Lot Quality Assurance Sampling (LQAS)

Protocol for Parallel Sampling

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Summary

This document provides guidance for using a Lot Quality Assurance Sampling (LQAS) parallel sampling methodology for conducting multiple surveys at the same time from different sample groups using the same logistical system. The U.S. Agency for International Development's Rapid CORE Assessment Tool for Child Health (Rapid CATCH) establishes a set of indicators, several with different denominators, required of all grantees supported by the Child Survival and Health Grants Program. Rapid CATCH 2007 indicators are used to illustrate the parallel sampling methodology. The LQAS parallel sampling protocol reflects experience-based guidance discussed during the CORE Monitoring and Evaluation Working Group LQAS Technical Advisory Group meeting held on August 27, 2008 (summary report available at http://www.coregroup.org/working_groups/monitoring.cfm).

Established in 1997, the CORE Group is a membership association of international nongovernmental organizations (NGOs) whose mission is to improve the health and well-being of children and women in developing countries through collaborative NGO action and learning. Collectively, CORE Group members work in more than 190 countries.

CORE Group, Inc. is a 501[c] 3 organization based in Washington, D.C.

Acknowledgements

Introduction

The U.S. Agency for International Development's (USAID's) Rapid Core Assessment Tool for Child Health (Rapid CATCH) establishes a set of standard indicators that are required of all grantees supported through the Child Survival and Health Grants Program (CSHGP). Data on these indicators are collected at baseline and end of project, and are utilized to demonstrate the important contributions of the CSHGP portfolio to increased coverage and improved practices and child nutrition status, and also to model estimated mortality reduction. The evolution of this tool in recent years, and the increased complexity of integrated programs that address the needs of multiple target populations have presented sampling challenges for grantees who have utilized the Lot Quality Assurance Sampling (LQAS) methodology. This guide seeks to clearly outline the recommended protocol for parallel sampling using LQAS to collect Rapid CATCH 2007 information.

The Rapid CATCH consists of standard indicators that CSHGP grantees must collect at baseline and final as part of a Knowledge, Practice and Coverage Survey (KPC).[1] These indicators are for a variety of maternal and child health intervention areas—

- Maternal and newborn care
- Breastfeeding and infant and young child feeding (IYCF)
- Vitamin A supplementation
- Immunization
- Malaria
- Control of diarrhea
- Acute respiratory infections
- Water and sanitation
- Anthropometrics

Many grantees choose LQAS because it can be used for the following purposes:

- Monitoring to see if targets are met during project implementation and to locate poor performing supervision areas, so that managers can devote more attention to them.

- Determining baseline and final project-level coverage.

To obtain information for these purposes, it is necessary to ensure adequate sample sizes for each indicator. This is complicated because Rapid CATCH indicators have different denominators, such as 0-5 months for exclusive breastfeeding and 12-23 months for immunization coverage. Parallel sampling must be used in order to address this situation. Therefore, this guide provides

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[1] The KPC consists of Rapid CATCH information that all CSHGP grantees collect and 15 modules for specific intervention areas. Grantees choose questions from the modules according to their specific interventions. For more information see http://www.childsurvival.com/kpc2000/kpc2000_new_summary.cfm.

instruction on how to implement parallel sampling for LQAS in the context of the CSHGP projects.

This guide complements other LQAS training material, in particular *Assessing Community Health Programs Using LQAS for Baseline Surveys and Regular Monitoring.*[2] The online training course developed the CORE group[3] and the *KPC Trainer of Survey Trainers curriculum.*[4] A series of Frequently Asked Questions on LQAS is also available on the CORE website[5] to clarify a number of issues on the overall methodology.

Definition of Parallel Sampling

Parallel sampling can be described as conducting multiple surveys at the same time using the same logistic system. It allows us to efficiently collect information from different sample groups in the same area at the same time. It ensures that there is an adequate sample size for each indicator from each sample group.

For Rapid CATCH indicators, parallel sampling allows simultaneous collection of information for the various intervention areas such as Infant and Young Child Feeding with a denominator of 6-23 months and treatment of diarrhea with oral rehydration solution (ORS), which has a denominator of children 0-23 months who had diarrhea in the last 2 weeks.

Remember that with LQAS, information can be obtained to make decisions about whether or not supervision areas (SAs) are meeting targets or benchmarks.[6] This same information can be aggregated, using a weighted average, across the supervision areas to obtain coverage for the entire project area.

Parallel sampling ensures that program managers will have a sample size of at least 19 for each indicator for each lot quality sampling area (supervision areas). This provides managers with a sufficient sample size to see, within their program area, which supervision areas are meeting program benchmarks or targets and which areas require special attention. It also helps to ensure that there will be an adequate sample size at the program or project level when the data from the separate supervision areas are pooled (minimum sample size of 95 for each indicator required). This allows program managers to calculate a mean and a confidence interval for each indicator for the entire project area, allowing him/her to identify and report on the current performance for each Rapid CATCH indicator.[7]

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[2] *Assessing Community Health Programs Using LQAS for Baseline Surveys and Regular Monitoring (Participants manual and workbook and the trainer's guide)* by Joseph J. Valadez, William Weiss, Corey Leburg, and Robb Davis, available at http://www.coregroup.org/working_groups/lqas_train.html and http://www.coregroup.org/working_groups/LQAS_Participant_Manual_L.pdf
[3] http://www.coregroup.org/conf_reg/lqas_series.cfm
[4] http://www.coregroup.org/working_groups/kpc_training/welcome.html
[5] http://www.coregroup.org/working_groups
[6] Coverage cannot be calculated for individual SAs, only for the entire project area.
[7] Aside from parallel sampling, adequate sample sizes for the entire project area are dependent on having five supervision areas or in the case of fewer supervision areas increasing the number of sample points per supervision

Steps for Implementing Parallel Sampling for Rapid CATCH Indicators

The following are the steps needed in order to use parallel sampling:

1. Determine number of sample groups
2. Develop questionnaires for each sample group
3. Select communities
4. Determine protocol for household and respondent selection
5. Train interviewers
6. Collect information.

1. Determine the number of sample groups

Examine the denominators of indicators being collected by the survey. Organize indicators into groups of like denominators. For the Rapid CATCH 2007, there are seven sample groups.

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area in order to reach a total of 95 for the entire project area. For example, in the case of four supervision areas, the number of sample points per supervision area would be 24.

Sample Groups for Rapid CATCH Indicators

Sample Groups	Rapid CATCH Indicator
Children **0-23 months**	**Maternal and Newborn Care**
	• Percentage of mothers with children 0-23 months who received at least two Tetanus Toxoid doses before the birth of the youngest child
	• Percentage of children 0-23 months whose births were attended by skilled personnel
	• Percentage of children 0-23 months who received a postnatal visit from an appropriately trained health worker within 3 days after birth
	Malaria
	• Percentage of children 0-23 months who slept under an insecticide-treated bed net (ITN) the previous night
	Water and Sanitation
	• Percentage of households with children age 0-23 months that treat water effectively
	• Percentage of mothers of children age 0-23 months who live in a household with soap at the place for hand washing
	Anthropometrics
	• Percentage of children age 0-23 months who are underweight (-2SD for the median weight for age according to SHO/NCHS reference population.
Children **6-23 months**	**Infant and Young Child Feeding**
	• Percentage of children age 6-23 months fed according to a minimum of appropriate feeding practices
	Vitamin A supplementation
	• Percentage of children age 6-23 months who received a dose of vitamin A in the last 6 months; card verified or mother's recall
Children **12-23 months**	**Immunization**
	• Percentage of children aged 12-23 months who received measles vaccine according to the vaccination card or mother's recall by the time of the survey
	• Percentage of children aged 12-23 months who received DPT1 according to the vaccination card or mother's recall by the time of the survey
	• Percentage of children aged 12-23 months who received DPT3 according to the vaccination card or mother's recall by the time of the survey
Children 0-5 months	**Breastfeeding**
	• Percentage of children 0-5 months who were exclusively given breast milk the day prior to the interview

Children with fever during the previous 2 weeks	Malaria
	• Percentage of children age 0-23 months with a febrile episode during the last 2 weeks who were treated with an effective anti-malarial drug within 24 hours after the fever began
Children with diarrhea during the previous 2 weeks	Control of Diarrhea
	• Percentage of children age 0-23 months with diarrhea in the last 2 weeks who received oral rehydration solution (ORS) and/or recommended home fluids
Children with cough or difficult breathing during the previous 2 weeks	Acute Respiratory Infections
	• Percentage of children age 0-23 months with chest relate-cough and fast and/or difficult breathing in the last 2 weeks who were taken to an appropriate health provider

2. *Develop questionnaires for each sample group*

In the case of the Rapid CATCH 2007, seven questionnaires are needed. (A separate questionnaire is needed for each sample group.)

- For each sample group, create a questionnaire that has questions relevant to those indicators. Start out by developing a questionnaire for mothers of children 0-23 months that has questions that can be asked of all mothers. This will include questions on maternal and newborn health, ITN use, water and sanitation, and anthropometrics.

- Next, develop the questionnaire for 6-23 months and continue with the other sample groups. See the table above for Rapid CATCH questions to include in each questionnaire. In addition to the Rapid CATCH questions, include questions from the KPC modules or other indicators that are important to the project that pertain to that sample group.

- Make sure that each questionnaire has room to record interviewer and respondent identification information and consent information.

Interviewers must fill out one set of questionnaires that includes all the sample groups for each community that is part of the survey. It is important for supervisors to organize the questionnaires so that the interview team that works in each community has one questionnaire from each sample group to fill out.

It is also important to remember to ask each mother interviewed for her consent and this must be recorded on a questionnaire.

3. Select communities

The selection of communities to be included in the survey follows the procedure described in the Participants Workbook and Manual of *Assessing Community Health Programs Using LQAS for Baseline Surveys and Regular Monitoring*, pages PM 33-40. This section describes how to use probability proportional to size sampling to select 19 communities in each supervision area. This is a five-step process—

1. List the communities and total population for each community
2. Calculate the cumulative population
3. Calculate the sampling interval (total cumulative population/19)
4. Choose a random number that is less than or equal to the sampling interval
5. Beginning with the random number, add the sampling interval to identify communities for the 19 sets of interviewers.

The community that contains this last number is included in the sample. This process is repeated for each supervision area. The result is a list of 19 communities in each supervision area. Communities are included in the survey if the sampling interval, added to the previous number (starting with the random number) falls within the cumulative population for the community. Questionnaires for each sample group will be applied to the same list of communities.

4. Determine protocol for household and respondent selection

The process for household selection is aimed at choosing as randomly as possible the first household to be interviewed. For parallel sampling, choose the first household using the procedure described on pages PM 41-51 of the Participants Workbook and Manual of *Assessing Community Health Programs Using LQAS for Baseline Surveys and Regular Monitoring*. This procedure is the same as the one used when there is only one sample group and, therefore, no need for parallel sampling. This LQAS workbook and manual provides instructions for either numbering all the houses in a community and selecting one randomly or using the spin-the-bottle technique for choosing the first household. The manual also instructs the survey team to divide communities that have 30 or more households into 2-5 areas, then select one area randomly and proceed to select a household in this area by either numbering all the households or by using the spin-the-bottle technique.

The spin-the-bottle technique has the following five steps:[8]

1. Clearly identify the village boundaries.

2. Go to the population center (not necessarily the geographic center) of the village, as best as you can locate it—with the help of the village leader, if possible. This allows a more equal chance for any household to be chosen.

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[8] This procedure is described in the KPC TOST Learning Session 14: Community/household/informant selection, pages 103-109 of trainer's guide.

3. Using a flat surface, spin a pen or a bottle. The direction it points is the direction you will use to choose the first household.

4. Walk along the chosen line and count all of the households along that line (e.g., 3 meters on either side of the line) until you reach the boundary of the village.

5. Choose a random number from the 1-X number of households you counted, using folded slips of paper, a currency note, etc. Return to the household represented by that number. That is the starting household.

Once you have identified the first household, the following protocol is recommended:

- At the first household, ask if a child 0-23 months lives there and if the mother also lives there. If no child of this age range lives in the house move to the house with the nearest door to the door of the first house and again ask if a child 0-23 months lives there and if the mother also lives there.

- At the first household with a child in the appropriate age range, ask all the questions on the questionnaire for mothers of children 0-23 months. Then ask questions on the questionnaire pertaining to one of the other sample groups based on the age of that child. For example, if the first child is 13 months old, then the interviewer should fill out the questionnaire for mothers of children 0-23 months. Next, fill out the questionnaire for children 12-23 months. After that, ask if the child had fever,[9] diarrhea, or cough with fast and/or difficult breathing in the last 2 weeks. If the child was ill with any of these illnesses, then fill out the appropriate illness questionnaire.

- After finishing all relevant questionnaires to the first household, identify the questionnaires that still need to be completed (other sample groups or missing illnesses). Proceed to the house with the nearest door to the door of the first house and ask if there is a child 0-23 months. If so, identify the age of the child and determine whether or not that child meets the criteria for any of the questionnaires that remain to be completed (either age-specific or illness-specific). Use the instruments that match the age or illness profile of the child, if any. After this, continue on to the next nearest household if there are any questionnaires that still need to be completed. Continue this process until all questionnaires have been completed. This means that a child in each sample age group and with each illness has been identified and each questionnaire is completed.

- If the community is very small and the interviewer has exhausted all the households in the community, then move to the nearest community, find the nearest household to the original community, and continue the interviews.

- In the case of two appropriate children being present at the initial household, one child is selected randomly and the mother is interviewed about that child using all the appropriate questionnaires. Afterwards, the interviewer can interview the same mother about the second child using questionnaires for sample groups that were *not applied* to the first

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[9] For non-malaria areas, do not apply the questionnaire about fever in the last 2 weeks.

child. For example, if two children 0-23 months (one is 23 months and the other is 4 months) live in the first household, the interviewer randomly selects one child. If this child is the 4-month-old, then the interviewer fills out questionnaires for 0-23 months and 0-5 months. The interviewer then asks if this child was ill in the last 2 weeks. If the child was not ill, then the interviewer proceeds to ask about the 23-month-old child. The interviewer applies questionnaires for 6-23 and 12-23 months for the second child. If this child was also ill with diarrhea in the last 2 weeks, then this questionnaire is also filled out. At the end of the session with this household, the only questionnaires left to fill out in the community are (1) ill with fever in the last 2 weeks, and (2) ill with cough and fast and/or difficult breathing.

- o Note that the application in one household of these questionnaires, *each one of which collects different information,* does not introduce bias into the sample. This is because the household was selected randomly as required by LQAS and because a mother was only asked once about questions for each indicator, even though some of these questions were asked about a child with one age and other questions were asked about a child of a different age. This would not be the case if two questionnaires about the same indicators (e.g., control of diarrhea) were applied in the same household for children of different ages.

- o It is important to remember that two children from the same sample group cannot be interviewed in the same household. In the previous example, if both children had fever during the previous 2 weeks, the malaria questionnaire is applied only to one child.

In following this protocol, it is important to remember that it is necessary to obtain one answer to each question in each sample group questionnaire for each community. This is then repeated for each community in the supervision area. Because 19 communities will be sampled for each supervision area, there will be a total of 19 answers to each question in each sample group questionnaire in each supervision area. If you have five supervision areas, this will result in 95 answers to each question in each sample group questionnaire for the entire project area.

This protocol must be adapted to the local situation. For example, if mothers are only home in the evening, then surveys must be conducted in the evening. Decisions must also be made as to how long to wait to return to a household if an appropriate mother and child live there, but are away. These are the same issues faced during surveys that do not involve parallel sampling.

5. *Train interviewers*

Interview training must ensure that interviewers have a good understanding of the household and respondent selection protocol. They must practice choosing the first household in a community and then households with children from the remaining sample groups. A good way to practice is to use cards with different household possibilities. Some interviewers participating in the training can hold the cards and pretend to be inhabitants of those households, while another interviewer

practices going from house to house until questionnaires for all sample groups have been filled out. The following households should be included in this list:

1. House with no children 0-23 months
2. House with child 12-23 months
3. House with child 6-23 months
4. House with child 0-11 months
5. House with child 0-5 months
6. House with child 0-23 months who had fever during the last 2 weeks
7. House with child 0-23 months who had diarrhea during the last 2 weeks
8. House with child 0-23 months who had cough with fast and/or difficult breathing during the last 2 weeks

Because using LQAS to collect Rapid CATCH information requires seven separate questionnaires, it is challenging for interviewers to keep track of the questionnaires. Therefore, during the training it is a good idea to practice conducting a complete set of interviews in a community in order to ensure that the interviewers and supervisors understand the process.

6. Collect information

Information is collected following the protocols for community and household selection described above. The interview team must bring one of each of the seven questionnaires to each community. During this process, it is important for supervisors to ensure that one (and not more than one) questionnaire for each sample groups is filled out in each community. The interviewer must make sure that each mother gives her consent for the interview. Therefore, a consent section must be filled out for each mother interviewed. Also, each filled-out questionnaire must contain information that identifies the interviewer and the respondent.