

## STEP 4

# Design the assessment and develop assessment protocol

Several decisions need to be made to design the assessment, culminating in a validated

assessment protocol document. Key steps for assessment design are outlined below.

### 4.1. Select assessment tools and methods

Several methods may be used to assess HHR and ITN activities. AMP has worked with Tropical Health and partners to develop two documents to describe each of the different

assessment methods and related Excel-based decision matrices to support the selection of the method which is best suited to country context and needs<sup>14</sup>:

- Annex 4: **Choosing tools and methods for assessment of the quality of household registration** for ITN distribution campaigns, in [MS Word](#), and household registration quality assessment tool and method choice decision matrices, in [MS Excel](#).
- Annex 5: **Choosing tools and methods for post-campaign assessment** of ITN coverage, access, and use, in [MS Word](#), and post-campaign tool and method choice decision matrices, in [MS Excel](#).

Both AMP documents describe three areas: (1) Collecting information and evaluating context, (2) Choosing the tools to collect data, and (3) Choosing the sampling strategy to use. The AMP documents also provide Excel decision-making matrices to score the tools

and methods according to a national context analysis. Short descriptions and links for each of the data collection tools mentioned in the two AMP guidance documents are included in the **List of paper and digital data collection tools** ([Annex 6](#)).

#### Important note:

Based on this scoring of ITN campaign assessment methods, one or more tools may be recommended, and national malaria programmes and partners should undertake more detailed discussion and reflection to arrive at the one most suited to their context and needs.

After review of the potential data collection tools and sampling methods and associated Excel-based scoring tools in Annexes 4 and 5,

programmes should select the data collection tool(s) and sampling method which they prefer to use for their assessment.

14. See AMP guidance: [https://allianceformalariaprevention.com/wp-content/uploads/2022/06/AMP\\_HHR\\_quality\\_assessment\\_26062021\\_EN.pdf](https://allianceformalariaprevention.com/wp-content/uploads/2022/06/AMP_HHR_quality_assessment_26062021_EN.pdf), [https://allianceformalariaprevention.com/wp-content/uploads/2022/06/AMP\\_HHR\\_quality\\_assessment\\_tool\\_and\\_method\\_choice\\_decision\\_matrices\\_26062021.xlsx](https://allianceformalariaprevention.com/wp-content/uploads/2022/06/AMP_HHR_quality_assessment_tool_and_method_choice_decision_matrices_26062021.xlsx), [https://allianceformalariaprevention.com/wp-content/uploads/2022/06/AMP\\_post-campaign\\_assessment\\_26062021\\_EN.pdf](https://allianceformalariaprevention.com/wp-content/uploads/2022/06/AMP_post-campaign_assessment_26062021_EN.pdf), [https://allianceformalariaprevention.com/wp-content/uploads/2022/06/AMP\\_post-campaign\\_tool\\_and\\_method\\_choice\\_decision\\_matrices\\_26062021.xlsx](https://allianceformalariaprevention.com/wp-content/uploads/2022/06/AMP_post-campaign_tool_and_method_choice_decision_matrices_26062021.xlsx)

**Important note:** These procedures are focused on the cLQAS with lot-level corrective action sampling method, described in Steps four to ten. Clustered LQAS has been successfully used globally to assess a specific set of key indicators for polio vaccination campaign outcomes, even in remote and insecure settings. Several countries have used cLQAS approaches and elements of cLQAS to conduct assessments of their HHR and ITN distribution activities as part of ITN campaigns (for example Benin, Cameroon, Central African Republic, Liberia, Nigeria, Sierra Leone). This assessment procedures document is based on a review of those assessment protocols and reports and seeks to overcome gaps identified to harmonize a comprehensive set of methods and tools in line with global best practice for cLQAS.

Clustered LQAS has been described as the “fastest, least expensive method to evaluate a representative sample of the HHR population using HHR assessment teams. It is recommended for situations where HHR assessment aims to inform more accurate enumeration figures prior to ITN distribution, particularly when results are needed quickly and when the budget is more limited”<sup>15</sup>. It is important to note that the cLQAS methodology can be considered for more frequent collection of ITN indicator data (and other data) to inform decisions about timing for ITN replacement, potential channels that would be most suitable and quantities of ITNs needed.

If national malaria programmes prefer to use one of the other sampling methods described in the AMP “Choosing tools and methods” guidance documents, they should consult available resources and experts to provide guidance and technical support to ensure correct sampling and analysis. Examples of sources of technical assistance include:

- National malaria programmes and M&E stakeholders including national statistics departments
- University departments that conduct health and/or malaria research
- Independent research organizations
- Implementing partner research or M&E teams
- Technical and normative partners such as WHO

## 4.2. Design the assessment

Assessment design for cLQAS is described in detail in the Global Polio Eradication Initiative (GPEI) Field Manual, Assessing Vaccination Coverage Levels Using Lot Quality Assurance Sampling (LQAS). The manual is included in the AMP ITN Campaign HHR and ITN Distribution Global and Country Resources<sup>16</sup>. Key elements of the harmonized cLQAS assessment approach are described below and an **ITN campaign assessment protocol template**, in English

and French and **ITN campaign assessment questionnaire templates** are available as a modifiable Word document ([Annex 12](#)) and modifiable Excel file ([Annex 14](#)). Additionally, examples of protocols previously developed for campaign assessments in Central African Republic, Liberia and Sierra Leone are included in the AMP ITN Campaign HHR and ITN Distribution Global and Country Resources folder for information.

15. Choosing tools and methods for assessment of the quality of household registration for ITN distribution campaigns and Choosing tools and methods for post-campaign assessment of ITN coverage, access and use. Annex (Excel) post-campaign tool and method choice decision matrices. [https://allianceformalariaprevention.com/wp-content/uploads/2022/06/AMP\\_HHR\\_quality\\_assessment\\_26062021\\_EN.pdf](https://allianceformalariaprevention.com/wp-content/uploads/2022/06/AMP_HHR_quality_assessment_26062021_EN.pdf), [https://allianceformalariaprevention.com/wp-content/uploads/2022/06/AMP\\_HHR\\_quality\\_assessment\\_tool\\_and\\_method\\_choice\\_decision\\_matrices\\_26062021.xlsx](https://allianceformalariaprevention.com/wp-content/uploads/2022/06/AMP_HHR_quality_assessment_tool_and_method_choice_decision_matrices_26062021.xlsx), [https://allianceformalariaprevention.com/wp-content/uploads/2022/06/AMP\\_post-campaign\\_assessment\\_26062021\\_EN.pdf](https://allianceformalariaprevention.com/wp-content/uploads/2022/06/AMP_post-campaign_assessment_26062021_EN.pdf), [https://allianceformalariaprevention.com/wp-content/uploads/2022/06/AMP\\_post-campaign\\_tool\\_and\\_method\\_choice\\_decision\\_matrices\\_26062021.xlsx](https://allianceformalariaprevention.com/wp-content/uploads/2022/06/AMP_post-campaign_tool_and_method_choice_decision_matrices_26062021.xlsx)

16. <https://drive.google.com/drive/folders/1YGoCbxCPLszLGjOcCv6utbYeEFb5M396?usp=sharing>

**LQAS** is a rapid survey method to assess the quality of coverage following a health intervention in pre-defined areas such as health districts or sub-districts (i.e. lots) using a small sample size. Traditionally, LQAS has been used with a simple random sample design.

**Clustered LQAS (cLQAS)**, similar to random survey sampling, divides the sample (N) into smaller clusters (k) of n individuals, where  $N=k*n$ . For example, if a sample of  $N=60$  is needed as a minimum standard in a district or lot, six villages would be selected first and then 10 individuals in each village, rather than randomly selecting 60 individuals throughout the district. The cLQAS approach increases the rapidity and efficiency for conducting the survey, but it reduces precision somewhat. For this reason, results are mostly presented as classification levels (good, uncertain, inadequate) which is in general sufficient for most programmatic decision-making during ITN campaign activities.

**Clustered LQAS with lot-level corrective action:** Clustered LQAS, similar to other “field” HH sampling procedures, uses multi-stage random sampling to classify adequate HHR and ITN distribution indicators at lot level. Planners can specify the desired sample size and must decide on upper and lower limits for clusters to be considered adequate or not in terms of the main indicators. Indicators are evaluated and corrective measures, such as re-registration or enhanced SBC, are taken at the lot level. Results from the lots can be combined to produce an overall district or higher-level point estimate of coverage.

**Clustered LQAS sampling frame with the addition of supplemental lots.** In contexts where more information is needed for specific geographic areas or sub-populations due to poverty, social norms, legal status, gender inequality, language and/or other barriers to ITN access, additional lots can be added. Households in these lots can be selected by probability

or non-probability (convenience) sampling. If non-probability (convenience) sampling of households is done, then results should only be reported separately (and not combined with the original sampling frame). If probability sampling of households is done in the supplemental lots and the supplemental lot area(s) overlap with the original sampling frame, then results should be reported separately. If the probability sampling of households is done and the area or sub-populations were not part of the original sampling frame, then the results can be added to the original sampling frame. In essence, the original sampling frame would be extended to fill in gaps.

**Identifying point estimates at the national, regional or district level:** Clustered LQAS can be used to provide point estimates with sufficiently narrow confidence intervals at national, regional, district or other levels. This requires the **combined results across at least five lots**, including more than 300 HHs, and provides point estimates and confidence intervals for the aggregate level, not for each lot. This is a well-known approach, but one which has not been described specifically in documents or the literature. To support the data analysis for this approach, identification of an experienced data analyst with knowledge of statistical software is essential.

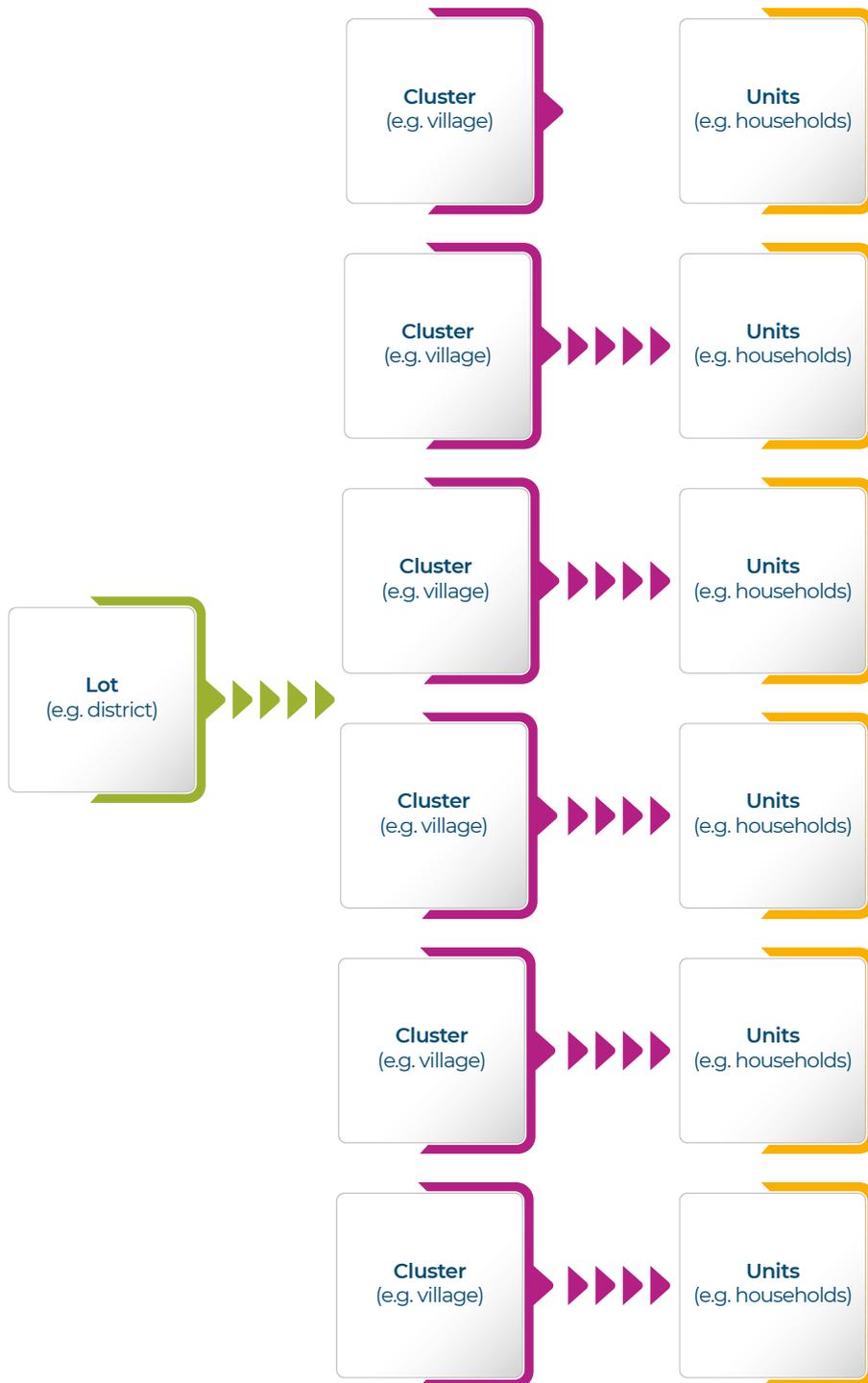
**Operational definition of a household:** It is important for the assessment design to use the same definition of a HH as determined during ITN campaign macroplanning. Depending on the country and context, a HH may be defined<sup>17</sup> in the same way as for the national census (e.g. a group of people who share the same cooking pot) or an operational definition of a HH may have been adopted to improve intra-household ITN access (e.g. in the case of polygamous families, each wife is defined as the head of HH with the husband associated with only one of the wives).

17. GPEI (2012). Assessing Vaccination Coverage Levels Using Lot Quality Assurance Sampling. Field Manual.

**Sampling** is used to choose a representative subset of areas covered by the ITN campaign. Sampling units used in cLQAS include:

- **Lot**= Usually an administrative area, such as a district, sub-district, health area or zone, or health facility catchment area. Each lot includes multiple smaller administrative units, or clusters
- **Cluster**= A group of units (typically HHs), often a sub-district, village or specific area
- **Unit**= Typically a HH

**Figure 2:** Example of sampling units



**Lot-level results:** Results from cLQAS will be relevant at the lot level. The lot is the district or sub-district area of intervention. If a lot is classified as failing, or inadequate, an immediate investigation would be needed to understand the reasons for the “inadequate” classification. [Annex 7](#) shows steps to be considered for investigation of low-performing lots (sub-districts, districts).

**cLQAS sampling frame:** To help ensure that sampling is performed correctly, the definition of lots and primary sampling units (clusters) should be done at a central level with the M&E sub-committee and/or assessment TWG. The lot should be pre-defined “based on geographical, administrative, health or census boundaries”<sup>18</sup>, which will inform and support corrective actions, considering the administrative and health authorities who will lead the corrections in their geographic areas. The lot for cLQAS is generally designed at the district or sub-district level.

**Random sampling:** cLQAS uses random sampling to select clusters or primary sampling units (PSU) and HH. As mentioned below, clusters are selected using probability proportional to size (PPS) sampling and HH are selected through segmentation, random sampling from a list and next-nearest-door approaches<sup>19</sup>. As mobile technology and satellite images become more accessible, these

tools can be used to select segments and HH more precisely.

**Probability proportional to size** is a sampling method that gives a higher probability of selection to larger clusters. One result of PPS is that each household has an equal probability of selection.

**Segmentation:** Once clusters are selected using PPS, HHs need to be selected. The first step is segmentation of the cluster into four more or less equal segments and selection of one segment by simple random sampling. The selected segments can each be further divided into four more or less equal segments until segments of approximately twenty HH remain. Generally, two to three rounds of segmentation are needed to get to the cluster or village/settlement level. The final segment should have approximately 20 (15–25) HH.

**Random selection of HHs:** Once a final segment of approximately 20 HHs is selected, then the 20 HHs should be crudely mapped and numbered<sup>20</sup>. The first HH to be sampled is selected using simple random sampling. After the first HH is selected and surveyed, assessment teams should exit and turn right out of the first HH, skip the next HH, and select the one after in rural areas and every third HH in urban areas.

### An example of segmentation and random HH selection is shown in Figure 3

- The figure below illustrates the last segmentation round with some 20 HHs in each segment.
- Using available landmarks, such as rivers and roads, surveyors divide the segment or cluster into “sectors” of approximately 20 HH in each sector.
- Next, surveyors randomly select one sector (in this example, sector 4), and number each HH in that sector.
- One of the 20 HHs will be randomly selected to use as the starting point and the first HH to be visited for interview (in this example, HH 13).
- Once surveyors have finished visiting the first HH, they exit the HH, turn to the right, and continue the survey by visiting every other HH.

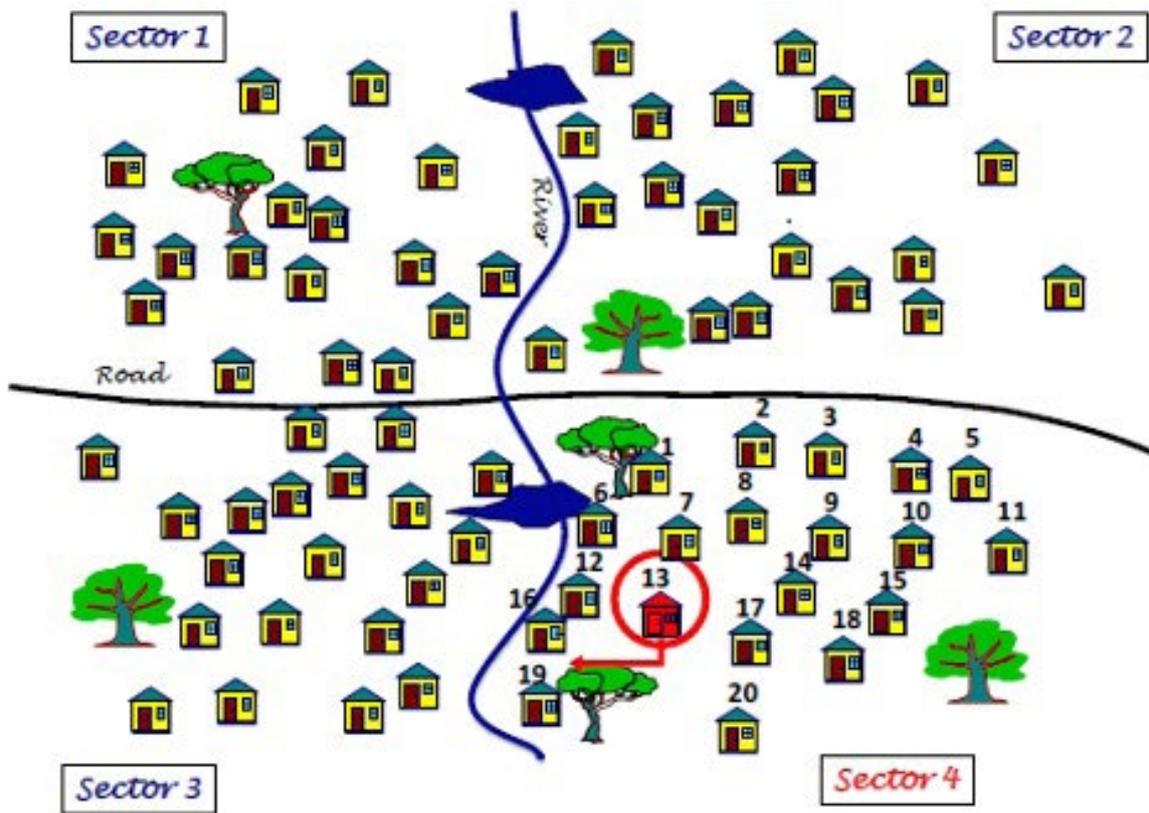
Note that if the sector had exceeded approximately 20 HHs, surveyors would need to repeat the first steps described above and further divide the sector into sub-sectors, repeating this until there are approximately 20 HHs in each sub-sector.

18. GPEI (2012). Assessing Vaccination Coverage Levels Using Lot Quality Assurance Sampling. Field Manual.

19. Ibid.

20. Ibid.

**Figure 3:** Example of segmentation and random HH selection. Image adapted from WHO. Assessing Vaccination Coverage Levels Using Lot Quality Assurance Sampling: Field Manual. GPEI, 2012.



### Sample size

**Minimum standard:** The selection of six clusters per lot and ten HH per cluster provides the minimum 6x10 sample size of 60 HH. This approach is based on the polio eradication assessment model and represents a trade-off between workload and precision.

Many national polio eradication programmes have been able to conduct hundreds of LQAS in campaign districts in the last 10 years because of the relatively low workload of the 6x10 design. However, the misclassification errors associated with the 6x10 decision rules from polio eradication may be different for malaria indicators. Misclassification errors include: the alpha error which is the probability of classification of a lot as “passed” when it should not have been passed; the beta error which is the probability of classification of a lot as “not passed” when it should have been.

Therefore, it is reasonable for malaria programmes to start with six clusters per lot and then look at the alpha and beta errors for the LQAS classification system during the analysis phase. If the alpha and beta errors are too high, then the number of clusters per lot can be increased from six to eight or 10 during the next campaign.

**Other sample size options** include: The selection of eight or ten clusters per lot and ten HH per cluster, for a sample size of 8x10 or 80 to 10x10 or 100, may reduce the miscalculation errors; however, the addition of clusters makes the operational approach heavier, which leads to increased workload for teams (more days) and increased budget costs.

### Sampling and segmentation for in-process

**cLQAS:** Sampling during in-process cLQAS is more complicated than for an end-process assessment. The M&E sub-committee, assessment coordinator and stakeholders need to decide on the number of days for the cLQAS process, then decide how the PSUs will be sampled. In general, it is difficult to sample PSUs and HHs on the same day as HHR teams are doing registration; therefore, PSUs and HHs are usually sampled the following day. For example, cLQAS PSUs and HHs are sampled on day two from the area where HHs were registered by teams on day one. Then, cLQAS PSUs and HHs are sampled on day three from the area where

HHs were registered by teams on day two. cLQAS personnel will use maps to identify the areas covered by HHR teams on day one and will divide that area into four to ten segments with approximately equal population. The number of clusters for that day (one to three clusters) would be selected from the four to ten clusters using simple random sampling. If the cLQAS process lasts six days, then one cluster/PSU could be selected from four segments every day for six days. The objective would be to select a total of six clusters/PSUs per lot and interview 10 households in each cluster/PSU over two to six days or longer.

### 4.3. Select geographic area(s) based on risk and/or resources

National malaria programmes may decide to prioritize certain geographic areas for assessment, due to higher malaria burden, lower ITN coverage, problems experienced during previous campaigns and/or to make best use of limited resources in the case of budget constraints.

To identify areas for prioritization, one approach is to perform a risk assessment and select lots in areas with the most disease burden and other

areas defined as high-risk for any other reason by local MOH authorities. The additional lots in high-risk areas can be in addition to the national frame of lots.

The campaign strategy will ultimately guide the selection of assessment objectives, including selection of geographical areas. Decisions should be validated by the national malaria programme director and shared in updates to the National Coordinating Committee.

### 4.4. Define assessment approaches for household data collection

As part of the protocol, it is important to define approaches to be used during HH data collection. These include:

- **Mobile device data collection application.**

Once the questionnaires have been finalized (Step seven), the mobile device data entry form should be prepared and tested. Special attention should be paid to the drop-down menu or “pick list” which will include the names of the clusters or PSUs and strata (lots). It will be important to confirm that they match the spelling in the list of clusters or PSUs used in the PPS selection of clusters/PSUs.

- **Length of data collection.** As noted in Step two, for in-process assessments it is recommended to conduct data collection during approximately one-third to one-half of the number of days planned for the HHR and/or ITN distribution activities— for

example two to four days for a seven-day campaign activity or five to seven days for a fifteen-day campaign activity— and at the start of or just after the start of the activities. This allows sufficient time to collect data and identify trends while also optimizing budget and staff resources focused during the timeframe when most issues will be identified. For end-process assessments, it is recommended to start data collection just after activities have been completed. From an operational perspective, assessment data collection for six to ten clusters may generally be completed within as few as two days, using three to five teams of one to two surveyors for each team, equipped with vehicles.

- **Identifying eligible interviewees.**

Surveyors should be given guidance to speak with the HH members who most directly participated in the HHR and/or ITN distribution activities. For assessments of ITN distribution from a distribution point it will be important to understand which member(s) of the HH participated in the retrieval of ITNs. Generally, interviewees should be over the age of 18 years as they will likely have the most accurate information about the HH participation in the registration or distribution activities.

- **Determining HH consent standards.**

Assessment protocols should include clear written standards for surveyors to

introduce themselves to HH heads and members and to confirm informed consent from the selected interviewee before proceeding with the interview. For cLQAS, if a household refuses to be interviewed, then another HH is selected for interview until ten households have been interviewed in each selected cluster.

- **Determining approach for HH dwellers not at home.**

For cLQAS approaches, the survey teams can record “not at home” on a row in the data collection form, then randomly select another HH until a total of 10 HHs with successful interviews in the cluster have been completed.

#### 4.5. Conduct real-time analysis of data

If surveyors use mobile technology, interview data can be entered and uploaded to a web database during or at the end of the day during the cLQAS process. The data should be sent to the data analyst by the late afternoon of each day. The data analyst should then share the analysis with the M&E sub-committee and assessment coordinator by the evening of each day or the next morning for review and coordination with the national malaria programme and key partners to determine corrective actions. The M&E sub-committee and/or the assessment coordinator should then share results with regional and district campaign staff daily to support the planning and implementation of corrective actions.

Paper-based data collection systems may also be used, where mobile technology and networks are not available or where resources and other contextual factors do not allow for its use. Assessment supervisors will generally compile paper-based data from surveyors' questionnaires using summary sheets. The supervisor will then transmit the data to district data manager(s) who conduct the data entry and transmit to the data analyst. Daily transmission of the results may still be possible, where surveyors and/or supervisors are able to travel to collect completed questionnaires, or

where surveyors are able to transmit photographed images of completed questionnaires to data managers via email or text messages. Depending on network access, availability of devices and/or vehicles to facilitate the data transfer, there may be a delay in daily data transmission and thus data analysis and corrective action planning. The M&E sub-committee and assessment coordinator can include these potential delays in assessment and corrective action planning with the national malaria programme and key partners to develop alternative approaches and timelines.

For in-process cLQAS, where a main objective is to identify issues and problems during the two to four or five to seven days of the HHR or ITN distribution assessment, real-time data analysis each day and evening is essential to alert ITN campaign supervisors of issues so that they can investigate and take action to improve campaign quality from the next morning. The process of real-time analysis of data is described more completely in [Annex 8](#). For end-process cLQAS, real-time analysis of data can also provide draft analysis products (tables, graphs and maps) within five days of the end of data collection for campaign stakeholders to consider and discuss.

#### 4.6. Analyse and classify lots (primarily for end-process assessments)

Part of the efficiency of the cLQAS methodology involves assessing HHR quality and ITN access and use in broad categories, rather than as precise estimates. AMP has adapted the LQAS lot classification system with three levels following the GPEI model of “Pass”, “Uncertain”, or “Fail” to use slightly different terminology: “Good”, “Uncertain” or “Inadequate”.

As noted in Step two, five **main end-process indicators** are used to classify lots (e.g. districts, sub-districts).

These are:

1. HHs with any campaign ITN
2. HHs that received the correct number of campaign ITNs according to ITN allocation rules
3. ITN use in all ages
4. ITN use in pregnant women
5. ITN use in children under five years old

Note that the first two indicators have HHs as the denominator and the last three have “persons” as the denominator. Therefore, the approach uses proportions or percentages of the indicators to classify each lot for each main indicator.

The **main indicators for in-process assessments** may vary slightly by the number of campaign phases:

- In a *single-phase campaign*, not all HHR indicators are needed in addition to a separate distribution indicator. For example, the assessment questionnaire for a single-phase campaign may include a question asking if the HH was registered and then asking the number of people in the HH and the number of nets received by the HH.
- In a *double-phase campaign*, the assessment questionnaire may include questions asking if the HH was registered and if a(ny) voucher(s) was/were received as part of the HHR assessment and then may ask the number of ITNs received by the HH during the ITN distribution assessment.

In campaigns where one voucher is provided in exchange for each ITN, the questionnaire can be simplified to ask for the number of vouchers or the number of ITNs.

#### Note:

It is critically important that HHR teams continue to register all HHs irrespective of the number of ITNs available for distribution to ensure that the HHR includes all HHs and people eligible to receive ITNs. Campaign assessments therefore need to identify any zones missed during HHR activities.

During the in-process assessment, classification of lots is not the major analysis task. The major tasks are to quickly identify all households that were not registered or identified (both single- and double-phase campaigns), that did not receive the correct number of vouchers or campaign nets, and reasons for the incorrect numbers of vouchers or campaign nets.

**Two-steps to finalize the classification system:** During the pre-campaign M&E planning process, the M&E sub-committee and national malaria programme need to decide on the **classification system breakpoints** for each main indicator and the **decision rules**.

As an example, campaign leaders can decide on classification breakpoints of 90—100 per cent for the “good” level, 80—90 per cent for the “uncertain” level, and under 80 per cent for “inadequate level” for the “at least one ITN”

In addition to the classification breakpoints, the M&E sub-committee needs to decide on “decision rules” for classification. Because of the wide confidence intervals of main indicators for each lot due to the small sample size, M&E leaders need to set the levels of percentages to be classified in the “good” and “uncertain” levels to reduce misclassification errors. For example, to be classified in the “good” category, a lot would need to achieve 95 per cent or greater for main indicator no. 2 (“correct” indicator). Those lots with 90—94 per cent would be classified as “uncertain”. By choosing 95 per cent as the decision rule cut-off for the “good” category instead of 90 per cent, the level of alpha misclassification error (misclassified as “good” when the true percentage is in the “uncertain” range) is reduced to reasonable levels. These procedures for HHR and ITN distribution assessment follow the GPEI practice of setting the decision rule five per cent higher than the lowest level of the classification system interval (95 per cent for the “good” 90—100 per cent level and 85 per cent for the “uncertain” 80—90 per cent level). This topic is discussed in more detail in [Annex 9](#).

**Summary table for the classification of lots:**

To help the M&E sub-committee, national malaria programme and stakeholders, the data analyst should prepare a single summary table of the main indicators showing estimates for all indicators, colour-coded classification for each main indicator, and analysis of the lots which qualify for investigation. In addition, the table should rank districts or sub-districts according to the average of the main indicators using a final index indicator (additional details can be found in [Annex 10](#).) The data analyst then shares the summary table with the M&E sub-committee and assessment coordinator who collaborate with the national malaria

main indicator (because that indicator is easier to reach high levels) and 90—100 per cent, 70—90 per cent, and under 70 per cent for the other four indicators that are more difficult to achieve with higher percentages.

programme to identify who should lead the investigation of lots with low indicators (4.7).

**Data cleaning and analysis:** These procedures include a program file (Stata .do file), [Annex 11](#), that national programmes can use to clean and analyse their data. This program file has several sections including data cleaning, main indicator preparation, weighting and analysis, taking the complex survey design into account. The program file calculates three weight components—base weights, weight adjustments due to unit and item non-response, and calibration/post-stratification weight adjustments. The program file also calculates the main indicators by lot—which is used to create the summary table of classification of lots as mentioned above. Real-time analysis principles should be applied to end-process and in-process analysis.

**Analysis of main and other indicators at higher levels (district, region, national):**

In most cases and for most indicators, a sample size of 300 HH yields a 95 per cent confidence interval of plus or minus 10 per cent or less, which is narrow enough for programme usefulness. Since the lot sample size is 60—100 HH, data from six or more lots can be combined to yield point estimates and reasonable-width confidence intervals, for example, at the district, region or national level. The analysis is similar (with weighting and accounting for complex design) as that in an MIS or DHS. Some indicators may not be suitable for LQAS. For example, as LQAS in its current application is limited by its shorter questionnaire, a register of persons and nets (ITNs) is not currently collected, so questions about individual nets cannot be captured. However, national programmes can modify the questionnaire to capture the data needed.

#### 4.7. Following classification of lots—conduct investigation, identify potential actions and lessons learned

For end-process cLQAS, after lots have been classified (which should be done within three to five days of the end of the last day of cLQAS data collection), the M&E sub-committee and assessment coordinator should meet with the national malaria programme and national monitors and review cLQAS results. For lots that have most indicators in the “inadequate” range (and where data quality is not a likely issue), some investigation should be done. To prepare the investigation, the data analyst can meet with the M&E sub-committee, assessment coordinator, and other key campaign stakeholders to review hypotheses regarding why indicator levels were so low compared to other units. This may include comparing cLQAS and administrative data from logistics and distribution teams and conferring with supervisors and key staff regarding possible contextual factors. These factors may include, for example, operational challenges of reaching HHs in dense urban, remote rural or insecure areas, or availability of vouchers and ITNs to complete HHR and ITN distribution. A list of steps to consider for the investigation is shown in [Annex 7](#).

After low-performing lots have been investigated, then the national malaria programme and stakeholders should consider potential corrective actions and identify lessons learned for the next campaign. During both in- and end-process assessments, decisions regarding corrective actions should first be determined at the national level with the national malaria programme and key campaign stakeholders during the design of the assessment protocol. These decisions should be clearly communicated to each affected regional and district campaign team by the data analyst or assessment coordinator as determined by the M&E sub-committee and corrective actions applied uniformly across geographic areas with inadequate lots. Feedback from district and regional campaign staff should be discussed and shared to support harmonized approaches for corrective actions to address issues identified and to overcome any operational challenges to implementing them.

During and following in- and end-process assessments, **lots classified as inadequate require corrective actions.**

Below are **examples of issues identified and corrective actions** which have been taken to address lots classified as inadequate.

- Vouchers for some HHs indicate the correct number of ITNs per campaign guidance, but several others receive vouchers that indicate an incorrect number of ITNs (fewer or more than planned in relation to the campaign ITN allocation rules). Corrective actions in this context should aim to quickly contact HHR teams to reiterate the allocation rules, re-share key messages from HHR training materials, and review and clarify any questions or points of concern with HHR teams to correct this moving forward. The number of supervision visits should also be increased in lots and for HHR teams where inadequate results are identified.
- Certain communities or zones have not received any HHR visits. HHR teams should be deployed to return and conduct registration of those areas which were missed.
- The number of ITNs planned during microplanning is insufficient to cover registered needs. During door-to-door single-phase campaigns, some national malaria programmes make a contingency stock of ITNs available at pre-positioning sites or distribution sites in advance of the campaign. In fixed-point distribution during double-phase campaigns, campaign staff should review the data early during HHR to make decisions for managing distribution with available ITNs. This may include adapting the maximum number of ITNs available per household or, though not ideal, temporarily borrowing ITNs from other channels (such as routine) and replacing them after the campaign.
- The indicator “information correctly communicated” shows inadequate results. SBC should be re-enforced and re-

emphasized, for example to re-disseminate messages through existing communication channels, such as through health district meetings, community outreach, radio and television spots. SBC teams should be included in daily campaign planning meetings at the regional and district levels so that they can hear the assessment updates directly and discuss the critical SBC actions needed to overcome the challenges identified in lots classified as inadequate.

- Security concerns exist at fixed-point distribution sites. District and regional health authorities should be engaged to speak with administrative authorities to reinforce expectations with populations and ensure the presence of sufficient numbers of appropriate security personnel. ITN distribution teams should also receive a briefing at the end of the day to reinforce security protocols for crowd control, limiting the number of people with access to ITN distribution personnel and the ITN distribution table, and protocols for temporarily closing ITN distribution sites as needed should be established.

#### 4.8. Develop, review, and finalize the assessment protocol

The **assessment protocol** serves as a workplan and description of the decisions made in developing the sampling design, operational and dissemination plans. It will be a key reference document for the national malaria programme to clarify roles and responsibilities of all partners supporting the assessment, for harmonizing

implementation roles and responsibilities across multiple areas and for ensuring standardized approaches in the case of uncertain or failed lots. [Annex 12](#) provides a **cLQAS ITN campaign assessment protocol overview**. The template can be used as a starting point in developing each new assessment protocol.

Key components of an assessment protocol include:

- Country/region context and malaria situation, ITN campaign strategy and summary of decisions leading to undertaking the assessment
- Assessment goal, objectives and priority indicators (Step two)
- Assessment design, including sampling design, selection of geographic area(s), data collection instructions and timeline, setting targets for each priority indicator, and classifying results (Step four and [Annex 12](#))
- Plans for carrying out corrective action if required (Step four)
- Financial plan (Step five)
- Recruitment and training of assessment staff (Steps six, eight)
- Fieldwork (Step nine)
- Plan for data management and analysis (Steps three, six, and ten)
- Data collection, analysis, validation, use and reporting (Step ten)

The draft protocol should be prepared by the M&E sub-committee and submitted to national malaria programme leadership for **review and finalization**. The national malaria programme may also request a review from M&E partners and/or independent experts. While routine programme monitoring, such as LQAS, and disease surveillance are generally excluded from ethical review by institutional review boards, the national malaria programme may need to

submit the protocol for review. It is always safest to discuss with national or local institutional review boards to see if they think that the LQAS protocol and questionnaire need a formal review by the board. After stakeholder inputs are compiled and the assessment protocol is updated, it should be shared with the national malaria programme director for final edits and comments before final review and validation by the National Coordinating Committee.