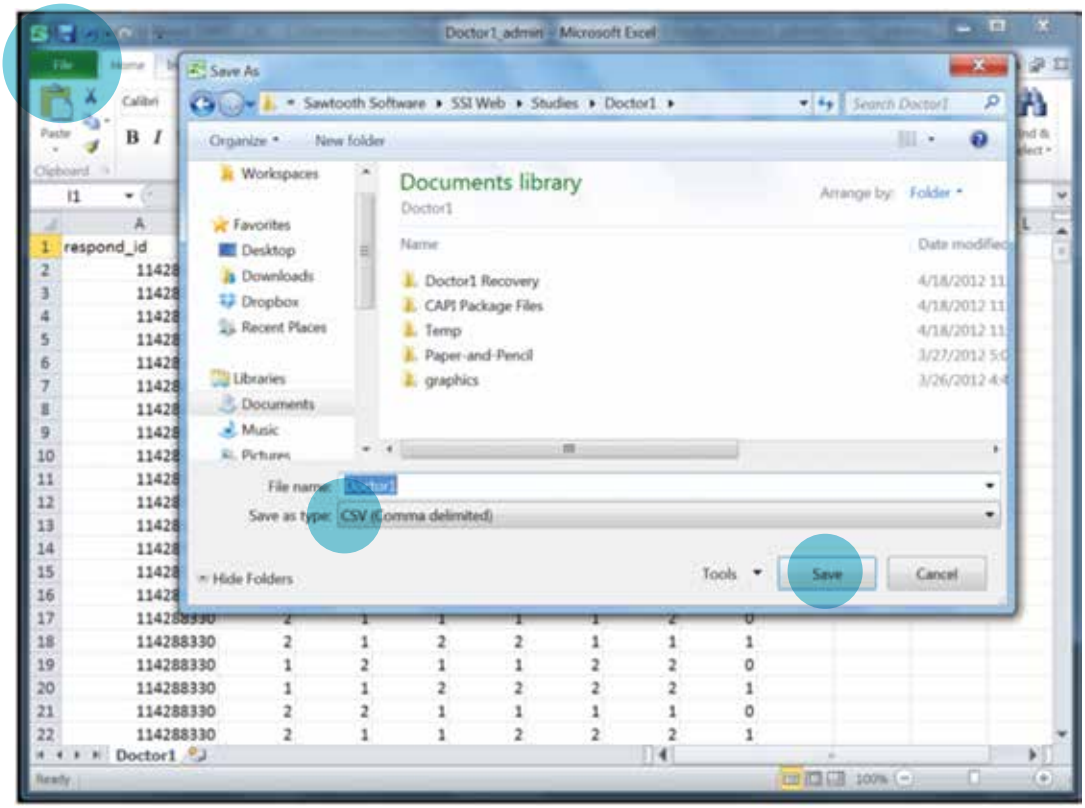
- Ensure that the columns task and Concept remain within your data set.

8. Save the file as a .CSV extension.

   - Under the File drop-down menu (see top circle in the following figure), click Save As.

   - Give the file a name (e.g., Doctor1_job preferences.csv) and note the location to which you are saving the file. Using the term job preferences in the file name will help differentiate it from the file that will be created later with the supplemental data (see instructions under the section, "Preparing the supplemental questions data" below), as the program tends to automatically give the files the same name, which may cause confusion during the data analysis phase in Stage 8.

- From the drop-down menu next to Save as type:, select CSV (comma delimited). (See middle circle in the figure below.)
- Click Save (see bottom right circle in the figure below).



This .CSV file should look similar to the table below. If you have 50 survey respondents, then you will have 1200 rows of data (i.e., 50 x 24 rows of data per respondent = 1200 total rows of data). Please note that the respondent identification numbers in the column respond_id are randomly assigned by the software (and oftentimes are random, large numbers) and will likely be different from those in the sample table below.

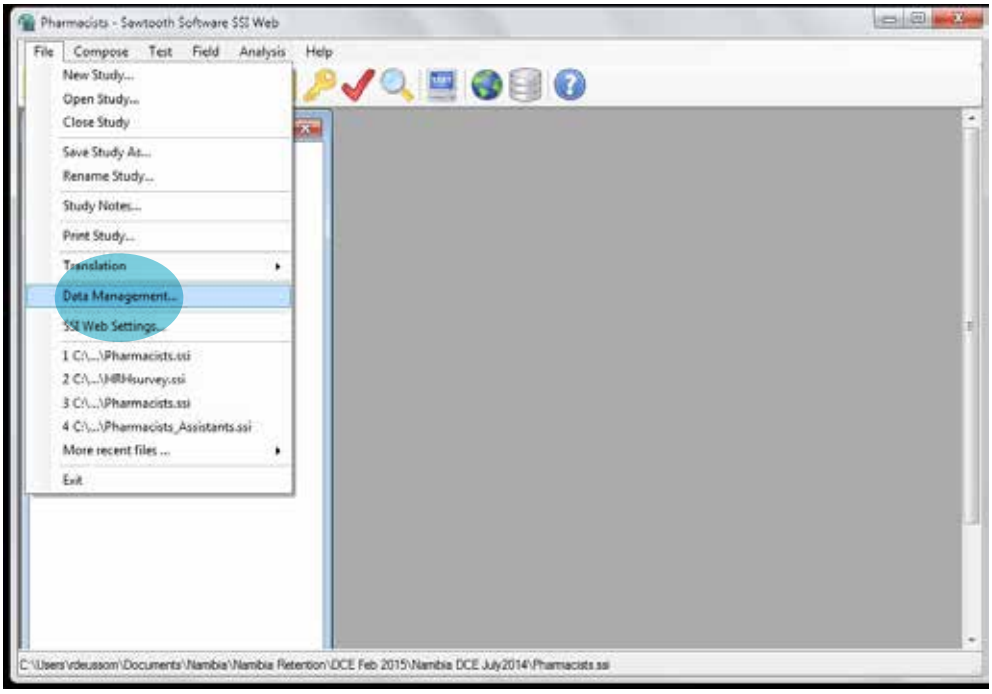
respond_id	task	concept	quality	housing	commitment	study	salary	management	choice
114288330	1	1	1	1	2	1	1	2	1
114288330	1	2	2	3	1	2	2	1	0
114288330	2	1	1	1	2	2	2	1	1
114288330	2	2	2	2	3	1	1	2	0
114288330	3	1	1	3	3	2	1	2	0
114288330	3	2	2	2	1	1	2	1	1
114288330	4	1	1	3	1	1	1	1	1
114288330	4	2	2	1	2	2	2	2	0
114288330	5	1	1	2	3	2	1	1	0
114288330	5	2	2	3	2	1	2	2	1
114288330	6	1	2	1	3	1	1	1	0
114288330	6	2	1	2	1	2	2	2	1
114288330	7	1	2	3	3	2	2	1	0
114288330	7	2	1	1	1	1	1	2	1
114288330	8	1	1	1	3	1	2	1	0
114288330	8	2	2	2	2	2	1	2	1
114288330	9	1	1	1	2	1	2	1	1
114288330	9	2	2	2	3	2	1	2	0
114288330	10	1	2	3	3	2	1	1	0
114288330	10	2	1	2	1	1	2	2	1
114288330	11	1	1	1	3	1	1	2	0
114288330	11	2	2	2	1	2	2	1	1
114288330	12	1	1	1	3	2	2	1	0
114288330	12	2	2	3	2	1	1	2	1
12268066	1	1	2	3	1	1	2	2	1
12268066	1	2	1	2	2	2	1	1	0
12268066	2	1	2	1	2	2	2	2	1
12268066	2	2	1	3	1	1	1	1	0
12268066	3	1	1	1	1	2	1	2	0
12268066	3	2	2	2	3	1	2	1	1
12268066	4	1	2	3	2	2	1	1	0
12268066	4	2	1	2	3	1	2	2	1
12268066	5	1	2	2	2	1	1	2	0
...	...	...	...	...	...	...	...	...	...

Preparing the supplemental questions data

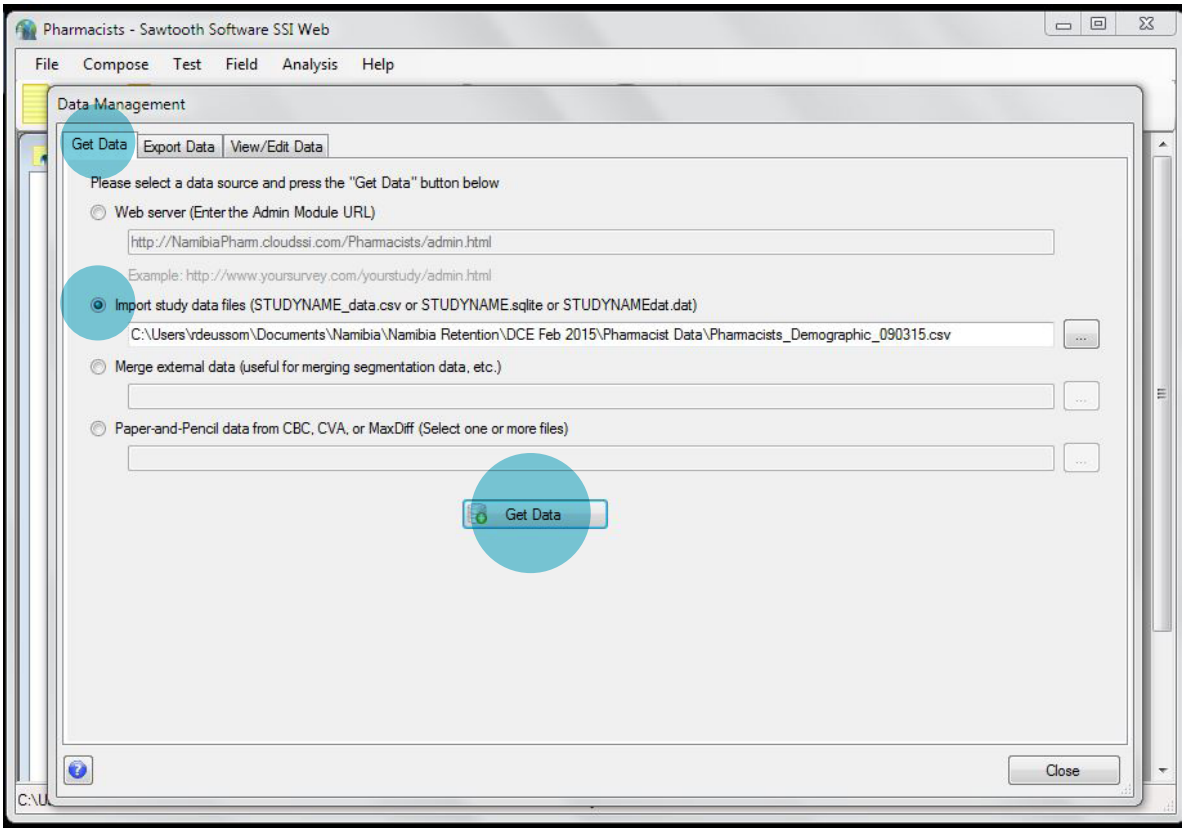
To retrieve the data for supplemental questions (for example, questions regarding demographics, professional experience, etc.) from the Sawtooth Software program:

1. With your survey of interest open in the Sawtooth SSI Web software:

- Click File > Data Management… (see circle in the figure below).

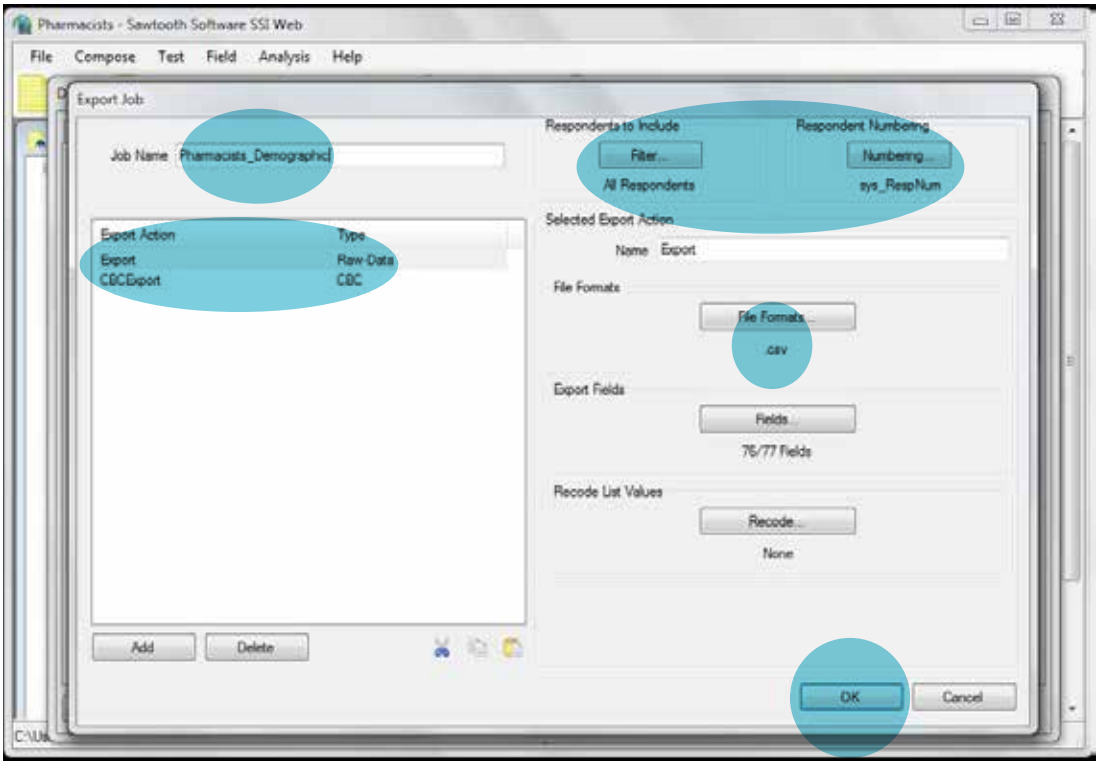


2. On the Get Data tab, select the second circle from the top and use the "…" to locate the demographic files (.CSV) (see top three circles in the figure below). Then click Get Data (see bottom circle in the figure below).

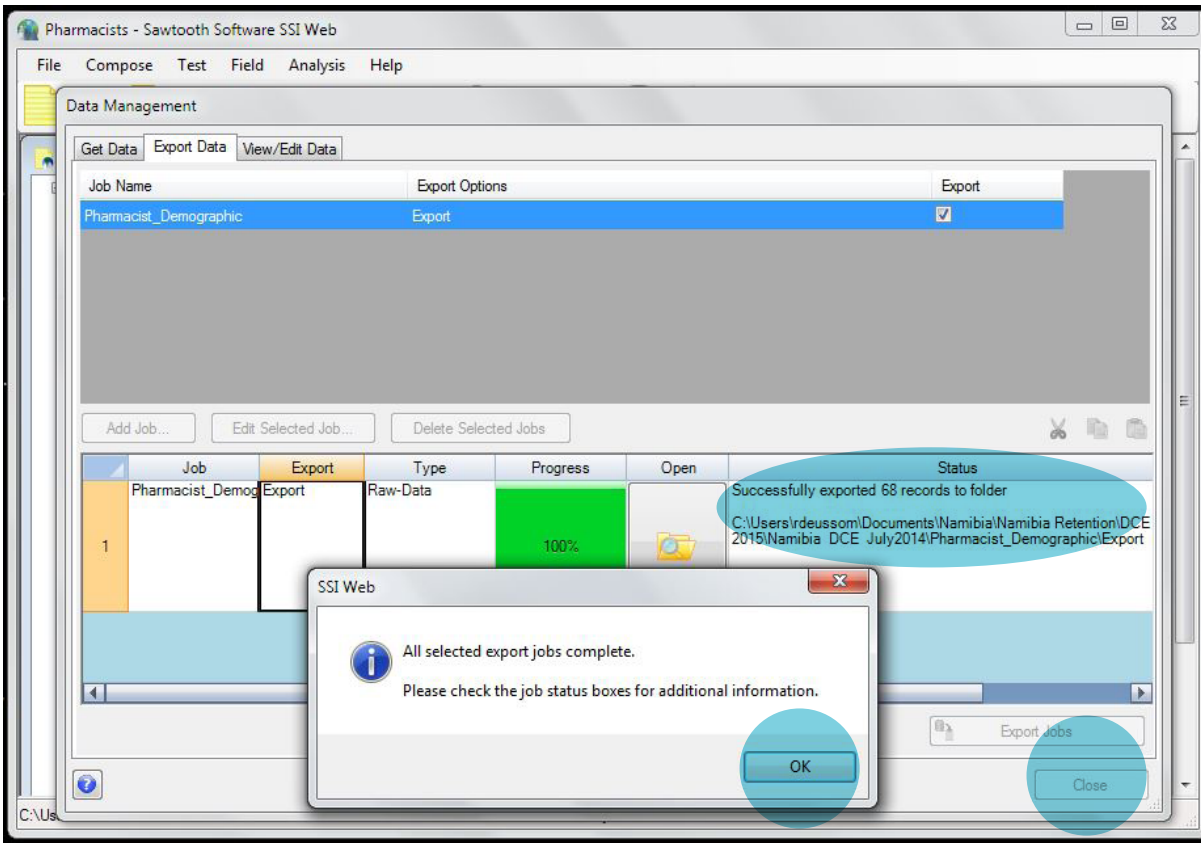


3. Click on the Export Data tab.

- Click Add Job…
- A new Export Job window will open.
- Name the file (e.g., Pharmacist_Demographic) (see top left circle in the figure below).
    - At the left of the window, the large box should include the Export Action as Export, and the Type as Raw-Data (see large middle left circle in the figure below).
    - At the right of the window, the Respondents to Include default selection should be All Respondents. The Respondent Numbering should be sys_RespNum (see large top right circle in the figure below). The File Format should be .csv (see middle right circle in the figure below).
    - Click OK to close the Export Job window (see bottom right circle in the figure below).



- Click on Export Jobs (see bottom right circle in the figure below).
- A green progress bar of the export will display below. When the data export is complete, a window will appear. Click OK to close the window (see bottom center circle in the figure below).
- Take note of the location of the file export under the Status column (see middle right circle in the figure below).
- Click Close (see bottom right circle in the figure below).



Open the file in Excel and rename the heading of the first column from sys_RespNum to `respond_id`. While the respondent identifiers (respond_id) correspond to the same numbers in the .CSV file with the job preferences data, note that in this supplemental data file there should only be one row of data per respondent. Remember that the job preferences data file has 24 rows per respondent, representing two job posting choices for each of the 12 job preference pair questions. An example dataset of supplemental questions will look similar to the following table. The respondent identification numbers in the respond_id column are randomly assigned by the software and may differ from the numbers in the following table (while we were assigned the simple, sequential values you see below, the program could also assign very large, random numbers as in the .CSV file with the job preferences data you saw earlier). Likewise, please note that the variables will differ depending on the supplemental questions asked in the survey and the variable name given to each question during development of the survey instrument.

respond_id (changed from the original "sys_RespNum")	gender	religion	religion_other	years_HW	age	...
123532234	2	2		13	40	...
432940165	1	1		5	25	...
693447020	1	2		5	33	...
109201234	1	4	Jewish	4	37	...
937602952	1	1		15	40	...
945876451	1	2		27	50	...
943576154	1	1		35	57	...
358248012	2	3		4	30	...
552761984	1	4	Animist	2	27	...
435484215	1	1		20	50	...
687325944	2	2		7	35	...
994435810	2	1		6	30	...
645754520	1	2		23	45	...
458243843	1	2		18	40	...
610500815	2	1		2	26	...
625100510	2	3		5	30	...
649454156	1	1		4	25	...
...	...	...	...	...	...	...

Your .CSV file of data from the supplemental questions section is now ready to import into the data analysis software program (see Stage 8).

Step 1 (Alternate): Prepare Data from Paper-Based Survey Administration

This step should only be completed if you administered a paper-based Rapid DCE survey.

Creating the database and data entry table

The Rapid DCE data collected with paper-based surveys will need to be entered into a database before analysis can be conducted. To create the data table for data entry:

1. Create a new spreadsheet in Microsoft Office Excel. You will need a separate Excel file for each targeted cadre's sample because each cadre's data must be analyzed separately. For example, if your Rapid DCE surveys medical students, nursing students, pharmacy students, currently practicing doctors, and currently practicing nurses, you will need FIVE separate Excel files—one for each group surveyed—and will need to complete the steps outlined below five times.

2. To avoid any confusion during the subsequent analysis phase, it is best to use lowercase letters, not capitalized letters, when developing the data entry table as the STATA software program (described in Stage 8) will convert your variables to lowercase letters in the end. Name the first two columns in the Excel spreadsheet as follows:

   - dceid: This variable is the identifier to differentiate each line of data, where each line represents one of the choices in a job preference pair (i.e., the questions where respondents choose between Rural Job Posting or Urban Job Posting).

     - Fill in the dceid column, beginning with "1" in the first row and labeling each line consecutively counting up to the number of respondents in your cadre sample multiplied by 24. For example, if you surveyed 120 doctors, the last number in the dceid column should be 2880 (120 x 24=2880). See cells highlighted in blue in the table on page 143. The dceid variable is only used in the paper-based survey for counting purposes (i.e., to keep track of the 24 rows of data per respondent) and will not be used in the actual analysis.

   - respond_id: This variable is the unique identifier for each respondent. Note that each respondent has 24 rows of data. This is because each respondent answered 12 job preference pair questions with two scenarios each (Rural Job Posting or Urban Job Posting, for a total of 24 scenarios.

     - Fill in the respond_id column by repeating the same respondent identification number down 24 consecutive rows. Beginning with the first respondent identification number (respond_id =1), fill in the first 24 rows of the respond_id column with "1" (corresponding with dceid numbers 1-24), the second 24 rows with "2" (corresponding to dceid rows 25-48), the third set of 24 rows with "3" (corresponding with dceid numbers 49-72), and so on. Continue numbering 24 rows until you have listed all the respondent identification numbers corresponding to the cadre group included in the dataset you are creating. See cells highlighted in green in the table on page 143.

3. The next columns represent the supplemental questions and will vary depending on the number of questions (variables) asked in the survey and the names given to those variables. Some examples to guide you in naming the columns for the supplemental questions:

   - gender: This can be the variable name for the question: `"What is your gender?"`

- religion: This can be the variable for the question: "What is your religion?"

- religion_other: this can be the variable name for cases where the respondent's answer to the question regarding religion was not one of the pre-coded options and so s/he checked "Other, please specify" and wrote in his/her religious affiliation. In this column you would write out the specified response (i.e., not use a coded number but the actual text the respondent wrote on the survey form). If respondents instead selected one of the pre-coded list of religions, then their coded answer would be captured in the variable column right before (religion), and the cell in the religion_other column would be left blank.

- yearshw: This can be the variable name for the question: "For how many years have you worked as a health worker?"

- age: This can be the variable name for the question: "How old are you?"

You will learn how to enter the supplemental data later in this step.

4. Immediately after the columns for the supplemental questions, add the following columns pertaining to the job preference pair questions section:

    - pair: This variable is the identifier for each job preference pair. Note that each pair has two lines of data. This is because each preference pair has two scenarios (Rural Job Posting and Urban Job Posting), and each respondent was asked 12 job preference pair questions.

    - concept: This variable distinguishes between the two different scenarios of job postings (i.e., rural versus urban) within each preference pair question as you have defined them by the Concept headings in Stage 3, Step 4.

        o Fill in the first two rows of the pair column with the number "1," the second two rows of the pair column with the number "2," the third two rows with the number "3," and so on. (See cells highlighted in orange in the table on page 143.) Continue to count up to as many preference pairs as were asked of all the respondents in the cadre sample. The final number in the pair column should be equal to the total number of respondents in the cadre-specific dataset multiplied by 12. So if you have 120 doctors included in the dataset, the final number in the pair column should be 1440 (120 x 12 =1440).

        o Fill in each of the two rows for each pair, with the first row being "1" and the second row being "2". Continue for the entire data set, so that for every preference pair, there is a column with the first row of "1" and the second row of "2" (see cells highlighted in gray in the table on page 143).

- version: This column specifies the particular version of the survey (remember, there were five different versions of the survey) that the respondent completed.

    - In the version column, write the number of the survey version the respondent was given on all 24 rows pertaining to that respondent identification number (respond_id). (See cells highlighted in purple in the table on page 143.)

5. The next columns represent the job attributes. For the six job attribute variables presented below we will use the Uganda example from Table 3. You should of course adapt your variable names depending on the attributes you selected for each cadre in your Rapid DCE survey. Note: the number of variables you have will depend on the number of attributes included in the Rapid DCE. For example, if there were only five job attributes, then you would only have five columns of variables. In the example we are using, there are six job attributes, as follows:

    - quality: the first job attribute variable corresponding to the two levels of the attribute `quality of the facility`
    - housing: the second job attribute variable corresponding to the three levels of the attribute `housing`
    - commitment: the third job attribute variable corresponding to the two levels of the attribute `length of commitment`
    - study: the fourth job attribute variable corresponding to the two levels of the attribute `study assistance`
    - salary: the fifth job attribute variable corresponding to the four levels of the attribute `salary`
    - management: the sixth job attribute variable corresponding to the two levels of the attribute `facility management support`.

You will learn how to code the job attribute variables with their corresponding levels later in this step.

6. Name the last column in the dataset choice. This variable represents the respondent's answer to the job preference pair question (i.e., if the respondent chose the rural job posting or the urban job posting).

You should have a database spreadsheet that looks similar to this:

dceid	re-spond_id	gender	religion	religion_4_ other	yearshw	age	...	pair	concept	version	quality	housing	commit-ment	salary	study	man-age-ment	choice
1	1							1	1	1							
2	1							1	2	1							
3	1							2	1	1							
4	1							2	2	1							
5	1							3	1	1							
6	1							3	2	1							
7	1							4	1	1							
8	1							4	2	1							
9	1							5	1	1							
10	1							5	2	1							
11	1							6	1	1							
12	1							6	2	1							
13	1							7	1	1							
14	1							7	2	1							
15	1							8	1	1							
16	1							8	2	1							
17	1							9	1	1							
18	1							9	2	1							
19	1							10	1	1							
20	1							10	2	1							
21	1							11	1	1							
22	1							11	2	1							
23	1							12	1	1							
24	1							12	2	1							
25	2							13	1	2							
26	2							13	2	2							
27	2							14	1	2							
28	2							14	2	2							
29	2							15	1	2							
30	2							15	2	2							
...	...							...	...	...							

Entering data from the supplemental questions

It is easiest to enter the responses from the supplemental questions using coding. Remember, in the section to develop the supplemental questions using Sawtooth Software, the response options to the gender question were coded as 1 for male and 2 for female. However, words can also be entered in the dataset, especially in the case of "Other (Please specify)" response options. Appendix 3 provides examples of supplemental questions and their coded responses (in parentheses to the right of the tick box of the respective response). You can give any numerical code to a response. For example, Sawtooth started coding with the number 1. The questionnaires in Appendices 3 and 4 begin with 0 (for example, male is coded 0 while female is coded 1).

We will continue the Uganda example and enter data for the variables gender, religion, yearshw, and age. The table below shows the responses to these selected questions by the first respondent (respond_id=1) and their respective codes.

Variable	Question (taken from the Uganda example)	Example Response	Code to Enter
gender	What is your gender? (Question 3)	Male	0
religion	What is your religion? (Question 9)	Christian	1
yearshw	For how many years in total have you worked as a health worker? (Question 11)	8	8
age	What is your age, in years? (Question 4)	32	32

To enter the responses, locate the first row of the respond_id=1 and then type "0" under the gender column, "1" under the religion column, "8" under the yearshw column, and "32" under the age column, and so on until you have completed the first row for all the supplemental question variables. Once you have completed them across, you will need to copy the entire row of responses you just entered and paste them down through all 24 rows (dceid 1-24) corresponding to respond_id=1. Remember this is because there are 12 job preference questions with two lines of data each (one pair), so each respondent has 24 lines of data. As such, while the respondent only answered the supplemental questions once, we need to repeat their responses across 24 lines (see cells highlighted in yellow in the following table). The next respondent's responses for the supplemental questions will be entered in the rows corresponding to dceid 25-48, representing that respondent's 24 rows of data.

Should a respondent not answer a supplemental question or leave it blank on the survey questionnaire, then code that response with a "." (period symbol). The "." will be recognized by the analysis software (described in Stage 7) as missing data. Be sure to also copy and paste the "." down all 24 lines of data corresponding to the respondent number (respond_id) in the same way as for the other supplemental question responses.

dceid	re-spond_id	gender	religion	religion_other	yearshw	age	...	pair	concept	version	quality	housing	commit-ment	salary	study	man-age-ment	choice
1	1	0	1		8	32		1	1	1							
2	1	0	1		8	32		1	2	1							
3	1	0	1		8	32		2	1	1							
4	1	0	1		8	32		2	2	1							
5	1	0	1		8	32		3	1	1							
6	1	0	1		8	32		3	2	1							
7	1	0	1		8	32		4	1	1							
8	1	0	1		8	32		4	2	1							
9	1	0	1		8	32		5	1	1							
10	1	0	1		8	32		5	2	1							
11	1	0	1		8	32		6	1	1							
12	1	0	1		8	32		6	2	1							
13	1	0	1		8	32		7	1	1							
14	1	0	1		8	32		7	2	1							
15	1	0	1		8	32		8	1	1							
16	1	0	1		8	32		8	2	1							
17	1	0	1		8	32		9	1	1							
18	1	0	1		8	32		9	2	1							
19	1	0	1		8	32		10	1	1							
20	1	0	1		8	32		10	2	1							
21	1	0	1		8	32		11	1	1							
22	1	0	1		8	32		11	2	1							
23	1	0	1		8	32		12	1	1							
24	1	0	1		8	32		12	2	1							
25	2	1	0	Satsana Phi	2	25		13	1	2							
26	2	1	0	Satsana Phi	2	25		13	2	2							
27	2	1	0	Satsana Phi	2	25		14	1	2							
28	2	1	0	Satsana Phi	2	25		14	2	2							
29	2	1	0	Satsana Phi	2	25		15	1	2							
30	2	1	0	Satsana Phi	2	25		15	2	2							
...	...	...	...	...	...	...		...	...	...							

Coding the levels of the job attributes

In a paper-based survey you need to fill in the dataset with the appropriate coding corresponding to the levels of the job attributes presented in the job preference pairs questions for each of the 12 questions. In other words, you need to convert the text description of the level of the job attribute presented in a given job preference pair question into a numerical figure or code. In this case, the code will simply be the numerical number of the level.

For the sake of providing a guiding example, we will continue to use the job attributes and their corresponding levels from the Uganda example in Table 3. These job attributes and the coding for their respective levels are presented in Table 5.

Table 5. Coding Levels of Job Attributes

Job Attribute	Attribute Levels	Code
Quality of the facility	Level 1: Basic (unreliable electricity, equipment; drugs/supplies not available) Level 2: Advanced (reliable electricity, equipment; drugs/supplies available)	1 2
Housing	Level 1: No housing or allowance provided Level 2: Housing allowance provided Level 3: Free basic housing provided	1 2 3
Length of commitment	Level 1: 2 years Level 2: 5 years	1 2
Study assistance	Level 1: No support (no financial assistance for further study after your commitment is over) Level 2: Full support (government will pay your full tuition for further study [e.g., specialty training] after your commitment is over)	1 2
Salary	Level 1: 700,000 Sh/month Level 2: 1,000,000 Sh/month Level 3: 1,500,000 Sh/month Level 4: 2,000,000 Sh/month	1 2 3 4
Management support	Level 1: Not supportive (the district health officer is not supportive and makes work more difficult) Level 2: Supportive (the district health officer is supportive and makes work easier)	1 2

So, for example, if the job preference pair question included a housing allowance, then the code for that level would be 2 since housing allowance is level 2 (no housing is level 1, and provision of a house is level 3). In a computer-based survey the Sawtooth Software automatically does this.

Since there are five versions of the survey, each with differing combinations of the job attribute levels the respondents choose from, we need to code the five separate versions. However, after you do this once, then you can copy and paste the coding throughout the rest of the dataset for each of the corresponding five versions, depending on which version a respondent completed. The coding you use will depend on the selected levels of the job attributes in the survey for a particular cadre.

To fill in the coding in the dataset you are creating, you need a printed copy of the job preference pair questions section of all five versions of the survey for that cadre. Go to the first job preference pair question in version 1 of the survey questionnaire. Let us assume they are the same job attributes and levels shown in Table 5 above, with preference pair questions such as in Figure 3 below.

FIGURE 3: EXAMPLE JOB PREFERENCE PAIR QUESTION

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

	Rural Job Posting	**Urban Job Posting**
Quality of Facility	Basic (unreliable electricity, equipment; drugs/supplies not available)	Advanced (reliable electricity, equipment; drugs/supplies available)
Housing	No housing or allowance provided	Free basic housing provided
Length of Commitment	You are committed to this position for 5 years	You are committed to this position for 2 years
Study Assistance	Full support (government will pay your full tuition for further study [e.g., specialty training] after your commitment is over)	No support (no financial assistance for further study after your commitment is over)
Salary	2,000,000 USh per month	1,500,000 USh per month
Management	Not supportive (the district health officer is not supportive and makes work more difficult)	Supportive (the district health officer is supportive and makes work easier)
	○	○

The first job attribute shown in the example question in Figure 3 is Quality of facility. The rural job posting is at a facility of basic quality, which according to Table 4 indicates level 1 or code 1. The urban job posting is at a facility of an advanced quality, which is level 2 or code 2. Using the example of a completed dataset in the following table as your guide, note the cells highlighted in brown, where the level for the quality variable in the first job pair question is coded. In the first row of pair 1, survey version 1 (since Rural Job Posting is always the first row of a pair), you should enter code 1 (basic quality of facility) while in the second row of pair 2, survey version 1 (since Urban Job Posting is always the second row of a pair) you should enter the number 2 (advanced quality of facility).

The second job attribute in Figure 3 is Housing. The level presented in Rural Job Posting is level 1 (no housing or allowance provided), so you should fill in code 1 in the first row of pair 1, survey version 1 of the housing column (see cells highlighted in red in the table on page 148-149). The level of housing offered in Urban Job Posting is free basic housing, corresponding to level 3. You should enter a code of 3 in the second row of pair 1, survey version 1.

The third job attribute in Figure 3 is Length of commitment with Rural Job Posting requiring a five-year commitment (corresponding to level 2 or code 2, according to Table 3). Urban Job Posting requires a two-year commitment (corresponding to level 1 or code 1). Therefore, you would enter code 2 in the first row of pair 1, survey version 1 under the "commitment" variable column (see cells highlighted in teal in the following table), and code 1 in the second row of pair 1, survey version 1.

Continue this process until you have coded all six attributes of the first job preference pair question. Then move to the second job preference pair question and fill in the codes for the next two rows (first row of pair 2 and second row of pair 2) of each job attribute variable.

When you have coded all 12 job preference questions in survey version 1, then you should follow the same process to code the job attributes for survey versions 2 through 5.

Once you have coded all five survey versions, then you can copy and paste the codes in the rest of the dataset since all respondents in that cadre who complete version 1 will have seen the same job preference questions. The same can be done for all respondents that were surveyed using version 2, version 3, and so on.

dceid	re-spond_id	gender	religion	religion_ other	yearshw	age	...	pair	concept	ver-sion	quality	housing	commit-ment	salary	study	man-age-ment	choice
1	1	0	1		8	32		1	1	1	1	1	2	4	1	2	0
2	1	0	1		8	32		1	2	1	2	3	1	3	2	1	1
3	1	0	1		8	32		2	1	1	1	2	1	1	2	2	1
4	1	0	1		8	32		2	2	1	2	3	2	2	1	1	0
5	1	0	1		8	32		3	1	1	2	1	2	1	2	1	0
6	1	0	1		8	32		3	2	1	1	3	1	4	1	2	1
7	1	0	1		8	32		4	1	1	1	2	1	1	2	1	0
8	1	0	1		8	32		4	2	1	2	3	2	3	1	2	1
9	1	0	1		8	32		5	1	1	1	1	2	4	1	2	0
10	1	0	1		8	32		5	2	1	2	1	1	2	2	1	1
11	1	0	1		8	32		6	1	1	1	3	1	1	1	2	1
12	1	0	1		8	32		6	2	1	2	2	2	3	2	1	0
13	1	0	1		8	32		7	1	1	1	1	1	3	1	1	1
14	1	0	1		8	32		7	2	1	2	3	2	4	2	2	0
15	1	0	1		8	32		8	1	1	1	3	2	1	2	2	0
16	1	0	1		8	32		8	2	1	2	1	1	3	1	1	1
17	1	0	1		8	32		9	1	1	1	1	1	2	1	2	1
18	1	0	1		8	32		9	2	1	2	3	2	3	2	1	0
19	1	0	1		8	32		10	1	1	1	2	1	4	2	1	1
20	1	0	1		8	32		10	2	1	2	3	2	4	1	2	0
21	1	0	1		8	32		11	1	1	1	2	1	3	1	2	1
22	1	0	1		8	32		11	2	1	2	2	2	1	2	1	0
23	1	0	1		8	32		12	1	1	1	1	1	1	1	2	1
24	1	0	1		8	32		12	2	1	2	2	2	2	2	1	0
25	2	1	0	Hindu	2	25		13	1	2	2	1	1	1	1	1	0
26	2	1	0	Hindu	2	25		13	2	2	1	2	2	4	2	2	1
27	2	1	0	Hindu	2	25		14	1	2	1	3	2	3	1	1	0
28	2	1	0	Hindu	2	25		14	2	2	2	3	1	2	2	2	1
29	2	1	0	Hindu	2	25		15	1	2	2	2	1	4	2	1	1
30	2	1	0	Hindu	2	25		15	2	2	1	1	2	2	1	2	0
31	2	1	4	Hindu	2	25		16	1	2	2	3	2	4	2	2	1
32	2	1	4	Hindu	2	25		16	2	2	1	2	1	2	1	1	0
33	2	1	4	Hindu	2	25		17	1	2	1	1	2	1	2	2	0
34	2	1	4	Hindu	2	25		17	2	2	2	2	1	2	1	1	1
35	2	1	4	Hindu	2	25		18	1	2	2	1	1	4	2	1	0
36	2	1	4	Hindu	2	25		18	2	2	1	1	2	2	1	2	1
37	2	1	4	Hindu	2	25		19	1	2	2	2	2	3	2	2	1
38	2	1	4	Hindu	2	25		19	2	2	1	2	1	2	1	1	0
39	2	1	4	Hindu	2	25		20	1	2	1	2	1	4	1	2	1
40	2	1	4	Hindu	2	25		20	2	2	2	3	2	1	2	1	0
41	2	1	4	Hindu	2	25		21	1	2	1	1	1	2	2	2	0
42	2	1	4	Hindu	2	25		21	2	2	2	3	2	2	1	1	1
43	2	1	4	Hindu	2	25		22	1	2	1	3	2	3	1	1	0
44	2	1	4	Hindu	2	25		22	2	2	2	1	1	3	2	2	1

dceid	re-spond_id	gender	religion	religion_ other	yearshw	age	...	pair	concept	ver-sion	quality	housing	commit-ment	salary	study	man-age-ment	choice
45	2	1	4	Hindu	2	25		23	1	2	2	2	1	2	1	2	1
46	2	1	4	Hindu	2	25		23	2	2	1	2	2	1	2	1	0
47	2	1	4	Hindu	2	25		24	1	2	2	3	2	4	1	2	1
48	2	1	4	Hindu	2	25		24	2	2	1	2	1	2	2	1	0
49	3	0	1		20	43		25	1	3	1	1	1	4	2	1	1
50	3	0	1		20	43		25	2	3	2	2	2	1	1	2	0
51	3	0	1		20	43		26	1	3	2	1	1	2	1	2	1
52	3	0	1		20	43		26	2	3	1	3	2	3	2	1	0
53	3	0	1		20	43		27	1	3	1	2	2	4	2	2	0
54	3	0	1		20	43		27	2	3	2	3	1	4	1	1	1
55	3	0	1		20	43		28	1	3	1	2	1	3	2	1	1
56	3	0	1		20	43		28	2	3	2	1	2	4	1	2	0
57	3	0	1		20	43		29	1	3	2	1	1	2	2	1	0
58	3	0	1		20	43		29	2	3	1	3	2	1	1	2	1
59	3	0	1		20	43		30	1	3	2	3	2	3	1	2	1
60	3	0	1		20	43		30	2	3	1	1	1	3	2	1	0
61	3	0	1		20	43		31	1	3	1	3	2	2	1	2	1
62	3	0	1		20	43		31	2	3	2	2	1	2	2	1	0
63	3	0	1		20	43		32	1	3	1	1	2	4	2	1	0
64	3	0	1		20	43		32	2	3	2	2	1	1	1	2	1
65	3	0	1		20	43		33	1	3	2	1	1	4	2	2	0
66	3	0	1		20	43		33	2	3	1	2	2	3	1	1	1
67	3	0	1		20	43		34	1	3	2	2	1	2	1	1	1
68	3	0	1		20	43		34	2	3	1	3	2	2	2	2	0
69	3	0	1		20	43		35	1	3	1	3	2	4	2	2	1
70	3	0	1		20	43		35	2	3	2	1	1	2	1	1	0
71	3	0	1		20	43		36	1	3	1	1	2	1	2	1	0
72	3	0	1		20	43		36	2	3	2	2	1	3	1	2	1
73	4	0	2		3	27		37	1	4	2	2	1	1	1	2	1
74	4	0	2		3	27		37	2	4	1	3	2	3	2	1	0
75	4	0	2		3	27		38	1	4	1	3	1	4	2	1	0
76	4	0	2		3	27		38	2	4	2	1	2	4	1	2	1
77	4	0	2		3	27		39	1	4	1	1	2	2	2	2	1
78	4	0	2		3	27		39	2	4	2	2	1	1	1	1	0
79	4	0	2		3	27		40	1	4	2	2	2	2	2	1	0
80	4	0	2		3	27		40	2	4	1	3	1	1	1	2	1
81	4	0	2		3	27		41	1	4	2	3	1	3	1	1	1
82	4	0	2		3	27		41	2	4	1	1	2	3	2	2	0
83	4	0	2		3	27		42	1	4	1	1	1	2	1	1	0
84	4	0	2		3	27		42	2	4	2	3	2	2	2	2	1
85	4	0	2		3	27		43	1	4	2	1	2	3	2	2	1
86	4	0	2		3	27		43	2	4	1	2	1	2	1	1	0
87	4	0	2		3	27		44	1	4	2	2	2	4	1	2	0
88	4	0	2		3	27		44	2	4	1	3	1	4	2	1	1
89	4	0	2		3	27		45	1	4	1	2	1	1	1	1	1
90	4	0	2		3	27		45	2	4	2	1	2	1	2	2	0
91	4	0	2		3	27		46	1	4	1	2	1	2	2	2	0
92	4	0	2		3	27		46	2	4	2	3	2	1	1	1	1
93	4	0	2		3	27		47	1	4	1	2	2	4	2	1	1
94	4	0	2		3	27		47	2	4	2	1	1	3	1	2	0
95	4	0	2		3	27		48	1	4	2	1	1	4	2	2	0
96	4	0	2		3	27		48	2	4	1	3	2	2	1	1	1
97	5	1	1		5	27		49	1	5	2	1	2	3	1	1	1
98	5	1	1		5	27		49	2	5	1	2	1	3	2	2	0
99	5	1	1		5	27		50	1	5	1	2	1	1	1	2	1
100	5	1	1		5	27		50	2	5	2	3	2	3	2	1	0
101	5	1	1		5	27		51	1	5	1	3	2	2	2	2	1
102	5	1	1		5	27		51	2	5	2	1	1	1	1	1	0
103	5	1	1		5	27		52	1	5	2	2	2	4	1	1	0
104	5	1	1		5	27		52	2	5	1	3	1	3	2	2	1
105	5	1	1		5	27		53	1	5	1	1	1	2	1	1	0
...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...

Entering data from the job preference questions section

The respondents' answers to which job posting they prefer (i.e., Rural Job Posting or Urban Job Posting) to each job preference pair question are recorded under the last column in the dataset with the variable name choice. The job posting scenario that the respondent selects (i.e., either Rural Job Posting or Urban Job Posting) is coded as "1" (it was chosen) while the job posting scenario the respondent did not choose is coded "0." So, for one of the lines in each job preference pair, the choice variable = "1" indicating that the respondent preferred this scenario, and for the other line in the preference pair, the choice variable = "0" indicating that the respondent did not prefer this scenario. Remember that each job preference pair question is represented by two lines of data with the same number pair variable (for example, there are two duplicated lines under the pair variable, 1 and 1, 2 and 2, 7 and 7, 10 and 10—see orange highlighted section in the table on page 148). Therefore, Rural Job Posting is represented by the first of the two lines for a pair while Urban Job Posting is represented by the second line in the pair.

Because of the way the data will be read and analyzed by the analysis software, you must mark "0" for the job that was not selected. You cannot leave it blank. Also, be careful when entering data so that each pair has a "0" and a "1." No other number will be allowed by the statistical analysis software. For example, if the first respondent (respond_id= 1) chose Urban Job Posting in the first job preference question, then you would enter "0" in the first row of pair 1 under the choice column and "1" under the second row of pair 1. If for the second job preference question, this respondent selected Rural Job Posting, then you would enter "1" in the first row of pair 2 under the choice column and "0" under the second row of pair 2.

When you have completed entering the responses to all 12 job preference pair questions (equaling 24 lines of data) you should see that you are at the start of the next respondent number (respond_id) and ready to enter that respondent's job preference choices.

Should a respondent leave a job preference question blank—i.e., not mark either "Rural Job Posting" or "Urban Job Posting" on the survey form—do not leave it blank in the database. Instead code that pair (two rows of data) with "." (period symbol). The "." will be recognized by the analysis software as missing data.

When you are done entering data, take a quick look through the dataset and make sure there are no empty rows. For example, you may have filled in all the respondent identification numbers (respond_id) ahead of time but were not able to survey all respondents. The 24 rows corresponding to the blank respondent numbers should be deleted, otherwise the analysis will be affected. For example, if you had labeled a questionnaire with a unique identifier number of 205, but that questionnaire was never administered in the field, you should delete its corresponding 24 rows from the database.

Converting to a file readable by the analysis software

In order for the statistical analysis software to read the dataset appropriately, we need to convert the file from a normal Excel spreadsheet (.XLS file) to a .CSV extension. To do this:

a. Select File from the tab at the top of the spreadsheet, and click Save As.
b. From the drop-down menu next to Save as Type: select CSV (comma delimited).
c. Give the file a name and note its location.
d. Click Save.

This .CSV file is now ready to analyze in the same manner as a file created during the computer-based survey administration process.

STAGE 8:
ANALYZING THE DATA

In Stage 8, you will now analyze the data that you have collected, prepared, and managed. Unless it is specifically noted with a computer and paper icons on the margin, each step applies to BOTH data collected by computer and on paper.

Regardless of whether your collected data are computer-based or paper-based, once you have followed the steps in Stage 7 above and obtained a .CSV file, the .CSV file is ready to import into an appropriate software program for data analysis. We will describe the steps required for analysis using the STATA software package. Other packages can also be used to analyze these data. However, the code presented below will only work with the STATA software. You can obtain additional information about the STATA software by visiting www.stata.com.

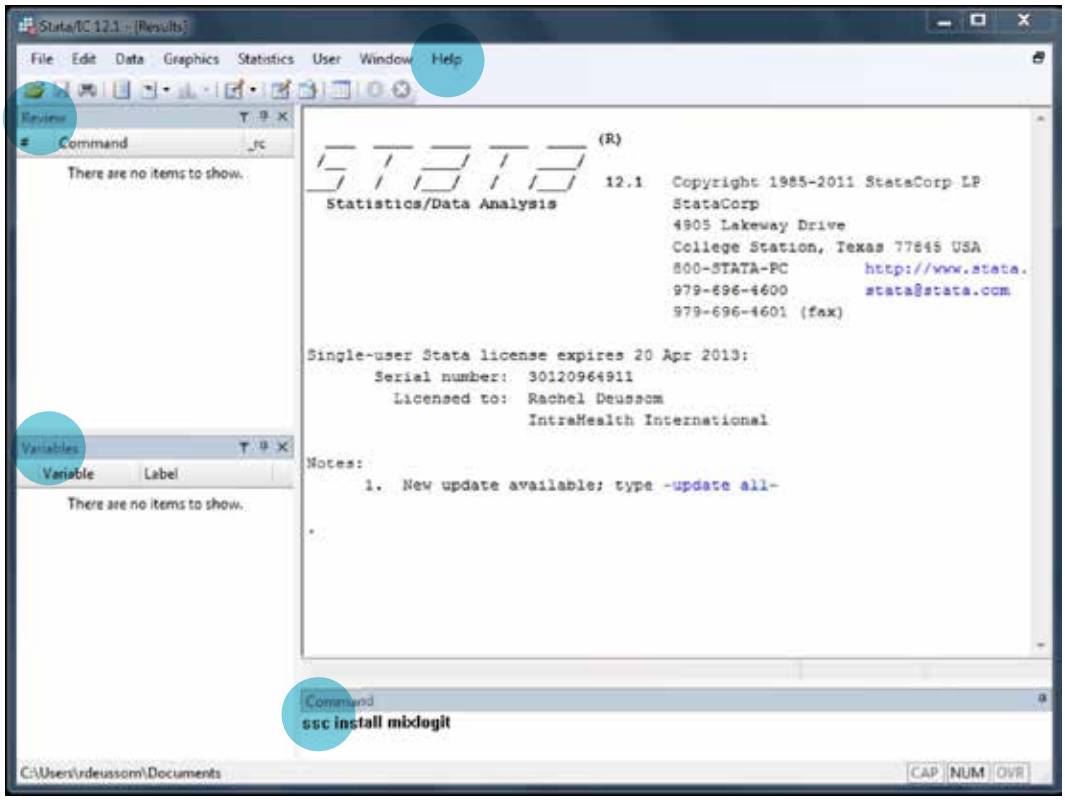
Step 1: Obtain the Software and License

These analyses will require a license for the STATA/IC module, which costs approximately USD$600 (in 2014) for an individual license.

The STATA software and license can be obtained from the following web address: www.stata.com/order/

Step 2: Set Up the Software

- Once you have installed the software, open the STATA program. You will see this:



- The blue Command box at the bottom of the window (see bottom circle in the figure on page 149) is where you will enter the programming commands that are specified below.

- The Review box at the upper left side of the window (see top left circle in the figure on page 153) is where you will see a historical listing of the commands that you have previously entered in the command box at the bottom of the window. You will note that if there is an error with one of your command entries, the listing in the Review box will appear in **red**. If there is no error, the commands will appear in **black**.

- The Variables box at the bottom left of the window (see bottom left circle in the figure on page 153) is where the listing of variables in your imported dataset will be displayed.

- Please note that further information, assistance, and instructions on how to use the software can be found by clicking the Help section of the software program (see top middle circle in the figure on page 153).

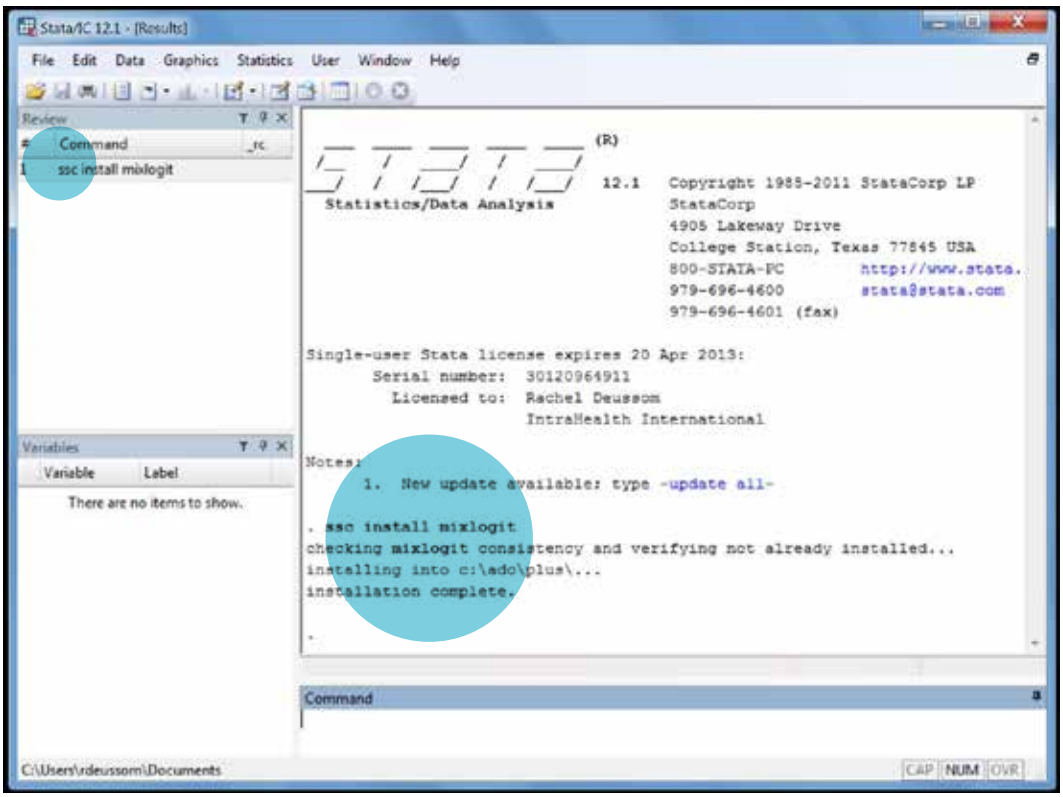
Before you begin analysis of the job preferences data file you created in Stage 7, it is necessary to download and install the mixlogit regression analysis command to your STATA software. There is no cost to download this analysis command.

- While connected to the Internet, place the cursor in the Command box at the bottom of the window (see bottom circle in the figure on page 153) and type the following:

```
ssc install mixlogit
```

- Press Enter on your computer's keyboard.

You will see the historical listing of the command in the top left Review box (see top circle in the figure below), as well as details about the mixlogit installation in the Notes section of the main box (see bottom circle in the figure below):



Step 3: Import a Data File

Now you need to import a .CSV file with your data (you created this in Stage 7) from the folder in which the files are located on your computer into the STATA program. Please note you will analyze each data file separately.

- Type the following command, filling in the exact destination folder and name of your file in the Command box at the bottom of the window:

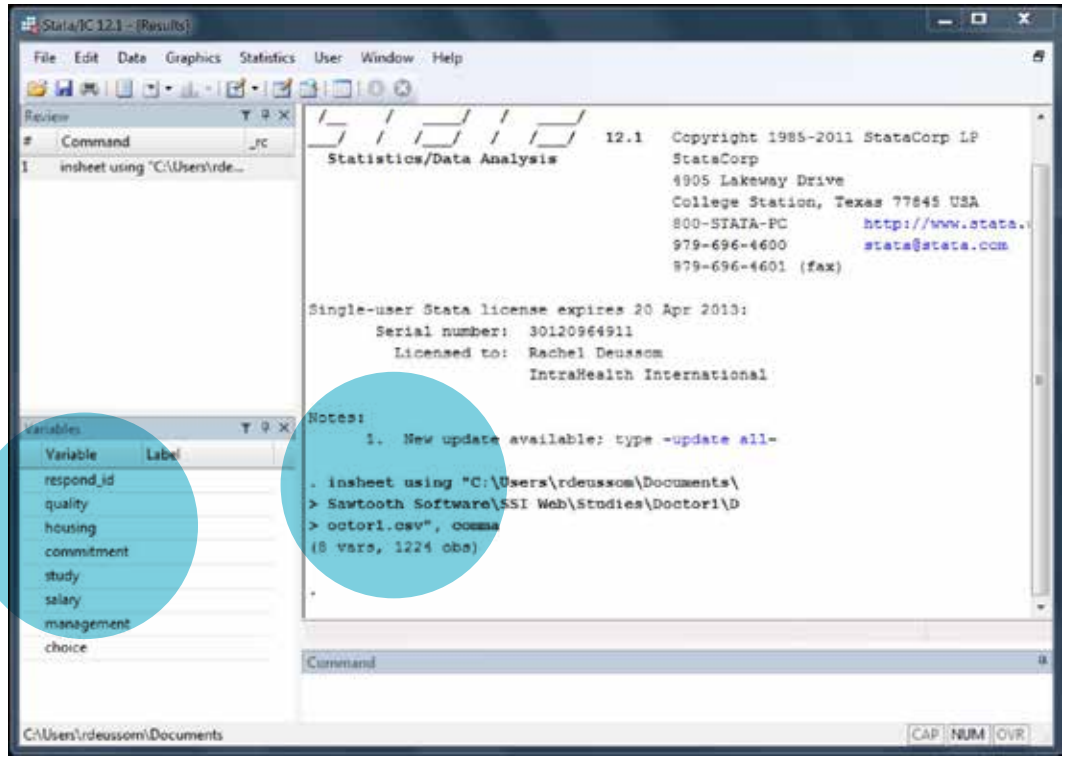
  ```
  insheet using "destination\name of file.csv", comma
  ```

  Please note you must use the beginning and ending quotation marks (`" "`) in this command as well as ending the command with the comma punctuation mark `(,)` and the word `comma`.

An example to import the file you created with the supplemental questions data from a computer-based survey is:

```
insheet using "C:\Users\Documents\DCE Study\Doctor1_
supplemental.csv", comma
```

In this example, `Doctor1_supplemental.csv` is the name of the data file located in the folder named DCE Study in the Documents Library folder of the hard drive (C:\). Be sure to add the .csv ending to the name of your file. Another example of a destination and file name can be seen in the circle on the right in the figure below. If the file is correctly imported then you should see the number of variables (vars) and observations (obs) included in the imported file (see right circle in the figure below) as well as the listing of variable names in the variables window on the left side of the screen (see left circle in the figure below).



Step 4: Analyze Data from the Supplemental Questions

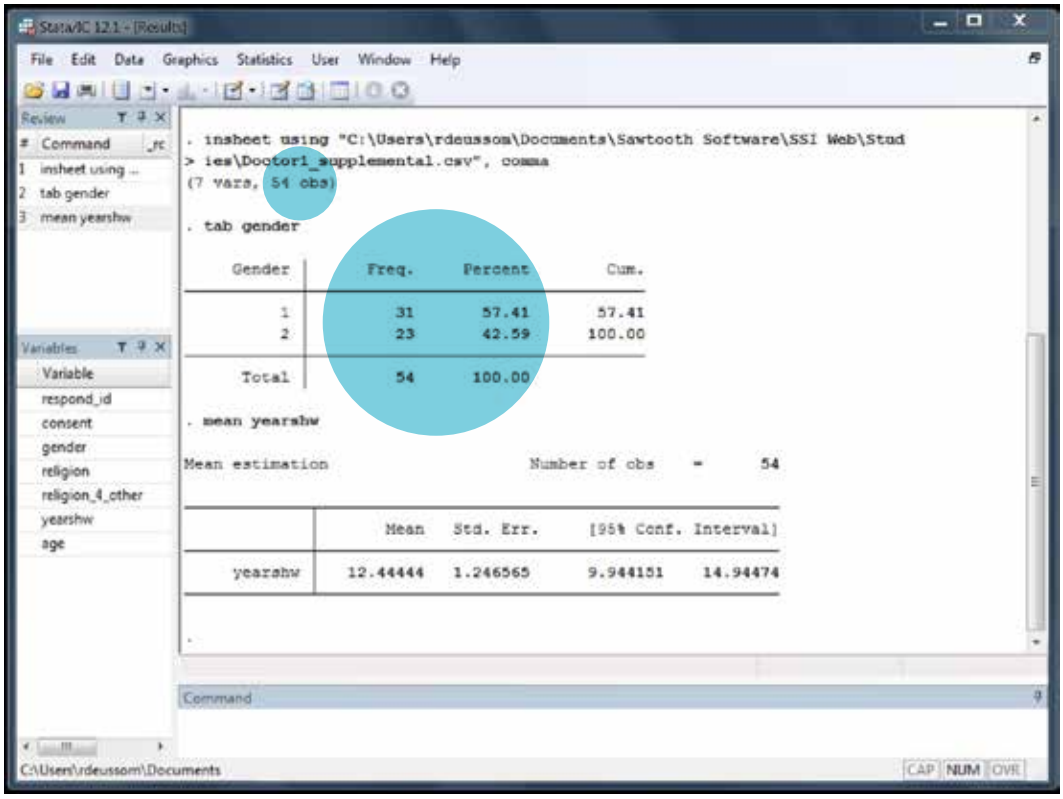
Please note that this step will need to be carried out for each dataset separately. At the end of this step we will show you how to clear the STATA program and bring in the next cadre's dataset (.CSV file) for analysis.

The majority of the data from the supplemental questions can be analyzed using a handful of common commands, such as frequencies, means, standard deviations, and cross tabulations. The table below provides examples of these commands, which you will type in the command window of STATA to obtain the desired information about the variables or questions in the dataset.

Purpose	Command	Example	Result
Obtain frequencies or counts of a variable	***tab 'variable'***	***tab gender***	Tabulates how many males and females are in the dataset
Obtain frequencies or counts across two variables	***tab 'variable 1' 'variable 2'***	***tab gender religion***	Tabulates how many of the males and females are Christian, Muslim, Buddhist or another religion.
Obtain mean, standard error and 95% confidence intervals of a variable	***mean 'variable'***	***mean yearshw***	Gives the mean years as a health worker plus standard error and confidence intervals of the mean
Obtain mean, standard deviation, and minimum and maximum figures	***summarize 'variable'***	***summarize age***	Gives the mean age of respondents, standard deviation, and the minimum and maximum age in the dataset

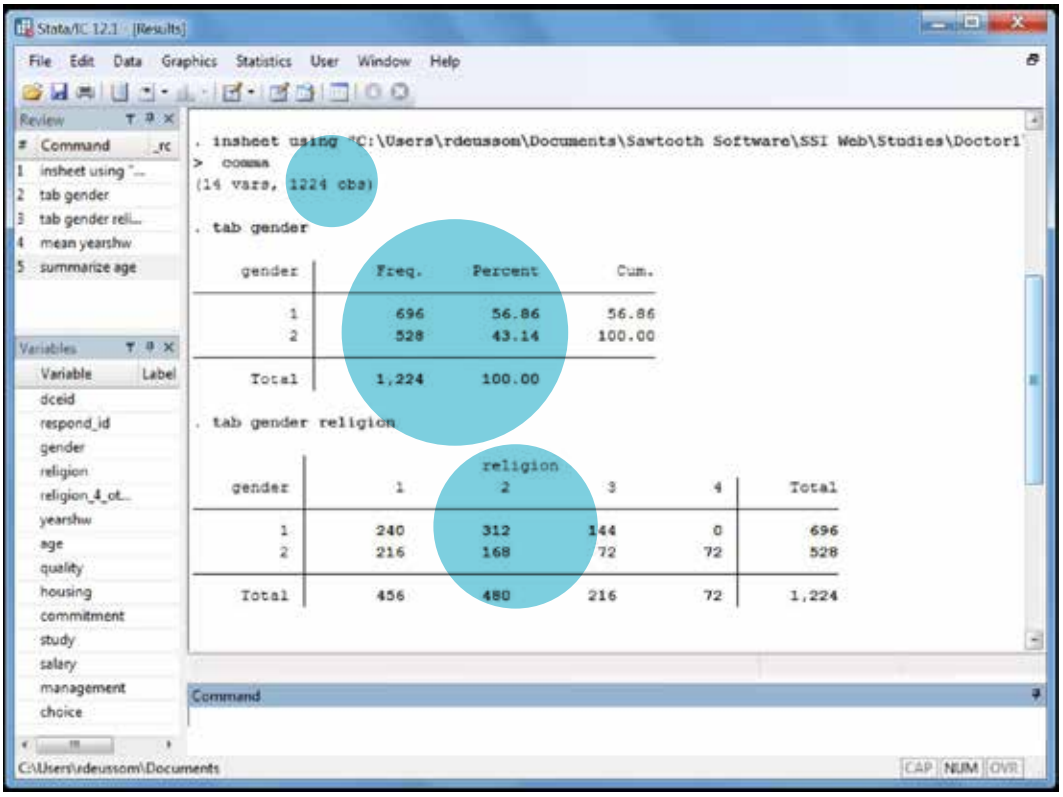
For an example of how to present supplemental data to stakeholders, please see Appendix 5. You can download a modifiable version at www.capacityplus.org/rapid-retention-survey-toolkit.

When you enter the commands to analyze the supplemental questions data from a ***computer***-based survey, you will see something like this:



After importing a supplemental questions data file created from a computer-based survey into the STATA program, the number of observations (obs) displayed under the insheet command in the main window (see top circle in the figure above) will represent the number of total respondents in the dataset. When calculating frequencies using the tab command, the value shown represents the number of respondents corresponding to each of the coded responses. For example, in the figure above, the dataset includes 31 males (code=1) and 23 females (code=2) (see large circle in the figure above).

When you enter the commands to analyze the supplemental questions data from a ***paper***-based survey, you will see something like this:



For data from paper-based survey administration only: When interpreting the STATA results, please note that you will need to divide the frequency and observation values (see top circle in the figure above) by 24 to get the real number of respondents (remember there are 24 lines of data for each respondent, and you copied/pasted the responses to the supplemental questions down 24 rows). For example, from the imported dataset in the figure above, we see that of the total 51 respondents (1224 obs ÷ 24 = 51), 29 are males (696 ÷ 24 = 29) and 22 are females (528 ÷ 24 = 22) (see middle circle in the figure above). Thirteen males (312 ÷ 24 = 13) and 7 females are Muslim (168 ÷ 24 = 7) (see the bottom circle in the figure above). (Note that in this example the codes are as follows [gender: 1=male, 2=female; religion: 1= Christian, 2=Muslim, 3=Buddhist, and 4=Other].)

Please refer to Appendix 5 for an example of how you may organize the analyzed supplemental data into a table for ease of presentation. You can download a modifiable version of the appendix at www.capacityplus.org/rapid-retention-survey-toolkit.

For data from paper-based survey administration only: An important final step in the data analysis process is to review and further clean the data. For example, by using the tab command to check the frequencies of each variable, you will find any data points that are out of place. In other words, if the coding for a particular variable or question only included 0 and 1

(for example, No=0 and Yes=1), and the frequency count shows there is a "2," that means that a data point was erroneously entered and should be corrected. You should then look for the "2" in that variable's column in the database (.csv file) and go back to the respondent's paper-based questionnaire (using the unique identifier/respond_id) to see what was actually reported. It also simply may be that instead of typing the number "1" in the database, the "2" key was accidentally struck instead.

If locating the paper survey is not possible, then you should instead replace the erroneous entry with a `". "` which represents a nonanswer. Data analysis of this specific question will then be reduced by one observation. If you have many nonanswers, then the statistical power of your survey will be reduced. For this reason, as we stated earlier, if you have the resources available, it is preferable to survey as many respondents within a given cadre group as is feasible. However, at a minimum you should have planned to survey a few additional respondents beyond the minimum of 50 to accommodate for any nonresponders or possible missing data from any unanswered survey questions.

If you conducted a paper-based Rapid DCE: You may proceed to Stage 8, Step 5 with the same cadre's .csv file loaded in the STATA program to analyze the job preferences data, as both the supplemental data and job preferences data for that cadre are contained in the .csv file.

If you conducted a computer-based Rapid DCE: When you have completed analyzing the supplemental questions data for one cadre's dataset, you will need to clear the STATA program and bring in that cadre's job preferences dataset (e.g., Doctor1_job preferences.csv file) for analysis using the instructions in Stage 8, Step 5. Or you may want to analyze another cadre's supplemental questions data before moving to analysis of the job preferences data for each cadre.

Save a sorted copy of the supplemental data in the STATA .DTA format by doing the following:

- Sort all of the supplemental data by respondent identifier by typing: `sort respond_id`
- Save the sorted supplemental data file by typing: `save "[file location and name].dta", replace`
    - At the end of the filename that you choose, you must type `.dta` as this is the file extension that STATA uses for data files
    - By typing `, replace` at the end of the command, you are telling STATA to overwrite if the file already exists. This will ensure that you are saving the most recent version of the data file.

To clear a data file from STATA, type `clear` into the command window and press Enter on the keyboard. You will see that this clears out the dataset (you will no longer see a listing of variables in the variables window on the left side of the program window), readying the program for the next set of data to analyze. However, you will note that the Review box on the upper left side of the window will keep a running list of the commands you have used. This way after you bring in the next file to analyze (using the insheet command described earlier) you can click on the commands in the upper left Review window so that you will not need

to retype the individual commands. However, do take note where a variable name may have changed from one data file to another, depending on the job attributes or supplemental questions in a cadre's survey instrument.

If you get an error message in red, you may have typed in the name of the file or destination incorrectly, used a forward slash (/) instead of a back slash (\) in the destination name, or forgotten to add the .csv ending to the file name. Recheck the insheet command statement and try again.

Step 5: Analyze Data from the Job Preference Pair Questions

If you had conducted a paper-based survey, you may continue with the same dataset loaded in the STATA program that you used to analyze the data from the supplemental questions (as that also contains the job preferences data).

If you are analyzing data from a computer-based survey, please do the following:

- Use the clear command described at the end of Stage 8, Step 4 to delete the file of supplemental questions data from the program. Then type the insheet command described in Stage 8, Step 3 in the Command window to import the .csv file with job preferences data for the cadre you are analyzing:

  ```
  insheet using "C:\Users\Documents\DCE Study\Doctor1_job preferences.csv", comma
  ```

- Press Enter on your computer's keyboard.

In order to analyze the job preference data we now need to prepare the variables. ***ONLY*** if you administered a ***computer-based*** survey, you must generate the pair variable. (If you administered a paper-based survey, skip this step.)

- Type the following in the Command box at the bottom of the program:

  ```
  gen pair = round(respond_id/10000,1)*100 + task
  ```

  If you administered an internet-hosted survey, then you should use this gen pair command instead: `gen pair = (respond_id*100) + task`

- Press Enter on your computer's keyboard.

All of the steps described in the rest of Stage 8 should be carried out regardless of whether you conducted a computer-based or a paper-based survey. Please note the values listed below are based on an adapted version of the Uganda example that has been referenced in this toolkit. You will need to modify them to match the attributes and levels in your Rapid DCE survey.

1. **Reformat the salary variable**

- Reformat the levels of the salary variable to reflect the values used in the survey by typing the following in the Command window:

```
recode salary (1=700000) (2=1000000) (3=1500000) (4=2000000)
```

Press Enter on your computer's keyboard. The variable and values used above, which you will need to modify based on your survey, represent the following:
Salary is the variable name of the job attribute that represents salary.

- 700000 is the value of the first level for salary (e.g., 700,000 Shillings/month)
- 1000000 is the value of the second level for salary (e.g., 1,000,000 Shillings/month)
- 1500000 is the value of the third level for salary (e.g., 1,500,000 Shillings/month)
- 2000000 is the value of the fourth level for salary (e.g., 2,000,000 Shillings/month)
- Note: As in the example above, do not use commas (",") in your salary figure (i.e., use 1500000 instead of 1,500,000) as they will result in an error message.

- Alternatively, if your Rapid DCE survey utilized percent increases in salary instead of salary figures in local currency, you would reformat the salary variable like this:

```
recode salary (1=0) (2=30) (3=40) (4=50)
```

Press Enter on your computer's keyboard. The variables above, which you will need to modify based on your survey, represent the following:

Salary is the variable name of the job attribute that represents salary.

- 0 is the value of the first level (e.g., 0% salary increase)
- 30 is the value of the second level (e.g., 30% salary increase)
- 40 is the value of the third level (e.g., 40% salary increase)
- 50 is the value of the fourth level (e.g., 50% salary increase).
- Note that the software program does not recognize a % symbol in the

Command window, so you must enter only the number increase it represents, as in the above example.

2. Reformat unordered attributes

- Reformat any of the attribute variables that have three or more levels but are not ordered (like salary), meaning that the level description does not imply it is higher or lower in value than another. For example, salary is an ordered variable because a larger salary figure indicates a higher value than a lower one (i.e., a 2,000,000 Shillings/month salary indicates a set value more than a 700,000 Shillings/month salary). From the Uganda example, an unordered variable is housing, where the three levels (no housing, housing allowance, and basic housing) do not necessarily imply having more or less value than another.

- As you reformat the unordered variables with three or more levels (such as housing in the example above), you can rename the variables to easily know which level it represents. From the Uganda example above, the housing attribute has three levels, so you would type the following three commands in the Command window to reformat the variable to generate new variables, pressing Enter on the keyboard after typing each command:

```
gen housing_no = (housing == 1)

gen housing_alwnc = (housing == 2)

gen housing_house = (housing == 3)
```

The variables above, which you will need to modify based on your survey, are explained as follows:

  - **housing_no** represents level 1 (no housing provided)
  - **housing_alwnc** represents level 2 (housing allowance provided)
  - **housing_house** represents level 3 (a basic house is provided).

Another example (although not from the Uganda example we have been using throughout) of a variable you would also need to reformat is career promotion. You would do so by typing the following three commands in the Command window, pressing Enter on the keyboard after typing each command (noting the use of double "=" signs in the portion of the command in parentheses):

```
gen career_5yr = (career == 1)
```

```
gen career_2yr = (career == 2)

gen career_direct = (career == 3)
```

The variables above, which you will need to modify based on your survey, are explained as follows:

- **career_5yr** represents level 1 (promoted to permanent staff after five years working in a rural health facility)
- **career_2yr** represents level 2 (promoted to permanent staff after two years working in a rural health facility)
- **career_direct** represents level 3 (promoted to permanent staff directly upon posting in a rural health facility).

If a job attribute variable only has two levels, you do NOT reformat it. For example, you would not do anything with the "study" variable since it only has two levels where level 1 is "no tuition assistance is provided," and level 2 is "full tuition assistance is provided."

Rename the concept variable to be called "location" so it will be easier to interpret in stages 9 and 10 by entering the following command in the Command window and then pressing Enter on the keyboard: `rename concept location`.

3. Run regression analysis

Now you are ready to run the regression analysis of the job preference data.

- Type the following command in the Command window, replacing the variables in green below with your own actual variable names. The other parts of the mixlogit command should be replicated exactly:

```
mixlogit choice salary, id(respond_id)group(pair)
rand(quality housing_alwnc housing_house
commitment study management location) nrep(500)
```

IMPORTANT: Please note that you should adjust the variables you include in the mixlogit command above based on the job attributes included in YOUR Rapid DCE survey. In this mixlogit command example, the variables are explained as follows:

- **choice** is the variable representing the respondent's selection of job preference (i.e., Rural Job Posting or Urban Job Posting)
- **salary** is the name of the variable representing salary

- **respond_id** is the variable that identifies each respondent in the dataset
- **group (pair)** will ensure that each the two options from each job pair question are compared with each other in the mixlogit analysis
- **rand** will randomly distribute the variables in the mixlogit model calculations so that results will less likely be attributable to chance
- **quality** is the variable representing "quality of the facility"
- **housing_alwnc** represents level 2 of the housing attribute (housing allowance is provided)
- **housing_house** represents level 3 of the housing attribute (a basic house is provided)
- **commitment** is the variable specifying the "length of commitment" to the job posting
- **study** is the variable representing "assistance for further study"
- **management** is the variable name given to the attribute corresponding to "management support at the facility"
- **location** is the variable representing the setting of the job posting, being either rural or urban (as based on the concept headers of each job preference pair question)
- **nrep(500)** indicates the number of times that the statistical model will be run, to ensure that the output is robust. For this reason, the analysis will take some time—perhaps five to ten minutes depending on your sample size—so please be patient!

Note that for any job attribute variable with three or more levels (i.e., housing in the example above) only levels 2 and 3 (**housing_alwnc** and **housing_house**, respectively) are included in the mixlogit command statement. You do NOT include the first level (**housing_no**). In an alternative example, the second and third levels of the career promotion variable (**career_2yr and career_direct**) would be included in the mixlogit command while the first level (**career_5yr**) would not be.

- Then press Enter on the computer keyboard.

After entering the mixlogit regression code into STATA, it may take several minutes before any data outputs are produced. If you have done the mixlogit regression correctly, you will see a data output that looks like the following:

```
. mixlogit choice salary, id(respond_id) group(pair) rand(quality housing_alwc housing_house commitment
study management location) nrep(500)

Iteration 0:   log likelihood = -718.61373  (not concave)
Iteration 1:   log likelihood = -707.51833
Iteration 2:   log likelihood = -703.94431
Iteration 3:   log likelihood = -703.87214
Iteration 4:   log likelihood =   -703.872
Iteration 5:   log likelihood =   -703.872

Mixed logit model                               Number of obs   =       2490
                                                LR chi2(8)      =      31.59
Log likelihood =   -703.872                     Prob > chi2     =     0.0001

------------------------------------------------------------------------------
      choice |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Mean         |
      salary |   4.31e-07   6.97e-08     6.19   0.000     2.95e-07    5.68e-07
     quality |   .4371023    .102825     4.25   0.000      .235569    .6386357
 housing_alwc |   .4941978   .1061059     4.66   0.000     .2862341    .7021615
housing_house |   .8753781   .1306951     6.70   0.000     .6192203    1.131536
  commitment |  -.4529024   .1181276    -3.83   0.000    -.6844281   -.2213766
       study |   .8532352    .114902     7.43   0.000     .6280315    1.078439
  management |   .8136335   .1132052     7.19   0.000     .5917554    1.035512
    location |   .4187161   .1030244     4.06   0.000     .2167921    .6206402
-------------+----------------------------------------------------------------
SD           |
     quality |   .6378853   .1219106     5.23   0.000     .3989449    .8768257
 housing_alwc |  -.0008959   .2579166    -0.00   0.997    -.5064031    .5046113
housing_house |   .5688642   .1646994     3.45   0.001     .2460593     .891669
  commitment |   .4563068   .1746902     2.61   0.009     .1139204    .7986933
       study |  -.0375812   .2711799    -0.14   0.890     -.569084    .4939215
  management |   .2348566   .2454244     0.96   0.339    -.2461664    .7158797
    location |   .5849764   .1286709     4.55   0.000     .3327862    .8371667
------------------------------------------------------------------------------
The sign of the estimated standard deviations is irrelevant: interpret them as
being positive
```

In Stage 9, you will learn how to interpret this STATA output for the purposes of developing rural job incentive packages.

Step 6 (Recommended): Analyze DCE and Supplemental Data Together

We recommend that you consider analyzing the DCE and supplemental data together. It may be useful to estimate preferences for sub-groups of the study population (e.g., by gender, or for workers of a certain age) to see if preferences vary between these subgroups. Which sub-groups of the study population you analyze will depend on your context. In order to complete this step, you must have a minimum of 50 respondents from this subgroup (i.e., to do an analysis of females only, you must have a minimum of 50 females within your study population), otherwise there will not be adequate statistical power to derive meaningful results from the analysis. You can review the demographic tabulations conducted in Stage 8, Step 4 to determine if sub-group analysis is possible and/or appropriate for you.

To do this, you will need to combine the dataset you created in Step 4 with the dataset you created in Step 5. You can do this within the Stata program by doing the following:

1. Merge the supplemental data from Step 4 with the DCE data from Step 5 in STATA by doing the following:

   Sort all of the DCE data by respondent identifier by typing: `sort respond_id`

   Merge the supplemental data in with the DCE data by typing: `merge m:1 respond_id using "[file location and name of supplemental data].dta", update replace`

   - If you have not correctly sorted by the supplemental data and the DCE data by the `respond_id` variable, the `merge` command will return an error.

- At this point, each line of DCE data for a particular respondent should also now include the supplemental data for that respondent.

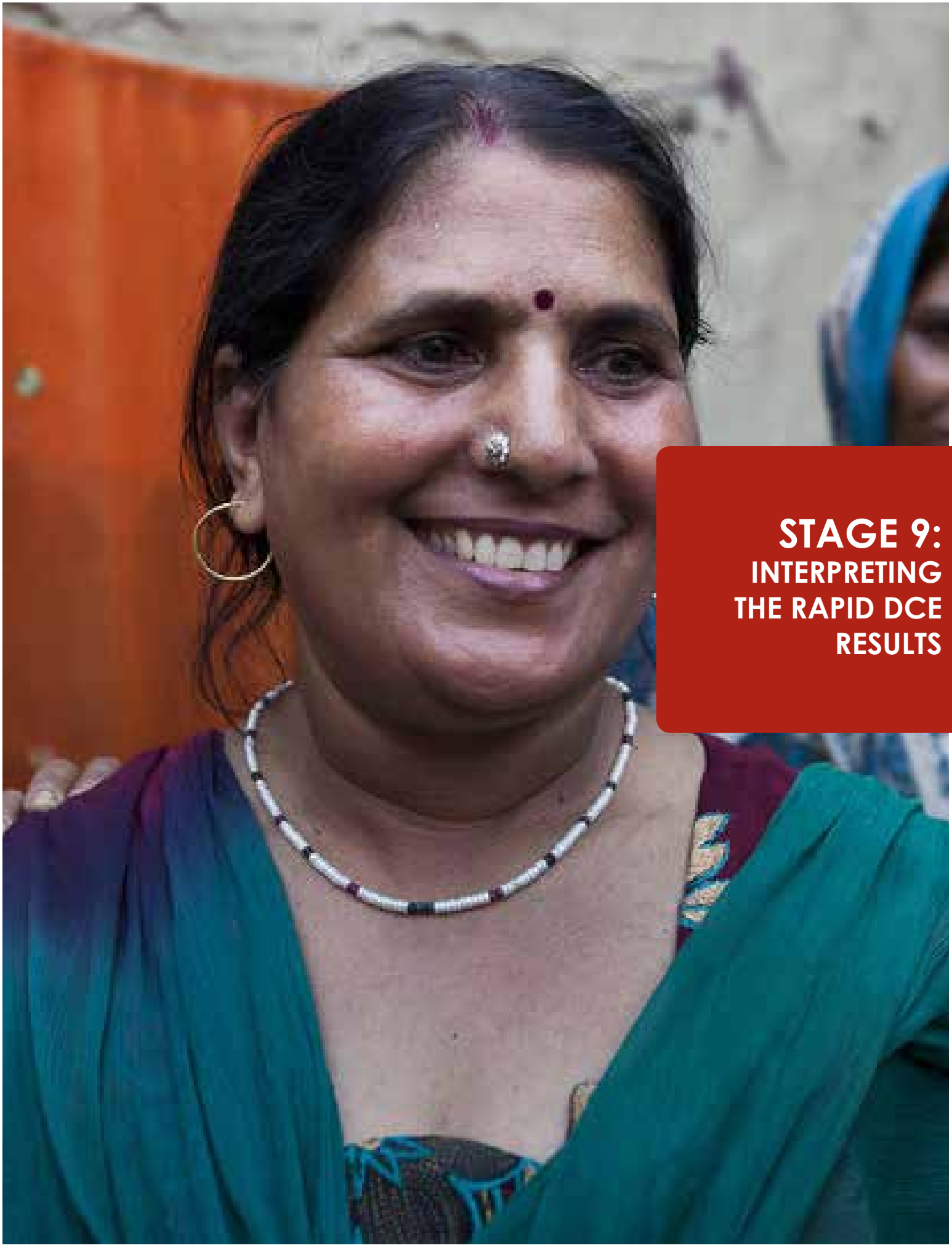
2. To analyze the DCE data for a sub-group of the study population, where the sub-group is defined according to a supplemental variable, use the same mixlogit command as in Step 5. However, identify that the model should only be run using data from the desired sub-group by using the if command. Note that the if command must be included just before the comma.

   For example, to estimate the preferences for females, add the command highlighted in blue below:

```
mixlogit choice salary if gender=2, id(respond_id)
group(pair) rand(quality housing_alwnc housing_house
commitment study management location) nrep(500)
```

   For example, to estimate the preferences for respondents above the age of 25, add the command highlighted in yellow below:

```
mixlogit choice salary if age > 25, id(respond_id)
group(pair) rand(quality housing_alwnc housing_house
commitment study management location) nrep(500)
```



STAGE 9:
INTERPRETING THE RAPID DCE RESULTS

We will now analyze the job preference data for a given cadre using the mixlogit regression command as described in Stage 8. When you review your STATA output, you will see that the values, attributes, and attribute levels will of course be different than the image below, but the format of the output will be similar to this simulated data output:

```
. mixlogit choice salary, id(respond_id) group(pair) rand(quality housing_alwc housing_house commitment
study management location) nrep(500)

Iteration 0:   log likelihood = -718.61373  (not concave)
Iteration 1:   log likelihood = -707.51833
Iteration 2:   log likelihood = -703.94431
Iteration 3:   log likelihood = -703.87214
Iteration 4:   log likelihood =   -703.872
Iteration 5:   log likelihood =   -703.872

Mixed logit model                               Number of obs   =       2490
                                                LR chi2(8)      =      31.59
Log likelihood =   -703.872                     Prob > chi2     =     0.0001

------------------------------------------------------------------------------
      choice |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
Mean         |
      salary |   4.31e-07   6.97e-08     6.19   0.000     2.95e-07    5.68e-07
     quality |   .4371023    .102825     4.25   0.000      .235569    .6386357
 housing_alwc |   .4941978   .1061059     4.66   0.000     .2862341    .7021615
housing_house |   .8753781   .1306951     6.70   0.000     .6192203    1.131536
  commitment |  -.4529024   .1181276    -3.83   0.000    -.6844281   -.2213766
       study |   .8532352    .114902     7.43   0.000     .6280315    1.078439
  management |   .8136335   .1132052     7.19   0.000     .5917554    1.035512
    location |   .4187161   .1030244     4.06   0.000     .2167921    .6206402
-------------+----------------------------------------------------------------
SD           |
     quality |   .6378853   .1219106     5.23   0.000     .3989449    .8768257
 housing_alwc |  -.0008959   .2579166    -0.00   0.997    -.5064031    .5046113
housing_house |   .5688642   .1646994     3.45   0.001     .2460593     .891669
  commitment |   .4563068   .1746902     2.61   0.009     .1139204    .7986933
       study |  -.0375812   .2711799    -0.14   0.890     -.569084    .4939215
  management |   .2348566   .2454244     0.96   0.339    -.2461664    .7158797
    location |   .5849764   .1286709     4.55   0.000     .3327862    .8371667
------------------------------------------------------------------------------
The sign of the estimated standard deviations is irrelevant: interpret them as
being positive
```

The numbers in the figure above provide answers to the kinds of important questions that motivate Rapid DCE surveys.

The Mean output in box 1 above is the most important for understanding the preferences of the cadre of interest. The numbers provided in the Coef. column are the relative importance of each job attribute listed under the choice column (remember the variables we used: **salary, quality, housing, commitment, study, management, and location**). We will use these numbers to determine which incentives or interventions may be most effective in attracting and retaining the cadre of interest. Please note that these estimates (coefficients), which result from the mixlogit regression analysis, will allow you to make comparisons about preferences for job attributes ***only*** within a given cadre. The resulting coefficients ***should not*** be compared across cadres (e.g., doctors compared to nurses) or group within a cadre (e.g., students and currently practicing health workers). This is because the units for model coefficients are scaled differently for each model.

Because we reformatted the job attributes that had three or more unordered levels, such as housing, note that the above output presents ***housing_alwc*** and ***housing_house***. These variables represent the relative preference of receiving a housing allowance (level 2) or being provided with a basic house (level 3), as compared to not being provided with a house or housing allowance (level 1).

The values in the column labeled P>|z| provide information on the statistical power of the analysis, known as the P-value. The smaller these numbers are, the better. If an adequate number of surveys have been included in the analysis, then the majority of these P-values should be 0.05 or less. If these P-value numbers are all greater than 0.20, then you should consider the results of your analysis as being weak and ensure that more respondents are included should you conduct future Rapid DCE surveys.

The Standard Deviation output in box 2 in the previous figure provides an estimate of heterogeneity, or diversity, in the respondents' preferences for job attributes. Interpretation of these estimates is beyond the scope of this toolkit and will generally not be necessary for the purpose of policy discussions.

Number of obs, the output in box 3 in the previous figure provides information on the number of respondents, or observations, included in the analysis. You should always check this number and compare it to the number of survey responses you collected in the field. The number of observations provided in the output above represents the number of lines of data—or job preference scenarios—analyzed. You should divide this number by 24 to obtain the actual number of respondents included in the analysis. (Note: In the case of missing data points, this number may not be exactly divisible by 24.)

Interpreting the coefficients

The figure of mixlogit output above produced the following values for each attribute, summarized for your ease of reference in the table below:

Job Attribute	Levels	Coefficient
Quality of the facility	1 = Basic	
	2 = Advanced	0.4371023
Housing	1 = No housing	
	2 = Housing allowance provided	0.4941978
	3 = Basic house provided	0.8753781
Length of commitment	1 = Two years	
	2 = Five years	-0.4529024
Study assistance	1 = No tuition support	
	2 = Full tuition support	0.8532352
Salary	1 = 700,000 SH/month	
	2 = 1,000,000 SH/month	
	3 = 1,500,000 SH/month	
	4 = 2,000,000 SH/month	0.000000431*
Management support	1 = Manager is not supportive	
	2 = Manager is supportive	0.8136335
Location	1 = Rural	
	2 = Urban	0.4187161

* Note that this figure in the STATA output table above is written as 4.31e-07.

Your mixlogit data analysis in STATA has produced a coefficient that corresponds to each job attribute included in the Rapid DCE. Next you will want to understand what these coefficients mean. While an individual coefficient does not have meaning on its own, there are three important ways to interpret the coefficients:

1. Weighted ranking of preferences (Stage 9, Step 1)

2. Predicted preference impact measure (Stage 10)

3. Willingness to pay (WTP) measure (Appendix 6). While the WTP is a first step in the predicted preference impact measure of Stage 10, we have included a discussion and instructions for using the WTP measure for identification and presentation of potential incentive packages in Appendix 6. You can download a modifiable version of the appendix at www.capacityplus.org/rapid-retention-survey-toolkit. Steps 1a and 1b of Appendix 7 also include the WTP calculation.

Note: As mentioned earlier, the coefficients resulting from the mixlogit models will allow you to make comparisons about preferences for job attributes ***only*** within a given cadre. The resulting coefficients ***should not*** be compared across cadres (e.g., doctors compared to nurses) or group within a cadre (e.g., students and currently practicing health workers). This is because the units for model coefficients are scaled differently for each model. The "willingness to pay" (WTP) estimates can provide a standard unit (currency) to compare job preferences across models.

Step 1: Determine Weighted Ranking of Preferences

The coefficients can be compared to each other to determine a ranking of respondents' preferences for the attributes included in the survey. Further, it is possible to determine the weighted ranking, through which you know by how much more respondents preferred the most preferred job attribute to the other attributes.

To do this, list the attributes by their coefficients from largest to smallest. Use the absolute value of the coefficient, meaning that you will rank by size whether the coefficient is positive or negative. Using the data from the STATA output table above, the ranking of most preferred attributes (from highest preference to lowest preference) is:

1. Housing provision: 0.8753781
2. Study assistance: 0.8532352
3. Management support: 0.8136335
4. Housing allowance: 0.4941978
5. Length of commitment: -0.4529024
6. Quality of the facility: 0.437023
7. Location: 0.4187161
8. Salary: 0.000000431

The coefficients provided in the model output should be interpreted as the relative preference of the second level for an attribute as compared to the first level or the third level as compared to the first level. So, for the attribute "housing," the preference 0.8753781 is for housing provision as compared to no housing. Similarly, the preference 0.4941978 is for housing allowance compared to no housing.

Note that "length of commitment", ranked fifth, has a negative value. A negative value can be interpreted as positive in the opposite direction. In other words, the survey results indicate a preference of +0.4529024 for a two-year posting commitment as compared to a five-year commitment.

In addition, you may note from the results that salary had the lowest ranking. This may be surprising, as many would expect salary to be among the more important job attributes. This is due to the way we formatted the salary variable. Because we reformatted the salary variable with the monthly local currency values (1=700,000; 2= 1,000,000; 3= 1,500,000; and 4= 2,000,000) for the analysis, the coefficient from the output represents the preference for a single unit of currency. That is to say, respondents had a preference of 0.000000431 for one unit of local currency.

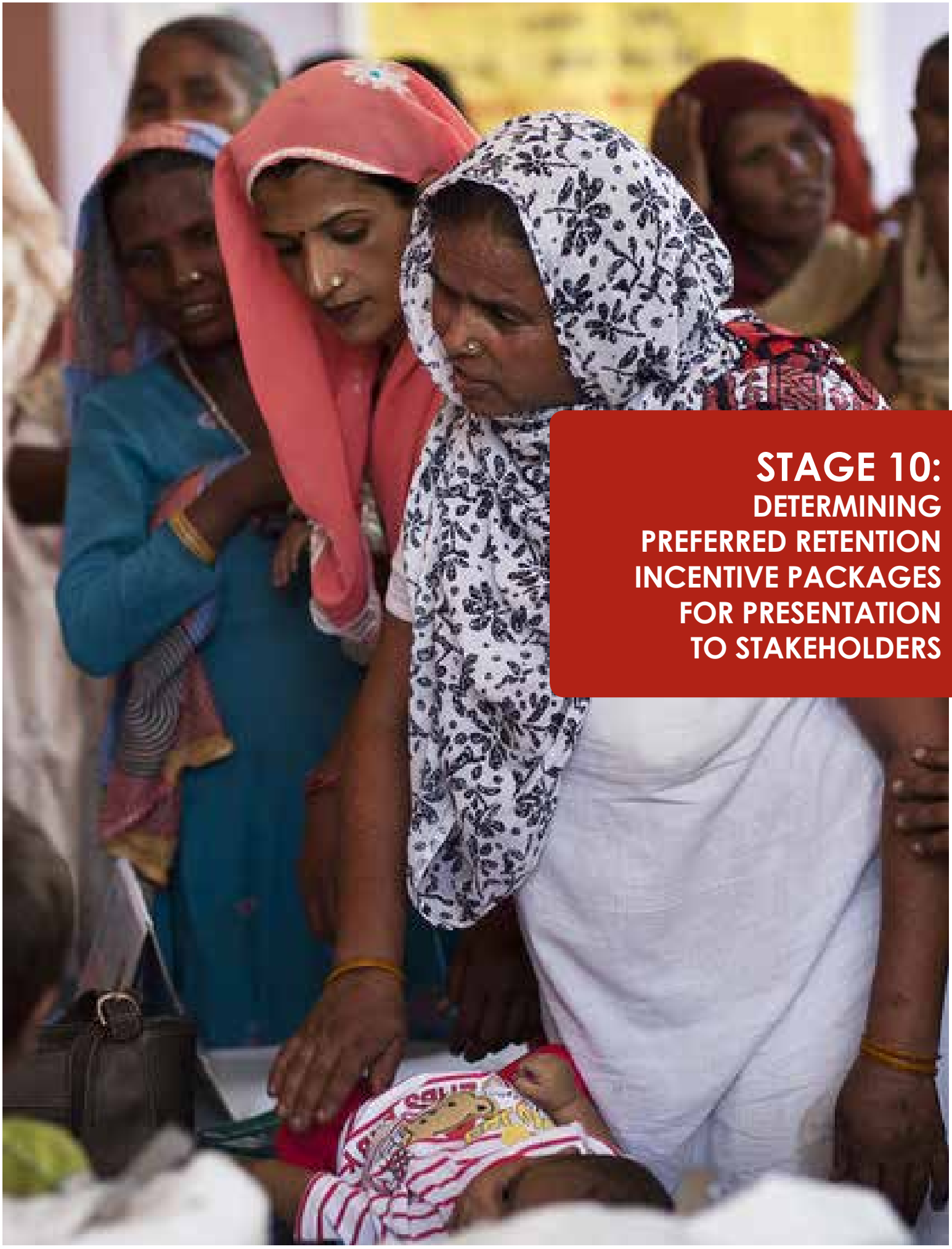
You can then use the salary coefficient and multiply it to obtain the cadre's preference for any salary amount. This will result in a new ranking of weighted preferences that includes preferences for each salary level. For example, to calculate respondents' preference for a salary of 2,000,000 Shillings per month, you multiply the salary coefficient (0.000000431) by 2,000,000 Shillings, resulting in a weighted preference of 0.862 (0.000000431 X 2,000,000 Shillings = 0.862). With a coefficient of 0.862, a salary of 2,000,000 Shillings per month would put it near the top of the table's weighted ranking of job attributes. Providing a monthly salary of 700,000 Shillings would

yield a preference of 0.3017 (0.000000431 X 700,000 Shillings) and rank the preference for a 700,000 Shilling/month salary below the coefficient for location (0.4187161), meaning that in this simulated data set, there is greater preference for a job in an urban setting.

The four salary levels included in this simulated data output example are presented below in rank order of the most preferred attributes (from highest preference to lowest preference):

1. Housing provision: 0.8753781
2. 2,000,000 Shillings/month salary: 0.862
3. Study assistance: 0.8532352
4. Management support: 0.8136335
5. 1,500,000 Shillings/month salary: 0.6465
6. Housing allowance: 0.4941978
7. Length of commitment: -0.4529024
8. Quality of the facility: 0.437023
9. 1,000,000 Shillings/month salary: 0.431
10. Location: 0.4187161
11. 700,000 Shillings/month salary: 0.3017

In Stage 10, you will use different coefficient values to calculate health workers' willingness to pay, and to calculate the preference impact measure for various combinations of job postings, compared to the "standard" job posting.



STAGE 10:
DETERMINING PREFERRED RETENTION INCENTIVE PACKAGES FOR PRESENTATION TO STAKEHOLDERS

STAGE 10: DETERMINING PREFERRED RETENTION INCENTIVE PACKAGES FOR PRESENTATION TO STAKEHOLDERS

In this stage we will address how to determine the combinations of incentives that would most motivate health workers to work in rural areas, based on the preferences they expressed in the Rapid DCE survey and how to present the results of your Rapid DCE survey to stakeholders. Stakeholders can then use this information to make evidence-based decisions regarding the development of retention policies and/or strategies.

The suggested method for sharing the results of the Rapid DCE to interested stakeholders is to present the most preferred retention intervention packages, or combination of incentives, as expressed by each cadre. We believe the more intuitive way to determine and present this information is through use of the predicted preference impact measure. As mentioned in Stage 9, another method is through use of the willingness to pay (WTP) measure (see Appendix 6 for a full description, and Appendix 7 Steps 1a and 1b for the WTP calculation worksheet). Both of these methods present the Rapid DCE results in different ways. If you will need to compare job preferences across cadres and health worker types (i.e., students versus currently practicing health workers), then you may consider the WTP measure, as it establishes a common currency for the perceived value of the incentive package. The predicted preference impact measure builds on the WTP measures and uses the WTP values; Stage 10 will guide you through the predicted preference impact measure. You should decide which method will present the preferred retention intervention packages in a way that will be most easily understood by the stakeholders for decision-making.

Regardless of the method selected, to make a truly evidence-based decision for the development of retention and attraction strategies, policy-makers will also need to know the costs of the desired incentive or intervention packages to determine the financial feasibility of implementation of the strategies. To do this, a costing exercise should be conducted. To assist with the costing process, Capacity***Plus*** and the WHO have developed a step-by-step retention intervention costing tool—iHRIS Retain—to enable HR managers and other HRH stakeholders to cost specific incentives and interventions. This costing software program can be accessed at: http://retain.ihris.org/retain.

Defining the Predicted Preference Impact Measure

The preference impact measure or uptake rate estimates the percentage of a cadre population that would prefer a job posting that offers a specific package of incentives and interventions as compared to other job postings. In other words, the preference impact measure examines how the likelihood that health workers would select a given job changes as the job attributes and levels of those attributes change (World Bank, WHO, Capacity***Plus*** 2012). Because these measures are based on respondents' expressed intention (i.e., a prediction of behavior as opposed to a confirmed behavior), we will be calculating the predicted preference impact measure.

For example, imagine you are a nurse deciding between two different nursing jobs. One would be a "standard" job posting, offering the usual benefits or having typical characteristics of a job within your institution. You will compare this standard posting to other possible "proposed" job postings, which include combinations of the job attributes examined in the Rapid DCE survey.

In Stage 10, we will use the following job attributes, levels and coefficients in our example to guide you, as shown on Table 6:

Table 6. Example Job Attributes, Levels, and Coefficients

Job Attribute	Level	Coefficient
Location*	1 = District hospital	
	2 = National tertiary hospital	-0.0433071
Housing	1 = No housing	
	2 = Housing allowance provided	2.475426
	3 = Well-maintained government housing provided	2.006815
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)	1.228102
Monthly Salary	1 = No additional salary	
	2 = 10% additional salary	
	3 = 20% additional salary	
	4 = 30% additional salary	0.0003341
Children's Education	1 = No good schools close by	
	2 = Good schools close by	0.752598
Career Advancement	1 = No eligibility	
	2 = Eligible for promotion after 2 years	1.674377
	3 = Eligible for promotion after 1 year	1.872621
Scope of Practice with Available Resources	1 = Narrow scope of practice with limited opportunity to apply skills due to lack of resources	
	2 = Wide scope of practice and opportunity to apply skills due to availability of resources	1.515097

* Please note that location was not specifically listed as an attribute within the Rapid DCE survey questionnaire, however location was accounted for within the mixlogit regression, thus we are treating it as an attribute. See Stage 8 for further explanation.

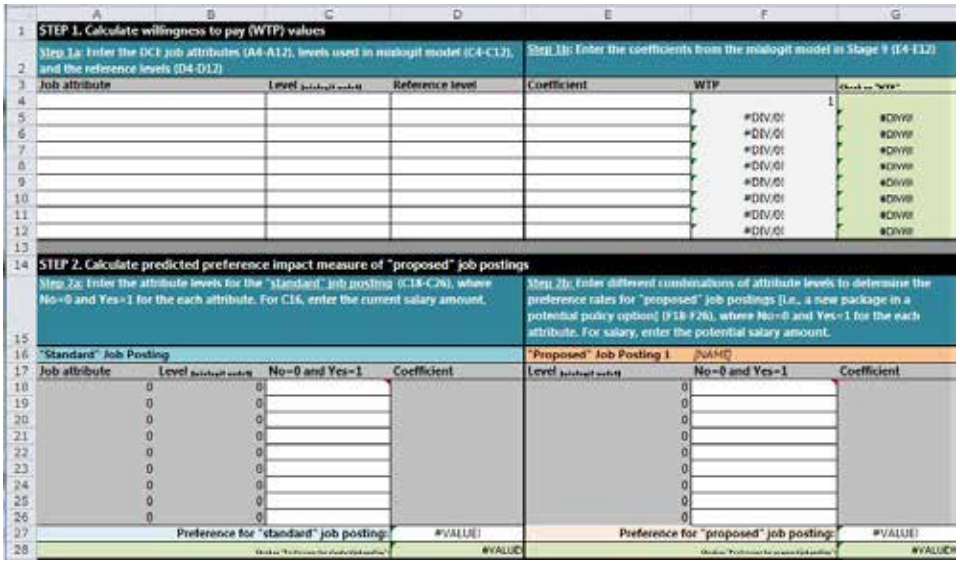
By using the coefficient values from Table 6, you can structure different packages of retention incentives or interventions by including different job attributes and varying the levels of the attributes. You can then determine which combination of incentives would have the highest probability of being chosen by health workers. With the preference impact measure, it is possible to develop a report presenting results from the Rapid DCE that will be useful in decision-making for determining appropriate attraction and retention strategies.

You will need to carry out the steps described in this stage for each health worker cadre included in the Rapid DCE in order to determine the intervention packages preferred by each one, as well as conduct separate analyses for attraction (students) and retention (health workers) if you have collected surveys from each of these groups. Remember, what motivates a doctor may differ from what motivates a nurse or pharmacist.

Step 1: Calculate Willingness to Pay (WTP) Values

To estimate willingness to pay and the predicted preference impact measure for each cadre:

Download the Preference Calculation worksheet (Appendix 7) and open it in Microsoft Excel. The first tab labeled "Calculation" looks like this:



Steps 1a and 1b will guide you to populate your spreadsheet with the job attributes and levels from your survey, and calculate willingness to pay values for each attribute.

Step 1a. On the "Calculation" tab, populate the spreadsheet with your job attributes and levels.

- In column A (cells A4-A12), enter the names of your Rapid DCE's job attributes.
    - Cell C4: You should always list the "salary" attribute first.
    - Cell C5: You should always list the "location" attribute second.
    - Cells C6-C12: List your remaining job attributes. For each job attribute that has more than TWO levels (i.e., the ones that you recoded in Stage 8 in STATA), list the job attribute one additional time for each additional level. In this example, since "Housing" had three attribute levels ("No housing", "Housing allowance provided", and "Well-maintained government housing provided"), you will list "Housing" twice in column A.

- In column C (cells C4-C12), enter the names or descriptions of the attribute used within your mixlogit model that are level "2" or higher.

    - Cell C4: If you used salary amounts in local currency for the job attribute "salary", then enter "1 currency unit" (i.e., 1 Namibian dollar). If you used percentages to represent salary increments for job attribute "salary", then enter "% salary increase".

    - Cell C5: List the description for the urban job posting concept for job attribute "location" (i.e., National tertiary hospital).

    - Cells C6-C12: For all other job attributes, list the names/descriptions your remaining job attribute levels used that are level "2" or higher in your mixlogit model as they correspond with the attributes listed in column A. In the example in Table 6, there are two additional levels for the job attribute "Housing" (i.e., 2 = Housing allowance provided; level 3 = Well-maintained government housing provided"), and both should be listed. This is the reason that "Housing" is listed twice in column A. As we have done in the figure below, you may wish to enter truncated, or abbreviated, names for each of these mixlogit levels for the sake of simplicity and readability.

- In column D (cells D4-D12), enter the reference job attribute level, or the level "1" of the attribute, for each attribute included in your mixlogit model.

    - Cell D4: List your unit of currency for job attribute "salary"(i.e., 1 Namibian dollar). If you used salary amounts for the job attribute "salary", then enter "1" to represent one unit of currency (i.e., 1 Namibian dollar). If you used percentages to represent salary increments for job attribute "salary", then enter the percent increase classified as level "1" (i.e. 0% for "no additional salary" as in Table 6).

    - Cell D5: List the description for the rural job posting concept for job attribute "location" (i.e., District hospital).

    - Cells D6-D12: For all other job attributes, list your remaining level "1", or reference level job attributes included in your mixlogit model as they correspond with the attributes listed in column A. Where you have multiple mixlogit levels listed in column C that are corresponding to the same job attribute in column A, you will repeat the reference level. In the example in Table 6, "no housing" should be listed, as it is Level 1 for "Housing". (i.e., Level 1 in the example on Table 6). As we have done in the figure below, you may wish to enter truncated, or abbreviated, names for each of these mixlogit levels for the sake of simplicity and readability.

See the figure below for a completed example using the job attributes and levels from the example in Table 6. Please note that you may have fewer job attributes than spreadsheet rows, and you may leave rows blank if they are not needed.

The worksheet will look something like this:

	A	B	C	D
1	**STEP 1. Calculate willingness to pay (WTP) values**			
2	**Step 1a: Enter the DCE job attributes (A4-A12), levels used in mixlogit model (C4-C12), and the reference levels (D4-D12)**			
3	**Job attribute**		**Level [mixlogit model]**	**Reference level**
4	Salary		1 Namibian Dollar	1 Namibian Dollar
5	Location		National tertiary hospital	District hospital
6	Housing		Allowance provided	No housing
7	Housing		Government housing	No housing
8	Living conditions		Always good access	Basic access
9	Children's education		Good schools close	No good schools close
10	Career advancement		Eligible in 1 year	No eligibility
11	Career advancement		Eligible in 2 years	No eligibility
12	Scope of practice		Wide scope	Narrow scope

Step 1b. In column E, enter the job attribute level coefficients that resulted from the data outputs of your mixlogit model in Stage 9. Note that the coefficient value for salary is that of one unit of currency. In the Table 6 example, these coefficient values are listed in the right side column. The formulas within column F (cells F4-F12) of the worksheet will automatically calculate the willingness to pay (WTP) values for each job attribute level. You will note that because WTP values are based on one unit of currency, the WTP value for "salary" will always be 1. Please see Appendix 6 for more information about using WTP values to present preferred incentive packages to stakeholders, and Steps 1a and 1b of Appendix 7 for the WTP calculation.

Cells G4-G12 have prepopulated formulas that will automatically check the willingness to pay calculations that result in cells F4-F12. If the cells read "Correct estimate", then the calculation is correct. If the cells read "Incorrect estimate", then you should review what you have entered in cells E4-E12.

Using the Rapid DCE survey job attributes and levels from the example in Table 6, the worksheet will look like this:

	A	B	C	D	E	F	G
1	**Calculating willingness to pay**						
2	**Step 1a: Enter the DCE job attributes (A4-A12), levels used in mixlogit model (C4-C12), and the reference levels (D4-D12)**				**Step 1b: Enter the coefficients from the mixlogit model in Stage 9 (E4-E12)**		
3	**Job attribute**		**Level [mixlogit model]**	**Reference level**	**Coefficient**	**WTP**	
4	Salary		1 Namibian Dollar	1 Namibian Dollar	0.0003341	1	Correct estimate
5	Location		National tertiary hospital	District hospital	-0.0433071	-129.6231667	Correct estimate
6	Housing		Allowance provided	No housing	2.475426	7409.236755	Correct estimate
7	Housing		Government housing	No housing	2.006815	6006.629752	Correct estimate
8	Living conditions		Always good access	Basic access	1.228102	3675.851541	Correct estimate
9	Children's education		Good schools close	No good schools close	0.752598	2252.61299	Correct estimate
10	Career advancement		Eligible in 1 year	No eligibility	1.872621	5604.971565	Correct estimate
11	Career advancement		Eligible in 2 years	No eligibility	1.674377	5011.60431	Correct estimate
12	Scope of practice		Wide scope	Narrow scope	1.51097	4522.508731	Correct estimate

Step 2: Calculate the Predicted Preference Impact Measure

We will use the willingness to pay measures calculated in Step 1 to calculate the predicted preference impact measure of various scenarios of incentives that would make a job posting in a rural area more attractive. This information will assist you and your stakeholders to determine how best to develop or revise rural recruitment and retention policies.

Step 2a: To calculate the predicted preference impact measure, we will determine the attractiveness of possible incentive packages by comparing "proposed" job postings (which would provide varied scenarios of incentive combinations) with "standard" job postings (typical jobs that may currently be available within your institution). To do this, you will first need to establish the attributes of the "standard" job posting. Consider the attributes of a "standard" job posting in your institution using the below questions and enter the attribute levels in cells C18-26. The figure on the following page provides a completed example.

- Cell C18: Enter the salary amount in your unit of currency.
    - What is the average salary for the health worker cadre of interest in a "standard" job posting? (Using the example job attributes and levels from Table 6, let us suppose that the standard monthly salary for a pharmacist is 20,000 Namibian dollars and "20000" should be entered in cell C18.)
- Cells C19-C26: For all other attributes, enter either:
    - "0" for No (meaning the reference level [i.e., the lowest level] is part of the "standard" job posting), or
    - "1" for Yes (meaning that this job attribute level is part of the "standard" job posting):
        - ◊ Where would the location of the "standard" job posting be? For example, is the "standard" job posting a rural job posting (i.e., a district hospital) or is at an urban facility (i.e.. a national tertiary hospital)? (In this example, the "standard" job postings are at district hospitals, so cell C19 should be "0".)
        - ◊ Does the "standard" job posting usually provide housing for the cadre of interest? (In this example, housing allowance is provided to pharmacists, so cell C20 should be "1". As government housing is not provided, cell C21 should be "0".)
        - ◊ For the "standard" job posting, what are the average living conditions? (In this example, as only basic availability and access to amenities are available at a rural job posting, cell C22 should be "0".)
        - ◊ Is there proximity to good schools for the health worker's children in a "standard" job posting? (In this example, as proximity to good schools is not guaranteed, cell C23 should be "0")
        - ◊ What is the eligibility for promotion for most "standard" job postings? (In this example, there is no promotion eligibility provided, so cells C24 and C25 should both be "0".)
        - ◊ For the scope of practice of the "standard" job posting, does the availability of human resources, infrastructure, and equipment allow for full opportunity for

health workers to apply their skills? (In this example, due to limited resources it is a narrow scope of practice, and cell C26 should be "0".)

Using the Rapid DCE survey job attributes and levels from the example described above, the formulas within the worksheet will automatically calculate the preference for this "standard" job posting (Row 27) and will look like this:

	A	B	C	D
14	**STEP 2. Calculate predicted preference impact measure of "proposed" job postings**			
15	**Step 2a: Enter the attribute levels for the "standard" job posting (C18-C26), where No=0 and Yes=1 for the each attribute. For C16, enter the current salary amount.**			
16	**"Standard" Job Posting**			
17	**Job attribute**	**Level (mixlogit model)**	**No=0 and Yes=1**	**Coefficient**
18	Salary	1 Namibian dollar	20000	0.0003341
19	Location	National tertiary hosp	0	-0.0433071
20	Housing	Allowance provided	1	2.475426
21	Housing	Government housing	0	2.006815
22	Living conditions	Always good access	0	1.228102
23	Children's education	Good schools close	0	0.752598
24	Career advancement	Eligible in 1 year	0	1.872621
25	Career advancement	Eligible in 2 years	0	1.674377
26	Scope of practice	Wide scope	0	1.515097
27		**Preference for "standard" job posting:**		9.157426
28		Check on "Preference for standard job posting":		Correct estimate

The resulting preference for the "standard" job posting—9.157426—has no meaning on its own, as it needs to be compared to a possible "proposed" job posting.

Step 2b: Next, fill in the levels in column F (cells F18-F26) for a possible "Proposed" Job Posting to reflect a package of incentives or interventions that you are considering offering to the health worker cadre. Usually, you would start by offering the top three or four job attributes or incentives (i.e., those job attributes with the highest weighted preferences or coefficients as described in Stage 9) in addition to a selected salary level. For example, let us assume you are considering the following incentive package with three incentives to motivate a selected cadre to take a rural job posting (enter 0 in cell F19, as the rural job will be in a district hospital and not at the national tertiary hospital):

- Increase salary by 20% to 24,000 Namibian dollars per month (from a base salary of 20,000 dollars per month) (enter "24000" in cell F18)
- Provide housing allowance (enter "1" in cell F20)
- Provide promotion eligibility after 1 year of service (enter "1" in cell F24)

For the other attribute levels that are not being provided for this "proposed" job posting, enter them into the spreadsheet:

- For the "proposed" job posting, what are the average living conditions provided? (In this example, as only basic availability and access to amenities are available at a rural job posting, cell F22 should be "0".)

- Is there proximity to good schools for the health worker's children in a "proposed" job posting? (In this example, as proximity to good schools is not guaranteed, cell F23 should be "0".)

- For the scope of practice of the "proposed" job posting, does the availability of human resources, infrastructure, and equipment allow for full opportunity for health workers to apply their skills? (In this example, due to limited resources at the district hospital, it is a narrow scope of practice, and cell F26 should be "0").

Using the Rapid DCE survey job attributes and levels from the example described above, the formulas within the worksheet will automatically calculate the preference for this "proposed" job posting (Row 27) and will look like this:

	A	B	C	D	E	F	G
14	**STEP 2. Calculate predicted preference impact measure of "proposed" job postings**						
15	Step 2a: Enter the attribute levels for the "standard" job posting (C18-C26), where No=0 and Yes=1 for the each attribute. For C16, enter the current salary amount.				Step 2b: Enter different combinations of attribute levels to determine the preference rates for "proposed" job postings [i.e., a new package in a potential policy option] (F18-F26), where No=0 and Yes=1 for the each attribute. For salary, enter the potential salary amount.		
16	"Standard" Job Posting				"Proposed" Job Posting 1	(NAME)	
17	Job attribute	Level	No=0 and Yes=1	Coefficient	Level	No=0 and Yes=1	Coefficient
18	Salary	1 Namibian dollar	20000	0.0003341	1 Namibian dollar	24000	0.0003341
19	Location	National tertiary hosp	0	-0.0433071	National tertiary hospital	0	-0.0433071
20	Housing	Allowance provided	1	2.475426	Allowance provided	1	2.475426
21	Housing	Government housing	0	2.006815	Government housing	0	2.006815
22	Living conditions	Always good access	0	1.228102	Always good access	0	1.228102
23	Children's education	Good schools close	0	0.752598	Good schools close	0	0.752598
24	Career advancement	Eligible in 1 year	0	1.872621	Eligible in 1 year	1	1.872621
25	Career advancement	Eligible in 2 years	0	1.674377	Eligible in 2 years	0	1.674377
26	Scope of practice	Wide scope	0	1.515097	Wide scope	0	1.515097
27			Preference for "standard" job posting:	9.157426		Preference for "proposed" job posting:	12.366447
28				Correct estimate			Correct estimate
29					Proportion preferring "proposed" job posting:		96%
30							Correct estimate

Based on these calculations, the predicted preference impact or percent of pharmacists who would prefer the "proposed" posting in a rural area (district hospital) with the offered package of incentives to the "standard" job posting without the incentives is 96%.

Therefore, if the package of incentives in the above example were to be implemented, it could be estimated that approximately **96% of the pharmacists would likely be motivated to take a job in a rural area**.

You may be interested to see what the predicted preference impact would be if you modified the salary within proposed incentive packages. To do this, repeat the calculations with higher or lower salary figures in the "proposed" job posting while maintaining the other incentives. As shown in the table below, the preference impact of the "proposed" job with incentive strategy with various salaries (offering either 22,000, 24,000, or 26,000 Namibian dollars instead of the 20,000 Namibian dollars used in the first calculation) will decrease or increase the overall preference impact by a relatively small amount. You can record these different percentage values on the "Presentation" tab of the same Excel worksheet (Appendix 7).

	A	B	C	D	E
1	**Step 3. Present potential retention strategies**	**Salary amount ($N)**			
2		**$20,000**	**$22,000**	**$24,000**	**$26,000**
3	**Incentive Package 1**				
4	Housing allowance	87%	93%	96%	98%
5	Eligibility for promotion after 1 year				

A predicted preference impact calculation should be done for all incentive packages you are considering to see which packages would yield the highest percentage of health workers by cadre motivated to take a job posting in a rural area. In this way you can see how varying the incen- tives offered affects the desirability of a job among a cadre of health workers. Additional "proposed" job posting sections are included on the "Calculation" tab of the Excel worksheet for this purpose.

Step 3: Present Potential Retention Strategies

This final step allows you to present and compare the preference impact measures of these many combinations of incentive packages to aid in determining which may be the most appropriate in your context.

You can then enter the predicted preference impact values for each combination of incentives by variable salary amounts on the "Presentation" tab for ease of presentation to stakeholders. Your Step 3. Presentation tab will look something like this:

	A	B	C	D	E
1	**Step 3. Present potential retention strategies**	**Salary amount ($N)**			
2		**$20,000**	**$22,000**	**$24,000**	**$26,000**
3	**Incentive Package 1**				
4	Housing allowance	87%	93%	96%	98%
5	Eligibility for promotion after 1 year				
9	**Incentive Package 2**				
10	Housing allowance	27%	42%	59%	74%
11	Wide scope of practice; available resources				
15	**Incentive Package 3**				
16	Well-maintained government housing	60%	75%	85%	92%
17	Eligibility for promotion after 1 year				
18	Wide scope of practice; available resources				
21	**Incentive Package 4**				
22	Well-maintained government housing	56%	71%	83%	90%
23	Eligibility for promotion after 2 years				
24	Wide scope of practice; available resources				
27	**Incentive Package 5**				
28	Housing allowance	67%	80%	88%	94%
29	Always access to amenities				
30	Good schools close by				
31	Eligibility for promotion after 2 years				
32	Wide scope of practice; available resources				

As you can see in the Step 3 table on the preceding page, varying the options within an incentive package can either change the overall preference impact in substantial or insignificant degrees. You may find that swapping one intervention for another yields similar results. For example, according to these Rapid DCE survey results, the desirability of a job that provides a housing allowance versus a basic house are relatively similar. However, the cost and effort to implement a housing allowance (perhaps by calculating and including the allowance in health workers' paychecks) could be significantly less than implementing basic housing (by building homes in rural areas throughout the country).This can provide further information when discussing with stakeholders which packages may be more feasible and/or financially sustainable within your specific context. This is why it is worth calculating the preference impact for various combinations of packages to try to find the package that simultaneously has a high degree of preference and high degree of political and financial feasibility.

Please see Appendix 8 for another example of how to organize and present varying incentive packages to stakeholders.

Step 4 (Recommended): Costing Retention Incentives

The iHRIS Retain costing software tool

To make an evidence-based decision regarding the development of retention and attraction strategies, policy-makers will also need to know the costs of the desired incentive or intervention packages to determine the financial feasibility of implementation of the strategies.

It is recommended that a costing exercise be conducted to determine the financial implications of the incentive packages under consideration. To assist with the costing process, Capacity***Plus***, the USAID-funded flagship project on strengthening the health workforce, and the WHO have developed a step-by-step retention intervention costing tool—iHRIS Retain—to enable HR managers and other HRH stakeholders to cost specific incentives and interventions. This open source costing software program can be accessed at: http://retain.ihris.org/retain.

CONGRATULATIONS!

Congratulations! If you have followed these steps successfully, you have completed the Rapid Retention Survey Toolkit.

We hope that your experience with the ***Rapid Retention Survey Toolkit*** has helped you in your responsibilities to plan, manage, and support HRH.

Your feedback is invaluable to the optimization of the toolkit. We invite you to contact the developers of this tool to ask questions and to share your experience. Please email us at info@capacityplus.org.

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APPENDIX 1. SAMPLE FOCUS GROUP DISCUSSION GUIDE

You can download a modifiable version of this appendix at:
www.capacityplus.org/rapid-retention-survey-toolkit

Introduction

Thank you very much for coming today. We are working with the Ministry of Health to learn about health professionals' motivation for working in rural and remote areas in [INSERT NAME OF COUNTRY]. We are interested in understanding the factors that you think about when you decide where you want to work as a health professional. This focus group should take approximately 1-1.5 hours. Your participation will help us to create the survey questionnaire that we will administer as part of this study.

[HAVE EACH PERSON READ CONSENT FORM AND SIGN]

I will now ask you some questions. Please let me know if anything is unclear or confusing.

Introductory question

1. Can you please introduce yourself?

Experience working in rural areas

2. Are you from a town/urban area or a rural village?

3. Have you ever worked or lived in a rural area?

Main content

4. What are some of the important issues you consider when thinking about where you want to work?

5. Do you think working in rural areas allows you to provide the kind and quality of health care you want to provide (e.g., the scope of practice you were trained to provide)? How important is this to you when deciding where you would like to work?

6. How would you compare the quality (e.g., cleanliness, equipment, etc.) of health facilities in rural areas as compared to urban areas? How important is the quality of the facility to you when deciding where you would like to work? What particular factors related to facility quality are most important (e.g., equipment, reliable drug supply, etc.)? Is safety an issue?

7. How would you compare health managers in rural areas to urban areas? Is there a difference in the support the Ministry of Health gives to rural facilities as compared to urban facilities? How important is management support to you when deciding where you will work?

8. Should there be a difference in salary for workers posted in rural areas as compared to urban areas? What salary increase for rural postings do you think would motivate workers to take those positions?

9. Are living conditions important to you?
   - Would you prefer an allowance for housing, or rather that the Ministry provide housing?
   - What particular aspects of living conditions are most important? Communications (phone, Internet, etc.), water, electricity?
   - Is access to social activities important?

10. Are transport considerations important to you?
    - Would you prefer an allowance for a car or public transport, or rather that the Ministry provide transport?

11. Are considerations related to your children's education important?
    - In terms of children's education what would make working in a rural area more attractive (e.g., education allowance)?

12. Are there any other allowances that would be important to motivate health workers to work in rural areas? Are bonuses important? What should bonuses be given for? How much should bonuses be?

13. How would you compare the opportunities for career promotion if you work in a rural area and an urban area? What should the career promotion opportunities be to make working in a rural area more attractive? How important are these opportunities when considering where you will work?

14. How would you compare opportunities for in-service training if you work in a rural area and an urban area? What should the in-service training opportunities be to make working in a rural area more attractive? How important are in-service training opportunities when considering where you will work?

15. How would you compare opportunities for study leave if you work in a rural area and an urban area? How important are study leave opportunities when considering where you will work? How many years do you think you should have to work in a rural area versus an urban area before you are given study leave?

16. How would you compare community support given to health workers in rural areas and in urban areas? How important is community support to you when considering where you will work?

17. Are there any other factors, which have not yet been mentioned, that are important to you when deciding where you will work?

We have now discussed several unique factors that may affect your decision on where you choose to work as a health professional. These factors include:

- The types of health care you may provide (scope of practice)
- The quality of facilities, including availability of equipment, drug supply, etc.
- Supportive management
- Career mentoring programs
- Salary
- Housing
- Living conditions (electricity, water, social activities)
- Transportation
- Performance bonuses
- Children's education
- Career advancement/promotion opportunities
- Opportunities for continued education
- Community support
- (Add any other factors mentioned that seem important).

18. Thinking about these factors, please rank which four are most important to you, starting with the most important.

(Facilitator: Distribute a copy of the table below to each participant for them to rank their top four choices. Collect the form from the participants when they are done.)

Job Factor Ranking* Form

Considering the job factors below, please rank which four factors are most important to you, starting with the most important as #1.

Factor	Ranking (#1 - 4)
Scope of practice	
Quality of the facility	
Supportive management	
Salary	
Housing	
Living conditions	
Transportation	
Performance bonuses	
Children's education	
Career advancement/promotion opportunities	
Opportunities for continued education	
Community support	
Other:	
Other:	
Other:	

* Where ranking values are 1=most important, 2=second most important, 3=third most important, 4=fourth most important), then the overall ranking is determined by adding up the rank value (if rank=1, then 4 points; if rank=2, then 3 points; if rank=3, then 2 points, if rank=4, then 1 point).

APPENDIX 2. SAMPLE INFORMED CONSENT FORM

You can download a modifiable version of this appendix at:
www.capacityplus.org/rapid-retention-survey-toolkit

Introduction
You are being asked to take part in a study examining the factors affecting health professionals' motivation for working in rural areas in [INSERT NAME OF COUNTRY]. In order to ensure that you are informed about the study, we are asking you to read this consent form. You will also be asked to sign it. Please ask us to explain anything you do not understand.

Purpose
This study is being conducted by [NAME OF ORGANIZATION] in collaboration with [INSERT NAMES OF OTHER ORGANIZATION(S)]. This study will gather information mainly on health worker motivation and preferences related to job postings in rural and remote areas. Basic demographic information, such as gender and age, will also be collected.

Your Part in the Study
Focus group discussion participants: If you agree to participate in the study, you will be interviewed as part of a small group, which will take approximately 1-1.5 hours. About [XXX] people will take part in the overall study in [INSERT NAME OF COUNTRY].

Survey participants: If you agree to participate in the study you will be asked to complete a questionnaire that takes approximately 20-30 minutes. About [XXX] people will take part in the overall study in [INSERT NAME OF COUNTRY].

If You Decide Not to Participate in the Study
Your participation in the study is voluntary. There is no penalty for refusing to take part.

Confidentiality
The information you provide will be confidential. We will not put your name on the form on which your responses will be recorded. If we publish the results of the study, your name will not be in it.

Benefits
There are no financial compensation or other personal benefits from participating in the study. However, your responses may provide insights into the best strategies for designing future incentive packages to help attract and retain health workers in rural areas.

Risks or Discomfort
There are no known risks to you resulting from your participation in the study. If you experience any personal discomfort, you may, as stated above, stop at any time or refuse to answer any questions.

Contact Person for Questions

If you have any questions about the study in general, your rights as a participant in this study, or any problems with the study, you may contact [NAME OF LOCAL MANAGER OR INVESTIGATOR] at the following telephone number _____or address _____.

Consent to Participate in Study

I have read (or had read to me) the information above describing the process, benefits, and risks of participating in this study. I agree to participate as a volunteer in this study.

_____	_____
Date	Signature of Study Participant
_____	_____
Date	Signature of Facilitator/Data Collector

APPENDIX 3. SAMPLE SUPPLEMENTAL QUESTIONS FROM A STUDENT SURVEY (Paper-Based)

You can download a modifiable version of this appendix at:
www.capacityplus.org/rapid-retention-survey-toolkit

Understanding health worker preferences for development of a national strategy to increase health worker attraction and retention in rural areas of Lao PDR

Student Cadre: Medical Student

Respondent ID: _____

Questionnaire Version: 4

Date: _____

Name of School/Hospital: _____

Name of Data Collector: _____

INFORMED CONSENT

Introduction

You are being asked to take part in a study examining the factors affecting health professionals' motivation for working in rural areas in Lao PDR. In order to ensure that you are informed about the study, we are asking you to read this consent form. You will also be asked to sign it. Please ask us to explain anything you do not understand.

Purpose

This study is being conducted by the Ministry of Health in collaboration with the World Health Organization and Capacity*Plus*, USAID's global health workforce project. This study will gather information mainly on health worker motivation and preferences related to job postings in rural and remote areas. Basic demographic information, such as gender and age, will also be collected.

Your Part in the Study

If you agree to participate in the study you will be asked to complete a questionnaire that takes approximately 20-30 minutes. More than 300 people will take part in the overall study in Lao PDR.

If You Decide Not to Participate in the Study
Your participation in the study is voluntary. There is no penalty for refusing to take part.

Confidentiality
The information you provide will be confidential. We will not put your name on the form on which your responses will be recorded. If we publish the results of the study, your name will not be in it.

Benefits
There is no financial compensation or other personal benefits from participating in the study. However, your responses may provide insights into the best strategies for designing future incentive packages to help attract and retain health workers in rural areas.

Risks or Discomfort
There are no known risks to you resulting from your participation in the study. If you experience any personal discomfort you may, as stated above, stop at any time or refuse to answer any questions.

Contact Person for Questions
If you have any questions about the study in general, your rights as a participant in this study or any problems with the study you may contact Dr. [NAME] at telephone number [NUMBER] or at the Ministry of Health, Department of Organization and Personnel.

Consent to Participate in Study

I have read (or had read to me) the information above describing the process, benefits and risks of participating in this study. I agree to participate as a volunteer in this study.

_____ _____

Date **Signature of Study Participant**

_____ _____

Date **Signature of Data Collector**

Introduction to the Survey:

Thank you very much for coming today. We are working with the Ministry of Health to learn about the factors that motivate health care providers to work in facilities located in rural areas. Since you are a student looking toward the future, we are interested in knowing more about what incentives or characteristics about a job would influence your decision to work in a rural area. This survey should take approximately 20-30 minutes.

You will be asked questions to obtain demographic and other background information. Then, there will be a series of questions about hypothetical job postings. Your participation will help us quantify the attractive power of incentives and characteristics to motivate health workers to accept postings in rural areas.

Please give your most honest responses throughout the questionnaire. There is no right or wrong answer. This information will assist the Ministry of Health to develop a national strategy to increase health worker attraction and retention in rural areas.

If you have any questions during the survey, please feel free to ask me.

Thank you for your participation!

Section A: Demographic and Background Information

First, we will ask you a set of questions about your personal background. Please note that the numbers in parentheses next to the boxes have no meaning for your response. They are used only as coding for data entry.

1. In which university are you currently enrolled?

   University of Health Sciences (Vientiane) ◯ (0)
   Other (specify)_____ ◯ (1)

2. In which year of study are you?

   6th year ◯ (0)
   5th year ◯ (1)
   Other (specify)_____ ◯ (2)

3. In which program are you?

   Direct entry ◯ (0)
   Upgrading ◯ (1)

4. What is your gender?
   Male ◯ (0)
   Female ◯ (1)

5. What is your age, in years?

   _____ years

6. From the age of 6 onwards, have you lived in a rural area for more than one year at a time?

   No ◯ (0)
   Yes ◯ (1)

7. What is your marital status?

   Single ◯ (0)
   Married and live with my spouse ◯ (1)
   Married but DO NOT live with my spouse ◯ (2)

8. How many living children do you have? (if none, enter 0)

   _____ children

9. What is your religion?

Buddhist	◯ (0)
Christian	◯ (1)
Muslim	◯ (2)
Animist	◯ (3)
Other (specify)_____	◯ (4)
No religion	◯ (5)

10. To which ethnic group do you belong?

Lao	◯ (0)
Hmong	◯ (1)
Khmou	◯ (2)
Other (specify) _____	◯ (3)

Section B: Professional Background

Now we are going to ask you a few questions related to your school and work experience.

11. How do you pay tuition for your current study program?

I am sponsored by the Government of Lao PDR.	◯ (0)
I am sponsored by an NGO.	◯ (1)
I pay my tuition fee myself or with help from my family.	◯ (2)
Other (specify) _____ _____	◯ (3)

12. Before enrolling in your current study program, how many years of work experience did you have as a health worker (if none, enter 0)?

_____ years

13. Have you at any time worked as a health worker in a rural area for more than six months at a time?

No	◯ (0) SKIP to Question 15.
Yes	◯ (1)

14. Please rate your experience overall working in a rural area.

Excellent	◯ (0)
Very good	◯ (1)
Good	◯ (2)
Fair	◯ (3)
Poor	◯ (4)

15. Are you under any obligation or have you made any commitment to work in a rural area after graduation?

No	◯ (0)
Yes	◯ (1)

16. During your studies thus far, have you done service in a rural area as part of your study program?

No	◯ (0) SKIP to Question 19.
Yes	◯ (1)

17. How many weeks did you spend doing service in a rural area during your study program?

_____ weeks

18. Please rate your experience overall doing service in a rural area during your study program.

Excellent	◯ (0)
Very good	◯ (1)
Good	◯ (2)
Fair	◯ (3)
Poor	◯ (4)

19. Please rate how likely you are to work in a rural area at some point in the future?

Very unlikely	◯ (0)
Unlikely	◯ (1)
Likely	◯ (2)
Very likely	◯ (3)

20. Thinking in general about the possibility of working in a rural area, which of the following factors do you consider to be the MOST IMPORTANT in your decision to work in a rural area? (Select ONLY one.)

The facility has sufficient staff type and number, and equipment is always available/working, according to facility type.	◯ (0)
You have accelerated career promotion/advancement opportunities.	◯ (1)
You are provided housing.	◯ (2)
You are provided a higher salary.	◯ (3)
You qualify for further study and a scholarship.	◯ (4)
You are provided transport for official and personal use.	◯ (5)
Other (specify)_____	◯ (6)

21. The government of Lao PDR is thinking of providing incentives and other motivational factors (which could include increased salary, housing, further study, better quality facilities) to encourage health workers to work in rural areas. If such incentives were available, would you consider working in a rural area?

No	◯ (0)
Yes	◯ (1)

APPENDIX 4. SAMPLE SUPPLEMENTAL AND JOB PREFERENCE QUESTIONS FROM A HEALTH WORKER SURVEY (Computer-Based)

Determining the right incentives to attract and retain health workers: The case of pharmacists in Namibia

PARTICIPANT CONSENT

Thank you very much for your time today. IntraHealth International is working with the Ministry of Health and Social Services and the University of Namibia to conduct a study. IntraHealth is an international health and development organization based in the United States.

We are requesting pharmacists from many parts of Namibia to respond to this survey. The goal of this study is to examine the factors affecting health professionals' motivations for working in rural areas in Namibia. We would like to ask you to participate in this study. If you agree, you will respond to this survey. We expect this will take approximately 30 minutes.

There are no right or wrong answers. We would just like your honest feedback about your working life. You will be asked questions to obtain basic demographic information. Then you will be asked to review a series of hypothetical job postings and select your preference.

Your responses may provide insights into the best strategies for designing future incentive packages to help attract and retain health workers in rural areas.

Click on the arrows at the bottom of the screen to navigate the survey. To view the survey in full screen mode, please click F11.

Informed Consent

Introduction You are being asked to take part in a study examining preferences for working at district hospitals in Namibia. In order to ensure that you are informed about the study, we are asking you to read this consent form.

Purpose This study is being conducted by the Ministry of Health and Social Services in collaboration with IntraHealth International and the University of Namibia.

This study will gather information mainly on pharmacists' preferences related to job postings in district hospitals. Basic demographic information, such as gender and age, will also be collected.

Your Part in the Study If you agree to participate in the study, you will be asked to complete a survey that takes approximately 20-30 minutes.

If You Decide Not to Participate in the Study Your participation in the study is voluntary. There is no penalty for refusing to take part.

Confidentiality The information you provide will be confidential. We will not put your name on the form on which your responses will be recorded. If we publish the results of the study, your name will not be in it.

Benefits There is no financial compensation or other personal benefits from participating in the study. However, your responses may provide insights into the best strategies for designing future incentive packages to help attract and retain pharmacists at district hospitals.

Risks or Discomfort There are no known risks to you resulting from your participation in the study. If you experience any personal discomfort, you may, as stated above, stop at any time or refuse to answer any questions.

Contact Person for Questions If you have any questions about the study in general, your rights as a participant in this study or any problems with the study you may contact [NAME] at the following telephone number: _____.

Do you agree to participate in this study?

- ○ **Yes, I agree to participate.**
- ○ **No, I do not agree to participate.**

Section A: Demographic and Background Information

1. What is your gender?
   - □ Male
   - □ Female

2. How old are you in years? _____

3. What is your nationality?
   - □ Namibian
   - □ Angolan
   - □ American
   - □ Congolese
   - □ Cuban

□ Egyptian
□ Nigerian
□ South African
□ Ugandan
□ Zambian
□ Zimbabwean
□ Other (please specify) _____

4. What is your current relationship status?
□ Single
□ Married
□ Cohabiting
□ Divorced/separated
□ Widowed

5. How many children do you have? (If none, please enter "0".) _____

6. Are you currently a student or practicing full-time?
□ I am a student.
□ I am practicing as a full-time pharmacist.

(If response to question 6 is "I am a student":)

7a. In which year of study are you?
□ First
□ Second
□ Third
□ Fourth
□ Other (please specify) _____

(If response to question 6 is "I am practicing as a full-time pharmacist":)

7b. For how many years have you been a practicing pharmacist? ____

8. In which region did you do your attachment? (Choose all that apply.)
□ Caprivi
□ Erongo
□ Hardap
□ Karas
□ Kavango East
□ Kavango West
□ Khomas
□ Kunene
□ Ohangwena
□ Omaheke
□ Omusati

□ Oshana
□ Oshikoto
□ Otjozondjupa
□ I have not yet done my attachment.
□ I did my schooling outside of Namibia.

9. Have you ever worked at a district hospital, including during your attachment?
□ Yes
□ No

10. Have you ever lived in a rural area for more than one year?
□ Yes
□ No

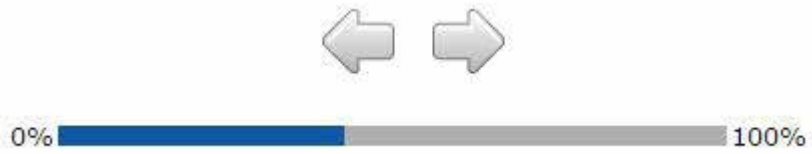
Section B: Job preferences

Imagine that your are thinking about finding another job. You find two postings in government facilities. One of these postings is at a district hospital and the other is at a national tertiary hospital in Windhoek.

Please imagine yourself in this situation and make a decision as to which of the two presented postings you would prefer. For the sake of this survey, please assume that you would receive the full benefits described for both of the postings.

In making your choice, please carefully read the full list of benefits for each posting and do not imagine any additional features of the postings. There will be 12 different scenarios presented.

Please note that while they may look similar at first, they are indeed each very different.



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	Housing allowance	Well-maintained government housing provided
Living Conditions	Always good availability and access to amenities (running water, electricity, supermarkets, Internet)	Availability and access to basic amenities (running water, electricity)
Monthly Salary	30% additional salary	10% additional salary
Children's Education	No good schools close by	Good schools close by
Career Advancement	Eligible for promotion after 1 year	Eligible for promotion after 2 years
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)	Wide scope of practice and opportunity to apply skills due to availability of resources (human, supplies, equipment, infrastructure)
	○	○

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	Housing allowance	No housing allowance
Living Conditions	Always good availability and access to amenities (running water, electricity, supermarkets, Internet)	Availability and access to basic amenities (running water, electricity)
Monthly Salary	No additional salary	20% additional salary
Children's Education	Good schools close by	No good schools close by
Career Advancement	Eligible for promotion after 1 year	Eligible for promotion after 2 years
Scope of Practice with Available Resources	Wide scope of practice and opportunity to apply skills due to availability of resources (human, supplies, equipment, infrastructure)	Narrow scope of practice with limited opportunity to apply skills due to lack of resources (human, supplies, equipment, infrastructure)
	○	○

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

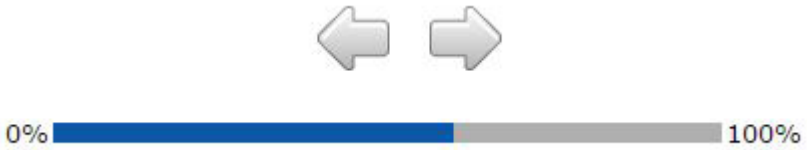
	District Hospital	National Tertiary Hospital
Housing	Housing allowance	No housing allowance
Living Conditions	Always good availability and access to amenities (running water, electricity, supermarkets, Internet)	Availability and access to basic amenities (running water, electricity)
Monthly Salary	No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

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	Well-maintained government housing provided	No housing allowance
Living Conditions	Always good availability and access to amenities (running water, electricity, supermarkets, Internet)	Availability and access to basic amenities (running water, electricity)
Monthly Salary	20% additional salary	30% additional salary
Children's Education	Good schools close by	No good schools close by
Career Advancement	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)	Wide scope of practice and opportunity to apply skills due to availability of resources (human, supplies, equipment, infrastructure)
	○	○

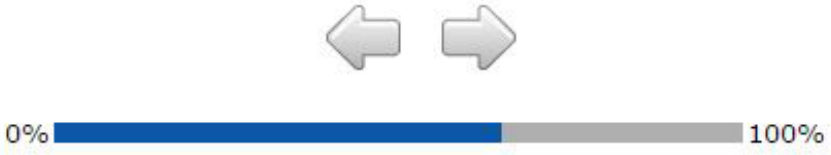
Which of these two job postings do you prefer? Select one by marking the circle under the job you prefer.

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



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	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	No additional salary	20% additional salary
Children's Education	No good schools close by	Good schools close by
Career Advancement	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)	Wide scope of practice and opportunity to apply skills due to availability of resources (human, supplies, equipment, infrastructure)
	○	○



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	Well-maintained government housing provided	No housing allowance
Living Conditions	Availability and access to basic amenities (running water, electricity)	Always good availability and access to amenities (running water, electricity, supermarkets, Internet)
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	○	○

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
Living Conditions	Availability and access to basic amenities (running water, electricity)	Always good availability and access to amenities (running water, electricity, supermarkets, Internet)
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	○	○

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	Well-maintained government housing provided	Housing allowance
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	20% additional salary	30% additional salary
Children's Education	No good schools close by	Good schools close by
Career Advancement	Eligible for promotion after 1 year	Eligible for promotion after 2 years
Scope of Practice with Available Resources	Wide scope of practice and opportunity to apply skills due to availability of resources (human, supplies, equipment, infrastructure)	Narrow scope of practice with limited opportunity to apply skills due to lack of resources (human, supplies, equipment, infrastructure)
	○	○

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	30% additional salary	10% additional salary
Children's Education	Good schools close by	No good schools close by
Career Advancement	Eligible for promotion after 2 years	Eligible for promotion after 1 year
Scope of Practice with Available Resources	Wide scope of practice and opportunity to apply skills due to availability of resources (human, supplies, equipment, infrastructure)	Narrow scope of practice with limited opportunity to apply skills due to lack of resources (human, supplies, equipment, infrastructure)
	○	○

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
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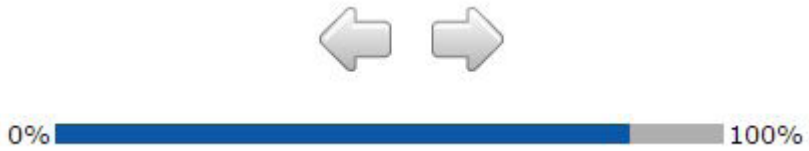
Living Conditions	Always good availability and access to amenities (running water, electricity, supermarkets, Internet)	Availability and access to basic amenities (running water, electricity)
Monthly Salary	20% additional salary	No additional salary
Children's Education	No good schools close by	Good schools close by
Career Advancement	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)	Wide scope of practice and opportunity to apply skills due to availability of resources (human, supplies, equipment, infrastructure)
	○	○

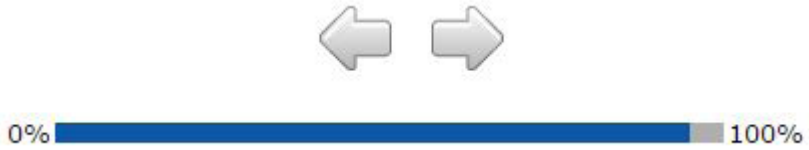


Which of these two job postings do you prefer? Select one by marking the circle under the job you prefer.

	District Hospital	National Tertiary Hospital
Housing	No housing allowance	Well-maintained government housing provided
Living Conditions	Always good availability and access to amenities (running water, electricity, supermarkets, Internet)	Availability and access to basic amenities (running water, electricity)
Monthly Salary	30% additional salary	10% additional salary
Children's Education	No good schools close by	Good schools close by
Career Advancement	Eligible for promotion after 1 year	Eligible for promotion after 2 years
Scope of Practice with Available Resources	Wide scope of practice and opportunity to apply skills due to availability of resources (human, supplies, equipment, infrastructure)	Narrow scope of practice with limited opportunity to apply skills due to lack of resources (human, supplies, equipment, infrastructure)
	○	○

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	Housing allowance	Well-maintained government housing provided
Living Conditions	Always good availability and access to amenities (running water, electricity, supermarkets, Internet)	Availability and access to basic amenities (running water, electricity)
Monthly Salary	20% additional salary	No additional salary
Children's Education	Good schools close by	No good schools close by
Career Advancement	Eligible for promotion after 1 year	Eligible for promotion after 2 years
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)	Wide scope of practice and opportunity to apply skills due to availability of resources (human, supplies, equipment, infrastructure)
	○	○



Otwa pa ndula, Dankie, Thank you, Ndangi, Aio

This marks the end of the survey. We thank you for your time.

If you are taking this survey in a computer lab, then please raise your hand to inform the survey administrator that you are finished.

If you are taking this survey via the internet, then you may now close your browser.

APPENDIX 5. EXAMPLE FOR PRESENTATION OF SUPPLEMENTAL DATA*

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Descriptive Statistics for Health Worker Respondents, by Cadre								
Variable	Doctors (N = 105)		Medical Assistants (N = 90)		Midlevel Nurses/Midwives (N = 106)		Low-Level Nurses/Midwives (N = 183)	
	n	(%)	n	(%)	n	(%)	n	(%)
Note: Values may not add to total N due to missing responses (ie., unanswered questions).								
Demographics								
Gender								
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								
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								
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%
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%
District Health Office	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

*Excerpted from Jaskiewicz et. al. 2012. Toward development of a rural retention strategy in Lao People's Democratic Republic: Understanding health worker preferences. Washington, DC: Capacity***Plus**.

APPENDIX 6. WILLINGNESS TO PAY MEASURE

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As mentioned in Stages 9 and 10, another way to compare the coefficients for each job attribute is to use the flexibility of the salary coefficient to obtain a monetary value for each attribute. Just as we can multiply the salary coefficient by any currency amount to yield different preference values, we can also divide any preference values by the salary coefficient to yield different currency amounts. In this way, we can obtain respondents' "willingness to pay" (WTP) for each attribute. As described earlier, the WTP measure conveys in monetary terms respondents' preferences for a proposed incentive package as compared to the "standard" job posting. In other words, this is the value the doctor, nurse, or other health worker places on the offered intervention package in monetary terms. Given the context, WTP can be defined as a measure of how much salary a respondent would be willing to forgo to receive other benefits or incentives in the job. Of course, everyone will receive their salary and not actually "forgo" any salary amount. This is just a way to interpret how important certain job characteristics or attributes are to the respondents over other job characteristics or attributes.

Step 1: Obtain "Willingness to Pay" Measure

To obtain WTP values, we need to divide each attribute's coefficient by the salary coefficient, as shown in the table below:

Job Attribute	Levels	Coefficient	Calculation	WTP
Quality of the facility	1 = Basic			
	2 = Advanced	0.8203349	÷ 0.00000179 =	458,288
Housing	1 = No housing			
	2 = Housing allowance provided	0.6011961	÷ 0.00000179 =	335,864
	3 = Basic house provided	0.5677403	÷ 0.00000179 =	317,173
Length of commitment	1 = Two years			
	2 = Five years	-0.7682844	÷ 0.00000179 =	-429,209
Study assistance	1 = No tuition support			
	2 = Full tuition support	1.297229	÷ 0.00000179 =	724,709
Salary	1 = 700,000/month			
	2 = 1,000,000/month			
	3 = 1,500,000/month			
	4 = 2,000,000/month	0.00000179	÷ 0.00000179 =	1.0
Management support	1 = Manager is not supportive			
	2 = Manager is supportive	0.4542702	÷ 0.00000179 =	253,782

With these calculations we can discern how much respondents would be "willing to pay" for particular job attributes. As stated above, because the salary for a job posting is being considered, it is in fact more accurate to consider respondents' "willingness to pay" as their "willingness to forgo salary."

The results in the previous table suggest respondents would be willing to accept 458,288 Shillings less in salary if the quality of the facility is advanced. Similarly, the results suggest that respondents would be willing to accept 724,709 Shillings less in salary if the posting includes full tuition support for continued education. Again, while this does not literally mean that health workers will receive a lower salary, this is a way to interpret how important certain job attributes are viewed by respondents compared to other job attributes.

Step 2: Determine the Preferred Incentive Packages Using the Willingness to Pay Measure

We can then use the WTP measure to determine the most preferred incentive packages. Remember, you will need to carry out these steps for each cadre included in the Rapid DCE in order to determine the intervention packages preferred by each specific cadre since motivational factors may differ among doctors, nurses, pharmacists, and others.

1. Using the table of WTP measures calculated in the preceding step, rank potential strategies from highest WTP to lowest WTP. This should be the same ordering as the weighted ranking we listed in Stage 9, Step 1. Note that the negative sign is not taken into consideration when ordering interventions according to their WTP measure. However, you should change the wording that was used to describe each attribute to instead describe a potential intervention, as shown below.

    - Provide full tuition support for continued education: 724,709
    - Improve the quality of the health facility in terms of electricity, equipment, and supplies: 458,288
    - Guarantee that the length of time committed to the posting is two years: 429,209
    - Provide a housing allowance: 335,864
    - Provide a basic house: 317,173
    - Ensure that managers provide support to health workers: 253,782
    - Increase salary by 1 Shilling: 1.0

2. Start by proposing a number of different combinations of incentive packages that could be offered to health workers. You can begin by offering the top three or four incentives with the highest WTP, as shown in the WTP ranking above, in addition to a selected salary level. As mentioned previously, it is useful to present each package of incentives or interventions with two different levels of potential salary for comparison purposes. For example, let us propose the sample package for doctors:

- Increase salary to 1,000,000 Shillings per month
- Improve the quality of the health facility
- Set commitment length of the position to two years
- Provide full tuition assistance for continued education.

To determine the WTP measure for the entire package, simply add up the WTP measure for each incentive or intervention being offered. See the table below for a few examples of the calculation.

Example of Retention Packages Using WTP			
Package 1: Salary Option A		Package 1: Salary Option B	
Incentive/Intervention	**WTP (Shillings)**	**Incentive/Intervention**	**WTP (Shillings)**
Increase salary to 1,000,000 Shillings/month	1,000,000	Increase salary to 800,000 Shillings/month	800,000
Improve the quality of the health facility	458,288	Improve the quality of the health facility	458,288
Set commitment to position at two years	429,209	Set commitment to position at two years	429,209
Provide full tuition support for continued education	724,709	Provide full tuition support for continued education	724,709
Total WTP	**2,612,206**	**Total WTP**	**2,412,206**
Package 4: Salary Option A		Package 4: Salary Option B	
Incentive/Intervention	**WTP (Shillings)**	**Incentive/Intervention**	**WTP (Shillings)**
Increase salary to 1,000,000 Shillings/month	1,000,000	Increase salary to 800,000 Shillings/month	800,000
Provide full tuition support for continued education	724,709	Provide full tuition support for continued education	724,709
Provide a housing allowance	335,864	Provide a housing allowance	335,864
Total WTP	**2,060,573**	**Total WTP**	**1,860,573**

You can then enter the WTP information in a table similar to the one below for ease of presentation to stakeholders. However, when presenting the package of strategies, rather than referring to WTP, a concept that may be confusing to some people, it can be better to say "doctors value this package of strategies at $[Total WTP] per month [or year]."

As in the previous method, you can see from the table that varying the options within an incentive package can either change the overall worth in terms of WTP in the eyes of the cadre in substantial or insignificant degrees. This is why it is worth calculating the WTP for various combinations of packages to try to find the package that simultaneously has a high degree of value to a cadre and a high degree of political and financial feasibility.

Example of Presentation of Retention Packages Using WTP	
Package 1	
Salary Option A 1. Increase salary to 1,000,000 Sh/month 2. Improve the quality of the health facility 3. Set commitment to position at two years 4. Provide full tuition support for continued education Doctors value this package at **2,612,206 Sh/month.**	**Salary Option B** 1. Increase salary to 800,000 Sh/month 2. Improve the quality of the health facility 3. Set commitment to position at two years 4. Provide full tuition support for continued education Doctors value this package at **2,412,206 Sh/month.**
Package 2	
Salary Option A 1. Increase salary to 1,000,000 Sh/month 2. Ensure supportive management 3. Set commitment to position at two years 4. Provide full tuition support for continued education Doctors value this package at **2,407,700 Sh/month.**	**Salary Option B** 1. Increase salary to 800,000 Sh/month 2. Ensure supportive management 3. Set commitment to position at two years 4. Provide full tuition support for continued education Doctors value this package at **2,207,700 Sh/month.**
Package 3	
Salary Option A 1. Increase salary to 1,000,000 Sh/month 2. Set commitment to position at two years 3. Provide full tuition support for continued education Doctors value this package at **2,153,918 Sh/month.**	**Salary Option B** 1. Increase salary to 800,000 Sh/month 2. Set commitment to position at two years 3. Provide full tuition support for continued education Doctors value this package at **1,953,918 Sh/month.**
Package 4	
Salary Option A 1. Increase salary to 1,000,000 Sh/month 2. Provide full tuition support for continued education 3. Provide a housing allowance Doctors value this package at **2,060,573 Sh/month.**	**Salary Option B** 1. Increase salary to 800,000 Sh/month 2. Provide full tuition support for continued education 3. Provide a housing allowance Doctors value this package at **1,860,573 Sh/month.**

As a reminder, it is recommended that a costing exercise also be conducted to determine the financial implications of the incentive packages under consideration. You can access the iHRIS Retain retention intervention costing tool, a collaborative effort between Capacity*Plus* and the WHO, at: http://retain.ihris.org/retain.

APPENDIX 7. PREFERENCE CALCULATION WORKSHEET

Please refer to Stage 10 for instructions on how to use the Preference calculation worksheet.

You can download a modifiable version of this appendix at:
www.capacityplus.org/rapid-retention-survey-toolkit

	A	B	C	D	E	F	G
1	**STEP 1. Calculate willingness to pay (WTP) values**						
2	**Step 1a: Enter the DCE job attributes (A4-A12), levels used in mixlogit model (C4-C12), and the reference levels (D4-D12)**				**Step 1b: Enter the coefficients from the mixlogit model in Stage 9 (E4-E12)**		
3	**Job attribute**		**Level [mixlogit model]**	**Reference level**	**Coefficient**	**WTP**	**Check on "WTP"**
4						1	
5						#DIV/0!	#DIV/0!
6						#DIV/0!	#DIV/0!
7						#DIV/0!	#DIV/0!
8						#DIV/0!	#DIV/0!
9						#DIV/0!	#DIV/0!
10						#DIV/0!	#DIV/0!
11						#DIV/0!	#DIV/0!
12						#DIV/0!	#DIV/0!
13							
14	**STEP 2. Calculate predicted preference impact measure of "proposed" job postings**						
15	**Step 2a: Enter the attribute levels for the "standard" job posting (C18-C26), where No=0 and Yes=1 for the each attribute. For C16, enter the current salary amount.**				**Step 2b: Enter different combinations of attribute levels to determine the preference rates for "proposed" job postings [i.e., a new package in a potential policy option] (F18-F26), where No=0 and Yes=1 for the each attribute. For salary, enter the potential salary amount.**		
16	**"Standard" Job Posting**				**"Proposed" Job Posting 1**	*[NAME]*	
17	**Job attribute**		**Level [mixlogit model]**	**No=0 and Yes=1**	**Coefficient**	**Level [mixlogit model]**	**No=0 and Yes=1**	**Coefficient**
18	0	0			0		
19	0	0			0		
20	0	0			0		
21	0	0			0		
22	0	0			0		
23	0	0			0		
24	0	0			0		
25	0	0			0		
26	0	0			0		
27			**Preference for "standard" job posting:**	#VALUE!		**Preference for "proposed" job posting:**	#VALUE!
28			**Check on "Preference for standard job posting":**	#VALUE!		**Check on "Preference for proposed job posting":**	#VALUE!

APPENDIX 8. EXAMPLE FOR PRESENTATION OF RETENTION INCENTIVE PACKAGES TO STAKEHOLDERS*

You can download a modifiable version of this appendix at:
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Predicted Preference Impact (Percentage) of Retention Strategy Packages for Medical Assistants				
Potential Retention Strategy				
Salary Increase	+0%	+30%	+40%	+50%
Package 1				
Provide support for children's education	91.1%	95.0%	95.8%	96.6%
Provide scholarship for further study after one year				
Provide housing				
Improve facility quality (staff number/type & equipment/supplies)				
Promote to permanent staff after one year				
Package 2				
Provide support for children's education	89.4%	94.0%	95.0%	95.9%
Provide scholarship for further study after one year				
Provide housing				
Improve facility quality (staff number/type & equipment/supplies)				
Package 3				
Provide support for children's education	87.1%	92.6%	93.9%	94.9%
Provide scholarship for further study after one year				
Provide housing				
Promote to permanent staff directly upon posting				
Package 4				
Provide support for children's education	85.7%	91.7%	93.1%	94.3%
Provide scholarship for further study after one year				
Provide housing				
Package 5				
Provide support for children's education	84.1%	90.7%	92.3%	93.6%
Provide housing				
Improve facility quality (staff number/type & equipment/supplies)				
Promote to permanent staff directly upon posting				
Package 6				
Provide support for children's education	83.9%	90.6%	92.2%	93.5%
Provide scholarship for further study after two years				
Provide housing				
Package 7				
Provide support for children's education	83.1%	90.1%	91.7%	93.2%
Provide allowance for housing				
Improve facility quality (staff number/type & equipment/supplies)				
Promote to permanent staff directly upon posting				
Package 8				
Provide support for children's education	80.1%	88.1%	90.1%	91.8%
Provide scholarship for further study after one year				

* Excerpted from Jaskiewicz et al. 2012. Toward development of a rural retention strategy in Lao People's Democratic Republic: Understanding health worker preferences. Washington, DC: Capacity*Plus*.

Predicted Preference Impact (Percentage) of Retention Strategy Packages for Medical Assistants				
Potential Retention Strategy				
Salary Increase	+0%	+30%	+40%	+50%
Package 9				
Provide support for children's education	78.0%	86.7%	88.9%	90.8%
Improve facility quality (staff number/type & equipment/supplies)				
Promote to permanent staff directly upon posting				
Package 10				
Provide support for children's education	77.7%	86.5%	88.7%	90.6%
Provide scholarship for further study after two years				
Package 11				
Provide support for children's education	76.9%	86.0%	88.3%	90.2%
Provide housing				
Package 12				
Provide support for children's education	75.9%	85.3%	87.7%	89.7%
Improve facility quality (staff number/type & equipment/supplies)				
Package 13				
Provide support for children's education	75.6%	85.1%	87.5%	89.6%
Provide allowance for housing				
Package 14				
Provide scholarship for further study after one year	75.2%	84.8%	87.2%	89.3%
Provide housing				
Promote to permanent staff directly upon posting				
Package 15				
Provide support for children's education	71.6%	82.3%	85.0%	87.4%
Promote to permanent staff directly upon posting				
Package 16				
Provide support for children's education	69.1%	80.4%	83.5%	86.1%
Package 17				
Provide housing	62.7%	75.6%	79.1%	82.3%
Promote to permanent staff directly upon posting				
Package 18				
Provide allowance for housing	61.0%	74.2%	77.9%	81.2%
Promote to permanent staff directly upon posting				

Capacity***Plus*** 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, Capacity***Plus*** helps countries achieve significant progress in addressing the health worker crisis while also having global impact through alliances with multilateral organizations.

Capacity***Plus***'s partners are: IntraHealth International, Inc. (lead partner), Abt Associates, IMA World Health, Liverpool Associates in Tropical Health (LATH), and Training Resources Group, Inc. (TRG).

Associate partners are: African Population & Health Research Center (APHRC), Asia-Pacific Action Alliance on Human Resources for Health (AAAH), Partners in Population and Development (PPD), and West African Institute of Post-Graduate Management Studies (CESAG).

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