

Infant Feeding Key Indicator Monitoring Manual



September 2006



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Developed by LINKAGES

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Adapted from

A Trainer's Guide for Baseline Surveys and Regular Monitoring
Using LQAS for Assessing Field Programs in Community
Health in Developing Countries
December 2001
(NGO Networks for Health)

A Participant's Manual for Baseline Surveys and Regular Monitoring
Using LQAS for Assessing Field Programs in Community
Health in Developing Countries
December 2001
(NGO Networks for Health)

Knowledge, Practices, and Coverage Survey 2000+
FIELD GUIDE
August 2001
(The Child Survival Technical Support Project)

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Table of Contents

| | |
|--|-----------|
| MONITORING OF KEY BREASTFEEDING AND INFANT FEEDING BEHAVIOR CHANGE INDICATORS USING LOT QUALITY ASSURANCE SAMPLING (LQAS) | 1 |
| INDICATORS | 3 |
| DEFINITIONS OF INDICATORS | 3 |
| CALCULATING AGE | 3 |
| USES OF SURVEYS | 5 |
| LOT QUALITY ASSURANCE SAMPLING (LQAS) | 6 |
| DETERMINING KEY BEHAVIOR CHANGE INDICATOR RATES USING LQAS | 8 |
| SAMPLING INSTRUCTIONS: LQAS MONITORING SYSTEM | 23 |
| IDENTIFYING LOCATIONS FOR INTERVIEWS..... | 24 |
| IDENTIFYING HOUSEHOLD FOR INTERVIEWS | 34 |
| INTERVIEW ETIQUETTE | 37 |
| EFFECTIVE INTERVIEWING TECHNIQUES | 38 |
| HOW TO CALCULATE WEIGHTED COVERAGE AND CONFIDENCE INTERVALS | 40 |

Monitoring of Key Breastfeeding and Infant Feeding Behavior Change Indicators Using Lot Quality Assurance Sampling (LQAS)

Objective: This toolkit is designed to permit organizations to carry out **routine monitoring** of key infant feeding behaviors: Exclusive Breastfeeding, Timely Initiation of Breastfeeding, and Timely Complementary Feeding.

Methodology: Short 2-page questionnaire administered to mothers of infants less than 12 months old during regular supervisory visits using Lot Quality Assurance Sampling (LQAS). Please refer to the brief overview of LQAS on the following page. This is provided as general background to this sampling methodology.

Frequency of Use: It is recommended that, at a minimum, key infant feeding behaviors be monitored annually. The simplicity of monitoring using LQAS permits more frequent use if desired by the implementing agency.

Overview: Monitoring of key infant feeding behaviors by LINKAGES and its partners has traditionally been undertaken using community-based surveys that have required fairly large sample sizes and considerable logistical preparation. In an effort to introduce an inexpensive, easy-to-use and sustainable system to monitor key indicators, LINKAGES proposes this toolkit to its partners. This toolkit is amenable to local adaptation and can be implemented using whatever timeframe is convenient to the organization. The toolkit is meant to be largely self-explanatory and should require minimal internal training.

Monitoring behaviors using LQAS methodology with minimal cost and time requires an existing and functioning supervisory system. The questionnaire is meant to be administered by supervisors during normal visits to their catchment areas. The results can be easily calculated in the field by the supervisor without the aid of a computer.

Monitoring indicators using LQAS methodology will result in two key pieces of information:

- Within the supervision catchment area, by interviewing only 19 mothers (or 38 mothers depending on the indicators to be monitored), it can be determined whether the practice of a given behavior by mothers (e.g., exclusive breastfeeding) is adequate or not adequate. This is useful for determining allocation of time and resources by catchment area. However, a meaningful indicator rate (e.g., the percentage of mothers who exclusively breastfeed) for the catchment area is not possible.
- Aggregated results from five or more supervision catchment areas will provide a meaningful indicator rate for an entire program area. This is useful for monitoring overall program performance for each indicator.

A Brief Overview of LQAS

LQAS's main applications in child survival are service adequacy, coverage, and quality. Reported applications present LQAS as a practical, relatively low-cost field method that is increasingly being applied in health programs. The method has been used to assess immunization coverage, women's health issues such as family planning and antenatal care, use of ORT, disease incidence, and evaluation of health worker performance, in urban zones, rural areas, or on a national scale, in over 32 countries and the five continents. Lots have been defined as health center catchment areas, townships, villages, districts or zones in a city or within a province. Physicians or individual community workers have also been considered as lots in at least five surveys. Total sample sizes are reported from 70 to 25,230

Management information at the peripheral level

The first strength of LQAS is in providing information at the local level, which the supervisors can use immediately to assess either the performance of health workers, or local levels of coverage, knowledge and practices (whether above or below a certain prevalence). Conducting the baseline KPC survey, rather than a one-time exercise, becomes basis for establishing a health information system for the project. Comparisons can be made between service areas. Data gathering can be decentralized at the level of the supervisors, and be used rapidly through a decision process defined *a priori*. The literature offers examples of how the method can be integrated into supervision systems.

Regional level coverage estimates by aggregating local data

The estimates at the local level are based on too small a sample to provide a useful level of precision, but they can be aggregated (and weighed according to the respective size of each zone) to provide a reliable regional estimate of coverage (or performance, whichever has been under investigation).

In summary:

- LQAS is a sampling strategy designed to guide management decisions, and answer with confidence whether specific areas perform below or above a determined threshold.
- The risk of error— as in all statistical procedures – is determined beforehand, by the manager/evaluator.
- Because it does not attempt to provide precise estimates at the local level, but only to answer a Yes/No question, LQAS allows working with small samples.
- In fact, sample sizes of 19 (19 households, 19 health workers, 19 activities performed by a health worker) offer a high level of precision for decision-making. When all areas under study perform above expectation, the LQAS decision rule loses its value as a way to differentiate high and low performance areas.

Let us imagine that the expected level of performance for measles coverage in all our supervision-areas is 70%. A 19:9 decision rule (meaning that nine non-immunized children would be "accepted" in each sample of 19 children randomly selected from one supervision-area) will allow us to discriminate low from high coverage areas with a high specificity. But if all supervision-areas are achieving 70% coverage, all samples will have no more than nine non-immunized children, and no management decision will be made from the results. Having chosen a sample size of 19 it will, however, be possible to change our decision rule to 19:7 for example, and thus differentiate supervision areas based on an expected coverage of 80%.

A sample size of 19 allows the manager to retrospectively change the thresholds of acceptable performance, change the number of acceptable errors accordingly, and conduct a test on more stringent standards, in order to define which areas require additional management support.

Data collected at the local level can be weighed and aggregated to provide a reliable regional-level estimate. Because LQAS is very similar to a direct random sampling strategy, it does not have a design effect, and can provide a more precise estimate than cluster sampling methods.

Indicators

- Exclusive breastfeeding rate (EBR) of infants 0-<6 months
- Timely initiation of breastfeeding rate (TIBR)
- Timely complementary feeding rate of appropriately dense foods of children 6-<10 months (TCFR)
- Lactational amenorrhea method (LAM) rate (LAR)

Definitions of Indicators

Exclusive breastfeeding: the percent of infants aged 0-<6 months who were exclusively breastfed in the previous 24 hours. An infant is considered to be exclusively breastfed if he/she receives only breastmilk with no other liquids or solids, with the exception of drops or syrups consisting of vitamins, mineral supplements, or medicines.

Timely initiation of breastfeeding: the percent of infants aged 0-<12 months who were put to the breast within one hour of birth.

Timely complementary feeding rate: the percent of children aged 6-<10 months who are breastfed AND who have received semi-solid and/or solid foods in the previous 24 hours.

LAM rate: the percent of mothers of infants aged 0-<6 months who say they practice LAM as a birth control method.

Calculating Age

See Age Conversion Chart on following page.

Age Conversion Chart for Children Less Than 12 Months Old

| MONTH OF BIRTH | MONTH OF INTERVIEW | | | | | | | | | | | | | | | | | | | | | | | |
|----------------|--------------------|-----------|---------------|-----------|---------------|-----------|---------------|-----------|---------------|-----------|---------------|-----------|---------------|-----------|---------------|-----------|---------------|-----------|---------------|-----------|---------------|-----------|---------------|-----------|
| | January | | February | | March | | April | | May | | June | | July | | August | | September | | October | | November | | December | |
| | B-day not yet | Had B-day | B-day not yet | Had B-day | B-day not yet | Had B-day | B-day not yet | Had B-day | B-day not yet | Had B-day | B-day not yet | Had B-day | B-day not yet | Had B-day | B-day not yet | Had B-day | B-day not yet | Had B-day | B-day not yet | Had B-day | B-day not yet | Had B-day | B-day not yet | Had B-day |
| January | 0 (11) | N/A | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 7 | 7 | 8 | 8 | 9 | 9 | 10 | 10 | 11 |
| February | 10 | 11 | 0 (11) | N/A | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 7 | 7 | 8 | 8 | 9 | 9 | 10 |
| March | 9 | 10 | 10 | 11 | 0 (11) | N/A | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 7 | 7 | 8 | 8 | 9 |
| April | 8 | 9 | 9 | 10 | 10 | 11 | 0 (11) | N/A | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 7 | 7 | 8 |
| May | 7 | 8 | 8 | 9 | 9 | 10 | 10 | 11 | 0 (11) | N/A | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 7 |
| June | 6 | 7 | 7 | 8 | 8 | 9 | 9 | 10 | 10 | 11 | 0 (11) | N/A | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 |
| July | 5 | 6 | 6 | 7 | 7 | 8 | 8 | 9 | 9 | 10 | 10 | 11 | 0 (11) | N/A | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| August | 4 | 5 | 5 | 6 | 6 | 7 | 7 | 8 | 8 | 9 | 9 | 10 | 10 | 11 | 0 (11) | N/A | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 |
| September | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 7 | 7 | 8 | 8 | 9 | 9 | 10 | 10 | 11 | 0 (11) | N/A | 0 | 1 | 1 | 2 | 2 | 3 |
| October | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 7 | 7 | 8 | 8 | 9 | 9 | 10 | 10 | 11 | 0 (11) | N/A | 0 | 1 | 1 | 2 |
| November | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 7 | 7 | 8 | 8 | 9 | 9 | 10 | 10 | 11 | 0 (11) | N/A | 0 | 1 |
| December | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 7 | 7 | 8 | 8 | 9 | 9 | 10 | 10 | 11 | 0 (11) | N/A |

“B-day” refers to monthly birthdays. For example, if the child is born on January 15 and the date of the interview is February 14, then this child has not yet had a birthday this month and the age would be recorded as 0. If the child is born on January 15 and the date of the interview is March 14, then this child has not yet had a birthday in the month and would be recorded as being 1 month old. But if the interview were March 15, the child would be 2 months old.

Note: 0 (11) means either 0 months old or 11 months old, depending on whether the child was born in the current month or about a year ago.

Uses of Surveys

Identify health knowledge and practices with:

1. **Large differences in coverage between supervision areas (SAs).**

- Identify the low coverage SAs to be able to:
 - Learn causes of low coverage.
 - Focus our efforts and resources on these SAs.
 - Improve coverage of the whole NGO program area by improving coverage in these SAs.
- Identify high coverage SAs to be able to:
 - Study and learn what is working well in these SAs.
 - Identify things that can be applied to other SAs.

2. **Little difference in coverage between SAs.**

- If coverage is generally high, shift resources to improve other health knowledge and practices.
- If coverage is generally low:
 - Learn causes of low coverage.
 - Identify/study other NGO Program areas to learn what is working well.
 - Identify things that can be applied in own program area.

LOT QUALITY ASSURANCE SAMPLING (LQAS)

LQAS is simply a method for selecting samples for a survey, evaluation, or monitoring system. It is an alternative to other sampling methodologies that usually require large numbers of people to be interviewed. LQAS combines principles of stratified sampling and simple random sampling. In public health settings, a sample size of 19 has become standard for reasons cited below.

Why Use a Sample of 19?

- ✓ A sample of 19 provides an acceptable level of error for making management decisions; at least 92% of the time it correctly identifies Supervision Areas that have reached their coverage target.
- ✓ Samples larger than 19 have practically the same statistical precision as 19. They do not result in better information, and they cost more.

What a Sample of 19 Can Tell Us

- ✓ Good for deciding what are the higher performing supervision areas to learn from
- ✓ Good for deciding what are the lower performing supervision areas
- ✓ Good for identifying knowledge/practices that have high coverage from those of low coverage
- ✓ Good for setting priorities among supervision areas with large differences in coverage
- ✓ Good for setting priorities among knowledge/practices within a Supervision Area (if one intervention is high but the other is low, we would concentrate on the low coverage intervention)

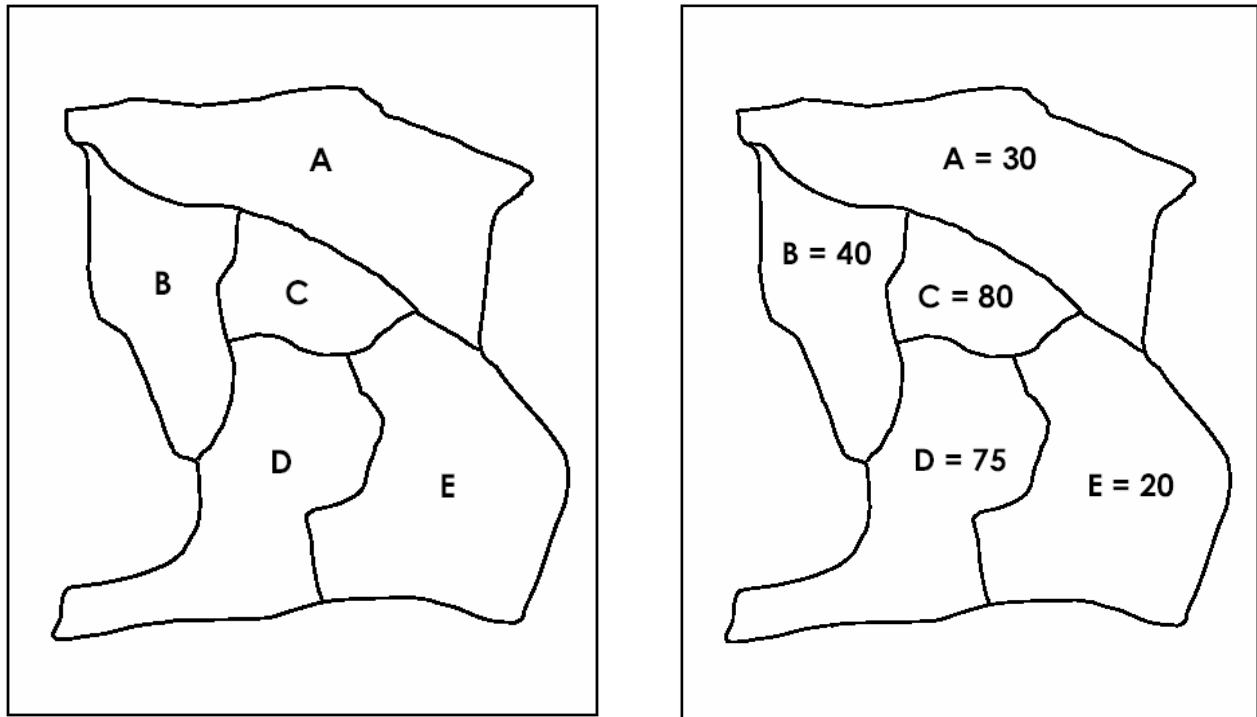
What a Sample of 19 Cannot Tell Us

- ✓ Not good for calculating exact coverage in a Supervision Area (but can be used to calculate coverage for an entire program)
- ✓ Not good for setting priorities among Supervision Areas that have little difference in coverage among them

LQAS Concepts

- ✓ “Average Coverage” for a question/indicator is the number of people in the sample that responded correctly to a question divided by the total number of people responding to that question.
- ✓ The “Decision Rule” tells you whether an individual supervision area reaches the average coverage or is below average coverage. It is also possible to determine a decision rule according to a target set by the project.

Defining Program Catchment Area and Supervision Areas



Together A, B, C, D, and E represent the Program Catchment Area.
A, B, C, D, and E represent 5 Supervision Areas.

NGO PROGRAM: IQAS Results Scenario Supervision Areas: A - E

Indicator: Percent of infants less than 6 months old that are exclusively breastfed.

The image on the right shows an example of the exclusive breastfeeding rate in each of the five supervision areas. Some supervision areas are doing better than others. Although it would be nice to be able to know the true exclusive breastfeeding rate for each supervision area within a program, in reality it is too time-consuming and costly to collect enough data to establish these rates. A survey or monitoring system using LQAS methodology can reliably determine whether a supervision area is doing well or not doing well without determining the exact rate. But LQAS can provide a rate for the indicator for the entire program area by aggregating the results of each supervision area.

Determining Key Behavior Change Indicator Rates Using LQAS

The table below shows an example of LQAS results for a single indicator within a program catchment area. In each of eight supervision areas (SA) a supervisor, during the course of a regular supervision visit to communities, has interviewed 19 randomly selected mothers of infants less than 6 months old using the very brief monitoring questionnaire. The supervisor has calculated the responses and has entered them on a monitoring form that will be described later.

As shown in the example below (Figure 1), the results of the eight supervisors are collected and entered into the form in the second column. To determine the exclusive breastfeeding rate for the entire program area, the total number of correct responses from the second column are added and then divided by the total number of monitoring questionnaires administered. This will give us the rate or “coverage estimate” for the program for this indicator.

Now we would like to determine how well each supervision area is doing. We have two options for evaluating the supervision areas. The choice of which option to use should be made by the program manager. We can either compare supervision areas based on the current coverage estimate or rate based on data just collected, or we can compare them with the expected target rate for the given indicator based on the program workplan.

In Figure 1, supervision areas are being evaluated based on the current estimate, 59.2%. To determine whether the SA is performing adequately or not in relation to the current exclusive breastfeeding rate, we must establish a decision rule. The decision rule is found in the “LQAS Table” below (Figure 3). Because we are using a sample size of 19 per lot, or SA, find the 19 in the column on the left called “sample size”. Then find the coverage % that matches our coverage estimate. Always round up to the nearest interval of 5, or 60% in the case of this example. Find the cell that corresponds to a sample size of 19 and coverage of 60%. You should find a 9, which is our decision rule. Accordingly, for each supervision area with 9 or more correct responses, we write in “Yes” in the last column of the form. This means that that SA is performing adequately in reference to the current coverage estimate (9). For each SA with fewer than 9 correct responses, we write in “No”, indicating that that SA is not performing adequately and may need extra attention. In our example, supervision areas 3 and 7 are not performing adequately.

FIGURE 1

| Indicator: Exclusive Breastfeeding Rate (Infants < 6 months) | # Correct (out of 19) From the Supervision Area Results Table | Exclusive Breastfeeding Rate = <u>59.2%</u> Sum of correct number of responses Number of supervision areas x 19 | Equal to or Above Decision Rule? Yes or No |
|--|---|--|---|
| Supervision Area 1 | 10 | | Yes |
| Supervision Area 2 | 16 | | Yes |
| Supervision Area 3 | 8 | | No |
| Supervision Area 4 | 15 | | Yes |
| Supervision Area 5 | 10 | Decision Rule = <u>9</u> (Using Decision Rule table and Coverage Estimate or Program Target Rate) | Yes |
| Supervision Area 6 | 17 | | Yes |
| Supervision Area 7 | 5 | | No |
| Supervision Area 8 | 9 | | Yes |

Alternately, instead of evaluating supervision areas in reference to the current indicator rate, we can compare them to the target rate set by the program for the time period in which this monitoring exercise takes place. Say that the program expected the exclusive breastfeeding rate to be 70% at the time these monitoring results were collected. Instead of 59.2%, we use 70% to determine the decision rule. Following the same steps described above, we find the cell in the LQAS Table that corresponds to a sample size of 19 and target coverage of 70%. You should find that the decision rule is 11, as shown in Figure 2. As before, write in “Yes” for supervision areas with 11 or more correct responses and “No” for fewer than 11 correct responses. When compared to the program target rate, we find that supervision areas 1, 3, 5, 7, and 8 are not performing adequately.

What does this tell us? Given the fact that most SA’s do not seem to be doing well, we can conclude one of several things. Either the program is being overly ambitious in setting its target rate for exclusive breastfeeding, or there may be program-wide discrepancies in how the behavior change strategies are being implemented. It is also possible that health workers in most areas perform poorly, unrelated to the training they have received or the strategy of the program, but this would have to be determined through other means beyond the scope of this simple monitoring system.

FIGURE 2

| Indicator: Exclusive Breastfeeding Rate (Infants < 6 months) | # Correct (out of 19) From the Supervision Area Results Table | Exclusive Breastfeeding Rate = <u>70%</u> Sum of correct number of responses Number of supervision areas x 19 | Equal to or Above Decision Rule? Yes or No |
|--|---|--|---|
| Supervision Area 1 | 10 | | No |
| Supervision Area 2 | 16 | | Yes |
| Supervision Area 3 | 8 | Decision Rule = <u>11</u> (Using Decision Rule table and Coverage Estimate or Program Target Rate) | No |
| Supervision Area 4 | 15 | | Yes |
| Supervision Area 5 | 10 | | No |
| Supervision Area 6 | 17 | | Yes |
| Supervision Area 7 | 5 | | No |
| Supervision Area 8 | 9 | | No |

FIGURE 3

Optimal LQAS Decision Rules for Sample Sizes of 12-30
For Coverage Benchmarks or Average Coverage of 10-95%

| Sample Size | Annual Coverage Benchmarks (for Monitoring and Evaluation) or Average Coverage (Baselines, Monitoring and Evaluation) | | | | | | | | | | | | | | | | | |
|-------------|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | 10% | 15% | 20% | 25% | 30% | 35% | 40% | 45% | 50% | 55% | 60% | 65% | 70% | 75% | 80% | 85% | 90% | 95% |
| 12 | na | na | 1 | 1 | 2 | 2 | 3 | 4 | 5 | 5 | 6 | 7 | 7 | 8 | 8 | 9 | 10 | 11 |
| 13 | na | na | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 6 | 7 | 8 | 8 | 9 | 10 | 11 | 11 |
| 14 | na | na | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 7 | 8 | 8 | 9 | 10 | 11 | 11 | 12 |
| 15 | na | na | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 6 | 7 | 8 | 9 | 10 | 10 | 11 | 12 | 13 |
| 16 | na | na | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 9 | 10 | 11 | 12 | 13 | 14 |
| 17 | na | na | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 18 | na | na | 1 | 2 | 2 | 3 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 11 | 12 | 13 | 14 | 16 |
| 19 | na | na | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 20 | na | na | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 21 | na | na | 1 | 2 | 3 | 4 | 5 | 6 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 16 | 17 | 18 |
| 22 | na | na | 1 | 2 | 3 | 4 | 5 | 7 | 8 | 9 | 10 | 12 | 13 | 14 | 15 | 16 | 18 | 19 |
| 23 | na | na | 1 | 2 | 3 | 4 | 6 | 7 | 8 | 10 | 11 | 12 | 13 | 14 | 16 | 17 | 18 | 20 |
| 24 | na | na | 1 | 2 | 3 | 4 | 6 | 7 | 9 | 10 | 11 | 13 | 14 | 15 | 16 | 18 | 19 | 21 |
| 25 | na | 1 | 2 | 2 | 4 | 5 | 6 | 8 | 9 | 10 | 12 | 13 | 14 | 16 | 17 | 18 | 20 | 21 |
| 26 | na | 1 | 2 | 3 | 4 | 5 | 6 | 8 | 9 | 11 | 12 | 14 | 15 | 16 | 18 | 19 | 21 | 22 |
| 27 | na | 1 | 2 | 3 | 4 | 5 | 7 | 8 | 10 | 11 | 13 | 14 | 15 | 17 | 18 | 20 | 21 | 23 |
| 28 | na | 1 | 2 | 3 | 4 | 5 | 7 | 8 | 10 | 12 | 13 | 15 | 16 | 18 | 19 | 21 | 22 | 24 |
| 29 | na | 1 | 2 | 3 | 4 | 5 | 7 | 9 | 10 | 12 | 13 | 15 | 17 | 18 | 20 | 21 | 23 | 25 |
| 30 | na | 1 | 2 | 3 | 4 | 5 | 7 | 9 | 11 | 12 | 14 | 16 | 17 | 19 | 20 | 22 | 24 | 26 |

na: not applicable, meaning LQAS cannot be used in this assessment because the coverage is either too low or too high to assess an SA.

Notes: α and β errors < 10% for all decision rules except where noted. Lightly shaded cells indicate where α or β errors are $\geq 10\%$.

Darker cells indicate where α or β errors are $\geq 15\%$.

Optimal LQAS Decision Rules for Sample Sizes of 31-50
For Coverage Benchmarks or Average Coverage of 10-95%

| Sample Size | Annual Coverage Benchmarks (for Monitoring and Evaluation) or Average Coverage (Baselines, Monitoring and Evaluation) | | | | | | | | | | | | | | | | | |
|-------------|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | 10% | 15% | 20% | 25% | 30% | 35% | 40% | 45% | 50% | 55% | 60% | 65% | 70% | 75% | 80% | 85% | 90% | 95% |
| 31 | na | 1 | 2 | 3 | 4 | 6 | 8 | 9 | 11 | 13 | 14 | 16 | 18 | 19 | 21 | 23 | 24 | 26 |
| 32 | na | 1 | 2 | 3 | 5 | 6 | 8 | 10 | 11 | 13 | 15 | 17 | 18 | 20 | 22 | 23 | 25 | 27 |
| 33 | na | 1 | 2 | 3 | 5 | 6 | 8 | 10 | 12 | 13 | 15 | 17 | 19 | 21 | 22 | 24 | 26 | 28 |
| 34 | na | 1 | 2 | 4 | 5 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 19 | 21 | 23 | 25 | 27 | 29 |
| 35 | na | 1 | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 |
| 36 | na | 1 | 3 | 4 | 5 | 6 | 9 | 11 | 13 | 15 | 17 | 19 | 20 | 22 | 24 | 26 | 28 | 31 |
| 37 | 1 | 2 | 3 | 4 | 6 | 7 | 9 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 25 | 27 | 29 | 31 |
| 38 | 1 | 2 | 3 | 4 | 6 | 7 | 9 | 11 | 13 | 15 | 17 | 20 | 22 | 24 | 26 | 28 | 30 | 32 |
| 39 | 1 | 2 | 3 | 5 | 6 | 7 | 9 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 31 | 33 |
| 40 | 1 | 2 | 3 | 5 | 6 | 7 | 10 | 12 | 14 | 16 | 18 | 21 | 23 | 25 | 27 | 29 | 32 | 34 |
| 41 | 1 | 2 | 3 | 5 | 7 | 7 | 10 | 12 | 14 | 17 | 19 | 21 | 23 | 25 | 28 | 30 | 32 | 35 |
| 42 | 1 | 2 | 3 | 5 | 7 | 7 | 10 | 12 | 15 | 17 | 19 | 22 | 24 | 26 | 28 | 31 | 33 | 36 |
| 43 | 1 | 2 | 4 | 5 | 7 | 8 | 10 | 13 | 15 | 17 | 20 | 22 | 24 | 27 | 29 | 31 | 34 | 37 |
| 44 | 1 | 2 | 4 | 5 | 7 | 8 | 11 | 13 | 15 | 18 | 20 | 23 | 25 | 27 | 30 | 32 | 35 | 37 |
| 45 | 1 | 2 | 4 | 6 | 7 | 8 | 11 | 13 | 16 | 18 | 21 | 23 | 25 | 28 | 30 | 33 | 35 | 38 |
| 46 | 1 | 2 | 4 | 6 | 8 | 8 | 11 | 14 | 16 | 19 | 21 | 24 | 26 | 28 | 31 | 33 | 36 | 39 |
| 47 | 1 | 2 | 4 | 6 | 8 | 8 | 11 | 14 | 16 | 19 | 22 | 24 | 27 | 29 | 32 | 34 | 37 | 40 |
| 48 | 1 | 3 | 4 | 6 | 8 | 8 | 11 | 14 | 17 | 19 | 22 | 25 | 27 | 30 | 32 | 35 | 38 | 41 |
| 49 | 1 | 3 | 4 | 6 | 8 | 9 | 12 | 14 | 17 | 20 | 22 | 25 | 28 | 30 | 33 | 36 | 39 | 42 |
| 50 | 1 | 3 | 5 | 7 | 9 | 9 | 12 | 15 | 18 | 20 | 23 | 26 | 28 | 31 | 34 | 36 | 39 | 42 |

na: not applicable, meaning LQAS cannot be used in this assessment because the coverage is either too low or too high to assess an SA.

Notes: α and β errors < 10% for all decision rules.

Tabulating Results from the Monitoring Questionnaire

At the end of each questionnaire is an analysis section (shown below) where the person who administered the questionnaire can calculate the key indicators. This section provides a key to determine whether a behavior was performed correctly or not.

Timely Initiation of Breastfeeding

To determine if a mother initiated breastfeeding within the first hour of birth of her child, Question 7 must be “0”. If this is the case, you would circle “Yes” for Question 15.

If the response for Question 7 is “1” or higher, then circle “No”.

Exclusive Breastfeeding

To determine if a mother is exclusively breastfeeding her infant 0-<6 months old, the questionnaire must indicate that the response for Question 11A is “Yes” and that every response for Questions 11B to 11J are “No”. If this is the case, circle “Yes” for Question 16.

If for any one of Questions 11B through 11J there is a “Yes”, or if Question 11A is “No”, then circle “No”.

Timely Complementary Feeding

To determine if a mother of an infant 6-<10 months old is practicing complementary feeding, the questionnaire must indicate that the response for Question 11A is “Yes” plus at least one of Questions 11G, 11H, 11I, or 11J must be “Yes”. If this is the case, circle “Yes” for Question 17.

If Question 11A is “No” or all four of Questions 11G through 11J are “No”, then circle “No”.

Lactational Amenorrhea Method

To determine if a mother of an infant 0-<6 months old is practicing LAM, the questionnaire must indicate that the response for Question 13 is “Yes”. If this is the case, circle “Yes” for Question 18.

If Question 13 is “No”, then circle “No”

SECTION 3: ANALYSIS

FROM SECTION 2, INDICATE BELOW WHETHER THE REQUIRED BEHAVIOUR WAS PERFORMED.

| | | | |
|----|--|--------|-------|
| 15 | Was breastfeeding timely initiated (That is Q7 = 00 hours) TIBF | 1. Yes | 0. No |
| 16 | If the child is less than 6 months, is he/she exclusively breastfed (That is Q11A = Yes and Q11b - Q11J = No) EBR | 1. Yes | 0. No |
| 17 | If the child is 6-9 months, has complementary feeding started (That is Q11A = Yes and any one or more of Q11G – Q11J = Yes) TICF | 1. Yes | 0. No |
| 18 | If child is less than 6 months, does mother use LAM? (Q13 = 1) | 1. Yes | 0. No |

Once all questionnaires have been administered and analyzed, the results will be recorded on Monitoring Form 1, which is described following the sample questionnaire.



MONITORING BREASTFEEDING AND COMPLEMENTARY FEEDING BEHAVIORS

MOTHERS OF CHILDREN UNDER 12 MONTHS OF AGE

(Verify that the child is less than 12 months old and continue. If the child is exactly 12 months or older, thank the mother and discontinue the interview)

| | |
|---------------------|---------------------|
| Form number: _____ | Village: _____ |
| District: _____ | House number: _____ |
| Sub-district: _____ | NGO: _____ |

Name of Supervisor: _____ Signature _____

Date of interview.....

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| d | d | m | m | y | y | y | y |

Notes: Please record any observations you made during the interview in this space.

SECTION 1: BACKGROUND

FIRST, I WANT TO ASK YOU A FEW QUESTIONS ABOUT YOURSELF AND YOUR YOUNGEST CHILD.

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|--|--|---|---|---|---|---|---|---|---|
| 1 | What is your youngest child's name? <i>(use this name in remaining questions)</i> | | | | | | | | | | | | | | | | |
| 2 | How old is (name of child)? Record age in completed months. months | | | | | | | | | | | | | | | | |
| 3 | Date of birth of child | | | | | | | | | | | | | | | | |
| | <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> <tr> <td>d</td> <td>d</td> <td>m</td> <td>m</td> <td>y</td> <td>y</td> <td>y</td> <td>y</td> </tr> </table> | | | | | | | | | d | d | m | m | y | y | y | y |
| | | | | | | | | | | | | | | | | | |
| d | d | m | m | y | y | y | y | | | | | | | | | | |
| 4 | Date of birth verified using child growth card/available record? 1. Yes 2. No | | | | | | | | | | | | | | | | |
| 5 | Sex of child 1. Boy 2. Girl | | | | | | | | | | | | | | | | |

SECTION 2: FEEDING HISTORY

NOW I'D LIKE TO ASK YOU SPECIFIC QUESTIONS ABOUT THE THINGS (NAME OF CHILD) EATS OR DRINKS.

| | | |
|---|---|-----------------------------------|
| 6 | Have you ever breastfed (name of child)? | 1. Yes 2. No Skip to 11 |
| 7 | How long after birth did you put (name of child) to the breast? <i>If "immediately" or less than 1 hour, record "00" hours. If less than 24 hours, record hours. Otherwise, record days.</i> | _____ Hours _____ Days |

| | | |
|---|---|--|
| 8 | Before putting (name of child) to the breast for the first time after delivery, did you offer anything apart from your breastmilk to (name of child) to eat or drink? | 1. Yes 2. No Skip to 10 |
| 9 | If yes, what did you offer (name of child) to eat or drink | 1. Plain water or with additives 2. Milk from a wet nurse 3. Other (specify)..... |
| 10 | Are you still breastfeeding (name of child)? | 1. Yes 2. No |
| 11 | Since this time yesterday, has (name of child) received (insert each item here)? | |
| A | Breastmilk | 1. Yes 2. No |
| B | Plain water | 1. Yes 2. No |
| C | Teas, millet water, fruit juice, sweetened water, herbal teas, etc. | 1. Yes 2. No |
| D | Milk (fresh cow milk, tin milk, baby formula, other) | 1. Yes 2. No |
| E | ORS | 1. Yes 2. No |
| F | Other liquids | 1. Yes 2. No |
| G | Fruits | 1. Yes 2. No |
| H | Semi-solid foods (koko, tom brown, rice water, weanimix, cerelac, soup) | 1. Yes 2. No |
| I | Solids or mushy foods (meat, fish, eggs, beans, nuts, yam, kenkey, rice, potatoes, petepete, yama, stew, etc) | 1. Yes 2. No |
| J | Other semi-solid foods, solids | 1. Yes 2. No |
| SECTION 3: LAM | | |
| NOW I'D LIKE TO ASK YOU SPECIFIC QUESTIONS ABOUT BIRTH SPACING. | | |
| 12 | Are you currently doing something or using any method to delay or avoid getting pregnant? | 1. Yes 2. No Skip to 14 |
| 13 | Which method are you currently using? | Lactational Amenorrhea Method 1 Female Sterilization 2 Male Sterilization 3 Pill 4 IUD 5 Injections 6 Condom 7 Diaphragm 8 Periodic Abstinence 9 Withdrawal 10 Other (specify): _____ 11 |
| 14 | Have you heard of LAM? | 1. Yes 2. No |

(CHECK THE QUESTIONNAIRE TO MAKE SURE THAT ALL RESPONSES HAVE BEEN PROVIDED)

**Thank you very much for your time and for helping us
as we try to make children's health better.
Do you have any questions for me?**

SECTION 3: ANALYSIS

FROM SECTION 2, INDICATE BELOW WHETHER THE REQUIRED BEHAVIOUR WAS PERFORMED.

| | | | |
|----|--|--------|-------|
| 15 | Was breastfeeding timely initiated (That is Q7 = 00 hours) TIBF | 1. Yes | 0. No |
| 16 | If the child is less than 6 months, is he/she exclusively breastfed (That is Q11A = Yes and Q11b - Q11J = No) EBR | 1. Yes | 0. No |
| 17 | If the child is 6-9 months, has complementary feeding started (That is Q11A = Yes and any one or more of Q11G – Q11J = Yes) TICF | 1. Yes | 0. No |
| 18 | If child is less than 6 months, does mother use LAM? (Q13 = 1) | 1. Yes | 0. No |

Monitoring Form 1

Once all questionnaires are completed and analyzed, the supervisor should complete Monitoring Form 1. This is useful for the supervisor to determine instantly how well the SA is doing for each indicator in reference to the respective program target rates. It is necessary that the supervisor know what the target rate is for each indicator, after which the decision rule can be determined as explained previously in this document. The supervisor can then determine if the SA is performing adequately or not adequately for each of the indicators.

Monitoring Form 1: Key Indicator Monitoring Results

SUPERVISION AREA

| | Indicators | # Correct | Program Target Rate for Indicator | Decision Rule | Equal to or Above Decision Rule? Yes or No |
|----------|--|------------------|--|----------------------|---|
| 1 | Exclusive Breastfeeding Rate (EBR) | (out of 19) | | | |
| 2 | Timely Initiation of Breastfeeding Rate (TIBF) | (out of 38) | | | |
| 3 | Timely Complementary Feeding Rate (TCF) | (out of 19) | | | |
| 4 | LAM Rate (LAR) | (out of 19) | | | |

Monitoring Form 2

Each supervisor will report the results of Monitoring Form 1 to the program manager. The program manager records the results onto Monitoring Form 2 (see the following page), which will provide overall program current coverage estimates (current rates) for each indicator as well as information on which supervision areas are performing adequately in relation to current coverage or to the program target. Instructions on how to use Monitoring Form 2 are given earlier in this document under “Determining Key Behavior Change Indicator Rates Using LQAS”.

The next step is for the program manager to transfer the results from the last column of Monitoring Form 2 to the “**Summary Results of the LQAS Key Indicator Monitoring System**” form. This form allows for an easy way to quickly assess where the program’s strengths and weaknesses are in regards to key Behavior Change and Communication indicators and supervision areas using a set of questions that will help program managers better utilize the results of this monitoring activity and how to use these results to improve program implementation. The form is also an introduction to “**A Guide for Discussion of Results from the LQAS Key Indicator Monitoring System**”, which involves a participatory approach to analyzing strengths and weaknesses of program strategies and can help reorient program activities to ensure that indicator goals are being met overall as well as in individual supervision areas.

Monitoring Form 2: Key Indicator Results by Supervision Area and for Program Area

| Indicator: <i>Exclusive Breastfeeding Rate (Infants < 6 months)</i> | # Correct (out of 19) From the Supervision Area Results Table (Form 1) | Exclusive Breastfeeding Rate = _____ | Equal to or Above Decision Rule? (Yes or No) |
|---|--|--|---|
| Supervision Area _____ | | Sum of correct number of responses Number of supervision areas x 19 | |
| Supervision Area _____ | | | |
| Supervision Area _____ | | Decision Rule = _____ (Using Decision Rule table and Coverage Estimate or Program Target Rate) | |
| Supervision Area _____ | | | |
| Supervision Area _____ | | | |
| Supervision Area _____ | | | |
| Supervision Area _____ | | | |
| Supervision Area _____ | | | |

| Indicator: <i>Timely Initiation of Breastfeeding Rate (Infants < 12 months)</i> | # Correct (out of 38) From the Supervision Area Results Table (Form 1) | Timely Initiation of Breastfeeding Rate = _____ | Equal to or Above Decision Rule? (Yes or No) |
|---|--|--|---|
| Supervision Area _____ | | Sum of correct number of responses Number of supervision areas x 38 | |
| Supervision Area _____ | | | |
| Supervision Area _____ | | Decision Rule = _____ (Using Decision Rule table and Coverage Estimate or Program Target Rate) | |
| Supervision Area _____ | | | |
| Supervision Area _____ | | | |
| Supervision Area _____ | | | |
| Supervision Area _____ | | | |
| Supervision Area _____ | | | |

| Indicator: <i>Timely Complementary Feeding Rate (Infants 6-<10 months)</i> | # Correct (out of 19) From the Supervision Area Results Table (Form 1) | Timely Complementary Feeding Rate = _____ | Equal to or Above Decision Rule? (Yes or No) |
|--|--|--|---|
| Supervision Area _____ | | Sum of correct number of responses Number of supervision areas x 19 | |
| Supervision Area _____ | | | |
| Supervision Area _____ | | Decision Rule = _____ (Using Decision Rule table and Coverage Estimate or Program Target Rate) | |
| Supervision Area _____ | | | |
| Supervision Area _____ | | | |
| Supervision Area _____ | | | |
| Supervision Area _____ | | | |
| Supervision Area _____ | | | |

| Indicator: <i>LAM Rate (Infants < 6 months)</i> | # Correct (out of 19) From the Supervision Area Results Table (Form 1) | LAM Rate = _____ | Equal to or Above Decision Rule? (Yes or No) |
|---|--|--|---|
| Supervision Area _____ | | Sum of correct number of responses Number of supervision areas x 19 | |
| Supervision Area _____ | | | |
| Supervision Area _____ | | Decision Rule = _____ (Using Decision Rule table and Coverage Estimate or Program Target Rate) | |
| Supervision Area _____ | | | |
| Supervision Area _____ | | | |
| Supervision Area _____ | | | |
| Supervision Area _____ | | | |
| Supervision Area _____ | | | |

**Summary Results of the LQAS Key Indicator Monitoring System
(For Program Management Decision-Making)**

From last column of Monitoring Form 2, write Y (yes) or N (no) in cells for corresponding indicators and supervision areas

| Indicators | | SUPERVISION AREA | | | | | | | | RATE |
|------------|--|------------------|--|--|--|--|--|--|--|------|
| | | | | | | | | | | |
| 1 | Exclusive Breastfeeding Rate (EBR) | | | | | | | | | |
| 2 | Timely Initiation of Breastfeeding Rate (TIBF) | | | | | | | | | |
| 3 | Timely Complementary Feeding Rate (TCF) | | | | | | | | | |
| 4 | LAM Rate (LAR) | | | | | | | | | |

1. Which Supervision Areas appear to be performing best for all three indicators?
2. Which Supervision Areas appear to need the most support overall?
3. Which Indicators need improvement across most Supervision Areas (entire program area)?
4. Which Indicators need improvement in only a few Supervision Areas?
5. Which Indicators are doing well across Supervision Areas?
6. For weak Indicators, which Supervision Areas need special attention?
7. From which Supervision Areas could it be useful to learn possible ways to improve weak indicators?

A Guide for Discussion of Results from the LQAS Key Indicator Monitoring System (For Program Management Decision-Making)

Goals:

- Create discussion among program/partner supervisors, managers, and technical coordinators about performance on key indicators overall and by supervision area.
- Reflect on various program inputs and characteristics associated with success in meeting overall indicator targets.
- Share insights among program/partner staff regarding the key to success in program areas.
- Reorient program activities to ensure that indicator goals are being met overall as well as in individual supervision areas.

Considerations:

- LQAS allows for an understanding of whether a particular behavior in a supervision area is adequately meeting a specified target and an estimated rate for the entire program (several supervision areas).
- As the rate cannot be determined in any one supervision area, supervisors will not know how close to their stated target they are.

Challenge

- Examining monitoring results of overall program and individual supervision area performance and encouraging feedback and discussion by program staff regarding the nature of these results.

Process

Preparation before hand:

Materials needed: large sheet of paper, markers, a small piece of paper, blue cards and green cards (any two different color cards will do)

The facilitator should prepare before a large-scale replication on paper or a board of the indicator and supervision area table with program rate indicators at the end of each row. “Y” and “N” should be visible for each supervision area. The program indicator rate should be covered at the end of each row by a piece of paper so that it is not visible to participants.

Step 1: Ask for volunteers to recall the program target for each indicator (if targets are being used). Then ask for several volunteers to guess at what the rates might be and give their reasons for their personal estimate. Ask if other group members agree or disagree with these estimates and probe as to why participants agree or disagree.

Step 2: Reveal the program indicator rates one by one. Ask the participants if the figures come as a surprise or meet expectations. If a surprise, ask “Why?” Also, ask various participants to comment on why this may be the case.

Step 3: Select the first indicator. Give those supervisors whose areas were determined to be adequate one blue card each. Give those supervisors whose areas were not adequate green cards. Split the participants up into two groups, blue and green. Within each small group have participants discuss why they think their supervision area is adequate or not adequate in terms of the specific indicator. Both groups should identify what they perceive to be both contributing factors and constraining factors to the “success” or “failure” of achieving adequate indicator rates. (If additional participants are included in the discussion of the results, divide them between the groups). Ask each group to create a list of reasons as to why their areas were adequate or not.

Step 4: The groups should then present their list of their reasons to one another. Ask participants to comment on why differences exist between those areas that are doing well and those that are not. Ask the teams if there are any reasons listed for the non-adequate areas that also apply to the adequate areas? If yes, ask, “Why even with these obstacles present are the areas doing better than other areas with the same problems?” What are the elements that need to come together to make things work well? Encourage individuals from each group to share their experiences in any one particular area.

Step 5: Move on to the second indicator and repeat steps 3 and 4. Make sure that along with discussion of the second indicator alone that groups touch upon possible different results for the first and second indicator; for example, one supervision area may be adequate in terms of EBR but have problems with complementary feeding. Reasons for why differences are present in any one area should be put on the list as well. Start the group discussion focusing on the second indicator and then move on to ask why there are areas that do well with one indicator but not the other.

Step 6: If there are results for a third indicator, have everyone remain in a group and have the group write on a piece of paper or on the board the reasons for why people think their area is adequate or not in that indicator. Again, share personal experiences and look at why there may be differences within and between areas.

Step 7: After all indicators are discussed, have the group list specific actions that can be taken to improve the target rate overall and in those areas that are not doing well individually. Have participants brainstorm options, and then group the options they give under different headings (e.g. increased collaboration with PVOs/MOH, stress number of feedings in trainings, increased supervision with community volunteers, vehicle coordination, etc.). Have them rank the most vital actions to take or identify “best practices”.

Step 8: Have participants think about where resources and time are currently allocated in the different districts and think about ways to increase the adequacy of a behavior in those areas that are having difficulties. The group as a whole should make an action plan if specific indicators as a whole look weak. Each participant should then make an action plan to address the activities to

be done and how the needs are to be addressed in their supervision area. These should be presented before the group for further feedback, discussion, and encouragement.

Step 9: The program manager and M&E officer for the program/partner organization should keep the action plans and ask about individual progress. These should also be reviewed and progress can be given at subsequent staff/organization meetings.

Summary Results of the LQAS Key Indicator Monitoring System
(For Program Management Decision-Making)

From Monitoring Form 2, write in Y (yes) or N (no) in cells for corresponding indicators and supervision areas

| Indicators | | SUPERVISION AREA | | | | | | | | RATE |
|------------|--|------------------|--|--|--|--|--|--|--|------|
| | | | | | | | | | | |
| 1 | Exclusive Breastfeeding Rate (EBR) | | | | | | | | | |
| 2 | Timely Initiation of Breastfeeding Rate (TIBF) | | | | | | | | | |
| 3 | Timely Complementary Feeding Rate (TCF) | | | | | | | | | |
| 4 | LAM Rate (LAR) | | | | | | | | | |

Group Discussion Questions

1. Which Supervision Areas appear to be performing best for all indicators?
2. Which Supervision Areas appear to need the most support overall?
3. Which Indicators need improvement across most Supervision Areas (entire program area)?
4. Which Indicators need improvement in only a few Supervision Areas?
5. Which Indicators are doing well across Supervision Areas?
6. For weak Indicators, which Supervision Areas need special attention?
7. Which Supervision Areas could be useful to learn possible ways to improve weak indicators?

SAMPLING INSTRUCTIONS: LQAS MONITORING SYSTEM

BACKGROUND: SIMPLE RANDOM SAMPLING

When you randomly select units from the general population, you ensure that every unit has an equal chance of being included in the study. Random sampling involves selecting units based upon chance. If you do not select a random sample, your results might be biased.

In theory, *simple random sampling (SRS)* is the "ideal" way to select units from the general population. However, most studies do not use SRS. One reason is because SRS requires a *sampling frame* (a listing of every unit in the population). With SRS, every unit in the sampling frame is assigned a unique number. Then, a sample is drawn by randomly selecting numbers until you reach the desired sample size. For example, if your project wants to randomly select 300 households, it will need to 1) list every household in the project area, 2) assign a number to each household, and 3) randomly select 300 numbers. If the project wants to select 300 individuals, it will need to 1) list every person who lives in the project area, 2) assign a number to each individual, then 3) randomly select 300 numbers (corresponding to 300 different people).

What makes a good sampling frame? Any complete and up-to-date listing of all units in the total population can be used. The following are some examples:

- census (either pre-existing or conducted by the PVO)
- voter registration lists
- tax lists
- community health worker registers
- surveillance records
- maps of the area showing each dwelling

LQAS, in simple terms is just random sampling within supervision areas (lots).

REMINDER

When using LQAS, the project's main objective is to classify lots, or supervision areas, into one of two groups:

1. coverage at or above expectation
2. coverage below expectation

The objective behind LQAS is not to get coverage estimates for each lot. This is one major difference between LQAS and other forms of stratified sampling. With LQAS, you collect information on only a small number of cases in each lot. (It is common to conduct **19** interviews in each lot.) Estimates based on such a small number of cases will have extremely wide confidence intervals, and therefore are not very meaningful. As a result, only combine data across lots to get estimates for the entire program area. These program-wide estimates are analogous to what you get with a cluster survey. With good quality control of data collection, estimates based on an LQAS sample can be more precise than estimates based on a cluster sample of the same size.

Identifying Locations for Interviews

Selecting community and household samples as closely as possible to simple random sample selection is crucial to the LQAS monitoring system if we want to achieve useful results. The following instructions serve as a guide to using the LQAS Monitoring Sampling Worksheets that you will use to select households to be interviewed.

- Step 1. List communities and total population.
- Step 2. Calculate the cumulative population.
- Step 3. Calculate the sampling interval.
- Step 4. Choose a random number.
- Step 5. Beginning with the random number, use the sampling interval to identify location numbers for the 19 sets of interviews.
- Step 6. Using the interview location numbers, identify the communities for the 19 sets of interviews

Step 1. List communities and total population (Sampling Worksheet 1)

Depending on how the project is organized, the list of communities for each supervision area with their respective population sizes may be drawn up by the program manager for all of the SAs, or by each supervisor for their respective area. The supervision area may include separate communities, or in the case of urban areas, various neighborhoods. The population figures should include everyone (men, women, and children). Sources of population figures can include the following:

- census (either pre-existing or conducted by the PVO)
- voter registration lists
- tax lists
- community health worker registers
- surveillance records
- maps of the area showing each dwelling

Total population for each community of a supervision area is recorded on Sampling Worksheet 1, as shown in the second column of the example on the following page.

Step 2. Calculate the cumulative population (Sampling Worksheet 1)

Next, calculate the cumulative population of the supervision area. In the first cell of the cumulative population column of Sampling Worksheet 1, record the population of the first community (548 for Pagai in our fictitious example). In the next cell below, record the cumulative population of the first two communities (548 (Pagai) + 730 (Santai) = 1278).

Repeat the process by adding the population of the next community to the combined populations of the previous communities. Continue until the populations of all communities are added. The final number in the column should match the Total Population under Step 1 of the worksheet.

Step 3. Calculate the sampling interval (Sampling Worksheet 2)

The sampling interval is calculated by dividing the total population of the supervision area by the sample size (19 in our case).

Step 4. Choose a random number (Sampling Worksheet 2)

You can use one of the following methods to select a number randomly:

1. **Currency note**—Get a currency note and look at the last few digits of the serial number. Usually, there are more digits in the currency note's serial number than in your sampling interval. To select a random number, refer to the number of digits in your sampling interval. This will determine how many digits you will refer to in the serial number. For example, if you have a two-digit sampling interval, look at the last two digits of the serial number; with a three-digit sampling interval, look at the last three digits of the serial number, and so on. In our example, the sampling interval equals 1236 (we drop the decimals for this purpose). You have a currency note with the serial number 123806229. Since you have a four-digit sampling interval (1236), look at the last four digits of the serial number (in this example, 12380**6229**). If the last four digits are less than or equal to your sampling interval, use that number as your random number. If the last four digits of the serial number are greater than the sampling interval (in the above example, 6229 is greater than 1236), select a new four-digit number by shifting to the left by one digit. In this example, that new number is 0622 (1238**06229**). If the new number is less than your sampling interval (in this case, 0622 is less than 1236), use that number as your random number. If no set of four digits in the currency note is less than or equal to your four-digit sampling interval, then you will need to use another currency note to identify another number. Please note the random number can begin with zero, as in our example.
2. **Random number table**—Some statistics books include a table of random numbers. In order to use a random number table, get a pen or pencil, close your eyes, then let the point of the pen/pencil land on the table. The number that the pen/pencil lands on will be your random number. If the random number has more digits than the sampling interval, you can use an approach similar to the process described for currency notes.
3. **Random number generator**—Some computers and calculators also have random number generators that will choose random numbers for you.

Step 5. Beginning with the random number, use the sampling interval to identify location numbers for the 19 sets of interviews (Sampling Worksheet 2)

Identify the location of each of the 19 Interviews in a Supervision Area using Sampling Worksheet 2 according to the following instructions.

1. The location number of the **1st interview is the random number**. For our example, we are assuming that **random number 622** was selected in the previous step.
2. The location number of the second interview is equal to the random number plus the sampling interval, in this case $622 + 1236.42 = 1858.42$ (for this step you always use the decimal).
3. The location number of the third interview is equal to interview location number 2 plus the sampling interval, or $1858.42 + 1236.42 = 3094.84$.

4. Continue this process until all 19 location numbers are calculated.

Step 6. Using the interview location numbers, identify the communities for the 19 sets of interviews (Sampling Worksheet 1)

1. The location of the first interview is the first community on the list with a cumulative population larger than the random number. In other words, the community in which the 622nd person is located for our example. That community is Santai. Record the number on the row corresponding to Santai under the Step 6 column of Sampling Worksheet 1.
2. The location of the second interview will be the first community on the list with a cumulative population equal to or larger than 1858 (note: the decimal is NOT used for identifying the location). This is Serina in our example. Record the number on the row corresponding to Serina under Step 6 of the Sampling Worksheet 1.
3. The location of the third interview will be the first community on the list with a cumulative population equal to or greater than 3094 (note: the decimal is NOT used for identifying the location; do not round the number up). Again, record the interview location number corresponding to the first community with a cumulative population equal to or larger than 3094.
4. Repeat until all 19 interview location numbers have been filled in corresponding to a community.

Step 7. Record the number of interviews to be carried out for each sampled community (Sampling Worksheet 1)

Under the Step 7 column of Sampling Worksheet 1, record the number of interviews to be carried out in each of the communities selected in the Step 6 column. If there is one number recorded for a community in column under Step 6, write "1" under Step 7. If there are two numbers recorded, write "2" under Step 7. It is possible that in very large communities there may be several interviews to carry out.

Sampling Worksheet 1
LQAS Sampling Frame for a Supervision Area

| Name of Community | STEP 1 Total Population | STEP 2 Cumulative Population | STEP 6 Interview Location Number | STEP 7 Number of Interviews |
|--------------------------|--|---|---|--|
| Pagai | 548 | | | |
| Santai | 730 | | | |
| Serina | 686 | | | |
| Mulrose | 280 | | | |
| Fanta | 1256 | | | |
| Bagia | 684 | | | |
| Rostam | 919 | | | |
| Mt. Sil | 1374 | | | |
| Livton | 1136 | | | |
| Farry | 544 | | | |
| Tunis | 193 | | | |
| Pulau | 375 | | | |
| Sasarota | 333 | | | |
| Pingra | 3504 | | | |
| Kanata | 336 | | | |
| Sirvish | 2115 | | | |
| Balding | 258 | | | |
| Rescuut | 678 | | | |
| Krista | 207 | | | |
| Manalopa | 1162 | | | |
| Garafa | 408 | | | |
| Spiltar | 455 | | | |
| Masraf | 978 | | | |
| Abrama | 335 | | | |
| Junagadh | 541 | | | |
| Singri | 725 | | | |
| Kalarata | 355 | | | |
| Ichimota | 498 | | | |
| Chaplar | 347 | | | |
| St. Kitt | 186 | | | |
| Nevis | 1346 | | | |
| Total | 23492 | | | 19 |

STEP 3: Go to Sampling Worksheet 2

Exercise
Sampling Worksheet 1
LQAS Sampling Frame for a Supervision Area

| Name of Community | STEP 1 Total Population | STEP 2 Cumulative Population | STEP 6 Interview Location Number | STEP 7 Number of Interviews |
|--------------------------|--|---|---|--|
| Pagai | 548 | 548 | | |
| Santai | 730 | 1278 | | |
| Serina | 686 | | | |
| Mulrose | 280 | | | |
| Fanta | 1256 | 3500 | | |
| Bagia | 684 | 4184 | | |
| Rostam | 919 | 5103 | | |
| Mt. Sil | 1374 | 6477 | | |
| Livton | 1136 | 7613 | | |
| Farry | 544 | 8157 | | |
| Tunis | 193 | 8350 | | |
| Pulau | 375 | 8725 | | |
| Sasarota | 333 | 9058 | | |
| Pingra | 3504 | 12562 | | |
| Kanata | 336 | 12898 | | |
| Sirvish | 2115 | 15013 | | |
| Balding | 258 | 15271 | | |
| Rescuut | 678 | 15949 | | |
| Krista | 207 | 16156 | | |
| Manalopa | 1162 | 17318 | | |
| Garafa | 408 | 17726 | | |
| Spiltar | 455 | 18181 | | |
| Masraf | 978 | | | |
| Abrama | 335 | | | |
| Junagadh | 541 | | | |
| Singri | 725 | | | |
| Kalarata | 355 | | | |
| Ichimota | 498 | | | |
| Chaplar | 347 | | | |
| St. Kitt | 186 | | | |
| Nevis | 1346 | | | |
| Total | 23492 | | | 19 |

STEP 3: Go to Sampling Worksheet 2

Sampling Worksheet 1
LQAS Sampling Frame for a Supervision Area

| Name of Community | STEP 1 Total Population | STEP 2 Cumulative Population | STEP 6 Interview Location Number | STEP 7 Number of Interviews |
|--------------------------|--|---|---|--|
| Pagai | 548 | 548 | | |
| Santai | 730 | 1278 | | |
| Serina | 686 | 1964 | | |
| Mulrose | 280 | 2244 | | |
| Fanta | 1256 | 3500 | | |
| Bagia | 684 | 4184 | | |
| Rostam | 919 | 5103 | | |
| Mt. Sil | 1374 | 6477 | | |
| Livton | 1136 | 7613 | | |
| Farry | 544 | 8157 | | |
| Tunis | 193 | 8350 | | |
| Pulau | 375 | 8725 | | |
| Sasarota | 333 | 9058 | | |
| Pingra | 3504 | 12562 | | |
| Kanata | 336 | 12898 | | |
| Sirvish | 2115 | 15013 | | |
| Balding | 258 | 15271 | | |
| Rescuut | 678 | 15949 | | |
| Krista | 207 | 16156 | | |
| Manalopa | 1162 | 17318 | | |
| Garafa | 408 | 17726 | | |
| Spiltar | 455 | 18181 | | |
| Masraf | 978 | 19159 | | |
| Abrama | 335 | 19494 | | |
| Junagadh | 541 | 20035 | | |
| Singri | 725 | 20760 | | |
| Kalarata | 355 | 21115 | | |
| Ichimota | 498 | 21613 | | |
| Chaplar | 347 | 21960 | | |
| St. Kitt | 186 | 22146 | | |
| Nevis | 1346 | 23492 | | |
| Total | 23492 | | | 19 |

STEP 3: Go to Sampling Worksheet 2

Sampling Worksheet 2
Identify the Location of Each of the 19 Interviews in a Supervision Area

STEP 3: Sampling Interval = Total Cumulative Population divided by 19 = 1236.42
 (The Sampling Interval is used repeatedly in the calculations below)

STEP 4: Calculate a Random Number from 1 to the sampling interval (without decimal point) from a random number table or currency bill: 622

| Interview Location No. | Calculation | STEP 5 Interview Location |
|------------------------|--|-------------------------------------|
| 1. | Random Number = Location Number 1 | 622 |
| 2. | RN + Sampling Interval = Location Number 2 | 622+1236.42 = 1858.42 |
| 3. | Interview Location Number 2 + Sampling Interval | 1858.42+1236.42 = 3094.84 |
| 4. | Interview Location Number 3 + Sampling Interval | 3094.84+1236.42 = 4331.26 |
| 5. | Interview Location Number 4 + Sampling Interval | |
| 6. | Interview Location Number 5 + Sampling Interval | |
| 7. | Interview Location Number 6 + Sampling Interval | |
| 8. | Interview Location Number 7 + Sampling Interval | |
| 9. | Interview Location Number 8 + Sampling Interval | |
| 10. | Interview Location Number 9 + Sampling Interval | |
| 11. | Interview Location Number 10 + Sampling Interval | |
| 12. | Interview Location Number 11 + Sampling Interval | |
| 13. | Interview Location Number 12 + Sampling Interval | |
| 14. | Interview Location Number 13 + Sampling Interval | |
| 15. | Interview Location Number 14 + Sampling Interval | |
| 16. | Interview Location Number 15 + Sampling Interval | |
| 17. | Interview Location Number 16 + Sampling Interval | |
| 18. | Interview Location Number 17 + Sampling Interval | |
| 19. | Interview Location Number 18 + Sampling Interval | |

STEP 6: Go to Sampling Worksheet 1

Sampling Worksheet 2
Identify the Location of Each of the 19 Interviews in a Supervision Area

STEP 3: Sampling Interval = Total Cumulative Population/19 = 1236.42

STEP 4: Calculate a Random Number from 1 to the sampling interval (without decimal point) from a random number table or currency bill: 622

| Interview Location No. | Calculation | STEP 5 Interview Location |
|------------------------|--|---------------------------------------|
| 1. | Random Number = Location Number 1 | 622 |
| 2. | RN + Sampling Interval = Location Number 2 | 622+1236.42 = 1858.42 |
| 3. | Interview Location Number 2 + Sampling Interval | 1858.42+1236.42 = 3094.84 |
| 4. | Interview Location Number 3 + Sampling Interval | 3094.84+1236.42 = 4331.26 |
| 5. | Interview Location Number 4 + Sampling Interval | 4331.26+1236.42 = 5567.68 |
| 6. | Interview Location Number 5 + Sampling Interval | 5567.68+1236.42 = 6804.10 |
| 7. | Interview Location Number 6 + Sampling Interval | 6804.10+1236.42 = 8040.52 |
| 8. | Interview Location Number 7 + Sampling Interval | 8040.52+1236.42 = 9276.94 |
| 9. | Interview Location Number 8 + Sampling Interval | 9276.94+1236.42 = 10513.36 |
| 10. | Interview Location Number 9 + Sampling Interval | 10513.36+1236.42 = 11749.78 |
| 11. | Interview Location Number 10 + Sampling Interval | 11749.78+1236.42 = 12986.20 |
| 12. | Interview Location Number 11 + Sampling Interval | 12986.20+1236.42 = 14222.62 |
| 13. | Interview Location Number 12 + Sampling Interval | 14222.62+1236.42 = 15459.04 |
| 14. | Interview Location Number 13 + Sampling Interval | 15459.04+1236.42 = 16695.46 |
| 15. | Interview Location Number 14 + Sampling Interval | 16695.46+1236.42 = 17931.88 |
| 16. | Interview Location Number 15 + Sampling Interval | 17931.88+1236.42 = 19168.30 |
| 17. | Interview Location Number 16 + Sampling Interval | 19168.30+1236.42 = 20404.72 |
| 18. | Interview Location Number 17 + Sampling Interval | 20404.72+1236.42 = 21641.14 |
| 19. | Interview Location Number 18 + Sampling Interval | 21641.14+1236.42 = 22877.56 |

STEP 6: Go to Sampling Worksheet 1

Exercise
Sampling Worksheet 1
LQAS Sampling Frame for a Supervision Area

| Name of Community | STEP 1 Total Population | STEP 2 Cumulative Population | STEP 6 Interview Location Number | STEP 7 Number of Interviews |
|--------------------------|--|---|---|--|
| Pagai | 548 | 548 | | |
| Santai | 730 | 1278 | 622 | |
| Serina | 686 | 1964 | 1858 | |
| Mulrose | 280 | 2244 | | |
| Fanta | 1256 | 3500 | | |
| Bagia | 684 | 4184 | | |
| Rostam | 919 | 5103 | | |
| Mt. Sil | 1374 | 6477 | | |
| Livton | 1136 | 7613 | | |
| Farry | 544 | 8157 | | |
| Tunis | 193 | 8350 | | |
| Pulau | 375 | 8725 | | |
| Sasarota | 333 | 9058 | | |
| Pingra | 3504 | 12562 | | |
| Kanata | 336 | 12898 | | |
| Sirvish | 2115 | 15013 | 12986, 14222 | |
| Balding | 258 | 15271 | | |
| Rescuut | 678 | 15949 | 15459 | |
| Krista | 207 | 16156 | | |
| Manalopa | 1162 | 17318 | 16695 | |
| Garafa | 408 | 17726 | | |
| Spiltar | 455 | 18181 | 17931 | |
| Masraf | 978 | 19159 | | |
| Abrama | 335 | 19494 | 19168 | |
| Junagadh | 541 | 20035 | | |
| Singri | 725 | 20760 | 20404 | |
| Kalarata | 355 | 21115 | | |
| Ichimota | 498 | 21613 | 21641 | |
| Chaplar | 347 | 21960 | | |
| St. Kitt | 186 | 22146 | | |
| Nevis | 1346 | 23492 | 22877 | |
| Total | 23492 | | | 19 |

STEP 3: Go to Sampling Worksheet 2

Sampling Worksheet 1
LQAS Sampling Frame for a Supervision Area

| Name of Community | STEP 1 Total Population | STEP 2 Cumulative Population | STEP 6 Interview Location Number | STEP 7 Number of Interviews |
|--------------------------|--|---|---|--|
| Pagai | 548 | 548 | | |
| Santai | 730 | 1278 | 622 | 1 |
| Serina | 686 | 1964 | 1858 | 1 |
| Mulrose | 280 | 2244 | | |
| Fanta | 1256 | 3500 | 3094 | 1 |
| Bagia | 684 | 4184 | | |
| Rostam | 919 | 5103 | 4331 | 1 |
| Mt. Sil | 1374 | 6477 | 5567 | 1 |
| Livton | 1136 | 7613 | 6804 | 1 |
| Farry | 544 | 8157 | 8040 | 1 |
| Tunis | 193 | 8350 | | |
| Pulau | 375 | 8725 | | |
| Sasarota | 333 | 9058 | | |
| Pingra | 3504 | 12562 | 9276, 10513, 11749 | 3 |
| Kanata | 336 | 12898 | | |
| Sirvish | 2115 | 15013 | 12986, 14222 | 2 |
| Balding | 258 | 15271 | | |
| Rescuut | 678 | 15949 | 15459 | 1 |
| Krista | 207 | 16156 | | |
| Manalopa | 1162 | 17318 | 16695 | 1 |
| Garafa | 408 | 17726 | | |
| Spiltar | 455 | 18181 | 17931 | 1 |
| Masraf | 978 | 19159 | | |
| Abrama | 335 | 19494 | 19168 | 1 |
| Junagadh | 541 | 20035 | | |
| Singri | 725 | 20760 | 20404 | 1 |
| Kalarata | 355 | 21115 | | |
| Ichimota | 498 | 21613 | 21641 | 1 |
| Chaplar | 347 | 21960 | | |
| St. Kitt | 186 | 22146 | | |
| Nevis | 1346 | 23492 | 22877 | 1 |
| Total | 23492 | | | 19 |

STEP 3: Go to Sampling Worksheet 2

Identifying Household for Interviews

Now that communities are selected in which interviews will be conducted, the next step is to identify the households in which the interviews will take place. Depending on the results from the sampling worksheets, there may be as few as one and possibly several interviews to conduct in a given community. The process of selecting households must be random. Interviewers should not visit a particular household just because a community leader says they should.

Use the following steps to identify households for interviews:

1. Assign numbers to households:
 - ✓ See **How to Assign Numbers to Households** on the following page).
2. Randomly select a number of households equal to the number of interviews that must be conducted:
 - ✓ The supervisor selects households **randomly** using a currency note or a random number table as described above earlier in these instructions. However, instead of using a sampling interval, the random numbers must fall between 1 and the total number of households in the community in which the interviews will take place. Choose however many random numbers as there are interviews to be carried out in the community.
3. Visit households and determine if household meets the criteria for conducting interviews:
 - ✓ The supervisor will then visit these households to determine if it meets the criteria for conducting interviews as described on the monitoring questionnaires. If a household does not meet the criteria, follow the **Rules for Identifying Interviewees**, also described below.
4. Conduct interviews:
 - ✓ Interviewing etiquette and techniques are described below.

How to Assign Numbers to Households

| IF: | THEN: |
|--|---|
| A complete household list is available (Tax list, census, map) | Assign a number to each house... ...Work is done! |
| If the community size is “about” 30 households or less | Make a household list or map with the location of each household (use assistance of a key interviewee from the community)... And then assign a number to each house... ... Work is done! |
| If the community size is more than “about” 30 households | Go to the population center of the sample area and identify four directions (north, south, east, and west) or four sections (quadrants). There is usually a landmark—a church/mosque/temple, market, or school—at the center of the community. If it is not clear where the center of the community is, look at a map of the area. Also, meet with persons who are familiar with the sample area to help you identify the center of the community... Write the four sections/directions on four slips of paper and put them in a container. Randomly select one of the slips of paper... Proceed in the selected direction and go to the place that equally divides the quadrant’s population in half. In other words, find out where 50% of the quadrant’s population resides on one side and the other 50% reside on the other side. Randomly select (for example, by flipping a coin) which of the two ways to proceed. <i>Repeat this step until you have a small and manageable set of houses (about 30)...</i> Make a household list or map with the location of each household (use assistance of a key interviewee from the community)... And then assign a number to each house... ...Work is done! |
| Household = group of persons who share the same kitchen or hearth; or, a group of persons who eat from the same cooking pot. | |

Rules for Identifying Interviewees

| If the type of interviewee you are looking for: | Then: |
|---|--|
| Is at the household* you selected | <u>Interview</u> that person <u>if</u> he/she consents. |
| Does not live at that household you selected | Go to the nearest household <u>from the front entrance</u> of the household you are at, and check at this “next nearest” household... <u>Continue</u> this process <u>until</u> you find the interviewee type you are looking for. |
| Lives at that household BUT is absent and far away (more than 30 minutes away) | [Hint: if 2 households are equally near then choose the one with the closest door. Otherwise “flip a coin.”] |
| Lives at that household, is absent BUT is nearby (<u>within</u> 30 minutes) | Go find the interviewee with the help of a guide from the community.... IF you cannot find the person in the next 30 minutes... GO to the next nearest household from the front entrance of the household of the person you cannot find. |

* Household = group of persons who share the same kitchen or hearth; or, a group of persons who eat from the same cooking pot.

Interview Etiquette

- ✓ Dress appropriately.
- ✓ Present official document/certificate from organization or project if necessary.
- ✓ Be punctual (if appointments have been made).
- ✓ Do not enter the house unless you are invited.
- ✓ If you remain outside, do not ask for a chair; sit on the porch, steps, etc.
- ✓ Tell the interviewee how long the questionnaire will take.
- ✓ Do not accept lunch (unless it would be rude to refuse).
- ✓ Do not give gifts to interviewees.
- ✓ Thank interviewees at the end.

Effective Interviewing Techniques

1. Introduce yourself, your organization, and talk briefly about the purpose of the survey (show document or certificate if necessary).
2. Maintain confidentiality:
 - ✓ Do not interview the interviewee in the presence of others (unless he/she indicates otherwise).
 - ✓ Explain that all answers will be kept confidential.
3. Ask questions exactly as written or with minor changes that were agreed upon during the training.
4. Wait for a response; be silent, then probe.
5. If the interviewee doesn't understand or question or if the answer is unclear, ask the question again, making as few changes in wording as possible.
6. Do not suggest – by tone of voice, facial expression, or body language – the answer you want to hear.
7. Do not ask leading questions, questions that signal the correct answer to the interviewee or suggest the answer you would like.
8. Try not to react to answers in such a way as to show that you approve or disapprove.
9. If one answer is inconsistent with another, try to clear up the confusion.
10. Try to maintain a conversational tone of voice; don't make the interview seem like an interrogation.
11. Know the local words for sensitive/delicate topics.

SURVEY CHECKLISTS

PRE-SURVEY CHECKLIST

Before the survey begins, be sure the following tasks have been completed:

1. Review the sampling frame before designing the plan for data collection.
2. Count the questionnaires to be sure you have 19 for each type of interviewee and for each supervision area.
3. Number questionnaires 1 through 19 for each supervision area.
4. Review each one of the 19 questionnaires to make sure that they have the correct number of pages and they are securely stapled.
5. Review the materials checklist below. Be sure you have (or have decided you don't need) the following materials:

Materials Checklist

- 19 "Mothers with a Child 0 to 5 months" questionnaires + 2 extras
- 19 "Mothers with a Child 6 to 9 months" questionnaires + 2 extras
- Pencil
- Pencil sharpener
- Eraser
- Clipboard
- Day pack or bag to carry questionnaires and materials
- Random number table
- Rules to select interviewees in a household
- Community maps or paper for making maps

How to Calculate Weighted Coverage and Confidence Intervals

Calculating a weighted average is more precise than an unweighted, crude measure. This calculation takes into account that not all SAs are of the same size. The contribution each SA makes to the calculation of the average should be related to its size. Although a weighted average is more accurate than a crude measure, in most cases it is only slightly more precise. Therefore, if you are able only to present a crude average, simply do so and note this decision in your reports.

Data can be weighted by SA population sizes using the *direct adjustment method*. While weighting is not needed when making LQAS judgments of an SA, it can be used when aggregating the data to calculate coverage for an entire catchment area or geographical area. Let's assume that a sample of 19 interview sets was carried out in each SA regardless of the SA population size and the number of SAs in the catchment area. Without weighting, a sample of 19 can potentially either overestimate or underestimate the coverage estimate. Weighting the data allows us to remove this distortion.

Calculating Weighted Coverage Proportions with a Confidence Interval by Hand

Most Ministries of Health at national and regional levels, and District Health Management Teams, calculate estimates of coverage for various interventions.

While LQAS data are quite useful for identifying SAs and interventions that are reaching coverage targets and those which are not, these same data can be used to calculate coverage proportions. This, however, is not the primary purpose for collecting LQAS data. Nevertheless, they can be used in this way. And it is a useful bi-product since the Ministry of Health and donors often want this information. When LQAS data are added together to calculate a coverage proportion, they are treated as a stratified random sample.

To calculate coverage with LQAS, use the example presented in Table 1.

| Supervision Area | Sample Size = n | Number Correct = C | $p = C/n$ | Population = N | $wt = N_i/\sum N$ | $wt*p$ |
|------------------|-----------------|--------------------|-----------|----------------|-------------------|--------------|
| Thika | 19 | 7 | .37 | 10,718 | 0.245 | 0.09 |
| Kiambu | 19 | 14 | .74 | 6,379 | 0.146 | 0.108 |
| Muthari | 19 | 5 | .26 | 9,379 | 0.215 | 0.056 |
| Nyeri | 19 | 16 | .84 | 9,731 | 0.223 | 0.187 |
| Naivasha | 19 | 4 | .21 | 7,500 | 0.172 | 0.036 |
| Totals | 95 | | | 43,707 | | 0.478 |

Let's assume you are assessing a Growth Monitoring and Promotion program. Column 1 lists 5 Health Centers (SAs) in a project catchment area. Column 2 is the sample size of each SA (19 in this case). Column 3 is the number of women in the sample that had up-to-date growth charts. Column 4 is a mini-coverage proportion (p) for each SA. This is calculated by using the number of women in the sample with up-to-date growth charts as a numerator, and the number of women

in the sample as the denominator (which is 19). Therefore, $7/19 = 0.37$ in the case of Thika. Column 5 is the size of the population in each SA; this can be an estimate because wide fluctuations in this number have little influence on the overall calculation. Column 6 is a weight which is calculated as the population in each SA divided by the total population of all the SAs in the entire catchment area. Therefore, the weight for Thika is $10,718/43,707 = 0.245$. Column 7 is the final calculation, which multiplies the *weight* and the mini-coverage proportion in each SA. Adding these numbers together gives the overall coverage estimate for the catchment area. In this case, the coverage in the catchment area is 47.8%.

The final step in measuring a coverage proportion is to calculate the confidence interval (CI). This measure is needed because the coverage calculation is an estimate and will not be precise. A 95% CI is the range in which we are 95% confident that the true coverage is within. Table 2 demonstrates this calculation.

| Table 2: Calculating a Weighted Confidence Interval for a Coverage Proportion (Rate) | | | |
|---|--------|--------------|------------------------------|
| Supervision Area | wt^2 | $p \times q$ | $\frac{wt^2 \times (pq)}{n}$ |
| Thika | 0.060 | 0.233 | 0.00074 |
| Kiambu | 0.021 | 0.194 | 0.00021 |
| Muthari | 0.046 | 0.194 | 0.00047 |
| Nyeri | 0.050 | 0.133 | 0.00035 |
| Naivasha | 0.029 | 0.166 | 0.00025 |
| Totals | | | 0.00202 |
| CI = (1.96 x SQRT(0.00202)) = ± 0.088 | | | |

Column 2 uses the weight from Table 1 and then squares it. Column 3 uses the value p , the mini-coverage proportion referred to in the previous table. The value of q is $(1 - p)$. The last column multiplies the values of columns 2 and 3, and divides them by 19 (the sample size, n). When they are added together they result in a value of 0.00202. The final step is to multiply the square root of 0.00202 by 1.96; the resulting value, +8.8%, is the confidence interval.

Therefore, the coverage in the project catchment area is 47.8%, +8.8%. In other words, we are 95% confident that the true coverage in this district is between 39.0% and 56.6%.