② **Rapid Mobile Phone-based (RAMP)**
survey toolkit

Implementing a RAMP survey:
practical field guide

Focusing on a LLIN post-campaign survey

November 2012

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RAMP - volume 2
Implementing a RAMP survey: practical field guide

Strategy 2020 voices the collective determination of the IFRC to move forward in tackling the major challenges that confront humanity in the next decade. Informed by the needs and vulnerabilities of the diverse communities with whom we work, as well as the basic rights and freedoms to which all are entitled, this strategy seeks to benefit all who look to Red Cross Red Crescent to help to build a more humane, dignified, and peaceful world.

Over the next ten years, the collective focus of the IFRC will be on achieving the following strategic aims:

1. **Save lives, protect livelihoods, and strengthen recovery from disasters and crises**

2. **Enable healthy and safe living**

3. **Promote social inclusion and a culture of non-violence and peace**

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Foreword

From the beginning, insecticide-treated mosquito bed net (ITN) distribution has been closely linked to innovative evaluation. The first integrated ITN campaign, carried out in Ghana almost a decade ago, was also the first use of handheld computers for public health evaluation in Africa. The resulting rapid, high quality evaluation had an immediate impact. Within six months of that evaluation, WHO and UNICEF had endorsed mass, free ITN distribution campaigns, laying the policy foundation for the global effort we see today. As the global ITN scale-up has progressed, intensive evaluation has created a knowledge base that allows informed decisions and best practice on delivery methods, hang-up strategies and methods of improving utilization. It is this thoughtful approach to programme planning that has maintained international, national and donor confidence in the overall effort.

A key to rapid implementation has been the high degree of country ownership of bed net programming. However, the overall evolution towards country ownership has not advanced as fast for evaluation as it has for other programme elements. While it is now commonplace for countries to plan, budget and implement sophisticated ITN delivery strategies, state-of-the-art evaluation usually requires external support for financing and technical expertise. A principal reason for this lack of local ownership of evaluation has been that the evaluation tools have not been appropriately adapted to the local requirements.

The three volumes making up the Rapid Mobile Phone-based (RAMP) survey toolkit are an effort to empower local ownership of evaluation. The toolkit is part of a vision that high quality evaluations should be able to be conducted using the expertise and resources available at the district level. It takes advantage of two technologies: locally-available mobile phones and EpiSurveyor (now re-named Magpi) software which enables mobile phones to be data collection platforms. Importantly, it is simplified without being simple. It brings within reach of all programme managers state-of-the-art methodology in survey sampling and the use of mobile phones to collect data. With it, local programme managers will not only be able to respond to concerns expressed at national and local level, but also to questions posed by international donors.

During an early integrated measles vaccination/ITN campaign in northern Uganda, a doctor told me that if the measles campaign was successful he could "close the measles ward". He added that if the bed net campaign was equally successful at controlling malaria he could "close the hospital". The developers of the RAMP toolkit hope that enhancing evaluations will be one more step towards our ultimate goal of closing the hospitals.

Mark Grabowsky
Deputy Director, National Vaccine Program Office
Department of Health and Human Services
Washington, D.C.

Acknowledgements

Terminology

In this manual, the personnel involved with the RAMP survey are referred to as follows:

Survey coordinating group: this group may be called the "steering committee". Representation on this group is likely to be at high level from the organization responsible for the survey, stakeholders (including the Ministry of Health) and donors. The health programme manager should attend this committee, as well as the person appointed to be the survey coordinator and the data manager/analyst. This group is responsible for overseeing the planning of the survey, and for ensuring that all technical and practical considerations have been taken into account.

Supervisory support and monitoring team (SSMT): this group is likely to include members of the survey coordinating group. It acts as a support group in the field, ensuring that the procedures as prescribed for the survey are followed, and that supervisors and interviewers are carrying out their duties appropriately.

Survey team: this group consists of all the personnel involved in the field survey, including the survey coordinator, local data manager and analyst, supervisors, interviewers, drivers, local guides and any administrative support staff and volunteers.

Field survey team: this group carries out the interviews in the field. It consists of interviewers and supervisors, supported by drivers and local guides.

Definitions

Dwelling: A structure used for accommodation, such as an apartment, hut or shack, that may be shared by one or more households.

Eligible respondent: Any capable adult member of the household who can provide accurate information about the household.

Household: One person or group of people, related by family ties or not, who live in the same dwelling and usually eat from the same food pot for the principal meals.

Household head: The person that the household identifies as such, male or female.

Sleeping space: A place where people sleep, inside or outside, that could be covered by a single bed net.

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Acronyms and abbreviations

AM	Anti-malarial medications
ACT	Artemisinin-containing combination therapy
GPRS	General packet radio system
HMM	Home-based management of malaria (Kenya)
IRB	Institutional Review Board
IRS	Indoor residual spraying
ITN	Insecticide-treated net
KRCS	Kenya Red Cross Society
LLIN	Long-lasting insecticide-treated net
MERG	Monitoring and Evaluation Reference Group of Roll Back Malaria
MoH	Ministry of Health
PPES	Probability proportionate to estimated size
SRS	Simple random sampling
SSMT	Supervisory support and monitoring team
WHO	World Health Organization

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01.
About this manual

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Volume 2 of the Rapid Mobile Phone-based (RAMP) survey toolkit is a practical guide to the operational aspects and organization of the survey, including detailed planning. Some elements of planning, such as the survey objectives, target population and sampling methods are covered in Volume 1, *Designing a RAMP survey: technical considerations,* which discusses the more technical and theoretical aspects of the design and methodology of the survey.

This volume should be used by the health programme manager, survey coordinator, members of the core survey coordinating group, the data manager/data analyst and resource persons, such as administrators and finance officers. Those undertaking the training of the field survey teams, using Volume 3 of the RAMP survey toolkit, *Training a RAMP survey team: guide for trainers,* may find some sections helpful to give them background information. Field survey team supervisors may wish to read the sections that are relevant to them.

The practical example used in the RAMP toolkit is a survey to measure ownership and use of long-lasting insecticide-treated bed nets (LLINs) following a mass distribution campaign. This volume will help to:
• plan the survey (section 2)
• identify the personnel needed (section 2)
• prepare the budget (section 2)
• address ethical considerations (section 2)
• select and train the fieldworkers (section 2)
• make logistical arrangements to prepare for fieldwork (section 3)
• select clusters (section 4)
• inform local authorities about the survey (section 4)
• decide on the rules for choosing segmentation of clusters or immediate simple random sampling (section 5)
• segment and sub-segment clusters to arrive at the final segment for simple random sampling of households (section 5)
• select households to be interviewed using simple random sampling (section 5)
• become familiar with the survey questionnaires (section 6)
• ensure teams follow a uniform set of procedures when collecting data (section 6)
• supervise the fieldwork and ensure data quality (section 6)
• manage the data in the field (section 7)
• clean and analyse the data (section 7)
• produce a "results bulletin", slides and a final survey report (section 7)
• make decisions about dissemination of results and follow-up action (section 7)

This guide is not intended to be used directly by the field survey team, i.e. personnel carrying out the interviews. Volume 3 of the RAMP survey toolkit, *Training a field survey team: guide for trainers,* consists of a complete curriculum to train supervisors and interviewers who will undertake the survey interviews. The training course is consistent with the tools, forms and examples used in this practical guide to implementation.

02.
Planning and organizing the survey

This section details the planning and organization of the survey, covering the practical aspects of preparing clear objectives, timeline, ethical considerations, approval, development of the survey questionnaire, determining size, composition and responsibilities of each member of the survey team, recruitment and training of personnel to implement the survey, overall survey budget and mobile phone needs.

This section will be most useful for the survey coordinating group, the survey coordinator and the health programme manager, as well as any other person, such as finance officer, involved in the detailed planning of the survey.

2.1 Detailed planning and protocol development

Detailed planning ensures the survey can be completed as efficiently as possible so that management responsibilities can be met, while respecting budget and time constraints. Allowing sufficient time at the planning stage to consider all aspects is critical to the smooth running of the implementation. Planning includes the development of a survey protocol that includes a description of all aspects of the survey, including:
- aim and objectives
- survey design and any questionnaires developed
- survey organization and management
- timelines and deadlines
- training
- field operations and procedures
- ethical considerations
- data management
- expected application of results

2.2 **Aim and objectives**

A description of the aim of the survey and its objectives should include statements about the following:

- why the survey is needed
- target population
- survey population
- stratification/survey domains
- desired precision for all point estimates
- what the survey will measure
- who will be responsible for overseeing the survey
- the timeframe to complete the survey and analysis
- how survey findings will be used

See Volume 1 of the RAMP survey toolkit, *Designing a RAMP survey: technical considerations* for elements of the survey design and data analysis that will help answer these questions and gain a clear understanding of the main aim and the survey objectives.

Examining the objectives in detail and arriving at a precise statement of the purpose, scope, timing and eventual use of the survey results helps implementers to keep focused, and can be used to explain to the authorities and the public why there is a need for the survey and what it should do.

2.3 **Preparing a time schedule for the survey**

The planning phase of the survey should begin as early as possible. On average it is estimated that to complete all phases of the survey process (from planning to dissemination of results) will take between three and five months.

In the example of measuring coverage of LLINs, in deciding the time of year to conduct field interviews, it is important to consider:

1. Factors that may influence LLIN usage, for example:
   - season
   - social mobilization activities

2. Factors that may influence the availability of the target population, for example:
   - agricultural schedule
   - academic schedule
   - market schedule
   - religious schedule
   - migration
   - security

The timing of a survey to measure LLIN ownership and use is often related to its objectives:

1. A survey can be conducted immediately after a mass LLIN campaign (usually within 30 days). This provides advocates and managers with important

information about the success of the campaign, in terms of LLIN ownership. However, if this campaign takes place in the dry season, LLIN use may be lower than ownership.

2. Surveys to measure LLIN use are best conducted in the first peak malaria season after the mass campaign. This provides information about LLIN use when needs are greatest.

3. LLIN ownership and use might be measured in the second or third peak malaria season after the mass campaign to check if coverage has been maintained. In some countries coverage has NOT been maintained, and it is therefore an important element to monitor.

Ideally, every phase of the health survey will be completed within three to five months to ensure the results are current. The fieldwork component will be completed within one week. See Figure 1 for an example of a timeline for a LLIN ownership and use survey.

1 *Responsible: to be determined. A partnership will usually be established to plan and carry out a RAMP survey. Partners may include the Red Cross Red Crescent National Society, the Ministry of Health, the Bureau of Statistics, local NGOs and the International Federation of Red Cross and Red Crescent Societies (IFRC). These partners will often be represented on the survey coordinating group.*

Figure 1: Sample timeline for a RAMP malaria survey

	Activity	Week number												Responsible[1]
		1	2	3	4	5	6	7	8	9	10	11	12	
1	**SURVEY ORGANIZATION**													
1.1	Establish survey coordinating group (SCG)	▓												
1.2	Define mandate and roles and responsibilities of SCG members	▓												
1.3	Prepare detailed work schedule		▓											
2	**SURVEY PROTOCOL**													
2.1	Prepare draft survey protocol		▓	▓	▓									
2.2	Develop survey questionnaire			▓	▓	▓								
2.3	Seek approval by ethical review committee (if required)						▓	▓	▓					
2.4	Translate survey questionnaire (if required) and prepare the web-based version							▓	▓					
2.5	Pre-test survey questionnaire								▓					
2.6	Decide sampling strategies and select clusters			▓	▓	▓								
2.7	Prepare draft budget			▓	▓									
2.8	Finalize survey budget					▓								
2.9	Finalize survey protocol					▓								
3	**MOBILE PHONES**													
3.1	Identify mobile phones for use in the survey			▓										
3.2	Test phone(s)				▓									
3.3	Procure phones					▓	▓							

	Activity	Week number												Responsible
		1	2	3	4	5	6	7	8	9	10	11	12	
3.4	Prepare phones for training							■	■					
3.5	Prepare phones for fieldwork									■				
4	**LOGISTICS**													
4.1	Recruit data manager			■	■	■								
4.2	Recruit interviewers			■	■	■								
4.3	Prepare survey movement plan/ schedule					■	■							
4.4	Plan for interviewer accommodation/ per diems						■	■	■					
4.5	Plan any rental and secure vehicles and other transport						■	■	■					
4.6	Obtain area and cluster maps (if available)					■	■							
4.7	Obtain field supplies						■	■	■					
5	**COMMUNICATION**													
5.1	Develop communication plan						■							
5.2	Social mobilization of chiefs and village authorities							■	■					
5.3	Contact village authorities and Red Cross Red Crescent volunteers regarding advance sketch mapping							■	■					
6	**TRAINING**													
6.1	Select training venue					■								
6.2	Review training programme					■								
6.3	Make adaptations (as appropriate) and finalize curriculum						■	■						
6.4	Prepare/print materials								■					
6.5	Hold pre-training briefings								■					
6.6	Hold training									■				
7	**FIELDWORK**													
7.1	Carry out survey										■			
7.2	Carry out monitoring by SSMT										■			
8	**ANALYSIS AND REPORTING**													
8.1	Process and analyse data											■	■	
8.2	Prepare reports											■	■	
9	**DEBRIEFINGS**													
9.1	Hold survey team debriefing											■		
9.2	Hold partners' debriefing											■	■	

An example of a detailed list of the key activities that need to be carried out can be found in Annex A: *Sample checklist of key activities and tasks for a RAMP survey.*

2.4 Ethical considerations

The health survey should be conducted to the highest ethical standards possible. An investigation should be made to determine whether national policies on ethics for surveys involving human subjects exist in the country. If so, these policies must be respected throughout the planning and implementation of the survey[2].

It is critical that each member of the survey team understands the importance of protecting the rights of the survey responders. This includes their right to informed consent to participate in the survey, their right to decline participation, their right to privacy and their right to be treated without judgement throughout the interview process. To obtain informed consent, a formal script should be prepared and read to the potential respondent (see example in section 6.2).

Once the survey is completed, the confidentiality of the respondents must be strictly protected and in no case should the identification of individuals or families be released in the survey results.

It is also important to ensure the safety of the survey teams, and guidelines should be developed to address issues such as standards for travel and identifying and minimizing security risks.

2.5 Obtaining approval for the survey

The survey must abide by the rules of the country. The manager of the health survey should discuss the nature of the survey with the appropriate national and local authorities. If approval by an ethical review committee or Institutional Review Board (IRB) is required, the proper documentation should be prepared and submitted early enough to gain approval and prevent delays. Obtaining approval may take considerable time and must be taken into account in planning the survey. Sometimes, survey partners or funders may require approval of the survey by their own ethical review committee.

In some settings, surveys may be considered as being management information, not research, and thus approval by an IRB may not be necessary.

2.6 Development of the survey questionnaire

The survey questionnaire(s) must address the objectives of the survey. The partner organizations responsible for the survey should be involved in the development of the survey objectives and the survey questionnaire. The questionnaire will depend on what the survey is designed to measure and the indicators selected.

2   *Adapted in part from World Health Organization (2005),* Immunization coverage cluster survey-Reference Manual. *See: www.who. int/vaccines-documents/ DocsPDF05/www767.pdf.*

For the RAMP LLIN post-campaign survey, model questionnaires have been developed and are provided in Annex B. See Section 6.1 *Interview questionnaires* for more details about the RAMP malaria questionnaires.

A decision will need to be made about the language in which the interviews will be conducted, and time allowed for translation if there is a need to interview in one or more local languages. It is preferable that native speakers of the required language undertake the translation, and that it is checked by being translated back into the original language independently by a different translator. At such times, words or phrases that may be ambiguous or confusing show up, and should be changed in the original so that there is no possibility of ambiguity. The survey coordinator may need to work closely with the translators to ensure that the meaning of questions is well understood.

Once developed, time is needed to prepare the questionnaires using the web-based mobile phone application so that the forms, when downloaded, are in the required language.

Pre-testing of the questionnaires should be done and can provide important information that will help in planning for the fieldwork, such as the average duration of the interview. In addition, pre-testing can identify potential problem areas, such as incorrect skip patterns or unanticipated interpretations. The feedback from the pre-test exercise should be used to revise the questionnaires, if warranted. It is important to establish a date for the finalization of the questionnaires and it is preferable that no changes to the questionnaires take place once the training begins.

2.7 Determining the size of the field survey teams

Determining how many field survey teams and drivers will be needed requires information on the number of clusters to be surveyed and the number of days allocated to the survey. The pre-test should also have given an indication of the amount of time that each interview will take, and therefore approximately how long all the interviews in one cluster (where 10 households, for example, will be selected for interview) should take.

Interviewers

Using the questionnaires developed for RAMP, or very similar, one team with two interviewers per team should be able to complete one cluster per day. Therefore a simple calculation can be completed to determine how many interviewers are needed for the survey.

$$\text{Number of survey teams} = \frac{\text{Number of clusters}}{\text{Number of days to complete the survey}}$$

Number of interviewers = Number of interview teams x 2

Example: the survey team is composed of two interviewers per team and 30 clusters:
- Number of interview teams = 30 clusters / 5 days = 6
- Number of interviewers = 6 teams x 2 persons per team = 12

Supervisors

A supervisor is needed on each field survey team. In the example above, therefore, six team supervisors will be required. The terms "team leader" or "field supervisor" could be used instead of team supervisor. The team size can differ, however, depending on decisions made about the team supervisor. If the interviewers have previous experience of carrying out surveys, the ratio of interviewers to supervisors can be modified such that one interviewer may act as the field team supervisor. If separate supervisors are recruited, depending on the survey, the supervisor could also carry out some interviews in each selected cluster.

Drivers

The distances between each cluster must be known in order to determine how many drivers are needed. For clusters that are geographically spread out, it may be necessary to allocate one driver per cluster. Depending on the clusters selected for the survey, it may be possible to have two teams using the same vehicle on a particular day of fieldwork. A useful exercise would be to map out the selected clusters geographically and devise a route for each survey team. Once this is complete, where and when each team travels can be planned. The costs of a driver and vehicle can be substantial, but before a final decision is made about the number of vehicles, it is essential that feasibility and safety are taken into account.

The example below shows a model for team size and composition. The example is tailored to surveys sponsored by Red Cross Red Crescent National Societies, using their staff and/or volunteers as interviewers and supervisors.

Survey team to measure impact of a state-wide or (sub)-district-wide LLIN distribution
The LLIN survey will collect data from 30 clusters with 10 households per cluster. The survey planners would like to complete the fieldwork in five days.
1 Survey coordinator
6 Field supervisors
12 Interviewers
7 Drivers (maximum; depends on the distance between clusters and road conditions; one driver per survey team plus one for the survey supervisory support and monitoring team; may be fewer if teams travel together or if other modes of transport are used)
Local guides (Red Cross Red Crescent volunteers)/translators (as required)

The RAMP survey can also be carried out for a larger geographical area, even as a survey to measure national-level indicators. For such a survey, it is likely that the pool of candidates for the survey would be drawn from ministries and higher institutes of learning (e.g., schools of public health, universities), and would include individuals with considerable survey experience. The preference would be for candidates with mobile phone-based survey experience. In this case, the model for survey team size and composition might be that of a survey team size of two people, with one person being the team supervisor, while also conducting interviews. A need for one vehicle per field team would be expected since the distance between clusters would be large.

2.8 **Identifying the survey teams**

Conducting a health survey requires a commitment of time and resources, with roles and responsibilities of members of the survey team clearly defined. Team members may be able to take on more than one role, depending on their skill set and availability. The health programme manager will be able to use the roles and responsibilities detailed below to decide on the size of the survey team and prepare a recruitment strategy to ensure the team has the necessary skills to complete each component of the survey. The programme manager will also be able to use this information to assist with the development of a timeframe for the survey, since recruitment and training may take some time.

The overall team conducting the survey is made up of a survey coordinator, a local data manager/data analyst, a number of interviewers and the team supervisors. There may also be a need for personnel to transport the interview teams, and for local guides and translators. The interviewers, supervisors, drivers and local guides/translators are divided into smaller field survey teams.

A supervisory support and monitoring team (SSMT) should also be established to monitor the fieldwork and contribute to ensuring the quality of the survey. The members of this team would usually be drawn from the partners in the survey coordinating group.

The charts below show the main responsibilities and tasks of each member of the survey team, together with the skills that will be required to carry out the role.

Survey coordinator

The survey coordinator reports directly to the health programme manager. The main responsibility is the overall organization and implementation of the health survey. To do this, the survey coordinator will need a variety of skills and experience, in particular leadership, good management and communication skills. Experience of planning, organizing and implementing previous health surveys would be an advantage. If the survey coordinator undertakes the training of volunteers as interviewers, good facilitation skills will be required. Ability to manage information and provide timely detailed reports will be essential.

Responsibilities	Tasks
Plan the health survey	• Outline the survey objectives for approval by the health programme manager • Determine the survey scope • Develop the survey protocol • Oversee the design of the survey • Identify partners • Obtain ethics clearance, if required • Collect necessary information to begin the planning phase of the survey, i.e. background on health programme in the survey area, population data, maps • Ensure that the questionnaires are finalized and translated, ready to be downloaded to the mobile phones • Identify personnel requirements for the survey (e.g., finance, administration, translators, training, data management)
Develop a timeline	• Prepare a timeline for each phase of the survey • Ensure work is meeting specified deadlines

Responsibilities	Tasks
	• Make necessary adjustments in timeline for unexpected or unavoidable delays • Decide sampling strategy (number of domains, when to use simple random sampling, segmentation procedures, etc.)
Decide sampling strategies and select clusters	• Decide sampling strategy (number of domains, when to use simple random sampling, segmentation procedures, etc.) • Ensure that clusters are selected using PPES sampling • If reliable administrative data are available in advance, segment clusters
Seek technical guidance	• Develop a network of statistical or survey experts to provide technical input and guidance, as required • Develop a network of communication technology experts to provide technical assistance and guidance on mobile phones, if necessary • Follow up with any design-related questions that may arise throughout the planning, implementation or report-writing phases of the survey
Selection and recruitment of field survey team	• Decide on size and structure of field survey team • Decide whether survey team will be hired or whether current staff members or volunteers will be used • Develop a recruitment strategy and selection criteria for hiring or selecting as necessary • Interview and hire or select survey team • Arrange any payment
Training of survey supervisors and interviewers	• Organize training for survey supervisors and interviewers • Prepare training materials • Facilitate training • Recruit and brief additional trainers, if needed • Record learning and feedback from training
Oversee fieldwork	• Ensure equipment, maps, materials, population data, survey movement plan, etc. are available to field survey team • Develop an adequate supervisory, monitoring and support mechanism • Ensure that segmentation of each cluster is carried out according to prescribed procedures • Meet with the field survey teams on a regular basis to ensure adherence to procedures and subsequent data quality • Ensure safety of survey team
Oversee data management	• Develop a system of data management
Report survey findings	• Prepare final report presenting survey findings, future action and lessons learnt • Distribute final report to health programme manager and interested partners and stakeholders • Plan and lead stakeholders' meetings and encourage constructive reflection and identification of next steps

Local data manager/data analyst

The two functions of local data management and data analysis may be performed by a single person, depending on the availability of suitably qualified and experienced personnel. The data manager/data analyst works in close collaboration with the survey coordinator and is responsible for managing the full data life cycle needs of the survey, using the data management system that has been established for the survey. Knowledge of the data management system is essential, and he or she will preferably have experience in developing survey questionnaires, and processing and analysing complex survey data. The ability to produce a report on schedule is important. In the field, the local data manager is responsible for data quality, and must have good communication skills to resolve data issues with interviewers and supervisors.

Responsibilities	Local data management tasks
Survey planning	• Work with survey coordinator to finalize the survey questionnaire • Provide guidance on selecting mobile phones and ensure phones are prepared for the survey and tested in the field • Help develop the data management system
Survey implementation	• Ensure data uploaded by interviewers or supervisors each night to a web-based database • Communicate with interviewers and supervisors to resolve data issues • Troubleshoot to resolve day to day problems
Data quality	• Report data issues to the survey coordinator on a daily basis • Communicate with the data analyst (if not the same person) about data issues, and seek to resolve any data issues identified by the data analyst • Report back about data corrections to the data analyst
Report survey findings	• Assist data analyst and survey coordinator to produce the results bulletin within 72 hours of the end of the survey, and a slides set and the final report within one week of survey end
	Data analysis tasks
Survey planning	• Help construct the list of indicators, and assist with the design of the survey (sample size, sampling frame, etc.) • Produce the data analysis plan and adjust sample size and survey design accordingly • Adjust results bulletin structure and survey report structure based on analysis plan • Adjust automated computerized data cleaning and analysis code based on final questionnaire
Carry out data processing and analysis	• After each day of the survey, examine data for potential data errors and resolve errors • Perform data cleaning • Produce analysis outputs (tables, figures) based on the analysis plan
Report survey findings	• Assist data manager and survey coordinator to produce results bulletin and slides set • Contribute to the finalization of the final survey report, especially the discussion section and the introduction/background section

Supervisors

Supervisors report directly to the survey coordinator, and are responsible for the quality and progress of field activities. They play a significant role in ensuring that work is carried out systematically and in accordance with prescribed field procedures. Supervisors are the liaison between the field and the survey coordinator. They will require good supervisory skills, good communication skills and the ability to lead a team. Literacy is essential, as is the ability to be

Responsibilities	Tasks
Announce/introduce survey	• Communicate with the local health and administrative officials in the selected cluster areas to explain the survey and its objectives and to gain their support and cooperation • Answer any questions that arise concerning the survey

methodical and well-organized in order to carry out their duties efficiently and effectively.

Responsibilities	Tasks
Ensure quality of data collected	• Ensure that a uniform set of procedures is followed • Make sure interviewers understand their role and tasks • Prepare materials and equipment for each workday • Make sure that segmentation is carried out correctly • Supervise the interviews and collection of data • Conduct interviews (if assigned this responsibility) • Discuss the quality of their work with the interviewers and check that no errors have been made • View data and edit data (if assigned these responsibilities) before data are sent to the server • Ensure data are sent to the server • At the end of each survey day, organize and submit required forms to the survey coordinator
Ensure safety and well-being of team members	• Be aware of any security issues in the cluster area • Ensure all members of the team return safely at the end of the day • Review and follow safety guidelines and procedures in case of difficulties • Maintain team motivation and morale and foster team spirit • Obtain and manage monetary advances

Interviewers

Interviewers report directly to their supervisor. They are responsible for collecting the data according to the procedures outlined in their training. Since they are dealing with the public, interviewers require good communication skills, empathy and the ability to work well within a team. They should have literacy skills, and the ability to work under time pressure.

Responsibilities	Tasks
Conduct interviews	• Understand the survey objectives • Assist the supervisor to complete the segmentation and mapping of each cluster as appropriate • Introduce and explain the survey objectives to the respondents • Obtain consent to conduct the interview from respondents • Conduct the number of interviews assigned in each selected cluster • Maintain a non-judgmental and impartial manner when conducting the interviews • Conduct interviews in accordance with the information and training that has been provided
Complete data forms	• Ensure that questionnaires are fully complete • Send data to the server • Take note of any data entry errors that may have occurred and report these to the supervisor on a daily basis • Discuss with the supervisor any problems or challenges that arise

Drivers

Drivers report directly to the team supervisor. They are responsible for transporting field teams and the survey supervisory support and monitoring team. As well as the ability to drive safely and within the law, drivers should be recruited who are able to communicate well with team members and the field

supervisor, and preferably have knowledge and experience of the area to be covered.

Responsibilities	Tasks
Provide transport for field survey teams	• Working with maps, local guides, etc., become familiar with cluster areas • Minimize loss of time by being aware of any challenges to access cluster areas • Monitor fuel levels and ensure vehicles are in good running condition • Have a valid driving permit • Drive safely to ensure the well-being of field survey team members and pedestrians at all times • Understand and abide by all transport laws in place
Be aware of security issues	• Drivers can play an important role in being aware of any security issues that may arise and should present this information to the field supervisor

Local guides/translators

Local guides can be used to assist the field survey team with identifying local authorities, organizations and geographic landmarks and dwellings in cluster areas. Local guides should have a good knowledge of the area, and should be able to communicate well with team members and the field supervisor. Translators must have the ability to communicate well in all languages required.

Responsibilities	Tasks
Facilitate introductions	• Introduce the field survey teams to local authorities, community leaders and relevant organizations
Provide knowledge of the area	• The local guide can be a valuable asset in assisting the field survey team with identifying the cluster areas and their boundaries • Provide important information for selecting and mapping segments, and listing and locating households that have been selected to be interviewed
Oral translation	• Translate the survey questions/answers as precisely as possible (for those households when the interview cannot be done in the language chosen for the survey)
Remain impartial	• It is critical that if a local guide/translator is used, they should remain impartial during the explanation of the survey objectives and the interview, and do not influence the implementation of the survey

2.9 Recruitment of the field survey teams

The survey coordinator is responsible for recruiting the survey supervisors and interviewers and organizing their training. The role descriptions provided above will help the survey coordinator to determine the skills that field supervisors and interviewers need. The box below lists the selection criteria used for the field survey teams for the pilot RAMP malaria survey in Kenya, and outlines the recruitment strategy used for selecting the interviewers and the supervisors.

Selection criteria

- Able to read and write in English, with a secondary school certificate
- Available and committed to working for the survey for the required duration
- Familiar with operating a mobile phone (or have a genuine interest in learning how to use a mobile phone)
- Have stamina and be able to work under difficult field conditions
- Able to speak the local language (Swahili and other languages needed to carry out the survey in the sample area)
- Be familiar with the local culture
- Be able to follow instructions
- Be able to work in a team environment
- Gender (see below)
- Be currently involved in the Kenya Red Cross Society (KRCS) Home-based management of malaria (HMM) programme in Malindi district (e.g., as a staff member, volunteer or board member) (desirable but not mandatory)
- Experience in conducting interviews (desirable but not mandatory)
- Previous experience in conducting a household survey (desirable but not mandatory)

Recruitment strategy

Interviewers: an announcement inviting candidates to apply for the post of interviewer for the RAMP survey was prepared. This was disseminated to the pool of high school graduate Red Cross volunteers serving the Malindi district. Potential candidates might not be directly involved with the HMM project, but would be volunteering in other areas. Applications were reviewed by a selection panel, and the interviewers selected.

Supervisors: the supervisors were chosen from the coaches who are seconded to the HMM project from the Ministry of Health (MoH). There are eight coaches serving the project, with one coach attached to each MoH centre. The number of Red Cross volunteers that a coach oversees ranges from 8 to 17.

In the case of KRCS, the selection panel were happy to select volunteers who were involved in the HMM project. It should be decided, however, whether an individual involved in the LLIN distribution campaign or currently serving as a volunteer or living in the intervention area should be involved in the survey being conducted. There is a balance between these individuals potentially being more prone to influence the respondents during the interview process, resulting in bias in the survey results, and their greater understanding of the programme activities and the goals of the survey, meaning they may be more thorough and knowledgeable. They may additionally be very familiar with the survey areas and have an in-depth understanding of the local languages, culture and norms.

It is important to establish the specific criteria that will guide the selection of the survey team members, and to determine a strategy for recruitment, such as direct appointment or open competition. Selection can be done by the survey coordinator alone or could involve a selection panel. Supervisors can be identified before the start of training (as was done in Kenya), or during training. If the latter approach is taken, it will be important to establish the performance criteria that will enable the impartial and informed selection of the supervisors from among the group of trainees.

Gender can be a consideration when recruiting the survey field personnel. Some organizations may have a human resource gender policy that includes an

enhanced commitment to women. There might be a commitment towards gender equality in staffing and opportunities that can affect the approach taken to recruiting individuals for the survey team; for example, establishing a targeted percentage for qualified female recruits, or a gender ratio (i.e. the number of females to males) among interviewers or team leaders. For the malaria survey, there are questions related to the health of the family and children under five years of age. These are areas in which women often play a leading role in the household, or are the caregivers, and in some cultures, there may be a preference to recruit women as the interviewers.

It may be useful to select a few extra interviewers/supervisors, who will attend the training, and will act as alternatives in case an interviewer or supervisor drops out or is not able to participate in the survey.

Survey team members must be given full information regarding the terms of their engagement in the RAMP survey. Issues such as compensation or daily allowances, the timing of any payments, the timing of the training and the survey and the debriefing event, and the travel, accommodation and other arrangements need to be discussed with each candidate. This can be important not only to ensure full commitment from each person but also for his/her morale and psychological well-being.

2.10 Training of the field survey teams

The training of the field supervisors and interviewers is an important step to ensure accurate and reliable data are collected and that the teams work well in the field. A well-trained team is critical in producing reliable survey results. For this reason, a great deal of care should be taken in planning the training. Volume 3 of the RAMP survey toolkit, *Training a RAMP survey team: guide for trainers,* is a companion volume to this manual and should be used when planning and conducting training of the survey teams. The example that is used in training is a survey to measure ownership and use of LLINs following a mass distribution campaign, but the manual could be adapted for any sort of survey. The training manual includes sample agenda, curriculum, detailed trainer's notes and tools such as sample presentations, handouts, administrative forms and evaluation forms. It is consistent with the tools and forms presented in this manual.

During training, the field survey teams will be given details of the survey objectives, the interview procedures, the questionnaires, the mobile technology being used, the field procedures and the reporting requirements.

2.11 Budgeting for the RAMP survey

Most of the costs of the survey come from a two-week period consisting of four to five days of training and approximately five days for implementing the survey, including daily allowances and possible need for accommodation. Local surveys with minimal or no accommodation or transport costs are likely to

be less expensive. Repeat surveys will be less costly if phones from a previous survey are available. If the same interviewers and supervisors are employed, refresher training is likely to cost less.

The survey coordinator is responsible for the preparation of a budget for the survey, but may take advice and technical assistance from the health manager and/or finance officer or partner organizations. Important factors in developing an accurate budget include:
- number of teams and composition of the teams (number of interviewers and supervisors) required to complete the fieldwork within the specified timeframe
- procedures used to gather population data, segmentation and mapping if required, and fieldwork
- availability of the detailed survey movement plan (this will include the number of days needed for the survey and enables the determination of key expenses, such as transport and accommodation)
- purchase of technological devices such as mobile phones and related accessories and supplies
- recruitment and training of the field survey teams

The budget should be carefully considered from the outset, and should cover all needs. It is not generally recommended to include contingency funding, as this implies lack of planning. Information should be gathered about the mobile phone service providers, the geographic coverage provided, and the types of service contracts or air time options available. In some situations, there will be a need to use more than one type of mobile phone service provider since different parts of a country or region may be covered by different providers. The field survey cost usually represents a large part of the overall budget because of the expenses related to renting vehicles, hiring drivers and providing compensation and daily allowances for the field team. It may be possible to decrease costs if, for example, partner organizations, sponsors or government departments lend vehicles and drivers for the survey, or provide low cost or free of charge accommodation.

The following is a list of common survey items that should be included in the survey budget:

Planning
- meeting costs for one day meeting
- local transport for participants
- communication for planning
- area and cluster maps
- recruitment of supervisors and interviewers

Training (x days[3])
- venue rental, including equipment
- catering of lunch and two breaks
- vehicle rental for field practice – two half days
- fuel for vehicle for field test(s)
- transport allowance for supervisors/interviewers
- accommodation for participants
- daily allowances for participants
- transport subsidy for participants
- training materials
- lamination of certificates
- local guides for field practice

[3] Training a RAMP survey team: guide for trainers *has a curriculum spreading over five days, the recommended duration of the training.*

Field survey (x days)
- vehicle rental per day
- other field transport (boat, motorcycle)
- fuel for vehicles
- daily allowances for interviewers and supervisors, including accommodation if required
- daily allowances for drivers, including accommodation if required
- vehicle maintenance, e.g., tyre replacement
- first aid kits for vehicles
- transport and accommodation for survey supervisory and monitoring team
- fuel for survey supervisory and monitoring team

Coordination
- external modem
- internet access (if needed, to provide access to e-mail for the survey coordinator and local data manager)
- stationery and office supplies for coordination
- mobile phones and accessories
- SIM cards for phones
- phone charger for vehicles
- local data manager
- local data manager transport
- local data manager office supplies

Debriefing after survey
- venue rental including equipment
- catering of lunch and one break
- stationery, flipchart, copies
- communication/report
- translation

Bank charges

The spreadsheet program for the budget, with categories as shown above, can be found on the RAMP website (www.ifrc.org/ramp).

2.12 Mobile phones for the survey

The survey coordinator will need to ensure that sufficient mobile phones are available and that all the mobile phones are properly prepared for the training and fieldwork. The following checklist will help to identify key responsibilities for preparing the phones. Ordinarily, the local data manager will act as the technologist to help procure and prepare the mobile phones for the survey by downloading the survey data collection software, e.g., Magpi, and the questionnaires.

Mobile phone checklist

Task	Responsible
1. Identify number of teams/number of interviewers and supervisors to determine the equipment needs. Include additional equipment and supplies if other individuals will be trained on, or will use the equipment during the training or survey.	
2. Identify all system requirements (i.e. number of mobile phones, the brand and model, and needs for equipment, accessories and supplies such as SIM cards and air credit). Before placing the order for the mobile phones, carry out a field test to ensure that the selected brand and model functions in the environment.	
3. Become familiar with web applications to be used.	
4. Prepare budget for mobile phones and accessories and supplies that will need to be purchased. Take into account the geographical coverage of the network providers and the area covered in the survey when deciding which provider to use for the survey. Ensure that sufficient air time/phone credit has been loaded onto each mobile phone.	
5. Order any equipment and supplies that are needed. Ensure that the mobile phones are procured and available at least three to four weeks before the start of training.	
6. Prepare the mobile phones for the training (including field tests) and the field survey (i.e. download web applications and forms).	

Training materials that directly relate to the mobile phones and their use should be prepared. Training should include basics of the mobile phones, navigation, data entry on the mobile phones, hands-on practice, sending data to the server and troubleshooting techniques. Viewing and editing of data can be covered depending on the responsibilities assigned to the field survey teams.

See Annex C for information on which mobile phones are most suitable for the task, and how to prepare and programme the phones before the training and fieldwork.

03.
Field logistics

This section gives examples of materials that need to be prepared in advance of fieldwork. Examples given include a number of checklists and forms to ensure that the field-work runs smoothly, with all procedures well-thought out in advance, and field survey teams trained to follow them. This section will be most useful for the survey coordinator, supervisors and the training facilitator(s).

3.1 Logistics and preparation of materials

The amount of preparation required to organize the fieldwork should not be underestimated. There are many tasks to be completed, and taking the time to carry these out properly and according to a well-thought out plan will help to ensure successful survey implementation. See the sample timeline in Section 2 for recommendations on the time-specific activities that should be undertaken. Good organization is essential before the fieldwork, described in Section 5, begins. One of the essential tasks is the preparation of a number of different checklists and forms, designed to ensure that the logistics of the operation work well.

The survey coordinator must ensure that fieldwork tools and equipment are in place before the fieldwork starts. The success or failure of a survey may depend on logistical issues.

The checklist below can be used to help organize fieldwork[4].

Logistics checklist for survey fieldwork

- **Transport:** Ensure that sufficient vehicles are available to transport the field survey teams and move them in the field as needed. The supervisory support and monitoring team should also have transport to be able to link up with the various field survey teams. In rural or hard-to-access areas, there should be one vehicle for each field survey team. The vehicles should be mechanically fit and kept well serviced for the duration of the fieldwork. Allowance should be made in the budget for fuel, maintenance and unforeseen repairs. Depending on the location of a cluster and travel conditions, it may also be necessary to arrange for other means of transport, such as motorcycles, boats or bicycles.

4 Adapted from World Health Organization. Immunization coverage cluster survey-Reference manual. *Department of Immunization, Vaccines and Biologicals, World Health Organization, Geneva, 2005, WHO/IVB/04.23, p 19. See:* www.who.int/vaccines-documents/DocsPDf05/WWW767.PDF

- *Accommodation:* Accommodation for field survey teams should be arranged for them rather than leaving teams or individuals to find their own. The accommodation should, as far as possible, be conveniently placed to allow the teams to review their day's activities with their supervisor on return from the field. If possible, an arrangement that permits all teams to meet at a chosen site at the end of each survey day can be valuable. This allows a daily procedures and data quality round to be held and ensures direct communication between the field supervisors and the survey coordinator.
- *Meals:* Field survey teams should be provided with either meals or food allowances for the duration of their stay in the field. Time can be saved if daytime meals are arranged for the teams instead of leaving individuals to arrange for their meals themselves.
- *Security:* The security of the field survey teams should be ensured and not taken for granted. Local guides can be useful in advising the teams on places to be avoided and on local etiquette.
- *General protection from the environment:* Field survey teams should be provided with protective materials against the weather, not only for their own welfare but also to protect the data collection tools. Field teams should wear appropriate clothing and footwear suited to the field conditions.
- *Remuneration:* Previously agreed daily allowances should be paid promptly to avoid breakdown of morale.
- *Maps:* To locate the clusters easily, it is important to have large and small-scale maps showing all the areas to be covered by the survey. In addition, the survey coordinator should obtain the key identifying characteristics of each cluster, such as the name of health facilities, names of notable persons, boundaries, landmarks, ease of access, etc. Helped by local guides, field survey teams will use this information, together with the maps, to locate the clusters.
- *Survey materials and supplies:* Basic materials should be supplied to each field survey team. A list of these materials should be made during the planning of the survey. They might include, for example, mobile phones and chargers, a sufficient number of job aids and forms, a carry-bag that can be closed, identification in the form of a badge, t-shirt or bib, etc.
- *Local information:* Each field survey team should be aware of who must be informed of their presence in the survey locality, and should carry a written letter of authorization to show to local authorities. Contact (communication or courtesy visit) with local authorities should occur in advance of the survey.
- *Communication facilities:* Mobile phone or other means of communication between the survey coordinator and the field supervisors must be established for the whole duration of the data collection period.

3.2 Tools for managing fieldwork

To help properly manage the fieldwork, various forms and tools can be useful. Some of these are listed and briefly described below. A selection of sample forms is also listed in this manual in Annex D. See Volume 3 of the RAMP survey toolkit, *Training a field survey team: guide for trainers* for samples of other administrative forms and tools.

1. A **survey team movement plan/schedule:** Survey teams need to know where they are going, and when. The SSMT also needs to know this. The movement plan should be well-organized in terms of distances needing to be covered, type of terrain, availability of transport, etc.

2. An **equipment sign-out sheet:** Mobile phones, related accessories and supplies will be distributed to the field survey teams. It is essential to keep track of the disposition of the equipment and supplies, and ensure that they are returned as per prior agreement and in good condition. A sample equipment sign-out sheet which can be adapted as required is shown below. This form can be filled out prior to leaving for the field, and then used by the survey coordinator to confirm that all the equipment has been returned on completion of the survey.

Sample

Equipment sign-out sheet

Team number:

Team supervisor:

Item	Received (✓)	Returned (✓)
MOBILE PHONE (person's name and phone's identifier number) and CHARGER		
1.		
2.		
3.		
4.		
VEHICLE CHARGER FOR MOBILE PHONES (1 per team)		
POWER BAR[5] (1 per team)		
MAP: AREA MAP		
MAP: CLUSTERS		

Received:

Supervisor signature: . . . . Date:. . . . .

Returned:

Survey coordinator signature: . . . . Date: . . . .

3. A **communications protocol:** Communications between the field supervisors and the SSMT, usually involving mobile phones, must be established for the whole duration of the survey. A communications protocol should be developed that all supervisors must follow. Daily contact is important to monitor the progress of each survey team, enable effective planning for monitoring visits to the field by the SSMT and ensure the safety of the team. The protocol should include the requirement that the supervisor sends a daily text message to a designated person of the SSMT (usually the survey coordinator or the data manager) at the end of each day's work in a cluster. The message should include information such as name of supervisor, date, cluster surveyed that day, total number of households interviewed and whether any problems have been encountered.

5 *A power bar is a device that can be useful because it allows multiple mobile phones to be connected at one time to charge them.*

A sample communications protocol which can be adapted as required is shown below.

Sample

Communications protocol

Survey supervisory support and monitoring team (SSMT):

▶ 0736880xxx (survey coordinator)
▶ 0718489xxx (command centre/data manager)
▶ 0729910xxx (other member of the SSMT)

Sending a daily text message

A text message should be sent to the survey coordinator (0736880xxx) at the end of each day. If you do not have mobile phone reception in the area you must send the text message as soon as you have reception. Ensure that you have at least one mobile phone on your team that uses <the mobile phone service provider for the survey area>.

The message should contain the following:

Team number:
Supervisor name:
Date of the survey: ensure that you have the correct date if you have had to wait for mobile phone reception to send the text
Cluster surveyed: provide cluster number and name
Total number of households interviewed today:
Cluster to be surveyed tomorrow: provide cluster number and name
Problems: No/Yes. If Yes, give an indication of the problem
If the SSMT receives a text with a « Yes » response to "Problems" and we have not yet heard from you, the survey coordinator will try to contact you immediately. In case of an emergency, contact a member of the SSMT immediately/as soon as possible.

For mobile phone technical support

Call the command centre:
▶ 0718489XXX

4. **Contacts list:** A contacts list must be prepared before the teams depart for the field. The list should include all members of field survey teams with their telephone numbers and the name of the mobile phone provider. In addition, the names of the people on the SSMT and the drivers and their mobile telephone numbers must be included. Mobile phone network coverage can vary across the study area. It can be important for a team to have the means of accessing more than one network operator for some areas or clusters. The survey coordinator and data manager too should have a contract with more than one mobile phone network operator. This can reduce the risk of lack of communication between the field teams and the survey coordinator.

5. **A field expenses form:** There will be a number of expenses faced while carrying out the fieldwork. This form should document the distribution of daily allowances to field survey team members. It might also record the payment of expenses such as allowances for local guides and the cost of local transport such as motorcycles or boats. Once completed, the form should be returned to the survey coordinator.

6. **Checklist of field supplies and materials:** Other than the mobile phones, accessories and chargers, there are a number of items that each survey team

member will need to have in the field, with some needed by the supervisor only. It can be useful to have a checklist to help when preparing and compiling the materials and organizing the packages of materials for the survey teams. A sample checklist for the RAMP malaria survey is provided below. The survey coordinator can use this checklist to help prepare packages of materials that will be distributed to the supervisors and interviewers before they depart for the field. The contents of the package for the supervisor will be different from that for the interviewers, and will contain a few additional items.

Sample

Field supplies and materials checklist		
Item	**Number needed per field survey team member (interviewers and supervisors)**	**Available (✓)**
ESSENTIAL		
Letter to authorities	1	
Identification badge	1	
Informed consent script	1	
ITN labels and packaging job aid (pictorial sheet)	1	
Medicines used to treat fever and malaria in children job aid (pictorial sheet or list of medicines used in area)	1	
Persons roster interviewer job aid	Number of interviews that will be completed by each team member + 10% extra	
Ballpoint pen	1	
Clipboard	1	
OPTIONAL		
Team t-shirt, cap, apron, etc.	1	
Bag to carry field supplies	1	
Raincoat or umbrella	1	
Rubber boots	1 pair	
SUPERVISORS ONLY		
Contacts list	1	
Communications protocol	1	
Survey movement plan/schedule	1	
Maps	1 area map for district/region 1 map of each selected cluster	
Monitoring cluster, household and person numbers on the rosters form	1 per cluster	
Recording of potential data quality issues form	1 per cluster	
Segment identification form	1 per cluster (more if sub-segmentation will be needed)	
Sketch map type 1 form	1 per cluster (more if sub-segmentation will be needed	
Sketch map type 2 form	1 per cluster	
List of households for random sampling form	1 per cluster	
Random numbers tables	3 per survey team	
Paper version of questionnaires (in case of network or mobile phone malfunction)	3 per survey team	

A number of these items will also be used during training and this will need to be taken into account when planning the timelines for various tasks. The preparation of the job aid *ITN labels and packaging* will require the collection of the appropriate samples of bed nets and a person to photograph the items and prepare the job aid. The preparation of the job aid *Medicines used to treat fever and malaria in children* may need consultation with a pharmacist or other person knowledgeable about the medicines available in the country and used to treat fever and malaria and the case management of malaria. An example of this aid in the form of a list adapted from the Nigeria pilot RAMP survey is provided in Volume 3, *Training a RAMP survey team: guide for trainers*. A resource that can be useful in classifying artemisinin-containing combination therapies (ACTs) is the "malaria drug database" maintained by ACTWatch[6]. This database contains lists of brand names and associated generic drugs for anti-malarial medicines currently in use.

7. **Field activity report:** Field activity reports allow the field team to manage their field responsibilities and keep a detailed account of the work completed. Field activity reports can be created by the survey coordinator to meet the reporting needs of the RAMP survey that he/she is overseeing.

04. Selecting clusters

This section details the steps that should be taken to select clusters in the area to be surveyed. The survey coordinator will often be responsible for the selection of clusters, and should find this section useful. A tool, the *Cluster identification form*, which can be electronic or paper, has been provided to assist with this task.

4.1 Using the *Cluster identification form*

The sample size and the number of clusters needed to meet the survey objectives have been decided (see Volume 1 of the RAMP toolkit, *Designing a RAMP survey: technical considerations* for a discussion of how the calculation is made). The selection of clusters should be made well in advance of the survey date so that a number of activities that will increase the effectiveness and efficiency of the survey can be carried out. These may include:

- contact with local authorities to inform them about the survey and to sensitize them to the need
- requesting local maps to be provided both for ease of cluster location and for use by field survey teams if they need to segment the cluster (see Section 5)
- requesting local population data, if appropriate

The number of clusters to be selected can be 30, 50, 100, 250, or any number higher than 30. In the fictional example used in this manual, 30 clusters are selected, as would be usual in a RAMP survey. The method described to select clusters is called probability proportional to estimated size (PPES). That is, the probability of a geographical unit (district, enumeration unit, village) being selected as a cluster to be included in the survey depends on its estimated size. The term "estimated" is used before "size" because the exact population size is rarely known. The clusters can be selected using paper or a computer spreadsheet program or can be selected using a computer statistical program like STATA or SAS. The procedures for using STATA and SAS can be found on the RAMP website (www.ifrc.org/ramp). The paper and spreadsheet method will be described below, and is also described in the EPI survey manual[7].

7   *World Health Organization. Immunization coverage cluster survey-Reference manual. Department of Immunization, Vaccines and Biologicals, World Health Organization, Geneva, 2005, WHO/IVB/04.23, Annex D. See: www.who.int/vaccines-documents/DocsPDf05/WWW767.PDF*

It may be necessary to read through the following steps and the example provided a couple of times to understand this process. A computer spread-sheet-based tool called the *Cluster identification form* shown in Figure 2 is used to highlight the steps needed to complete the form and select 30 clusters from the sampling frame. The worksheet can be printed and used as a paper and pencil method, or can be used as an electronic tool using the spreadsheet functions. The blank electronic tool can be found on the RAMP website, (www.ifrc.org/ramp). The sampling frame in this fictional example is limited to 50 clusters although in most real situations the sampling frame may have many more clusters than 50.

Based on our fictional example, list population units in Part 1, their size, and cumulative size, then calculate the sum (the total population found at the bottom of the cumulative size column). This is the sampling frame. That sum is put into item (a). The number of clusters is established – item (b). The sampling interval is calculated automatically – item (c). A random starting point is chosen by the user between 1 (one) and the sampling interval – item (d), inclusive. Then Part 2 is completed to calculate the cumulative size end-point for each cluster. In Part 3, the end-points from Part 2 "hit" certain clusters in the Part 1 list of all population units. Those "hits" are then selected for sampling. In a population unit/enumeration area, these "hits" can result in none, one or more than one cluster being selected.

Figure 2: Cluster identification form: tool for selecting clusters from the sampling frame

NOTE: Complete Part 1, then Part 2, then Part 3

Part 1. Data on all population units in the sampling frame	
a. Total population in the sampling frame (copied from sum of column 4 [item e. Total at bottom] showing size of population unit as number of persons or households) **40,047 persons**	b. Total number of clusters **30**
c. Sampling interval (round up) (a/b) **1334.9** (rounded to **1335**)	**NOTE:** **Complete Part 1, then Part 2, then Part 3**
d. Random start number between 1 (one) and c. sampling interval, inclusive **817**	
d. Choose using a serial number on currency (money) bill or other method	

	Part 1, continued				Part 3. Identification of selected clusters		Part 2. Identification of clusters (after cluster No. 1 is identified, add sampling interval to the cumulative number in the previous row)	
Number	Sub-district	Sub, sub-district (could be enumeration area)	Size (number of persons or households. Persons used in this example)	Cumulative size	Put size number from column 9 Identification of clusters here	Cluster number (Transfer cluster number from column 8 here)		
-1	-2	-3	-4	-5	-6	-7	-8	-9
1	Ngogo	Asakos	820	820	817	1	Random number (identifies cluster No. 1 from item d. above)	817
2	Ngogo	Bokongwe	2,113	2,933	2,152	2	Cluster No. 2 (random number + sampling interval)	2,152
3	Ngogo	Bundu	807	3,740	3,487	3	Cluster No. 3 (Cluster 2 + sampling interval)	3,487
4	Ngogo	Owa	707	4,447			Cluster No. 4	4,822
5	Ngogo	Kempembe	747	5,193	4,822	4	Cluster No. 5	6,157
6	Ngogo	Darmashoni	800	5,993			Cluster No. 6	7,492
7	Ngogo	Notsu	400	6,393	6,157	5	Cluster No. 7	8,827
8	Ngogo	Malabar	1720	8,113	7,492	6	Cluster No. 8	10,162
9	Agome	Bahani	3,173	11,287	8,827 / 10,162	7 / 8	Cluster No. 9	11,497
10	Agome	Dogaville	1,333	12,620	11,497	9	Cluster No. 10	12,832
11	Agome	Glenogan	1,207	13,827	12,832	10	Cluster No. 11	14,167
12	Agome	Nyele	2,060	15,887	14,167 / 15,502	11 / 12	Cluster No. 12	15,502
13	Agome	Hahatosu	560	16,447			Cluster No. 13	16,837
14	Agome	Hekpoe	1,147	17,593	16,837	13	Cluster No. 14	18,172
15	Agome	Kamele	720	18,313	18,172	14	Cluster No. 15	19,507
16	Mulafa	Tomekoni	1,007	19,320			Cluster No. 16	20,842
17	Mulafa	Gajagan	960	20,280	19,507	15	Cluster No. 17	22,177
18	Mulafa	Tihoun	1,233	21,513	20,842	16	Cluster No. 18	23,512
19	Mulafa	Yegonu	1,227	22,740	22,177	17	Cluster No. 19	24,847
20	Mulafa	Lougacoundi	767	23,507			Cluster No. 20	26,182
21	Mulafa	Riverstown	1,500	25,007	23,512 / 24,847	18 / 19	Cluster No. 21	27,517
22	Mulafa	Mirmoz	887	25,893			Cluster No. 22	28,852
23	Mulafa	Fossda	2,793	26,687	26,182	20	Cluster No. 23	30,187

Number	Sub-district	Sub, sub-district (could be enumeration area)	Size (number of persons or households. Persons used in this example)	Cumulative size	Put size number from column 9 Identification of clusters here	Cluster number (Transfer cluster number from column 8 here)	Part 2. Identification of clusters (after cluster No. 1 is identified, add sampling interval to the cumulative number in the previous row)	
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
24	Mulafa	Keneba	933	29,620	27,517 28,852	21 22	Cluster No. 24	31,522
25	Mulafa	Randahar	1,000	30,620	30,187	23	Cluster No. 25	32,857
26	Bossir	Adu	140	30,760			Cluster No. 26	34,192
27	Bossir	Chagama	373	31,133			Cluster No. 27	35,527
28	Bossir	Mkolani	180	31,313			Cluster No. 28	36,862
29	Bossir	Rokka	233	31,547	31,522	24	Cluster No. 29	38,197
30	Bossir	La	360	31,907			Cluster No. 30	39,532
31	Bossir	Langobanu	500	32,407				
32	Bossir	Ranomena	487	32,893	32,857	25		
33	Bossir	Matanga	227	33,120				
34	Bossir	Viraka	280	33,400				
35	Bossir	Makabassi	313	33,713				
36	Wakali	Makabassi South	547	34,260	34,192	26		
37	Wakali	Bitamena	140	34,400				
38	Wakali	Imakry	327	34,727				
39	Wakali	Impitanga	720	35,447				
40	Wakali	Tshikaba	220	35,667	35,527	27		
41	Wakali	Berenti	573	36,240				
42	Wakali	Sotana	547	36,787				
43	Wakali	Lafithia	440	37,227	36,862	28		
44	Sisana	Fatala	533	37,760				
45	Sisana	Madina	187	37,947				
46	Sisana	Dabathi	287	38,233	38,197	29		
47	Sisana	Bore	360	38,593				
48	Sisana	Zigabore	333	38,927				
49	Sisana	Chakimi	940	39,867	39,352	30		
50	Sisana	Jola	180	40,047				
			e. Total 40,047					

Part 1, continued / **Part 3. Identification of selected clusters**

Note: Sub-districts 9, 12, 21 and 24 have two clusters each. This can happen when some units are substantially larger than other units.

4.2 Steps for first-stage selection of clusters using PPES

1. A spreadsheet program is often used to select the clusters. In Part 1 of the *Cluster identification form* or using the spreadsheet that can be found on the RAMP website (www.ifrc.org/ramp), list the names of the clusters, size and cumulative size in columns 2, 3, 4, and 5. A spreadsheet program is usually used because the number of clusters in the sampling frame may be much greater than 100. In column 5, calculate the "cumulative size/population". To obtain a cumulative population, you must add the population of the area to the combined total of all populations in preceding areas. For example, using the fictional example shown in Figure 2, the cumulative population of:
   - Cluster 1 is 820
   - Cluster 2 is 2,933 (820+2,113)
   - Cluster 3 is 3,740 (807+2,933), and so on.

   The final cumulative population for the last area (No. 50 in this example) is the same as the total population to be surveyed. Place this figure in box Part 1a.

2. Next, at the top of Part 1, the sampling interval and the random start number are calculated. The sampling interval is calculated by taking the final cumulative population from column 5 (40,047) and dividing by the number of clusters in Part 1b (30 in the example) and rounding up to the nearest integer (1335). Next, the random start number is calculated by finding a random number from one to the sampling interval, inclusive (817 in the example).

3. The process continues on the right side in Part 2. In column 8 in Part 2, the number of clusters are numbered from 1 to 30 since 30 clusters will be selected. If 100 clusters were required, then there would need to be 100 rows and 100 numbers.

4. In the first row in column 9, put the random start number from Part 1d (817 in the example).

5. In the second row in column 9, put the sum of the random start number and the sampling interval (817 + 1,335 = 2,152 in the example).

6. In the third row, put the sum of the second row and the sampling interval (2,152 + 1,335 in the example).

7. In the fourth row, put the sum of the third row and the sampling interval, and so on until 30 numbers have been calculated.

8. To select the first cluster, find the number in the first row in Part 2, column 9—that number is 817. Then, using column 5 cumulative size/population in Part 1, note where 817 falls. In the example, 817 falls in Cluster 1 (within 1 and 820 inclusive). Now record a "1" in Part 3 column 7 across from Cluster 1 indicating that it was the first cluster selected.

9. To select the second cluster, repeat the same procedure. Find the number in the second row in Part 2 column 7—that number is 2,152. Then, using column 5 cumulative size/population in Part 1, see where 2,152 falls. In the example, 2,152 falls in Cluster 2 (within 821 to 2,933). Note, 821 is the first number in Cluster 2—the first number above or outside of Cluster 1. Now record a "2" in Part 3 column 7 across from Cluster 2 indicating that it was the second cluster selected. This procedure is repeated until Part 3 column 7 has 30 numbers indicating which clusters have been selected for sampling.

Multiple clusters can be selected in a single area. In the example, four sub-districts (9, 12, 21 and 24) had two clusters selected. This is more common when the area has a larger-than-average population. In this case, the procedure for selecting segments to sample (described later) would be repeated more than once.

For clusters found to be inaccessible after making the sampling frame and cluster selection:
- If the problem is temporary (e.g., road blocked) and the place is expected to be accessible in the near future (say within a week or so), the survey of that area can be deferred unless there would be major problems in returning with the survey team later.
- If the duration of the problem is not known, an alternative cluster may be selected by the survey coordinator.

Remoteness of a community is not a reason for counting a cluster as inaccessible.

Advance planning must take account of the characteristics of the area to be surveyed, particularly if it is a large rural area, and provide for adequate time and logistic support to get to remote communities if they happen to be selected as clusters.

4.3 Introduction of the survey to local authorities[8]

Once the clusters have been identified, the local authorities must be contacted in advance of any fieldwork. This may be accomplished by sending out a high-level formal letter of introduction, usually from the Ministry of Health, District Health Management Team or the organization leading the survey, such as the Red Cross Red Crescent National Society, outlining the survey objectives, and requesting the local officials' consent and support in contacting their community members. In addition to the official letter, meetings with authorities and local leaders in the study area can be helpful to give them information and ask them to spread the word about the survey. When the population is notified that survey teams will be conducting interviews in the area, it can help to enhance support for the survey, aid in the planning of interview schedules and limit refusals by potential respondents.

In some surveys, it may be possible to make arrangements with local authorities and community volunteers to complete some advance mapping work to create segments (see Section 5).

8 *Adapted in part from World Health Organization (2005),* Immunization coverage cluster survey-Reference manual. *See www.who. int/vaccines-documents/ DocsPDF05/www767.pdf.*

On arrival in an area to start field interviews, the first step would be to make contact with the officials to introduce the field survey team. A letter of authorization from the survey coordinator should be provided to each supervisor to support his or her team's field activities.

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05.
Segmentation of clusters and simple random sampling

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This section discusses the next steps to be taken after clusters are selected. The rules concerning whether and when segmentation of clusters or simple random sampling should be done are described. How segmentation and sub-segmentation are done in order to randomly select one segment for the final selection of households is shown. Finally, how to carry out random selection of households in the final segment in order to arrive at the list of households that will be interviewed is described. A number of tools and forms have been provided to assist this process.

This section will be most useful for the survey planners, survey coordinator, the training facilitator(s) and field survey team supervisors.

5.1 Rules for choosing segmentation or simple random sampling

Before the field survey teams depart for the survey site, they will be informed which clusters each team has been assigned to survey. This information is provided on the survey movement plan/schedule. Several weeks before the survey, planners should have established rules for sampling within the clusters to select the households to be interviewed. The field survey team will either proceed directly to simple random sampling, or they will segment, and possibly sub-segment the cluster first, followed by simple random sampling. The issue of SRS or segmentation is discussed in more detail in Section 5.2 of Volume 1 of the RAMP toolkit, *Designing a RAMP survey: technical considerations*.

To establish the rules, planners need to decide:
- number of households to be sampled in each cluster
- estimated final segment size (usually 1.5—2 times the number of households to be sampled)
- maximum number of segments if segmentation is used (for example, 10)

Field survey team supervisors should be given instructions in the form of one of three types of rules:

EITHER

Rule type 1

Always start with segmentation of cluster

OR

Rule type 2

Never segment clusters. Always start with simple random sampling

OR

Rule type 3

Start with segmentation if the number of households is more than "x".

Start with simple random sampling if the number of households
is fewer than or equal to "x".

For a RAMP survey, it is most likely that rule type 1 (always segment clusters) will be the method chosen. Reasons for this include cost, feasibility and availability of resources. Field survey teams will receive training in how to carry out segmentation, using the following rules.

**Example: Selecting the households to be sampled
for a malaria survey – instructions to supervisors**

10 households are to be sampled in each cluster. Final segment size should be between 15 and 20 households.

1. Always start with segmentation if the number of households in the cluster is more than 30 (nearly all clusters).

2. If there are fewer than 30 households in the cluster, then start with simple random sampling immediately.

3. In the first phase of segmentation, the maximum number of segments should be 10. Try to create segments that are approximately 15—20 households (they can be larger, but not smaller than 10 households).

4. After the first phase of segmentation, if the segment selected has fewer than 20 households, then proceed to simple random sampling.

5. After the first phase of segmentation, if the segment selected has more than 20 households, then sub-segment into sub-segments that have between 10 and 20 households, select one sub-segment, then proceed to simple random sampling.

To assist the process and ensure that the rules are followed as prescribed, a number of tools and forms have been developed. Figure 3 shows how these tools and forms fit into the processes of segmentation and sub-segmentation, if required.

Figure 3: Flow diagram showing the steps from creating a sampling frame to selecting households by simple random sampling for interview

Make sampling frame using population data available at the lowest level (e.g., enumeration area, district, sub-district, ward, etc.) and enter data (name of administrative levels, population size) on the **Cluster identification form.** See Section 4

Select 30 clusters from the sampling frame using the **Cluster identification form.** See Section 4

OPTIONAL

Start SRS of all households in each cluster

Start segmentation of each cluster using locally-available data of administrative sub-units (sub-district, wards, villages, etc.). Use **Segment identification form** to randomly select one segment in each cluster

If administrative sub-unit data are not available, use **Sketch map type 1** to divide cluster into 2 to 10 segments. Use **Segment identification form** to randomly choose one segment

If chosen segment is too big, repeat the segmentation process using another **Sketch map type 1** to divide segment into 2 to 10 sub-segments. Use **Segment identification form** to randomly choose one sub-segment

Assuming that (sub)-segment is small enough to map all households, make a **Sketch map type 2** to show all households in the selected (sub)-segment. Consecutively number all households (number will be called, "map household number")

Use **List of households for random sampling** to randomly select 10 households (or number needed). On the **List of households,** the 10 selected households are given a consecutive number from 1 to 10 called the "household interview number"

Interviewers proceed to the ten households for interviews

5.2 Segmentation and sub-segmentation

The process of sub-segmentation is identical to segmentation. The cluster sampling and segmentation rules, as shown above, provide sufficient guidance about whether sub-segmentation will be needed. For example, if the number of households to be sampled is 10, final segment size is between 15 and 20, and the maximum number of segments is 10, then a single phase of segmentation is likely to be needed (without sub-segmentation), if the total number of households in the cluster is less than 150. Sub-segmenting is likely to be needed if the number of households in the cluster is more than 200. Very often the survey coordinator will know this in advance of the survey by means of the administrative data that will have been requested, and can advise the field survey teams accordingly.

Clusters will be split into unequal size segments. "Unequal" segment sampling[9] is so called because the segments do not need to be the same size (as measured by the number of households or population). It uses probability proportionate to estimated size (PPES) to select segments and is very similar to the method for selecting clusters at the first stage.

Sometimes, clusters can be easily sub-divided into smaller segments using official administrative units like sub-districts, wards, settlements or villages. If official administrative units are available, then one administrative unit would be selected, using PPES. Selecting segments or clusters by PPES is standard survey practice.

Lists of villages can be used (in either identifying clusters or segments/sub-segments of clusters), if the survey leaders have high confidence that the list is complete. However, caution is needed. If the list may be missing villages or some percentage of villages, then the list should not be used during the survey to select clusters or segments.

Survey planners will establish a target range of households for the size of the segments in the final segmentation phase (e.g., 15 to 20 households, 20 to 40 households, 30 to 50 households) depending on the number of households targeted for interviewing (e.g., 10, 15, 20, or 40 households), resources and other considerations. As noted in Volume 1 of the RAMP toolkit, *Designing a RAMP survey: technical considerations*, the size of the segment that is easiest to map is between 1.5 and two times the number of households to interview.

Selecting segments and sub-segments differs from selecting clusters in the following way:
- a single segment is selected, not multiple segments/clusters
- the segments or sub-segments are often divided into segments using a hand-drawn sketch map, whereas clusters (district, enumeration areas) often have professionally drawn maps

For a RAMP survey, the unequal segment method involves the following six steps:

1. identification of the cluster area

2. segmentation using administrative sub-units (if available)

9 Brogan D, Flagg EW, Deming M, Waldman R. Increasing the accuracy of the Expanded Programme on Immunization's cluster survey design. *Annals of Epidemiology, 1994, 4(4):302–311.* See: *www.ncbi.nlm.nih.gov/ pubmed/7921320*

3. additional segmentation (if required) using a *Sketch map type 1*

4. sub-segmentation (if required) using a *Sketch map type 1*

5. mapping and numbering of the households in the segment/sub-segment selected using a *Sketch map type 2*

6. selection of the houses to be interviewed by simple random sampling

5.3 Selecting one segment using official local administrative units

Start segmentation of each cluster using locally-available data of administrative sub-units (sub-district, wards, villages, etc.). Use **Segment identification form** to randomly select one segment in each cluster

If clusters are too big for simple random sampling, they can be divided into smaller pieces using official local administrative units if the information is available. To select one segment, the RAMP survey method uses a form called the *Segment identification form*, which is very similar to the *Cluster identification form*. The differences are as follows:

- size is usually number of households and not population (but can be either). Divide the population by the average number of people in a household to arrive at the number of households. This manual uses five persons in an average household
- selection of only one segment instead of multiple (30) clusters
- since only one segment is chosen, only a single random number is chosen ("random start number"). When choosing clusters, 30 numbers are identified
- no "sampling interval" is used to select the one segment
- there are only two to ten segments in the "sampling frame" as compared to possibly hundreds when choosing clusters

The *Segment identification form* should be used as follows:

1. In Section 1 of the form, in columns 2 and 3 list the names of all the sub-units and the size (number of households) in each sub-unit. In this fictional example, there are five sub-units (villages) in the administrative unit Fossda, which is a sub-district of Mulafa. The number of households is provided in column 3.

2. In column 4 of the form, calculate the "cumulative number of households". To obtain a cumulative size, you must add the number of households of the administrative sub-unit to the combined total of all households in preceding sub-units. The final cumulative number of households is the same as the

total number at the top of the form. In the example the cumulative number of households of:

- Sub-unit 1 (Village A) is 114
- Sub-unit 2 (Village B) is 204 (114 + 90)
- Sub-unit 3 (Village C) is 361 (204 + 157)
- and so on.

3. At the top of the *Segment identification form*, insert the total number of population or households (559 households in this example) in all the administrative sub-units. Next, again at the top of the form, calculate and insert a single "random number". The random number is found by selecting a random number from one to the total number of households in all sub-units (559 in the example), inclusive of one and the total number. In the example, the number 312 was the random number. See Annex E for a description of how to generate random numbers.

4. Using the "random number" from the top of the form, identify which sub-unit contains the random number in column 4 and mark an "X" in column 5 for that selected sub-unit (village C). This sub-unit is the one selected for further sampling.

Segment identification form				
Example: Using the Segment identification form to select one administrative unit during the process of sub-dividing a cluster. From the fictional population shown in Figure 2, this example is based on cluster 20, sub-district of Mulafa, sub-sub-district Fossda				
Total size (households) of all the administrative units listed below Random number from one to total size				559 households 312
Consecutive number	Name/label of segment, sub-segment or administrative unit	Size (households)	Cumulative size (households)	Unit selected (mark with "x")
Column -1	-2	-3	-4	-5
1	Village A	114	114	
2	Village B	90	204	
3	Village C	157	361	X
4	Village D	83	444	
5	Village E	115	559	
6				
7				
8				
9				
10				

After the one sub-unit has been chosen, there are two possible next steps. If the number of households in the segment is small enough to map, number and interview households, then it is appropriate to proceed to the phase of simple random sampling of households (see Section 5.5). If the number of households is still too large or the households are spread in an area too large, then further segmentation is required to create a segment that is smaller. The rules provided by the survey planners should define the criteria for proceeding to sub-segmentation, including a clear instruction for what is considered "too large".

5.4 Segmentation of the cluster or administrative sub-unit using a sketch map

If administrative sub-unit data are not available, use **Sketch map type 1** to divide cluster into 2 to 10 segments. Use **Segment identification form** to randomly choose one segment

Sketch maps can be used to divide clusters or administrative units into smaller segments under two circumstances:

1. if clusters do not have small official local administrative units that can be used for selecting a segment

2. if the cluster has been divided as much as possible using existing administrative units/sub-units, but the selected sub-unit is still too big to map and interview households

Any type of sketch map can be used to divide an area into segments. Figure 2 is an example of a hand-drawn *Sketch map type 1* in which natural boundaries (roads, rivers, footpaths, house of the chief) are used to divide the sub-unit.

The ideal situation is to map households and not just dwellings or structures. There may be more than one household in a dwelling or structure. Although it is always advantageous to map households rather than dwellings, in *Sketch map type 1* the difference between the two has little practical significance.

For the RAMP malaria survey example, using a *Sketch map type 1: creating segments for the cluster, segment or sub-segment*, each cluster is divided into approximately two to ten segments (in terms of number of households or population size) using the available physical features of the area and local data. The size of the segments can be different: some segments may have up to two or three times the number of households as other segments. One of these segments is then randomly selected using PPES, then, if the segment is still too large, the area is further sub-segmented (and sub-sub-segmented) until there are between two and ten smaller segments of approximately 15 to 20 households each. Then one of these segments is selected by PPES. A second type of sketch map (which is called *Sketch map type 2: mapping and numbering households for simple random sampling in the selected cluster, segment or sub-segment*) is created with the selected segment showing all 15 to 20 households, and ten households are randomly selected from that segment to be interviewed.

The steps in the process of segmentation are shown below. Within the description of these steps, an example of sub-dividing an administrative unit that has a total of 157 households is used to illustrate the selection of one segment.

1. Prepare a *Sketch map type 1*, dividing the cluster, administrative sub-unit or segment into smaller parts according to natural boundaries such as roads, rivers, large trees, a field, a footpath, etc.

> If chosen segment is too big, repeat the segmentation process using another **Sketch map type 1** to divide segment into 2 to 10 sub-segments. Use **Segment identification form** to randomly choose one sub-segment

Figure 4: Segmentation using *sketch map type 1*. An example of dividing the area into segments
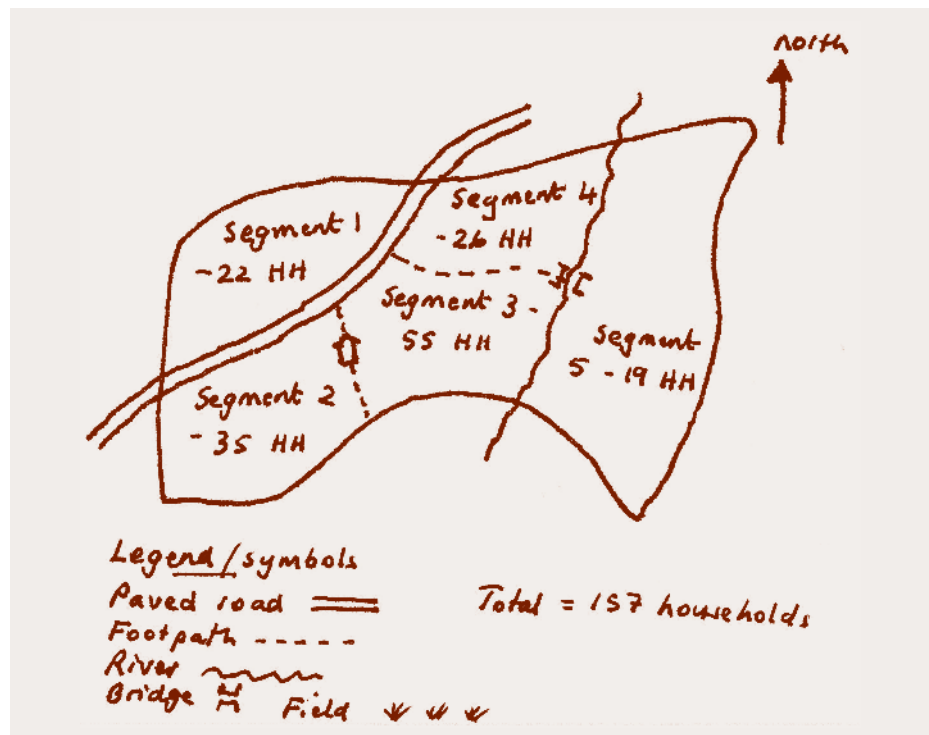
2. Use the *Segment identification form* to list the temporary names (Segment 1, Segment 2, etc., or Sub-segment A-1, A-2, A-3, etc.) of the segments in column 2.

3. In column 3, record the estimated number of households (or population) in each part on the map using all available local data, such as census, immunization, maternal and child health register, village data, knowledge of village leaders, knowledge of community worker, etc.

4. In the example, the area is divided into five segments, then the number of households in each of the segments is assigned. These five segments become the sampling frame for this phase of the segmenting. The number of households or population can be used to estimate the size of each segment. Note

that five segments are used in the example, but the number of segments can be any number. Generally between 2 and ten segments are used. The size of the segments does not need to be equal.

5. In column 4, calculate the "cumulative size/households/population". To obtain a cumulative number of households, add the number of households of the segment to the combined total of all households in preceding segments. The final cumulative number of households is the same as the total number of households (157). In the example, the cumulative number of households of:
   - Segment 1 is 22
   - Segment 2 is 57
   - Segment 3 is 112
   - Segment 4 is 138
   - Segment 5 is 157

6. At the top of the *Segment identification form*, insert the total number of house-holds or population (157) in all the segments.

7. Next, again at the top of the form, calculate and insert a "random number". The random number is found by selecting a random number from one to the total number of households in all segments (157 in the example), inclusive of one and the total number. In the example, the number 74 was the random number. See Annex E for a description of how to use a table of random num-bers, or how to use currency notes to choose the random number.

8. Using the random number from the top of the form, identify in column 4 (cumulative number of households) which segment contains the random number and mark an "x" in column 5 alongside that selected segment. This segment is the one selected segment for further sampling. In the example, the random number selected (74) falls within Segment 3, thus we will select households from Segment 3 (55 households).

Segment identification form				
Example: Using the Segment identification form to identify one segment during the process of sub-dividing a cluster or segment				
Total size (households) of all the segments listed below Random number from 1 to total size				**157** **74**
Consecutive number	Name/label of segment, sub-segment or administrative unit	Size (Number of households)	Cumulative size (Number of households)	Unit selected (mark with "x")
Column -1	-2	-3	-4	-5
1	Segment 1	22	22	
2	Segment 2	35	57	
3	Segment 3	55	112	X
4	Segment 4	26	138	
5	Segment 5	19	157	

After the one segment has been chosen, there are two possible next steps. If the number of households in the segment is small enough to map, number and interview, then the next phase is simple random sampling of households (see Section 5.5). If the number of households is still too large or the households are spread in too wide an area, then the next phase is sub-segmentation (an identical procedure to segmentation) to create a segment that is smaller.

If the segment is too big, another *Sketch map type 1* (Figure 5) is made to divide the selected segment into smaller sub-segments. Segment 3 is divided into three sub-segments (3A, 3B, and 3C).

Figure 5: Dividing the selected segment into smaller sub-segments using *Sketch map type 1*
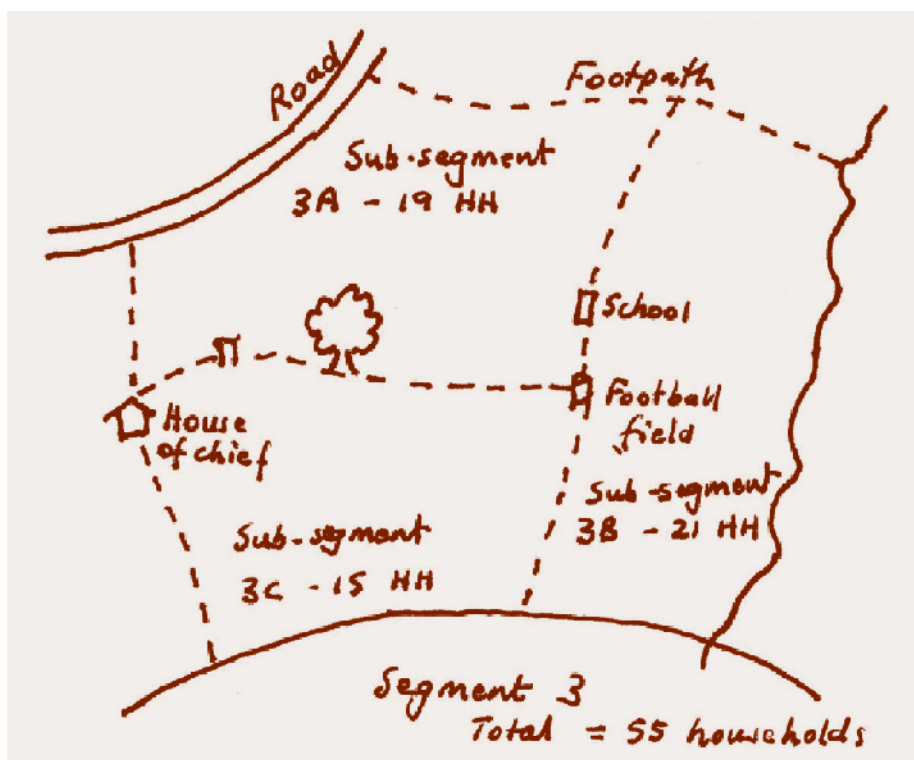
Then, another *Segment identification form* is used to choose one sub-segment. An example is shown below, where Segment 3B (21 households) is selected to begin simple random sampling of households. The completed *Segment identification form* for the sub-segmentation of the example cluster is shown below.

	Segment identification form			
	Example: Using the Segment identification form to identify one sub-segment during the process of sub-dividing a cluster			
Total size (households) of all the segments listed below Random number from 1 to total size				**55** **29**
Consecutive number	Name/label of segment, sub-segment or administrative unit	Size (Number of households)	Cumulative size (Number of households)	Unit selected (mark with "x")
Column -1	-2	-3	-4	-5
1	Sub-segment 3A	19	19	
2	Sub-segment 3B	21	40	X
3	Sub-segment 3C	15	55	
4				
5				
6				

5.5 Selecting households to be interviewed

> Assuming that (sub)-segment is small enough to map all households, make a **Sketch map type 2** to show all households in the selected (sub)-segment. Consecutively number all households (number will be called, "map household number")

Once a segment or sub-segment small enough to map, number and interview has been selected, the process of simple random sampling of households begins. In summary, the households are mapped, a number assigned to each household, and households selected at random for interview. The detailed steps are listed below.

1. Make a *Sketch map type 2* (used to list and number households for simple random sampling) by household of the selected segment or sub-segment (Figure 6), sub-segment 3-B with 21 households in the example.

2. Consecutively number the households. These numbers will be called the "map household numbers". The number of mapped households may be different from the number estimated, particularly if it is known that there is more than one household in a dwelling. In *Sketch map type 2*, those preparing the map should map households whenever possible. In Figure 6, the number of households mapped in sub-segment 3-B was 21.

Figure 6: **Numbering households using *Sketch map type 2***

> Use **List of households for random sampling** to randomly select 10 households (or number needed). On the **List of households**, the 10 selected households are given a consecutive number from 1 to 10 called the "household interview number"

3. Next a tool called *List of households for random sampling* (see below) is used to list all map household numbers (21 household numbers in our example) from which to choose some of those households (10 households in our example) by simple random sampling. The map household numbers are found in Column 1. Next, mark the number of the last household (household 21 in the example) and draw a line across all three columns under number 21 (from 22 to 50: see Figure 7 for an example) to include all those numbers that will not be used for simple random sampling.

4. The number of households to be selected at random was decided during the design of the survey. In the malaria example, 10 households per cluster will be selected to be visited for interviewing. The number of households to be selected for interviewing per cluster can be any number, but should follow the original design and sample size calculation. Although 10 households will be selected for visiting, some households may not be interviewed because all potential respondents are absent. In this case, some households will be recorded as "no response" or "missing". **Alternate households to replace those that had "no response" or were "missing" will <u>not</u> be chosen**.

5. Using a random numbers table or other random method (see Annex E. Generating random numbers, Method B, first example), choose 10 random numbers between 1 and 21 inclusive, and in column 2 mark those households selected with an "X". The numbers 1 to 21 refer to the "map household number". In column 3 put consecutive numbers (1 to 10). The number in column 3 will be called the "household interview number" or just the "household number". For the malaria RAMP survey, this household number will be used on all three questionnaires and will be put into the mobile phone.

Figure 7: List of households for random sampling

Example: List of households for random sampling					
Cluster _#16 (Mojani, sub-segment 3B)			**Team supervisor** .... *Beauty*		**Date:** *2 November*
Map household number (number of the household from the map of households) -1	Selected at random (mark with an "X") -2	Household interview number (consecutive household number assigned for households chosen at random (and marked with an "X" in column 2) -3	Map household number (number of the household from the map of households) -1	Selected at random (mark with an "X") -2	Household interview number (consecutive household number assigned for households chosen at random (and marked with an "X" in column 2) -3
1	χ	1	26		
2	χ	2	27		
3			28		
4	χ	3	29		
5			30		
6			31		
7			32		
8			33		
9			34		
10			35		
11	χ	4	36		
12	χ	5	37		
13	χ	6	38		
14	χ	7	39		
15			40		
16	χ	8	41		
17			42		
18			43		
19			44		
20	χ	9	45		
21	χ	10	46		
22			47		
23			48		
24			49		
25			50		

6. The team supervisor then assigns households 1 to 10 to interviewers.

7. There is a possibility that *Sketch map type 2* and the *List of households for random sampling* will contain a dwelling with multiple households. This should be a rare event since the interviewers and village or local assistants should have mapped every household with its own icon, even if two or more households share a dwelling. However, if interviewers find more than one household in a multi-household dwelling that was mapped/listed, then all households should be interviewed (extra households will be given higher household numbers like 11 or 12 if 10 households were to be sampled).

> **Interviewers proceed to the ten households for interviews**

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06.
Conducting
the fieldwork

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Following a description of the questionnaires developed for the survey, this section focuses on the actions that are taken during the survey fieldwork: obtaining consent, conducting the interviews and ensuring the quality of the data collected. The information will be most useful to the survey coordinator, data manager and training facilitator(s). Supervisors may wish to familiarize themselves with some of their responsibilities. A number of tools are provided to help guide the work of the field survey teams.

6.1 Interview questionnaires

This manual uses the example of a RAMP survey to measure the ownership and use of LLINs following a mass distribution campaign. For that purpose, a set of questionnaires was designed and created using EpiSurveyor (now called Magpi). There are three main questionnaires in the RAMP malaria survey:

1. household questionnaire

2. persons roster

3. net roster

The household questionnaire includes an introduction, and asks questions about sleeping spaces, indoor residual spraying (IRS) and household characteristics and assets. The persons roster questionnaire records data about each person that slept in the household last night (name, line number, gender, age). For children under five years of age, there are questions regarding fever within the past two weeks, treatment with fever-reducing and/or anti-malarial drugs (e.g., artemisinin-containing combination therapy (ACT)), and whether the child with fever received a blood test to diagnose malaria. The net roster collects data about each net owned by the household, including source, brand, and who slept under each net the night before.

An interviewer job aid *Persons roster and who slept under which net last night* (see Section 6.5) has been developed for use during the interview, following the data entry for the household questionnaire.

While the RAMP malaria survey consists of standardized core questionnaires, it is possible to include additional questions that may be relevant to decision-makers. In the Namibia survey, for example, discussion among partners led to the addition of questions about the cause and prevention of malaria.

The starting point for the malaria survey questions comes from Roll Back Malaria (RBM) Malaria Indicator Surveys, 2012 version. Selected questions were chosen from this version and additional questions were included that had special interest for IFRC (e.g., Has a community volunteer visited this household in the last six months to talk about malaria or mosquito nets?).

The model RAMP malaria survey questionnaires, consistent with the instructions in this manual, are shown in Annex B. When a new survey is being planned, the model questionnaires should be reviewed. It may be decided to adjust the model questionnaire to produce a final version that suits specific needs, for example based on the requirements of stakeholders. If it is decided to alter any of the questions, however, it must be done with careful consideration of how the changes might affect the data analysis.

The text of the questionnaires is from the export function of Magpi (previously EpiSurveyor). A "label" variable is one in which the text is shown on the screen of the mobile phone but no data are entered.

Within variable names, hh=household questionnaire, rp = roster, persons, and rn = roster, net.
The filenames of the model questionnaires are MAS_Household, MAS_Person, and MAS_Net (MAS = Master). Potential users should visit the RAMP website (www.ifrc.org/ramp) to see the most up-to-date questionnaires, resource materials and information on how to access and copy the model malaria questionnaires for adaptation.

For training, the export function of Magpi (EpiSurveyor) can be used to export the web-based questionnaires that have been developed, and the questionnaires then further formatted so that a paper version of the questionnaires can be produced (see Volume 3 of the RAMP toolkit, *Training a field survey team: guide for trainers*, to see an example of a paper version.) This can help the surveyors to become more familiar with the questionnaires and aid the trainer as he or she delivers the training sessions.

6.2 Obtaining consent from respondents

Before conducting an interview, it is essential for the field survey team to explain the survey to each respondent and obtain his or her informed consent. Respondents have the right to refuse participation in the survey.

The field survey team members should be correctly identified. If they are from the Red Cross Red Crescent National Society they must wear the bib or identification badge provided for the survey, and should behave according to the Code

of Conduct of the National Society and the principles and values of the Red Cross Red Crescent Movement. Other organizations leading the survey should ensure similar conditions.

On reaching a household, the interviewer should ask to speak to the head of the household or an adult member. To obtain consent to conduct an interview, an informed consent statement should be read to the (potential) eligible respondent and consent obtained. An eligible respondent is a person who is qualified to be interviewed for the survey. The person must be a capable adult member of the household, often the household head. To minimize measurement bias, only one respondent should be selected for each household interviewed in a cluster.

The informed consent script should include:
- a greeting and an introduction to the interviewer
- an explanation of the purpose and importance of the survey
- the survey procedures
- statements describing the confidential and voluntary nature of the survey
- statements explaining the respondent's right to skip any questions and to end the interview at any time

In some countries, if verbal consent is obtained, this must be recorded on a separate form and signed by the interviewer, and (in some cases) by the respondent too.

A sample of the script for informed consent for the RAMP malaria survey is shown below. The interviewer should proceed as follows:

INFORMED CONSENT STATEMENT

Say: "Good morning/good afternoon Sir/Ma'am. My name is . . . .
and I am a volunteer with the <insert name of Red Cross Red Crescent National Society/lead organization>. The Red Cross Red Crescent is working with the Ministry of Health and other partners to improve malaria prevention in <insert name of region/district>. Malaria is a major problem in our <region/district> and we are working together to carry out a survey about malaria prevention. Your village is one of 30 randomly selected villages where the survey will be conducted. We are visiting people in their homes and your household has been randomly selected to see if you would be willing to share some information about the malaria-related activities regarding your family."

Say: "We want to learn how well the malaria prevention programme is working in <insert name of area>. I would like to ask you some questions about mosquito bed net use in your home, and also some general questions about your child[ren]'s health and other things that are linked to malaria. This should only take about 20 to 30 minutes. A mobile phone will be used to collect the information you provide."

Say: "Note that your participation in this survey is voluntary. You can refuse to answer any questions and can end the survey at any time. If you agree to take part, your answers to all questions will remain strictly confidential. No information released about this survey will bear your name or identity. I hope that you will participate in this survey since your views are important and the survey will help the health of the children and families in <name of region/district>."

Say: "At this time, do you have any questions about the survey?"

Say: "Do you agree to participate in this survey? May I begin the interview now?"

Once the interviewer has the consent of the eligible respondent for the household to participate in the survey, he/she should begin to administer the survey. On completing the interview, the interviewer should say:

Say: "Thank you very much for your time today [and for allowing me to come into your home]. Make sure that all members of your household sleep under insecticide-treated bed nets every night of the year to be protected from malaria."

If the respondent refused consent to participate in the survey, the interviewer should be polite and thank the person for their time.

6.3 Interview techniques

The quality of the data collected depends on many factors and the field team certainly plays an important role during the interviews. The following list provides a guideline for effective interview techniques:

EFFECTIVE INTERVIEW TECHNIQUES[10]

1. Introduce yourself, your organization and the purpose of the survey (show document or letter if necessary).

2. Maintain confidentiality: do not interview the respondent in the presence of others (unless he/she indicates otherwise). Explain that all answers will be kept confidential.

3. Ask questions exactly as written.

4. Wait for a response; be silent, then follow up if necessary.

5. If the respondent does not understand or the answer is unclear, ask the question again, making as few changes in wording as possible. Do not violate the intent of the question.

6. Do not suggest – by tone of voice, facial expression or body language – the answer you want.

7. Do not ask leading questions, questions that signal the correct answer 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; do not make the interview seem like an interrogation.

11. Know the local words for sensitive or delicate topics.

Once the interviewing is finished, a data quality tool called *Monitoring cluster, household and person numbers on the rosters* is used by the team supervisor to list all households that were targeted for interviewing (see Figure 8).

Determining the best possible interview schedule by checking during the planning stage on factors such as market days, daily work routines, religious events, village meetings, holidays, etc., is advisable. Once interview dates are planned, contacting local authorities in advance of the dates and asking them to ensure that the population in the study area is present at the time, and aware of the importance of the survey, should help to avoid the problem of respondents not being at home.

If there is no one at home at the first visit, the interview team must revisit the house at least one more time during the same day. A message may be left with someone locally to explain when the interviewers will return. If the field team has made every attempt but has still not been able to conduct the interview at a selected house, this should be recorded and an entry made in the mobile phone indicating a "missing household". In the malaria survey, a record is entered into the household questionnaire recording the interviewer name, cluster number, household number, and a "no" response for the question about whether the household was interviewed. The interview team should not select an alternate household to be interviewed.

6.4 Field procedures and data quality

The quality of the data collected will depend greatly on strict adherence to the correct field procedures. The supervisors will be responsible for ensuring that the survey procedures prescribed during training are followed and for monitoring the performance of the team's interviewers. The interviewers in turn are expected to pay careful attention to correct data entry. This is essential for ensuring quality data and simplifying the tasks carried out by the data manager.

Observing interviews or re-interviewing respondents are important aspects of data quality. A supervisor can often observe 30 to 50 per cent of the interviews if there is one supervisor and two interviewers. It is especially important to observe the interviews during the first two days of fieldwork to ensure that interviewers understand the mechanics of high-quality interviewing. After each observation, the supervisor should provide feedback to the interviewer about his/her performance. If supervisors are observing fewer than 20 per cent of the interviews, then the survey planners may consider arranging for supervisors to re-interview five to ten households during the course of the survey. If there is any incentive for interviewers to skip households or respondents, or to falsify data, then re-interviewing may be essential. For example, if some of the questionnaires are long, tedious or require laborious laboratory specimens, the interviewers may not be rigorous in adhering to the survey guidelines.

Survey planners must also consider the role of the supervisors in reviewing data once they are entered into the mobile phone, and in changing data on the phones. If the supervisors are not skilled with mobile phones and the data entry software, then the guidelines should prohibit supervisors from reviewing or changing data on the phones. If supervisors are skilled in the mobile data entry software, the survey planners may ask supervisors either (1) to review data, not change data on the phone but record potential errors on a paper form, or (2) to both review and change data on the mobile phones.

If supervisors are told to record potential data errors on paper, then the form *Recording of potential data quality issues* should be used. If there are no potential errors observed by the supervisor or interviewers, then the supervisor should write "no data issues" on the form and return it to the survey coordinator at the end of the day.

In this manual, a number of procedures and tools have been developed to help assure data quality. One of these is the daily checklist for supervisors, shown below.

DAILY CHECKLIST FOR SUPERVISORS

1. Know which cluster your team is assigned to survey each day. Review the data collection plan as a team and with each interviewer. Make a preliminary determination of whether segmentation (and sub-segmentation) in the field will be required. If required, make an estimate of the number of segments to be created (based on the estimated population size [number of households] of the cluster.)

2. If feasible, in advance of the team arriving at an assigned cluster, contact a local person (e.g., community health worker, Red Cross or Red Crescent volunteer) and ask for a sketch map to be prepared. The sketch map will be used to help you segment the cluster and get to the point where you have a segment of about 15 to 20 households. This will be the segment from which you will randomly select ten households to be interviewed. Note that a request for a rough sketch map may have already been made by the survey coordinator.

3. In each assigned cluster, explain the survey and its objectives to local authorities and local guides, and cooperate with these people throughout the process.

4. Organize the equipment at the beginning and end of each day (e.g., charge mobile phones, and ensure that the team has the necessary field supplies and materials).

5. In the field, carry out a leading role in segmentation, household mapping and numbering in each cluster assigned to your team. Sub-segmentation may need to be carried out, depending on the estimated number of households in the cluster. Use the *Segment identification form* and the *Sketch map type 1* in each cluster, and keep these to return to the survey coordinator. Use *Sketch map type 2* to map all households in the selected segment/sub-segment. Assign a number to each of the households drawn on the map. Use the *List of households for random sampling* to list the randomly-selected households. Assign the households to be interviewed, giving each interviewer a batch of households that are reasonably close together, to save time between interviews. Make a note of those households to be interviewed. There will be two sets of household numbers: a) the "map household number" that was assigned when you do the mapping and listing of the households, and b) the "household interview number"/"household number" (the consecutive number from one to ten that was given to each of the randomly-selected households assigned to interview).

6. Monitor the performance of the interviewers. This should include observing interviews carried out by each interviewer and providing feedback based on observations. If re-interviews are part of the field procedures, carry out re-interviews of some households.

7. Confirm that attempts have been made to interview ten households in each cluster. Use the form *Monitoring cluster, household and person numbers on the rosters* to record if a household was interviewed. If no one was at home to be interviewed, then there may be fewer than ten households interviewed in the cluster and shown in column 5. If a household was not interviewed, then a second attempt should be made before the team leaves that cluster. Confirm with the interviewer that he/she entered this information in the household questionnaire, entering "No, not interviewed" for the question "Interviewer was able to interview member of this household?"

8. Follow the communication protocol.

9. Follow data management procedures. Use the form *Recording of potential data quality issues* for each cluster to note data quality issues and the possible resolution of those issues. If you have been assigned the role of viewing and editing data records, ensure that you view the records from each interviewer, paying special attention to the procedure for monitoring the cluster numbers and household numbers on all rosters, and person line numbers on the net roster. Edit the record if an error has been found. Use the form *Monitoring cluster, household and person numbers on the rosters* (one page per cluster), completing columns 6 to 8. Ensure that your team sends data to the server every day.

10. Maintain daily contact with the survey coordinator to provide an update about the work completed, challenges encountered, data quality issues, security, etc. Compile and submit the required documentation every day: the completed *Segment identification form*, *Sketch map type 1* of the cluster, *Sketch map type 2* of households for simple random sampling, *List of households for random sampling*, the form *Monitoring cluster, household and person numbers on the rosters*, the completed *Persons roster* interviewer job aids (one per household interview) and the form *Recording of potential data quality issues* (one per cluster).

11. Depending on the survey, the survey coordinator may request that additional materials be returned: for example, written signed informed consent forms, a daily log of fieldwork, etc.

6.5 **Minimizing data errors**

In the RAMP malaria survey, it is important to ensure that there is a minimal mismatch of the person numbers in the person database and of person numbers in the net database. A mismatch can be a common source of data error. The rate of error can tend to be higher in those households with two or more nets. At the end of the day, all the net data should be reviewed by the supervisors (if they have been given the responsibility of viewing and editing data before sending to the server) and by the data manager. The review will involve checking to ensure that there is no duplication in the person line number of those sleeping under each net.

Some tools have been developed to help minimize data entry errors. These include:
- the form *Monitoring cluster, household and person numbers on the rosters* (Figure 8 below)
- the interviewer job aid *Persons roster and who slept under which net last night* (Figure 9 below)
- the form *Recording of potential data quality issues* (Figure 10, below)
- a note about the data quality procedure for monitoring the cluster numbers and household numbers on all rosters and person line numbers on the persons and net rosters
- a note about the daily meeting or quality round procedure

A sample of each of these is included in the following pages.

Important data management items to check are:
- cluster and household identification numbers on each record in all three databases
- person number in the persons roster
- person number in the net roster

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Figure 8: Monitoring cluster, household and person numbers on the rosters

Use ONE PAGE PER CLUSTER. Return completed form to the survey coordinator or data manager at the end of each day

Cluster number: . . . . **Cluster name:** . . . . **Supervisor:** . . . .

Interview date (dd/month): . . . .

Map household (HH) number	HH interview number*	Interviewer	Name head of HH (available at time of interview)	Interviewed **Yes/No**	Supervisor was instructed to review data on the mobile phone		
					Supervisor verified phone cluster and HH numbers in the HH and persons roster **Yes/No**	Supervisor verified person line numbers (and cluster and HH numbers) in the net roster **Yes/No**	Data error(s) found **Yes/No** (if Yes, ensure that form *Recording of potential data quality issues* is filled in)
-1	-2	-3	-4	-5	-6	-7	-8
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

* Note: No replacements or alternate households are used. More rows should be added if the number of households to be interviewed is increased from ten.

Figure 9: Persons roster and who slept under which net last night

Cluster number: [   ]   Household number: [   ]   Date: . . . .

Interviewer: . . . .

Part A: To be completed BEFORE the persons roster questionnaire on the phone.
*Only record the names of people who slept in the household the previous night. This should NOT include all family members (if one of them slept somewhere else) and it CAN include people who are NOT family members (e.g., friends, temporary visitors or domestic servants).
*Start with the head of the household. If the head of the household DID NOT sleep here last night, start with the oldest person.

Person number	Name
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

Part B: To be completed BEFORE the net roster questionnaire on the phone. *Write the person number from above into their box below. We want to know which people slept under which net last night. For each net, list the name and person number that slept under each net last night (moving down the column).

Net 1 Description of net (memory device only)	Net 2	Net 3	Net 4	Net 5
Name: Person number: [ ]	Name: Person number: [ ]	Name: Person number: [ ]	Name: Person number: [ ]	Name: Person number: [ ]
Name: Person number: [ ]	Name: Person number: [ ]	Name: Person number: [ ]	Name: Person number: [ ]	Name: Person number: [ ]
Name: Person number: [ ]	Name: Person number: [ ]	Name: Person number: [ ]	Name: Person number: [ ]	Name: Person number: [ ]
Name: Person number: [ ]	Name: Person number: [ ]	Name: Person number: [ ]	Name: Person number: [ ]	Name: Person number: [ ]

NOTE: ONLY the person NUMBER (data inside the boxes) is entered into the mobile phone.
* If more than five (5) nets are owned by the household use another sheet.

Figure 10: Recording of potential data quality issues

Use ONE FORM PER CLUSTER. Return completed form to the survey coordinator or data manager at the end of each day.
Cluster number: . . . . **Cluster name:** . . . . **Supervisor:** . . . .
Record data issue and possible resolution of issue. Record interviewer's name and household number (if pertinent). If there are no data issues for the whole cluster, write NO DATA ISSUES in the first box.
1.
2.
3.
4.
5.

DATA QUALITY PROCEDURE:
MONITORING CLUSTER NUMBERS AND HOUSEHOLD NUMBERS ON ALL ROSTERS, AND PERSON LINE NUMBERS ON THE PERSONS AND NET ROSTERS

This procedure ensures that the cluster and household numbers on all rosters, and person line numbers in the persons and net rosters are correct.

1. After the household mapping and listing is done, the supervisor assigns the household numbers to be interviewed. Numbering of the households in batches can be helpful to ensure interviewers do not have far to walk between interviews: e.g., household numbers 1 to 5, and 6 to 10.

2. Supervisor makes a note on the data quality monitoring form called *Monitoring cluster, household and person numbers on the rosters* (Figure 8) of which households are to be interviewed by which interviewer. Each interviewer should make a note of which households he/she has been assigned to interview.

3. At the time of the household interview, the interviewer records the name of the head of household along with the cluster number and household number on the interviewer job aid *Persons roster and who slept under which net last night* (Figure 9).

4. At the end of the survey in that cluster, the interviewer tells the supervisor the name of the head of household (available at the time of the interview) and household number for each household that he/she interviewed. The interviewer hands over to the supervisor the *Persons roster* interviewer job aids for those households that he/she has interviewed.

5. Supervisor completes the *Monitoring cluster, household and person numbers on all rosters* form, paying attention to which households were assigned and visited but not interviewed because no one was available for interviewing. If only one attempt was made to interview a household, the supervisor should arrange that a second attempt be made. Data in Column 4 are checked, ensuring the correct name of the head of household for each household interviewed.

6. At the end of the day, *before data are sent to the server* (and only if the supervisor has been assigned the responsibility of reviewing and editing data) the supervisor checks all mobile phone data records for each household interviewed to ensure that the following are correct:
a. cluster and household number in the household roster
b. cluster, household, and person number in the persons roster
c. cluster, household, and person line number in the net roster

7. *Only if* the supervisor has been assigned the responsibility of editing data, if an error is found the supervisor will edit the data, entering the correct data, before the data are sent to the server. The supervisor will complete columns 6, 7 and 8 of the *Monitoring cluster, household and person numbers on all rosters* form.

8. Use the form *Recording of potential data quality issues* for each cluster to record any data quality issues that have been encountered in surveying the cluster and the possible resolution of the issue.

At the end of each day, the supervisor gives the *Monitoring cluster, household and person numbers on the rosters* form, all the interviewer job aids *(Persons roster and who slept under which net last night)* for the households interviewed in that cluster and the *Recording of potential data quality issues* form to the survey coordinator or survey data manager for review.

6.6 Procedure for the daily quality round[11]

At the end of each day of fieldwork, on the return of the survey teams from the field to the central site, each supervisor must meet with the survey coordinator. It is desirable for the interviewers and the data manager to be present, if possible. The purpose of the meeting is to review the work carried out in the field and ensure data quality and adherence to the correct field procedures. The meeting provides the opportunity to give further instruction and reinforce correct field procedures. The field procedures that are to be emphasized should relate to the findings of that day and the review to date of the teams' performance in the field.

The supervisors are asked to submit the following items to the survey coordinator each day:
- the *Segment identification form* (one for each phase of segmentation/ sub-segmentation)
- the *Sketch map type 1, Creating segments for the cluster, segment or sub-segment* (one for each phase of segmentation/sub-segmentation)
- the *Sketch map type 2, Mapping households for simple random sampling in the selected cluster, segment or sub-segment*
- numbering of households for simple random sampling, completed on form *List of households for random sampling*
- the set of *Persons roster* interviewer job aids (one per household interviewed) completed that day
- completed form *Monitoring cluster, household and person numbers on the rosters*
- completed form *Recording of potential data quality issues*

The survey coordinator should ask if any challenges were encountered, how they were overcome, and if any issues arose that were related to the performance of the team and its members. The supervisor is also expected to report if any data entry errors were made or other data quality issues encountered.

11 *The feasibility of holding this session will depend on whether the survey teams return to a central site at the end of each field survey day.*

QUALITY ROUND PROCEDURE

1. Ask the supervisor how the day went. Ask if any problems or challenges were encountered during the day's fieldwork. Provide guidance for the resolution of any problems encountered. Emphasize proper field procedures. It can be helpful to ask the team members to describe a field procedure or data entry process to help ensure that these are well understood and are being carried out correctly.

2. Emphasize to the supervisor that he/she too must be monitoring the quality of the work being carried out by the interviewers. Ask to see the *Segment identification form(s)*, and the *Sketch maps types 1 and 2* that were prepared for the area that was surveyed that day. Ask the supervisor to explain how they segmented the area and then mapped and listed the households and selected them. Review the completed *List of households for random sampling.* Use this as an opportunity to reinforce the procedures involved in creating segments and the random selection of households to interview.

3. Ask if it was possible to interview all ten households in the cluster. If it was not, ask for the reason. Use this as an opportunity to stress that it is important to revisit a household at least once more if no one is at home at the first visit. Remind the supervisor that it is not expected that an alternate household will be identified to be interviewed in such a situation.

4. Ask if there were any refusals to participate in the survey.

5. Ask what the supervisor did to monitor the interviewers' performance. Stress that it is important for the supervisor to observe each interviewer a number of times throughout the course of the fieldwork. The supervisor should observe at least two interviews per interviewer during the first two days of fieldwork so that any errors made or problems identified can be dealt with right away. Following each interview observed, the supervisor and interviewer should discuss the interviewer's performance. The supervisor should mention any errors or problems and praise what was done well. If the survey procedure includes the expectation that the supervisors carry out re-interviews, ask the supervisor to provide information about this (e.g., how many re-interviews were done and what was found during this process).

6. Review with the team supervisor the *Persons roster* interviewer job aids that were completed for the cluster surveyed. Count the aids, verifying that all are present for the households that were interviewed.
   a. Check to see if the correct cluster number and household numbers have been used.
   b. Review the *Persons roster*, ensuring that each person has been assigned a unique and correct person line number.
   c. Review the net roster part of the interviewer job aid in which the number of net and the person line number of the persons that slept under the net has been completed and check that NO duplicate entries have been made (i.e., that a person has not been recorded as sleeping under more than one net).

7. If the supervisor was given the responsibility, confirm whether he/she checked all mobile phone data records for each household interviewed before data were sent to the server to ensure that the following are correct:
   a. cluster, and household number in the household roster
   b. cluster, household, and person numbers in the persons roster
   c. cluster, household, and person line numbers in the net roster

8. If an error was identified, ask if the supervisor edited the data and entered the correct data before the data were sent to the server. Check all entries on the *Monitoring cluster, household and person numbers on all rosters* to confirm the information provided for this cluster, and the form *Recording of potential data quality issues* to see what issues may have arisen during the fieldwork in the cluster.

9. Confirm that all records for that cluster have been sent to the server.

10. Confirm that the supervisor knows the cluster number and name of the village that his/her team is scheduled to survey the next day. Provide the population estimate for the village, and discuss the number of segments that may need to be created for the survey in this village. Inform the supervisor about any advance communications that have taken place with local authorities or Red Cross Red Crescent volunteers regarding estimating population size or preparing a sketch map of the cluster.

11. Ask if the supervisor requires any additional field materials or supplies and provide, if needed.

12. Confirm the starting time and place for tomorrow's fieldwork.

13. Thank the supervisor and his/her team for the work that they carried out today.

14. Ensure that data entry errors have been reported to the data manager so that they will be taken into account when the data are being cleaned and edited.

15. Retain the field materials that have been submitted from each team (*Segment identification form*, *Sketch maps types 1 and 2*, *List of households for random sampling,* form *Monitoring cluster, household and person numbers on the rosters*, *Persons roster* interviewer job aids and form *Recording of potential data quality issues*). If data errors are subsequently identified, these materials might help the data manager in correcting them.

07.
Data management and analysis

This section details the practical and operational aspects of data management and analysis that are specific to RAMP surveys, including the use of mobile phones and internet databases. Tasks include survey planning and organization, particularly in respect of the questionnaires to be used, acquiring mobile phones and preparing them for the survey, assisting in training of interviewers, analysing data, reporting and disseminating results. More detail of the specific tasks to be performed by the person or persons with the data management and analysis functions are in Section 2.8.

This section will be most useful for members of the survey coordinating group, the survey coordinator and the data manager/analyst.

More technical and theoretical discussions about data management can be found in Volume 1 of the RAMP survey toolkit, *Designing a RAMP survey: technical considerations*, including indicators, analysis tables for an example malaria survey, and examples of STATA code for analysis.

7.1 Data management staffing

Data management tasks in four broad areas are described in this section:
- survey planning and organization
- data quality and cleaning
- data analysis
- producing and disseminating results products

The tasks have been grouped into the functions of the local data manager, and those of the data analyst, as different skills sets are required for each role. While these tasks may be performed by a single individual, the availability of local personnel with the required competencies and experience to perform the work effectively will be a major factor in determining staffing requirements.

7.2 The role of the local data manager

Survey planning and organization

Specific data management tasks during the planning phase of the survey are as follows:

- In collaboration with the survey coordinator and data analyst, the questionnaires should be finalized. Then a final check and field test of the questionnaire(s), especially skip patterns and "must enter" settings must be made. To ensure that the questionnaires are robust, the data manager should field test the questionnaires with at least one or two other persons entering several records representing different household situations.
- A decision on the mobile phones that will be needed must be made, and a request made for their purchase or acquisition from a previous survey. If required to be purchased, they may come from inside or outside the country, with sufficient time allowed for their procurement and delivery.
- Mobile phones should be prepared for data entry by downloading the data entry software application (EpiSurveyor, now renamed Magpi, was used in the pilot surveys) and the questionnaires. Finalization of the questionnaires, acquisition of the mobile phones, and testing of the questionnaires should be performed well in advance of the first day of interviewer training.
- The data manager will assist with the training of the interviewers and supervisors on the paper and phone aspects of data management. Good competence-based training can prevent errors and minimize later work. The data manager must be at the survey site and working full-time for the two weeks needed for training and implementation of the survey.

Survey implementation

During implementation of the survey, the local data manager must ensure data quality. In the first one to two days of the survey, he/she should check that mistakes are not being made and should take action to rectify the situation if errors are found. Other tasks are as follows:

- The data manager should work together with the survey coordinator to receive and review all the forms from the interview teams at the end of each day (if it is a local survey). The following forms are particularly important to review: (1) *Monitoring cluster, household and person numbers on the rosters* (if survey has more than one database), *(2) Persons roster and who slept under which net last night* (malaria surveys only), and (3) *Recording of potential data quality issues* (all types of surveys). These forms are useful to correct common data errors in surveys with multiple databases (household and person databases) and malaria surveys (household, person and net databases). The review of form (1) is useful for preventing and correcting incorrect data entry of the cluster and household numbers, while checking form (2) is useful for finding incorrect entry of person numbers for persons sleeping under nets last night. Form (3) is used to record potential data errors that were noticed by field supervisors

or interviewers during the day. Following review, the data manager can then speak to the interviewers and supervisors that evening or the next morning to resolve any issues. In surveys with a single "person" database (like immunization surveys that do not have a separate household database), these additional data quality paper forms may not be needed.

- The data manager and the data analyst (if a different person) should exchange information each survey night and the following morning to resolve data issues. The optimal communication method between the local data manager and the data analyst is through e-mail. Therefore, the local data manager needs to have continuous access to e-mail (through a laptop or smartphone) during the week of the fieldwork at the survey site.

Reporting

The data manager should assist the data analyst and survey coordinator to complete the survey bulletin and report.

7.3 The role of the data analyst

The data analysis tasks can be performed by the survey local data manager who, during the survey implementation, should be located near the site of the survey. This might be, for example, in a district capital. The tasks may also be carried out by someone not at the site of the survey. The off-site person can operate from within the country (for example, in the nation's capital), or outside the country (at regional or international level). The data analysis tasks can be performed off-site because they are concerned primarily with the survey data that are in an internet database. It is mandatory for the data analyst to have good access to the internet, which may be more robust at the national, regional, or international level compared to local (sub-district, district, provincial) levels. The data analyst needs to adjust his/her working schedule so he/she can be available in the evenings and nights during the five days of the fieldwork to conduct nightly data cleaning operations.

Data acquisition and cleaning

At the end of each fieldwork day, once all interviewers have sent their data to the internet database, the data analyst can start data cleaning. Data are downloaded from the internet database and loaded into a computer spreadsheet program like Microsoft Excel. Annex F details the steps required to download the web-based data into Excel. Once data are downloaded, data cleaning in the spreadsheet can start. In general, there are two data cleaning steps:

1. visually examine the data in the spreadsheet

2. use a computer data analysis program to perform pre-programmed and ad hoc data cleaning

Pre-programmed data cleaning programs are those that search for common errors anticipated in the field, such as missing or illogical cluster or household numbers, or mismatches between person numbers in the net and person databases. Pre-programmed data cleaning programs need to be prepared in advance by the data analyst/data manager. The pre-programmed data cleaning code for the example malaria survey can be found on the RAMP website (www.ifrc.org/ramp).

Beginning the first evening of the fieldwork, ad hoc data cleaning analyses search for uncommon types of errors or new error patterns that were not anticipated. As and when potential data errors are discovered each evening of the fieldwork, the data analyst communicates, usually by e-mail, with the local data manager. The local data manager may then examine the forms (1), (2) and (3) mentioned above to resolve the data errors. Each evening, the data analyst and local data manager should continue to exchange e-mails until all potential data issues have been resolved.

Data analysis

Preliminary data analysis can be started after the second night of the survey. Preliminary analyses provide an opportunity to test and refine the analysis computer code (programming statements). The analysis computer code should be prepared in advance of the survey based on the questionnaires and the analysis tables (see Volume 1, *Designing a RAMP survey: technical considerations*, Section 7.1, and Annex F). The complete analysis code for the example malaria survey can be found on the RAMP website (www.ifrc.org/ramp).

7.4 Production of reports and dissemination of results

Generally, the data are clean enough to produce preliminary analysis tables or a four-page "results bulletin" within 12 hours of the end of the last interview. The results bulletin is a compilation of key tables and graphs showing the main results of the survey, without explanatory text. It is a visual display of the data from analysis tables contained in the analysis plan. Information on the main indicators and the results shown are embedded within the results bulletin.

For the pilot malaria surveys, the results bulletin served several purposes. It was used to show the preliminary results to the interviewers at the wrap-up meeting and it provided a four-page visual take-home paper and electronic product for stakeholders. Further details of the contents of the malaria results bulletin can be found in Annex H and a sample results bulletin can be found in Annex I.

During the week following the survey, a meeting of partners will be held to discuss preliminary results. For this meeting, after the analysis tables are finished, the data analyst, local data manager and survey coordinator should work within three days to complete a preliminary survey report and PowerPoint slide set. Since the survey is usually conducted from Monday to Friday, the survey coordinator and data person(s) should be prepared to work through the weekend to complete the preliminary report. The slide set contains more information on the background, methods, and discussion of results than the four-page bulletin. Finally, a full survey report is produced that provides a more detailed description of background, methods, and discussion of results than the results bulletin or slide set.

The survey coordinator and the data analyst should have already written the introduction/background section of the report prior to the field survey work. The data analyst should also have finalized the methods section at the same time. The results section should be completed by the data analyst within 24 hours of the end of the survey. In the 72 hours following the survey, the

discussion section needs to be completed. This will be done jointly by the data analyst and the survey coordinator. Others involved in the survey should also be consulted on the content of this section. The target timeline is to complete the preliminary report within 72 hours of the end of the survey so that it is available for a meeting of partners and stakeholders during the week following the end of the survey. At this time the results bulletin, slide presentation and preliminary report can be reviewed. Using the feedback from the meeting, the survey report should be finalized within seven days after the meeting.

Further guidance on the content of a malaria survey report can be found in Annex J and sample survey reports can be found on the RAMP website (www.ifrc.org/ramp).

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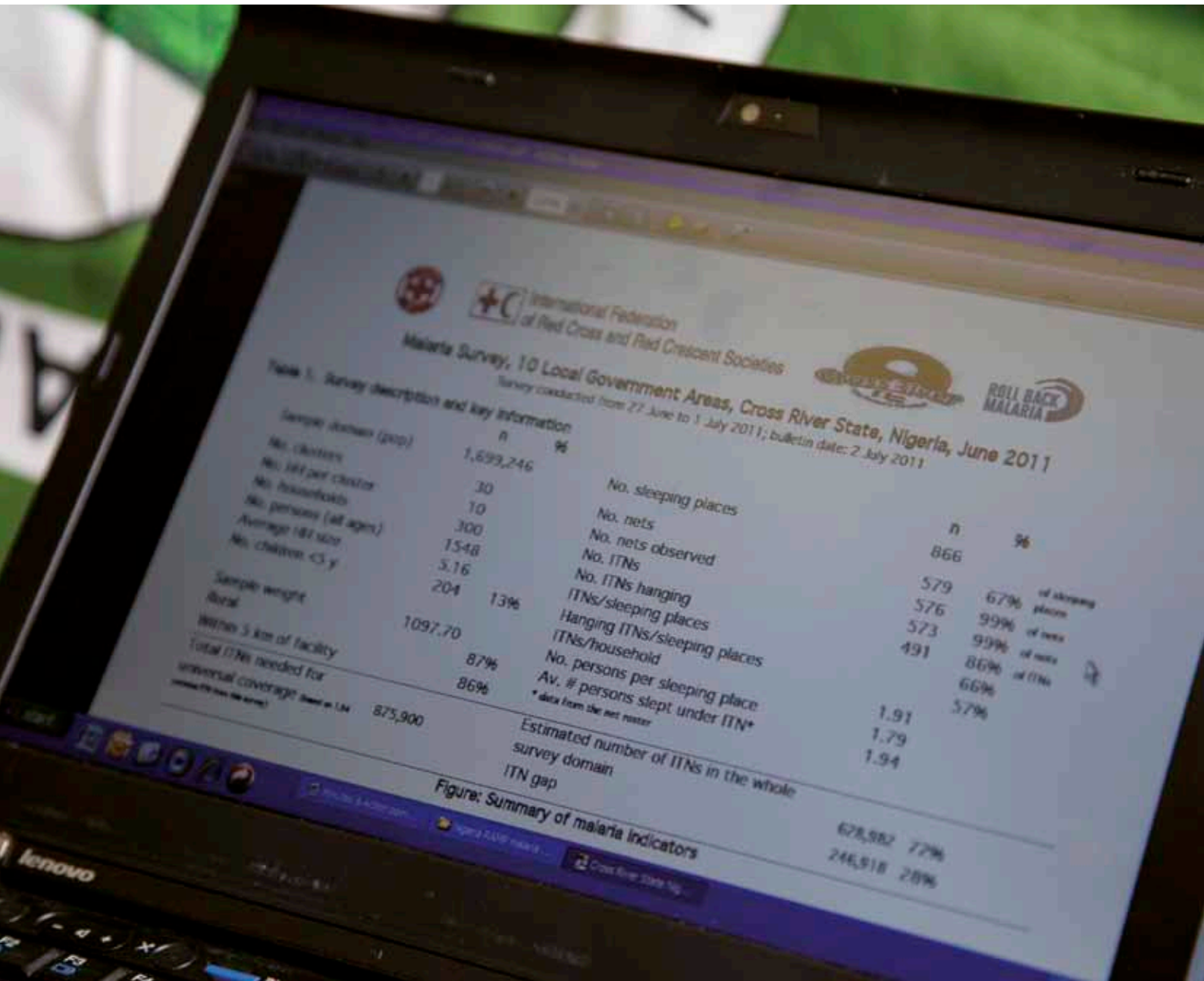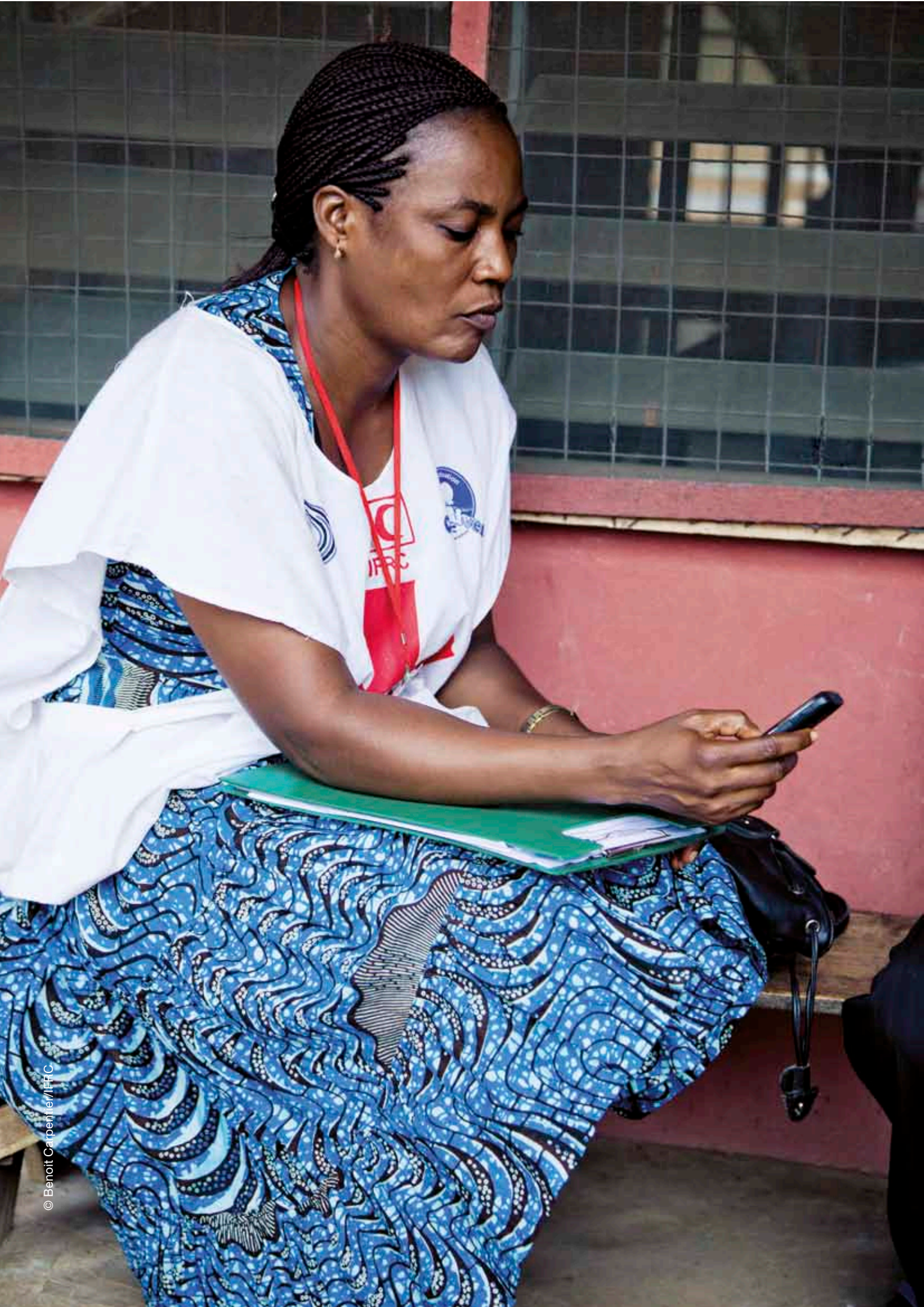
08.
The RAMP website

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The RAMP website (www.ifrc.org/ramp) contains electronic versions of the three-volume RAMP toolkit and other RAMP-related materials. It is intended as a dynamic resource and will be kept updated as new materials and information become available.

Each volume of the RAMP toolkit is available as a .pdf file. In addition, many tools and forms contained within the RAMP toolkit are accessible separately in a format that allows the user to modify the file, (e.g., as a word processor or spreadsheet file) through a link. The questionnaires for a post LLIN campaign malaria survey are also available. Three types of data analysis files are available:
• sample dataset for a malaria survey
• data cleaning programs, in STATA, for a malaria survey
• data analysis programs, in STATA, for a malaria survey

Links are provided for users to download the data analysis programs and the sample dataset.

Two sets of questionnaires and data programs are available on the website, one set matching the information in the published RAMP toolkit. A second set of questionnaires and data programs will be available that match any updated malaria questionnaires. As recommendations change, the malaria questionnaires will be adjusted, for example, as new questions about physical status and care and repair of nets are added. While WHO and MERG have not yet (November 2012) included indicators for physical care and repair of nets in their standard set, these are important new areas of investigation.

Other resources, such as non-malaria questionnaires, for example those covering emergencies, immunizations, nutrition or community health, will be placed on the website as they become available.

Links are also provided to other useful sites, for example Magpi (EpiSurveyor), where the complete Mobile Phone User Client Guide, available in English, Spanish, French and Swahili, can be downloaded.

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Annex A
Sample checklist of key activities and tasks for a RAMP survey [12,13]

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Key activities	Responsible	Key dates
During the four months before the survey		
• Meetings have been held with key partner organizations (e.g., MoH, other government departments, Bureau of Statistics, Red Cross Red Crescent National Society, NGOs). These meetings should have representation from any stakeholder involved in either the survey planning and implementation or its follow-up.		
• Focal persons in the survey project area have been identified and a contacts list prepared.		
• Decisions have been made about survey management and communications. Membership of the survey coordinating group has been confirmed. Pre-survey communications plan has been discussed.		
• Decisions have been made about roles and responsibilities of the different organizations involved at central and regional/district level.		
• Survey protocol has been prepared.		
• Survey protocol has been circulated and key aspects discussed (including the objectives, the sampling scheme, the survey site, duration of training, duration of fieldwork, number and composition of teams, selection of survey team, language of the survey, data management and reporting).		
• Survey questionnaires have been reviewed and discussed, and any changes required have been identified.		
• Any missing documents or materials for finalization of the protocol or implementation of the survey (e.g., details of malaria control programme in the survey area, background of the survey site, census data or other population data, training guides, job aids, etc.) have been identified.		
• Survey protocol has been revised if necessary, and circulated to partners.		
• A decision has been made on whether there is a need to translate the questionnaires into other languages.		
• An official letter of request for sampling frame population size estimates has been sent to the appropriate organization (e.g., Planning Commission, Bureau of Statistics).		
• The census data (or other appropriate population data) have been obtained showing estimated population size and number of households, down to the lowest administrative unit (often an enumeration area). These data are usually available in spreadsheet form.		

12 *This checklist is an example only. It would need to be modified to suit each specific RAMP survey.*

13 *An indication of the organization (or individual) that has the main responsibility for an activity and the target dates for its completion can also be helpful to add.*

Key activities	Responsible	Key dates
• Survey sampling has been carried out, with the 30 clusters identified.		
• Needs related to maps (area maps and maps of the 30 clusters) for the surveys have been discussed. Factors such as cost, degree of detail provided on the maps and ease of obtaining the maps have been taken into account.		
• If needed, an official letter of request to obtain maps of the survey area has been submitted.		
• A timeline of critical events has been developed. This should include recruitment of survey personnel, training, survey implementation, debriefing and final reporting.		
• Approach to be taken for data management and dissemination, including data cleaning, data analysis, reporting and access to the survey data set has been discussed.		
• Bed nets and anti-malarial medications used in the locality of the survey have been identified (to be used during training).		
• The organization and person responsible for managing the budget has been identified.		
• A budget for the survey has been developed and approved, including costs for mobile phones, travel, training, accommodation, daily allowances, data analysis, etc.		
• A person responsible for procurement and preparation of mobile phones has been identified.		
• Action points, persons responsible and deadline dates for ensuring the survey is ready at the appropriate time have been identified and the information shared with core partners.		
During the month before the survey		
1. Survey design		
• Questionnaires have been finalized in first language of choice using web-based questionnaire design.		
• Questionnaires have been finalized in a second language if appropriate and have been checked.		
• Final questionnaires have been shared according to the file-sharing protocol defined by the survey coordinating group.		
• Final questionnaires have been tested using the mobile phones that will be used for the survey (including mock interviews if possible).		
• Hard copy versions of the questionnaires have been prepared (for training and also to be carried by field survey teams in case of mobile phone or network malfunction).		
• The programming codes for the data cleaning and analysis have been reviewed and refined/revised, if needed.		
• Preliminary survey report has begun to be prepared (sections on introduction, background, references).		
2. Survey logistics, operations and planning		
Budget		
• Funds for all survey expenses have been acquired.		
Mobile phones		
• Mobile phones have been purchased and other equipment and supplies related to the phones, such as chargers, cables, etc. have been acquired.		
• Mobile phones have been prepared for the survey. This includes activating SIM cards, acquiring sufficient air time, applying identification labels to each phone, preparing a list of mobile phone brands and models with their identification number, downloading questionnaires.		
• Each phone has been tested to ensure it is in proper working order for the survey.		

Key activities	Responsible	Key dates
Recruitment and selection of interviewers		
• Criteria for the selection of interviewers and supervisors have been established and the recruitment strategy identified.		
• In the recruitment strategy, a decision has been made about whether supervisors will be identified in advance, or during the training.		
• Using the criteria that have been established, candidates for the interviewers and supervisors have been recruited and selected to participate in the training.		
• Candidates have been informed about the dates for training, fieldwork and debriefing.		
Maps		
• Maps of the clusters have been obtained (not essential. The survey can be completed successfully without them). Area maps have been obtained.		
• If village leaders/community workers are preparing sketch maps in advance of the fieldwork, appropriate arrangements have been made in terms of contact and instructions.		
Survey logistics and administration		
• Contracts (if any) have been prepared and issued.		
• Survey administrative focal point has been identified.		
• A draft survey movement plan/schedule has been prepared.		
• Transport for the field practice (during training) has been organized.		
• Transport, directly related to the survey movement plan/schedule, has been organized for field survey teams and supervisory support and monitoring team.		
• The amount for daily allowances has been determined and funds obtained for distribution.		
• Supplies for the field survey have been obtained.		
Communication with authorities and community sensitization		
• A communication plan has been prepared to ensure the support of local authorities and leaders and community sensitization.		
• Local level authorities have been contacted to seek their support for the survey and ensure its smooth implementation.		
• A letter of introduction has been prepared that can be used to inform local level authorities about the survey and its purpose.		
• Arrangements have been made to ensure there will be community representatives to guide the survey team on arrival in the cluster.		
3. Training		
• A training venue that meets the required standards has been reserved (size, requirement for electronic equipment outlets, microphones, meals, etc.)		
• The IFRC publication *Training a RAMP survey team: guide for trainers* has been acquired by the survey coordinator and the trainer(s). The sample agenda, curriculum and materials have been adapted, as needed. Additional training materials have been prepared, if needed.		
• Trainers have prepared all materials needed for training and arranged to have sufficient copies of handouts, forms, etc.		
• Administrative forms (daily allowance forms, equipment sign-out sheet, participant attendance forms, etc.) have been prepared.		
• Samples of bed nets in common use in the survey area have been obtained, including the LLIN brand(s) provided during the last mass distribution campaign. Job aid has been prepared.		
• Samples of anti-malarial medications have been obtained.		
• Equipment (laptop, LCD projector, screen, flipcharts, etc.) has been reserved.		

Key activities	Responsible	Key dates
During training (4 or 5 days)		
• The training is being carried out, held immediately before the survey fieldwork, with all trainees present for all sessions.		
• Administrative forms have been prepared and are being used.		
• Mobile phones have been prepared for the training exercises.		
• Draft survey movement plan/schedule has been reviewed by each survey team, and changes made if needed.		
• Daily allowances have been distributed to members of the field survey teams.		
• Insurance contracts (if applicable) have been prepared and signed.		
• Equipment and supplies have been distributed to all interviewers and supervisors.		
• Certificates have been prepared.		
During the fieldwork (5 days)		
• The field survey is being carried out, with field survey teams following the schedule that has been provided to them, and correctly following the field procedures prescribed during the training.		
• The daily quality round (if feasible) is being held.		
• Supervisory support and monitoring team has established a schedule for monitoring all field survey teams and is conducting field visits to teams.		
• Data have been uploaded after each survey day.		
• Data cleaning is being done at the end of each day's fieldwork, using the established data cleaning procedures.		
• Preliminary data analysis has begun after the second day of the survey.		
After the survey		
• Immediately on completion of fieldwork, field survey teams have returned mobile phones and other equipment and supplies to the designated return point. Returned equipment and supplies have been checked by the survey coordinator.		
• After the last interviews have been uploaded to the server, work is being done to ensure that the survey bulletin is prepared within 24 hours, and the preliminary survey report within 72 hours.		
• A debriefing event has been held, the day after the completion of the fieldwork, with participation of field survey teams. Preliminary results in the form of the bulletin should be available. An exercise designed to extract lessons learnt and recommendations has been carried out.		
• The preliminary survey bulletin and report have been circulated for feedback by key partners three days after the completion of fieldwork.		
• A debriefing event to discuss the preliminary results and survey report has been held with key partners. The dissemination plan and follow-up activities have also been discussed at this event.		
• The bulletin and report have been revised, taking into account any feedback received from partners, and disseminated.		
• Final clean data set has been provided to key partners.		

Annex B
The questionnaires

Using the EXPORT command, the questionnaires (as shown below) can be exported from Magpi (EpiSurveyor) into a Rich Text Format (.rtf) that can be read by Microsoft Word and other programs. The exported questionnaires show the question, type of question (text, number, etc.), data field name, and possible responses (e.g., Yes, No, Do not know). The exported questionnaires in text format are easy to review for finalization of the questionnaire. For training, the survey coordinator might decide to create a paper training tool version of the questionnaires, using a format that is designed to more closely reproduce the appearance of the questionnaires on the mobile phone screen. A sample of this paper version for training, as well as the interviewer job aid that accompanies the questionnaires, is provided in Volume 3 of the RAMP survey toolkit, *Training a RAMP survey team: guide for trainers*, and is also available as a Microsoft Word file on the RAMP website (www.ifrc.org/ramp). The RAMP website also contains a second set of malaria questionnaires that are periodically revised and updated, based on the latest guidance from the international malaria community.

Survey Name: MAS_HouseHold
No of Questions: 55

1. **Household questionnaire for malaria survey (label)**

2. **Interviewer name (text)**
   Data Field Name: interviewer

3. **Cluster and household number questions follow next (label)**

4. **Cluster number (number)**
   Data Field Name: hh_clusternumber

5. **Household number (number)**
   Data Field Name: hh_hhnumber

6. **Interviewer was able to interview member of this household? (multi)**
   Data Field Name: hhinterviewed_yn

   Possible responses:
   - Yes interviewed
   - No not interviewed

7. **Consent Obtained? (multi)**
   Data Field Name: consent

   Possible responses:
   - Yes
   - No

8. **Name of head of household (text)**
   Data Field Name: hh_hhname

9. **Household in a rural or urban area? (NOTE: To be completed by interviewer, not by asking respondent). (multi)**
   Data Field Name: rural_urban

   Possible responses:
   - Rural
   - Urban

10. **How many kilometres is your household from the nearest government, NGO, or mission health facility or hospital? (98=do not know).**
    If less than 1 km, put "1". (number)
    Data Field Name: num_km_to_facility

11. **How many minutes does it take to walk to the nearest health facility? (number) Data Field Name:** min_to_health_facility

12. **MOSQUITO BED NET questions follow next (label)**

13. Number of people of all ages who slept in this household last night? (do NOT include usual members of this household who slept somewhere else last night) (number)
Data Field Name: totalpersons

14. Last night, how many sleeping spaces were there (both inside and outside if someone slept outside)? (Sleeping space defined as a place where people sleep that could be covered by a single net.) (number) Data Field Name: numhhsleepingspaces

15. Does your household have any mosquito nets that can be used while sleeping? (multi)
Data Field Name: nets_yn

Possible responses:
- Yes
- No

16. How many mosquito nets does your household have? (Enter "0" if none) (number)
Data Field Name: nets_numberinhh

17. Has a community volunteer visited this household in the last 6 months to talk about malaria or mosquito nets? (multi)
Data Field Name: visithomemalaria

Possible responses:
- Yes
- No
- Do not know

18. What is your greatest source of information on the use of mosquito nets? (multi)
Data Field Name: itn_netinfosource

Possible responses:
- Radio
- Health centre staff
- Community- based volunteer
- Community leader
- Neighbour
- Relative
- Television
- Other
- No information

19. Indoor Residual Spraying (IRS) questions follow next (label)

20. At any time in the past 12 months, has anyone sprayed the interior walls of your dwelling against mosquitoes? (multi)
Data Field Name: irsyn

Possible responses:
- Yes
- No
- Do not know

21. Who sprayed the dwelling? (multi)
Data Field Name: irs_whosprayed

Possible responses:
- government worker or program
- private company
- non governmental organization NGO
- other
- do not know

22. Household characteristics questions follow next (label)

23. What is the main household source of drinking water? (multi)
Data Field Name: wlth_hhwater

Possible responses:
- Piped into dwelling
- Piped into yard or plot
- Piped public tap or standpipe
- Tube well or borehole
- Dug well protected
- Dug well unprotected
- Rainwater
- Tanker truck
- Cart with small tank
- Surface water (lake, pond etc.)
- Bottled water
- Other

24. Where is that water source located? (multi) Data Field Name: water_wheresource

Possible responses:
- in own dwelling
- in own yard or plot
- elsewhere

25. How long (in minutes) does it take to go there, get water, and come back? (number)
Data Field Name: water_howlong

26. What kind of toilet facility do members of your household usually use? (multi)
Data Field Name: wlth_hhtoilet

Possible responses:
- FLUSH or POUR FLUSH to piped sewer
- FLUSH or POUR FLUSH to septic tank

- FLUSH or POUR FLUSH to pit latrine
- FLUSH or POUR FLUSH to somewhere else
- FLUSH do not know where
- PIT ventilated improved
- PIT with slab
- PIT without slab or open pit
- COMPOSTING toilet
- BUCKET toilet
- HANGING toilet or latrine
- NO TOILET bush or field
- OTHER

27. Do you share this toilet facility with other households? (multi)
Data Field Name: toilet_share

Possible responses:
- Yes
- No

28. How many households use this toilet facility? (number) Data Field Name: wlth_toilet_numotherhholds

29. Does your household have electricity? (multi) Data Field Name: wlth_elect

Possible responses:
- Yes
- No

30. Radio? (multi)
Data Field Name: wlth_radio

Possible responses:
- Yes
- No

31. Television? (multi)
Data Field Name: wlth_tv

Possible responses:
- Yes
- No

32. Mobile phone? (multi)
Data Field Name: wlth_mobphone

Possible responses:
- Yes
- No

33. Non- mobile phone? (multi) Data Field Name: wlth_nonmobphone

Possible responses:
- Yes
- No

34. Refrigerator? (multi)
Data Field Name: wlth_refridg

Possible responses:
- Yes
- No

35. What is the main type of cooking fuel used in your household? (multi)
Data Field Name: wlth_hhcook

Possible responses:
- ELECTRICITY
- LPG
- NATURAL GAS
- BIOGAS
- KEROSENE
- COAL LIGNITE
- CHARCOAL
- WOOD
- STRAW SHRUB GRASS
- AGRICULTURAL CROP
- ANIMAL DUNG
- NO FOOD COOKED IN HOUSEHOLD
- OTHER

36. What is the main material of flooring in your house? (Interviewer may choose to observe) (multi)
Data Field Name: wlth_hhfloor

Possible responses:
- EARTH or SAND
- DUNG
- WOOD PLANKS
- PALM or BAMBOO
- PARQUET OR POLISHED WOOD
- VINYL OR ASPHALT STRIPS
- CERAMIC TILES
- CEMENT
- CARPET
- OTHER

37. Main material of roof? (Interviewer may choose to observe) (multi)
Data Field Name: wlth_roof

Possible responses:
- NATURAL no roof
- NATURAL thatch or palm leaf
- NATURAL sod
- RUDIMENTARY rustic mat
- RUDIMENTARY palm or bamboo
- RUDIMENTARY wood planks
- RUDIMENTARY cardboard
- FINISHED metal
- FINISHED wood
- FINISHED calamine or cement fiber
- FINISHED ceramic tiles
- FINISHED cement
- FINISHED roofing shingles
- OTHER

38. Main material of exterior walls? (Interviewer may choose to observe) (multi)
Data Field Name: wlth_extwalls

Possible responses:
- NATURAL no walls
- NATURAL cane palm or trunks
- NATURAL dirt
- RUDIMENTARY bamboo with mud
- RUDIMENTARY stone with mud
- RUDIMENTARY uncovered adobe
- RUDIMENTARY plywood
- RUDIMENTARY cardboard
- RUDIMENTARY reused wood
- FINISHED cement
- FINISHED stone with lime or cement
- FINISHED bricks
- FINISHED cement blocks
- FINISHED covered adobe
- FINISHED wood planks or shingles
- OTHER

39. Watch? (multi)
Data Field Name: wlth_watch

Possible responses:
- Yes
- No

40. Bicycle? (multi)
Data Field Name: wlth_bicycle

Possible responses:
- Yes
- No

41. Motorcycle or scooter? (multi)
Data Field Name: wlth_motocyc

Possible responses:
- Yes
- No

42. Animal-drawn cart? (multi) Data Field Name: wlth_animaldrawncart

Possible responses:
- Yes
- No

43. Car or truck? (multi)
Data Field Name: wlth_car

Possible responses:
- Yes
- No

44. Boat with motor? (multi)
Data Field Name: wlth_boat_motor

Possible responses:
- Yes
- No

45. Does any member of this household own any agricultural land? (multi)
Data Field Name: wlth_hhagland

Possible responses:
- Yes
- No

46. How many hectares of agricultural land do members of this household own? IF 950 or more, enter "950" (number) Data Field Name: wlth_hectaresownland

47. Does this household own any livestock, herds, other farm animals, or poultry? (multi) Data Field Name: wlth_ownfarmanimals

Possible responses:
- Yes
- No

48. How many cattle? (Enter "0" if none) (number)
Data Field Name: wlth_numcattle

49. How many milk cows or bulls? (Enter "0" if none) (number)
Data Field Name: wlth_milkcowsbulls

50. How many horses, donkeys, mules? (Enter "0" if none) (number) Data Field Name: wlth_horsesdonkeysmules

51. How many goats? (Enter "0" if none) (number)
Data Field Name: wlth_goats

52. How many sheep? (Enter "0" if none) (number)
Data Field Name: wlth_sheep

53. How many chickens? (Enter "0" if none) (number)
Data Field Name: wlth_chickens

54. Does any member of this household have a bank account? (multi)
Data Field Name: wlth_bankaccount

Possible responses:
- Yes
- No

55. This portion of the interview is complete. Close this questionnaire by clicking "Finish for now" on next screen. If consent was NOT obtained, proceed to next household. If consent was obtained, proceed to the "Persons Roster" questionnaire. (label)

The interviewer job aid (Part A) is completed before beginning the Persons roster.

Survey Name: MAS_Person
No of Questions: 23

1. PERSONS ROSTER. Ask about persons who slept here last night including non-family members. Start with head of HH or oldest person. Do NOT include usual members of HH if they DID NOT sleep here last night (label)

2. **Interviewer name (text)**
   Data Field Name: interviewer

3. **Cluster Number (same as in Household questionnaire) (number)**
   Data Field Name: rp_clusternumber

4. **Household number (same as in Household questionnaire) (number)**
   Data Field Name: rp_hhnumber

5. **Name of the person (text)**
   Data Field Name: rp_name

6. **Line Number of the person in the household (Obtain this from paper Persons Roster, column 1) (number) Data Field Name:**
   rp_hhpersonnumber

7. **Gender (multi)**
   Data Field Name: rp_gender

   Possible responses:
   - Male
   - Female

8. **Age in YEARS? Mark zero(0) if less than 12 months old. (Estimate if they do not know, especially for adults) (number)**
   Data Field Name: rp_age

9. **[ASK Q9- 22 OF CHILDREN <5 YEARS OLD ONLY] Has (NAME) been ill with a fever in the last two weeks? (multi)**
   Data Field Name: childfever

   Possible responses:
   - Yes
   - No
   - Do not know

10. **(IF FEVER), at any time during the illness, did (NAME) have blood taken from his/her finger or heel for testing? (multi)**
    Data Field Name: childfever_blood

    Possible responses:
    - Yes
    - No
    - Do not know

11. **(IF FEVER), did you seek advice or treatment for the illness from any source? (multi) Data Field Name:**
    childfever_anytreat

    Possible responses:
    - Yes
    - No
    - Do not know

12. **(IF ADVICE OR TREATMENT), how many different sources did you go to for advice or treatment? (multi)**
    Data Field Name: childfever_treat_num_sources

    Possible responses:
    - 1
    - 2
    - 3
    - 4

13. **(IF ADVICE OR TREATMENT), where did you seek advice or treatment FIRST? (multi)**
    Data Field Name: childfever_typetreat_first

    Possible responses:
    - Public government hospital
    - Public government health center
    - Public mobile clinic
    - Public fieldworker
    - Public other
    - Private hospital
    - Private pharmacy
    - Private doctor
    - Private mobile clinic
    - Private field workers
    - Private other
    - Other shop
    - Other traditional practitioner
    - Other market

14. **(IF ADVICE OR TREATMENT MORE THAN ONE PLACE), where did you seek advice or treatment SECOND? (multi) Data Field Name:**
    childfever_typetreat_second

    Possible responses:
    - Public government hospital
    - Public government health center
    - Public mobile clinic

- Public fieldworker
- Public other
- Private hospital
- Private pharmacy
- Private doctor
- Private mobile clinic
- Private field workers
- Private other
- Other shop
- Other traditional practitioner
- Other market

15. (IF ADVICE OR TREATMENT MORE THAN TWO PLACES), where did you seek advice or treatment THIRD? (multi)
Data Field Name: childfever_typetreat_third

Possible responses:
- Public government hospital
- Public government health center
- Public mobile clinic
- Public fieldworker
- Public other
- Private hospital
- Private pharmacy
- Private doctor
- Private mobile clinic
- Private field workers
- Private other
- Other shop
- Other traditional practitioner
- Other market

16. At any time during the illness, did (NAME) take any drugs for the illness? (multi) Data Field Name: childfever_treat_anydrug

Possible responses:
- Yes
- No
- Do not know

17. (IF TOOK DRUG), what drugs did (NAME) take (FIRST DRUG, UP TO THREE DRUGS)? (multi)
Data Field Name: childfever_drug1

Possible responses:
- Mal SP Fansidar
- Mal Chloroquine
- Mal Amodiquine
- Mal Quinine
- Mal ACT
- Mal Other
- Antibiotic pill or syrup
- Antibiotic injection
- Other Aspirin
- Other Acetaminophen
- Other Ibuprofen
- Other
- Do not know

18. (IF TOOK FIRST DRUG), how long after the fever started did (NAME) first take the drug? (multi) Data Field Name: childfever_drug1_timing

Possible responses:
- Same day
- Next day
- Two days after fever
- Three or more days after fever
- Do not know

19. (IF TOOK DRUG), what drugs did (NAME) take (SECOND DRUG, UP TO THREE DRUGS)? (multi)
Data Field Name: childfever_drug2

Possible responses:
- Mal SP Fansidar
- Mal Chloroquine
- Mal Amodiquine
- Mal Quinine
- Mal ACT
- Mal Other
- Antibiotic pill or syrup
- Antibiotic injection
- Other Aspirin
- Other Acetaminophen
- Other Ibuprofen
- Other
- Do not know

20. (IF TOOK A SECOND DRUG), how long after the fever started did (NAME) take the drug? (multi)
Data Field Name: childfever_drug2_timing

Possible responses:
- Same day
- Next day
- Two days after fever
- Three or more days after fever
- Do not know

21. (IF TOOK DRUG), what drugs did (NAME) take (THIRD DRUG)? (multi)
Data Field Name: childfever_drug3

Possible responses:
- Mal SP Fansidar
- Mal Chloroquine
- Mal Amodiquine
- Mal Quinine
- Mal ACT
- Mal Other
- Antibiotic pill or syrup
- Antibiotic injection
- Other Aspirin
- Other Acetaminophen
- Other Ibuprofen
- Other
- Do not know

22. **(IF TOOK A THIRD DRUG), how long after the fever started did (NAME) take the drug? (multi)**
Data Field Name: childfever_drug3_timing

Possible responses:
- Same day
- Next day
- Two days after fever
- Three or more days after fever
- Do not know

23. IF there IS another person who slept here last night click "Add New Record" on the next screen. IF NO MORE people, close this questionnaire by clicking option "Finish for now" on the next screen. Then proceed to "Net Roster" questionnaire. (label)

The interviewer job aid (Part B) is completed before the net roster is conducted.

Survey Name: MAS_Net
No of Questions: 19

1. ROSTER OF NETS. I would like to ask you about each mosquito bed net that you have in the household (includes all nets that were owned and present in the household last night. Interviewer must enter a new record for each net) (label)

2. **Interviewer name (text)**
Data Field Name: interviewer

3. **Cluster number (same as in Household questionnaire) (number)**
Data Field Name: rn_clusternumber

4. **Household number (same as in Household questionnaire) (number)**
Data Field Name: rn_hhnumber

5. **Net number, INTERVIEWER ONLY: What net are you collecting information about? If the first net PUT number 1, if the second net PUT number 2, etc. (Use consecutive numbers) (number)**
Data Field Name: rn_netnumber

6. **INTERVIEWER ONLY: Ask if you can see this net. Did you observe the net? (multi)**
Data Field Name: rn_observenet

Possible responses:
- Yes
- No

7. **Was this net hung last night? (Look for evidence of hanging and observe or ask if the net was hanging) (multi)**
Data Field Name: rn_hangingnet

Possible responses:
- Yes
- No
- Do not know

8. **How many months ago did your household get the mosquito net? (RECORD IN MONTHS. Put "36" for 3 yrs, "48" for 4 yrs, and "60" for >5yrs. 98=NOT SURE) (number)**
Data Field Name: rn_netagemonths

9. **From where did you obtain this mosquito net? (multi)**
Data Field Name: rn_srce

   Possible responses:
   - Mass campaign 20XX
   - Market/Retail shop
   - Health facility
   - Pharmacy
   - Friend/Relative
   - Other

10. **Brand/type of the net? (Observe or ask for the brand/type of mosquito net. If the brand is unknown, and you cannot observe the net, show pictures of typical net types/brands to respondent) (multi)**
Data Field Name: rn_brandnet

    Possible responses:
    - LLIN- Brand A
    - LLIN- Brand B
    - LLIN- Brand C
    - Other LLIN or DK LLIN brand
    - Other non-LLIN brand
    - Do not know brand

11. **Since you got the net, was it ever soaked or dipped in a liquid to kill or repel mosquitoes? (multi) Data Field Name:** net_soaked_dipped_yn

    Possible responses:
    - Yes
    - No
    - Do not know

12. **How many months ago was the net last soaked or dipped? (Enter "99" for do not know) (number) Data Field Name:** net_monthsago_soaked

13. **Did anyone sleep under this mosquito net last night? (multi) Data Field Name:** rn_sleeplastnightyn

    Possible responses:
    - Yes
    - No
    - Not sure

14. **Who slept under this net last night? Enter line number of the first person that slept under this net. (Get this from the paper job aid "Persons Roster") (number) Data Field Name:** rn_personone

15. **Line number of the second person that slept under this net. (Get this from the paper job aid) (number) Data Field Name:** rn_persontwo

16. **Line number of the third person that slept under this net. (Get this from the paper job aid) (number) Data Field Name:** rn_personthree

17. **Line number of the fourth person that slept under this net. (Get this from the paper job aid) (number) Data Field Name:** rn_personfour

18. **Line number of the fifth person that slept under this net. (Get this from the paper job aid) (number) Data Field Name:** rn_personfive

19. IF there is another bed net in the household click "Add New Record" on the next screen. IF there are NO MORE bed nets, close this questionnaire by clicking "Finish for now". Proceed to the next household. (label)

Annex C

Purchasing the right mobile phone and preparing for use with EpiSurveyor[14]

The right mobile phone

Making the decision about which brand and model of mobile phone to purchase can be difficult. The mobile phone chosen must be supported by the EpiSurveyor team. An up-to-date list of supported devices can be found on the EpiSurveyor website (www.episurveyor.org). Other considerations include the purpose of the phone, cost of phone, ease of use, internal memory capacity and the intended user.

Preparing the mobile phones for use with EpiSurveyor

Once purchased, arrangements need to be made to ensure that the phones are properly prepared for the survey. These technical guidelines are meant as an aid for programme managers and the survey coordinator when setting up phones for use with EpiSurveyor. Several simple steps need to be taken before the mobile phone is programmed and ready for use. These relate to Subscriber Identity Module (SIM) card set up, setting phone time/date, home screen display, network connections and packet data settings. Details of these steps are provided below:

1. **Getting ready:** Working in a spacious area, with a laptop handy, gather all the purchased items (that is, the mobile phones in their original packaging, labels, pen, power bars, SIM cards and airtime vouchers).

2. **Packaging:** Keep the original packaging that the phones came in, and the SIM card packaging. The phones may be stored in the box after the survey and there is often additional documentation in the box, including the phone's serial number. The SIM card packaging typically contains essential

information such as the telephone number, and the PIN (personal identification number) and PUK (pin unlock code) numbers.

3. **Fill in the mobile phone record table:** The mobile phone record table (see sample below) should be filled out. This table will consolidate key information that should be known by the survey manager and survey coordinator, and will act also as a back-up to the information contained in the packaging. This table can be used once the training starts as a tool to record the names of each participant and the phone that he/she has received and each person's attendance during training.

For each mobile phone:

4. **Insert SIM card in phone** (new phones typically have one to two hours of charge on the battery but battery may need charging).

5. **Upload airtime minutes** (typically using a valid recharge voucher card or ticket). Keep all the vouchers or tickets because they will be needed to track expenses.

6. **Use a sticker to label phone with:** (1) assigned phone identification (ID) number, (2) phone number (from SIM card package), (3) PIN[15] (from SIM card package).

7. **Use a sticker to label phone box with:** (1) assigned phone ID number, (2) phone number (from SIM card package), (3) PIN (from SIM card package).

8. **Use a sticker to label SIM package (box) with:** (1) assigned phone ID number.

9. **Use the mobile phone record table to record:** (1) assigned phone ID number, (2) phone brand and model, (3) phone serial number (typically from box), (4) phone number (from SIM card package), (5) PIN (from SIM card package), and (6) PUK number (from SIM card package). The PUK is used to unlock the phone if the PIN entered is wrong beyond the specified limit, typically three to five times in a row. The table can also be expanded later to record: (7) name of the person assigned to each phone and (8) the daily attendance of each person during the training.

10. **Setting phone preferences:**
    a. Menu → tools → settings → general → personalization → display
    b. Configure the settings to save power (e.g., change the power saver time-out to 90 seconds)
    c. Change the light time-out (e.g., to 60 seconds)
    d. Select back
    e. Home screen (select) → change to basic

11. **Setting date and time:** Configure the settings for time and date. Specify the time format preferred (24 hour clock), and specify the date format (DD/MM/YYYY) for all phones.

12. **Activate and enable GPRS/EDGE/3G connection on the mobile phone:** see the phone manual guide for information on how to activate the connection or contact the mobile phone service provider. The actual steps that must be followed to activate the connection will differ depending on the country and sometimes the service provider. The steps may also differ depending on the model of phone to be used for the survey.

15 *It may be decided to disable the PIN. If so, then the PIN or PUK need not be written on each mobile phone.*

To activate the settings for internet connectivity and to be able to run applications, it is an option to call the service provider helpdesk who will then send a text message (SMS) with a detailed list of the steps to be followed to activate the GPRS settings. This will generally require opening the SMS, and when prompted typing in the PIN number that the service provider has sent, and switching the phone off and on before proceeding further. Alternatively, it is possible to visit the service provider in person to receive direct assistance from one of their agents. Both of these options will require the phone number list of all the mobile phones to be used in the survey. During a personal visit, the service provider's agent might also want to see each mobile phone unit.

13. **Download EpiSurveyor Mobile to the phone:**[16] EpiSurveyor Mobile is available for download on the internet. To download the application directly to the phone[17] a number of steps must be followed. The sequence may change with the online download feature, but as of August 2012, the sequence was:
    a. Open the mobile phone browser (Menu > Web > Browser) and enter the address http://www.episurveyor.org/m
    b. A list of mobile phone manufacturers and models will appear.
    c. Select the appropriate phone and click on it.
    d. A message will appear asking if you want to install EpiSurveyor. Click "Yes" and proceed with the installation.
    e. Select Open for the EpiSurveyor.jar file.
    f. The EpiSurveyor application will be installed to the phone's application folder. Wait for the download (may take up to 2—5 minutes, depending on internet connection speed). When downloading the application, system messages may pop up depending on your mobile phone and service. Press <Yes> and <Accept> for prompts requesting access and/or downloading rights.
    g. When the download is complete, you will be prompted to close the browser and open the application if you want. It is a good way to check that the browser is operating correctly, so click <Yes>. Remember, in order to use EpiSurveyor Mobile you must be logged into the application. This will require you to enter valid log-in credentials (usually the same as the account details you created in EpiSurveyor.org).

14. **Charge mobile phone battery (if needed).**

Before distributing the mobile phones to the interviewers ensure that all phones:
• are fully charged
• have enough air time
• have the correct version of the questionnaires for training and for the survey

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Getting the GPRS connection: An example from the RAMP survey pilot in Kenya (for the Nokia 2730)

Activating the configuration settings for internet connectivity:

1) Menu>Settings>Configuration

2) Scroll down to see that under "Default config.sett" below it says: Safaricom

3) Scroll down to see "Preferred access point". Below it says: Safaricom

4) Menu>Settings>Configuration>default config.sett.>Select>Details

The following are listed as items received: *web; *Multimedia messaging (MMS); *x-midlet-Nokia visual radio; *Access point.

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16 *The complete EpiSurveyor Mobile Phone User Client Guide (version 1.0.0) can be found on the website www.episurveyor.org. Click on the Phone Guide tab. EpiSurveyor Mobile is available in English, Spanish, French and Swahili. The application is available only for selected mobile devices.*

17 *The installation can also be downloaded to a computer enabled with Bluetooth functionality and installed into the mobile device via Bluetooth.*

Defining access points for Nokia e63 and e71: the Kenya RAMP survey pilot

Each mobile phone needs to have its settings activated so that a connection can be made to the internet, and the applications run. The exact procedure will differ somewhat depending on the model of a phone. In Kenya, Safaricom was the service provider selected because it was the one that had the strongest connectivity in the RAMP survey project area. The following outlines the procedure used for getting internet connectivity for the Nokia 2700, 2730, e63 and e71 models.

1. Setting new access points:
2. Menu → tools → settings → connection → access point → options → new access point
- Connection name=safaricom internet (Kenya specific service provider, will be different in other countries)
- Data bearer=packet data
- Access point=safaricom
- User name=none
- Prompt password=no
- Password=none
- Authentication=normal
- Homepage=none

3. Download EpiSurveyor Mobile by doing the following:

4. Menu → web → options → navigation options → web page → www.episurveyor.org/m

5. Select your model of phone and download application

If you are using the Nokia 2730, you must choose the 'Other phone' option and then select Nokia 2700 as the model

In Nokia 2700/2730, EpiSurveyor will appear under 'Games'; in Nokia e63 and 371 it will appear under 'Installations'

6. Defining access point for EpiSurveyor:
a. Menu → Installations → Application Manager (App.mgr.)
b. Scroll down to EpiSurveyor (select by clicking centre button)
c. Scroll down to Access points (select) → choose safaricom internet (or other country specific network in SLE, Namibia, etc.) → ok
d. Scroll down to network access (select) → choose 'ask first time' → ok
e. Scroll down to connectivity → choose 'always allowed' → ok

FOR e71 GPS settings

f. Scroll down to positioning (select) → choose 'first time' → ok.

In the pilot RAMP surveys in 2011 and 2012, a decision was made to use the Nokia brand for the surveys. EpiSurveyor is compatible with Nokia 2700, 2730, e63, and e71 among several other models. The Nokia 2700, 2730, e63 and e71 models were tested. The classic Nokia 2700/2730 is the least expensive model (approximately US$ 100) of the four, followed by the Nokia e63, and then the e71. The primary difference between the classic and the e series is that the former does not have a full keyboard whereas the other two models do. The classic also has a slightly smaller screen than the e series. The e71 is equipped with Global Positioning System (GPS). For all basic questionnaires that do not require an extensive amount of written text, the classic 2700 or 2730 are the most cost-effective option. However, if questions are inserted that require long free text input, then a cell phone with a keypad should be considered.

It is valuable to take time to look over the DataDyne and the EpiSurveyor website. EpiSurveyor is the application that the RAMP survey uses, and familiarity with the application is essential. The website has tutorials and case studies to help with using EpiSurveyor.

Mobile phone records for a RAMP survey

Phone ID	Phone brand and model	Serial number	Phone number	SIM PIN	PUK	Name of person issued [18]	TRAINING ATTENDANCE				
							D1	D2	D3	D4	D5
1		356240042694xxx	0816993xxx	6351	54029242	Amadika	Y				
2		356240042697xxx	0816962xxx	8736	65557639	Bomani	Y				
3		356240042961xxx	0816962xxx	0823	16084212	Dexter	Y				
4		353780046913xxx	0817204xxx	3533	95434691	Kennedy	Y				
5		353780046937xxx	0817204xxx	7220	54269000	Brenda	Y				
6		354313044296xxx	0817204xxx	9526	72404509	Abdal	Y				
7		354313044299xxx	0817204xxx	3649	46468609	Alana	Y				
8		354313044300xxx	0817208xxx	2341	63862581	Museta	Y				
9		354313044306xxx	0817208xxx	3111	74872573	Zibonwa	Y				
10		354313044306xxx	0817208xxx	5550	28825586	Muyumbano	Y				
11		354313044307xxx	0817208xxx	3537	09334883	Alberta	Y				
12		354313044307xxx	0817208xxx	5164	00922569	Zorina	Y				
13		354313044308xxx	0817208xxx	5063	09482661	Chikalila	Y				
14		354313044309xxx	0817208xxx	0405	37493241	Bernice	Y				
15		354313044309xxx	0817208xxx	0181	19863027	Ernest	Y				
16		356240042696xxx	0816301xxx	4870	23268100	Regina	Y				
17		356240042692xxx	0816301xxx	3714	68577908	Qadim	Y				
18		356240042690xxx	0816301xxx	2045	44915362	Mayamba	Y				
19		356240042697xxx	0816301xxx	4872	95598752	Bryson	Y				

18 *The full name of the person should be provided. Only the first name has been provided in this fictional example.*

Annex D
The RAMP toolbox

The following forms and tools are included in the RAMP toolbox. Examples of their use have been given in the manual in the sections shown. For ease of use, blank versions of many of the tools in various formats, such as word processor or spreadsheet programs, can be found on the accompanying CD, and can also be downloaded from the RAMP website (www.ifrc.org/ramp).

- Sample timeline: See 2.3
- Budget spreadsheet program: See 2.11
- Equipment sign-out sheet: See 3.2
- Communications protocol: See 3.2
- Field supplies and materials checklist: See 3.2
- Cluster identification form: See 4.1
- Segment identification form: See 5.3 and 5.4
- Sketch map type 1: creating segments for the cluster, segment or sub-segment: See 5.4
- Sketch map type 2: mapping and numbering households for simple random sampling in the selected cluster, segment or sub-segment: See 5.5
- List of households for random sampling: See 5.5
- Informed consent script: See 6.2
- Monitoring cluster, household and person numbers on the rosters: See 6.5
- The model malaria questionnaires: See 6.1 and Annex B
- Interviewer job aid: Persons roster and who slept under which net last night: See 6.5
- Recording of potential data quality issues: See 6.5
- Sample checklist of key activities and tasks for a RAMP survey: See Annex A
- Purchasing the right mobile phone: See Annex C
- Mobile phone records list: See Annex C
- Methods for generation of random numbers: See Annex E

Annex E
Generating random numbers

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There are three occasions when there is a need for random numbers in RAMP surveys, (1) selection of clusters, (2) selection of a single segment or sub-segment and (3) selection of multiple households from a list for simple random sampling. Choosing a random number is an important step in a coverage survey because it is the only way to ensure that there is no unconscious bias in the selection of households and individuals to be interviewed.

This annex describes three methods for generating random numbers. Both Method A (random numbers table) and Method C (currency notes) can be used to provide random numbers for all three occasions. Method B is only used for the third occasion, choosing multiple households to interview from the final segment or sub-segment.

A number of programs to produce random numbers can be found on the internet or on mobile phones.

Method A[19]
Using a random numbers table

While this method is a general one that can be used for all three occasions referred to above, the example below shows the use of the method for the selection of clusters.

Step 1
Choose a direction (right, left, up or down) in which you will read the numbers from the table.

Step 2
Select a starting point by using one of the following methods:

(a) Using a currency note, select a single digit random number between 0 and 9 to identify a column. Select a two-digit random number between 01 and 25 to identify a row. (Note: the numbers 01 to 09 each count as two-digit numbers.) The five digit number in the table that is at the intersection of the column and row you have selected is the starting point.

(b) Close your eyes, and touch the random number table with a pointed object. Open your eyes. The digit closest to the point where you touched the table is the starting point.

19 *Adapted from World Health Organization (2005)* Immunization coverage cluster survey-Reference manual, *Department of Immunization, Vaccines and Biologicals.*

Check that the starting point will give a number which is going to be less than or equal to the sampling interval. If not, start again before going on to step 3.

Step 3
Read the number of digits required (determined by the sampling interval) in the direction chosen in step 1. Because each individual digit in the table is random, the sequence(s) of digits can be used across spaces between the five-digit numbers. The number which ends up is the random number.

For example, let us say it was decided to read numbers to the right, and by using method (b) in step 2 the starting point was identified as the number 3 in row 01, column 8 (see the table that follows). If the sampling interval had four digits, then the random number would be 3861. The numbers 6 and 1 come from row 01, column 9.

Note: remember that the random number selected must be equal to or smaller than the sampling interval. If it is not, then another random number must be selected.

Row	0	1	2	3	4	5	6	7	8	9
01	88008	13730	06504	37113	62248	04709	17481	77450	46438	61538
02	01309	13263	70850	11487	68136	06265	36402	06164	35106	77350
03	45986	59490	98462	11032	78613	78744	13478	72648	98769	28262
04	50107	24914	99266	23640	76977	31340	43878	23128	03536	01590
05	71163	52034	03287	86680	68794	94323	95879	75529	27370	68228
06	76445	87636	23392	01883	27880	09235	55886	37532	46542	01416
07	84130	99937	86667	92780	69283	73995	00941	65606	28855	86125
08	00642	10003	08917	74937	57338	62498	08681	28890	60738	81521
09	64478	94624	82914	00608	43587	95212	92406	63366	06609	77263
10	02379	83441	90151	14081	28858	68580	66009	17687	49511	37211
11	32525	44670	57715	38888	28199	80522	06532	48322	57247	46333
12	01976	16524	32784	48037	78933	50031	64123	83437	09474	73179
13	67952	41501	45383	78897	86627	07376	07061	40959	84155	88644
14	38473	83533	39754	90640	98083	39201	94259	87599	50787	75352
15	91079	93691	11606	49357	55363	98324	30250	20794	83946	08887
16	72830	10186	08121	28055	95788	03739	65182	68713	63290	57801
17	40947	75518	59323	64104	24926	85715	67332	49282	66781	92989
18	44088	70765	40826	74118	62567	75996	68126	88239	57143	06455
19	19154	29851	16968	66744	77786	82301	99585	23995	15725	64404
20	13206	90988	34929	14992	07902	23622	11858	84718	22186	35386
21	24102	13822	56106	13672	31473	75329	45761	47361	47713	99678
22	59863	62284	24742	21956	95299	24066	60121	78636	61805	39904
23	57389	70298	05173	48492	68455	77552	87048	16953	45811	22267
24	63741	76077	44579	66289	88263	54780	76661	90479	79388	15317
25	17417	56413	35733	27600	06266	76218	42258	35198	26953	08714
26	85797	58089	91501	34154	96277	83412	70244	58791	64774	75699
27	65145	97885	44847	37158	54385	38978	20127	40639	80977	73093
28	24436	65453	37073	81946	36871	97212	59592	85998	34897	97593
29	20891	03289	98203	05888	49306	88383	56912	12792	04498	20095
30	81253	41034	09730	53271	92515	08932	25983	69674	72824	04456
31	64337	64052	30113	05069	54535	01881	16357	72140	00903	45029
32	35929	76261	43784	19406	26714	96021	33162	30303	81940	91598
33	34525	54453	43516	48537	60593	11822	89695	80143	80351	33822
34	27506	45413	42176	94190	29987	90828	72361	29342	72406	44942
35	92413	00212	35474	22456	76958	85857	85692	75341	32682	00546
36	76304	57063	70591	06343	38828	15904	79837	46307	40836	69182
37	17680	92757	40299	98105	67139	01436	68094	78222	61283	40512
38	43281	36931	26091	42028	62718	38898	64356	19740	77068	78392
39	30647	40659	23679	04204	67628	81109	73155	68299	62768	58409
40	26840	42152	80242	57640	19189	47061	44640	52069	98038	49113

Method B
Using a random numbers by interval table

This method is a practical one to use for the random selection of the households to be interviewed in a cluster or segment. Two different examples are provided to ensure that the survey team does not use the same set of numbers for all clusters/segments. It is also reasonably straightforward to produce random numbers tables in a spreadsheet program or to obtain new sets of random numbers using the sites available on the internet for generating random numbers.

As an example of how this table is used, the field survey team has been instructed to sample 10 households out of 21 in a segment. The COLUMN in which the 21 appears will be used (1 to 25). Since, however, the maximum number in the column heading is more than the number of households in the segment to be sampled, there may be some numbers in the first 10 ROWS that are not within the range 1 to 21. These must be discarded. In the first example below, the number 22 will not be used, and instead, row 11 and the number 13 will be selected. If there were more numbers over 21 in the first ten rows, then further rows would need to be used.

Non-duplicated random numbers by intervals: first example

		Approximate number of households in the segment from which to sample households using SRS							
		1 to 10	1 to 15	1 to 20	1 to 25	1 to 30	1 to 40	1 to 50	1 to 100
Households to be sampled	1	3	13	10	11	22	5	25	92
	2	1	3	5	16	3	35	40	59
	3	5	14	18	22	23	26	26	80
	4	10	1	13	4	5	13	13	29
	5	8	5	8	20	20	20	29	36
	6	6	10	2	1	26	16	23	88
	7	4	8	1	21	11	8	48	57
	8	9	6	3	2	21	2	38	4
	9	2	4	15	14	6	4	3	18
	10	-----	9	4	12	7	18	41	79
	11	-----	2	14	13	28	38	14	23
	12	-----	11	16	10	13	28	44	19
	13	-----	7	9	9	9	14	31	66
	14	-----	12	19	6	17	40	42	17
	15	-----	-----	11	19	27	7	36	13
	16	-----	-----	12	17	14	11	50	6
	17	-----	-----	7	15	15	36	15	46
	18	-----	-----	17	8	2	21	10	28
	19	-----	-----	6	24	19	9	22	64
	20	-----	-----	-----	7	8	19	28	25
	21	-----	-----	-----	3	13	23	8	1
	22	-----	-----	-----	23	1	24	19	87
	23	-----	-----	-----	18	16	34	6	27
	24	-----	-----	-----	5	29	22	49	83
	25	-----	-----	-----	-----	10	12	4	75
	26	-----	-----	-----	-----	4	17	43	32
	27	-----	-----	-----	-----	12	10	46	52
	28	-----	-----	-----	-----	18	15	9	69
	29	-----	-----	-----	-----	24	37	2	86
	30	-----	-----	-----	-----	-----	39	11	11
	31	-----	-----	-----	-----	-----	16	32	60

Households to be sampled	Approximate number of households in the segment from which to sample households using SRS							
	1 to 10	1 to 15	1 to 20	1 to 25	1 to 30	1 to 40	1 to 50	1 to 100
32	-----	-----	-----	-----	-----	30	37	93
33	-----	-----	-----	-----	-----	32	30	42
34	-----	-----	-----	-----	-----	33	20	8
35	-----	-----	-----	-----	-----	29	21	31
36	-----	-----	-----	-----	-----	27	47	14
37	-----	-----	-----	-----	-----	31	12	16
38	-----	-----	-----	-----	-----	3	17	44
39	-----	-----	-----	-----	-----	25	27	73
40	-----	-----	-----	-----	-----	-----	39	3

Non-duplicated random numbers by intervals: second example

Households to be sampled	Approximate number of households in the segment from which to sample households using SRS							
	1 to 10	1 to 15	1 to 20	1 to 25	1 to 30	1 to 40	1 to 50	1 to 100
1	5	10	10	11	3	9	29	10
2	9	11	15	20	12	13	47	18
3	6	12	2	17	19	18	50	89
4	4	15	9	7	16	31	15	76
5	8	2	19	13	18	37	10	45
6	1	7	11	22	1	5	42	85
7	3	1	1	25	11	6	21	27
8	7	9	14	24	20	33	25	16
9	10	13	6	21	26	40	13	48
10	-----	14	18	23	8	21	39	90
11	-----	3	4	5	13	34	16	8
12	-----	4	7	8	2	26	33	50
13	-----	8	16	9	4	1	14	88
14	-----	6	3	19	9	24	20	26
15	-----	-----	8	14	17	36	30	12
16	-----	-----	5	15	21	4	9	42
17	-----	-----	12	10	15	30	43	57
18	-----	-----	20	12	25	19	6	15
19	-----	-----	17	4	29	35	2	44
20	-----	-----	-----	16	23	28	31	65
21	-----	-----	-----	2	6	38	46	35
22	-----	-----	-----	3	24	14	28	59
23	-----	-----	-----	1	22	2	3	78
24	-----	-----	-----	18	30	39	32	91
25	-----	-----	-----	-----	27	3	36	58
26	-----	-----	-----	-----	5	10	8	19
27	-----	-----	-----	-----	10	27	44	53
28	-----	-----	-----	-----	28	32	18	80
29	-----	-----	-----	-----	7	12	27	100
30	-----	-----	-----	-----	-----	29	49	11
31	-----	-----	-----	-----	-----	8	48	1
32	-----	-----	-----	-----	-----	7	19	31
33	-----	-----	-----	-----	-----	20	34	86
34	-----	-----	-----	-----	-----	25	41	32
35	-----	-----	-----	-----	-----	17	7	4
36	-----	-----	-----	-----	-----	15	1	62
37	-----	-----	-----	-----	-----	23	35	96
38	-----	-----	-----	-----	-----	16	22	30
39	-----	-----	-----	-----	-----	11	5	81
40	-----	-----	-----	-----	-----	-----	38	34

Method C
Using a currency note to choose a random number

When in the field, using a currency note to select a random number is a good method as it does not require carrying a manual or paperwork.

The serial numbers on currency notes can be used to identify random numbers. If the range from which the random number must be chosen is one digit, then each digit in the serial number can be used as a separate random number. If the range needed is two digits (10 to 99) then the first two digits on the serial number can be used to identify the first half of the random number, and the digits on the serial number in positions 3 and 4 can be used to identify the second half. If the random number is between 100 and 999, then three digit groups from the serial number will be needed.

If the necessary number of digits is not found on the currency note, then more currency notes can be used to generate more random numbers.

Similar to a random number table, some of the random numbers identified from the serial number of the currency note might not be usable if they are out of range. For example, if the random number range is 1 to 12, then randomly-generated two-digit numbers from 13 to 99 must be discarded.

This method may be used to identify a few random numbers, but using a random numbers table is easier if a larger number of random numbers is required.

Annex F
Transferring data records from your mobile phone to the server[20]

Following data collection there are several ways in which to transfer the data from the phone to the web based server. Typically, the manner in which this is completed is by selecting 'send data to server' on each mobile phone once in the vicinity of a 2G network connection. In the case where network connections are not functioning properly, or the area in which you are working does not have any access to a 2G network, data can still be transferred from the phone to a computer through the use of the mobile phone's memory card and an external micro USB cable that connects from the phone to a computer. The computer can either be connected or not connected to the internet. If the computer does not have an internet connection, then the data can be stored on the computer and transferred into a database (e.g., Excel, Access). If the computer is connected to the internet the data can be transferred into EpiSurveyor.

The following is a set of instructions to download data collected in the field to the mobile phone's memory card. Prior to completing these steps the phone must be equipped with a memory card, and a micro USB cable and a computer with USB ports must be available.

Downloading data to a memory card and uploading through USB to EpiSurveyor server

1. On the Phone
   a. Once in EpiSureveyor, go to EpiSurveyor Forms list
      i. Highlight with cursor the questionnaire that you want to save to the memory card
      ii. Select options → scroll down and select 'Send Data to Memory Card'
      iii. Pop-up 'allow application Episurveyor to read user data' → select, <yes>
      iv. Scroll down to E:// → highlight with cursor → select options → Export Here
      v. Pop-up 'allow application Episurveyor to read user data' → select <yes>

      vi.   Pop-up 'allow application Episurveyor to write user data' → select <yes> (for each record of data both these messages will pop up, thus if you have five records you must select <yes> to ten pop-up messages)
      vii. Attach USB cable to phone and computer
      viii. Select USB mode: Mass storage
      ix.   Pop-up 'allow application Episurveyor to read user data' → select <yes>

2. Computer
   a. My computer → open Removable Disk (F:)
   b. Records within the questionnaire should appear as a .txt file
   c. Copy file and paste into a selected folder on computer

3. When access to internet is available
   a. Open EpiSurveyor in Internet Explorer → login to your account
   b. Select the questionnaire that you have saved to memory card → open
   c. Select Data Tab → Select 'upload data' → browse and find the .txt file that was saved earlier → select upload → files should be uploaded successfully

4. In order to ensure that your records have been successfully uploaded you may do the following:
   Options → view data → grey checkmarks appear beside the sent records and '0 unsent' (this means that records have been successfully uploaded) appears in the top right heading.

Marking records as 'unsent' and sending them to the server

In the case where you have sent data to your memory card and have not uploaded data to the Episurveyor server you may wish to mark the records as unsent and send them to the server via network connectivity (2G).

To mark records that have been sent to your memory card as 'unsent' to the server you must do the following :

1. Select the questionnaire (with the desired records to mark as unsent) and highlight it with cursor

2. Select options → Mark all as unsent (select)
   Grey checkmarks should disappear and the number of unsent records should appear in the top right heading.

....

Annex G

Downloading data from EpiSurveyor for cleaning and analysis on a computer[21]

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A. Uploading data from the phones and downloading data for analysis

Before data are cleaned, they must be uploaded from the mobile phone to a web-based or computer database. Following the final question in the questionnaire, EpiSurveyor goes on to a screen for sending data to the server.

....

21 *During production of the RAMP survey toolkit, news came that EpiSurveyor would be changing its name to Magpi in January 2013, and the main website will change to www.magpi.com. The web application will retain a very similar layout and there will be video demonstrations of the new improved features of Magpi. It is expected that the instructions and information in this annex will therefore still be relevant. The RAMP website (www.ifrc.org/ramp) will be updated to reflect any important changes.*

This annex explains in more detail how data on the phone can be uploaded to the EpiSurveyor web database.

Usually, the GPRS network can be used to upload the data immediately. At least by the end of each day, the new data can be uploaded to the internet-enabled

EpiSurveyor database using the GPRS cell network, and then examined and cleaned. This is a clear advantage of real-time data.

Data on the mobile phone can also be saved to the phone's own memory disk. If an interviewer cannot upload the data using the GPRS network or the connection between the local (national) GPRS network and the internet is not functioning, the data file should be copied from the phone's internal memory to the memory disk using the EpiSurveyor function described below.


The disk should then be removed from the phone and inserted into one of several adaptors (micro-SIM to USB adaptor, micro- to macro-SIM adaptor, etc.). To transfer data to a computer, the SIM adaptor should be inserted into a SIM reader on the computer, a memory card reader, or directly into a USB port if using a micro-SIM USB adaptor. The mobile phone can also be connected to the computer using a cable.

Microsoft Excel is used to clean the data each night, rather than using the EpiSurveyor web database. Excel is also used to maintain the master databases. A computer-based spreadsheet program like Excel is used for a number of reasons. In many settings in countries in the process of development the editing functions and the speed of internet databases can be limiting. It may also be the case that the internet connections being used by the local data manager are slow, making it difficult to perform on-screen editing of internet databases.
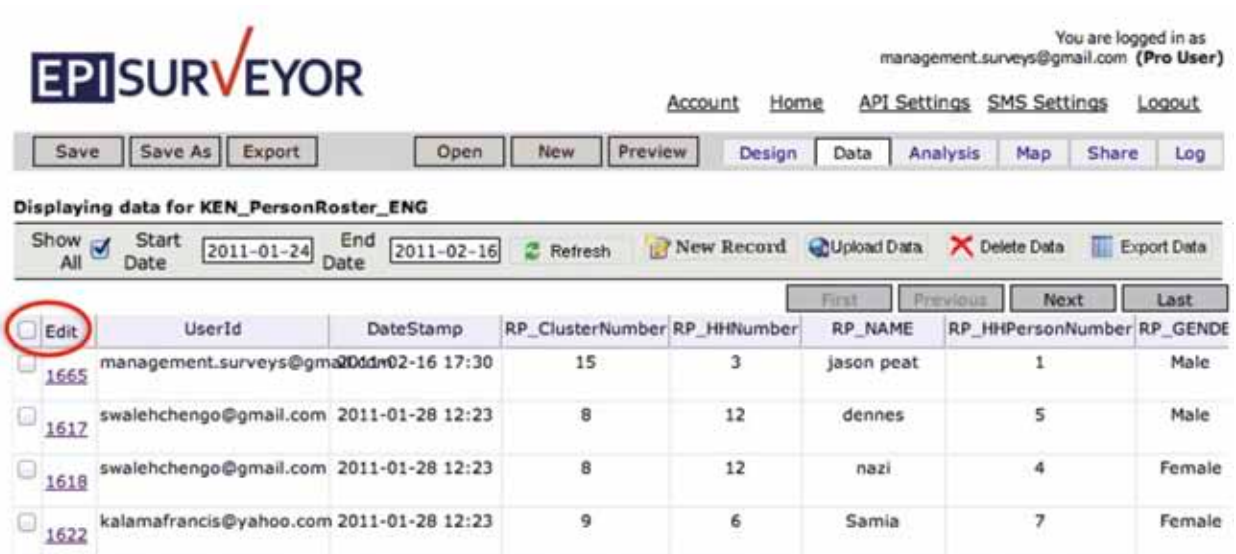
The steps to clean the data are:
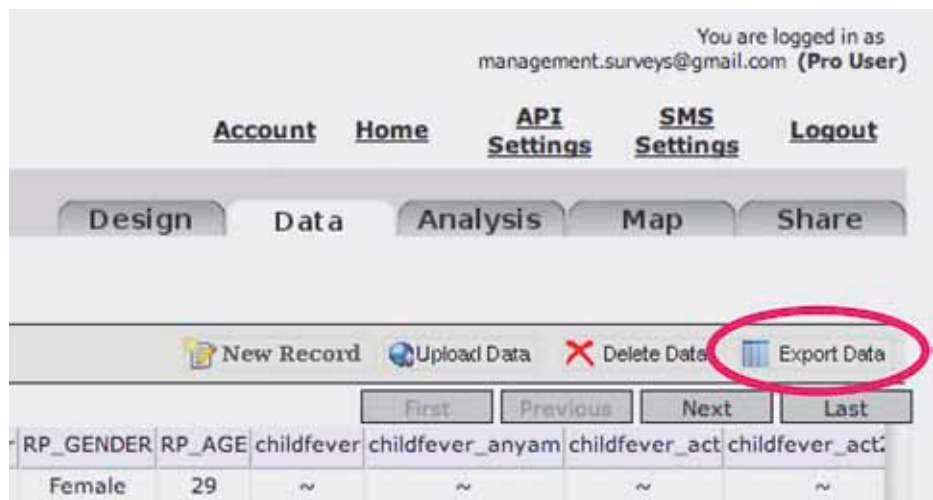
A. Exporting from EpiSurveyor to Excel
➜ "Open" an EpiSurveyor database
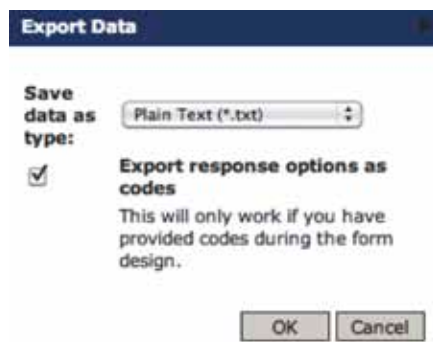➜ Click on the data tab as described in the figure below
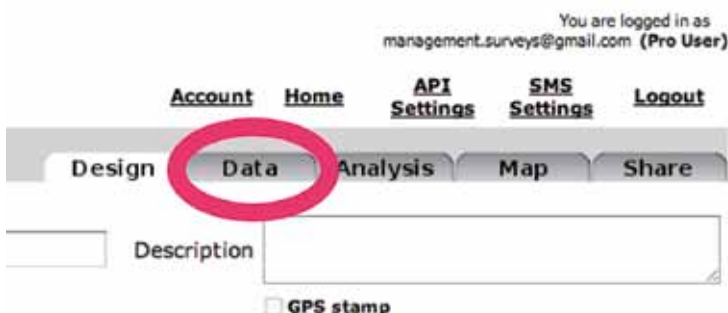
➔ Click on the small checkbox on the far left near the word "Edit" to select all records for exporting (see figure below)

➔ Click on "Export Data" at the top right (see figure below)

➔ Under the "Export Data" bar click on "Plain text *.txt" and change the selection to "Microsoft Excel *.xls".

➔ Once this .xls file is exported to your computer hard drive, open the .xls file in Excel.

Since there are three databases (household, persons and net), the above steps must be followed for each database.

B. Using Excel to edit and clean data before exporting for analysis

Excel is a good tool for examining and cleaning data and making a master database before exporting to another program for analysis. If the survey lasts five days, worksheets in the same Excel workbook could be used for "Master", "Day 1", "Day 2", "Day 3", "Day 4" and "Day 5" for each of the three databases.

The full database or multi-day data will be exported from EpiSurveyor each night. However, only the data from the new day will need cleaning. The variable called "DateStamp" (the date and time) which is automatically generated when a data record "hits" the database can be used by the data manager to delete already cleaned records from previous days.

The data are copied and pasted from the "Day X" (where X = 1, 2, 3, etc.) worksheet to a master worksheet, and then examined for errors. The main errors are generally:
• cluster numbers (all databases)
• household numbers (all databases)
• person numbers (persons and net databases)

Since there are three databases that need to be linked together in malaria surveys, the cluster number, household number and person number are extremely important, since mismatched data will be treated as missing.

Data can be sorted by cluster number, household number, and often person or net number, so that they can be examined carefully.

When the data are exported from EpiSurveyor, all data are strings. EpiSurveyor uses the tilde (~) for missing data. The string data are not converted to numeric numbers, nor is the missing data tilde sign removed until the data are exported into an analysis program.

The cell colour "fill" feature of Excel can be used to highlight possible data entry errors. This can be extremely helpful if an external data analyst is working with the local data analyst to clean data and correct errors. The coloured cells allow the local data manager and external data manager to go back and forth each night and day to resolve data issues.

The tool called *Monitoring cluster, household and person numbers on the rosters* is used to correct data errors in the cluster number and household number. The form called *Persons roster and who slept under which net last night* is used to correct person ID numbers on the persons database and in the net database (the net database contains information on which person(s) slept under each net during the previous night). This form is completed for each household that is interviewed. If the survey is local (so that all survey teams meet at a single location each night), the team supervisor gives these forms to the survey coordinator and local data manager each night. If the survey is national, then the data

manager must contact the team supervisors to ask them to refer to the job aid to examine data for correction of the errors.

In the net database, the most common data errors occur in the number of persons sleeping under a specific bed net the night before. A household may have more than one net and an interviewer might incorrectly enter data having the same person listed under different nets during the same night. The database allows for a person to be sleeping under only one specified net per night.

Missing data in the assets variables require checking, since a single missing value for any of the assets variables causes the household record to be eliminated from the wealth quintile analyses.

Data should also be checked over each day for inconsistencies or other problems.

Excel is primarily used for data cleaning, but in the RAMP survey is not used for analysis. This is because is it difficult to use Excel to calculate estimates from variables with categorical responses (yes, no, unknown, health worker, village worker, markets, etc.), and nearly impossible to calculate survey standard errors correctly.

C. Backing up the data files each night

After cleaning, it is mandatory to create a back-up of the "Master" and "Day" Excel workfiles each night. Files can be backed up to a portable hard drive or USB drive. To be even more secure, the master database can be attached to an e-mail and sent to an appropriate person. The file size of the Excel workbook is small. The e-mail attachment will act as a different back-up method, since it will be safely stored on an e-mail server.

D. Deleting data in the EpiSurveyor databases

The free-of-charge version of EpiSurveyor has a limit of 500 records per database, requiring data to be deleted on a regular basis if the survey covers more than 500 respondents. Deleting data in EpiSurveyor is a two-step process. First, the records requiring deletion are selected. Checking the box on the left side (indicated by the number 1 in the figure below) selects all records for deletion.
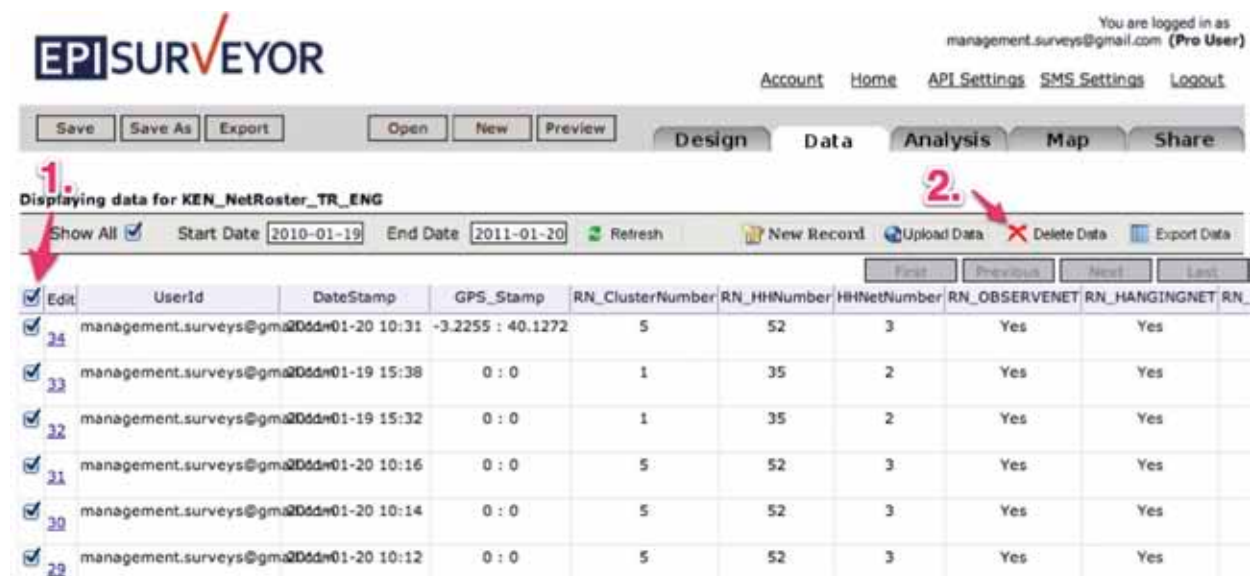
Second, click on "Delete data" (indicated at number 2 in the figure). After deleting the data, the database will be empty and an additional 500 records can be uploaded into this database. With the EpiSurveyor "Pro" account (US$ 5,000 per year per account as of 2012), an organization would have an account with unlimited records per database and unlimited number of databases.

E. Exporting data from Excel into STATA for analysis

STATA has been chosen to use for data analysis, primarily because it has a perpetual licence (purchase once and keep forever, without an annual licence fee). However, SPSS, SAS, EpiInfo or any other analysis program can be used. The program statements for analysis of cluster surveys are relatively similar in all the analysis programs.

Data are imported from Excel into STATA using the Excel export command within STATA (new in version 12) or by exporting Excel data into the "csv" (comma separated values) format (STATA versions prior to 12), then importing the csv data into STATA. The STATA commands for importing Excel data are contained within the full set of analysis code on the RAMP website (www.ifrc.org/ramp).

Annex H
Guidance on the results bulletin

The results bulletin is a series of data tables and figures showing the key findings of the survey (without explanatory text). Collection of survey data in real time using mobile phones during the survey allows draft results to be produced within 24 hours because data cleaning takes place during the survey period itself.

In the results bulletin for malaria, the estimates of all the main indicators are compared in a single figure, as the example below demonstrates.

Figure 1: Survey description and key information
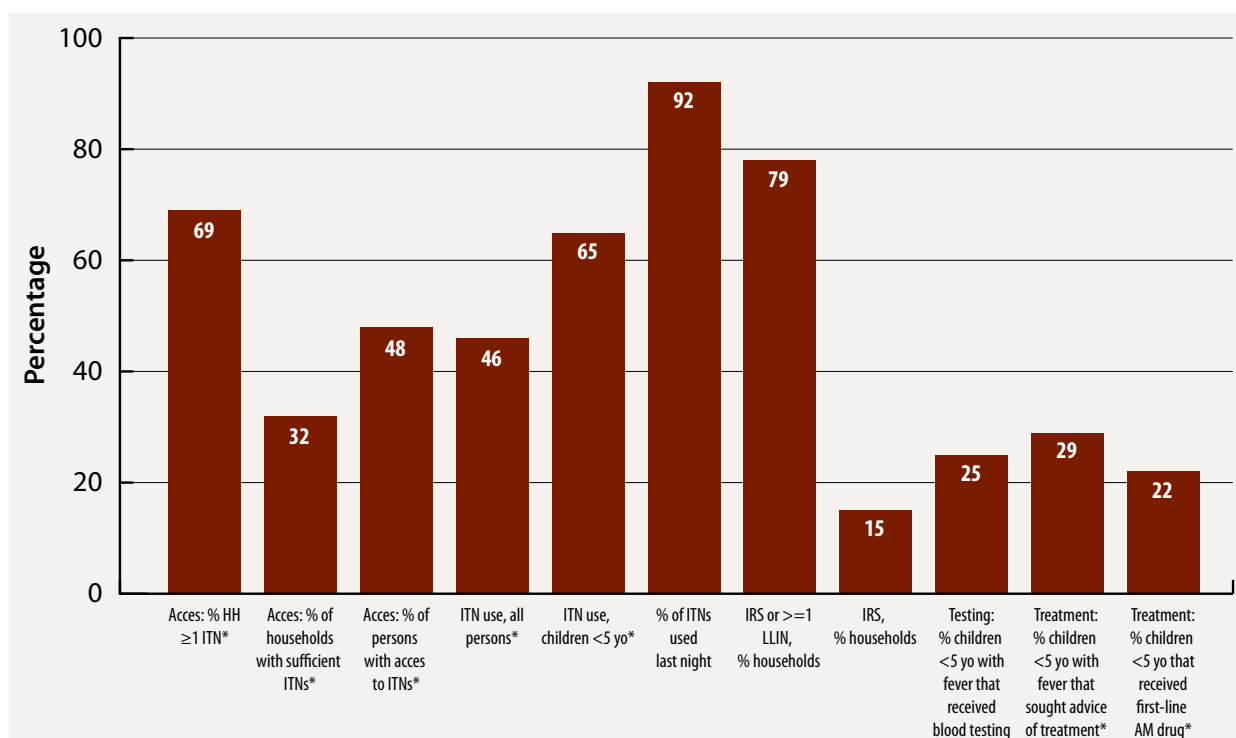
* Indicates main MERG indicator as of June 2012

The malaria survey contains standard Malaria Indicator Survey (MIS)-like questions that enable the analyst to produce results for standard malaria indicators. The standard malaria indicators shown in the results bulletin are mainly those listed by WHO and MERG as of mid-2012. The main indicators are shown below.

Data from ITN surveys are harder to analyse than most health surveys because of the three types of databases: households, persons and nets. These three databases need to be combined for several analyses. Other health surveys, such as infant immunization surveys, have one database and are easier to analyse. Three malaria interventions, bed nets, treatment for fever and IRS are examined in the survey. The indicators were taken from the RBM Malaria Indicator Survey model from 2012. During the 2011 and 2012 meetings, MERG suggested several changes to the standard malaria indicator list. These have been integrated into the model results bulletin that follows the recommended pattern described below, and can be seen in the example in Annex I.

The results bulletin contains key information on the most important dimensions of ITNs and malaria interventions, for example:
• ITN access and use of ITNs by the population
• ITNs by wealth quintiles
• age of ITNs
• home visits made to households for discussion of malaria
• source of information about malaria interventions
• IRS
• treatment and testing for malaria
• types of nets that households possess
• the number of persons sleeping under each ITN

The results bulletin is organized so that the main indicators appear on the first page, following the survey description and key information. The second page contains additional information about ITNs. The third page contains information about IRS, treatment and diagnosis for malaria. The last page gives details about ITN use. In detail:

Page 1

Figure 1 contains the main indicators.
1. Access: proportion of households with at least one ITN
2. Access: proportion of households with sufficient ITNs for all persons (with sufficient defined as one ITN per two persons)
3. Access: proportion of the population with access to an ITN within their household (with access defined as one ITN per two persons)
4. Use, persons: proportion of individuals who slept under an ITN the previous night
5. Use, persons: proportion of children under the age of five years who slept under an ITN the previous night
6. Use, nets: proportion of existing ITNs used the previous night*
7. Proportion of households with at least one ITN and/or sprayed by IRS in the last 12 months
8. Proportion of households that received IRS in the previous 12 months*
9. Diagnosis: proportion of children under five years old with fever in the last two weeks who had a finger or heel stick
10. Treatment: proportion of children under five years old with fever in the last two weeks for whom advice or treatment was sought
11. Treatment: proportion receiving first line treatment, among children under five years old with fever in the last two weeks who received any anti-malarial (AM) drugs

* indicates secondary indicators

Two of the access indicators are relatively new and were recommended at the MERG 2011 meeting. The numerator of the indicator "proportion of the population with access to an ITN within their household (with access defined as one ITN per two persons)" is calculated by summing the number of persons that existing household ITNs could cover in each household, assuming that one ITN covers two persons. Similarly, the numerator of the indicator "proportion of households with sufficient ITNs for all persons (with sufficient defined as one ITN per two persons)" is calculated by counting the number of households that had enough ITNs in their possession to cover all household residents (assuming that one ITN covers two persons).

Page 1 also contains other useful information in Table 1:
- sample domain (population)
- number of clusters
- number of households per cluster
- number of households targeted for interview
- number of households interviewed
- number of persons (all ages)
- average household size
- number of children under five years old
- rural households (percentage)
- unadjusted household weight
- adjusted household weight
- number of sleeping places
- number of nets
- number of nets observed
- number of nets hanging last night
- number of ITNs
- number of persons per sleeping space
- average number of persons that slept under a net (from net roster data)

The table also includes various percentages and ratios of the numbers above.

Below Table 1, the bulletin shows the total LLINs needed for universal coverage, the number of ITNs estimated to be in the households already and the gap. The need is calculated by dividing 1.8[22] persons per net into the total population. The calculated number of ITNs in all households in the domain equals the number of ITNs found times the adjusted sample weight. The gap is the number of ITNs needed minus the number of ITNs found in the households.

Page 2

Table 2, "ITN indicators by wealth quintile" gives information on the confidence intervals for several key ITN indicators, and shows data on equity. The wealth quintile data should be interpreted with caution since the confidence intervals are not shown. They are likely to be wide since the small sample size is divided into five strata for the wealth analysis.

Table 3, "Age of ITNs in years" shows the age of ITNs that are present in the surveyed households. This indicator shows if ITNs are primarily new nets (within 24 months) or are older, meaning that they may have lost an important amount of insecticide effectiveness.

22 *Although malaria indicators are based on two persons sleeping under one net, the ratio of persons to nets for procurement purposes is different (1.8) because approximately half of households have an uneven number of persons. For example, households with five persons will need three nets to ensure that all persons can sleep under nets.*

Table 4, "Household visits by community volunteers" shows the percentage of households that received a home visit at which malaria or ITNs were discussed in the six months before the survey. The question about home visits is of particular interest to the IFRC since Red Cross Red Crescent community volunteers make home visits to promote hanging and use of ITNs.

Page 3

Table 5 shows the source of ITNs (mass distribution, market, etc.) and the source of greatest information on ITN use.

Table 6 shows the main indicators for diagnosis and treatment for malaria and the types of non-ACT malaria treatments that are still used to treat suspected malaria cases.

Table 7 shows the width of the confidence interval and the design effect for several key indicators.

Page 4

Figure 2 shows the percentage of ITN use by age group. This graph shows important information; usually indicating that persons between five and 24 years of age have the lowest proportion using an ITN.

Table 8 shows the types of nets found in the households.

Table 9 shows the percentage of persons sleeping under ITNs the previous night by the number of persons per net. A high percentage of ITNs being used by three or four persons may indicate that ITNs are scarce and that more ITNs may be needed.

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Annex I
Sample results bulletin from a malaria post-campaign survey

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Survey report: page 1

National Society

Survey of Malaria Indicators

XXXX Regional Red Cross Society area, Country XXXX, Jan-Feb 2012

Survey conducted from 30 January to 3 February 2012, bulletin date: 4 February 2012

Table 1. Survey description and key information

	n	%		n	%	
Sample domain (pop)	46 727		No. sleeping places	739		
No. clusters	30		No. nets	358	48%	of sleeping places
No. HH per cluster	10		No. nets observed	345	96%	of nets
No. HHs targeted	300		No. nets hanging	337	94%	of nets
No. HHs interviewed	288	96%			46%	of sleeping places
No. persons (all ages)	1256		No. ITNs	345	96%	of nets
Average HH size	4,19				47%	of sleeping places
No. children <5 y	174	14%	No. persons per sleeping place	1,74		
Rural households		100%	Av. # persons slept under net*	1,89		
Unadjusted HH weight	37,20		* data from the net roster			
Adjusted HH weight (av)	38,45					

NOTE: n's in the table above were not calculated based in adjusted sampling weight, but percentages were

Total LLINs needed for universal coverage	24 723		Estimated number of LLINs in the whole survey domain	13 319	54%
			ITN gap	11 405	46%

Figure 1: Summary of malaria indicators
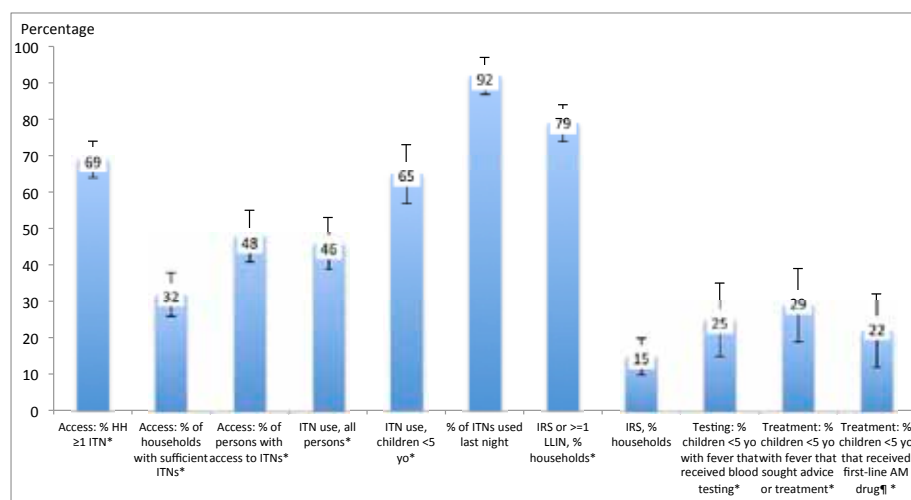
* Indicates main MERG indicator as of June 2012
¶ Percentage receiving first line treatment, among children under five years old with fever in the last two weeks who received any antimalarial drugs
- error bars represent 95% confidence intervals

Survey report: page 2

Table 2: ITN indicators by wealth quintile

<div align="center">Wealth quintiles</div>

	All	CI	Most poor	More poor	Middle	Less Poor	Least Poor	Ratio highest/ lowest*
HH Ownership								
All	69	62-76	58	63	75	73	76	1.3
Rural	68	61-76						
Use of ITNs								
All persons	46	39-53	41	42	50	52	44	1.1

* interpret with caution: limited sample size in each wealth quintile

Table 3: Age of ITNs (years)

Category, years	<1	1	2	3	4	5+	Did not know age
%	15	29	15	26	6	4	5
cum. %	15	44	59	85	91	95	6%

Mean age of ITNs = 27.5 months

Table 4: Household (HH) visits by community volunteers

	%
No. HH with home visit in last 6 months about malaria/ITN	17

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Table 5: ITN source and information

a. ITNs: Source of ITNs	State/ Mass	Market	Clinic	Other
%	25	13	54	8

b. Greatest source of information about ITN use	Health centre staff	Commun- ity-based volunteer	Commun- ity leader	Radio	Neigh- bor	Other
%	44	13	1	37	0	5

Table 6: Diagnosis and treatment

	%	Types of non-ACT antimalarials	
Children with fever in the last 2 weeks	49		% (of all non-ACT Ams)
% children <5 yo with fever that received blood testing*	25	Chloroquine	9
% children <5 yo with fever that sought advice or treatment*	29	SP	2
% receiving first line treatment, among children under five years old with fever in the last two weeks who received any anti-malarial drugs	22	Other	79
		Do not know	9

Table 7: Precision and design effect of key indicators

Key indicators	CI, ±	Design effect (DEFF)
ITN use, all ages	7	6.8
ITN use, children <5 years old	8	1.1
Household ownership, ≥1 ITN	7	1.8
% children <5 yo with fever that received blood testing*	10	1.9

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Additional ITN analyses

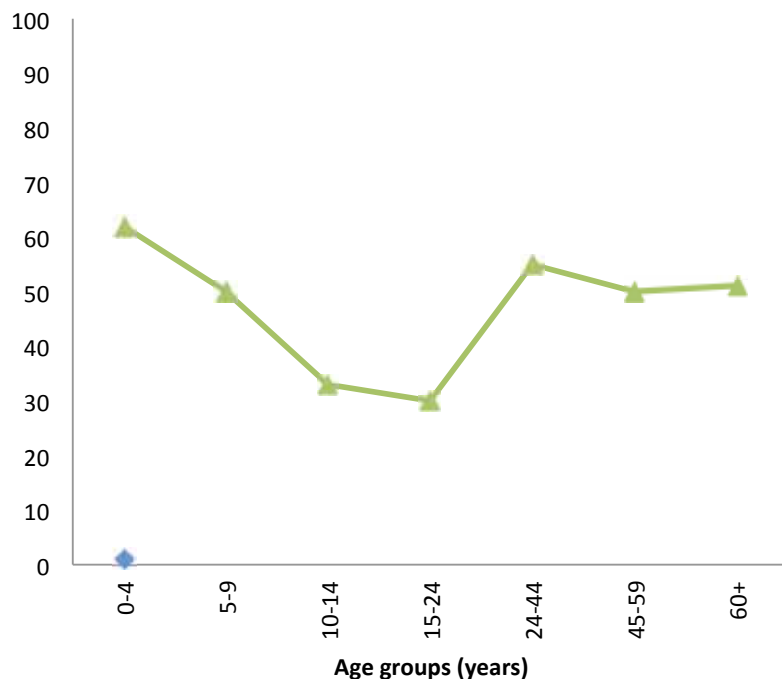**Figure 2: % ITN use by age group**

Age groups (years)

Table 8. Percentage type of net

Dawa	45
Permanet	45
SuperNet Plus	3
Other LLIN	3
Non-LLIN	3
Did not know	1

Table 9. Percentage of persons sleeping under nets last night

1	person	33
2	persons	48
3	persons	16
4+	persons	2

Mean persons/net = 1.89

Annex J
Guidance on the survey report

A survey report is a technical document recording the details of the survey. It is an important tool to:
- document the findings
- assess the impact of the distribution campaign
- make decisions about future programme activities
- discuss learning points and recommendations

For easy readability, it is recommended that it is spaced widely (not single spaced), and will contain the following sections:

1. One page executive summary or abstract

2. Introduction and background information

3. Methods

4. Results

5. Discussion

6. References

7. Tables, figures and annexes

Survey reports from the pilot RAMP surveys can be seen on the RAMP website (www.ifrc.org/ramp). These are examples of reports about a malaria survey, but any health survey could follow this format.

One page executive summary
This is a very brief summary of the main points: background, purpose, methods, results and conclusions/implications.

Introduction and background information
This section describes the context of the survey and its purpose. In a malaria survey, this would include a description of the previous mass LLIN distribution campaigns, previous intervention coverage surveys, the trend of malaria indicators in the recent past and the current malaria status.

Methods

This section gives a basic understanding of the methods used to conduct each major step of the survey. For example:

- dates of the household interviews
- a description of the sampling frame (how many provinces, districts, villages, etc.), including the size of the sampling frame and source of the data for the size of the primary sampling units (clusters) at the first stage
- method used for choosing the clusters (PPES)
- method used for segmenting and sub-segmenting and the size measure used
- approximate size of the final segment used for simple random sampling of households
- definition of household (for example, sharing a common cooking pot)
- definition of persons in the household (all persons sleeping in the household the previous night, usual residents, etc.)
- information about the sample weight and how it was calculated, including adjustment for non-response
- information about the questionnaire(s) used, for example, how they were developed
- information about the analysis, including construction of more complicated variables such as wealth quintiles, statistical software used for analysis, method of standard error estimation, and a statement that the analysis was conducted in a way that accounted for the multi-stage cluster design of the survey
- additional information about indicators which were complicated to construct (either numerator, denominator, or both). In the malaria survey, an example would be the percentage of the population and households that had adequate "access" to ITNs

The section also contains a brief description of the survey operations, including:

- how data were collected and converted into electronic form (paper or electronic maps, personal digital assistants, GPS devices, mobile phones, etc.)
- any additional information that might affect data quality, including characteristics of the interviewers, constraints, obstacles (for example, areas that could not be reached because of weather conditions)

Results

The results section should be organized according to the subject matter of the survey. In a malaria survey, there might be separate sections on LLINs, IRS and treatment. The first part should provide data about the survey, for example, the total number of statistical units and households sampled, and the level of non-response.

Both the estimates (often called point estimates) and the confidence intervals should be provided for key results. In the example results bulletin, confidence intervals are shown for key LLIN results in Table 2.

Discussion

This section provides a commentary and interpretation of key results, putting the interpretations in context. For example, for malaria, the report might state that IRS coverage results were low and explain why that finding is important. The section could be organized as follows:

- key findings
- additional findings
- limitations
- conclusions

The first paragraph often highlights the most striking findings of the survey. For example, the lead sentence in the Nigeria report commented that the percentage of households with at least one ITN was the highest recorded by any state in Nigeria up to that time.

All discussion sections should have a paragraph on the limitations of the survey results, including interpretation of non-response and selection bias. For example, the example malaria survey report highlighted an unusually high percentage of children with fever reporting being treated with ACTs, indicating a potential bias in that result. The educational level and experience of the interviewers was also noted as a caution. Non-response and potential selection bias should be discussed.

The final part of the discussion section often ends with conclusions. For example, a report might state that the survey objectives were met, and that the survey methodology provided valuable health data rapidly and at low cost.

Annexes
The survey questionnaires should be included as an annex. They can be exported from Magpi, using the EXPORT command, into a Rich Text Format (.rtf) that can be read by Microsoft Word and other programs. The exported data show the question, type of question (text, number, etc.), data field name and possible responses (Yes, No, Do not know).

The Fundamental Principles of the International Red Cross and Red Crescent Movement

Humanity The International Red Cross and Red Crescent Movement, born of a desire to bring assistance without discrimination to the wounded on the battlefield, endeavours, in its international and national capacity, to prevent and alleviate human suffering wherever it may be found. Its purpose is to protect life and health and to ensure respect for the human being. It promotes mutual understanding, friendship, cooperation and lasting peace amongst all peoples.

Impartiality It makes no discrimination as to nationality, race, religious beliefs, class or political opinions. It endeavours to relieve the suffering of individuals, being guided solely by their needs, and to give priority to the most urgent cases of distress.

Neutrality In order to enjoy the confidence of all, the Movement may not take sides in hostilities or engage at any time in controversies of a political, racial, religious or ideological nature.

Independence The Movement is independent. The National Societies, while auxiliaries in the humanitarian services of their governments and subject to the laws of their respective countries, must always maintain their autonomy so that they may be able at all times to act in accordance with the principles of the Movement.

Voluntary service It is a voluntary relief movement not prompted in any manner by desire for gain.

Unity There can be only one Red Cross or Red Crescent Society in any one country. It must be open to all. It must carry on its humanitarian work throughout its territory.

Universality The International Red Cross and Red Crescent Movement, in which all societies have equal status and share equal responsibilities and duties in helping each other, is worldwide.

For more information on this IFRC publication, please contact:

In Geneva
Jason Peat
Senior Health Officer, Malaria
E-mail: jason.peat@ifrc.org

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