SIERRA LEONE

Malaria Indicator Survey (MIS)

2013

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Malaria Indicator Survey 2013

Final Report

National Malaria Control Programme

Statistics Sierra Leone

College of Medicine and Allied Health Services
University of Sierra Leone

Catholic Relief Services

Freetown, Sierra Leone

ICF International
Calverton, Maryland
United States

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The 2013 Sierra Leone Malaria Indicator Survey (2013 SLMIS) was implemented by the National Malaria Control Programme (NMCP), Statistics Sierra Leone (SSL), the College of Medicine and Allied Health Services (COMAHS) of the University of Sierra Leone (USL), and Catholic Relief Services (CRS) from February 2013 through March 2013. ICF International provided technical assistance. Funding for the 2013 SLMIS was provided through CRS with funds from the Global Fund (GF).

Additional information about the 2013 SLMIS may be obtained from the headquarters of the Ministry of Health and Sanitation, Youyi Building, Brookfields, Freetown, Sierra Leone.

Information about the survey may also be obtained from ICF International, 530 Gaither Road, Rockville, MD 20850, United States; Telephone: 301-407-6500; Fax: 301-407-6501; E-mail: reports@measuredhs.com; Internet: http://www.measuredhs.com.

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PREFACE

Malaria remains one of the biggest public health problems in Sierra Leone. Over the past several years, the country has made progress in defining the effort required to control the impact of malaria among its citizens, including the development of a National Malaria Control Programme (NMCP) Strategic Plan 2011 – 2015 and revision of guidelines in December 2011 to ensure that programme implementation is evidence-based. Success in malaria control relies on solid partnerships among all key players. The Ministry of Health and Sanitation (MoHS) of Sierra Leone and Catholic Relief Services (CRS) are co-implementing nationwide malaria prevention and treatment activities funded by the Global Fund.

The Malaria Indicator Survey, conducted every two years, is meant to gauge progress on outcomes and impact by measuring status of key malaria indicators. Under the leadership of the NMCP and a Technical Working Group, CRS managed the implementation of a Malaria Indicator Survey in early 2013. The Technical Working Group consisted of representatives from the Ministry of Health and Sanitation (Laboratory Services and the National Malaria Control Programme), Statistics Sierra Leone, and the World Health Organization. The protocol has also been reviewed locally by the Sierra Leone Ethics and Scientific Review Committee and internationally by ICF International. The MIS was designed to measure the coverage of the core malaria control interventions defined in the 2011-2015 National Malaria Strategic Plan to help the country assess current implementation strategies.

The MIS 2013 looked at (1) parasite prevalence age children age 6-59 months with malaria infection (detection of parasitemia by microscopy); (2) percentage of children under age 5 with confirmed malaria in the last two weeks who received ACT within 24 hours of onset of fever at the community level; (3) percentage of children under age 5 with confirmed malaria in the last two weeks who received ACT within 24 hours of onset of fever at the facility level; (4) percentage of children under age 5 who slept under a long-lasting insecticidal net (LLIN) the previous night; (5) percentage of pregnant women who slept under an LLIN the previous night; (6) percentage of households with at least two LLINs; (7) percentage of women who received two or more doses of intermittent preventive treatment (IPT) for malaria during their last pregnancy (in last 2 years); (8) percentage of people (or target groups) who knew the causes, symptoms, treatment, and preventive measures for malaria; and (9) anemia status among children under age 5.

I wish to thank the members of the Technical Working Group for providing strategic direction that guided the planning, technical, administrative, and logistical phases of the 2013 MIS implementation and CRS for leading the implementation of that strategy. The support provided by the MoHS's various directorates and units, especially Disease Prevention and Control, is also acknowledged. I wish to express appreciation to ICF International for their technical assistance at all stages of the survey, including the writing and finalization of the report.

Sincere gratitude goes to the supervisors, interviewers, nurses, laboratory scientists, and drivers for their tireless efforts. The commitment of the entire field staff of the 2013 SLMIS to ensuring success while conducting the survey is commendable. The success of the 2013 SLMIS was also made possible by the support and collaboration of a number of organisations and individuals to whom we are grateful. I wish to acknowledge the financial support provided by the Global Fund (through CRS). Finally, I thank all the households and respondents who participated in the survey; without their participation and support, the much needed data for planning purposes would not have been collected.

Honourable Miatta Kargbo
Minister of Health and Sanitation
Freetown
September 2013

ACRONYMS AND ABBREVIATIONS

ACT	Artemisinin-based combination therapy
Ag	Antigen
ANC	Antenatal care
ASAQ	Artesunate + amodiaquine
CDC	US Centers for Disease Control and Prevention
Co-PR	Co-principal recipient
COMAHS	College of Medicine and Allied Health Services
CRS	Catholic Relief Services
CSPro	Census Survey Processing Software
DHS	Demographic and Health Survey
DPC	Directorate of Disease Prevention and Control
DPI	Directorate of Planning and Information
EA	Enumeration area
FISIM	Financial intermediation services indirectly measured
g/dl	Grams per decilitre
the Global Fund	Global Fund to Fight AIDS, Tuberculosis, and Malaria
GPS	Global positioning system
Hb	Haemoglobin
HDR	Human Development Report
HMM	Home management of malaria
HRP2	Histidine-rich protein 2
IPT	Intermittent preventive treatment
IPTp	Intermittent preventive treatment in pregnancy
IRB	Institutional review board
IRS	Indoor residual spraying
ITN	Insecticide-treated net
KAP	Knowledge, Attitudes, and Practices
LLIN	Long-lasting insecticidal net
MDGs	Millennium Development Goals
MERG	Monitoring and Evaluation Reference Group
MICS	Multiple Indicator Cluster Survey
MIS	Malaria Indicator Survey
MoHS	Ministry of Health and Sanitation

NMCP	National Malaria Control Programme
NMSP	National Malaria Strategic Plan
PSM	Procurement and supply management
PSU	Primary sampling unit
RBM	Roll Back Malaria
RBM-MERG	Roll Back Malaria Monitoring & Evaluation Reference Group
RDT	Rapid diagnostic test/testing
SLMIS	Sierra Leone Malaria Indicator Survey
SLPHC	Sierra Leone Population and Housing Census
SP	Sulphadoxine-pyrimethamine
SRs	Sub-recipients
SSL	Statistics Sierra Leone
TWG	Technical working group
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
USL	University of Sierra Leone
WHO	World Health Organization

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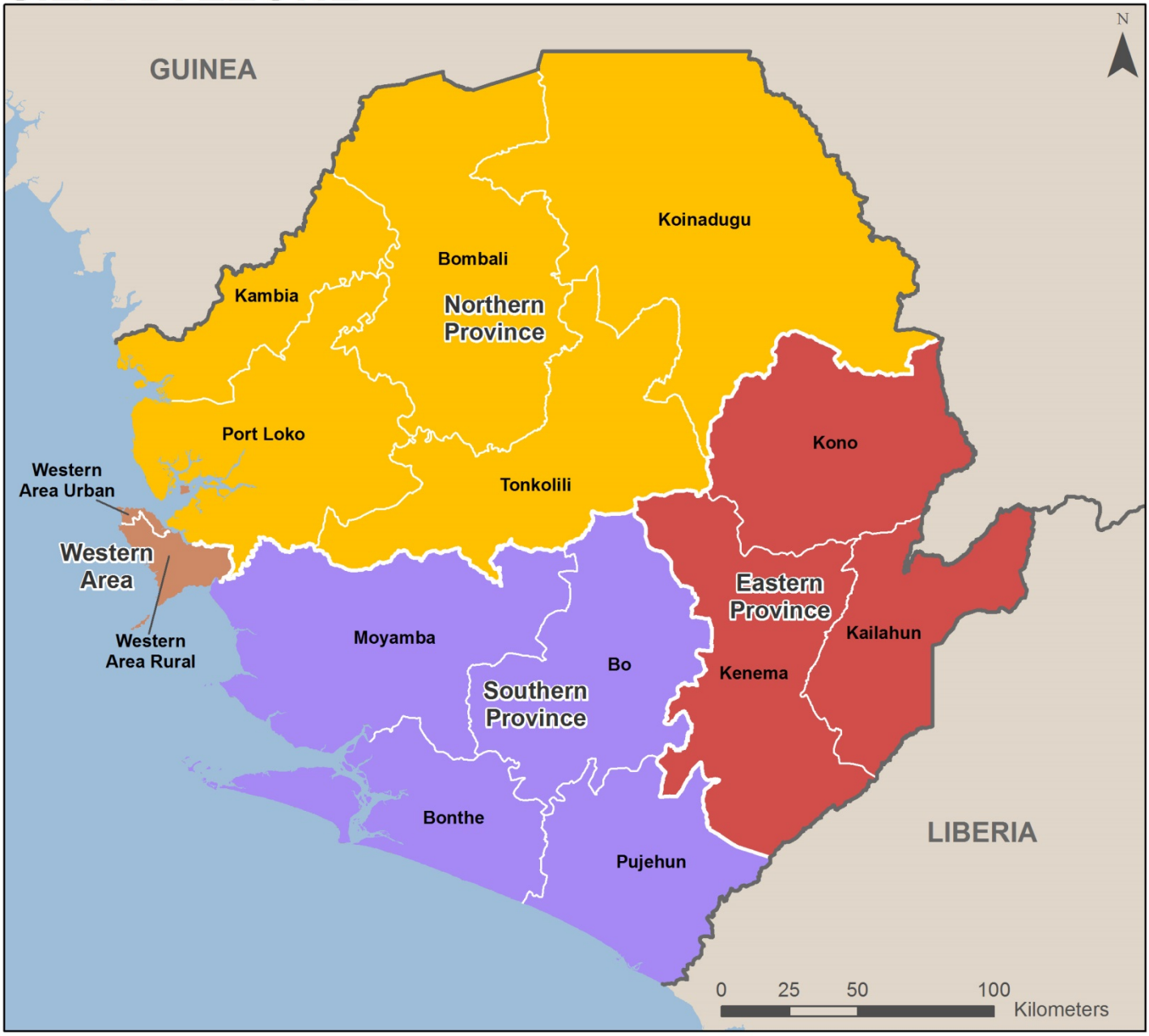


INTRODUCTION 1

1.1 GEOGRAPHY

Sierra Leone is located on the west coast of Africa and covers an area of about 72,000 square kilometres (28,000 square miles). It extends from latitude 7 to 10 degrees north, and from longitude 10 to 14 degrees west. The Republic of Guinea borders it to the north and northeast, and the Republic of Liberia borders it to the east and southeast. To the west and southwest, the Atlantic Ocean extends approximately 340 kilometres (211 miles). Administratively, Sierra Leone is divided into 4 provinces. Each province is subdivided into districts, and each district is divided into chiefdoms. Overall, there are 14 districts and 149 chiefdoms. Western Province is divided into 69 wards. Among the 14 districts, there are 5 city councils and 14 district councils, including Freetown, the capital, for a total of 19 local councils (SSL, 2006).

Sierra Leone has four main physical regions: the Freetown Peninsula raised beaches and hills, the Coastal Plains, the Interior Lowlands, and the Interior Plateau. The Freetown peninsula consists of three roughly parallel ranges of highlands that are narrow but extend about 30 kilometres south of Freetown. The hills and mountains in these highlands rise impressively from 200 to 1000 metres above the low-lying narrow coastal area.

The Interior Lowlands region makes up about half of the country. Most of the area, which is largely swamp, is less than 150 metres above sea level. The Interior Plateau region makes up the eastern half of the country. It is the most extensive physical region and includes the greatest variety of land forms. It is 300 to 450m above sea level. The Interior Plateau is dissected by the main rivers flowing westward towards the sea. Rising above the general level of this region are a number of hills and mountains, including the Kambui, Nimini, and Gori hills and the Sula, Kangari, Loma, Tingi, and Wara Wara mountains.

The country has eight main river systems: Great Scarcies, Little Scarcies, Rokel, Jong, Sewa, Wanjei, Moa, and Mano. The rivers typically flow from northeast to southwest, eventually reaching the Atlantic Ocean.

Climate in Sierra Leone is determined mainly by the seasonal movements of two air masses: the northeasterly Continental Tropical Winds (commonly called the North-East Trade Winds) and the southwesterly Maritime Tropical Winds (commonly called the South-West Monsoon). The country has a tropical climate with temperatures ranging from 21^{o}C to 32^{o}C and a mean daily temperature of 25^{o}C. There are two major seasons: the dry season (November to April) and the wet season (May to October) with heavy rains in July and August. Sierra Leone has an average annual rainfall of approximately 320 centimetres. Relative humidity is high, ranging from 60 to 90 percent.

At present the following vegetation communities can be distinguished: forest, savannah, grassland, and swamp. The country has a varied terrain, ranging from coastline swamps, inland swamps and rain forest to one of the highest mountains in West Africa, Bintumani at 2200m. The vegetation is mainly secondary palm-bush interspersed with numerous swamps, which are mostly cultivated for rice. These swamps provide ideal breeding places for the Anopheline vectors of malaria. Moreover, the coastal line has several mangrove swamps, which provide the breeding sites for *Anopheles melas* mosquitoes, which is one of the major vectors of malaria besides *gambiae* and *funestus*.

1.2 ECONOMY

According to population projection figures, the 2013 population of Sierra Leone is estimated at about 6 million (SSL, 2006). For the period 1985-2004, the population growth rate was estimated at 1.8 percent. About 64 percent of the population resides in rural areas. The 2013 recent population projection figures indicate that the annual population growth rate is 3.2 percent per annum. Sierra Leone was ranked number 177 among the 185 countries surveyed globally in the 2013 United Nations Human Development Index, with a per capita GDP of about USD$769, a life expectancy of 48.1 years, and an adult literacy rate of 42 percent. The UNDP 2013 Human Development Report estimates that in the 2002-2011 period, 53 percent of the population lived on less than USD$1.25 per day (UNDP, 2013).

In 2007, Sierra Leone's real GDP grew by 6.4 percent, or about 0.9 percentage points below the 2006 growth rate of 7.3 percent. Of the total 2007 GDP, the contribution of agriculture declined to 46 percent; industry and services (less FISIM[1]) remained unchanged at 10 percent and 37 percent, respectively; while the Net-Tax contribution went up by 1 percent to 7 percent. The economy has been unable to create jobs at a rate to match the rising labour force demand.

The most recent household income and expenditure survey (2003-04) showed that 70 percent of the population lives below the poverty line, according to the National Poverty Line of Le 2,111 per day[2] (SSL, 2004). Overall, poverty is highest in rural areas, with 79 percent of the rural population living below the poverty line. The most acute form of poverty, insufficient food, is concentrated mainly in rural areas. About 68 percent of the population cannot afford enough food to eat. Three out of four people (75 percent) in rural areas outside Freetown do not attain the minimum daily calorie intake (2700 calories). The poor in Sierra Leone can meet only about 71 percent of their basic needs. A poor and undernourished population is more susceptible to various diseases. Thus, rising maternal and child mortality rates, increasing rates of illiteracy, and rising unemployment levels characterize the living conditions in many parts of Sierra Leone. The HIV/AIDS pandemic has also had a major impact on all sectors of the economy through loss of production and labour force. Against this background, the government of Sierra Leone in 2005 launched the Economic Recovery Strategy, aimed at restoring economic growth, generating employment opportunities, and reducing poverty levels (Poverty Reduction Strategy Paper, March 2005). In April 2010, the government introduced a free healthcare initiative for pregnant women, lactating mothers, and children under age 5, followed by the introduction of free testing and treatment for malaria for all age groups in April 2012. Partners are supporting the implementation of these initiatives which have led to an increase in public health facilities' attendance, especially for children under age 5.

1.3 POPULATION

The population of Sierra Leone increased from 2,180,355 in 1963 to 5,746,800 in 2013 (Central Statistics Office, 1963; SSL, 2006).

1.4 BACKGROUND ON MALARIA PROGRAMME IN SIERRA LEONE

Malaria is endemic in Sierra Leone, with stable and perennial transmission in all parts of the country. As such, the entire population is at risk of developing the disease. Malaria accounts for about 50 percent of outpatient morbidity and is presently the leading cause of morbidity and mortality among children under age 5,

[1] FISIM is Financial Intermediation Services Indirectly Measured. The SNA 93 recommends that it should be treated as Intermediate Consumption and therefore deducted from the output of sectors that incur them; or appears in the account but deducted from the total.

[2] National currency is Sierra Leonean leone (Le): 1 Le = 0.00023 U.S. dollars (as per August 2013)

with a mortality attributed to malaria estimated to be 38 percent among this age group and 25 percent for all ages (Outpatient morbidity statistics, MoHS, 2009, MIS 2010).

The 2010 MIS found that 46 percent of children under age 5 who seek care receive prompt and effective treatment of malaria with the medicine of choice for treating uncomplicated malaria, artemisinin-based combination therapy (ACT), at the health facility level within 24 hours (MIS 2010).

The National Malaria Control Programme (NMCP), under the Directorate of Disease Prevention and Control (DPC), is mandated to manage all malaria control efforts in country. The guiding document for malaria control is the National Malaria Control Programme Strategic Plan 2011 – 2015. This strategy informs all interventions and sets national targets based on established indicators.

The Global Fund supports the Government of Sierra Leone in efforts to fight AIDS, tuberculosis and malaria. In 2010, the Government of Sierra Leone successfully submitted a proposal to the Global Fund to support malaria interventions. Two grants emanating from the proposal were signed by the MoHS and CRS as co-principal recipients (Co-PRs). CRS's main activities include: strengthening information systems related to malaria medicine and commodities; community behaviour change communication; mass-media communication; and major research studies. The activities are implemented by CRS Sierra Leone in partnership with the MoHS, in particular with the NMCP and the Directorate of Planning and Information (DPI), as well as through s-recipients (SRs). The main responsibilities of the MoHS include: prompt and effective treatment, including procurement and supply management (PSM), and health worker training; home management of malaria, and malaria in pregnancy prevention and treatment.

The overall goal of the Global Fund Round 10 Malaria project is to achieve the malaria-related Millennium Development Goals (MDGs) by 2015, not only by national aggregate, but also among the poorest groups across Sierra Leone. This goal is also in line with Abuja Targets and the National Health Sector Strategic Plan (2009-2015), and will be reached by focusing on five key objectives listed below, all contributing to the goal and objectives of the National Malaria Strategic Plan of 2011-2015:

1. Increase the coverage of prompt and effective treatment of malaria from 50 percent in 2010 to 80 percent for all age groups by 2016

2. Increase and maintain the proportion of pregnant women receiving at least two doses of intermittent preventive treatment during pregnancy (IPTp) from 72.3 percent in 2008 to at least 90 percent by 2016

3. Maintain universal coverage of long-lasting insecticidal nets (LLINs) through 2016

4. Increase to 80 percent the proportion of the population that takes appropriate action to prevent and treat malaria (2 doses of IPTp, sleeping under an LLIN, timely care seeking) through Information Education Communication / Behaviour Change Communication by 2016.

5. Strengthen organizational capacity for more effective management of malaria control activities

1.5 SURVEY OBJECTIVES AND ORGANIZATION OF THE 2013 SIERRA LEONE MALARIA INDICATOR SURVEY

The 2013 Sierra Leone Malaria Indicator Survey (SLMIS) is a comprehensive, nationally-representative household survey designed following the Roll Back Malaria Monitoring and Evaluation Reference Group guidelines. The 2013 SLMIS was designed in order to track progress and impact. A national MIS was conducted in Sierra Leone in 2010 by the MoHS. However, the 2013 SLMIS is the first national MIS

that is inclusive of rapid diagnostic testing (RDT) and microscopy to determine the national malaria prevalence among children under age 5.

After an LLIN mass-distribution campaign in 2010, a survey was conducted to assess coverage and usage of nets in 2011. Other recent sources of malaria-related data include the 2008 Sierra Leone Demographic and Health Survey (DHS) and the 2010 Multiple Indicator Cluster Survey (MICS). The 2013 SLMIS survey builds on lessons learned from a recent Knowledge, Attitudes, and Practices (KAP) survey conducted in January and February of 2012, in terms of the Information Communication Technology used.

The key partners in the 2013 SLMIS are Catholic Relief Services, Ministry of Health and Sanitation (Directorate of Disease Prevention and Control, Laboratory Services, Directorate of Planning and Information, and the National Malaria Control Programme), Statistics Sierra Leone, University of Sierra Leone, and World Health Organization. Technical assistance to the survey for paper questionnaire development, data collection and blood sample collection training, and data analysis was provided by ICF International. CRS provided technical assistance for the data entry program for the Apple iPhones.

The Roll Back Malaria Monitoring & Evaluation Reference Group (RBM-MERG), a global technical advisory group providing monitoring and evaluation guidance for malaria control programmes, recommends that the MIS be conducted every two years within six weeks of the end of the rainy season in countries with endemic malaria transmission patterns, especially those in sub-Saharan Africa. This is generally the high-transmission period. In Sierra Leone, the rainy season extends from May to October. The 2013 SLMIS was conducted February – March, 2013 due to delays in the survey implementation. Although this is not the high-transmission period for malaria in Sierra Leone, the technical working group made the decision to field the survey during these months because malaria transmission is high enough throughout the year. The 2013 SLMIS used a standard set of instruments and the protocol developed by RBM-MERG which the technical working group (TWG) adapted to the country context. These tools are largely based on the collective experience gained from the DHS and MIS surveys and are presented as a package of materials to promote standardized survey management and data collection methodology. The package also includes standardized measurement of malaria parasite and anaemia prevalence among target populations to derive the malaria-related burden at the national, regional, and district levels.

The key objectives of the 2013 SLMIS are to:

- Measure the level of ownership and use of mosquito nets
- Assess coverage of the intermittent preventive treatment for pregnant women
- Identify treatment practices, including the use of specific antimalarial medications to treat malaria among children under 5
- Measure the prevalence of malaria and anaemia among children age 6-59 months
- Assess knowledge, attitudes, and practices of malaria among women age 15-49 years

The 2013 SLMIS was designed to produce most of the key malaria indicators for the country as a whole; for urban and rural areas separately; for each of four regions in Sierra Leone – Eastern, Northern, Southern, and Western; and for the 14 districts – Bo, Bombali, Bonthe, Kailahun, Kambia, Kenema, Koinadugu, Kono, Moyamba, Port Loko, Pujehun, Tonkolili, Western Area Rural, and Western Area Urban.

The results of the 2013 SLMIS will be used to assess implementation strategies to date for the NMCP, specifically with regard to measuring the coverage of the following core malaria control intervention indicators as defined in the 2011-2015 National Malaria Strategic Plan:

- Measure malaria prevalence among children age 6-59 months by detection of parasitemia using microscopy
- Measure the percentage of children under age 5 with confirmed malaria in the last two weeks who received ACT within 24 hours of onset of fever at the community level[3]
- Measure the percentage of children under age 5 with confirmed malaria in the last two weeks who received ACT within 24 hours of onset of fever at the facility level[3]
- Measure LLIN usage among children age 0-59 months from data provided on the percentage of children age 0-59 months who slept under a LLIN the previous night before the survey
- Measure LLIN usage among pregnant women age 15-49 from data provided on the percentage of pregnant women who slept under an LLIN the previous night before the survey
- Measure net ownership from data provided on the percentage of households with at least two LLINs
- Measure intermittent preventive treatment in pregnancy (IPTp) coverage from the data provided on the percentage of women who had a birth in the two years prior to the survey and received two or more doses of SP/Fansidar for malaria prevention during their last pregnancy
- Assess knowledge of malaria from data on the percentage of women age 15-49 who know the causes, symptoms, treatment, and preventive measures for malaria
- Measure anaemia prevalence among children age 6-59 months

1.6 METHODOLOGY OF THE 2013 SIERRA LEONE MALARIA INDICATOR SURVEY

The 2013 SLMIS was conducted from February to March 2013, covering a nationally-representative sample of 6,717 households. All women aged 15-49 years in the selected households were eligible for individual interviews and were asked questions about malaria prevention during pregnancy and treatment of childhood fever. In addition, the survey included testing for anaemia and malaria among children aged 6-59 months using a finger prick blood sample. The results of anaemia and malaria rapid diagnostic testing were available immediately and were provided to the children's parents or guardians. Thick blood smears were collected in the field and transported to the 2013 Sierra Leone MIS Laboratory at Lakka Hospital in Freetown where they were tested for the presence of malaria parasites.

1.6.1 Survey Organization

The 2013 SLMIS was overseen by the Technical Working Group (TWG) which was drawn from the Ministry of Health and Sanitation (NMCP, DPC, and DPI), SSL, COMAHS-USL, CRS, and the World Health Organization. In coordination with the TWG, CRS and SSL were responsible for general administrative and

[3] There are limitations for obtaining estimates for these two malaria program indicators from the 2013 SLMIS, because it is difficult to obtain information for confirmed malaria cases for children at the facility or community level in the survey.

logistical management of the survey, including overseeing the day-to-day operations; establishing and hosting meetings of the survey TWG; designing the survey instruments and supporting documentation; and developing the survey protocol and ensuring its approval by the Sierra Leone National Ethical Review Board and the ICF International Institutional Review Board (IRB) prior to the data collection. CRS was responsible for administering all the funds for the local costs of the survey and keeping adequate accounts and providing office space for the survey operations and data processing. The MoHS and SSL recruited and monitored field personnel, and the MoHS provided artesunate + amodiaquine (ASAQ) for treating children in the field who tested positive for malaria on the rapid diagnostic test. USL was instrumental in establishing the SLMIS laboratory at Lakka Hospital.

A CRS Senior Technical Advisor developed the survey sample design and SSL conducted the household listing in the selected enumeration areas (EAs). As part of this exercise, SSL drew up the necessary maps, recorded the geographic coordinates of each EA, and listed the households in the selected EAs. CRS, SSL, and ICF International were responsible for the interviewer training. CRS and SSL were responsible for fieldwork implementation.

Technical assistance was provided by ICF International, who assisted with the adaptation of RBM-MERG approved survey instruments, overall survey design, questionnaire design, field staff training, and field work monitoring. In addition to training the interviewers, ICF International also provided training of the health technicians in the collection of biomarkers for anaemia testing, as well as rapid diagnostic testing and preparing thick blood smears for testing of malaria.

Finally, CRS provided technical assistance in data processing. ICF International provided technical assistance in data cleaning, data analysis, and report preparation. Financial support for the survey was provided by the Global Fund through a grant to CRS.

1.6.2 Sample Design

The 2013 SLMIS sample was designed to produce most of the key indicators for the country as a whole, for urban and rural areas separately, for each of the 4 regions, and for the 14 districts in Sierra Leone. The sample design was developed by a CRS Senior Technical Advisor. The 2013 SLMIS was conducted in 336 enumeration areas (EAs). Twenty-four primary sampling units (PSUs) were selected from each of the 14 districts. The survey utilized a two-stage sample design (see Appendix A for details). The first stage involved selecting 336 clusters with probability proportional to size from the list of approximately 9,671 EAs covered in the 2004 Sierra Leone Population and Housing Census (SLPHC 2004). Among the 336 clusters selected, 99 were in urban areas and 237 were in rural areas. Urban areas were oversampled within regions in order to produce robust estimates for that domain.

SSL conducted a complete listing of households in September through October 2012, and a mapping exercise for each cluster was carried out. The lists of households resulting from this exercise served as the sampling frame for the selection of households in the second stage. In addition to listing the households, the SSL listing enumerators used global positioning system (GPS) receivers to record the coordinates for each household of the 2013 SLMIS sample clusters. In the second stage, in each of the selected EAs, 20 households were selected, using systematic sampling, from a list of households in the EA.

All women age 15-49 years who were either permanent residents of the selected households or visitors present in the household on the night before the survey were eligible to be interviewed. In addition, all children age 6-59 months who were listed in the household were eligible for anaemia and malaria testing.

1.6.3 Questionnaires

Three questionnaires were used in the 2013 SLMIS: a Household Questionnaire, a Biomarker Questionnaire, and a Woman's Questionnaire. The Household and Woman's questionnaires were based on the model MIS questionnaires developed by the RBM and DHS programs. The model questionnaires were modified to reflect relevant issues of malaria in Sierra Leone in consultation with the TWG and staff from ICF International. All questionnaires were in English.

The **Household Questionnaire** was used to list all the usual members and visitors in the selected households. Some basic information was collected on the characteristics of each person listed, including age, sex, and relationship to the head of the household. The main purpose of the Household Questionnaire was to identify women who were eligible for the individual interview and children age 6-59 months who were eligible for anaemia and malaria testing. The Household Questionnaire also collected information on characteristics of the household's dwelling unit, such as the source of water, type of toilet facilities, materials used for the floor, roof, and walls of the house, ownership of various durable goods, and ownership and use of mosquito nets.

The **Biomarker Questionnaire** was used to record members of the household in the household schedule, the haemoglobin measurements for children age 6-59 months and results of malaria testing for children under age 5. The household schedule section of the questionnaire was filled in by the interviewer, and immediately transcribed into the Apple iPhone, and the haemoglobin and malaria testing section was filled in by the health technician.

The **Woman's Questionnaire** was used to collect information from all women age 15-49 years and covered the following topics:

- Background characteristics (age, residential history, education, literacy, religion, and language)
- Full reproductive history and child mortality
- Prenatal care and preventive malaria treatment for most recent birth
- Prevalence and treatment of fever among children under age 5
- Knowledge about malaria (symptoms, causes, ways to prevent malaria, and types of antimalarials)

The 2013 SLMIS used **Apple 3GS iPhones** to collect data via the **iFormBuilder platform**, a software service application with a companion application (app) for the mobile devices allowing for timely data collection, monitoring, and analysis. Questionnaires were programmed into iPhones to eliminate the need for paper transcribing, to allow quicker data tabulation, and to facilitate data collection from available skip patterns. In designing the data collection program, CRS and partners developed three main forms: 1) a Household Questionnaire; 2) a Woman's Questionnaire; and 3) a Biomarker Questionnaire form for eligible children. Within each of these forms, other sub-forms were created. The questionnaire skip logic and validations were programmed in order to facilitate consistent and complete data entry. It took three rounds of approximately three weeks each of intense programming and testing, over the course of a 10-month period, to program the MIS questionnaire into the iFormBuilder platform.

For the purposes of the household schedule and to facilitate data entry at the time of the interview, all household names and village, district, and GPS locations were recorded into the iPhones by the interviewers. Each individual was also assigned a unique identification code at the time of questionnaire administration to ensure confidentiality during subsequent data analysis.

The iPhone/iFormBuilder technology eliminated the need for paper transcribing, allowing for quicker data tabulation, and facilitated faster interviewing through skip patterns. The survey teams were able to upload completed questionnaire data from the field to the central office using cloud technology, which allowed central data managers to view completed questionnaires in real time.

A key lesson learned from the experience is to include a more robust database monitoring plan to identify critical data entry mistakes in the field throughout the data collection period that would have better facilitated data accuracy, completeness of data, and the final data cleaning process.

1.6.4 Anaemia and Malaria Testing

The 2013 SLMIS incorporated three biomarkers. Finger prick blood samples were collected from children age 6-59 months to perform on-the-spot testing for anaemia and malaria, and to prepare thick blood smears that were to be read in the laboratory to determine the presence of malaria parasitemia. Each data collection team included one laboratory technician who was responsible for the malaria and anaemia testing and for preparing blood smear slides. Each field team also included one health professional (a nurse, or a medical student in their clinical year or residency) who served as an interviewer. In addition to conducting field interviews, the health professional on each team was responsible for dispensing malaria medications according to the appropriate national treatment guidelines. Verbal and written informed consent for testing of children was obtained from the child's parent or guardian at the end of the household interview for anaemia and malaria testing, separately. The protocol for the blood specimen collection and analysis was approved by the ICF International Institutional Review Board as well as by the National Ethical Review Committee in Sierra Leone.

Anaemia testing. Due to the strong correlation between malaria infection and anaemia, the SLMIS included anaemia testing for children age 6-59 months. After obtaining informed consent from the child's parent or guardian, blood samples were collected using a single-use, spring-loaded, sterile lancet to make a finger prick. Laboratory technicians then collected a drop of blood on a microcuvette from the finger prick. Haemoglobin analysis was carried out on site using a battery-operated portable HemoCue analyser, which produces results in less than one minute. Results were given to the child's parent or guardian in both verbal and written form.

Children who had a haemoglobin level under 8 g/dl (severe anaemia) were recommended to be taken to a health facility for follow-up care. They were given a referral letter with the haemoglobin reading to show staff at the health facility. Results of the anaemia test were recorded on the Biomarker Questionnaire, in the iPhone application, as well as in an anaemia brochure that included information about the causes and prevention of anaemia which was given to the child's parent/guardian by the nurses.

Rapid malaria testing. Another major objective of the 2013 SLMIS was to provide information about the extent of malaria infection among children age 6-59 months. Using the same finger prick used for anaemia testing, a drop of blood was tested immediately using the First Response Malaria Antigen (Ag) histidine-rich protein 2 rapid diagnostic test, which tests for *Plasmodium falciparum*. The test includes a loop applicator that comes in a sterile packet. A tiny volume of blood is captured on the applicator and placed in the well of the device. Results are available in 20 minutes. The results were provided to the child's parent/guardian both orally and in written form, and were recorded in the Biomarker Questionnaire and the iPhone application.

Children who tested positive for malaria using the rapid diagnostic test were offered a full course of medicine according to standard procedures for uncomplicated malaria treatment in Sierra Leone. To ascertain the correct dose, the health professional on each team was instructed to ask about any medications the child might already be taking. S/he then provided the child's parent/guardian with the appropriate dose of the antimalarial ASAQ along with instructions on how to administer the medicine to the child.

Malaria microscopy. In addition to the First Response Malaria Ag HRP2 RDT, a thick blood smear was taken for all children tested in the field to be tested in the laboratory for the presence of malaria parasites. Each blood smear slide was given a bar code label, with a duplicate label attached to the Biomarker Questionnaire on the line showing consent for that child. A third copy of the same bar code label was affixed to a Blood Sample Transmittal Form, which accompanied the blood samples from the field to the laboratory. The blood smears were dried and packed carefully in the field. They were periodically collected in the field along with the completed Biomarker Questionnaires and transported first to the CRS headquarters in Freetown and then to the 2013 SLMIS Malaria Laboratory at the Lakka Hospital in Freetown for logging in, microscopic reading, and determination of malaria infection.

1.6.5 Pretest Activities

The training for the pretest took place October 28 – November 6, 2012. Fourteen people participated in the training. Four supervisors (2 were nurses), 4 nurses, 4 laboratory technicians, and 2 microscopists were trained during the pretest. SSL, CRS, and ICF International staff members led the training in collaboration with the TWG. The TWG members served as the supervisory team for the pretest fieldwork. Participants were trained to administer questionnaires using the iPhone application and to collect biomarkers. The pretest training consisted of a project overview and survey objectives, techniques of interviewing, field procedures, a detailed description of all sections of the Household Questionnaire and the Woman's Questionnaire, instruction on the iForm Builder data collection application on the iPhones, and three days of field practice. The trainers and resource persons included professionals from NMCP, SSL, MoHS, CRS, WHO, and University of Sierra Leone. The pretest fieldwork was conducted by three teams from November 3-5, 2012, in urban and rural EAs within Bo district.

At the end of fieldwork, a debriefing session was held in Bo City on November 6, 2012, with all staff involved in the pretest. The questionnaires and iPhone applications were modified based on the findings from the pretest.

1.6.6 Training of Field Staff

The NMCP in collaboration with SSL recruited 120 people to be trained for the SLMIS data collection. The participants attended a three-week interviewer and supervisor training which took place from January 7 to 25, 2013, at the National Stadium in Freetown. CRS, SSL, and ICF International led the fieldwork training in collaboration with the TWG. All field staff participated in the one-week training session, focusing on how to fill out the Household and Woman's Questionnaires, mock interviews, and interviewing techniques on paper questionnaires. The second week of the training session focused on the field staff filling out the Household and Woman's Questionnaires using the iPhones. Four quizzes were administered to assess how well the participants absorbed the training materials, both on the paper questionnaires and also with the iPhones as data collection tools.

During the third week of training, NMCP conducted a briefing on the epidemiology of malaria and the malaria control program in Sierra Leone for all the field personnel. The rest of the training was conducted in two parallel sessions: one for the interviewers and field supervisors and one for the health personnel and laboratory technicians. The training of interviewers and field supervisors focused on the use of iPhones for data collection, assigning households to interviewers, and transferring data for completed questionnaires in completed clusters via cloud technology to the central data processing center at CRS. Additionally, supervisors received a separate training, which covered the roles and responsibilities of the supervisor as they relate to managing the team, locating clusters, ensuring high-quality data collection, and transferring data from the field to the central office.

ICF International conducted the training of health personnel and laboratory technicians, which focused on preparation of blood samples and testing for anaemia using the HemoCue equipment and malaria testing using the First Response Malaria Ag HRP2 RDT. The training involved presentation, discussion, and actual testing for anaemia and malaria. The technicians were trained in identifying children eligible for testing, administering informed consent, conducting the anaemia and malaria rapid testing, and making a proper thick blood smear. They were also trained in storing the blood slides, recording test results on the Biomarker Questionnaire, and providing the results to the parents/guardian of the children tested. Finally, the health personnel received a briefing on the correct treatment protocols.

All participants took part in three field practice exercises in households close to the training site and outside of the SLMIS survey sample. Health personnel were also trained on how to record children's anaemia and malaria results on the respective brochures and how to fill in the questionnaires and referral slips for any child who was found to be severely anaemic. The TWG also arranged for the health personnel and laboratory technicians to visit nearby clinics for malaria and anaemia testing.

1.6.7 Fieldwork

Twenty-eight teams were organized for field data collection. Each team consisted of one field supervisor, one health professional to interview and administer treatment, one experienced survey implementer with map reading skills, one laboratory technician to conduct biomarker testing, and one driver. The field staff also included 14 district coordinators, and 14 district runners who collected slides from the field teams and delivered them to the CRS headquarters in Freetown twice a week.

CRS arranged for printing the questionnaires, manuals, consent forms, brochures, and other field forms. CRS obtained and organized field supplies, such as backpacks and identification cards. The TWG coordinated fieldwork logistics.

Field data collection for the 2013 SLMIS started on January 30, 2013. To allow for maximum supervision, all ten teams were visited by the national supervisors at least once in the first two weeks. The national supervisors visited the teams periodically throughout the data collection period. Fieldwork was completed in March 8, 2013.

1.6.8 Laboratory Testing

Prior to the start of the field staff training, an ICF International staff person worked with the laboratory technicians at the SLMIS Malaria Laboratory at Lakka Hospital to train the laboratory staff on the MIS protocol. Additionally, ICF International staff worked on site with the laboratory staff for two weeks in March 2013 to assist the team with the microscopy work.

For the malaria parasitemia, all microscopic slides were stained with Giemsa and read by laboratory technicians. Blood smears were considered negative if no parasites were found after counting 200 fields. For quality control, all slides were read by a second laboratory technician, and a third reviewer, the laboratory director, settled any discrepant readings. Ten percent of the slides were re-read by an independent, external microscopist to ascertain the quality of microscopy reading.

1.6.9 Data Processing

Data for the 2013 SLMIS was collected through questionnaires programmed onto iPhones using the iForm Builder application. The iPhones were programmed by CRS programming specialists and loaded with the Household, Biomarker, and Woman's questionnaires. Using the cloud, the field supervisors transferred

data on a daily basis to the central data processing center at CRS in Freetown. To facilitate communication and monitoring, each field worker was assigned a unique identification number.

The ICF International data processing phase used Census Survey Processing Software (CSPro) for data editing, weighting, cleaning, and tabulation. In the CRS central office, data received from the field teams' iPhones were registered and checked against any inconsistencies and outliers. The central office data processing unit communicated with each of the 28 teams in every EA to provide the teams feedback on data completeness and quality.

Data editing and cleaning included an extensive range of structural and internal consistency checks. Any anomalies were communicated to CRS in order for the CRS and ICF International data processing teams to resolve data discrepancies. The corrected results were maintained in a master CSPro data files at ICF and used for analysis in producing tables for the final report.

1.7 RESPONSE RATES

Table 1.1 shows that of the 6,717 households selected for the sample, 6,649 were occupied at the time of fieldwork. Among the occupied households, 6,614 were successfully interviewed, yielding a total household response rate of nearly 100 percent. In the interviewed households, 7,819 eligible women were identified to be eligible for individual interview and 7,658 were successfully interviewed, yielding a response rate of 98 percent.

Table 1.1 Results of the household and individual interviews

Number of households, number of interviews, and response rates, according to residence (unweighted), Sierra Leone 2013

Result	Residence		Total
	Urban	Rural	
Household interviews			
Households selected	1,999	4,718	6,717
Households occupied	1,988	4,661	6,649
Households interviewed	1,975	4,639	6,614
Household response rate[1]	99.3	99.5	99.5
Interviews with women aged 15-49			
Number of eligible women	2,794	5,025	7,819
Number of eligible women interviewed	2,725	4,933	7,658
Eligible women response rate[2]	97.5	98.2	97.9

[1] Households interviewed/households occupied
[2] Respondents interviewed/eligible respondents

CHARACTERISTICS OF HOUSEHOLDS AND WOMEN 2

Key Findings

- Five in ten households have access to improved sources of water.
- One in ten households uses an improved toilet or latrine facility.
- In Sierra Leone, 14 percent of households have electricity.
- One in three women age 15-49 in Sierra Leone is literate.

This chapter provides a descriptive summary of basic demographic and socioeconomic characteristics of the households and the women living within them who were interviewed in the 2013 Sierra Leone Malaria Indicator Survey (SLMIS). A household is defined by the survey as a person or a group of persons, related or unrelated, who live and eat from the same pot. The Household Questionnaire collects information on age, sex, and relationship to the head of the household for all usual residents and visitors who spent the night preceding the interview (see Appendix E). This method of data collection allows analysis of the results for either the *de jure* (usual household residents) or the *de facto* (individuals who slept in the household the night before the interview including usual household residents and visitors) populations. The Household Questionnaire also obtains information on housing facilities (e.g., source of water supply, sanitation facilities) and household possessions. Selected items are used to create an index of relative wealth for the household, which is described later in this chapter. This chapter also profiles the women who live in the household and their basic characteristics, including age at the time of the survey, religion, ethnicity, residence, education, literacy, and wealth.

The information presented in this chapter is intended to facilitate interpretation of the key demographic, socioeconomic, and health indicators presented later in the report. It is also intended to assist in the assessment of the representativeness of the survey sample.

2.1 HOUSEHOLD ENVIRONMENT

The physical characteristics of the dwelling in which a household lives are important determinants of the health status of household members, especially children. They can also be used as indicators of the socioeconomic status of households. Results are presented both in terms of households and of the *de jure* population.

2.1.1 Drinking Water

One of the Millennium Development Goals (MDGs) that Sierra Leone and other countries have adopted is to increase the percentage of the population with sustainable access to an improved water source in both urban and rural areas (United Nations General Assembly, 2001). The categorization into improved and nonimproved is proposed by the WHO/UNICEF Joint Monitoring Program for Water Supply and Sanitation (http://www.wsinfo.org/definitions-methos/watsan-categories/). Improved water sources include piped water; water from a public standpipe, tube well, or borehole; and water from a protected well or spring. Water that must be fetched from an improved source may be contaminated during transport or storage. Thus, a long distance to an improved source of water may limit the quantity of suitable drinking water available to a household.

Table 2.1 shows the percent distribution of households and the de jure population by source of drinking water and time to obtain drinking water, according to residence. The results show that 56 percent of the households and 57 percent of the population have access to improved sources of water. In urban areas, 73 percent of the households have access to improved sources of water compared with 49 percent of households in rural areas. A public tap or standpipe is the main source of drinking water for households in urban areas (25 percent), whereas in rural areas the main source of drinking water is surface water (25 percent). Nationally, the most common source of drinking water for households is surface water (19 percent), which is a non-improved source of water.

Thirteen percent of households have a source of drinking water on the premises. Availability of water on the household premises is higher in urban households (24 percent) than in rural households (8 percent). Sixty-six percent of households take less than 30 minutes to travel round trip to obtain water; 73 percent of these households are in the rural areas, and 51 percent are in the urban areas.

Table 2.1 Household drinking water

Percent distribution of households and de jure population by source of drinking water and time to obtain drinking water, according to residence, Sierra Leone 2013

	Households			Population		
Characteristic	Urban	Rural	Total	Urban	Rural	Total
Source of drinking water						
Improved source						
Piped into dwelling	15.0	3.0	6.7	14.7	2.7	6.5
Public tap/standpipe	25.1	13.1	16.8	26.4	13.2	17.3
Tube well or borehole	9.8	17.4	15.1	8.8	16.6	14.1
Protected well	22.8	13.6	16.4	24.9	15.0	18.1
Protected spring	0.4	1.5	1.1	0.5	1.4	1.1
Rain water	0.1	0.1	0.1	0.1	0.1	0.1
Bottled water	0.1	0.1	0.1	0.0	0.1	0.1
Total	**73.4**	**48.8**	**56.4**	**75.4**	**49.1**	**57.3**
Non-improved source						
Unprotected well	9.0	12.7	11.6	9.4	13.8	12.4
Unprotected spring	3.6	12.8	10.0	3.7	12.1	9.5
Surface water	7.1	24.9	19.4	6.2	24.3	18.6
Water sachets	6.6	0.1	2.1	4.9	0.0	1.5
Total	**26.3**	**50.5**	**43.0**	**24.2**	**50.2**	**42.1**
Other	0.4	0.7	0.6	0.4	0.7	0.6
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Time to obtain drinking water (round trip)						
Water on premises	24.1	7.9	12.9	24.4	7.9	13.1
Less than 30 minutes	51.2	73.0	66.2	50.4	73.2	66.0
30 minutes or longer	23.5	17.5	19.4	24.1	17.3	19.5
Don't know/missing	1.2	1.6	1.5	1.1	1.6	1.4
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Number	2,046	4,568	6,614	11,532	25,202	36,733

2.1.2 Household Sanitation Facilities

Increasing the percentage of the population with access to improved sanitation in both urban and rural areas is another indicator of the MDGs. Households without proper sanitation facilities have a higher risk of diseases such as dysentery, diarrhoea, and typhoid fever than do those with improved sanitation facilities. Improved sanitation technologies are defined as follows: connection to a public sewer, connection to a septic system, pour-flush latrine, simple pit latrine with a slab, or ventilated, improved pit latrine. According to the WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation of 2005 (WHO/UNICEF, 2005), a household is classified as having an improved toilet if the toilet is used only by members of one

household (i.e., it is not shared with other households) and if the facility used by the household separates the waste from human contact.

Table 2.2 shows that only 10 percent of households use an improved toilet or latrine facility, 26 percent use a shared facility, and 64 percent use a nonimproved facility. Households in urban areas are notably more likely than those in rural areas to use improved, non-shared facilities (22 percent compared with 5 percent). The most commonly used improved, non-shared toilet facility is the pit latrine with a slab (7 percent of all households). Only 3 percent of households use a facility that flushes to a septic tank and is not shared. This proportion is higher among urban households (9 percent) than among rural households (less than 1 percent).

Table 2.2 Household sanitation facilities

Percent distribution of households and de jure population by type of toilet/latrine facilities, according to residence, Sierra Leone 2013

	Households			Population		
Type of toilet/latrine facility	Urban	Rural	Total	Urban	Rural	Total
Improved, not shared facility						
Flush/pour flush to piped sewer system	0.3	0.0	0.1	0.4	0.1	0.2
Flush/pour flush to septic tank	9.1	0.4	3.1	9.2	0.5	3.3
Flush/pour flush to pit latrine	0.8	0.1	0.3	1.3	0.1	0.5
Ventilated improved pit (VIP) latrine	0.1	0.2	0.2	0.2	0.2	0.2
Pit latrine with slab	11.3	4.3	6.5	14.2	5.2	8.0
Composting toilet	0.0	0.1	0.1	0.0	0.1	0.1
Total	**21.6**	**5.2**	**10.3**	**25.2**	**6.2**	**12.1**
Shared facility[1]						
Flush/pour flush to piped sewer system	0.0	0.0	0.0	0.1	0.0	0.0
Flush/pour flush to septic tank	1.3	0.0	0.4	0.7	0.0	0.2
Flush/pour flush to pit latrine	0.9	0.1	0.3	0.8	0.1	0.3
Ventilated improved pit (VIP) latrine	0.9	1.6	1.4	0.9	1.7	1.4
Pit latrine with slab	43.8	13.9	23.1	40.3	13.9	22.2
Composting toilet	0.4	0.5	0.5	0.5	0.5	0.5
Total	**47.3**	**16.1**	**25.8**	**43.2**	**16.1**	**24.6**
Nonimproved facility						
Flush/pour flush not to sewer/septic tank/pit latrine	0.0	0.0	0.0	0.0	0.0	0.0
Pit latrine without slab/open pit	25.4	51.9	43.7	25.1	51.6	43.3
Bucket	0.2	0.0	0.1	0.1	0.0	0.1
Hanging toilet/hanging latrine	2.1	2.5	2.4	2.9	2.6	2.7
No facility/bush/field	2.6	23.5	17.0	2.5	22.6	16.3
Other	0.8	0.7	0.8	0.9	0.9	0.9
Total	31.0	78.7	64.0	31.6	77.7	63.2
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Number	2,046	4,568	6,614	11,532	25,202	36,733

[1] Facilities that would be considered improved if they were not shared by two or more households.

2.1.3 Housing Characteristics

Table 2.3 presents information on household characteristics such as electricity, flooring material, number of all rooms, rooms used for sleeping, and use of various types of fuel for cooking. These characteristics reflect the household's socioeconomic situation and may influence environmental conditions that have a direct bearing on household members' health and welfare.

In Sierra Leone, 14 percent of households have electricity. The proportion of households with electricity is much higher in urban areas (43 percent) than in rural areas (2 percent). Earth or sand is the most common flooring material, used by 55 percent of all households. As expected, rural households are substantially more likely to have floors made of earth or sand (73 percent) than urban households (15 percent). Overall, 31 percent of households have floors made of cement. Use of cement floors is more common among households in urban areas than in rural areas (49 percent compared with 22 percent).

The number of rooms a household uses for sleeping is an indicator not only of a household's socioeconomic level but also of crowding in the household, which can facilitate the spread of disease. In the 2013 SLMIS, household respondents were asked how many rooms were used for sleeping, regardless of whether they were bedrooms. Forty-three percent of the households use three rooms for sleeping, 30 percent use one room for sleeping, and 27 percent use two rooms. There are slight urban-rural differences in the number of rooms used for sleeping, as 47 percent of rural households use three or more rooms for sleeping compared with 40 percent of households in urban areas that use one room for sleeping.

Respondents were asked about the number of sleeping spaces. Thirty-two percent of the households have two sleeping spaces, while 50 percent have three or more sleeping spaces in the house. Households in the urban areas are more likely to have one sleeping space than households in the rural areas (40 and 25 percent, respectively), while rural households are more likely to have three or more sleeping spaces than urban households (47 and 36 percent, respectively).

Table 2.3 also shows that wood is the fuel most commonly used for cooking, reported by 81 percent of households. Use of wood is about twice as common in rural areas (97 percent) as in urban areas (44 percent). Eighteen percent of all households interviewed use charcoal for cooking; 53 percent in urban areas compared with 2 percent in rural areas. Almost all households use solid fuel for cooking (99 percent), 97 percent in urban areas and 100 percent in rural areas.

Table 2.3 Household characteristics

Percent distribution of households by housing characteristics and percentage using solid fuel for cooking, according to residence, Sierra Leone 2013

Housing characteristic	Residence		Total
	Urban	Rural	
Electricity			
Yes	42.5	1.6	14.2
No	57.5	98.4	85.8
Total	100.0	100.0	100.0
Flooring material			
Earth, sand	14.6	73.3	55.2
Dung	1.2	1.7	1.5
Wood/planks	0.1	0.1	0.1
Palm/bamboo	0.0	0.4	0.3
Parquet or polished wood	0.1	0.0	0.0
Ceramic tiles	10.0	0.4	3.4
Cement	48.9	22.4	30.6
Carpet	11.9	0.1	3.7
Other	13.3	1.5	5.1
Total	100.0	100.0	100.0
Rooms used for sleeping			
One	39.5	25.3	29.7
Two	24.9	28.2	27.2
Three or more	35.6	46.5	43.1
Total	100.0	100.0	100.0
Number of sleeping spaces			
One	19.1	17.2	17.8
Two	35.5	30.4	32.0
Three or more	45.4	52.3	50.2
Total	100.0	100.0	100.0
Cooking fuel			
Electricity	0.3	0.0	0.1
LPG/natural gas/biogas	0.5	0.0	0.2
Kerosene	0.4	0.0	0.2
Charcoal	53.4	2.4	18.2
Wood	43.8	97.2	80.7
Straw/shrubs/grass	0.0	0.0	0.0
Other	0.3	0.0	0.1
No food cooked in household	1.2	0.2	0.5
Total	100.0	100.0	100.0
Percentage using solid fuel for cooking[1]	97.3	99.7	99.0
Number	2,046	4,568	6,614

LPG = Liquid petroleum gas
[1] Includes coal/lignite, charcoal, wood/straw/shrubs/grass, and agricultural crops.

2.2 HOUSEHOLD POSSESSIONS

The availability of durable consumer goods is a good indicator of a household's socioeconomic status. Moreover, particular goods have specific benefits. For instance, having access to a radio or a television exposes household members to innovative ideas; a refrigerator prolongs the wholesomeness of foods; and a means of transport allows greater access to services away from the local area.

Table 2.4 shows by place of residence the percentages of households possessing or owning various household effects, means of transport, agricultural land, livestock/farm animals, and bank account. Overall, 60 percent of households own a radio. Households in urban areas are more likely than those in rural areas to own a radio (78 percent compared with 52 percent). Twelve percent of the households own a television; 37 percent in urban areas and 2 percent in rural areas. A mobile telephone is owned by 52 percent of households (83 percent in urban areas and 37 percent in rural areas). Finally, 7 percent of households have a refrigerator; 20 percent in urban areas compared with only 1 percent in rural areas.

Table 2.4 also shows the proportions of households owning various means of transport. Six percent of the households own a bicycle, 5 percent of households own a motorcycle or scooter, and 2 percent own a car or truck. Ownership of a car or truck is higher among urban than rural households (6 percent versus less than 1 percent).

Agricultural land is owned by 56 percent of all households (71 percent in rural areas and 21 percent in urban areas), and farm animals are owned by 47 percent of households (53 percent in rural areas and 32 percent in urban areas). Thirty percent of households own a bank account, loans and savings, or osusu (45 percent in urban areas and 24 percent in rural areas).

Table 2.4 Household possessions

Percentage of households possessing various household effects, means of transportation, agricultural land and livestock/farm animals by residence, Sierra Leone 2013

Possession	Residence		Total
	Urban	Rural	
Household effects			
Radio	77.7	52.1	60.0
Television	36.9	1.5	12.4
Mobile telephone	83.4	37.4	51.6
Non-mobile telephone	0.4	0.1	0.2
Refrigerator	19.8	0.6	6.6
Means of transport			
Bicycle	6.1	5.9	6.0
Animal drawn cart	0.3	0.4	0.3
Motorcycle/scooter	7.6	3.5	4.8
Car/truck	6.3	0.3	2.2
Boat with a motor	0.5	0.3	0.3
Ownership of agricultural land	20.9	71.2	55.6
Ownership of farm animals[1]	32.1	53.3	46.7
Ownership of bank account/loans and savings/osusu	44.8	24.0	30.4
Number	2,046	4,568	6,614

[1]Cattle, cows, bulls, horses, donkeys, goats, sheep or chickens

2.3 WEALTH INDEX

The wealth index is a background characteristic that is used as a proxy for the long-term standard of living of the household. It is based on data about the household's ownership of durable goods; dwelling characteristics; source of drinking water; toilet facilities; and other characteristics that are indicators of a household's socioeconomic status. To construct the index, each of these assets is assigned a weight (factor score) generated through principal component analysis, and the resulting asset scores are standardized in relation to a standard normal distribution, with a mean of zero and standard deviation of one (Gwatkin et al., 2000). Each household is then assigned a score for each asset, and the scores are summed for each household. Individuals are ranked according to the total score of the household in which they reside. The sample is then divided into quintiles from one (lowest) to five (highest). A single asset index is developed on the basis of data from the entire country sample, and this index is used in all the tabulations presented.

Table 2.5 shows the distribution of the *de jure* household population into five wealth quintiles based on wealth index by residence and region. These distributions indicate the degree to which wealth is evenly (or unevenly) distributed by geographic area. The Gini Coefficient demonstrates this distribution by representing greater equality of incomes where the coefficient is closer to "0" and more inequality of incomes where it is closer to "1". The urban population is much more likely to fall in the higher wealth quintiles than the rural population. Fifty-nine percent of the population in urban areas is in the highest quintile compared with only 2 percent of the population in rural areas. On the other hand, only 2 percent of the urban population falls in the lowest wealth quintile, compared with 28 percent of the rural population. Variations are also observed regionally, with the Southern Region having the highest percentage of population in the lowest quintile (26 percent) compared with the Northern Region (23 percent), the Eastern Region (22 percent), and the Western Region (1 percent). The Northern Region has the lowest percentage in the highest quintile (7 percent) compared with the other regions: 8 percent for the Eastern Region, 9 percent for the Southern Region, and 81 percent for the Western Region. There are variations by district, with the Bonthe District having the highest percentage of population in the lowest quintile (45 percent), and the Western Area Urban District having the highest percentage of population in the highest quintile (89 percent).

Table 2.5 Wealth quintiles

Percent distribution of the de jure population by wealth quintiles, and the Gini Coefficient, according to residence and region, Sierra Leone 2013

Residence/region	Wealth quintile					Total	Number of persons	Gini coefficient
	Lowest	Second	Middle	Fourth	Highest			
Residence								
Urban	1.8	2.4	9.9	27.3	58.6	100.0	11,532	0.22
Rural	28.3	28.0	24.6	16.7	2.4	100.0	25,202	0.35
Region								
Eastern	22.0	23.9	26.0	20.2	8.0	100.0	7,400	0.25
Northern	23.0	25.8	23.2	20.5	7.4	100.0	15,259	0.35
Southern	26.4	19.1	21.5	23.8	9.2	100.0	8,047	0.22
Western	1.3	1.7	2.5	13.5	81.1	100.0	6,028	0.20
District								
Kailahun	15.9	20.2	32.6	28.0	3.3	100.0	2,218	0.20
Kenema	18.3	26.7	28.1	16.3	10.5	100.0	3,006	0.26
Kono	33.2	23.7	16.3	17.5	9.2	100.0	2,176	0.34
Bombali	21.0	22.2	21.5	18.9	16.3	100.0	3,434	0.33
Kambia	13.4	26.2	33.9	21.8	4.7	100.0	1,813	0.26
Koinadugu	23.7	25.4	20.0	24.9	6.0	100.0	1,682	0.32
Port Loko	16.2	28.8	24.5	23.9	6.6	100.0	4,430	0.34
Tonkolili	36.7	25.7	19.5	15.7	2.4	100.0	3,900	0.33
Bo	18.0	19.2	19.8	24.5	18.6	100.0	2,972	0.26
Bonthe	44.9	16.7	15.6	18.4	4.4	100.0	1,858	0.34
Moyamba	21.3	19.2	27.3	29.3	2.9	100.0	2,094	0.24
Pujehun	27.8	22.6	25.2	20.5	3.9	100.0	1,123	0.26
Western Area Rural	7.3	9.3	8.7	29.0	45.7	100.0	1,085	0.29
Western Area Urban	0.0	0.0	1.1	10.0	88.8	100.0	4,943	0.15
Total	20.0	20.0	20.0	20.0	20.0	100.0	36,733	0.30

2.4 POPULATION BY AGE AND SEX

Age and sex are important demographic variables and are the primary basis of demographic classification. Table 2.6 shows the distribution of the de facto household population in the 2013 Sierra Leone MIS by five-year age groups, according to sex and residence.

A total of 36,395 people were enumerated in the survey, and they were almost equally divided by sex; the overall sex ratio is 91 males per 100 females. The sex ratio[1] in urban areas is 89 males per 100 females and in rural areas it is 92 males to 100 females. Sixty-nine percent of the population lives in rural areas.

The population age structure shows a substantially larger proportion of persons in younger age groups than in older age groups for each sex (Figure 2.1). This reflects the relatively youthful age structure of the population of Sierra Leone and indicates a population with high fertility. Forty-six percent of the population is under age 15, while 50 percent is between age 15 and 64. Four percent of the population is age 65 or older.

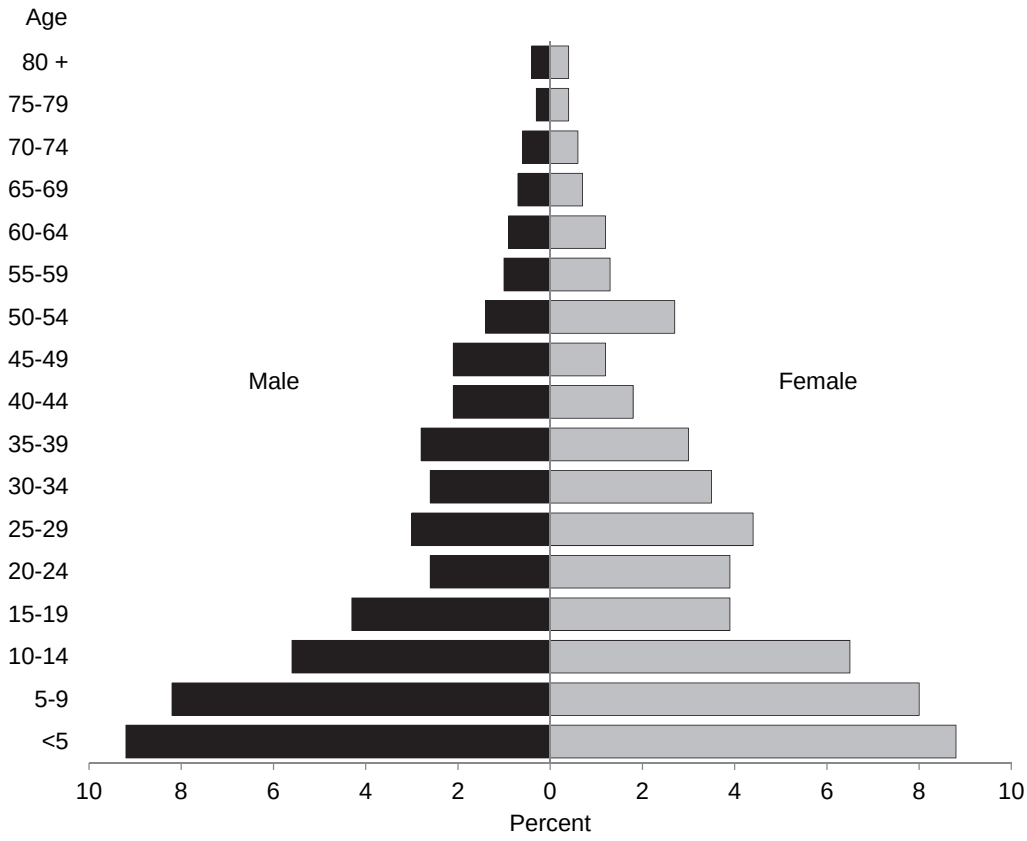
[1] Sex ratio is the demographic concept that measures the proportion of males to females in a given population. It is usually measured as the number of males per 100 females.

Table 2.6 Household population by age, sex, and residence

Percent distribution of the de facto household population by five-year age groups, according to sex and residence, Sierra Leone 2013

	Urban			Rural					
Age	Male	Female	Total	Male	Female	Total	Male	Female	Total
<5	16.5	13.0	14.6	20.5	18.7	19.6	19.2	16.9	18.0
5-9	13.4	12.9	13.1	18.9	16.3	17.5	17.2	15.2	16.1
10-14	12.7	13.6	13.2	11.4	11.7	11.6	11.8	12.3	12.1
15-19	12.7	11.7	12.2	7.2	5.5	6.3	8.9	7.5	8.2
20-24	7.2	9.5	8.4	4.6	6.4	5.5	5.4	7.4	6.4
25-29	7.6	8.9	8.3	5.6	8.2	7.0	6.2	8.5	7.4
30-34	6.7	6.9	6.8	5.0	6.7	5.9	5.5	6.7	6.2
35-39	5.2	5.9	5.6	6.2	5.6	5.9	5.9	5.7	5.8
40-44	4.1	3.5	3.8	4.4	3.3	3.8	4.3	3.3	3.8
45-49	3.9	2.7	3.3	4.6	2.1	3.3	4.4	2.3	3.3
50-54	2.9	4.4	3.7	2.8	5.6	4.3	2.8	5.2	4.1
55-59	2.0	2.0	2.0	2.1	2.7	2.4	2.1	2.5	2.3
60-64	1.6	1.8	1.7	2.0	2.5	2.3	1.9	2.3	2.1
65-69	1.6	1.0	1.3	1.5	1.6	1.6	1.6	1.4	1.5
70-74	0.9	1.0	1.0	1.4	1.3	1.4	1.3	1.2	1.2
75-79	0.3	0.5	0.4	0.8	0.8	0.8	0.6	0.7	0.7
80 +	0.7	0.7	0.7	0.9	0.9	0.9	0.9	0.8	0.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	5,400	6,054	11,454	11,942	12,998	24,940	17,342	19,052	36,395

Figure 2.1 **Population pyramid**



[SLMIS 2013]

2.5 HOUSEHOLD COMPOSITION

Table 2.7 presents information on the household composition, including the sex of the head of the household and the household size. These characteristics are important because they are associated with the welfare of the household. Female-headed households are, for example, typically poorer than male-headed households. Economic resources are often more limited in large households. Moreover, where the size of the household is large, crowding can lead to health problems.

Table 2.7 shows that households in Sierra Leone are predominantly headed by men (71 percent), a common finding in most African countries. The proportion of households headed by women is higher in urban areas than in rural areas (34 percent and 27 percent, respectively).

Overall, the mean size of a household in Sierra Leone is six people, with most households having between three and six members.

Table 2.7 Household composition

Percent distribution of households by sex of head of household and by household size; mean size of household, according to residence, Sierra Leone 2013

Characteristic	Residence		Total
	Urban	Rural	
Household headship			
Male	65.9	73.2	70.9
Female	34.1	26.8	29.1
Total	100.0	100.0	100.0
Number of usual members			
0	0.0	0.0	0.0
1	5.1	3.1	3.7
2	7.6	6.0	6.5
3	13.4	12.7	12.9
4	15.2	17.2	16.6
5	15.3	18.1	17.3
6	12.8	14.9	14.3
7	9.1	10.0	9.7
8	7.2	5.8	6.3
9+	14.2	12.1	12.8
Total	100.0	100.0	100.0
Mean size of households	5.6	5.5	5.6
Number of households	2,046	4,568	6,614

Note: Table is based on de jure household members, i.e., usual residents.

2.6 CHARACTERISTICS OF FEMALE RESPONDENTS

2.6.1 General Characteristics

Table 2.8 presents the distribution of women age 15-49 by selected background characteristics. The proportion of women is between 18 and 20 percent for the youngest age groups up to age 29, after which it declines as age increases; this reflects the comparatively young age structure of the population.

The majority of women in Sierra Leone are Muslim (76 percent). Twenty-four percent are Christian.

The largest ethnic group are the Temne (36 percent), followed by Mende (31 percent) and Limba (7 percent).

The proportion of women age 15-49 living in rural areas is higher (62 percent) than those living in urban areas (38 percent). By region, the smallest percentage of women lives in the Eastern Region (19 percent) compared with 20 percent in the Southern Region, 22 percent in the Western Region, and 39 percent in the Northern Region. By district, the greatest percentage of women lives in Western Area Urban (18 percent) and the smallest percentage of women lives in Pujehun District (3 percent).

Sixty-two percent of women age 15-49 have never been to school. Ten percent have primary education and 24 percent have secondary education. Four percent of women have an education beyond secondary school.

Roughly one-fifth of respondents fall into each wealth quintile, with slightly more women in the highest quintile (25 percent).

2.6.2 Education Attainment of Women

Education is a key determinant of the lifestyle and status an individual enjoys in a society. Studies have consistently shown that educational attainment has a strong effect on health behaviours and attitudes. Generally, the higher the level of education a woman has attained, the more knowledgeable she is about the use of health facilities, family planning methods, and the health management of her children.

Table 2.9 shows the percent distribution of women age 15-49 by highest level of schooling attended or completed, and median years completed, according to background characteristics. The results show that only 8 percent of women age 15-49 have some primary school education and 2 percent have completed primary school. Additionally, 19 percent of women have some secondary education and 6 percent have completed their secondary education.

As mentioned above, 4 percent of women have more than secondary education. Younger women have higher levels of education than older women. For example, 37 percent of women age 15-24 have no education compared with 82 percent of women age 45-49. Similarly, 38 percent of women age 15-24 have some secondary education compared with just 6 percent of women age 45-49.

The Northern Region has the highest proportion of women with no education (77 percent) compared with 72 percent in the Eastern Region, 62 percent in the Southern Region, and 27 percent in the Western Region. By district, Koinadugu has the highest percentage of women with no education (84 percent). Western Area Rural District has the highest percentage of women who have attended some secondary education (39 percent), followed by Western Area Urban (33 percent), Tonkolili (20 percent), and Moyamba (20 percent).

Table 2.9 also shows the correlation between education and economic status. Results show that the poorer a woman is, the less likely she is to have an education; 85 percent of women in the lowest wealth quintile have no education compared with 25 percent of women in the highest wealth quintile.

Table 2.8 Background characteristics of respondents

Percent distribution of women age 15-49 by selected background characteristics, Country 2011

Background characteristic	Women		
	Weighted percent	Weighted number	Unweighted number
Age			
15-19	17.6	1,347	1,373
20-24	18.4	1,410	1,449
25-29	20.3	1,551	1,535
30-34	16.6	1,272	1,262
35-39	13.8	1,058	1,019
40-44	7.9	607	599
45-49	5.4	411	421
Religion			
Christian	24.3	1,861	1,901
Muslim	75.6	5,786	5,743
Traditional	0.0	1	3
None	0.1	9	11
Ethnic group			
Krio	1.6	124	101
Mende	31.2	2,390	2,703
Temne	36.0	2,755	2,298
Limba	7.3	557	578
Fullah	3.6	276	316
Kissi	1.5	119	143
Susu	2.8	216	269
Loko	3.9	300	179
Kono	4.3	329	325
Madingo	2.4	186	197
Yalunke	0.6	48	77
Karanko	3.0	231	277
Sherbro	1.3	99	165
Other	0.4	28	30
Residence			
Urban	37.6	2,878	2,725
Rural	62.4	4,780	4,933
Region			
Eastern	19.2	1,473	1,506
Northern	38.6	2,956	2,704
Southern	20.4	1,559	2,099
Western	21.8	1,670	1,349
District			
Kailahun	5.9	449	559
Kenema	8.0	616	496
Kono	5.3	409	451
Bombali	9.3	716	580
Kambia	4.6	353	566
Koinadugu	3.8	294	456
Port Loko	10.8	830	543
Tonkolili	10.0	764	559
Bo	7.9	606	516
Bonthe	4.5	344	578
Moyamba	5.3	407	572
Pujehun	2.6	201	433
Western Area Rural	3.5	266	612
Western Area Urban	18.3	1,403	737
Education			
No education	61.9	4,744	4,806
Primary	9.9	758	797
Secondary	24.0	1,839	1,789
More than secondary	4.1	317	266
Wealth quintile			
Lowest	17.7	1,355	1,422
Second	17.8	1,363	1,294
Middle	18.7	1,435	1,451
Fourth	20.4	1,559	1,762
Highest	25.4	1,947	1,730
Total 15-49	100.0	7,658	7,658

Note: Education categories refer to the highest level of education attended, whether or not that level was completed.

Overall, the median number of years of education among women age 15-49 is 0.0 years. The median number of years of education is highest among women age 15-19 (6.7 years), and decreases to 0.0 years for

women age 25 and older. The median number of years of education for urban women is higher (6.2 years) than the median for rural women (0.0 years). The median number of years of education is 8.0 years in the Western Region, while it is 0.0 years in the other regions.

Table 2.9 Educational attainment: Women

Percent distribution of women age 15-49 by highest level of schooling attended or completed, and median years completed, according to background characteristics, Sierra Leone 2013

Background characteristic	Highest level of schooling						Total	Median years completed	Number of women
	No education	Some primary	Completed primary[1]	Some secondary	Completed secondary[2]	More than secondary			
Age									
15-24	37.1	10.1	2.1	37.7	9.0	4.1	100.0	5.5	2,758
15-19	24.5	10.6	2.7	53.9	7.5	0.9	100.0	6.7	1,347
20-24	49.1	9.6	1.5	22.2	10.5	7.1	100.0	0.3	1,410
25-29	70.2	8.9	1.8	8.9	4.7	5.6	100.0	0.0	1,551
30-34	77.3	6.6	1.5	7.3	3.0	4.2	100.0	0.0	1,272
35-39	79.2	5.5	2.6	7.4	1.7	3.5	100.0	0.0	1,058
40-44	78.3	4.9	3.5	8.1	2.7	2.6	100.0	0.0	607
45-49	81.5	2.9	1.2	5.7	5.9	2.8	100.0	0.0	411
Residence									
Urban	37.5	7.0	2.6	30.5	12.7	9.7	100.0	6.2	2,878
Rural	76.6	8.3	1.7	11.4	1.1	0.8	100.0	0.0	4,780
Region									
Eastern	72.1	8.8	2.8	13.3	1.9	1.1	100.0	0.0	1,473
Northern	76.7	6.1	1.5	12.3	1.9	1.5	100.0	0.0	2,956
Southern	62.2	11.5	1.8	18.5	3.4	2.5	100.0	0.0	1,559
Western	26.5	6.7	2.7	34.2	16.8	13.1	100.0	8.0	1,670
District									
Kailahun	64.6	12.1	5.1	15.8	1.6	0.9	100.0	0.0	449
Kenema	77.0	5.9	1.2	12.7	1.9	1.3	100.0	0.0	616
Kono	73.2	9.5	2.7	11.6	2.2	0.8	100.0	0.0	409
Bombali	72.6	6.2	1.4	16.0	2.1	1.8	100.0	0.0	716
Kambia	78.6	9.4	0.5	10.7	0.5	0.3	100.0	0.0	353
Koinadugu	83.9	3.2	1.1	7.6	4.0	0.2	100.0	0.0	294
Port Loko	75.3	5.5	2.0	13.0	2.2	1.9	100.0	0.0	830
Tonkolili	78.5	6.3	1.4	10.7	1.4	1.7	100.0	0.0	764
Bo	58.0	11.4	1.1	20.3	5.5	3.7	100.0	0.0	606
Bonthe	66.5	7.8	1.9	18.5	2.3	3.0	100.0	0.0	344
Moyamba	59.6	13.7	3.1	20.3	2.4	0.9	100.0	0.0	407
Pujehun	73.1	13.7	1.0	9.6	1.2	1.5	100.0	0.0	201
Western Area Rural	38.3	6.7	1.2	39.4	8.6	5.9	100.0	7.0	266
Western Area Urban	24.3	6.7	3.0	33.2	18.4	14.5	100.0	8.3	1,403
Wealth quintile									
Lowest	85.4	7.3	0.9	5.7	0.5	0.2	100.0	0.0	1,355
Second	79.1	9.3	1.9	9.0	0.4	0.3	100.0	0.0	1,363
Middle	75.9	7.5	1.5	13.8	1.1	0.2	100.0	0.0	1,435
Fourth	59.9	8.8	2.4	22.0	4.6	2.3	100.0	0.0	1,559
Highest	24.9	6.7	3.1	34.9	16.4	14.0	100.0	8.1	1,947
Total	61.9	7.8	2.1	18.5	5.5	4.1	100.0	0.0	7,658

[1] Completed 6 years at the primary level.
[2] Completed 6 years at the secondary level.

2.6.3 Literacy of Women

Knowing the level and distribution of literacy among the population is an important factor in the design and delivery of health messages and interventions. In this part of the survey, female respondents who had only primary education were shown a card with a short sentence in their respective languages and asked to read the complete sentence or part of it to assess their literacy. The percentage of women who are considered literate includes those who could read the entire card or part of a sentence and women who had secondary or

higher education. Table 2.10 shows the distribution of female respondents by level of schooling attended and literacy, and the percentage literate, according to background characteristics.

Table 2.10 Literacy: Women

Percent distribution of women age 15-49 by level of schooling attended and level of literacy, and percentage literate, according to background characteristics, Sierra Leone 2013

Background characteristic	Secondary school or higher	No schooling or primary school: Can read a whole sentence	No schooling or primary school: Can read part of a sentence	No schooling or primary school: Cannot read at all	Total	Percentage literate[1]	Number of women
Age							
15-24	50.8	1.4	4.6	43.2	100.0	56.8	2,758
15-19	62.3	2.4	5.7	29.5	100.0	70.5	1,347
20-24	39.8	0.3	3.6	56.3	100.0	43.7	1,410
25-29	19.1	0.2	4.7	75.9	100.0	24.0	1,551
30-34	14.6	0.4	3.2	81.8	100.0	18.2	1,272
35-39	12.6	0.4	3.7	83.2	100.0	16.8	1,058
40-44	13.3	1.6	3.9	81.2	100.0	18.8	607
45-49	14.4	0.2	2.4	83.0	100.0	17.0	411
Residence							
Urban	52.8	1.1	5.1	41.0	100.0	59.0	2,878
Rural	13.3	0.6	3.5	82.6	100.0	17.4	4,780
Region							
Eastern	16.3	0.4	3.1	80.2	100.0	19.8	1,473
Northern	15.7	0.8	2.6	80.8	100.0	19.2	2,956
Southern	24.5	1.0	5.2	69.3	100.0	30.7	1,559
Western	64.1	0.8	6.6	28.5	100.0	71.5	1,670
District							
Kailahun	18.3	0.8	2.0	78.9	100.0	21.1	449
Kenema	15.9	0.4	3.7	80.1	100.0	19.9	616
Kono	14.6	0.1	3.5	81.7	100.0	18.1	409
Bombali	19.8	0.6	2.1	77.4	100.0	22.6	716
Kambia	11.5	1.5	3.9	83.1	100.0	16.9	353
Koinadugu	11.8	1.6	1.5	85.1	100.0	14.9	294
Port Loko	17.2	0.6	3.1	79.2	100.0	20.8	830
Tonkolili	13.8	0.8	2.4	83.0	100.0	17.0	764
Bo	29.5	0.7	5.1	64.7	100.0	35.3	606
Bonthe	23.7	0.7	3.4	72.2	100.0	27.8	344
Moyamba	23.6	2.3	7.1	67.1	100.0	32.9	407
Pujehun	12.3	0.0	5.0	82.6	100.0	17.4	201
Western Area Rural	53.8	0.1	3.9	42.2	100.0	57.8	266
Western Area Urban	66.0	1.0	7.1	25.9	100.0	74.1	1,403
Wealth quintile							
Lowest	6.3	0.3	2.3	91.1	100.0	8.9	1,355
Second	9.7	1.1	3.8	85.4	100.0	14.6	1,363
Middle	15.1	0.5	2.5	80.9	100.0	19.1	1,435
Fourth	28.9	1.0	3.7	66.3	100.0	33.6	1,559
Highest	65.3	1.0	6.4	27.4	100.0	72.6	1,947
Total	28.2	0.8	4.1	66.9	100.0	33.1	7,658

[1] Refers to women who attended secondary school or higher and women who can read a whole sentence or part of a sentence.

The results show that, overall, 33 percent of women age 15-49 in Sierra Leone are literate. Younger women are more literate that older women; 57 percent of women age 15-24 are literate compared with 17 percent of women age 45-49. Urban-rural differences also exist: 59 percent of urban women are literate compared with 17 percent of rural women. The proportion of women who are literate is lowest in the Northern Region (19 percent) and in the lowest wealth quintile (9 percent). Koinadugu District (74 percentage) has the lowest percentage of women who are literate and Western Area Urban has the highest percentage (74 percent).

MALARIA PREVENTION 3

Key Findings

- More than half (62 percent) of households in Sierra Leone own at least one insecticide-treated net (ITN), and almost one-fifth (17 percent) of households have at least one ITN for every two people who stayed in the house the night before the survey.
- Almost all mosquito nets in Sierra Leone are long-lasting insecticidal nets.
- Nearly four in ten people (37 percent) have access to an ITN. This means 37 percent of Sierra Leoneans could sleep under a mosquito net if every net in a household were used by two people.
- Thirty-nine percent of the population slept under an ITN the night before the survey, while 45 percent of children and 47 percent of pregnant women slept under an ITN the previous night.
- Sixty-two percent of pregnant women received intermittent preventive treatment (IPTp) for malaria, that is, at least two doses of SP/Fansidar with at least one dose received during an antenatal care visit, which occurred during the most recent pregnancy.

This chapter describes the population coverage rates of the primary malaria control interventions. Malaria control efforts in Sierra Leone have focused on scaling up these interventions, which include the ownership and use of long-lasting insecticide-treated nets (LLINs), providing prompt effective treatment with artesunate + amodiaquine (ASAQ) within 24 hours of onset of symptoms, and intermittent preventive treatment in pregnancy (IPTp) for pregnant women. Cross-cutting interventions such as behaviour change communication have been critical for increasing knowledge of prevention and rapid case identification and management.

In Sierra Leone, net distribution is conducted routinely through public health facilities that target pregnant women and children under age 5. A Mass LLIN Campaign, first conducted in 2010, complements the country's routine net distribution programme. During the 2010 Mass LLIN Distribution Campaign, 3.2 million LLINs were distributed to Sierra Leoneans. The Post-Campaign Ownership and Use Survey conducted in 2011 found that 66 percent of households owned at least two nets (Bennett, 2012). The 2012 Knowledge, Attitudes, and Practices (KAP) Survey found that ownership had decreased to 57 percent (CRS, 2012).

3.1 MOSQUITO NETS

Untreated nets and window screening have long been considered useful protection methods against mosquitoes and other insects (Lindsay and Gibson, 1988). Nets reduce the human-vector contact by acting as a physical barrier, thereby reducing the number of bites from infective vectors (Bradley et al., 1986). However, nets and screens are often not well fitted or are torn, allowing mosquitoes to enter or feed on the part of the body adjacent to the netting fabric during the night (Lines et al., 1987). The problem of ill-used nets and screens has served as motivation for impregnating nets and screens with a fast-acting insecticide that repels or kills mosquitoes before or shortly after feeding (Lines et al., 1987; Hossain and Curtis, 1989).

Net treatment has been made possible by the availability of synthetic pyrethroids, the only insecticides currently used for treating nets. This class of insecticides was developed to mimic the insecticidal compounds of the natural pyrethrum. Currently, ITNs are regarded as a promising malaria control tool, and when used by all or most members of the community, they can reduce malaria transmission. ITNs have been shown to reduce malaria transmission by as much as 90 percent under trial conditions (Lengeler, 2004). ITNs also reduce malaria morbidity and mortality.

Long-lasting insecticidal nets (LLINs) are a subset of ITNs. An LLIN is a factory-treated mosquito net made with netting material that has insecticide incorporated within or bound around the fibers. The net must retain its effective biological activity without re-treatment for repeated washes, for three years of use under field conditions (WHO/Global Malaria Program, 2007). The current generation of LLINs lasts three to five years, after which point the net should be replaced. Vector control, specifically the ownership and use of LLINs, is one of the key interventions in malaria control.

The guiding document for malaria control in Sierra Leone is the National Malaria Control Programme Strategic Plan 2011 – 2015. This strategy informs all interventions and sets national targets based on established indicators. The objectives of the plan are to:

1. Increase the coverage of prompt and effective treatment of malaria from 50 percent in 2010 to 80 percent for all age groups by 2016.

2. To increase and maintain the proportion of pregnant women receiving at least two doses of IPTp from 72 percent in 2008 to at least 90 percent by 2016.

3. To maintain universal coverage of LLINs through 2016.

4. To increase to 80 percent the proportion of population who take appropriate action to prevent and treat malaria (2 doses of IPTp, sleeping under an LLIN, timely care seeking) through Information Education Communication / Behaviour Change Communication by 2016.

5. To strengthen organizational capacity for more effective management of malaria control activities.

3.1.1 Ownership of Mosquito Nets

The ownership and use of treated mosquito nets is the primary prevention strategy for reducing malaria transmission in Sierra Leone. To assess household net ownership, all households in the 2013 SLMIS were asked if they owned mosquito nets and, if so, how many. To determine the type of net in the household, interviewers were instructed to observe the nets or ask the respondent the type of net he or she owns. Table 3.1 provides information on the percentage of households that own at least one mosquito net (any net, an ITN, and an LLIN), the average number of nets per household, and the percentage of households with at least one net per every two people who slept in the household the previous night, according to background characteristics.

Table 3.1 shows that 62 percent of all households own at least one mosquito net of any type, 62 percent of households own at least one ITN, and 62 percent own at least one LLIN. Almost all nets in Sierra Leone are LLINs. On average, Sierra Leonean households own 1.1 ITNs (or LLINs) per household.

As seen in Table 3.1, LLIN ownership is higher in rural households compared with urban households. Sixty-five percent of households in the rural areas report having at least one LLIN compared with 54 percent of households in the urban areas. By region, household ownership of LLINs is highest in the Southern Region (71 percent) than in other regions, followed by the Eastern Region (70 percent), the Northern Region (60 percent), and the Western Region (44 percent). Among districts, Kenema has the highest percentage of LLIN ownership (75 percent) and Koinadugu and Port Loko have the lowest (52 percent for both). Households in the highest and lowest wealth quintiles are less likely to own mosquito nets than households in second, middle, and fourth wealth

quintiles. Fifty percent of the households in the highest wealth quintile and 59 percent of households in the lowest wealth quintile own an LLIN; in contrast, ownership is 65 percent to 70 percent for households in the second through the fourth wealth quintiles.

Table 3.1 Household possession of mosquito nets

Percentage of households with at least one mosquito net (treated or untreated), insecticide-treated net (ITN), and long-lasting insecticidal net (LLIN); average number of nets, ITNs, and LLINs per household; and percentage of households with at least one net, ITN, and LLIN per two persons who stayed in the household last night, by background characteristics, Sierra Leone 2013

Background characteristic	Percentage of households with at least one mosquito net			Average number of nets per household			Number of house-holds	Percentage of households with at least one net for every two persons who stayed in the household last night[1]			Number of households with at least one person who stayed in the household last night
	Any mosquito net	Insecticide-treated mosquito net (ITN)[2]	Long-lasting insecticidal net (LLIN)	Any mosquito net	Insecticide-treated mosquito net (ITN)[2]	Long-lasting insecticidal net (LLIN)		Any mosquito net	Insecticide-treated mosquito net (ITN)[2]	Long-lasting insecticidal net (LLIN)	
Residence											
Urban	54.6	53.7	53.7	0.9	0.9	0.9	2,046	13.0	12.7	12.7	2,046
Rural	65.4	65.1	65.1	1.2	1.2	1.2	4,568	19.2	19.0	18.9	4,564
Region											
Eastern	70.5	69.6	69.6	1.1	1.1	1.1	1,455	20.5	20.2	20.2	1,453
Northern	59.7	59.6	59.6	1.1	1.1	1.1	2,610	15.5	15.4	15.4	2,610
Southern	71.5	70.7	70.5	1.4	1.4	1.4	1,430	23.3	22.6	22.5	1,428
Western	44.4	44.2	44.2	0.7	0.7	0.7	1,118	9.5	9.5	9.5	1,118
District											
Kailahun	74.1	74.0	74.0	1.3	1.3	1.3	398	20.6	20.6	20.6	397
Kenema	75.5	75.4	75.4	1.2	1.2	1.2	644	25.8	25.7	25.7	643
Kono	59.1	56.6	56.4	0.9	0.8	0.8	413	12.1	11.2	11.2	413
Bombali	71.2	71.0	71.0	1.4	1.4	1.4	612	21.2	21.2	21.2	612
Kambia	56.9	56.9	56.9	1.1	1.1	1.1	300	11.9	11.8	11.8	300
Koinadugu	52.3	52.1	52.1	0.9	0.9	0.9	304	13.7	13.7	13.7	304
Port Loko	51.8	51.7	51.7	1.0	1.0	1.0	703	13.5	13.5	13.5	703
Tonkolili	62.1	61.9	61.9	1.1	1.1	1.1	691	14.8	14.7	14.7	691
Bo	69.3	68.4	68.4	1.2	1.2	1.2	587	22.8	22.1	22.1	587
Bonthe	73.2	72.3	71.8	1.7	1.7	1.7	280	26.2	25.6	25.0	280
Moyamba	77.0	76.0	75.7	1.6	1.5	1.5	339	25.9	24.8	24.6	337
Pujehun	66.9	66.6	66.6	1.0	1.0	1.0	225	17.2	16.9	16.9	225
Western Area Rural	48.3	48.0	48.0	0.8	0.8	0.8	206	10.9	10.9	10.9	206
Western Area Urban	43.5	43.3	43.3	0.6	0.6	0.6	912	9.1	9.1	9.1	912
Wealth quintile											
Lowest	58.7	58.6	58.5	0.9	0.9	0.9	1,493	18.5	18.3	18.2	1,492
Second	66.0	65.7	65.7	1.2	1.2	1.2	1,342	19.2	19.1	19.1	1,342
Middle	69.9	69.6	69.6	1.3	1.3	1.3	1,264	18.5	18.4	18.4	1,261
Fourth	66.0	65.1	65.1	1.3	1.3	1.3	1,201	19.4	18.8	18.7	1,201
Highest	50.8	49.9	49.9	0.8	0.8	0.8	1,314	10.7	10.6	10.6	1,314
Total	62.1	61.6	61.5	1.1	1.1	1.1	6,614	17.3	17.0	17.0	6,610

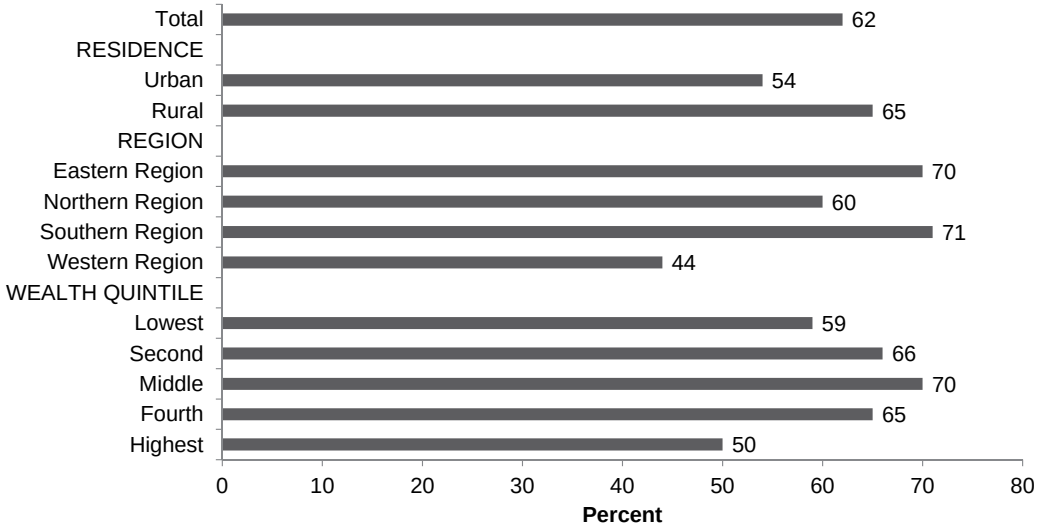
[1] De facto household members.
[2] An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment (LLIN) or a net that has been soaked with insecticide within the past 12 months.

Although mosquito net ownership is an important indication of the success of reducing human-vector contact, it is also important to determine if a household has a sufficient number of nets for those sleeping within the household. By assuming that each net is shared by two people in the household, universal net coverage within the population can be measured. Table 3.1 also shows the percentage of households with at least one mosquito net for every two persons who stayed in the household the night before the interview.

Overall, 17 percent of households in Sierra Leone have reached universal LLIN coverage; that is, less than one in five households has at least one LLIN for every two persons who slept in the household the night before the survey. Universal LLIN coverage is higher among rural households compared with urban households (19 percent and 13 percent, respectively). Twenty-three percent of households in the Southern Region have at least one LLIN for every two people, compared with 20 percent of households in the Eastern

Region, and 15 percent of households in the Northern Region. The Western Region has the lowest proportion of households with one LLIN for every two people (10 percent). Household ownership of LLINs ranges from a low of 52 percent in Koinadugu and Port Loko to 76 percent in Moyamba. By wealth quintile, the highest proportion of households to have reached universal LLIN coverage is found within the second and fourth wealth quintiles (19 percent for both). The highest wealth quintile has the lowest proportion of households to have reached universal LLIN coverage (11 percent).

Figure 3.1 **Percentage of households with at least one LLIN**



3.1.2 Indoor Residual Spraying

Indoor residual spraying (IRS) is vector control intervention used to control malaria transmission. IRS is the spraying of the interior walls and ceilings of a dwelling with long-lasting insecticide. It reduces the transmission of malaria by killing adult female mosquitoes when they rest on the walls of the dwelling after feeding. The IRS programme within Sierra Leone is not national; and to date has only been conducted in selected chiefdoms within four districts: Bo, Bombali, Kono, and Western Area Rural. To obtain information on the prevalence of indoor residual spraying, all households interviewed in the 2013 SLMIS were asked whether the interior walls of their dwelling had been sprayed to protect against mosquitoes during the 12-month period before the survey and, if so, who had sprayed the dwelling. The percentage of households with IRS in the past 12 months is presented in Table 3.2.

Table 3.2 shows that 6 percent of all households in Sierra Leone were sprayed in the past 12 months. By residence, rural households are more than twice as likely as urban households to have had IRS (7 percent compared with 3 percent). Among the regions, a higher proportion of households in the Northern Region (7 percent) have been sprayed compared with households in the other regions.

Among the four districts where IRS has been conducted, 27 percent of households in Bombali have been sprayed with IRS, 23 percent in Kono, 18 percent in Western Area Rural, and 11 percent in Bo.

By wealth quintile, households in the highest wealth quintile are the least likely to have been sprayed (2 percent), while 6 to 7 percent of households in the lowest to fourth quintiles have been sprayed.

Most of the spraying in the past 12 months was done by a government worker (92 percent), followed by a private company (3 percent) (data not shown).

Table 3.2 also shows which households are covered by any vector control intervention; by combining IRS with use of an ITN, it is possible to look at a combined indicator of malaria protection at the household level. Overall, 63 percent of households are protected by either owning an ITN or else having received IRS in the past 12 months. Rural households are more likely to have had at least one ITN and/or IRS in the past 12 months (67 percent) compared with urban households (55 percent). Households in the Eastern and Southern Regions are more likely to have had at least one ITN and/or IRS in the past 12 months (72 percent for both) compared with those in the Northern and Western Regions (61 and 46 percent, respectively). Percentages by district are varied. The proportion of households covered by this vector control intervention is highest in the middle wealth quintile and lowest in the highest wealth quintile (71 and 51 percent, respectively).

Table 3.2 Indoor residual spraying against mosquitoes

Percentage of households in which someone has come into the dwelling to spray the interior walls against mosquitoes using indoor residual spray (IRS) in the past 12 months, the percentage of households with at least one ITN and/or IRS in the past 12 months, and the percentage of households with at least one ITN for every two persons and/or IRS in the past 12 months, by background characteristics, Sierra Leone 2013

Background characteristic	Percentage of households with IRS[1] in the past 12 months	Percentage of households with at least one ITN[2] and/or IRS in the past 12 months	Percentage of households with at least one ITN[2] for every two persons and/or IRS in the past 12 months	Number of households
Residence				
Urban	3.0	54.6	15.3	2,046
Rural	7.0	67.0	24.6	4,568
Region				
Eastern	6.4	72.0	25.2	1,455
Northern	6.7	60.9	21.1	2,610
Southern	4.7	71.9	26.0	1,430
Western	4.0	45.8	13.4	1,118
District				
Kailahun	0.0	74.0	20.6	398
Kenema	0.1	75.4	25.7	644
Kono	22.5	64.8	28.9	413
Bombali	27.1	76.0	44.2	612
Kambia	0.1	57.0	12.0	300
Koinadugu	0.2	52.1	13.9	304
Port Loko	0.8	51.9	13.9	703
Tonkolili	0.4	62.1	15.0	691
Bo	11.0	71.4	30.1	587
Bonthe	0.0	72.3	25.6	280
Moyamba	0.2	76.0	24.9	339
Pujehun	0.6	66.8	17.5	225
Western Area Rural	18.3	55.4	28.3	206
Western Area Urban	0.8	43.7	10.0	912
Wealth quintile				
Lowest	5.8	61.1	22.7	1,493
Second	6.6	66.8	24.5	1,342
Middle	6.9	71.1	23.8	1,264
Fourth	7.3	67.0	25.1	1,201
Highest	2.4	50.6	12.7	1,314
Total	5.8	63.2	21.7	6,614

[1] Indoor residual spraying (IRS) is limited to spraying conducted by a government, private or non-governmental organization.
[2] An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment (LLIN), or a net that has been soaked with insecticide within the past 12 months.

3.2 ACCESS TO MOSQUITO NETS

The 2013 SLMIS presents data on access to an ITN, measured by the proportion of the population that could sleep under an ITN if each ITN in the household were used by up to two people. Coupled with mosquito net usage, ITN access can provide useful information on the magnitude of the behavioural gap in ITN ownership and use, or, in other words, the proportion of the population with access to an ITN but not using it. If the difference between these indicators is substantial, the program may need to focus on behaviour change and how to identify the main drivers or barriers to ITN use in order to design an appropriate intervention. This analysis helps ITN programs determine whether they need to achieve higher ITN coverage, promote ITN use, or both. Table 3.3 shows percent distribution of the de facto household population by number of ITNs the household owns, according to number of people who stayed in the household the night before the survey.

Table 3.3 Access to an insecticide-treated net (ITN)

Percent distribution of the de facto household population by number of ITNs the household owns, according to number of people who stayed in the household the night before the survey, Sierra Leone 2013

	Number of people who stayed in the household the night before the survey								
Number of ITNs	1	2	3	4	5	6	7	8+	Total
0	49.1	37.7	41.2	37.9	39.4	38.2	36.1	35.4	37.4
1	48.5	52.7	44.4	39.4	31.0	26.4	22.1	16.3	26.8
2	2.1	9.3	11.4	17.5	20.4	19.7	19.2	17.1	17.6
3	0.2	0.3	2.3	4.2	7.8	12.7	16.7	16.9	11.7
4	0.1	0.0	0.7	0.7	1.3	2.1	4.5	7.2	3.7
5	0.0	0.0	0.1	0.0	0.2	0.6	1.0	3.8	1.6
6	0.0	0.0	0.0	0.3	0.0	0.3	0.4	2.1	0.8
7+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	264	912	2,549	4,383	5,781	5,522	4,398	12,585	36,395
Percent with access to an ITN[1]	50.9	62.3	44.0	42.4	37.9	37.6	37.5	31.8	37.4

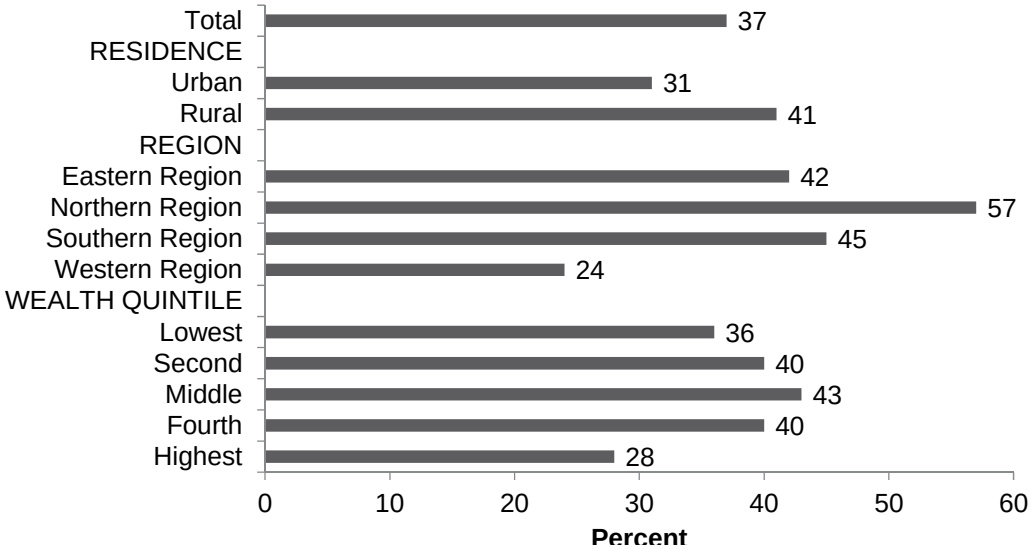
[1] Percentage of the de facto household population who could sleep under an ITN if each ITN in the household were used by up to two people.

As shown in Table 3.3, the majority of Sierra Leoneans do not have access to an ITN. Less than two in five people (37 percent) slept in homes with no ITN the night before the survey and therefore were not able to use an ITN. Just over a quarter of the population (27 percent) stayed in households that own at least one ITN, while two in ten (18 percent) slept in households that own two ITNs. Only 12 percent of the Sierra Leoneans slept in a home with three ITNs, and 4 percent of the population slept in homes with four ITNs. Very few individuals slept in homes with more than five ITNs (3 percent).

Overall, 37 percent of the population could sleep under an ITN if each ITN in the household were to be used by up to two people. As expected, the proportion of people with access to an ITN tends to decrease as household size increases. Access to an ITN is highest for households with two people staying in the household the night before the survey (43 percent), followed by three to four people sleeping in the household (40 percent to 41 percent). ITN access steadily decreases thereafter.

Figure 3.2 shows the percentage of the population with access to an ITN in the household, by residence and wealth quintile. People living in rural areas are more likely to have access to an ITN than their urban counterparts (41 percent and 31 percent, respectively). Residents of the Southern Region are more likely to have access to an ITN (45 percent) compared with those in other regions. By wealth quintile, households in the middle quintile have the highest percentage of access to an ITN, and households is the highest quintile have the lowest percentage (43 and 28 percent, respectively).

Figure 3.2 **Percentage of the de facto population with access to an ITN in the household**



3.2.1 Use of Mosquito Nets by Household Population

Mosquito net coverage of the entire population is necessary to accomplish large reductions in the malaria burden. Although vulnerable groups such as children under age 5 and pregnant women should still be prioritized, the equitable and communal benefits of wide-scale ITN use by older children and adults should be promoted and evaluated by national malaria control programs (Killeen, 2007). The 2013 SLMIS asked about use of mosquito nets by household members during the night before the survey. These data are shown on Table 3.4.

Table 3.4 shows that 39 percent of the household population slept under any net, an ITN, or LLIN the night before the survey. As stated earlier in the report, these data are similar because most of the mosquito nets in Sierra Leone are LLINs. Forty-two percent of Sierra Leoneans, however, were covered by a vector control intervention the night before the survey; that is they either slept under an ITN or slept in a dwelling sprayed with IRS in the past 12 months. ITN use among the general population is highest for adults age 50 and older (47 percent), followed by children under age 5 (45 percent), when compared with other age groups. Women and girls (41 percent) are more likely than men and boys (37 percent) to have slept under an ITN the previous night. People residing in rural areas are more likely to have slept under an ITN the night before the survey than people in urban areas (43 and 31 percent, respectively). By region, however, ITN use is the highest among people living in the Southern Region (47 percent). Bonthe district has the highest percentage of people sleeping under an ITN (52 percent). ITN use is highest in the middle wealth quintile (44 percent) and lowest in the highest quintile (28 percent).

As expected, ITN use is higher among households that own an ITN. In households that own at least one ITN, 62 percent of the population slept under an ITN the night before the survey. In households with at least one ITN, women and girls are more likely than men and boys to sleep under an ITN (65 and 60 percent, respectively). There is an urban-rural difference in the percentage of population who utilized an ITN the night before the survey: 65 percent of the population in rural households compared with 55 percent of the population of urban households slept under an ITN.

Table 3.4 Use of mosquito nets by persons in the household

Percentage of the de facto household population who slept the night before the survey under a mosquito net (treated or untreated), under an insecticide-treated net (ITN), under a long-lasting insecticidal net (LLIN), and under an ITN or in a dwelling in which the interior walls have been sprayed against mosquitoes (IRS) in the past 12 months; and among the de facto household population in households with at least one ITN, the percentage who slept under an ITN the night before the survey, by background characteristics, Sierra Leone 2013

	Household population					Household population in households with at least one ITN[1]	
Background characteristic	Percentage who slept under any net last night	Percentage who slept under an ITN[1] last night	Percentage who slept under an LLIN last night	Percentage who slept under an ITN[1] last night or in a dwelling sprayed with IRS[2] in the past 12 months	Number	Percentage who slept under an ITN[1] last night	Number
Age (in years)							
<5	45.4	45.0	44.9	47.5	6,536	69.2	4,251
5-14	28.8	28.6	28.6	32.7	10,289	45.6	6,452
15-34	37.8	37.3	37.3	40.1	10,274	60.9	6,302
35-39	49.6	49.2	49.1	51.8	4,674	80.1	2,870
50+	47.5	47.2	47.1	50.0	4,622	75.1	2,902
Sex							
Male	37.5	37.1	37.1	40.1	17,342	59.5	10,812
Female	41.1	40.8	40.7	43.9	19,052	64.9	11,966
Residence							
Urban	31.1	30.6	30.6	32.1	11,454	54.5	6,431
Rural	43.2	42.9	42.8	46.6	24,940	65.4	16,347
Region							
Eastern	46.3	45.9	45.9	49.9	7,319	65.8	5,110
Northern	37.6	37.5	37.5	40.8	15,177	62.6	9,083
Southern	48.3	47.4	47.3	49.5	7,892	65.4	5,720
Western	23.6	23.4	23.4	26.0	6,007	49.1	2,866
District							
Kailahun	50.9	50.8	50.8	50.8	2,185	67.8	1,636
Kenema	51.1	50.9	50.9	51.0	3,007	67.6	2,265
Kono	35.0	33.9	33.8	47.3	2,128	59.7	1,209
Bombali	45.6	45.3	45.3	59.6	3,394	61.6	2,494
Kambia	37.2	37.1	37.1	37.3	1,791	63.8	1,042
Koinadugu	34.2	34.1	34.1	34.2	1,676	65.2	877
Port Loko	28.1	27.9	27.9	28.4	4,421	55.0	2,246
Tonkolili	43.2	43.1	43.1	43.2	3,895	69.3	2,423
Bo	46.3	45.8	45.8	51.2	2,919	64.6	2,068
Bonthe	52.6	51.9	51.7	51.9	1,809	70.1	1,339
Moyamba	48.9	47.1	46.7	47.2	2,049	61.6	1,567
Pujehun	45.3	45.0	45.0	45.3	1,114	67.3	745
Western Area Rural	31.3	31.2	31.2	42.4	1,082	62.8	537
Western Area Urban	21.9	21.7	21.7	22.4	4,925	46.0	2,329
Wealth quintile							
Lowest	39.2	39.1	39.0	42.3	7,259	66.5	4,270
Second	43.6	43.4	43.3	46.5	7,263	67.2	4,686
Middle	44.1	43.9	43.9	48.4	7,268	62.7	5,081
Fourth	41.9	41.4	41.3	44.4	7,303	63.4	4,766
Highest	28.0	27.5	27.4	28.8	7,302	50.5	3,975
Total	39.4	39.0	39.0	42.1	36,395	62.3	22,778

[1] An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment (LLIN), or a net that has been soaked with insecticide within the past 12 months.
[2] Indoor residual spraying (IRS) is limited to spraying conducted by a government, private or non-governmental organization.

Among households that own an ITN, the Eastern Region residents are more likely than those living in other regions to sleep under an ITN: 66 percent compared with 65 percent in the Southern Region, 63 percent in the Northern Region, and 49 percent in the Western Region. In households with at least one ITN, ITN use decreases as wealth increases.

Figure 3.3 shows the data from previous tables in this chapter as the data relate to net ownership, access, and use of ITNs within Sierra Leone.

Figure 3.3 **Ownership of, access to, and use of ITNs**

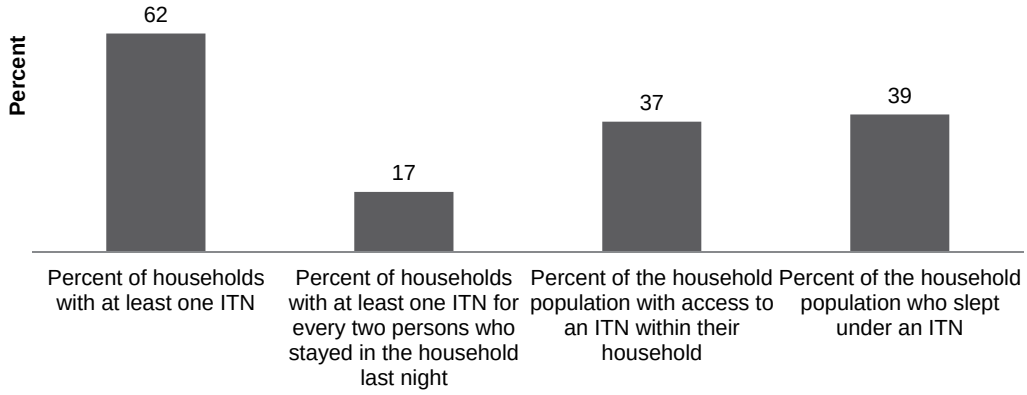


Table 3.5 shows data on the percentage of ITNs that were used by anyone in the household the night before the survey. This table is different from the previous tables because the unit of analysis is nets as opposed to households or individuals within households. The 2013 SLMIS obtained information on a total of 7,255 ITNs. Eighty-eight percent of the ITNs were used the night before the survey. The data shows few variations by background characteristics, with the exception of the data by district.

3.2.2 Use of Mosquito Nets by Children under Five

Children under age 5 are considered the most vulnerable to severe complications of malaria infection due to their lack of acquired immunity. Those living in areas of high malaria transmission naturally acquire immunity to the disease over time (Doolan et al., 2009). Acquired immunity is not the same as sterile immunity – that is, acquired immunity does not prevent *P. falciparum* infection, but rather protects against severe disease and death. Age is an important factor in determining levels of acquired immunity to malaria. For about six months following birth, antibodies acquired from the mother during pregnancy protect children born in areas of endemic malaria. This immunity is gradually lost and children start to develop their own immunity to malaria. The pace at which immunity develops depends on the exposure to malarial infection, and in high malaria-endemic areas, children are thought to attain a

Table 3.5 Use of existing ITNs

Percentage of insecticide-treated nets (ITNs) that were used by anyone the night before the survey, by background characteristics, Sierra Leone 2013

Background characteristic	Percentage of existing ITNs[1] used last night	Number of ITNs[1]
Residence		
Urban	86.4	1,852
Rural	88.6	5,403
Region		
Eastern	88.4	1,630
Northern	88.6	2,941
Southern	86.9	1,945
Western	87.8	739
District		
Kailahun	90.3	525
Kenema	87.2	755
Kono	88.3	351
Bombali	82.1	873
Kambia	93.9	316
Koinadugu	94.2	274
Port Loko	88.9	712
Tonkolili	91.5	766
Bo	84.2	712
Bonthe	90.6	481
Moyamba	85.0	525
Pujehun	92.6	227
Western Area Rural	91.1	164
Western Area Urban	86.9	575
Wealth quintile		
Lowest	87.9	1,408
Second	89.6	1,554
Middle	88.8	1,635
Fourth	86.8	1,581
Highest	86.6	1,077
Total	88.0	7,255

[1] An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment (LLIN), or a net that has been soaked with insecticide within the past 12 months.

high level of immunity by their fifth birthday. Such children may experience episodes of malaria illness but usually do not suffer from severe, life-threatening malaria.

Table 3.6 shows the use of mosquito nets by children under age 5. Nationally, 45 percent of children in Sierra Leone under age 5 slept under an ITN the previous night. ITN utilization among children tends to decrease with age. For example, 47 percent of children less than 12 months have slept under an ITN the night before the survey compared with 40 percent of children age 48-59 months. ITN utilization is equal among girl and boy children (45 percent for both). Children in rural areas are more likely than children in urban areas to use ITNs (48 percent and 37 percent, respectively). Children living in the Southern and Eastern Regions and those in the second and middle wealth quintiles are more likely than others to have slept under an ITN. By district, the percentage of children sleeping under an ITN the night before the survey ranges from 29 percent in Western Area Urban to 59 percent in Kailahun. Figure 3.4 shows the percentage of children under age 5 who slept under an ITN the night before the survey.

Not surprisingly, ITN utilization is higher among children that slept in households that own at least one ITN than among children in all households. In households with at least one ITN, 69 percent of children slept under an ITN the night before the survey.

Figure 3.4 **Percentage of children under age 5 who slept under an ITN the night before the survey**

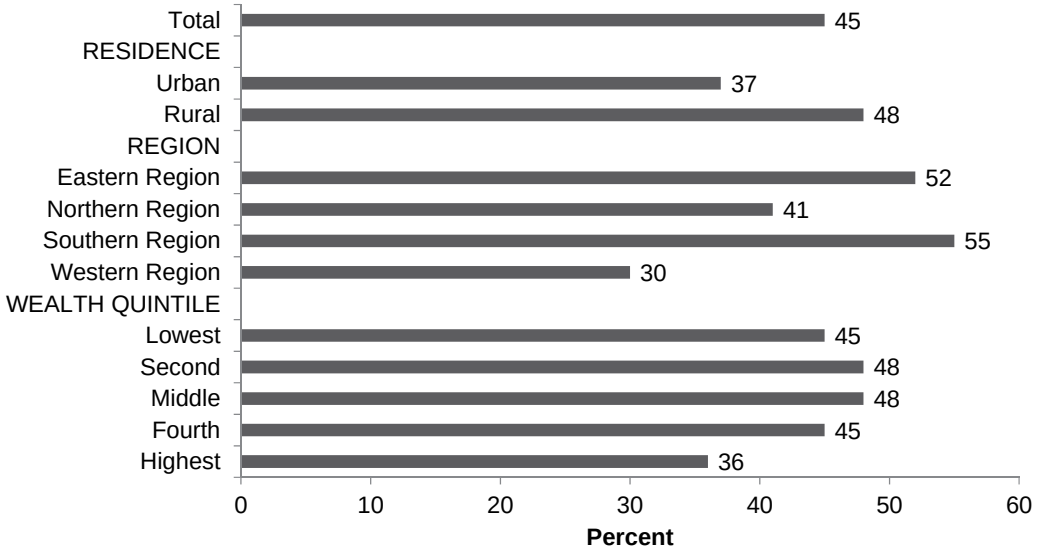


Table 3.6 Use of mosquito nets by children

Percentage of children under five years of age who, the night before the survey, slept under a mosquito net (treated or untreated), under an insecticide-treated net (ITN), under a long-lasting insecticidal net (LLIN), and under an ITN or in a dwelling in which the interior walls have been sprayed against mosquitoes (IRS) in the past 12 months; and among children under five years of age in households with at least one ITN, the percentage who slept under an ITN the night before the survey, by background characteristics, Sierra Leone 2013

	Children under age 5 in all households					Children under age 5 in households with at least one ITN[1]	
Background characteristic	Percentage who slept under any net last night	Percentage who slept under an ITN[1] last night	Percentage who slept under an LLIN last night	Percentage who slept under an ITN[1] last night or in a dwelling sprayed with IRS[2] in the past 12 months	Number of children	Percentage who slept under an ITN[1] last night	Number of children
Age (in months)							
<12	47.3	46.9	46.8	48.5	1,251	74.0	793
12-23	49.7	49.2	49.2	51.3	1,162	73.1	782
24-35	47.3	46.7	46.6	49.8	1,266	71.7	824
33-47	43.6	43.4	43.4	46.7	1,371	66.3	898
48-59	40.6	40.2	40.1	42.4	1,487	62.6	955
Sex							
Male	45.6	45.2	45.1	47.3	3,328	69.0	2,177
Female	45.2	44.9	44.8	47.7	3,207	69.4	2,075
Residence							
Urban	38.0	37.4	37.3	38.5	1,684	62.2	1,012
Rural	48.0	47.7	47.6	50.6	4,852	71.4	3,239
Region							
Eastern	52.9	52.2	52.1	55.1	1,436	72.4	1,036
Northern	40.6	40.5	40.5	43.3	2,791	67.7	1,669
Southern	56.1	55.3	55.1	56.9	1,462	73.2	1,105
Western	30.2	30.0	30.0	32.1	847	57.6	441
District							
Kailahun	59.5	59.3	59.3	59.3	409	76.6	317
Kenema	55.7	55.4	55.4	55.5	647	71.4	502
Kono	40.8	39.1	38.7	50.0	379	68.3	217
Bombali	47.8	47.6	47.6	59.5	654	68.4	456
Kambia	40.3	40.2	40.2	40.2	341	66.6	205
Koinadugu	37.5	37.5	37.5	37.6	249	71.4	131
Port Loko	31.2	31.0	31.0	31.2	753	58.2	401
Tonkolili	44.7	44.7	44.7	44.7	795	74.5	476
Bo	56.9	56.3	56.3	60.8	469	74.3	355
Bonthe	58.2	57.7	57.5	57.7	368	76.7	276
Moyamba	55.7	54.1	53.3	54.3	387	66.8	313
Pujehun	52.3	51.7	51.7	52.2	239	77.0	161
Western Area Rural	34.4	34.2	34.2	43.0	171	71.0	82
Western Area Urban	29.1	28.9	28.9	29.3	676	54.5	359
Wealth quintile							
Lowest	45.2	45.0	44.8	47.4	1,564	75.6	931
Second	48.3	48.1	47.9	50.5	1,431	71.7	959
Middle	48.0	47.9	47.9	51.7	1,387	67.6	981
Fourth	46.3	45.4	45.4	47.8	1,179	67.9	789
Highest	36.8	36.1	36.0	36.9	974	59.5	591
Total	45.4	45.0	44.9	47.5	6,536	69.2	4,251

Note: Table is based on children who stayed in the household the night before the interview.
[1] An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment (LLIN), or a net that has been soaked with insecticide within the past 12 months.
[2] Indoor residual spraying (IRS) is limited to spraying conducted by a government, private or non-governmental organization.

3.2.3 Use of Mosquito Nets by Pregnant Women

Pregnancy suppresses immunity and women in their first pregnancies especially are at increased risk for severe malaria compared with other adults. In addition, malaria in pregnant women is frequently associated

with the development of anaemia; it also interferes with the maternal-foetus exchange, leading to low-birth-weight infants. In order to prevent complications from malaria in pregnancy such as anaemia, low birth weight, and trans-placental parasitaemia, all pregnant women are advised to sleep under an ITN or LLIN in malaria endemic areas.

Table 3.7 shows the use of mosquito nets by pregnant women by background characteristics. Overall, just under half of pregnant women in Sierra Leone slept under an ITN the previous night (47 percent). ITN utilization among pregnant women is highest among those women living in rural areas (53 percent), among women with a primary education (60 percent), and among women in the second wealth quintile (60 percent).

As expected, use of an ITN is considerably higher for women who live in households that own at least one ITN than for women in all households. Overall, 76 percent of pregnant women who live in households with at least one ITN slept under an ITN the night before the survey compared with 47 percent of women in all households. Variations in ITN utilization by pregnant women in households with at least one ITN by background characteristics are different than those found in all households. For example, the percentage of pregnant women who slept under an ITN in households with at least one ITN is highest among those living in the Northern Region compared with ITN utilization by pregnant women in all households, which is highest for women living in the Southern Region. Among the districts, ITN usage for pregnant women ranges from 19 percent in Western Area Urban to 66 percent in Moyamba. Figure 3.5 shows ITN utilization among pregnant women.

Figure 3.5 **Percentage of pregnant women who slept under an ITN the night before the survey**

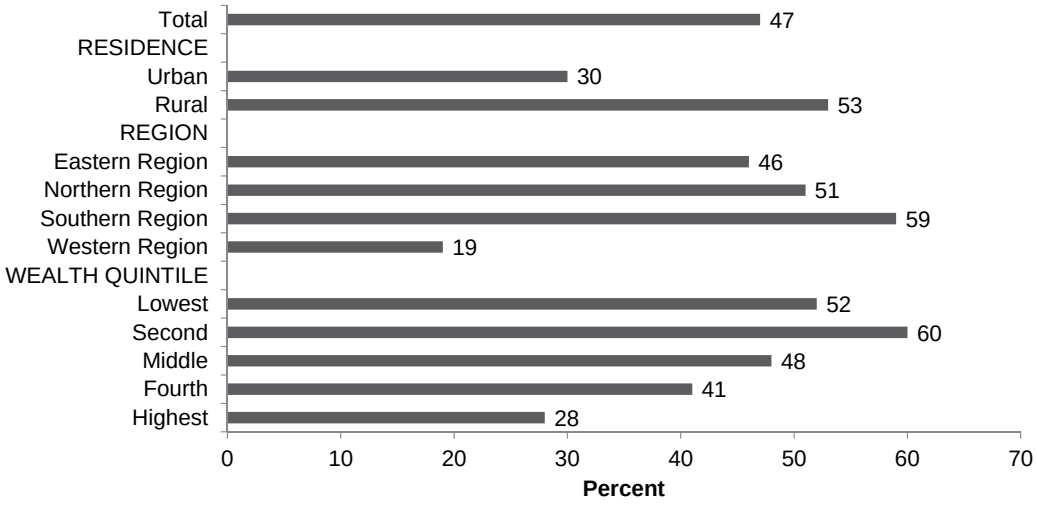


Table 3.7 Use of mosquito nets by pregnant women

Percentages of pregnant women aged 15-49 who, the night before the survey, slept under a mosquito net (treated or untreated), under an insecticide-treated net (ITN), under a long-lasting insecticidal net (LLIN), and under an ITN or in a dwelling in which the interior walls have been sprayed against mosquitoes (IRS) in the past 12 months; and among pregnant women age 15-49 in households with at least one ITN, the percentage who slept under an ITN the night before the survey, by background characteristics, Sierra Leone 2013

	Among pregnant women age 15-49 in all households					Among pregnant women age 15-49 in households with at least one ITN[1]	
Background characteristic	Percentage who slept under any net last night	Percentage who slept under an ITN[1] last night	Percentage who slept under an LLIN last night	Percentage who slept under an ITN[1] last night or in a dwelling sprayed with IRS[2] in the past 12 months	Number of women	Percentage who slept under an ITN[1] last night	Number of women
Residence							
Urban	29.9	29.9	29.9	31.8	161	60.5	79
Rural	53.3	53.1	53.0	56.1	461	79.9	307
Region							
Eastern	46.0	45.7	45.7	49.6	150	70.4	97
Northern	50.8	50.7	50.7	53.0	237	82.4	146
Southern	58.5	58.5	57.9	59.7	151	79.7	111
Western	19.2	19.2	19.2	23.7	85	(50.3)	32
District							
Kailahun	(41.3)	(41.3)	(41.3)	(41.3)	39	(60.5)	27
Kenema	(54.2)	(54.2)	(54.2)	(54.2)	61	(70.9)	46
Kono	39.8	38.9	38.9	50.4	50	*	24
Bombali	(65.0)	(65.0)	(65.0)	(73.3)	45	*	37
Kambia	32.9	32.4	32.4	32.4	34	*	15
Koinadugu	(27.6)	(27.6)	(27.6)	(27.6)	24	*	13
Port Loko	(46.2)	(46.2)	(46.2)	(48.4)	69	*	38
Tonkolili	(63.5)	(63.5)	(63.5)	(63.5)	65	(93.7)	44
Bo	(55.8)	(55.8)	(55.8)	(60.2)	42	*	27
Bonthe	59.2	59.2	59.2	59.2	31	(76.5)	24
Moyamba	66.1	66.1	64.4	66.1	51	80.5	42
Pujehun	47.2	47.2	47.2	47.2	26	(71.7)	17
Western Area Rural	(19.7)	(19.7)	(19.7)	(37.6)	21	*	7
Western Area Urban	(19.1)	(19.1)	(19.1)	(19.1)	64	*	25
Education							
No education	49.0	49.0	48.8	51.1	404	80.8	245
Primary	60.1	60.1	60.1	64.0	72	76.2	57
Secondary	35.9	35.4	35.4	38.3	132	61.6	76
More than secondary	*	*	*	*	14	*	8
Wealth quintile							
Lowest	52.1	52.1	51.5	53.7	140	82.1	89
Second	59.5	59.5	59.5	61.6	127	88.3	85
Middle	48.1	48.1	48.1	50.1	141	74.1	92
Fourth	41.4	41.0	41.0	47.6	128	69.1	76
Highest	28.5	28.3	28.3	28.9	87	(54.9)	45
Total	47.2	47.1	47.0	49.8	622	75.9	386

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.

[1] An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment (LLIN), or a net that has been soaked with insecticide within the past 12 months.

[2] Indoor residual spraying (IRS) is limited to spraying conducted by a government, private or non-governmental organization.

3.3 INTERMITTENT PREVENTIVE TREATMENT OF MALARIA IN PREGNANCY

As explained previously, in areas of high malaria transmission, by the time an individual reaches adulthood, she or he has acquired immunity that protects against severe disease. However, pregnant women – especially those pregnant for the first time – frequently regain their susceptibility to malaria. Although malaria in pregnant women may not manifest itself as either febrile illness or severe disease, it is frequently the cause

of mild to severe anaemia. In addition, malaria during pregnancy can interfere with the maternal-foetus exchange that occurs in the placenta, leading to the delivery of low-birth-weight infants.

Intermittent preventive treatment of malaria (IPTp) in pregnancy is the standard of care in Sierra Leone. The national policy guidelines for IPTp require a pregnant mother to take at least two treatment doses of an effective antimalarial drug during routine antenatal care visits. The drug used for IPT in pregnancy is sulphadoxine-pyrimethamine (SP).

In the 2013 SLMIS, women who had a live birth in the two years preceding the survey were asked several questions regarding the time they were pregnant with their most recent birth. They were asked if anyone told them during their pregnancy that pregnant women need to take medicine to keep them from getting malaria. They were also asked if they had taken any drugs to prevent getting malaria during that pregnancy and, if so, which drug. If the respondent did not know the name of the drug she took, interviewers were instructed to show her some examples of common antimalarials. They also were instructed to probe to see if she took three big, white tablets at the health facility (indicative of SP/Fansidar). If respondents had taken SP/Fansidar, they were further asked how many times they took it and whether they had received it during a prenatal care visit. IPTp data are presented in Table 3.8.

Table 3.8 shows that nearly 4 in 5 pregnant women (79 percent) took any SP/Fansidar during their last pregnancy. Sixty-three percent of women reported taking two or more doses of SP/Fansidar during their last pregnancy, and received at least one dose during an antenatal care (ANC) visit. Rural women are more likely than urban women to have taken any SP/Fansidar during pregnancy (64 percent relative to 57 percent). Among the regions, women living in the Western Region (88 percent) are more likely than those living elsewhere to have taken any SP/Fansidar during their last pregnancy.

By district, women who took any SP/Fansidar during an ANC visit ranges from 63 percent of women in Koinadugu to 90 percent of women in Port Loko. When observing the percent of women who took two or more doses of SP/Fansidar and received at least one dose during an ANC visit, the data vary greatly. For example, twice as many

Table 3.8 Use of intermittent preventive treatment (IPTp) by women in pregnancy

Percentage of women aged 15-49 with a live birth in the two years preceding the survey who, during the pregnancy preceding the last birth, received any SP/Fansidar during an ANC visit, and who took at least two doses of SP/Fansidar and received at least one dose during an ANC visit, by background characteristics, Sierra Leone 2013

Background characteristic	Percentage who received any SP/Fansidar during an ANC visit	Percentage who took 2+ doses of SP/Fansidar and received at least one during an ANC visit	Number of women with a live birth in the two years preceding the survey
Residence			
Urban	78.9	56.9	597
Rural	78.4	63.5	1,588
Region			
Eastern	76.3	64.1	455
Northern	80.3	66.3	921
Southern	71.2	49.5	495
Western	88.1	63.7	313
District			
Kailahun	88.8	81.1	133
Kenema	67.3	60.3	190
Kono	76.6	52.4	132
Bombali	83.6	79.2	197
Kambia	73.3	46.0	107
Koinadugu	62.7	41.6	90
Port Loko	89.6	74.1	277
Tonkolili	76.7	65.1	251
Bo	72.0	54.8	155
Bonthe	77.4	58.5	121
Moyamba	67.2	40.4	147
Pujehun	67.5	41.8	72
Western Area Rural	84.0	74.8	53
Western Area Urban	88.9	61.5	260
Education			
No education	77.5	62.4	1,524
Primary	76.2	60.2	248
Secondary	84.0	59.8	366
More than secondary	(83.1)	(62.0)	46
Wealth quintile			
Lowest	72.5	59.8	505
Second	75.5	59.0	461
Middle	81.3	63.5	446
Fourth	80.2	67.2	419
Highest	85.5	59.1	354
Total	78.5	61.7	2,184

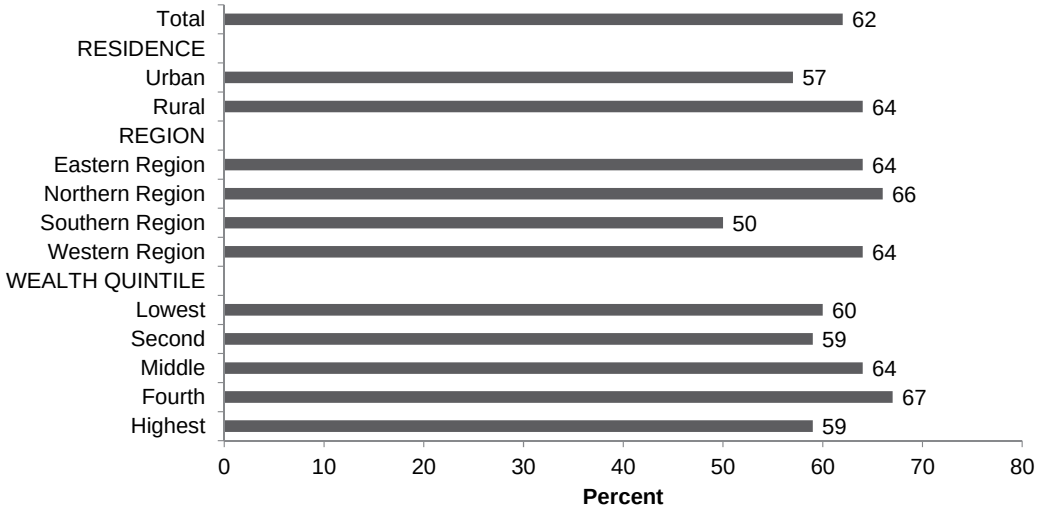
Note: Figures in parentheses are based on 25-49 unweighted cases.

women in Kailahun took two or more doses of SP/Fansidar and received at least one dose during an ANC visit compared with the percentage of women in Moyamba (81 and 40 percent, respectively).

The proportion of pregnant women that took any SP/Fansidar generally increases with household wealth. For example, women in the wealthiest households are more likely than women in other household wealth quintiles to take SP/Fansidar during pregnancy (86 percent).

Figure 3.6 presents data on IPTp use among women in the past two years who took two or more doses of SP/Fansidar and received at least one during an ANC visit.

Figure 3.6 **Percentage of pregnant women who gave birth two years before the survey who received two or more doses of SP/Fansidar and received at least one dose during an ANC visit**



3.4 PREFERENCE FOR SHAPE OF MOSQUITO NET

The 2013 SLMIS household respondents were asked whether they preferred conical-shaped or rectangular-shaped mosquito nets. Table 3.9 shows shape preference.

Table 3.9 shows that more than half of household respondents report that they prefer rectangular-shaped nets (55 percent), while 33 percent prefer conical-shaped nets, and 11 percent do not have a preference. Conical nets are more popular among urban households (41 percent), while rectangular nets are the preferred shape in rural areas (58 percent). Households in the Eastern Region are more likely than households in other regions to prefer conical nets (43 percent), while rectangular nets are more preferred in the Southern Region (62 percent) than in other regions. Preference varies greatly by districts. Preference for conical nets increases with wealth quintile, from 27 percent for households in the lowest quintile to 45 percent for households in the highest quintile. Preference for rectangular nets decreases with wealth. Sixty-one percent of households in the lowest wealth quintiles prefer rectangular nets compared with 50 percent of households in the highest wealth quintile.

Table 3.9 Preference of shapes of mosquito net

Percent distribution of household by preference of shapes of mosquito net by background characteristics, Sierra Leone 2013

Background characteristic	Conical	Rectangular	Either	Don't know	Total	Number
Residence						
Urban	40.8	48.7	9.1	1.4	100.0	2,046
Rural	28.9	58.2	12.4	0.5	100.0	4,568
Region						
Eastern	42.7	42.7	12.1	2.5	100.0	1,455
Northern	24.0	59.0	16.5	0.5	100.0	2,610
Southern	31.9	61.5	6.4	0.1	100.0	1,430
Western	40.4	54.6	5.0	0.0	100.0	1,118
District						
Kailahun	45.0	50.9	3.4	0.7	100.0	398
Kenema	37.9	35.3	21.6	5.3	100.0	644
Kono	47.9	46.5	5.6	0.0	100.0	413
Bombali	21.7	68.7	9.3	0.4	100.0	612
Kambia	16.9	63.9	18.1	1.2	100.0	300
Koinadugu	35.8	63.3	0.8	0.1	100.0	304
Port Loko	15.1	52.5	32.3	0.0	100.0	703
Tonkolili	33.2	53.0	13.0	0.9	100.0	691
Bo	25.6	65.1	9.4	0.0	100.0	587
Bonthe	36.8	61.4	1.8	0.0	100.0	280
Moyamba	37.0	57.2	5.4	0.5	100.0	339
Pujehun	34.9	59.0	6.1	0.0	100.0	225
Western Area Rural	52.1	39.2	8.7	0.0	100.0	206
Western Area Urban	37.7	58.1	4.2	0.0	100.0	912
Wealth quintile						
Lowest	27.0	61.0	10.8	1.2	100.0	1,493
Second	28.2	57.2	13.8	0.7	100.0	1,342
Middle	31.7	54.0	13.3	1.0	100.0	1,264
Fourth	32.3	52.4	14.5	0.8	100.0	1,201
Highest	44.7	50.3	5.0	0.0	100.0	1,314
Total	32.6	55.2	11.4	0.8	100.0	6,614

MALARIA IN CHILDREN 4

Key Findings

- One-third (33 percent) of Sierra Leonean children had a fever in the two weeks prior to the survey. Of these children, 63 percent sought advice or treatment.
- Among children that had a fever, 37 percent took an ACT, the recommended malaria treatment in Sierra Leone.
- Among children under age 5 with fever who received antimalarials for treatment, 84 percent were given artesunate + amodiaquine (ASAQ). One in ten children (10 percent) have severe anaemia (haemoglobin <8g/dL).
- Analysis of blood smears by microscopy revealed a malaria prevalence of 43 percent among children age 6-59 months.

Chapter 4 of the 2013 SLMIS presents data to assess treatment implementation and health outcomes of the National Malaria Control Programme. The data show the prevalence of fever in household members as well as the prevalence, diagnosis, and treatment of fever in children. Data are also presented showing the prevalence of severe anaemia, defined as haemoglobin levels <8g/dL, and malaria infection in children age 6-59 months.

4.1 PREVALENCE, DIAGNOSIS, AND PROMPT TREATMENT OF CHILDREN WITH FEVER

Malaria case management, including the identification, diagnosis, and rapid treatment of all malaria cases with appropriate and effective antimalarial drugs, is one of the key strategic goals for malaria control in Sierra Leone. Fever is a major manifestation of malaria and other acute infections in children. Most malarial fevers occur at home, and prompt and effective treatment is critical to prevent morbidity and mortality related to malaria. The 2013 SLMIS asked mothers whether their children under age 5 had a fever in the two weeks preceding the survey and, if so, whether any treatment was sought. Questions were also asked about blood testing, the types of drugs given to the child, and how soon and for how long the drugs were taken.

Table 4.1 shows the percentage of children under age 5 who had fever in the two weeks preceding the survey and, among those children under age 5 with fever, the percentage for whom advice or treatment was sought from a health facility, provider, or pharmacy, the percentage of such children who had a drop of blood taken from a finger- or heel-prick (presumably for a malaria test), the percentage who took ACT or any antimalarial drugs, and the percentage who took drugs on the same or next day.

Table 4.1 shows that one-third (33 percent) of children under age 5 had fever during the two weeks preceding the survey, with a higher proportion of urban children (37 percent) than rural children (32 percent) having fever. Similar percentages of male children and female children had fever in the last two weeks (34 percent and 33 percent, respectively), while the prevalence of fever was highest among children age 12-23 months (39 percent). Children from the Western Region (41 percent) and Northern Region (40 percent) and those whose mothers had at least a secondary education (38 percent) were more likely than other children to

have had fever in the two weeks before the survey. Kailahun is the district with the highest percentage of children with fever (46 percent) and Port Loko has the lowest percentage (20 percent). Children in the highest wealth quintile were less likely to have experienced fever (30 percent) than those in other wealth quintiles (32 percent or higher).

Among children with fever, 63 percent were taken to a health facility, provider, or pharmacy for advice or treatment. Treatment seeking behaviour tends to decrease with children's age; children less than age 24 months are more likely to be taken for treatment than older children. Male children are more likely than female children to be taken for treatment (64 percent compared with 61 percent). Urban children are more likely than rural children to have been taken to a health facility, provider, or pharmacy for advice or treatment (71 percent compared with 59 percent). The proportion of children who were taken for treatment is higher in the Southern Region (69 percent) and lowest in the Eastern Region (58 percent). Seventy-five percent of children in Bombali were taken for treatment compared with 42 percent of children in Koinadugu. Care-seeking behaviour for children with fever generally increases with the mother's education. For example, treatment for fever was sought for 72 percent of children whose mothers have had a secondary education compared with 60 percent of children whose mothers have had no education.

In the 2013 SLMIS, mothers were asked whether children under age 5 with fever had blood taken from a finger or heel for testing, presumably for diagnostic purposes. It should be noted that the question did not ask which test was conducted. Although the blood could have been taken for malaria testing, it could also have been taken for anaemia or other tests. The mother may or may not have known the reason for which blood was taken from her child. Overall, 1 percent of children with fever had a heel or finger prick.[1] The percentage is highest for children in the Eastern Region (3 percent) compared with other regions.

Table 4.1 also presents the percentage of children with fever that received prompt treatment. Overall, 37 percent of children with fever took artemisinin-based combination therapies (ACTs), the recommended treatment for malaria in Sierra Leone. In Sierra Leone, the most common ACT is artesunate + amodiaquine (ASAQ). Forty-four percent of children took any antimalarial. By age, children 12-23 months (43 percent) are more likely than others to have taken an ACT, while there is a small difference in ACT use by child's sex (38 percent for males compared with 36 percent for females). Children in the urban areas (47 percent) are more likely than children in the rural areas (33 percent) to take an ACT. Among the regions, children living in the Western Region (51percent) are almost twice as likely to have taken an ACT compared with children in the Northern Region (29 percent). By district, the proportion of children who took an ACT ranges from a low of 15 percent in Port Loko to a high of 60 percent in Western Area Urban. The proportion of children that took an ACT increases with an increase in the mother's education and wealth quintile.

Among children with fever, about one in three (32 percent) took an ACT within 24 hours of onset of fever, or during the recommended timeframe. Variation by background characteristics among the percentage of children who took an ACT the same or next day are similar to the differentials observed for children who took an ACT. By residence, children in urban areas are 1.5 times more likely than children in rural areas to have taken an ACT within the same or next day after onset of fever (42 percent in urban areas and 27 percent in rural areas). The percentage of children with fever treated with an ACT the same or next day varies greatly among the districts from 13 percent in Port Loko to 54 percent in Western Area Urban. The percentage of children with fever treated with ACT has a positive relationship with the mother's education; it is lowest for

[1] Data for this indictor is limited to responses from mothers who sought advice or treatment from more than one place for their child who had fever in the last two weeks. Women who sought one place of advice or treatment were not asked the question on blood taken from a finger- or heel-prick for testing due to error in the data collection instrument.

children with an uneducated mother (30 percent) and increases with the mother's education to 42 percent for children of mothers who have more than a secondary education.

Table 4.1 Prevalence, diagnosis, and prompt treatment of children with fever

Percentage of children under age five with fever in the two weeks preceding the survey; and among children under age five with fever, the percentage for whom advice or treatment was sought, the percentage who had blood taken from a finger or heel, the percentage who took any artemisinin-based combination therapy (ACT), the percentage who took ACT the same or next day following the onset of fever, the percentage who took antimalarial drugs, and the percentage who took the drugs the same or next day following the onset of fever, by background characteristics, Sierra Leone 2013

	Among children under age five:		Among children under age five with fever:						
Background characteristic	Percentage with fever in the two weeks preceding the survey	Number of children	Percentage for whom advice or treatment was sought[1]	Percentage who had blood taken from a finger or heel for testing	Percentage who took any ACT	Percentage who took any ACT same or next day	Percentage who took antimalarial drugs	Percentage who took antimalarial drugs same or next day	Number of children
Age (in months)									
<12	34.6	1,160	75.4	1.0	32.2	28.3	39.1	33.3	401
12-23	38.7	1,005	67.1	1.2	42.5	36.1	48.1	40.5	389
24-35	36.7	980	59.0	1.3	38.2	31.9	47.1	40.7	360
36-47	28.4	1,019	54.1	2.2	34.2	30.3	43.3	37.7	290
48-59	28.6	1,046	51.8	1.1	37.6	30.9	42.6	34.3	299
Sex									
Male	34.0	2,716	63.5	1.6	38.3	32.6	46.0	39.2	924
Female	32.7	2,495	61.4	1.0	35.5	30.4	41.9	35.3	815
Residence									
Urban	36.5	1,359	70.7	0.9	46.8	42.4	56.3	50.4	496
Rural	32.3	3,852	59.2	1.5	33.1	27.2	39.2	32.1	1,242
Region									
Eastern	39.7	1,195	58.4	3.1	39.6	34.8	46.1	41.0	475
Northern	27.5	2,184	60.1	0.9	28.8	23.3	36.0	29.2	601
Southern	33.5	1,162	68.8	0.3	37.1	30.2	44.0	35.7	389
Western	40.9	669	66.0	0.6	50.5	45.8	58.6	51.3	274
District									
Kailahun	45.5	335	65.5	6.8	43.2	38.5	48.1	43.3	153
Kenema	35.4	544	60.6	2.4	44.2	38.1	50.3	44.4	192
Kono	41.2	315	51.7	0.0	28.4	25.5	37.3	33.5	130
Bombali	33.6	501	75.1	0.3	38.9	31.2	41.6	33.9	168
Kambia	28.9	264	57.2	2.1	24.9	15.0	28.6	18.3	76
Koinadugu	32.3	204	41.5	0.0	17.4	17.4	22.9	22.9	66
Port Loko	20.1	593	62.2	0.0	15.2	13.3	29.6	26.1	119
Tonkolili	27.5	623	53.9	1.8	34.3	28.6	43.1	34.0	171
Bo	36.6	358	73.1	0.7	51.6	39.8	54.3	42.5	131
Bonthe	27.0	289	64.0	0.0	30.9	26.3	33.4	28.8	78
Moyamba	39.2	335	70.9	0.0	25.5	21.5	38.0	31.1	131
Pujehun	26.9	180	71.8	0.7	39.1	34.4	49.4	40.9	48
Western Area Rural	35.1	145	56.4	1.1	59.5	54.4	68.9	56.2	51
Western Area Urban	42.5	524	68.2	0.4	48.5	43.9	56.3	50.2	223
Mother's education									
No education	32.1	3,880	59.6	1.0	35.0	29.9	40.9	35.0	1,244
Primary	37.1	541	67.7	2.5	37.2	31.4	46.0	37.7	201
Secondary	38.3	692	71.8	1.8	44.0	38.3	55.2	46.7	265
More than secondary	30.4	98	(66.9)	(0.0)	(57.7)	(42.2)	(67.2)	(51.7)	30
Wealth quintile									
Lowest	28.8	1,252	55.1	0.3	30.9	25.1	36.2	29.7	361
Second	32.5	1,152	55.8	1.9	30.5	25.6	36.5	31.3	374
Middle	33.6	1,098	60.8	1.4	32.8	26.3	39.3	30.3	369
Fourth	36.6	937	71.9	2.0	43.9	39.1	54.0	48.0	343
Highest	37.8	772	71.5	0.8	50.1	44.8	57.9	51.0	292
Total	33.4	5,211	62.5	1.3	37.0	31.6	44.1	37.4	1,739

Note: Figures in parentheses are based on 25-49 unweighted cases.
[1] Excludes market and traditional practitioner.

Table 4.2 presents information on sources from which advice or treatment for fever was sought. The information on where children receive advice or treatment is useful for malaria programme managers and implementers for logistic planning. In the 2013 SLMIS, all women who reported their children age 5 and younger who had a fever in the two weeks preceding the survey for whom advice or treatment was sought were asked where their child obtained the advice or treatment. Because mothers may not know exactly in which category the source falls (e.g., government or private, health centre, or clinic), the interviewers were instructed to note the full name of the source or facility. Furthermore, supervisors and field editors were trained to verify the name and type of source to maintain consistency and improve accuracy of the source, for instance, by asking informants in the clusters for the names of local health facilities. Note that advice or treatment can be sought from multiple sources.

Table 4.2 shows that among the 63 percent of children with fever in the two weeks preceding the survey, treatment or advice for approximately two-thirds of children (74 percent) was sought from the public sector. The majority of these children were taken to a government health centre (62 percent), followed by 10 percent who received advice or treatment from a government hospital, and 1 percent from a mobile clinic. Fifteen percent of children received advice or treatment from the private sector: 7 percent from a pharmacy, 4 percent from a private hospital or clinic, and 3 percent from a mission or faith based hospital or clinic. One percent of children received advice or treatment from an unspecified private medical source and less than one percent from a mobile clinic. Eleven percent of children received advice or treatment from a drug peddler, 2 percent from a traditional practitioner, and 1 percent from a shop.

Table 4.2 Source of advice or treatment for children with fever

Percentage of children under age five with fever in the two weeks preceding the survey for whom advice or treatment was sought from specific sources; and among children under age five with fever in the two weeks preceding the survey for whom advice or treatment was sought, the percentage for whom advice or treatment was sought from specific sources, by background characteristics, Sierra Leone 2013

Source	Among children with fever	Percentage for whom advice or treatment was sought from each source: Among children with fever for whom advice or treatment was sought	Among children with fever who took ACT the same or next day
Any public sector source	52.9	74.2	78.5
Government hospital	7.3	10.2	13.5
Government health centre	44.3	62.1	63.7
Mobile clinic	0.7	0.9	1.1
CBP	0.3	0.4	0.0
Any private sector source	10.5	14.7	14.3
Private hospital/clinic	1.4	2.0	2.0
Pharmacy	5.3	7.4	5.9
Private clinic	1.2	1.6	1.9
Mission/faith based hospital	1.1	1.6	2.2
Mission/faith based clinic	0.6	0.8	1.2
Mobile clinic	0.3	0.5	0.4
Other private medical sector	0.9	1.3	1.6
Any other source	10.1	14.1	4.1
Shop	0.9	1.3	0.3
Traditional practitioner	1.6	2.2	1.0
Drug peddler	7.6	10.6	2.1
Number of children	1,739	1,241	549

Table 4.2 also presents data on the source of treatment among children who took an ACT the same or next day. The majority of children who took an ACT the same or next day received treatment from the public sector (79 percent). Most of these children received advice or treatment from a government health centre (64 percent) and 14 percent sought advice or treatment from a government hospital. Fourteen percent of children sought advice or treatment from the private sector and 4 percent from other sources.

4.2 MALARIA CASE MANAGEMENT AMONG CHILDREN

Details on the types and timing of antimalarial drugs given to children to treat fever are presented in Table 4.3. When interpreting the results, it is important to remember that the information is based on reports from the mothers of the ill children, many of whom may not have known the specific drug given to the child.

As shown in Table 4.3, an overwhelmingly large proportion of children under age 5 with fever who took an antimalarial drug were given an ACT (84 percent), while 7 percent were given chloroquine, 5 percent were given SP/Fansidar, 5 percent were given an unspecified type of antimalarial, 2 percent were given amodiaquine, and 2 percent were given quinine. Other than the districts, there is not much variation in the type of antimalarial drugs use by background characteristics.

Table 4.3 Type of antimalarial drugs used

Among children under age five with fever in the two weeks preceding the survey who took any antimalarial medication, the percentage who took specific antimalarial drugs, by background characteristics, Sierra Leone 2013

Background characteristic	Percentage of children who took drug:						Number of children with fever who took anti-malarial drug
	Any ACT	Qunine	SP/ Fansidar	Chloroquine	Amodiaquine	Other anti-malarial	
Age (in months)							
<12	82.2	1.3	4.5	5.8	3.9	5.4	157
12-23	88.3	1.8	1.5	5.5	1.3	3.2	187
24-35	81.2	3.5	6.7	10.4	0.9	5.4	170
36-47	79.1	0.8	8.4	12.0	0.8	5.3	125
48-59	88.2	0.0	3.2	3.8	1.4	3.9	128
Sex							
Male	83.4	1.4	4.4	8.5	2.2	3.1	425
Female	84.7	1.9	5.0	6.2	1.0	6.4	342
Residence							
Urban	83.2	1.8	4.9	9.1	1.6	4.0	279
Rural	84.4	1.5	4.5	6.5	1.7	4.9	487
Region							
Eastern	85.9	1.5	2.9	8.5	0.9	1.2	219
Northern	80.0	1.6	7.2	8.2	1.6	4.5	216
Southern	84.4	0.5	6.5	5.5	3.3	3.5	171
Western	86.1	3.0	1.8	7.1	1.2	10.4	160
District							
Kailahun	89.8	1.7	2.8	2.8	2.6	2.0	73
Kenema	87.9	2.1	2.8	7.9	0.0	0.0	97
Kono	76.2	0.0	3.2	18.2	0.0	2.4	48
Bombali	93.5	0.0	5.3	2.9	0.0	0.0	70
Kambia	*	*	*	*	*	*	22
Koinadugu	*	*	*	*	*	*	15
Port Loko	(51.4)	(0.0)	(23.5)	(24.5)	(4.5)	(11.2)	35
Tonkolili	79.5	4.6	2.7	5.3	0.0	8.0	74
Bo	95.1	0.0	5.9	1.3	4.0	0.0	71
Bonthe	(92.5)	(3.1)	(2.7)	(1.7)	(0.0)	(0.0)	26
Moyamba	67.3	0.0	11.8	11.3	4.2	5.5	50
Pujehun	79.2	0.0	1.2	10.0	3.2	13.3	24
Western Area Rural	86.3	9.8	0.0	2.4	2.7	31.6	35
Western Area Urban	86.1	1.1	2.4	8.4	0.7	4.5	125
Mother's education							
No education	85.6	1.8	3.8	7.4	1.5	3.8	508
Primary	80.8	1.2	3.0	9.4	2.7	4.5	92
Secondary	79.8	0.6	7.8	6.8	1.7	6.4	146
More than secondary	*	*	*	*	*	*	20
Wealth quintile							
Lowest	85.4	2.7	3.4	6.8	1.2	3.6	131
Second	83.6	1.4	4.2	11.6	0.5	1.3	136
Middle	83.4	0.0	5.0	4.4	1.6	7.2	145
Fourth	81.3	2.9	5.5	8.3	3.3	6.2	185
Highest	86.5	1.0	5.0	6.2	1.3	4.0	169
Total	83.9	1.6	4.7	7.4	1.7	4.6	767

Notes: An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed. Figures in parentheses are based on 25-49 unweighted cases.
ACT = Artemisinin-based combination therapy.

4.3 ANAEMIA AND MALARIA PREVALENCE AMONG CHILDREN

Similar to many countries in sub-Saharan Africa, malaria is the leading cause of death in Sierra Leone among children under age 5. With high transmission of malaria experienced in Sierra Leone throughout the year, partial immunity develops within the first two years of life. Many people however, including children, may have malaria parasites in their blood without showing any signs of infection. Such asymptomatic infection not only contributes to further transmission of malaria but also increases the risk of anaemia among the infected individuals. Anaemia associated with malaria is a major cause of morbidity and mortality, making prevention and treatment of malaria among children and pregnant women even more critical.

A total of 6,015 children age 6-59 months living in households randomly selected for the 2013 SLMIS were eligible for haemoglobin and malaria testing. The HemoCue system was used to measure the concentration of haemoglobin in the blood obtained from a finger prick. The First Response Malaria Antigen (Ag) Histidine-Rich Protein 2 (HRP2) rapid diagnostic test (RDT) was used to detect malaria in the blood from the same finger prick. Both tests were carried out in the field.

Table 4.4 shows the coverage of anaemia and malaria testing in children age 6-59 months. Of the 6,015 children eligible for haemoglobin and malaria testing, 97 percent were tested for anaemia, 96 percent were tested for malaria with RDTs, and 96 percent of children's blood samples underwent microscopy analysis.

Table 4.4 Coverage of testing for anaemia and malaria

Percentage of eligible children age 6-59 months who were tested for anaemia and for malaria, by background characteristics (unweighted), Sierra Leone 2013

Background characteristic	Percentage tested for: Anaemia	Malaria with RDT	Malaria by microscopy	Number of children
Age (in months)				
6-8	82.5	82.1	82.5	351
9-11	96.5	96.5	96.5	361
12-17	96.8	96.7	96.5	590
18-23	98.6	98.6	98.2	573
24-35	97.1	96.9	96.7	1,273
36-47	98.1	97.1	98.1	1,371
48-59	97.1	96.3	96.8	1,497
Sex				
Male	96.7	96.0	96.4	3,026
Female	96.4	96.0	96.2	2,989
Mother's interview status				
Interviewed	97.1	96.7	96.8	4,568
Not interviewed[1]	94.8	93.9	94.7	1,447
Residence				
Urban	96.1	96.0	96.2	1,541
Rural	96.7	96.1	96.4	4,474
Region				
Eastern	96.7	96.5	96.7	1,342
Northern	97.0	96.0	96.5	2,580
Southern	95.5	95.4	95.5	1,328
Western	96.6	96.5	96.5	765
District				
Kailahun	97.6	97.4	97.6	380
Kenema	96.8	97.0	97.0	613
Kono	95.4	94.6	94.9	349
Bombali	96.6	94.5	96.4	613
Kambia	96.7	95.9	96.7	312
Koinadugu	97.1	96.5	97.1	217
Port Loko	96.1	95.5	94.9	683
Tonkolili	98.3	97.4	97.9	754
Bo	93.8	93.8	93.8	435
Bonthe	95.1	94.6	95.1	333
Moyamba	97.0	97.0	97.0	344
Pujehun	97.3	97.3	96.8	216
Western Area Rural	98.6	98.3	98.2	155
Western Area Urban	96.1	96.1	96.1	610
Mother's education[2]				
No education	97.2	96.7	96.9	3,499
Primary	97.9	97.8	97.8	825
Secondary	92.4	92.4	92.4	204
More than secondary	95.0	95.0	95.0	41
Not interviewed	94.8	93.9	94.7	1,447
Wealth quintile				
Lowest	96.5	96.0	96.2	1,442
Second	95.4	94.1	95.2	1,310
Middle	97.8	97.4	97.6	1,297
Fourth	97.7	97.7	97.8	1,076
Highest	95.0	94.9	94.6	890
Total	96.5	96.0	96.3	6,015

RDT = Rapid diagnostic test. The RDT used in the 2013 Sierra Leone MIS is the First Response Malaria AG HRP2 test.

[1] Includes children whose mothers are deceased.
[2] Excludes children whose mothers were not interviewed.

As shown in the table, the coverage levels vary across background characteristics. Younger children age 6-8 months are least likely to have been tested for anaemia (83 percent), RDTs (82 percent), and microscopy (83 percent). The likelihood of being tested for anaemia or malaria does not vary by gender. Children who are members of the household in which their mothers were not interviewed are less likely to be tested for anaemia and microscopy (95 percent for both) than children whose mothers were interviewed (97 percent for both anaemia and microscopy).

4.3.1 Anaemia Prevalence among Children

Anaemia, defined as a reduced level of haemoglobin in blood, decreases the amount of oxygen reaching the tissues and organs of the body and reduces their capacity to function. Anaemia is associated with impaired motor and cognitive development in children. The main causes of anaemia in children are malaria and inadequate intake of iron, folate, vitamin B12, or other nutrients. Malaria accounts for a significant proportion of anaemia in children under age 5 in Sierra Leone. Other causes of anaemia include intestinal worms and sickle cell disease. In this survey, severe anaemia was defined as a haemoglobin (Hb) level less than 8 grams per decilitre (g/dL).

Table 4.5 shows that 10 percent of children age 6-59 months are severely anaemic; that is, they have a haemoglobin level less than 8 g/dL. Children age 9-11 months (14 percent) are the most likely to be severely anaemic compared with other children, and in general, prevalence of severe anaemia decreases with age. Male children are slightly more likely than female children to be severely anaemic (11 percent and 10 percent, respectively). Rural children are more likely than urban children to have severe anaemia (11 percent and 8 percent, respectively). By region, children who live in the Northern Region (15 percent) are more likely to be severely anaemic than children in other areas. Among the districts, almost a quarter (24 percent) of children in Kambia have severe anaemia compared with only 3 percent of children in Bonthe and Western Area Urban. The proportion of children with severe anaemia decreases with an increase in mother's education and wealth status. For example, 12 percent of children whose mothers have no education are severely anaemic relative to 3 percent of children whose mothers have at least a secondary education. The prevalence of severe anaemia is highest in the middle wealth quintile (13 percent) and lowest in the highest wealth quintile (4 percent).

Table 4.5 Haemoglobin <8.0 g/dl in children

Percentage of children age 6-59 months with haemoglobin lower than 8.0 g/dL, by background characteristics, Sierra Leone 2013

Background characteristic	Haemoglobin <8.0 g/dl	Number of children
Age (in months)		
6-8	6.4	289
9-11	14.4	348
12-17	11.8	571
18-23	10.8	564
24-35	12.0	1,236
36-47	10.6	1,345
48-59	7.5	1,453
Sex		
Male	11.0	2,927
Female	9.6	2,880
Mother's interview status		
Interviewed	10.6	4,435
Not interviewed	9.3	1,372
Residence		
Urban	7.7	1,481
Rural	11.1	4,327
Region		
Eastern	10.4	1,297
Northern	14.9	2,503
Southern	4.7	1,269
Western	4.2	739
District		
Kailahun	7.6	371
Kenema	11.4	593
Kono	11.6	333
Bombali	17.7	593
Kambia	23.7	302
Koinadugu	8.8	210
Port Loko	12.6	657
Tonkolili	12.7	741
Bo	3.5	408
Bonthe	3.2	317
Moyamba	6.8	334
Pujehun	5.4	210
Western Area Rural	8.4	153
Western Area Urban	3.1	586
Mother's education		
No education	11.8	3,401
Primary	7.6	807
Secondary	2.5	188
More than secondary	2.7	39
Not interviewed	9.3	1,372
Wealth quintile		
Lowest	10.8	1,392
Second	10.2	1,249
Middle	13.2	1,269
Fourth	11.3	1,051
Highest	3.8	846
Total	10.3	5,808

Note: Table is based on children who stayed in the household the night before the interview. Prevalence of anaemia is based on haemoglobin levels and is adjusted for altitude using CDC formulas (CDC, 1998). Haemoglobin is measured in grams per deciliter (g/dl).
[1] Includes children whose mothers are deceased

4.3.2 Malaria Prevalence among Children

In the 2013 SLMIS, malaria prevalence among children age 6-59 months was measured using microscopy. Laboratory technicians prepared thick blood smears that were brought back to the SLMIS laboratory at Lakka Hospital for microscopic examination. Blood smears with parasites were classified as malaria positive. In order to be able to treat infected children, it was also necessary to test the children using RDT to have instant results in the field. To do this, one person who was either health personnel or a laboratory technician on each team used the First Response Malaria AG HRP2 RDT kit to diagnose malaria from finger prick blood samples. Children who tested positive for the presence of *P. falciparum* with the RDT were offered treatment with fixed dose combination artesunate + amodiaquine (ASAQ). Table 4.6 presents the results of both tests.

Based on the RDT, 46 percent of children age 6-59 months in Sierra Leone tested positive for malaria. Analysis of blood smears by microscopy revealed a slightly lower prevalence of malaria: 43 percent of children tested positive for malaria according to microscopy. Regardless of which diagnostic test was used, malaria prevalence generally increases with age, does not vary greatly by gender, and decreases with mother's education level and with household wealth.

Malaria prevalence measured by microscopy is almost two times higher in rural areas (48 percent) than in urban areas (28 percent). By region, malaria prevalence according to microscopy is highest in the Northern Region (52 percent) relative to the malaria prevalence in the Eastern Region (44 percent), Southern Region (37 percent), and Western Region (22 percent). Among the districts, the highest malaria prevalence is found in Kambia (61 percent) and the lowest is in Western Area Urban (19 percent).

Table 4.6 Prevalence of malaria in children

Percentage of children age 6-59 months classified in two tests as having malaria, by background characteristics, Sierra Leone 2013

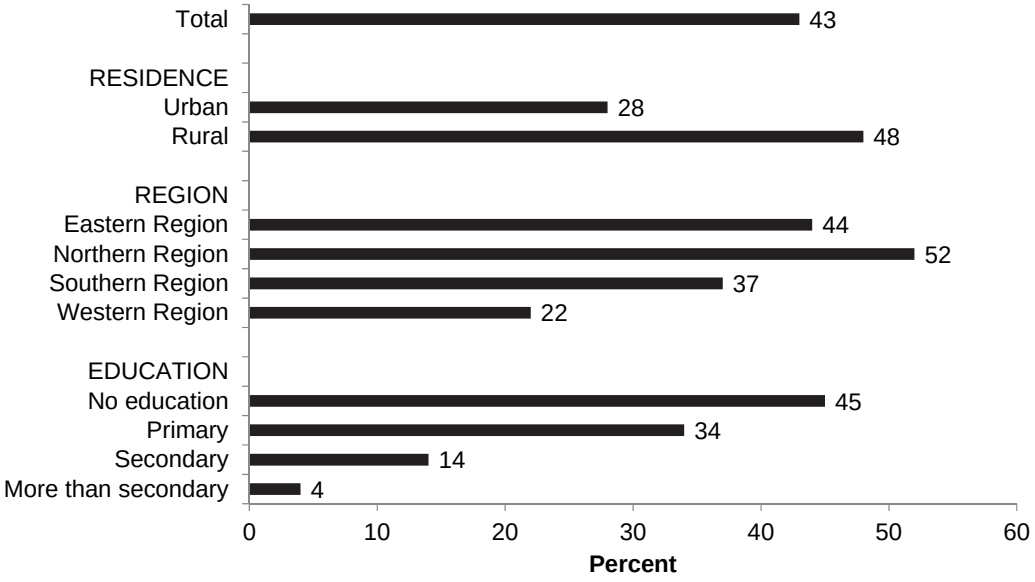
Background characteristic	Malaria prevalence according to RDT		Malaria prevalence according to microscopy	
	RDT positive	Number of children	Microscopy positive	Number of children
Age (in months)				
6-8	18.8	288	26.7	289
9-11	22.8	348	22.0	348
12-17	30.6	571	29.4	570
18-23	37.2	564	32.0	562
24-35	45.4	1,233	39.4	1,231
36-47	55.4	1,332	51.6	1,345
48-59	59.2	1,441	55.6	1,448
Sex				
Male	47.8	2,906	42.3	2,918
Female	44.5	2,870	43.5	2,877
Mother's interview status				
Interviewed	44.8	4,418	41.2	4,424
Not interviewed	50.7	1,358	48.5	1,370
Residence				
Urban	36.7	1,479	28.1	1,482
Rural	49.4	4,297	48.0	4,312
Region				
Eastern	45.7	1,295	43.5	1,297
Northern	53.2	2,476	51.8	2,491
Southern	40.3	1,267	36.9	1,268
Western	33.5	738	22.1	738
District				
Kailahun	41.6	370	40.4	371
Kenema	45.0	594	37.7	595
Kono	51.4	330	57.4	331
Bombali	53.2	580	51.7	591
Kambia	61.3	300	60.7	302
Koinadugu	54.5	209	55.0	210
Port Loko	51.9	653	49.3	649
Tonkolili	50.9	735	49.3	738
Bo	43.5	408	34.4	408
Bonthe	30.4	315	32.9	317
Moyamba	49.1	334	42.5	334
Pujehun	35.1	210	38.9	209
Western Area Rural	47.7	153	35.7	152
Western Area Urban	29.8	586	18.6	586
Mother's education				
No education	47.4	3,384	44.7	3,391
Primary	40.8	807	34.3	806
Secondary	23.2	188	14.4	188
More than secondary	9.9	39	4.4	39
Not interviewed	50.7	1,358	48.5	1,370
Wealth quintile				
Lowest	49.7	1,385	49.6	1,387
Second	50.9	1,233	48.3	1,248
Middle	50.7	1,263	48.0	1,266
Fourth	45.3	1,051	41.5	1,052
Highest	27.8	844	17.8	842
Total	46.2	5,776	42.9	5,794

Note: Figures in parentheses are based on 25-49 unweighted cases.

The differences in malaria prevalence observed between the RDTs and microscopy are expected. Microscopic detection of malaria is dependent on the visualization of stained parasites under a microscope, whereas the diagnosis of malaria by RDT relies on the interaction between a parasite antigen present in the blood and an antibody in the RDT formulation. The microscopic examination of blood smears is the method of choice for the detection of malaria parasites and has long been considered the gold standard for the clinical diagnosis when performed under optimal conditions. However, comparing malaria results from microscopy with those from RDTs should be done with caution. In comparison to microscopy, RDTs have the advantage of being quick and easy to use, but are less sensitive (Wongsrichanalai et. al., 2007). The First Response Malaria AG HRP2, like many other commercially available RDTs, detects the *P. falciparum*-specific, histidine-rich protein-2 (HRP-2) rather than the parasite itself. Because HRP-2 remains in the blood for up to a month following parasite clearance with antimalarials (Moody, 2002), in areas highly endemic for *P. falciparum* malaria, its persistence could account for the observation that a higher malaria prevalence was detected using RDTs than microscopy.

Figure 4.1 shows malaria prevalence based on the microscopy by background characteristics.

Figure 4.1 **Malaria prevalence among children 6-59 months by residence, region, and education according to microscopy**



MALARIA KNOWLEDGE 5

Key Findings

- Knowledge of malaria among women in Sierra Leone is widespread (96 percent).
- Nine in ten women are aware that mosquito bites cause malaria.
- All Sierra Leonean women reported having seen or heard messages about malaria in the last six months.
- The most commonly cited source of information about malaria is a government clinic (75 percent), followed by the radio (70 percent), a source in the home (51 percent), and community health workers (50 percent).

One objective of the 2013 SLMIS was to assess general knowledge about malaria. All women who were interviewed as a part of the survey were asked if they had ever heard of malaria and, if they responded yes, they were asked a series of questions about their knowledge of signs and symptoms, causes, and preventive measures.

5.1 KNOWLEDGE OF MALARIA

5.1.1 General knowledge of malaria

Table 5.1 presents, by background characteristics, the percentages of women who have heard of malaria. Also shown are the percentages of these women with general knowledge of malaria symptoms, causes, and prevention methods. Tables 5.1 through 5.6 present more detailed data for specific responses women mentioned in relation to malaria causes, symptoms, and preventative measures.

Knowledge of malaria among women in Sierra Leone is widespread; 96 percent of women have heard of malaria, with some variation across subgroups of women. Women in both the youngest age cohorts are the least likely to have heard of malaria compared with women in the other age groups. Urban women, women with the highest level of education, and women in the highest wealth quintile are more likely than other women to have heard of malaria. By region, women living in the Southern Region (94 percent) are the least likely to have heard of malaria compared with women living in the other regions. Women in Koinadugu and Bonthe were least likely to have heard of malaria (83 percent for both) compared with women in the other districts. In contrast, almost all the women in Port Loko, Western Area Rural, and Western Area Urban have heard of malaria.

When asked to name the main symptoms of malaria, more than half of Sierra Leonean women (64 percent) mention fever. Women in rural areas are more likely to mention fever as a symptom than women in urban areas (66 and 61 percent, respectively). Among regions, women in the Northern Region are most likely to mention fever as a symptom (66 percent), and women in the Western Region are the least likely (62 percent). By district, almost one-third of women in Koinadugu report that they recognize fever as a symptom of malaria (32 percent). About half of women in Pujehun (48 percent) and Moyamba (50 percent) report recognizing fever as a symptom of malaria. Fifty-nine percent of women in Western Area Urban report fever as a symptom. Kailahun has the highest percentage of women who report recognizing fever as a symptom of malaria (84 percent). Women with more than a secondary education were least likely to mention fever as a

symptom of malaria (76 percent), while women with a primary education were the most likely (65 percent). There is no clear pattern by wealth quintile.

Table 5.1 General knowledge of malaria

Percentage of women aged 15-49 who reported having heard of malaria, percentage who can recognize fever as a sign of malaria, percentage who reported mosquito bites as the cause of malaria, and percentage who reported that sleeping under a mosquito net can protect against malaria, by background characteristics, Sierra Leone 2013

Background characteristic	Percentage who have heard of malaria	Number of women	Percentage who recognize fever as a symptom of malaria	Percentage who reported mosquito bites as a cause of malaria	Percentage who reported treated mosquito nets as a prevention method	Number of women
Age						
15-19	94.9	1,347	61.6	91.6	51.3	1,279
20-24	96.4	1,410	62.3	89.3	49.6	1,360
25-29	96.3	1,551	65.9	91.3	50.4	1,494
30-34	96.3	1,272	62.6	91.5	50.7	1,225
35-39	97.3	1,058	68.1	91.3	48.3	1,029
40-44	98.0	607	64.2	89.6	53.6	595
45-49	97.0	411	64.9	90.9	48.6	399
Residence						
Urban	98.6	2,878	61.2	93.3	53.3	2,837
Rural	95.1	4,780	65.8	89.3	48.4	4,545
Region						
Eastern	95.3	1,473	63.8	87.1	46.8	1,404
Northern	96.5	2,956	65.9	89.6	47.9	2,852
Southern	93.7	1,559	63.6	91.9	53.1	1,461
Western	99.8	1,670	61.5	95.2	55.1	1,666
District						
Kailahun	90.2	449	84.0	96.7	57.1	405
Kenema	98.1	616	57.0	85.5	53.9	604
Kono	96.7	409	53.6	79.8	25.3	395
Bombali	96.8	716	73.3	91.5	48.2	693
Kambia	98.1	353	60.4	91.8	60.7	346
Koinadugu	82.5	294	31.5	74.6	45.9	243
Port Loko	99.8	830	72.7	95.2	51.6	828
Tonkolili	97.2	764	65.2	85.2	38.0	743
Bo	98.8	606	75.6	94.9	51.9	599
Bonthe	82.6	344	67.4	91.8	54.7	284
Moyamba	95.5	407	50.1	87.0	52.7	389
Pujehun	93.8	201	47.6	92.9	55.0	189
Western Area Rural	99.7	266	74.7	97.1	69.7	266
Western Area Urban	99.8	1,403	59.0	94.9	52.3	1,400
Education						
No education	95.4	4,744	63.8	89.0	48.6	4,525
Primary	97.6	758	65.0	89.4	47.2	740
Secondary	97.9	1,839	62.0	94.7	54.8	1,801
More than secondary	99.9	317	75.9	98.9	57.1	316
Wealth quintile						
Lowest	94.0	1,355	63.7	87.0	46.2	1,274
Second	96.8	1,363	63.8	87.9	45.7	1,319
Middle	94.2	1,435	66.4	89.0	52.5	1,352
Fourth	96.8	1,559	64.3	91.9	51.6	1,509
Highest	99.1	1,947	62.6	95.9	53.7	1,929
Total	96.4	7,658	64.0	90.8	50.3	7,382

Awareness that mosquitoes are the vectors for malaria transmission is fundamental to the design of prevention programs, and overall, knowledge that a mosquito bite causes malaria is high in Sierra Leone (91 percent of women). Women in urban areas (93 percent) and those who live in the Western Region (95 percent) are more likely to say that mosquitoes cause malaria than women residing in other areas. Among the districts, the percentage of women who say that mosquitoes cause malaria ranges from a low of 75 percent in Koinadugu to a

high of 97 percent for women living in Kailahun and Western Area Rural. The proportion of knowledge for women knowing that mosquitoes cause malaria increases as education and household wealth increases.

Use of a treated mosquito net is vital to the prevention of malaria. Women in the survey were asked how to protect themselves from getting malaria and at the national level, only half mentioned that sleeping under a treated net protects a person from malaria. However, another 41 percent of women stated that sleeping under a regular mosquito net protects a person from malaria (Data shown in Table 5.5). Variations in knowledge of sleeping under treated mosquito nets to prevent malaria among women differ greatly by background characteristics, especially among the districts.

5.1.2 Knowledge of causes of malaria

Lack of knowledge about how malaria is spread interferes with the ability to take appropriate preventive measures. Women age 15-49 who had heard of malaria were asked their opinions on what they thought were the causes. As show in Table 5.2, , 91 percent of women correctly identified mosquito bites as a cause of malaria. However, women also mentioned several other possibilities. Almost half of women (47 percent) say that dirty surroundings cause malaria, 14 percent say that drinking dirty water causes malaria, and 12 percent say that eating dirty food causes malaria. Other items are mentioned by smaller percentages of women. The causes vary by background characteristics. For all causes mentioned, the proportion of women who believe in a particular cause decreases as education and household wealth increases, with the exception of those who mention mosquito bites and dirty surroundings..

Table 5.2 Knowledge of causes of malaria

Among women aged 15-49, the percentage who cite specific causes of malaria according to background characteristic, Sierra Leone 2013

Background characteristic	Knowledge of what cause malaria														
	Mosquito bites	Eating immature sugar cane	Eating cold food	Eating dirty food	Drinking beer/ palm wine	Drinking dirty water	Getting soaked with rain	Cold or changing weather	Eating oranges or mangos	Eating plenty oil	Bed bugs	Dirty surroun-dings	Other	Don't know	Number of women
Age															
15-19	91.6	1.5	1.9	12.7	0.9	12.6	0.4	2.7	6.8	4.8	3.2	49.0	4.9	2.1	1,279
20-24	89.3	1.7	2.3	11.2	2.8	12.0	1.0	4.0	7.6	4.8	3.9	46.0	5.4	3.5	1,360
25-29	91.3	2.7	3.1	12.5	2.1	14.7	1.3	3.4	8.5	6.8	2.5	47.7	4.2	2.4	1,494
30-34	91.5	1.3	2.8	13.1	2.8	13.5	0.5	4.8	9.3	6.8	2.7	43.4	4.7	2.3	1,225
35-39	91.3	2.9	2.8	10.1	4.2	16.2	1.8	4.1	11.1	8.6	3.6	48.1	5.1	3.2	1,029
40-44	89.6	1.5	2.5	14.8	3.3	17.0	2.6	4.6	6.0	8.0	6.0	44.6	7.5	2.7	595
45-49	90.9	2.2	1.7	12.0	2.3	15.0	3.0	3.7	7.2	4.6	6.3	52.7	5.9	1.6	399
Residence															
Urban	93.3	0.6	1.2	9.4	1.0	10.9	0.6	2.5	7.5	5.3	1.7	55.5	5.1	1.4	2,837
Rural	89.3	2.8	3.3	14.0	3.5	16.0	1.6	4.6	8.7	6.9	4.7	41.7	5.2	3.4	4,545
Region															
Eastern	87.1	2.2	5.4	9.3	2.1	12.7	1.2	9.4	5.1	4.4	3.5	48.1	5.8	2.8	1,404
Northern	89.6	3.6	2.9	15.9	4.4	18.2	2.0	3.1	10.8	8.8	6.7	43.4	4.4	3.3	2,852
Southern	91.9	0.5	1.3	13.3	1.3	14.3	0.3	2.9	4.8	3.3	0.5	36.2	5.5	3.2	1,461
Western	95.2	0.3	0.6	7.4	0.8	7.9	0.7	1.1	9.5	6.2	0.9	61.5	5.3	0.9	1,666
District															
Kailahun	96.7	5.3	8.2	6.8	0.3	11.6	0.8	7.3	2.1	0.3	0.3	69.6	1.8	1.1	405
Kenema	85.5	1.0	5.6	11.1	4.3	10.8	1.6	7.9	8.1	9.7	5.5	46.6	6.3	2.6	604
Kono	79.8	0.8	2.2	9.1	0.4	16.5	0.8	14.0	3.6	0.4	3.8	28.2	9.1	4.6	395
Bombali	91.5	8.6	3.7	20.4	13.4	18.0	5.1	2.2	20.5	20.7	8.9	44.3	7.9	1.5	693
Kambia	91.8	2.4	6.5	24.8	0.8	17.7	1.2	0.7	8.8	6.5	8.6	17.5	0.9	1.6	346
Koinadugu	74.6	0.0	0.5	9.1	1.2	6.2	3.7	6.6	2.2	1.6	0.5	30.9	3.1	14.8	243
Port Loko	95.2	2.9	3.4	10.2	3.1	16.9	0.4	0.5	9.8	6.0	4.7	54.4	2.1	1.4	828
Tonkolili	85.2	1.3	0.8	16.1	0.4	23.8	0.7	6.7	6.8	4.4	7.9	46.5	5.9	4.1	743
Bo	94.9	0.4	1.3	19.9	1.5	21.3	0.4	1.5	4.4	4.9	0.8	37.7	5.4	1.7	599
Bonthe	91.8	0.8	0.9	6.9	0.7	7.1	0.2	1.7	3.5	1.7	0.2	37.4	5.8	2.0	284
Moyamba	87.0	0.5	1.2	9.3	1.1	11.5	0.6	4.1	3.8	2.2	0.3	30.6	5.8	7.0	389
Pujehun	92.9	0.4	1.9	10.5	1.7	8.9	0.0	6.7	10.4	3.0	0.5	41.3	5.1	1.9	189
Western Area Rural	97.1	0.8	1.0	11.8	2.8	4.3	0.5	1.6	19.4	11.0	2.5	43.4	1.6	0.5	266
Western Area Urban	94.9	0.3	0.5	6.5	0.4	8.6	0.8	1.0	7.6	5.3	0.6	65.0	6.0	0.9	1,400
Education															
No education	89.0	2.4	3.0	13.7	3.2	15.9	1.5	4.6	9.4	7.4	4.6	41.7	4.6	3.4	4,525
Primary	89.4	1.7	4.0	14.3	2.3	13.4	2.0	4.2	9.3	7.3	4.2	44.9	7.8	3.3	740
Secondary	94.7	1.2	1.2	8.8	1.0	10.7	0.3	2.3	5.8	3.8	1.2	56.6	5.5	0.9	1,801
More than secondary	98.9	0.6	0.3	5.8	1.8	8.2	0.4	0.1	3.0	2.7	0.3	72.0	3.9	0.0	316
Wealth quintile															
Lowest	87.0	2.5	2.9	13.1	3.1	15.2	1.1	7.4	8.1	7.9	5.7	35.2	6.2	4.9	1,274
Second	87.9	3.2	4.5	15.4	4.4	15.6	1.7	4.5	10.1	8.8	6.5	39.4	5.2	3.0	1,319
Middle	89.0	2.5	3.4	15.3	4.0	17.7	0.8	3.9	8.6	6.9	3.6	46.8	4.7	3.0	1,352
Fourth	91.9	2.0	2.2	12.1	1.4	14.6	2.5	3.8	8.3	4.3	2.4	49.4	3.7	2.3	1,509
Highest	95.9	0.4	0.7	7.4	0.7	9.2	0.3	1.0	6.8	4.7	1.0	58.2	5.7	0.8	1,929
Total	90.8	2.0	2.5	12.2	2.5	14.0	1.2	3.8	8.2	6.3	3.6	47.0	5.1	2.6	7,382

5.1.3 Knowledge of symptoms of malaria and severe malaria

Women were also asked during the survey to name specific symptoms of malaria. Table 5.3 shows responses provided by women age 15 to 49 for the symptoms of malaria. Table 5.4 shows information on severe symptoms of malaria.

According to Table 5.3, 64 percent of women say that fever is a symptom of malaria. Nationally, 44 percent of women say loss of appetite is a symptom, while another 41 percent state that feeling cold also is a malaria symptom. Thirty-nine percent mention body weakness, 37 percent cite body aches or joint pain, and 35 say that a headache is a symptom. Several other symptoms are mentioned.

Table 5.4 presents information on what women consider to be severe malaria symptoms. Overall, 41 percent stated that low blood (anaemia) is a symptom of severe malaria, followed by 38 percent stating jaundice, 37 percent stating vomiting, 27 percent mentioning dizziness, and 23 percent saying shivering, shaking, and convulsions.

Table 5.3 Knowledge of malaria symptoms

Among women who have ever heard of malaria, percentage of women aged 15-49 who know various symptoms of malaria by background characteristics, Sierra Leone 2013

Background characteristic	Knowledge of malaria symptoms																
	Fever	Excessive sweating	Feeling cold	Headache	Nausea and vomiting	Diarrhea	Dizziness	Loss of appetite	Body ache or joint pain	Pale eyes	Body weakness	Refusing to eat or drink	Jaundice	Dark urine	Other	Don't know	Number of women
Age																	
15-19	61.6	17.9	37.4	32.9	23.0	3.1	20.4	42.0	29.4	19.5	38.5	2.7	8.9	17.6	1.3	1.3	1,279
20-24	62.3	23.0	39.1	33.4	22.1	3.6	20.0	40.9	33.3	18.5	37.6	2.8	7.3	15.9	2.6	1.6	1,360
25-29	65.9	24.9	39.6	36.4	20.8	3.6	23.4	43.9	37.2	21.2	39.3	3.5	9.4	15.9	2.2	0.7	1,494
30-34	62.6	23.7	45.8	36.1	17.6	2.2	19.6	42.0	37.0	17.6	36.4	2.9	8.2	13.7	2.3	0.8	1,225
35-39	68.1	27.3	44.4	37.8	20.6	3.0	26.7	46.6	43.4	21.8	43.3	3.4	7.3	14.0	2.7	0.7	1,029
40-44	64.2	24.3	45.8	37.6	22.4	5.2	23.0	50.8	40.0	18.0	39.5	3.6	8.1	13.5	2.8	0.1	595
45-49	64.9	24.1	39.6	33.8	19.8	2.0	28.8	48.5	42.5	22.9	43.7	6.7	11.2	13.9	1.9	0.3	399
Residence																	
Urban	61.2	16.7	30.9	31.9	29.3	1.4	27.9	51.1	39.4	17.2	49.3	3.3	6.5	16.4	3.0	0.6	2,837
Rural	65.8	27.6	47.8	37.5	15.7	4.4	18.9	39.4	34.7	21.3	32.9	3.3	9.7	14.5	1.7	1.1	4,545
Region																	
Eastern	63.8	26.0	48.4	29.7	12.4	2.7	21.4	30.6	40.6	15.7	37.1	4.2	8.0	16.0	2.5	0.9	1,404
Northern	65.9	28.0	47.6	44.7	18.7	5.7	13.8	47.5	37.6	24.1	32.7	3.9	10.5	13.3	1.6	1.2	2,852
Southern	63.6	20.8	34.9	25.5	15.7	1.8	26.3	31.5	23.7	16.7	32.9	1.2	9.6	15.5	2.1	1.2	1,461
Western	61.5	15.4	30.2	32.7	36.4	0.9	34.4	59.6	42.2	18.3	57.6	3.4	4.4	17.9	3.2	0.2	1,666
District																	
Kailahun	84.0	44.3	53.3	42.8	18.8	3.7	34.0	37.7	48.8	24.5	44.5	3.1	8.6	20.9	4.4	1.0	405
Kenema	57.0	18.8	45.1	31.3	10.8	2.2	21.0	30.0	46.9	16.3	36.9	5.5	11.3	15.4	0.6	0.6	604
Kono	53.6	18.3	48.3	14.0	8.4	2.4	9.3	24.4	22.9	5.7	29.8	3.1	2.2	11.9	3.5	1.1	395
Bombali	73.3	27.7	46.0	52.1	20.4	6.7	10.0	48.5	42.7	28.4	37.2	4.5	7.5	17.8	2.1	0.5	693
Kambia	60.4	18.1	50.4	38.5	17.1	3.5	13.7	33.3	21.3	10.0	18.4	1.1	4.3	8.6	0.2	0.7	346
Koinadugu	31.5	4.5	30.3	21.4	6.7	0.5	9.4	32.3	21.8	25.2	25.9	0.3	6.4	4.1	3.1	4.2	243
Port Loko	72.7	31.0	48.4	46.6	24.1	10.1	13.2	60.4	46.6	26.9	33.6	5.9	17.1	12.4	0.8	0.6	828
Tonkolili	65.2	37.4	52.8	46.1	15.9	2.4	19.4	43.9	35.6	23.2	36.2	3.6	10.0	15.1	2.2	1.8	743
Bo	75.6	21.6	35.4	32.8	18.7	1.9	26.8	35.1	23.4	13.3	30.6	2.0	10.7	14.0	1.8	0.8	599
Bonthe	67.4	13.4	28.4	22.4	19.2	1.3	16.5	25.2	21.0	10.7	33.2	0.6	10.4	13.0	2.9	1.4	284
Moyamba	50.1	25.6	35.0	18.5	10.4	1.7	27.7	25.9	19.3	29.5	26.0	0.8	6.6	20.5	1.9	2.0	389
Pujehun	47.6	19.8	43.0	21.7	12.1	2.0	36.3	41.3	37.7	9.8	54.4	0.4	10.8	13.8	2.4	0.3	189
Western Area Rural	74.7	24.1	48.0	37.4	25.7	0.6	22.6	50.4	41.0	16.8	38.6	5.0	12.8	11.6	0.1	0.3	266
Western Area Urban	59.0	13.8	26.8	31.8	38.4	1.0	36.7	61.4	42.5	18.6	61.2	3.1	2.8	19.1	3.8	0.2	1,400
Education																	
No education	63.8	25.3	45.5	37.2	17.9	3.3	19.2	40.5	36.2	19.4	35.6	3.4	9.0	13.7	1.6	1.0	4,525
Primary	65.0	23.1	37.6	29.1	16.2	5.5	26.1	41.2	32.7	18.1	33.4	2.7	5.7	17.0	3.3	1.2	740
Secondary	62.0	19.0	33.2	30.3	26.9	2.4	27.1	49.3	36.1	20.6	46.8	2.9	8.4	18.4	2.4	0.7	1,801
More than secondary	75.9	22.0	36.5	52.7	41.5	1.5	31.5	67.6	51.4	22.4	61.0	5.0	6.7	15.7	7.4	0.0	316
Wealth quintile																	
Lowest	63.7	23.7	44.4	35.9	12.9	3.5	16.1	36.4	35.1	20.9	33.6	3.0	8.4	16.3	2.2	1.1	1,274
Second	63.8	27.7	51.9	39.8	14.7	5.7	18.2	35.1	32.5	20.8	31.3	3.1	9.4	16.2	1.6	1.4	1,319
Middle	66.4	27.4	46.4	35.1	15.7	3.1	21.3	40.2	35.9	21.4	31.8	4.4	10.4	13.9	1.4	1.3	1,352
Fourth	64.3	24.7	39.0	35.0	20.9	4.0	20.7	46.7	36.6	20.0	39.0	3.4	9.9	11.8	2.1	1.0	1,509
Highest	62.6	16.4	30.3	32.4	34.2	1.0	31.4	55.2	40.4	16.8	53.5	2.7	5.3	17.6	3.3	0.1	1,929
Total	64.0	23.4	41.3	35.3	20.9	3.2	22.4	43.9	36.5	19.7	39.2	3.3	8.4	15.3	2.2	0.9	7,382

Table 5.4 Knowledge of symptoms of severe malaria

Among women who have ever heard of malaria, percentage of women aged 15-49 who know various symptoms of severe malaria by background characteristics, Sierra Leone 2013

	Knowledge of malaria symptoms among women who have heard of malaria, percentage who cite specific symptoms of severe malaria									
Background characteristic	Shivering/ shaking/ convulsion	Vomiting everything	Confusion	Low blood (anemia)	Difficulty breathing	Dizziness	Jaundice	Other	Don't know	Number of women
Age										
15-19	20.6	39.2	9.5	37.3	12.0	29.2	33.6	4.6	8.4	1,279
20-24	24.1	35.6	11.9	39.5	12.4	24.9	35.6	7.1	5.6	1,360
25-29	22.6	39.5	11.2	39.3	15.6	26.7	40.8	5.0	4.7	1,494
30-34	20.7	35.4	11.2	42.4	12.5	28.6	39.0	6.6	4.2	1,225
35-39	26.6	34.5	14.9	44.9	15.0	25.9	39.8	8.5	4.1	1,029
40-44	25.5	39.2	14.7	44.7	11.9	25.0	38.8	6.2	2.4	595
45-49	27.6	34.6	12.2	44.8	15.8	29.2	41.9	7.4	3.1	399
Residence										
Urban	26.8	37.9	12.6	34.3	15.2	33.5	31.7	8.7	5.5	2,837
Rural	21.1	36.5	11.4	45.2	12.4	22.9	42.0	4.8	4.8	4,545
Region										
Eastern	17.2	35.4	10.2	44.2	7.7	24.0	51.7	5.6	5.7	1,404
Northern	22.3	38.3	9.3	46.6	13.3	20.2	40.8	4.1	4.6	2,852
Southern	23.1	32.0	13.0	39.8	13.6	27.1	34.9	9.8	4.3	1,461
Western	30.2	40.9	16.7	29.9	18.6	40.8	24.7	7.6	5.9	1,666
District										
Kailahun	20.0	40.3	2.4	57.6	4.8	33.1	71.5	2.4	10.5	405
Kenema	17.3	37.4	18.8	41.8	10.2	20.7	57.6	1.7	3.3	604
Kono	14.4	27.4	5.0	34.2	6.9	19.9	22.4	14.9	4.5	395
Bombali	44.8	47.0	23.1	51.6	13.7	16.9	30.8	3.9	4.7	693
Kambia	9.9	34.4	3.8	71.2	6.3	32.7	32.6	0.6	3.4	346
Koinadugu	21.1	33.2	1.7	20.9	3.6	19.5	15.4	5.9	18.1	243
Port Loko	15.7	44.3	8.2	54.8	15.6	18.7	39.6	1.9	0.7	828
Tonkolili	14.8	26.8	2.8	29.5	16.7	19.5	63.6	7.8	5.0	743
Bo	25.1	39.7	18.1	32.4	21.6	30.6	33.8	9.0	2.1	599
Bonthe	32.0	30.7	9.9	50.7	9.4	21.0	21.8	13.0	4.2	284
Moyamba	17.4	23.6	9.8	45.3	5.8	27.2	30.5	9.0	8.9	389
Pujehun	15.2	26.7	8.2	35.5	10.2	25.4	67.1	9.7	2.3	189
Western Area Rural	39.2	43.9	23.0	51.0	17.1	39.2	19.9	1.6	1.9	266
Western Area Urban	28.5	40.3	15.5	25.8	18.9	41.1	25.6	8.7	6.6	1,400
Education										
No education	21.4	36.6	11.0	43.4	14.0	24.3	39.4	5.3	4.8	4,525
Primary	23.3	35.3	12.5	38.0	8.3	27.2	39.9	8.9	6.1	740
Secondary	24.7	37.3	11.7	37.0	12.6	31.8	34.5	6.8	5.7	1,801
More than secondary	41.9	46.9	23.7	36.1	22.8	37.6	35.4	12.1	2.2	316
Wealth quintile										
Lowest	19.4	33.5	10.4	41.5	14.2	23.4	40.9	5.2	5.8	1,274
Second	22.5	38.4	12.0	44.2	13.7	22.0	40.2	5.9	4.6	1,319
Middle	19.6	34.3	11.5	46.6	12.5	23.1	45.5	4.6	4.4	1,352
Fourth	22.7	37.1	9.7	45.0	10.2	26.0	40.2	5.8	5.0	1,509
Highest	29.3	40.4	14.7	31.4	16.1	36.2	27.9	8.9	5.4	1,929
Total	23.3	37.1	11.9	41.0	13.5	27.0	38.1	6.3	5.1	7,382

5.1.4 Knowledge of ways to avoid malaria

Women were also asked to name specific ways to avoid getting malaria. Table 5.5 shows responses provided by women age 15 to 49. The majority of women (81 percent) respond that sleeping under a treated or untreated (regular) net can help a person avoid getting malaria. Forty-two percent of women mention that one's surroundings should be kept clean, while 35 percent say that one should avoid mosquito bites. Another 23 percent mention taking preventive medication and 19 percent say mosquito coils and store-bought insect killer should be used. Table 5.5 shows that women's knowledge of ways to avoid malaria varies greatly by background characteristics.

Table 5.5 Knowledge of ways to avoid malaria

Among women age 15-49 who have ever heard of malaria, the percentage of women who cite specific ways to avoid getting malaria, according to background characteristics, Sierra Leone 2013

Background characteristic	Sleep under a regular/ treated mosquito net	Use mosquito repellant	Avoid mosquito bites	Take prevent-ive medica-tion	Indoor residual spray (IRS)	Use mosquito coils/ Store bought insect killer	Cut the grass around the house/ Cut the grass	Eliminate stagnant water	Keep surround-ings clean	Burn leaves	Don't drink dirty water	Don't eat bad food (immature sugar cane/ leftover food)	Use mosquito screens on windows	Other	Don't know	Number women
Age																
15-19	79.9	7.0	38.4	18.9	1.9	21.5	8.3	13.3	44.3	1.2	5.3	3.7	1.6	2.4	2.5	1,279
20-24	80.9	5.9	33.2	23.9	1.9	17.2	9.3	15.2	42.2	2.3	5.2	3.6	0.4	4.4	2.8	1,360
25-29	82.1	6.7	35.0	25.5	1.7	17.8	11.2	15.7	41.8	2.7	6.6	3.4	0.9	4.1	2.1	1,494
30-34	80.9	6.1	32.3	23.2	1.0	17.7	9.8	13.3	41.7	1.5	5.9	3.3	0.7	3.3	1.7	1,225
35-39	81.9	7.2	35.8	25.7	2.2	20.0	9.5	12.1	40.5	2.0	6.8	3.1	1.0	4.0	2.4	1,029
40-44	83.3	6.2	33.6	21.6	2.7	19.8	11.1	15.4	44.0	3.1	8.2	4.4	1.0	4.4	2.1	595
45-49	78.3	8.1	35.0	23.5	1.5	16.6	10.0	14.2	43.4	2.4	8.4	4.7	1.9	2.8	4.0	399
Residence																
Urban	85.3	7.3	39.2	22.9	2.1	23.2	5.2	18.2	56.5	0.8	6.1	5.1	2.1	6.0	1.1	2,837
Rural	78.6	6.2	32.1	23.5	1.6	15.9	12.7	11.7	33.6	2.9	6.3	2.6	0.3	2.2	3.1	4,545
Region																
East	82.1	10.4	39.5	16.9	2.3	12.0	12.8	17.3	44.8	3.0	8.1	3.0	0.2	3.1	2.5	1,404
North	78.1	6.7	28.1	26.5	1.6	19.2	13.9	8.2	30.7	3.5	5.4	2.1	0.4	2.1	3.4	2,852
South	77.7	2.0	30.2	18.7	1.2	9.7	8.2	12.5	36.1	0.7	5.4	3.3	0.3	2.8	2.3	1,461
West	88.7	7.2	46.6	27.1	2.2	31.5	1.8	23.3	65.8	0.1	6.9	6.8	3.2	7.7	0.5	1,666
District																
Kailahun	91.9	24.6	64.9	7.3	7.2	21.4	20.8	42.3	61.2	3.7	9.6	1.3	0.3	1.2	1.0	405
Kenema	84.3	7.1	36.7	15.3	0.1	10.3	12.2	5.7	42.2	3.6	3.3	1.6	0.3	4.3	1.9	604
Kono	68.5	0.7	17.7	29.1	0.5	4.9	5.7	9.4	31.8	1.4	13.9	7.0	0.0	3.0	5.0	395
Bombali	83.0	6.3	32.0	31.6	3.6	21.2	16.4	13.3	37.5	8.7	8.7	1.2	0.9	1.7	2.1	693
Kambia	69.5	6.3	39.4	37.2	0.4	17.7	5.3	2.3	25.2	3.2	4.0	4.3	0.0	0.6	3.6	346
Koinadugu	68.7	0.6	20.6	24.5	0.5	3.6	6.1	3.9	29.6	1.3	2.9	2.3	0.0	2.0	13.6	243
Port Loko	82.9	13.4	27.3	16.7	1.7	21.4	15.9	6.7	22.4	2.6	2.6	0.0	0.6	0.4	0.9	828
Tonkolili	75.3	1.7	22.4	28.5	0.6	20.4	15.9	9.2	36.6	0.5	7.1	4.1	0.0	4.9	4.0	743
Bo	80.2	2.2	35.5	15.6	2.2	14.4	8.5	11.9	37.4	0.7	5.4	1.0	0.5	2.2	1.0	599
Bonthe	75.3	1.2	34.2	15.6	0.7	2.3	6.6	17.1	40.1	1.2	3.6	4.0	0.3	1.2	2.4	284
Moyamba	72.7	2.2	17.6	24.9	0.5	6.5	9.8	12.1	28.1	0.6	7.1	6.6	0.0	4.4	4.4	389
Pujehun	83.9	1.9	33.3	20.3	0.4	12.0	6.1	8.2	42.4	0.3	4.5	2.7	0.0	3.9	2.5	189
Western Area Rural	93.9	10.9	41.8	22.7	9.0	18.7	4.2	13.3	52.4	0.1	1.4	0.3	1.8	2.0	0.6	266
Western Area Urban	87.7	6.5	47.5	28.0	1.0	33.9	1.3	25.2	68.3	0.2	7.9	8.0	3.5	8.7	0.4	1,400
Education																
No education	78.7	5.5	32.1	22.6	1.4	17.1	11.1	10.5	34.8	2.6	6.0	3.4	0.3	2.7	3.1	4,525
Primary	82.2	5.4	32.2	23.9	1.3	14.7	9.1	15.3	43.0	1.9	7.0	3.8	0.7	5.5	2.5	740
Secondary	84.7	7.5	41.0	21.8	2.8	23.0	6.8	18.1	54.5	1.0	6.5	3.8	2.1	4.2	1.0	1,801
More than secondary	94.6	20.3	46.0	40.3	3.1	27.0	10.2	42.1	79.6	1.3	6.5	3.2	4.9	9.9	0.0	316
Wealth quintile																
Lowest	73.5	3.4	30.2	27.5	0.6	15.9	11.8	9.2	29.4	3.0	5.2	2.3	0.0	2.5	5.0	1,274
Second	77.2	5.2	31.4	24.8	1.3	14.8	13.1	11.6	34.9	3.7	7.3	2.1	0.2	2.4	2.7	1,319
Middle	80.4	6.3	33.4	20.9	1.7	14.0	12.5	11.0	36.5	2.4	6.7	3.5	0.5	2.3	2.9	1,352
Fourth	83.2	8.3	33.8	18.6	3.3	17.5	11.0	15.1	42.3	1.9	5.0	4.4	0.9	3.3	1.7	1,509
Highest	87.9	8.5	42.1	24.9	1.8	27.4	3.5	20.8	60.2	0.3	6.8	4.8	2.6	6.5	0.5	1,929
Total	81.2	6.6	34.8	23.3	1.8	18.7	9.8	14.2	42.4	2.1	6.3	3.6	1.0	3.7	2.4	7,382

5.1.5 Knowledge of malaria treatment

Women were asked how malaria can be treated and to cite specific drugs that are used to treat malaria. Table 5.6 presents information on their knowledge of malaria treatment.

Overall, 69 percent of women report that an ACT can be used to treat malaria, 31 percent report traditional medicine and herbs can treat malaria, 27 percent say that aspirin, Panadol, or paracetamol can be used to treat malaria, and 26 percent say that chloroquine can treat malaria. Other responses mentioned regarding malaria medicines include SP/Fansidar (21 percent) and quinine (15 percent).

It is interesting to note that 23 percent of women in Koinadugu and 18 percent of women in Tonkolili report that they do not know which medicine is used to treat malaria.

Table 5.6 Knowledge of malaria treatment

Among women aged 15-49 who have heard of malaria, the percentage who cite specific various drugs to treat malaria, according to background characteristics, Sierra Leone 2013

Background characteristic	ACT	Chloroquine	SP/Fansidar	Quinine	Aspirin/ panadol/ paracetamol	Traditional medicine/ herbs	Other	Don't know	Number of women
Age									
15-19	63.2	25.4	17.0	14.0	26.2	29.9	4.6	7.4	1,279
20-24	70.8	23.0	23.3	12.9	26.2	29.0	7.0	4.7	1,360
25-29	73.5	23.8	22.9	16.0	26.8	31.4	3.5	4.0	1,494
30-34	72.4	22.8	22.1	16.9	29.0	31.6	5.3	4.2	1,225
35-39	68.3	32.4	22.2	17.5	25.6	31.4	5.1	4.3	1,029
40-44	65.0	32.1	19.9	18.5	24.5	31.6	5.9	4.7	595
45-49	62.7	28.9	18.4	12.3	24.6	36.9	6.4	5.5	399
Residence									
Urban	73.0	31.4	27.1	19.3	20.3	23.6	10.2	3.4	2,837
Rural	66.6	22.5	17.6	13.0	30.4	35.7	2.1	5.9	4,545
Region									
Eastern	77.6	11.9	15.6	10.6	29.5	22.8	4.0	4.3	1,404
Northern	57.6	34.4	19.3	17.8	38.1	39.7	1.8	7.7	2,852
Southern	74.8	7.3	17.6	3.9	11.1	29.6	4.8	3.9	1,461
Western	76.3	39.5	32.6	25.6	17.4	24.4	12.5	1.5	1,666
District									
Kailahun	90.1	12.1	17.2	17.1	43.3	11.0	3.0	4.5	405
Kenema	79.4	8.5	18.7	12.3	25.9	24.5	3.1	2.3	604
Kono	62.1	16.8	9.4	1.4	20.9	32.3	6.3	6.9	395
Bombali	67.3	43.5	18.5	23.7	37.4	40.6	2.1	2.7	693
Kambia	52.6	18.4	13.6	4.7	42.0	70.6	1.8	3.0	346
Koinadugu	44.2	18.4	12.4	1.8	15.4	15.7	3.4	22.7	243
Port Loko	58.2	56.7	34.3	29.7	43.5	40.0	0.5	0.7	828
Tonkolili	54.5	13.8	8.1	10.4	38.4	31.9	2.6	17.6	743
Bo	85.8	6.6	23.9	5.9	14.1	25.7	7.5	2.2	599
Bonthe	67.7	3.9	17.8	1.3	7.5	21.1	2.1	7.2	284
Moyamba	58.7	11.4	12.2	3.0	6.7	44.1	3.5	5.1	389
Pujehun	84.0	6.7	8.3	3.2	16.2	25.1	2.5	2.0	189
Western Area Rural	79.6	19.8	29.9	46.0	47.1	35.4	3.2	0.8	266
Western Area Urban	75.7	43.2	33.1	21.7	11.8	22.3	14.2	1.6	1,400
Education									
No education	66.4	25.3	19.0	13.3	29.4	35.6	2.3	5.4	4,525
Primary	69.1	19.5	18.0	10.3	22.5	30.1	5.7	6.7	740
Secondary	72.1	28.8	25.4	18.7	22.7	21.8	9.0	3.8	1,801
More than secondary	89.2	33.0	36.9	39.1	16.0	20.4	24.4	0.0	316
Wealth quintile									
Lowest	61.3	18.6	13.8	9.1	26.1	38.7	1.9	7.4	1,274
Second	63.8	23.1	15.0	11.1	30.8	39.4	2.3	5.6	1,319
Middle	68.2	20.8	19.8	14.3	31.2	34.0	2.1	5.9	1,352
Fourth	73.1	27.5	22.6	15.5	30.6	30.2	3.6	4.6	1,509
Highest	75.1	35.0	30.4	23.3	17.2	18.8	12.9	2.2	1,929
Total	69.0	25.9	21.2	15.4	26.5	31.0	5.2	4.9	7,382

5.1.6 Correct knowledge of malaria

Table 5.7 is a summary of the malaria knowledge indicators according to the 2012 Knowledge, Attitudes, and Practices (KAP) Survey in Sierra Leone. Correct knowledge within the table is defined as a women responding by mentioning the correct symptoms of malaria, preventive measures, and treatment, either alone or in combination with another response as defined in the table notes.

Almost all women mention correct symptoms of malaria. Eighty-seven percent of women correctly identify various methods of prevention, and 73 percent correctly state that ACT or quinine are treatments. Overall, two-thirds of women have combined knowledge of malaria symptoms, preventive methods, and treatment.

Table 5.7 Correct knowledge of malaria

Percentage of women age 15-49 who have heard of malaria and know the correct knowledge of malaria indicators by background characteristics, Sierra Leone 2013

Background characteristic	Knowledge of indicators				
	Correct knowledge of symptoms of malaria[1]	Correct knowledge of preventative measures[2]	Correct knowledge of treatments[3]	Correct knowledge in all domains[4]	Number of women
Age					
15-19	98.7	84.6	66.4	59.5	1,279
20-24	98.3	87.6	74.1	68.0	1,360
25-29	99.3	88.4	75.8	69.5	1,494
30-34	99.1	87.2	75.8	68.0	1,225
35-39	99.2	88.8	72.7	66.5	1,029
40-44	99.9	88.9	70.1	66.1	595
45-49	99.7	84.7	64.3	56.8	399
Residence					
Urban	99.4	88.9	75.9	70.7	2,837
Rural	98.8	86.3	70.1	62.8	4,545
Region					
East	99.0	89.0	79.2	73.8	1,404
North	98.7	85.9	62.9	56.8	2,852
South	98.8	85.1	75.7	66.8	1,461
West	99.8	90.2	79.6	74.0	1,666
District					
Kailahun	99.0	93.5	92.1	87.0	405
Kenema	99.4	89.5	81.5	75.4	604
Kono	98.4	83.6	62.6	57.8	395
Bombali	99.3	90.1	77.4	71.8	693
Kambia	99.3	79.5	55.5	50.2	346
Koinadugu	95.7	78.0	44.4	39.0	243
Port Loko	99.4	86.4	65.6	54.8	828
Tonkolili	98.2	87.0	56.0	53.8	743
Bo	99.2	86.3	86.8	76.3	599
Bonthe	98.4	82.0	68.0	59.5	284
Moyamba	98.0	83.7	60.1	53.0	389
Pujehun	99.7	88.5	84.4	75.7	189
Western Area Rural	99.7	96.4	90.6	87.1	266
Western Area Urban	99.8	89.0	77.5	71.5	1,400
Education					
No education	98.9	86.0	70.1	63.1	4,525
Primary	98.8	88.3	71.3	64.8	740
Secondary	99.2	88.6	75.3	69.3	1,801
More than secondary	100.0	96.4	90.0	88.3	316
Wealth quintile					
Lowest	98.6	84.7	64.2	56.7	1,274
Second	98.6	85.4	66.8	59.6	1,319
Middle	98.7	86.3	71.8	65.2	1,352
Fourth	99.0	88.7	76.9	70.6	1,509
Highest	99.9	89.9	78.3	73.0	1,929
Total	99.0	87.3	72.3	65.9	7,382

[1] Includes responses for women who mention the following symptoms of malaria: fever, excessive sweating, feeling cold, headache, nausea/vomiting, diarrhea, dizziness, loss of appetite, body ache/joint pain/body weakness, pale eyes, jaundice, dark urine, or anemia.
[2] Includes responses for women who mention a treated mosquito net/treated net/regular mosquito net, use mosquito repellent, avoid mosquito bites, take preventive medication, indoor residual spray (IRS), use mosquito coils, cut grass around house, eliminate stagnant water, keep surroundings clean, use mosquito screens on windows, use store-bought insect killer. This column excludes responses that mention burn leaves, don't drink dirty water, don't eat bad food (immature sugarcane/leftover food), and don't get soaked in rain.
[3] Includes responses for women who mention ACT or quinine.
[4] Includes responses for women who mention the correct responses for symptoms of malaria, preventative measures, and treatment.

5.1.7 Knowledge of the effectiveness of sleeping under an untreated versus a treated mosquito net to prevent getting malaria

In the 2013 SLMIS, women were asked whether it is better to sleep under an untreated or treated mosquito net to prevent getting malaria. Table 5.8 show that almost all women (97 percent) say it is more effective to sleep under a treated net versus 2 percent who do not know, and 1 percent who state an untreated net was better. There is little variation by background characteristics.

Table 5.8 Knowledge of whether sleeping under an untreated or treated mosquito net is effective to prevent getting malaria

Among women aged 15-49 who have ever heard of malaria, the percentage who cite whether it is more effective to avoid malaria by sleeping under an untreated or treated net, according to background characteristics, Sierra Leone 2013

Background characteristic	Sleep under an untreated mosquito net	Sleep under a treated mosquito net	Don't know	Total	Number
Age					
15-19	0.9	98.1	1.0	100.0	1,279
20-24	1.2	97.0	1.8	100.0	1,360
25-29	1.0	96.9	2.1	100.0	1,494
30-34	0.5	96.9	2.5	100.0	1,225
35-39	1.1	97.6	1.3	100.0	1,029
40-44	1.1	96.9	2.0	100.0	595
45-49	0.5	94.7	4.8	100.0	399
Residence					
Urban	1.2	96.8	2.0	100.0	2,837
Rural	0.8	97.3	1.9	100.0	4,545
Region					
Eastern	0.9	95.7	3.3	100.0	1,404
Northern	1.0	96.4	2.7	100.0	2,852
Southern	0.9	98.0	1.0	100.0	1,461
Western	0.9	98.7	0.4	100.0	1,666
District					
Kailahun	0.5	98.5	1.0	100.0	405
Kenema	1.1	92.5	6.4	100.0	604
Kono	1.1	97.9	1.0	100.0	395
Bombali	1.2	94.6	4.2	100.0	693
Kambia	2.4	94.2	3.4	100.0	346
Koinadugu	0.3	98.3	1.4	100.0	243
Port Loko	0.1	96.8	3.1	100.0	828
Tonkolili	1.2	97.9	0.9	100.0	743
Bo	0.3	99.0	0.7	100.0	599
Bonthe	0.2	99.6	0.2	100.0	284
Moyamba	2.2	96.2	1.7	100.0	389
Pujehun	1.3	96.7	2.0	100.0	189
Western Area Rural	0.8	99.2	0.0	100.0	266
Western Area Urban	0.9	98.6	0.4	100.0	1,400
Education					
No education	1.0	96.3	2.7	100.0	4,525
Primary	1.3	97.4	1.3	100.0	740
Secondary	0.6	98.8	0.6	100.0	1,801
More than secondary	0.6	98.2	1.2	100.0	316
Wealth quintile					
Lowest	0.5	96.6	2.8	100.0	1,274
Second	0.7	97.1	2.2	100.0	1,319
Middle	1.6	95.9	2.5	100.0	1,352
Fourth	0.6	97.6	1.7	100.0	1,509
Highest	1.2	97.8	1.0	100.0	1,929
Total	0.9	97.1	2.0	100.0	7,382

5.1.8 Knowledge of groups most affected by malaria

When asked which groups of people are most likely to be affected by malaria, 78 percent of women report that children are most likely to be affected by malaria, 43 percent of women report that pregnant women are vulnerable, 30 percent say that adults are vulnerable, and 29 percent say that anyone is vulnerable. Fourteen percent of women say that older adults are most likely to be affected. Two percent of women state that they do not know who is most likely to be affected by malaria.

Table 5.9 Knowledge of specific groups most affected by malaria

Among women aged 15-49 who have heard of malaria, the percentage who cite specific groups most likely to be affected by malaria, according to background characteristics, Sierra Leone 2013

Background characteristic	Children	Adults	Pregnant woman	Older adults	Anyone	Other	Don't know	Number of women
Age								
15-19	73.1	30.4	34.7	15.1	29.6	1.4	2.5	1,279
20-24	76.7	27.0	40.8	14.1	30.2	1.5	2.8	1,360
25-29	82.9	29.6	47.4	12.4	26.6	0.7	2.1	1,494
30-34	80.6	30.3	47.5	12.2	28.5	2.1	1.7	1,225
35-39	80.6	33.7	41.2	16.0	26.9	1.9	2.4	1,029
40-44	72.9	28.0	41.5	14.3	33.7	1.0	2.1	595
45-49	75.9	26.5	43.6	10.4	36.1	1.9	4.0	399
Residence								
Urban	74.5	29.5	34.3	14.1	30.0	1.4	1.1	2,837
Rural	80.4	29.7	47.6	13.5	28.8	1.5	3.1	4,545
Region								
Eastern	81.8	36.3	47.5	11.7	28.9	1.4	2.5	1,404
Northern	77.6	25.4	51.5	14.3	31.2	1.6	3.4	2,852
Southern	83.1	29.5	39.6	11.1	20.0	1.6	2.3	1,461
Western	71.8	31.3	25.3	16.7	34.3	1.1	0.5	1,666
District								
Kailahun	86.6	48.6	54.5	12.1	29.3	0.6	1.0	405
Kenema	79.3	37.6	51.3	13.3	37.3	0.5	1.9	604
Kono	80.7	21.8	34.6	8.7	15.6	3.6	5.0	395
Bombali	74.0	30.5	51.2	20.0	33.9	2.7	2.1	693
Kambia	71.3	18.0	43.1	13.8	49.7	0.8	3.6	346
Koinadugu	66.8	12.1	46.7	7.1	23.2	2.3	13.6	243
Port Loko	81.6	32.1	55.8	10.3	20.8	0.8	0.9	828
Tonkolili	82.8	21.1	52.4	15.9	34.1	1.6	4.0	743
Bo	90.1	35.9	51.6	15.1	11.6	2.4	1.0	599
Bonthe	79.4	23.7	32.3	6.2	27.6	0.2	2.4	284
Moyamba	70.4	19.9	23.3	7.4	25.6	0.9	4.4	389
Pujehun	93.0	37.9	46.5	13.4	23.9	2.4	2.5	189
Western Area Rural	80.3	41.0	65.0	35.4	44.2	0.5	0.6	266
Western Area Urban	70.2	29.5	17.7	13.2	32.4	1.2	0.4	1,400
Education								
No education	79.0	29.5	46.3	12.9	29.3	1.3	3.1	4,525
Primary	79.5	28.0	40.0	16.6	24.3	1.9	2.5	740
Secondary	76.3	29.9	35.4	14.4	30.1	1.5	1.0	1,801
More than secondary	74.2	33.0	34.1	14.2	34.4	2.0	0.0	316
Wealth quintile								
Lowest	79.7	27.9	48.0	13.3	28.2	1.4	5.0	1,274
Second	80.9	26.9	45.9	14.8	30.0	1.6	2.7	1,319
Middle	79.4	31.4	48.2	11.6	28.4	1.0	2.9	1,352
Fourth	79.0	30.5	45.8	13.8	28.0	1.7	1.7	1,509
Highest	73.8	30.7	29.8	14.6	31.0	1.5	0.5	1,929
Total	78.2	29.6	42.5	13.7	29.2	1.4	2.4	7,382

5.2 EXPOSURE TO MALARIA MESSAGES

The National Malaria Control Program (NMCP) has developed an information, education, and communication strategy to better communicate malaria messages to vulnerable populations. Key messages include the importance of sleeping under LLINs and seeking prompt treatment for fever.

In the 2013 SLMIS, women were asked if they had seen or heard messages or information about malaria in the six months preceding the survey. If they answered yes, the women were asked the source of message. Table 5.10 shows the percentages, by background characteristics, of women who had seen or heard a malaria message in the last six months; among those women. Three out of four women (75 percent) had seen or heard a message about malaria in the 6 months before the survey from a government clinic, 70 percent had heard a message on the radio, 51 percent heard or saw messages at home, and 49 percent heard or saw malaria messages from a community health worker. Another 40 percent saw or heard messages about malaria from friends and family, while a quarter of women saw messages on posters or billboards. Ten percent heard about malaria in a community meeting, 10 percent from the television, 9 percent from a peer educator, 6 percent from a drama group, and 6 percent from a town crier. Five percent of women heard or saw malaria messages from a faith-based or religious leader and 4 percent from the newspaper. Differentials vary greatly by background characteristics.

Table 5.10 Media exposure to malaria messages

Percentage of women aged 15-49 who have seen or heard a message about malaria in the past 6 months through specific sources of media, by background characteristics, Sierra Leone 2013

Background characteristic	Govern-ment clinic	Com-munity health worker	Friends and family	At home	Drama group	Peer educator	Com-munity meeting	Town crier	Posters/ Bill-boards	TV	Radio	News-paper	Faith/ religious leader	Any source	Number of women
Residence															
Urban	74.7	41.8	58.9	66.7	9.6	13.7	9.9	4.3	41.4	22.5	77.3	7.7	5.7	99.6	2,128
Rural	74.4	53.5	28.9	42.3	3.3	6.4	10.7	7.5	15.8	2.0	65.2	1.3	5.0	99.5	3,579
Region															
Eastern	64.7	41.5	21.0	28.4	0.4	6.9	3.7	3.9	13.2	0.3	59.9	0.6	1.5	99.2	1,049
Northern	75.3	54.1	35.0	54.3	2.9	6.7	10.4	6.1	14.1	3.0	69.3	0.8	6.9	99.7	2,273
Southern	78.9	52.1	24.2	29.0	5.6	7.4	18.2	11.4	25.7	4.7	66.4	3.5	4.8	99.4	1,164
Western	77.4	43.9	81.3	87.1	15.3	17.2	8.6	4.0	56.2	34.6	82.0	11.9	6.2	99.7	1,221
District															
Kailahun	67.9	55.8	16.7	25.5	0.7	6.9	3.0	0.6	34.8	0.1	82.9	0.4	2.6	99.8	355
Kenema	67.0	29.7	25.5	28.4	0.4	9.9	5.4	9.1	2.4	0.8	48.4	0.7	1.7	99.3	391
Kono	58.0	39.9	20.1	31.7	0.1	3.2	2.5	1.1	1.8	0.0	47.8	0.5	0.0	98.3	303
Bombali	79.5	62.1	46.7	60.8	2.8	7.1	19.7	13.0	15.6	6.0	59.8	1.3	15.0	99.4	524
Kambia	49.3	61.9	18.9	30.5	0.7	3.3	8.4	0.8	1.8	2.8	79.0	0.7	1.4	99.4	210
Koinadugu	85.7	25.5	17.8	28.4	1.7	1.5	7.9	5.2	1.5	1.0	31.3	1.1	1.4	100.0	115
Port Loko	84.2	35.5	21.7	64.2	6.3	7.3	9.2	2.9	2.7	3.9	80.8	0.8	1.6	99.6	750
Tonkolili	68.3	70.9	48.6	50.0	0.1	7.7	5.7	6.1	31.6	0.3	67.3	0.3	9.0	100.0	676
Bo	79.5	39.1	20.0	21.9	4.3	7.9	9.1	2.8	15.5	6.9	64.0	5.2	2.9	99.0	532
Bonthe	78.2	66.2	23.2	25.6	1.5	2.9	13.2	5.6	46.6	0.2	75.0	0.4	1.1	99.6	237
Moyamba	74.2	65.2	38.0	46.8	13.0	12.4	41.7	36.2	36.6	6.0	73.4	3.8	13.3	99.7	283
Pujehun	89.7	50.3	11.2	25.0	1.5	1.8	12.7	1.4	2.1	0.8	41.8	0.8	0.0	100.0	112
Western Area Rural	80.8	74.9	85.7	91.0	16.5	27.2	14.4	10.4	41.2	17.6	93.1	15.6	4.6	100.0	260
Western Area Urban	76.6	35.5	80.1	86.1	14.9	14.6	7.1	2.3	60.3	39.2	79.0	10.9	6.6	99.7	961
Education															
No education	76.2	49.8	30.4	44.3	2.1	4.0	10.5	6.5	12.5	2.3	64.0	0.2	4.4	99.6	3,458
Primary	73.5	54.5	45.6	54.3	2.5	8.7	13.4	8.1	25.2	5.2	69.3	0.6	7.4	99.6	576
Secondary	70.2	47.8	55.2	63.0	12.0	18.3	9.4	5.9	48.2	21.8	79.8	8.7	6.0	99.3	1,404
More than secondary	77.8	36.9	74.9	75.3	24.9	28.5	7.5	3.1	70.5	50.1	91.3	28.6	8.2	100.0	269
Wealth quintile															
Lowest	70.0	56.0	28.4	32.7	0.6	3.7	9.7	7.5	13.8	0.2	49.8	0.2	5.8	99.9	949
Second	73.3	54.9	28.2	41.5	1.3	5.1	9.6	7.2	12.0	0.6	62.4	0.2	5.8	99.2	1,031
Middle	74.9	50.0	27.2	41.9	3.8	7.0	10.9	8.4	17.3	1.7	70.6	0.7	3.3	99.8	1,049
Fourth	78.3	48.8	36.4	52.7	6.4	11.2	12.8	5.7	22.8	3.8	74.1	2.8	4.9	99.4	1,225
Highest	74.9	40.3	68.7	76.4	12.8	15.3	9.0	4.0	50.3	32.9	83.5	11.3	6.4	99.5	1,453
Total	74.5	49.2	40.1	51.4	5.6	9.1	10.4	6.3	25.3	9.6	69.7	3.7	5.3	99.6	5,707

5.3 SOURCE OF ADVICE OR TREATMENT AMONG ADULTS IN THE HOUSEHOLDS

The 2013 SLMIS asked respondents where they sought advice or treatment when they suspect they have malaria. Table 5.11.1 presents data by source of advice or treatment.

Table 5.11.1 shows that 68 percent of adult household respondents state that they seek advice or treatment from a government health centre when they think they may have malaria. Nineteen percent go to a government hospital, 13 percent seek advice or treatment from a traditional practitioner, and 11 percent from a drug peddler. Nine percent of adults seek advice or treatment from a pharmacy and only 4 percent consult a private hospital.

Table 5.11.2 presents data according to a public, private, or other source by background characteristics. Overall, 85 percent of the household respondents report that they seek advice and treatment from the public sector, 21 percent from other sources (shops, traditional practitioners, and drug peddlers), and 17 percent from the private sector. The public sector and other sources are relied upon more in rural areas than urban areas. A higher percentage of respondents in the Western Region (47 percent) and the highest wealth quintile (50 percent) seek advice and treatment from the private sector than respondents in other regions and wealth quintiles.

Table 5.11.1 Source of advice or treatment for malaria among adults in households

Percentage of adults in households who cite specific sources of advice or treatment for malaria, Sierra Leone 2013

Source	Percentage for adults who cite source of treatment for malaria
Government hospital	19.1
Government health center	68.4
Mobile clinic	2.2
CBP	1.5
Other public	0.1
Private hospital	3.8
Private clinic	1.9
Mission/ faith based hospital	1.6
Mission/ faith based clinic	0.8
Pharmacy	8.8
Private mobile clinic	0.3
Other private	1.0
Shop	0.5
Traditional practitioner	12.9
Drug peddler	10.5
Other	0.9
Total number of households	6,614

Note: The respondent of the household questionnaire was asked this question

Table 5.11.2 Source of advice or treatment for malaria among adults in households

Percentage of adults in households who cite specific sources of advice or treatment for malaria, by background characteristic, Sierra Leone 2013

Background characteristic	Public sector	Private sector	Other	Number of households
Residence				
Urban	74.6	41.6	11.9	2,046
Rural	89.7	5.6	25.5	4,568
Region				
Eastern	87.7	12.5	21.5	1,455
Northern	87.8	8.7	30.7	2,610
Southern	89.8	11.7	11.7	1,430
Western	68.9	47.2	11.4	1,118
District				
Kailahun	98.0	9.8	33.4	398
Kenema	86.9	13.7	18.8	644
Kono	79.1	13.3	14.3	413
Bombali	92.1	10.3	35.6	612
Kambia	87.2	4.3	48.8	300
Koinadugu	89.0	5.0	14.4	304
Port Loko	84.9	10.2	33.2	703
Tonkolili	86.5	9.5	23.3	691
Bo	90.3	15.9	4.2	587
Bonthe	92.0	7.6	8.2	280
Moyamba	82.7	12.1	32.2	339
Pujehun	96.2	5.3	4.6	225
Western Area Rural	88.3	20.3	8.2	206
Western Area Urban	64.5	53.3	12.1	912
Wealth quintile				
Lowest	87.0	3.5	28.2	1,493
Second	89.0	5.9	26.8	1,342
Middle	90.4	8.0	25.2	1,264
Fourth	87.1	18.3	17.6	1,201
Highest	71.4	49.5	7.6	1,314
Total	85.0	16.7	21.3	6,614

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SAMPLE DESIGN

Appendix A

A.1 INTRODUCTION

The 2013 Sierra Leone Malaria Indicator Survey (SLMIS) called for a nationally representative sample of about 6,700 households. The survey is designed to provide information on key malaria-related indicators including mosquito net ownership and use, coverage of preventive treatment for pregnant women, treatment of childhood fever, and the prevalence of anaemia and malaria among children aged 6-59 months. The sample for the 2013 SLMIS was designed to provide most of these indicators for the country as a whole, for urban and rural areas separately, for each of the four provinces, and for each of the fourteen districts. The provinces and districts are as follows:

1. Eastern Province: Kailahun, Kenema, and Kono

2. Northern Province: Bombali, Kambia, Koinadugu, Port Loko, and Tonkolili

3. Southern Province: Bo, Bonthe, Moyamba, and Pujehun

4. Western Province: Western Area Rural and Western Area Urban

A.2 SAMPLING FRAME

Administratively, Sierra Leone is divided into 4 provinces. Each province is subdivided into districts; each district into chiefdoms, and each chiefdom into sections, with the exception of Western Province which is divided into wards rather than chiefdoms. In total, there are 14 districts, 149 chiefdoms and 1,322 sections. Samples were allocated to each district and by urban-rural distinction within each district.

In addition to these administrative units, during the 2004 Sierra Leone Population and Housing Census (SLPHC 2004), each section was subdivided into convenient area units called Enumeration Areas (EAs). An electronic file of a complete list of all the EAs is available. The list contains census information on household, population, urban-rural specification, and administrative designation for each EA. The census EAs were used as primary sampling units (PSUs), also called clusters, for the 2013 SLMIS. The sample of the 2013 SLMIS was selected from the frame of PSUs available at Statistics Sierra Leone (SSL). The frame excludes the population living in collective housing units, such as hotels, hospitals, work camps, and prisons. Table A.1 below gives the distribution of EAs and their average size by district and by urban-rural specification.

In total, there are 9,671 EAs in Sierra Leone; 2,903 EAs are located in urban areas and 6,768 EAs are located in rural areas. On average, a census EA has 102 households in urban areas and 77 households in rural areas, with an overall average of 85 households per EA. Table A.2 and Table A.3 show the distribution of the household population and the distribution of households by domain and by urban-rural specification. In Sierra Leone, 35.8 percent of the household population lives in urban areas and they occupy 36.3 percent of the households, according to the sampling frame. The statistics from the sampling frame show no differences when compared with the 2004 Population and Housing Census; this indicates that the sampling frame covers the whole country.

Table A.1 Distribution and average size of EAs by domain and by type of residence

Domain	Number of EAs			Average number of households per EA		
	Urban	Rural	Total	Urban	Rural	Total
Eastern Province	507	1,805	2312	388	253	277
Kailahun District	86	618	704	109	90	92
Kenema District	312	691	1003	99	84	88
Kono District	109	496	605	180	79	97
Northern Province	537	3,004	3,541	424	363	373
Bombali District	166	644	810	93	72	76
Kambia District	84	422	506	81	72	73
Koinadugu District	41	468	509	91	85	86
Port Loko District	124	767	891	85	72	74
Tonkolili District	122	703	825	74	62	64
Southern Province	420	1,873	2,293	318	300	309
Bo District	251	586	837	115	80	91
Bonthe District	53	310	363	70	70	70
Moyamba District	67	549	616	57	75	73
Pujehun District	49	428	477	76	75	75
Western Province	1,439	86	1,525	295	145	270
Western Area Urban	1,349		1349	99		99
Western Rural District	90	86	176	196	145	171
Sierra Leone	2,903	6,768	9,671	102	77	85

Source: Sampling frame from the 2004 Population and housing census

Table A.2 Distribution and Proportion of households by domain and by type of residence

Domain	Households			Proportion		
	Urban	Rural	Total	Urban	Rural	Total
Eastern Province	59,778	152,530	212,308	0.28	0.72	0.259
Kailahun District	9,353	55,573	64,926	0.14	0.86	0.079
Kenema District	30,783	57,773	88,556	0.35	0.65	0.108
Kono District	19,642	39,184	58,826	0.33	0.67	0.072
Northern Province	45,620	215,581	261,201	0.17	0.83	0.319
Bombali District	15,503	46,408	61,911	0.25	0.75	0.076
Kambia District	6,793	30,346	37,139	0.18	0.82	0.045
Koinadugu District	3,714	39,986	43,700	0.08	0.92	0.053
Port Loko District	10,552	55,038	65,590	0.16	0.84	0.08
Tonkolili District	9,058	43,803	52,861	0.17	0.83	0.064
Southern Province	40,202	141,945	182,147	0.22	0.78	0.222
Bo District	28,932	46,868	75,800	0.38	0.62	0.092
Bonthe District	3,701	21,784	25,485	0.15	0.85	0.031
Moyamba District	3,857	41,366	45,223	0.09	0.91	0.055
Pujehun District	3,712	31,927	35,639	0.10	0.90	0.043
Western Province	151,755	12,443	164,198	0.92	0.08	0.200
Western Area Urban	134,138		134,138	1.00	0.00	0.164
Western Rural District	17,617	12,443	30,060	0.59	0.41	0.037
Sierra Leone	297,355	522,499	819,854	0.36	0.64	1.000

Source: Sampling frame from the 2004 Population and housing census

A.3 SAMPLE SIZE

The 2013 SLMIS sample was designed to produce most of the key indicators for the country as a whole, for urban and rural areas separately, for each of 4 regions, and for the 14 districts in Sierra Leone. The SLMIS sample size was calculated with the assumption that a future cross-sectional survey will be conducted

to allow result comparison. The target populations are households, household heads, and individuals living in those households at risk of malaria, specifically women of reproductive aged (15-49 years) and all children under 5 years. As multiple indicators were assessed, sample size calculations were done for each indicator of interest. All values for population-level prevalence percentages were taken from reputable national surveys, namely 2008 Sierra Leone DHS, the 2010 Sierra Leone MIS, and the 2010 Sierra Leone MICS. Using these calculations, the appropriate sample size for the household survey was based on the indicator requiring the largest sample size, which was found to *be the percentage of women who received two or more doses of Intermittent preventive treatment (IPT) for malaria during their last pregnancy (in last 2 years).* With a total sample of 6,720 households at national the level, the survey collected data from 336 clusters, with 20 households per selected cluster. The clusters were distributed among the 14 administrative districts. The following parameters were used to make this calculation:

- *The percentage of women who received two or more doses of Intermittent preventive treatment (IPT) for malaria during their last pregnancy (in last 2 years)* was estimated at 10.3 percent using the 2010 MICS for Children 0-59 months who had fever in last two weeks of survey.
- Relative Standard Error (RSE) of 15 percent
- 95 percent confidence level
- A design effect of 1.75
- A factor to adjust for non-response of 1.15
- An average household size of 5.9

A.4 SAMPLE ALLOCATION AND SELECTION

The sample allocation takes the precision consideration at domain level into account. The allocation was done in two steps: firstly, an equal allocation was used to allocate the target number of households to each domain; then the domain sample size was proportionally allocated to each sampling stratum (that is, the urban and rural areas of each district) within the domain.

The 2013 SLMIS sample was designed to produce most of the key indicators for the country as a whole, for urban and rural areas separately, for each of 4 regions, and for the 14 districts in Sierra Leone. The sample design was developed by a CRS Senior Technical Advisor and was reviewed and approved by SSL. The 2013 SLMIS sample was randomly selected using a two-stage cluster sampling methodology; using the census frame for all the districts. Stratification was achieved by separating each district into urban and rural areas. Twenty-four primary sampling units (PSUs) were selected from each of the 14 districts. Samples were selected independently in each stratum, by a two-stage selection. The first stage involved the selection of EAs while the second stage involved the selection of households in the selected EAs. The first stage involved selecting 336 clusters with probability proportional to size from the list of approximately 9,671 EAs covered in the 2004 Sierra Leone Population and Housing Census (SLPHC 2004). This represents 99 EAs in urban areas and 237 EAs in rural areas; 6,720 households were selected with 1,980 households in urban areas and 4,740 households in rural areas. Urban areas were oversampled within regions in order to produce robust estimates for that domain.

Samples were selected independently in every stratum (urban, rural), with a predetermined number of EAs selected within each stratum. By using a probability proportional to size selection at the first stage's

sampling, an implicit stratification and proportional allocation was achieved at each of the lower administrative levels of the districts, by sorting the EAs, within each sampling stratum, according to lower administrative units.

Before the main survey, all households within a selected EA were listed and geo-positioning units were recorded. The resulting lists of households served as sampling frame for the selection of households in the second stage. Household selection in the second stage is an equal probability systematic selection of fixed size: 20 households per cluster. With a fixed second stage sample size, it is easy to allocate the fieldwork load to different interviewers and easy to control the fieldwork quality. Table A.3 show the distribution of sample clusters by urban and rural locations for each district in the Eastern, Northern, Southern, and Western provinces.

Table A.3 Sample allocation of EAs and households by domain and by stratum

Domain	Number of EAs selected			Number of HH allocated		
	Urban	Rural	Total	Urban	Rural	Total
Eastern Province	20	52	72	400	1040	1440
Kailahun District	4	20	24	80	400	480
Kenema District	3	16	19	60	320	380
Kono Town (Kenema) District	5	0	5	100	0	100
Koidu Town (Kono) District	6	0	6	120	0	120
Kono District	2	16	18	40	320	360
Northern Province	20	100	120	400	2000	2400
Bombali District	2	18	20	40	360	400
Kambia District	4	20	24	80	400	480
Koinadugu District	2	22	24	40	440	480
Makeni (Bombali) District	4	0	4	80	0	80
Port Loko District	4	20	24	80	400	480
Tonkolili District	4	20	24	80	400	480
Southern Province	21	75	96	420	1500	1920
Bo District	2	15	17	40	300	340
Bo Town (Bo) District	7	0	7	140	0	140
Bonthe District	3	20	23	60	400	460
Bonthe Town (Bonthe)	1	0	1	20	0	20
Moyamba District	4	20	24	80	400	480
Pujehun District	4	20	24	80	400	480
Western Province	38	10	48	760	200	960
Western Area Urban	14	10	24	280	200	480
Western Rural District	24	0	24	480	0	480
Sierra Leone	99	237	336	1,980	4,740	6,720

Source: Sampling frame from the 2004 Population and housing census

Table A.4 presents response rates for the zones and the urban and rural areas for the household and women's survey.

Table A.4 Sample implementation: Women

Percent distribution of households and eligible women by results of the household and individual interviews, and household, eligible women and overall women response rates, according to urban-rural residence and region (unweighted), Sierra Leone 2013

	Residence		Region				
Result	Urban	Rural	Eastern	Northern	Southern	Western	Total
Selected households							
Completed (C)	98.8	98.3	98.2	98.1	98.6	99.5	98.5
Household present but no competent respondent at home (HP)	0.1	0.1	0.0	0.0	0.1	0.2	0.1
Dwelling not found (DNF)	0.6	0.4	0.0	0.2	1.3	0.3	0.5
Other (O)	0.6	1.2	1.8	1.8	0.0	0.0	1.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of sampled households	1,999	4,718	1,438	2,399	1,920	960	6,717
Household response rate (HRR)[1]	99.3	99.5	100.0	99.8	98.6	99.5	99.5
Eligible women							
Completed (EWC)	97.5	98.2	97.1	98.4	97.4	98.8	97.9
Not at home (EWNH)	0.6	0.6	1.0	0.3	1.2	0.0	0.6
Refused (EWR)	0.0	0.1	0.0	0.0	0.2	0.0	0.1
Partly completed (EWPC)	0.1	0.1	0.1	0.1	0.0	0.1	0.1
Incapacitated (EWI)	0.0	0.1	0.1	0.0	0.1	0.0	0.1
Other (EWO)	1.7	0.9	1.8	1.1	1.1	1.0	1.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of women	2,794	5,025	1,551	2,748	2,155	1,365	7,819
Eligible women response rate (EWRR)[2]	97.5	98.2	97.1	98.4	97.4	98.8	97.9
Overall women response rate (ORR)[3]	96.9	97.7	97.1	98.2	96.1	98.3	97.4

[1] Using the number of households falling into specific response categories, the household response rate (HRR) is calculated as:

$$\frac{100 * C}{C + HP + P + R + DNF}$$

[2] The eligible women response rate (EWRR) is equivalent to the percentage of interviews completed (EWC)
[3] The overall women response rate (OWRR) is calculated as:
OWRR = HRR * EWRR/100

ESTIMATES OF SAMPLING ERRORS *Appendix* B

The estimates from a sample survey are affected by two types of errors: nonsampling errors and sampling errors. Nonsampling errors are the results of mistakes made in implementing data collection and data processing, such as failure to locate and interview the correct household, misunderstanding of the questions on the part of either the interviewer or the respondent, and data entry errors. Although numerous efforts were made during the implementation of the 2013 Sierra Leone Malaria Indicator Survey (2013 SLMIS) to minimize this type of error, nonsampling errors are impossible to avoid and difficult to evaluate statistically.

Sampling errors, on the other hand, can be evaluated statistically. The sample of respondents selected in the 2013 SLMIS is only one of many samples that could have been selected from the same population, using the same design and expected size. Each of these samples would yield results that differ somewhat from the results of the actual sample selected. Sampling errors are a measure of the variability between all possible samples. Although the degree of variability is not known exactly, it can be estimated from the survey results.

A sampling error is usually measured in terms of the *standard error* for a particular statistic (mean, percentage, etc.), which is the square root of the variance. The standard error can be used to calculate confidence intervals within which the true value for the population can reasonably be assumed to fall. For example, for any given statistic calculated from a sample survey, the value of that statistic will fall within a range of plus and minus two times the standard error of that statistic in 95 percent of all possible samples of identical size and design.

If the sample of respondents had been selected as a simple random sample, it would have been possible to use straightforward formulas for calculating sampling errors. However, the 2013 SLMIS sample is the result of a multi-stage stratified design, and, consequently, it was necessary to use more complex formulae. The computer software used to calculate sampling errors for the 2013 SLMIS is a SAS procedure. This procedure used the Taylor linearization method of variance estimation for survey estimates that are means or proportions.

The Taylor linearization method treats any percentage or average as a ratio estimate, $r = y/x$, where y represents the total sample value for variable y, and x represents the total number of cases in the group or subgroup under consideration. The variance of r is computed using the formula given below, with the standard error being the square root of the variance:

$$SE^2(r) = var(r) = \frac{1}{x^2}\sum_{h=1}^{H}\left[\frac{(1-f_h)m_h}{m_h-1}\left(\sum_{i=1}^{m_h} z_{hi}^2 - \frac{z_h^2}{m_h}\right)\right]$$

in which

$$z_{hi} = y_{hi} - rx_{hi}\text{, and } z_h = y_h - rx_h$$

where h represents the stratum which varies from 1 to H,

m_h is the total number of clusters selected in the h^{th} stratum,

y_{hi} is the sum of the weighted values of variable y in the i^{th} cluster in the h^{th} stratum,

x_{hi} is the sum of the weighted number of cases in the i^{th} cluster in the h^{th} stratum, and

f_h is the sampling fraction in stratum h, which is so small that it is ignored.

In addition to the standard error, the design effect (DEFT) for each estimate is calculated, which is defined as the ratio between the standard error using the given sample design and the standard error that would result if a simple random sample had been used. A DEFT value of 1.0 indicates that the sample design is as efficient as a simple random sample, while a value greater than 1.0 indicates the increase in the sampling error due to the use of a more complex and less statistically efficient design. The relative standard error and confidence limits for the estimates are also calculated.

Sampling errors for the 2013 SLMIS are calculated for selected variables considered to be of primary interest. The results are presented in this appendix for the country as a whole, for urban and rural areas separately, and for each of the fourteen districts. For each variable, the type of statistic (mean, proportion, or rate) and the base population are given in Table B.1. Tables B.2 to B.18 present the value of the statistic (R), its standard error (SE), the number of unweighted (N-UNWE) and weighted (N-WEIG) cases, the design effect (DEFT), the relative standard error (SE/R), and the 95 percent confidence limits (R±2SE), for each variable. The DEFT is considered undefined when the standard error considering simple random sample is zero (when the estimate is close to 0 or 1).

The confidence interval, e.g., as calculated for *child slept under an ITN last night* for the national sample, can be interpreted as follows: the proportion from the national sample is 0.450 and its standard error is 0.015. Therefore, to obtain the 95 percent confidence limits, one adds and subtracts twice the standard error to the sample estimate, i.e., $0.450 \pm 2 \times 0.015$. There is a high probability (95 percent) that the *true* proportion of children slept under an ITN last night is between 0.421 and 0.479.

For the total sample, the value of the DEFT, averaged over all variables for women, is 1.786. This means that, due to multi-stage clustering of the sample, the average standard error for all the indicators is increased by a factor of 1.786 over that in an equivalent simple random sample.

Table B.1 List of selected variables for sampling errors, Sierra Leone MIS 2013

Variable	Type of estimate	Base population
No education	Proportion	All women 15-49 years
At least some secondary education	Proportion	All women 15-49 years
Prenatal care from skilled professional	Proportion	All births of women age 15-49 in the last five years
Owns at least 1 insecticide-treated net (ITN)	Proportion	Households
Child slept under an ITN last night	Proportion	Children under five in households
Pregnant woman slept under an ITN last night	Proportion	All pregnant women age 15-49 in households
Received 2+ doses of SP/Fansidar and at least one was received during an antenatal visit	Proportion	Last birth of women age 15-49 with at leat a live birth in the last two years
Child had fever in last 2 weeks	Proportion	Children under 5
Child sought care/treatment from a health facility, provider, or pharmacy	Proportion	Children under 5 with fever in last 2 weeks
Child took ACT	Proportion	Children under 5 with fever in last 2 weeks
Child has anaemia (Haemoglobin < 8.0 g/dl)	Proportion	Children 6-59 months tested for anaemia
Child has malaria (on rapid test)	Proportion	Children 6-59 months tested (rapid test) for malaria
Child has malaria (on microscopy)	Proportion	Children 6-59 months tested (on microscopy) for malaria

Table B.2 Sampling errors: Total sample, Sierra Leone MIS 2013

VARIABLE	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.619	0.014	7658	7658	2.499	0.022	0.592	0.647
At least some secondary education	0.282	0.014	7658	7658	2.670	0.049	0.254	0.309
Prenatal care from skilled professional	0.938	0.006	4142	4083	1.697	0.007	0.925	0.951
Ownership of at least one ITN	0.616	0.013	6614	6614	2.185	0.021	0.590	0.642
Child slept under an ITN last night	0.450	0.015	6569	6536	1.868	0.032	0.421	0.479
Pregnant women slept under an ITN last night	0.471	0.027	650	622	1.309	0.057	0.418	0.525
Received 2+ doses of SP/Fansidar during antenatal visit	0.617	0.017	2222	2184	1.634	0.028	0.583	0.651
Child has fever in last 2 weeks	0.334	0.011	5350	5211	1.572	0.032	0.312	0.355
Child sought care/treatment from a health facility	0.617	0.019	1785	1739	1.588	0.032	0.578	0.656
Child took ACT	0.013	0.004	1785	1739	1.654	0.346	0.004	0.022
Child has anaemia (Haemoglobin < 8.0 g/dl)	0.103	0.006	5820	5808	1.350	0.055	0.091	0.114
Child has malaria (based on rapid test)	0.462	0.011	5790	5776	1.591	0.024	0.439	0.484
Child has malaria (based on microscopy test)	0.429	0.011	5808	5794	1.607	0.027	0.406	0.452

Table B.3 Sampling errors: Urban sample, Sierra Leone MIS 2013

VARIABLE	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.375	0.028	2725	2878	3.053	0.076	0.319	0.432
At least some secondary education	0.528	0.030	2725	2878	3.081	0.056	0.469	0.587
Prenatal care from skilled professional	0.942	0.010	1164	1202	1.474	0.011	0.922	0.963
Ownership of at least one ITN	0.537	0.022	1975	2046	1.952	0.041	0.493	0.581
Child slept under an ITN last night	0.374	0.030	1628	1684	2.047	0.079	0.315	0.433
Pregnant women slept under an ITN last night	0.299	0.052	156	161	1.396	0.173	0.195	0.402
Received 2+ doses of SP/Fansidar during antenatal visit	0.569	0.032	579	597	1.521	0.056	0.505	0.632
Child has fever in last 2 weeks	0.365	0.021	1339	1359	1.551	0.059	0.323	0.408
Child sought care/treatment from a health facility	0.682	0.036	500	496	1.554	0.052	0.610	0.753
Child took ACT	0.013	0.007	500	496	1.268	0.508	0.000	0.026
Child has anaemia (Haemoglobin < 8.0 g/dl)	0.077	0.014	1434	1481	1.828	0.177	0.050	0.105
Child has malaria (based on rapid test)	0.367	0.026	1431	1479	1.889	0.071	0.315	0.420
Child has malaria (based on microscopy test)	0.281	0.021	1435	1482	1.612	0.075	0.238	0.323

Table B.4 Sampling errors: Rural sample, Sierra Leone MIS 2013

VARIABLE	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.766	0.013	4933	4780	2.106	0.017	0.741	0.792
At least some secondary education	0.133	0.011	4933	4780	2.319	0.084	0.111	0.155
Prenatal care from skilled professional	0.936	0.008	2978	2882	1.774	0.009	0.920	0.952
Ownership of at least one ITN	0.651	0.015	4639	4568	2.190	0.024	0.620	0.682
Child slept under an ITN last night	0.477	0.016	4941	4852	1.721	0.033	0.445	0.508
Pregnant women slept under an ITN last night	0.531	0.028	494	461	1.203	0.053	0.475	0.588
Received 2+ doses of SP/Fansidar during antenatal visit	0.635	0.020	1643	1588	1.672	0.031	0.595	0.675
Child has fever in last 2 weeks	0.323	0.012	4011	3852	1.590	0.038	0.298	0.347
Child sought care/treatment from a health facility	0.592	0.023	1285	1242	1.593	0.039	0.546	0.638
Child took ACT	0.013	0.006	1285	1242	1.803	0.440	0.002	0.024
Child has anaemia (Haemoglobin < 8.0 g/dl)	0.111	0.006	4386	4327	1.224	0.054	0.099	0.123
Child has malaria (based on rapid test)	0.494	0.012	4359	4297	1.521	0.025	0.470	0.519
Child has malaria (based on microscopy test)	0.480	0.014	4373	4312	1.668	0.029	0.452	0.507

Table B.5 Sampling errors: Eastern sample, Sierra Leone MIS 2013

VARIABLE	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.721	0.028	1506	1473	2.443	0.039	0.665	0.778
At least some secondary education	0.163	0.019	1506	1473	2.048	0.120	0.124	0.202
Prenatal care from skilled professional	0.956	0.014	875	911	2.049	0.014	0.928	0.983
Ownership of at least one ITN	0.696	0.021	1412	1455	1.697	0.030	0.655	0.738
Child slept under an ITN last night	0.522	0.035	1346	1436	2.124	0.067	0.452	0.593
Pregnant women slept under an ITN last night	0.457	0.040	140	150	0.943	0.089	0.376	0.538
Received 2+ doses of SP/Fansidar during antenatal visit	0.641	0.036	443	455	1.599	0.056	0.570	0.712
Child has fever in last 2 weeks	0.397	0.023	1121	1195	1.589	0.059	0.351	0.444
Child sought care/treatment from a health facility	0.584	0.043	493	475	1.792	0.074	0.498	0.670
Child took ACT	0.011	0.006	493	475	1.239	0.531	0.000	0.023
Child has anaemia (Haemoglobin < 8.0 g/dl)	0.104	0.013	1212	1297	1.404	0.125	0.078	0.130
Child has malaria (based on rapid test)	0.457	0.026	1208	1295	1.660	0.056	0.406	0.508
Child has malaria (based on microscopy test)	0.435	0.025	1212	1297	1.665	0.058	0.385	0.485

Table B.6 Sampling errors: Northern sample, Sierra Leone MIS 2013

VARIABLE	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.767	0.015	2704	2956	1.824	0.019	0.738	0.797
At least some secondary education	0.157	0.012	2704	2956	1.777	0.079	0.132	0.182
Prenatal care from skilled professional	0.924	0.011	1551	1692	1.654	0.012	0.902	0.946
Ownership of at least one ITN	0.596	0.025	2353	2610	2.466	0.042	0.546	0.646
Child slept under an ITN last night	0.405	0.024	2487	2791	1.859	0.058	0.358	0.452
Pregnant women slept under an ITN last night	0.507	0.044	229	237	1.279	0.087	0.419	0.596
Received 2+ doses of SP/Fansidar during antenatal visit	0.663	0.027	825	921	1.672	0.041	0.609	0.718
Child has fever in last 2 weeks	0.275	0.016	2008	2184	1.497	0.057	0.244	0.307
Child sought care/treatment from a health facility	0.600	0.031	556	601	1.434	0.052	0.537	0.663
Child took ACT	0.025	0.012	556	601	1.780	0.475	0.001	0.049
Child has anaemia (Haemoglobin < 8.0 g/dl)	0.149	0.009	2226	2503	1.203	0.063	0.130	0.167
Child has malaria (based on rapid test)	0.532	0.016	2205	2476	1.403	0.029	0.501	0.564
Child has malaria (based on microscopy test)	0.518	0.019	2216	2491	1.693	0.038	0.479	0.556

Table B.7 Sampling errors: Southern sample, Sierra Leone MIS 2013

VARIABLE	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.622	0.021	2099	1559	2.026	0.034	0.579	0.665
At least some secondary education	0.245	0.020	2099	1559	2.115	0.081	0.205	0.284
Prenatal care from skilled professional	0.936	0.011	1184	861	1.528	0.012	0.914	0.958
Ownership of at least one ITN	0.707	0.014	1894	1430	1.378	0.020	0.678	0.736
Child slept under an ITN last night	0.553	0.018	2002	1462	1.237	0.032	0.518	0.588
Pregnant women slept under an ITN last night	0.585	0.039	208	151	1.084	0.067	0.507	0.663
Received 2+ doses of SP/Fansidar during antenatal visit	0.495	0.029	693	495	1.492	0.058	0.437	0.553
Child has fever in last 2 weeks	0.335	0.023	1614	1162	1.842	0.068	0.289	0.381
Child sought care/treatment from a health facility	0.683	0.031	518	389	1.497	0.045	0.622	0.744
Child took ACT	0.003	0.002	518	389	0.933	0.734	0.000	0.008
Child has anaemia (Haemoglobin < 8.0 g/dl)	0.047	0.005	1737	1269	0.962	0.108	0.036	0.057
Child has malaria (based on rapid test)	0.403	0.020	1734	1267	1.526	0.050	0.363	0.443
Child has malaria (based on microscopy test)	0.369	0.017	1736	1268	1.298	0.045	0.336	0.402

Table B.8 Sampling errors: Western sample, Sierra Leone MIS 2013

VARIABLE	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.265	0.031	1349	1670	2.544	0.116	0.204	0.326
At least some secondary education	0.641	0.041	1349	1670	3.140	0.064	0.559	0.723
Prenatal care from skilled professional	0.952	0.013	532	620	1.406	0.014	0.925	0.979
Ownership of at least one ITN	0.442	0.028	955	1118	1.770	0.064	0.385	0.499
Child slept under an ITN last night	0.300	0.038	734	847	1.891	0.127	0.224	0.376
Pregnant women slept under an ITN last night	0.192	0.075	73	85	1.608	0.389	0.043	0.342
Received 2+ doses of SP/Fansidar during antenatal visit	0.637	0.052	261	313	1.724	0.082	0.533	0.742
Child has fever in last 2 weeks	0.409	0.030	607	669	1.428	0.074	0.348	0.470
Child sought care/treatment from a health facility	0.621	0.054	218	274	1.544	0.087	0.513	0.729
Child took ACT	0.004	0.004	218	274	0.966	1.032	0.000	0.012
Child has anaemia (Haemoglobin < 8.0 g/dl)	0.042	0.014	645	739	1.817	0.330	0.014	0.070
Child has malaria (based on rapid test)	0.335	0.044	643	738	2.147	0.130	0.248	0.422
Child has malaria (based on microscopy test)	0.221	0.032	644	738	1.621	0.143	0.158	0.285

Table B.9 Sampling errors: Kailahun sample, Sierra Leone MIS 2013

VARIABLE	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.646	0.031	559	449	1.522	0.048	0.584	0.707
At least some secondary education	0.183	0.024	559	449	1.464	0.131	0.135	0.231
Prenatal care from skilled professional	0.992	0.005	323	261	0.948	0.005	0.983	1.001
Ownership of at least one ITN	0.740	0.033	469	398	1.605	0.044	0.674	0.805
Child slept under an ITN last night	0.593	0.044	479	409	1.539	0.074	0.506	0.681
Pregnant women slept under an ITN last night	0.413	0.098	49	39	1.230	0.237	0.217	0.609
Received 2+ doses of SP/Fansidar during antenatal visit	0.811	0.054	163	133	1.779	0.067	0.702	0.920
Child has fever in last 2 weeks	0.455	0.040	403	335	1.523	0.088	0.375	0.536
Child sought care/treatment from a health facility	0.649	0.071	186	153	1.845	0.110	0.506	0.791
Child took ACT	0.000	0.000	186	153	na	na	0.000	0.000
Child has anaemia (Haemoglobin < 8.0 g/dl)	0.076	0.016	433	371	1.150	0.210	0.044	0.107
Child has malaria (based on rapid test)	0.416	0.050	432	370	1.891	0.119	0.317	0.515
Child has malaria (based on microscopy test)	0.404	0.056	433	371	2.209	0.139	0.291	0.516

Table B.10 Sampling errors: Kenema sample, Sierra Leone MIS 2013

VARIABLE	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.770	0.054	496	616	2.813	0.070	0.663	0.877
At least some secondary education	0.159	0.039	496	616	2.372	0.246	0.081	0.237
Prenatal care from skilled professional	0.965	0.016	296	410	1.551	0.016	0.933	0.996
Ownership of at least one ITN	0.754	0.035	473	644	1.771	0.047	0.683	0.824
Child slept under an ITN last night	0.554	0.072	453	647	2.601	0.130	0.410	0.698
Pregnant women slept under an ITN last night	0.542	0.079	39	61	1.057	0.146	0.384	0.700
Received 2+ doses of SP/Fansidar during antenatal visit	0.603	0.055	144	190	1.386	0.091	0.493	0.713
Child has fever in last 2 weeks	0.354	0.034	388	544	1.422	0.095	0.287	0.421
Child sought care/treatment from a health facility	0.577	0.070	154	192	1.655	0.121	0.438	0.717
Child took ACT	0.016	0.009	154	192	0.947	0.597	0.000	0.035
Child has anaemia (Haemoglobin < 8.0 g/dl)	0.114	0.023	415	593	1.389	0.202	0.068	0.161
Child has malaria (based on rapid test)	0.450	0.038	415	594	1.517	0.085	0.373	0.526
Child has malaria (based on microscopy test)	0.377	0.035	416	595	1.410	0.093	0.306	0.447

Table B.11 Sampling errors: Kono sample, Sierra Leone MIS 2013

VARIABLE	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.732	0.031	451	409	1.491	0.043	0.669	0.794
At least some secondary education	0.146	0.026	451	409	1.554	0.178	0.094	0.197
Prenatal care from skilled professional	0.901	0.043	256	239	2.315	0.048	0.815	0.987
Ownership of at least one ITN	0.566	0.036	470	413	1.554	0.063	0.495	0.637
Child slept under an ITN last night	0.391	0.038	414	379	1.289	0.098	0.315	0.468
Pregnant women slept under an ITN last night	0.389	0.047	52	50	0.687	0.120	0.296	0.482
Received 2+ doses of SP/Fansidar during antenatal visit	0.524	0.061	136	132	1.465	0.116	0.403	0.646
Child has fever in last 2 weeks	0.412	0.039	330	315	1.442	0.094	0.335	0.489
Child sought care/treatment from a health facility	0.517	0.084	153	130	1.938	0.162	0.350	0.684
Child took ACT	0.017	0.017	153	130	1.524	0.972	0.000	0.050
Child has anaemia (Haemoglobin < 8.0 g/dl)	0.116	0.018	364	333	1.064	0.153	0.081	0.152
Child has malaria (based on rapid test)	0.514	0.045	361	330	1.520	0.087	0.425	0.603
Child has malaria (based on microscopy test)	0.574	0.041	363	331	1.508	0.072	0.492	0.657

Table B.12 Sampling errors: Bombali sample, Sierra Leone MIS 2013

VARIABLE	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.726	0.036	580	716	1.914	0.049	0.654	0.797
At least some secondary education	0.198	0.037	580	716	2.198	0.184	0.125	0.271
Prenatal care from skilled professional	0.931	0.017	336	395	1.230	0.019	0.897	0.966
Ownership of at least one ITN	0.710	0.038	478	612	1.839	0.054	0.634	0.787
Child slept under an ITN last night	0.476	0.046	540	654	1.563	0.096	0.385	0.567
Pregnant women slept under an ITN last night	0.650	0.107	36	45	1.358	0.164	0.437	0.864
Received 2+ doses of SP/Fansidar during antenatal visit	0.792	0.056	158	197	1.726	0.070	0.681	0.903
Child has fever in last 2 weeks	0.336	0.028	434	501	1.156	0.083	0.281	0.392
Child sought care/treatment from a health facility	0.751	0.064	144	168	1.677	0.085	0.624	0.878
Child took ACT	0.000	0.000	144	168	na	na	0.000	0.000
Child has anaemia (Haemoglobin < 8.0 g/dl)	0.177	0.017	489	593	0.962	0.094	0.144	0.210
Child has malaria (based on rapid test)	0.532	0.029	482	580	1.161	0.055	0.473	0.590
Child has malaria (based on microscopy test)	0.517	0.025	488	591	0.984	0.048	0.468	0.567

Table B.13 Sampling errors: Kambia sample, Sierra Leone MIS 2013

VARIABLE	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.786	0.033	566	353	1.888	0.042	0.721	0.851
At least some secondary education	0.115	0.022	566	353	1.649	0.192	0.071	0.160
Prenatal care from skilled professional	0.867	0.029	317	196	1.524	0.034	0.809	0.926
Ownership of at least one ITN	0.569	0.048	478	300	2.123	0.085	0.472	0.665
Child slept under an ITN last night	0.402	0.044	537	341	1.657	0.108	0.315	0.489
Pregnant women slept under an ITN last night	0.324	0.064	55	34	0.987	0.196	0.197	0.452
Received 2+ doses of SP/Fansidar during antenatal visit	0.460	0.053	168	107	1.383	0.115	0.355	0.566
Child has fever in last 2 weeks	0.289	0.036	427	264	1.634	0.126	0.216	0.362
Child sought care/treatment from a health facility	0.539	0.052	114	76	1.114	0.096	0.435	0.643
Child took ACT	0.010	0.010	114	76	1.080	0.967	0.000	0.030
Child has anaemia (Haemoglobin < 8.0 g/dl)	0.237	0.034	476	302	1.625	0.145	0.168	0.305
Child has malaria (based on rapid test)	0.613	0.034	472	300	1.475	0.055	0.545	0.680
Child has malaria (based on microscopy test)	0.607	0.049	476	302	1.936	0.081	0.509	0.706

Table B.14 Sampling errors: Koinadugu sample, Sierra Leone MIS 2013

VARIABLE	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.839	0.016	456	294	0.928	0.019	0.807	0.871
At least some secondary education	0.118	0.012	456	294	0.788	0.101	0.094	0.142
Prenatal care from skilled professional	0.833	0.058	268	168	2.485	0.070	0.717	0.948
Ownership of at least one ITN	0.521	0.051	471	304	2.196	0.098	0.419	0.622
Child slept under an ITN last night	0.375	0.058	388	249	1.900	0.154	0.260	0.490
Pregnant women slept under an ITN last night	0.276	0.096	40	24	1.299	0.348	0.084	0.469
Received 2+ doses of SP/Fansidar during antenatal visit	0.416	0.048	144	90	1.148	0.116	0.320	0.512
Child has fever in last 2 weeks	0.323	0.024	327	204	0.858	0.073	0.276	0.370
Child sought care/treatment from a health facility	0.415	0.068	102	66	1.325	0.164	0.279	0.552
Child took ACT	0.032	0.026	102	66	1.514	0.831	0.000	0.085
Child has anaemia (Haemoglobin < 8.0 g/dl)	0.088	0.023	335	210	1.374	0.261	0.042	0.133
Child has malaria (based on rapid test)	0.545	0.040	333	209	1.295	0.074	0.465	0.625
Child has malaria (based on microscopy test)	0.550	0.055	335	210	1.803	0.099	0.441	0.660

Table B.15 Sampling errors: Port Loko sample, Sierra Leone MIS 2013

VARIABLE	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.753	0.033	543	830	1.802	0.044	0.686	0.820
At least some secondary education	0.172	0.021	543	830	1.265	0.119	0.131	0.213
Prenatal care from skilled professional	0.946	0.019	299	465	1.463	0.020	0.908	0.984
Ownership of at least one ITN	0.517	0.047	450	703	1.998	0.091	0.422	0.611
Child slept under an ITN last night	0.310	0.033	479	753	1.280	0.106	0.244	0.376
Pregnant women slept under an ITN last night	0.462	0.088	49	69	1.170	0.190	0.287	0.638
Received 2+ doses of SP/Fansidar during antenatal visit	0.741	0.055	176	277	1.679	0.074	0.632	0.851
Child has fever in last 2 weeks	0.201	0.033	383	593	1.531	0.161	0.136	0.266
Child sought care/treatment from a health facility	0.615	0.061	77	119	1.021	0.100	0.492	0.737
Child took ACT	0.096	0.058	77	119	1.720	0.605	0.000	0.213
Child has anaemia (Haemoglobin < 8.0 g/dl)	0.126	0.020	422	657	1.199	0.163	0.085	0.167
Child has malaria (based on rapid test)	0.519	0.033	420	653	1.310	0.064	0.453	0.585
Child has malaria (based on microscopy test)	0.493	0.037	415	649	1.475	0.076	0.419	0.568

Table B.16 Sampling errors: Tonkolili sample, Sierra Leone MIS 2013

VARIABLE	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.785	0.024	559	764	1.401	0.031	0.737	0.834
At least some secondary education	0.138	0.024	559	764	1.652	0.175	0.090	0.186
Prenatal care from skilled professional	0.953	0.019	331	468	1.642	0.020	0.916	0.991
Ownership of at least one ITN	0.619	0.057	476	691	2.557	0.092	0.505	0.734
Child slept under an ITN last night	0.447	0.057	543	795	1.996	0.129	0.332	0.562
Pregnant women slept under an ITN last night	0.635	0.084	49	65	1.133	0.132	0.467	0.803
Received 2+ doses of SP/Fansidar during antenatal visit	0.651	0.047	179	251	1.331	0.072	0.557	0.745
Child has fever in last 2 weeks	0.275	0.033	437	623	1.470	0.121	0.209	0.342
Child sought care/treatment from a health facility	0.539	0.063	119	171	1.341	0.117	0.414	0.665
Child took ACT	0.004	0.004	119	171	0.721	1.010	0.000	0.012
Child has anaemia (Haemoglobin < 8.0 g/dl)	0.127	0.012	504	741	0.785	0.094	0.103	0.151
Child has malaria (based on rapid test)	0.509	0.031	498	735	1.335	0.060	0.448	0.570
Child has malaria (based on microscopy test)	0.493	0.046	502	738	1.841	0.093	0.402	0.585

Table B.17 Sampling errors: Bo sample, Sierra Leone MIS 2013

VARIABLE	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.580	0.041	516	606	1.859	0.070	0.499	0.661
At least some secondary education	0.295	0.039	516	606	1.933	0.132	0.217	0.373
Prenatal care from skilled professional	0.937	0.021	246	289	1.373	0.023	0.894	0.980
Ownership of at least one ITN	0.684	0.019	473	587	0.900	0.028	0.645	0.722
Child slept under an ITN last night	0.563	0.026	381	469	0.867	0.047	0.510	0.615
Pregnant women slept under an ITN last night	0.558	0.083	34	42	0.949	0.148	0.393	0.724
Received 2+ doses of SP/Fansidar during antenatal visit	0.548	0.060	128	155	1.387	0.110	0.428	0.669
Child has fever in last 2 weeks	0.366	0.062	302	358	2.084	0.170	0.242	0.490
Child sought care/treatment from a health facility	0.708	0.067	105	131	1.561	0.094	0.575	0.842
Child took ACT	0.003	0.003	105	131	0.626	1.037	0.000	0.010
Child has anaemia (Haemoglobin < 8.0 g/dl)	0.035	0.008	328	408	0.803	0.227	0.019	0.051
Child has malaria (based on rapid test)	0.435	0.046	328	408	1.512	0.105	0.343	0.526
Child has malaria (based on microscopy test)	0.344	0.024	328	408	0.824	0.069	0.297	0.392

Table B.18 Sampling errors: Bonthe sample, Sierra Leone MIS 2013

VARIABLE	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.665	0.032	578	344	1.641	0.049	0.601	0.730
At least some secondary education	0.237	0.029	578	344	1.631	0.122	0.180	0.295
Prenatal care from skilled professional	0.905	0.023	322	192	1.399	0.025	0.859	0.950
Ownership of at least one ITN	0.723	0.042	476	280	2.061	0.059	0.638	0.808
Child slept under an ITN last night	0.577	0.044	608	368	1.675	0.076	0.489	0.664
Pregnant women slept under an ITN last night	0.592	0.082	53	31	1.141	0.139	0.428	0.756
Received 2+ doses of SP/Fansidar during antenatal visit	0.585	0.038	207	121	1.101	0.065	0.509	0.661
Child has fever in last 2 weeks	0.270	0.030	485	289	1.467	0.110	0.211	0.330
Child sought care/treatment from a health facility	0.627	0.059	126	78	1.369	0.093	0.510	0.744
Child took ACT	0.000	0.000	126	78	na	na	0.000	0.000
Child has anaemia (Haemoglobin < 8.0 g/dl)	0.032	0.007	527	317	0.872	0.218	0.018	0.047
Child has malaria (based on rapid test)	0.304	0.034	524	315	1.449	0.111	0.237	0.371
Child has malaria (based on microscopy test)	0.329	0.037	527	317	1.665	0.114	0.254	0.404

Table B.19 Sampling errors: Moyamba sample, Sierra Leone MIS 2013

VARIABLE	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.596	0.044	572	407	2.139	0.074	0.508	0.685
At least some secondary education	0.236	0.039	572	407	2.180	0.165	0.158	0.313
Prenatal care from skilled professional	0.975	0.012	352	251	1.399	0.012	0.952	0.998
Ownership of at least one ITN	0.760	0.032	476	339	1.609	0.042	0.697	0.823
Child slept under an ITN last night	0.541	0.036	539	387	1.354	0.067	0.468	0.613
Pregnant women slept under an ITN last night	0.661	0.062	67	51	1.080	0.094	0.536	0.785
Received 2+ doses of SP/Fansidar during antenatal visit	0.404	0.060	211	147	1.760	0.149	0.283	0.524
Child has fever in last 2 weeks	0.392	0.026	465	335	1.095	0.066	0.341	0.444
Child sought care/treatment from a health facility	0.678	0.046	193	131	1.285	0.067	0.587	0.769
Child took ACT	0.006	0.006	193	131	1.012	0.972	0.000	0.017
Child has anaemia (Haemoglobin < 8.0 g/dl)	0.068	0.011	464	334	0.933	0.159	0.047	0.090
Child has malaria (based on rapid test)	0.491	0.029	464	334	1.235	0.060	0.432	0.550
Child has malaria (based on microscopy test)	0.425	0.035	464	334	1.460	0.082	0.356	0.495

Table B.20 Sampling errors: Pujehun sample, Sierra Leone MIS 2013

VARIABLE	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.731	0.037	433	201	1.736	0.051	0.656	0.805
At least some secondary education	0.123	0.022	433	201	1.419	0.182	0.078	0.168
Prenatal care from skilled professional	0.902	0.039	264	128	2.151	0.043	0.825	0.979
Ownership of at least one ITN	0.666	0.026	469	225	1.184	0.039	0.614	0.718
Child slept under an ITN last night	0.517	0.026	474	239	0.914	0.050	0.466	0.569
Pregnant women slept under an ITN last night	0.472	0.080	54	26	1.176	0.169	0.313	0.632
Received 2+ doses of SP/Fansidar during antenatal visit	0.418	0.048	147	72	1.222	0.116	0.321	0.515
Child has fever in last 2 weeks	0.269	0.044	362	180	1.954	0.163	0.181	0.356
Child sought care/treatment from a health facility	0.718	0.074	94	48	1.736	0.103	0.571	0.866
Child took ACT	0.000	0.000	94	48	na	na	0.000	0.000
Child has anaemia (Haemoglobin < 8.0 g/dl)	0.054	0.015	418	210	1.344	0.275	0.024	0.084
Child has malaria (based on rapid test)	0.351	0.036	418	210	1.497	0.104	0.278	0.423
Child has malaria (based on microscopy test)	0.389	0.037	417	209	1.472	0.096	0.314	0.463

Table B.21 Sampling errors: Western Area Rural sample, Sierra Leone MIS 2013

VARIABLE	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.383	0.070	612	266	3.513	0.182	0.243	0.522
At least some secondary education	0.538	0.080	612	266	3.924	0.149	0.378	0.698
Prenatal care from skilled professional	0.903	0.026	276	122	1.499	0.029	0.850	0.956
Ownership of at least one ITN	0.480	0.060	476	206	2.617	0.126	0.360	0.601
Child slept under an ITN last night	0.342	0.060	390	171	2.086	0.176	0.222	0.462
Pregnant women slept under an ITN last night	0.197	0.074	42	21	1.300	0.377	0.048	0.345
Received 2+ doses of SP/Fansidar during antenatal visit	0.748	0.053	130	53	1.354	0.071	0.641	0.854
Child has fever in last 2 weeks	0.351	0.067	330	145	2.454	0.192	0.216	0.485
Child sought care/treatment from a health facility	0.564	0.066	98	51	1.335	0.118	0.431	0.697
Child took ACT	0.000	0.000	98	51	na	na	0.000	0.000
Child has anaemia (Haemoglobin < 8.0 g/dl)	0.084	0.033	342	153	2.316	0.395	0.018	0.151
Child has malaria (based on rapid test)	0.477	0.050	340	153	1.763	0.105	0.377	0.578
Child has malaria (based on microscopy test)	0.357	0.044	341	152	1.568	0.123	0.269	0.445

Table B.22 Sampling errors: Western Area Urban sample, Sierra Leone MIS 2013

VARIABLE	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.243	0.036	737	1403	2.254	0.147	0.171	0.314
At least some secondary education	0.660	0.048	737	1403	2.742	0.073	0.564	0.757
Prenatal care from skilled professional	0.964	0.014	256	497	1.255	0.015	0.935	0.993
Ownership of at least one ITN	0.433	0.031	479	912	1.382	0.072	0.371	0.496
Child slept under an ITN last night	0.289	0.044	344	676	1.569	0.154	0.200	0.378
Pregnant women slept under an ITN last night	0.191	0.096	31	64	1.410	0.505	0.000	0.383
Received 2+ doses of SP/Fansidar during antenatal visit	0.615	0.061	131	260	1.453	0.099	0.494	0.736
Child has fever in last 2 weeks	0.425	0.034	277	524	1.144	0.080	0.357	0.493
Child sought care/treatment from a health facility	0.634	0.065	120	223	1.357	0.102	0.505	0.763
Child took ACT	0.005	0.005	120	223	0.785	1.040	0.000	0.015
Child has anaemia (Haemoglobin < 8.0 g/dl)	0.031	0.016	303	586	1.665	0.504	0.000	0.063
Child has malaria (based on rapid test)	0.298	0.055	303	586	1.917	0.184	0.189	0.408
Child has malaria (based on microscopy test)	0.186	0.040	303	586	1.474	0.217	0.105	0.267

SAMPLE IMPLEMENTATION

Appendix C

Table C.1 Household age distribution

Single-year age distribution of the de facto household population by sex (weighted), Sierra Leone 2013

	Women		Men			Women		Men	
Age	Number	Percent	Number	Percent	Age	Number	Percent	Number	Percent
0	560	2.9	689	4.0	40	349	1.8	425	2.5
1	557	2.9	596	3.4	41	55	0.3	63	0.4
2	667	3.5	597	3.4	42	106	0.6	146	0.8
3	679	3.6	690	4.0	43	86	0.4	71	0.4
4	754	4.0	762	4.4	44	43	0.2	49	0.3
5	313	1.6	337	1.9	45	223	1.2	452	2.6
6	799	4.2	823	4.7	46	47	0.2	60	0.3
7	680	3.6	717	4.1	47	38	0.2	66	0.4
8	667	3.5	641	3.7	48	85	0.4	114	0.7
9	442	2.3	457	2.6	49	47	0.2	69	0.4
10	563	3.0	614	3.5	50	519	2.7	277	1.6
11	245	1.3	310	1.8	51	119	0.6	39	0.2
12	496	2.6	487	2.8	52	200	1.1	93	0.5
13	448	2.4	338	2.0	53	84	0.4	34	0.2
14	596	3.1	300	1.7	54	76	0.4	50	0.3
15	275	1.4	425	2.4	55	230	1.2	176	1.0
16	212	1.1	260	1.5	56	83	0.4	59	0.3
17	232	1.2	254	1.5	57	44	0.2	34	0.2
18	412	2.2	355	2.0	58	67	0.4	57	0.3
19	290	1.5	256	1.5	59	46	0.2	33	0.2
20	464	2.4	337	1.9	60	298	1.6	204	1.2
21	187	1.0	148	0.9	61	18	0.1	25	0.1
22	342	1.8	183	1.1	62	57	0.3	64	0.4
23	206	1.1	150	0.9	63	36	0.2	13	0.1
24	211	1.1	115	0.7	64	28	0.1	21	0.1
25	605	3.2	440	2.5	65	161	0.8	164	0.9
26	264	1.4	127	0.7	66	12	0.1	16	0.1
27	254	1.3	168	1.0	67	18	0.1	31	0.2
28	332	1.7	198	1.1	68	60	0.3	39	0.2
29	159	0.8	146	0.8	69	16	0.1	20	0.1
30	681	3.6	475	2.7	70+	520	2.7	480	2.8
31	113	0.6	78	0.4					
32	242	1.3	201	1.2	Total	19,052	100.0	17,342	100.0
33	141	0.7	107	0.6					
34	106	0.6	97	0.6					
35	569	3.0	515	3.0					
36	125	0.7	101	0.6					
37	139	0.7	152	0.9					
38	176	0.9	145	0.8					
39	80	0.4	105	0.6					

Note: The de facto population includes all residents and nonresidents who stayed in the household the night before the interview.

Table C.2 Age distribution of eligible and interviewed women

De facto household population of women age 10-54, interviewed women age 15-49; and percent distribution and percentage of eligible women who were interviewed (weighted), by five-year age groups, Sierra Leone 2013

Age group	Household population of women age 10-54	Interviewed women age 15-49		Percentage of eligible women interviewed
		Number	Percentage	
10-14	2,348	na	na	na
15-19	1,421	1,378	17.8	97.0
20-24	1,410	1,392	18.0	98.7
25-29	1,613	1,577	20.4	97.8
30-34	1,283	1,266	16.4	98.7
35-39	1,089	1,076	13.9	98.7
40-44	638	622	8.0	97.5
45-49	440	428	5.5	97.3
50-54	998	na	na	na
15-49	7,894	7,739	100.0	98.0

Note: The de facto population includes all residents and nonresidents who stayed in the household the night before the interview. Weights for both household population of women and interviewed women are household weights. Age is based on the household questionnaire.
na = Not applicable

Table C.3 Completeness of reporting

Percentage of observations missing information for selected demographic and health questions (weighted), Sierra Leone 2013

Subject	Percentage with information missing	Number of cases
Month Only (Births in the 15 years preceding the survey)	0.07	5,432
Month and Year[1] (Births in the 15 years preceding the survey)	0.00	5,432
Respondent's education (All women age 15-49)	0.00	7,658
Rapid Diagnostic Test (Living children age 6-59 months from the Household Questionnaire)	3.97	6,015
Microscopy (Living children age 6-59 months from the Household Questionnaire)	3.69	6,015

[1] Both year and age missing

SURVEY PERSONNEL

Appendix D

2013 SIERRA LEONE MIS TECHNICAL WORKING GROUP

Dr. Foday Sahr, Acting Provost, University of Sierra Leone
Role in SLMIS: Principal Investigator

Dr. Mohamed Samai, Dean, Faculty of Basic Medical Sciences, University of Sierra Leone
Role in SLMIS: Co-Principal Investigator

Dr. Samuel J. Smith, Program Manager, National Malaria Control Program
Role in SLMIS: Project Manager

Dr. Amara Jambai, Director, Directorate for Disease Prevention and Control in MOHS
Role in SLMIS: TWG Member

Mr. Francis Tommy, Senior Statistician, Statistics Sierra Leone
Role in SLMIS: National Coordinator

Mr. Sahr Yambasu, Census Manager, Statistics Sierra Leone
Role in SLMIS: Co-National Coordinator

Ms. Emily Bostick, GF R10 Project Director, Catholic Relief Services
Role in SLMIS: Project Manager

Ms. Adrienne Cox, Survey Manager, ICF International
Role in SLMIS: Survey Technical Consultant

Dr. Mercy Guech-Ongey, Biomarker Specialist, ICF International
Role in SLMIS: Survey Biomarker Specialist

Mr. Bockarie Sesay, M&E Officer, Catholic Relief Services
Role in SLMIS: Monitoring & Evaluation Officer

Dr. Jackson Sillah, Medical Officer, Malaria, World Health Organization
Role in SLMIS: Technical Assistant to NMCP

Mr. Alpha S. Swaray, Medical Microbiologist, Ministry of Health and Sanitation
Role in SLMIS: Laboratory Manager

2013 SIERRA LEONE MIS LABORATORY STAFF

Alpha S. Swaray	Laboratory Director
Anthony D. Swarray	Microscopist
Idrissa Labor Kamara	Microscopist
Philip G. Pessima	Microscopist
Zaac Bah *(deceased)*	Microscopist
Augustine Genda	Microscopist

District Coordinators

Sr. Beatrice Tommy	Bo
Emmanuel G. Bernard	Bombali
Bawie A. Sandy	Bonthe
Steven J. Amara	Kailahun
Sam Samba	Kambia
Sylvia Kpaka	Kenema
Prince Koh	Koinadugu
E.M. Kabba-Kamara	Kono
Sr. Aminata Nunie	Moyamba
Roselyn F. Kamara	Port Loko
Mimkailu Massaquoi	Pujehun
James Junisa	Tonkolili
Sr. Wani K Lahai	Western Area Rural
Sr. Anitta Kamara	Western Area Urban

District Runners

Hassanatu Rogers	Bo
Victor Tommy	Bombali
Mohamed K. Bangura	Bonthe
Lawrence Musa	Kailahun
FatmataTuray	Kambia
Samuel Toto	Kenema
Septimus Moiwo	Koinadugu
Moses Yongai	Kono
Mohamed Kallay	Moyamba
Osman Kamara	Port Loko
Salamatu Musa	Pujehun
Abdul Rahman Bangura	Tonkolili
Mohamed Sankoh	Western Area Rural
Aminata Turay	Western Area Urban

Slide Managers

Marian Mayers
Fatama Binta Mansaray
Francess Nasu Jimmy

Bo Field Staff

Ismeal Bash-Karama	Supervisor
Peter Jusu Kabu	Supervisor
Augusta Kondorvoh	Biomarker
Gloria Kpaka	Biomarker
Sarah Gulama	Interviewer
Nylaima Mustapha	Interviewer
Timothy Jusu	Interviewer
Erica King	Interviewer

Bombali Field Staff

Albert Vandi	Supervisor
Victoria Koroma	Supervisor
Rachael Sesay	Biomarker
Daphine Conteh	Biomarker
Idriss E. Koroma	Interviewer
Hassanata Koroma	Interviewer
Mary Conteh	Interviewer
Nanah Dumbuya	Interviewer

Bonthe Field Staff

Nelson S. Fofana	Supervisor
Roberta Macauley	Supervisor
Dantes Musa	Biomarker
David Mattia	Biomarker
Albert Ansumana	Interviewer
Franklyn Foday Maiah	Interviewer
Osman Conteh	Interviewer
Leelei Taluva	Interviewer

Kailahun Field Staff

Memuna Bome	Supervisor
Patrick George-Vandi	Supervisor
Julliet Sevallie	Biomarker
Velma Kamara-Macauley	Biomarker
Francess Kemokai	Interviewer
Joseph Charles	Interviewer
Francis Kamara	Interviewer
Ibrahim Tarawallie	Interviewer

Kambia Field Staff

Osman Barrie	Supervisor
Solomon T.K. Johnson	Supervisor
Mohamed L. Sesay	Biomarker
Susanette B. Koroma	Biomarker
Alhaji Kamara	Interviewer
Fatama Kargbo	Interviewer
Priscilla Ganner	Interviewer
Rugiatu Bangura	Interviewer

Kenema Field Staff

Regina Johnson	Supervisor
Milton H. Gogra	Supervisor
Samuel K. Lavalley	Biomarker
Jenneh Abu	Biomarker
Mawonde Marrah	Interviewer
Simeon B. Mansaray	Interviewer
Sukai Tunis	Interviewer
Auguster Macauley	Interviewer

Koinadugu Field Staff

Ismael Hassan	Supervisor
Paul Lahai	Supervisor
Issa Jabie	Biomarker
Mohamed Kallon-Massaray	Biomarker
Abdulai M. Mansaray	Interviewer
Ivan Kamara	Interviewer
Lovetta Hawa Jawara	Interviewer
Rugiatu Bangura	Interviewer

Kono Field Staff

Sahr Gbandel	Supervisor
Solomon Bomeh	Supervisor
Aisha Musa	Biomarker
Mohamed Samai	Biomarker
Ann Marie Hafner	Interviewer
Jokogeh Decker	Interviewer
Marion F.R. Sesay	Interviewer
Sia Tina James	Interviewer

Moyamba Field Staff

Emmanuel T. Jusu	Supervisor
Prince A. Fangawo	Supervisor
Victor Caulker	Biomarker
Patrick Moiwo-Anssumana	Biomarker
Assiatu Sarah Kabba	Interviewer
Fatmata Rogers	Interviewer
Gabriel Mossima	Interviewer
Mangu Juana	Interviewer

Port Loko Field Staff

Laurel Kargbo	Supervisor
Mabinty Fofanah	Supervisor
Fatmata Bayor	Biomarker
Jerikatu Bangura	Biomarker
Dauda Sesay	Interviewer
Ibrahim Kargbo	Interviewer
Ramatu Kamara	Interviewer
Victoria OShoba-Williams	Interviewer

Pujehun Field Staff

Mariatu Kamara	Supervisor
Edwin B. Jusu	Supervisor
Sahr Boyah	Biomarker
Johannes Lebby	Biomarker
Khadijatu Vandy	Interviewer
Salamatu Sesay	Interviewer
Bintu Kallon	Interviewer
Willhemina Sesay	Interviewer

Tonkolili Field Staff

Sr. Sama Sesay	Supervisor
Fatmata H. Bangura	Supervisor
Adama Gandi	Biomarker
Theodora Bome	Biomarker
Henrietta Kargbo	Interviewer
Alimamy Bangura	Interviewer
Mary Madina James	Interviewer
Mary D. Yamba	Interviewer

Western Area Rural Field Staff

Ramatu Kanneh	Supervisor
Ngadi Lombi	Supervisor
Adama Gondor	Biomarker
Edwina Conteh	Biomarker
Margaret N. Jalloh	Interviewer
KabbaSesay	Interviewer
Mohamed Y. Koroma	Interviewer
Umu Hawa Jalloh	Interviewer

Western Area Urban Field Staff

John Seppeh	Supervisor
Betty Musa	Supervisor
Fatmata Koroma	Biomarker
Zainab Juleh Bah	Biomarker
Patricia Mokuwa	Interviewer
Philip Roberts	Interviewer
Rosaline Ngeneh	Interviewer
Salamatu Koroma	Interviewer

CATHOLIC RELIEF SERVICES (CRS) PROGRAMMING STAFF

Emily Bostick	Project Director
Or Dashevsky	Solution Architect
Jose Gutierrez	Intern
TD Jose	Senior Technical Advisor M&E
Yayah Kamara	Logistics and Supplies
Apoorv Pal	Solution Architect
Paul Perrin	Senior Technical Advisor Health
Victoria Pratt	Finance Officer
Bockarie Sesay	M&E Officer
Augustine Smart	IT
Simiyu Tete	Solution Architect
Arsène Tianhoun	Solution Architect
Suzanne Van Hulle	Regional Technical Advisor

ICF INTERNATIONAL STAFF

Adrienne Cox	Survey Manager
Mercy Guech-Ongey	Biomarker Specialist
Ladys Ortiz	Data Processing Specialist
Ruilin Ren	Senior Sampling Statistician
Sam Nsobya Lubwama	Laboratory Expert
Nancy Johnson	Senior Editor
Chris Gramer	Report Production Specialist
Katherine Gray	Report Production Consultant
Barbara Yang	Biomarker Supplies Procurement Coordinator

QUESTIONNAIRES

Appendix **E**

2013 SIERRA LEONE MALARIA INDICATOR SURVEY

HOUSEHOLD QUESTIONNAIRE

SIERRA LEONE
MINISTRY OF HEALTH AND SANITATION, NATIONAL MALARIA CONTROL PROGRAMME
STATISTICS SIERRA LEONE
CATHOLIC RELIEF SERVICES

IDENTIFICATION

LOCALITY NAME _____

NAME OF HOUSEHOLD HEAD _____

CLUSTER NUMBER . . . . . .

HOUSEHOLD NUMBER . . . . . .

DISTRICT . . . . . .

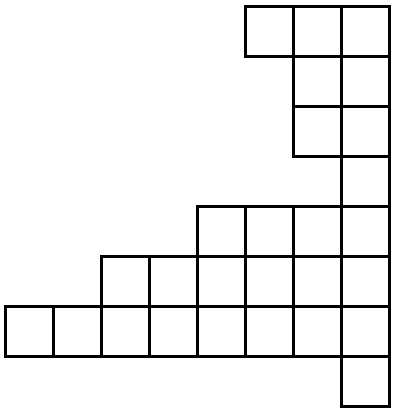
PROVINCE . . . . . .

CHIEFDOM . . . . . .

SECTION . . . . . .

ENUMERATION AREA . . . . . .

URBAN-RURAL (RURAL=1 , URBAN=2) . . . . . .



INTERVIEWER VISITS

	1	2	3	FINAL VISIT
DATE				DAY
				MONTH
				YEAR 2013
INTERVIEWER'S NAME				INT. NUMBER
RESULT*				RESULT
NEXT VISIT: DATE				TOTAL NUMBER OF VISITS
TIME				

*RESULT CODES:

1 COMPLETED
2 NO HOUSEHOLD MEMBER AT HOME OR NO COMPETENT RESPONDENT AT HOME AT TIME OF VISIT
3 ENTIRE HOUSEHOLD ABSENT FOR EXTENDED PERIOD OF TIME
4 POSTPONED
5 REFUSED
6 DWELLING VACANT OR ADDRESS NOT A DWELLING
7 DWELLING DESTROYED
8 DWELLING NOT FOUND
9 OTHER _____ (SPECIFY)

TOTAL PERSONS IN HOUSEHOLD

TOTAL ELIGIBLE WOMEN

LINE NO. OF RESPONDENT TO HOUSEHOLD QUESTIONNAIRE

SUPERVISOR	OFFICE EDITOR	KEYED BY
NAME _____		

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INTRODUCTION AND CONSENT

Hello. My name is _____. I am working with the Ministry of Health and Sanitation (MoHS). We are conducting a survey about malaria all over Sierra Leone. The information we collect will help the government to plan health services. Your household was selected for the survey. I would like to ask you some questions about your household. The questions usually take about 15 to 20 minutes. All of the answers you give will be confidential and will not be shared with anyone other than members of our survey team. You don't have to be in the survey, but we hope you will agree to answer the questions since your views are important. Should you have any questions, feel free to call any of the following contact person(s):

In case you need more information about the survey, you may contact the person listed on this card.

GIVE CARD WITH CONTACT INFORMATION

2013 SLMIS Principle Investigator, Dr. Foday Sahr; 076480288; fsahr@yahoo.com
Chairman of Ethics Committee, Professor Hector G. Morgan; 076629251; hmorg2007@yahoo.com
Director of Research-MoHS, Dr. Donald Bash-Taqi; 076603256; dabashtaqi@gmail.com
National Malaria Control Programme (NMCP), Dr. Samuel Smith; 076611042; samueljuana@yahoo.com
Catholic Relief Services, Emily Bostick; 078611399; emily.bostick@crs.org

As part of the survey we would first like to ask some questions about your household. All of the answers you give will be confidential. As part of this survey, we are asking that children all over the country take an anemia test. Anemia is a serious health problem that usually results from poor nutrition, infection, or disease. This survey will help the government to develop programs to prevent and treat anemia. As part of this survey, we are asking that children all over the country take a test to see if they have malaria. Malaria is a serious illness caused by a parasite transmitted by a mosquito bite. If the malaria test is positive, treatment will be offered. This survey will help the government to develop programs to prevent malaria. Participation in the survey is completely voluntary. If we should come to any question you don't want to answer, just let me know and I will go on to the next question; or you can stop the interview at any time. However, we hope you will participate in the survey because your views are important.

At this time, do you want to ask me anything about the survey?
May I begin the interview now?

Signature of interviewer: _____ Date: _____

Signature/thumb print of respondent: _____ Date: _____

Signature/thumb print of witness: _____ Date: _____

RESPONDENT AGREES TO BE INTERVIEWED . . . 1 ↓ RESPONDENT DOES NOT AGREE TO BE INTERVIEWED 2 → END

HOUSEHOLD SCHEDULE

LINE NO.	USUAL RESIDENTS AND VISITORS	RELATIONSHIP TO HEAD OF HOUSEHOLD	SEX	RESIDENCE		AGE	WOMEN AGE 15-49	CHILDREN AGE 0-5
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
	Please give me the names of the persons who usually live in your household and guests of the household who stayed here last night, starting with the head of the household. AFTER LISTING THE NAMES AND RECORDING THE RELATIONSHIP AND SEX FOR EACH PERSON, ASK QUESTIONS 2A-2C TO BE SURE THAT THE LISTING IS COMPLETE. THEN ASK APPROPRIATE QUESTIONS IN COLUMNS 5-9 FOR EACH PERSON.	What is the relationship of (NAME) to the head of the household? SEE CODES BELOW.	Is (NAME) male or female?	Does (NAME) usually live here?	Did (NAME) stay here last night?	How old is (NAME)? IF 95 OR MORE, RECORD '95'.	CIRCLE LINE NUMBER OF ALL WOMEN AGE 15-49 YEARS	CIRCLE LINE NUMBER OF ALL CHILDREN AGE 0-5 YEARS
			M F	Y N	Y N	IN YEARS		
01			1 2	1 2	1 2		01	01
02			1 2	1 2	1 2		02	02
03			1 2	1 2	1 2		03	03
04			1 2	1 2	1 2		04	04
05			1 2	1 2	1 2		05	05
06			1 2	1 2	1 2		06	06
07			1 2	1 2	1 2		07	07
08			1 2	1 2	1 2		08	08
09			1 2	1 2	1 2		09	09
10			1 2	1 2	1 2		10	10

CODES FOR Q. 3: RELATIONSHIP TO HEAD OF HOUSEHOLD

01 = HEAD
02 = WIFE OR HUSBAND
03 = SON OR DAUGHTER
04 = SON-IN-LAW OR DAUGHTER-IN-LAW
05 = GRANDCHILD
06 = PARENT
07 = PARENT-IN-LAW
08 = BROTHER OR SISTER
09 = NIECE/NEPHEW BY BLOOD
10 = NIECE/NEPHEW BY MARRIAGE
11 = OTHER RELATIVE
12 = ADOPTED/FOSTER/ STEPCHILD
13 = NOT RELATED
98 = DON'T KNOW

LINE NO.	USUAL RESIDENTS AND VISITORS	RELATIONSHIP TO HEAD OF HOUSEHOLD	SEX	RESIDENCE		AGE	WOMEN AGE 15-49	CHILDREN AGE 0-5
1	2	3	4	5	6	7	8	9
	Please give me the names of the persons who usually live in your household and guests of the household who stayed here last night, starting with the head of the household. AFTER LISTING THE NAMES AND RECORDING THE RELATIONSHIP AND SEX FOR EACH PERSON, ASK QUESTIONS 2A-2C TO BE SURE THAT THE LISTING IS COMPLETE. THEN ASK APPROPRIATE QUESTIONS IN COLUMNS 5-9 FOR EACH PERSON.	What is the relationship of (NAME) to the head of the household? SEE CODES BELOW.	Is (NAME) male or female?	Does (NAME) usually live here?	Did (NAME) stay here last night?	How old is (NAME)? IF 95 OR MORE, RECORD '95'.	CIRCLE LINE NUMBER OF ALL WOMEN AGE 15-49 YEARS	CIRCLE LINE NUMBER OF ALL CHILDREN AGE 0-5 YEARS
			M F	Y N	Y N	IN YEARS		
11			1 2	1 2	1 2		11	11
12			1 2	1 2	1 2		12	12
13			1 2	1 2	1 2		13	13
14			1 2	1 2	1 2		14	14
15			1 2	1 2	1 2		15	15
16			1 2	1 2	1 2		16	16
17			1 2	1 2	1 2		17	17
18			1 2	1 2	1 2		18	18
19			1 2	1 2	1 2		19	19
20			1 2	1 2	1 2		20	20

TICK HERE IF CONTINUATION SHEET USED ☐

2A) Just to make sure that I have a complete listing: are there any other persons such as small children or infants that we have not listed?
YES ☐ → ADD TO TABLE NO ☐

2B) Are there any other people who may not be members of your family, such as domestic servants, lodgers, or friends who usually live here?
YES ☐ → ADD TO TABLE NO ☐

2C) Are there any guests or temporary visitors staying here, or anyone else who stayed here last night, who have not been listed?
YES ☐ → ADD TO TABLE NO ☐

CODES FOR Q. 3: RELATIONSHIP TO HEAD OF HOU

01 = HEAD
02 = WIFE OR HUSBAND
03 = SON OR DAUGHTER
04 = SON-IN-LAW OR DAUGHTER-IN-LAW
05 = GRANDCHILD
06 = PARENT
07 = PARENT-IN-LAW
08 = BROTHEF
09 = NIECE/NE
10 = NIECE/NE
11 = OTHER R
12 = ADOPTEI STEPCHILD
13 = NOT REL
98 = DON'T KN

HOUSEHOLD CHARACTERISTICS

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
101	What is the main source of drinking water for members of your household?	PIPED WATER PIPED INTO DWELLING . . . . . 11 PIPED TO YARD/PLOT . . . . . 12 PUBLIC TAP/STANDPIPE . . . . . 13 TUBE WELL OR BOREHOLE . . . . . 21 DUG WELL PROTECTED WELL . . . . . 31 UNPROTECTED WELL . . . . . 32 WATER FROM SPRING PROTECTED SPRING . . . . . 41 UNPROTECTED SPRING . . . . . 42 RAINWATER . . . . . 51 TANKER TRUCK . . . . . 61 CART WITH SMALL TANK . . . . . 71 SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/ IRRIGATION CHANNEL) . . . . . 81 BOTTLED WATER . . . . . 91 WATER SATCHETS . . . . . 92 OTHER _____ 96 (SPECIFY)	→ 104 → 104
102	Where is that water source located?	IN OWN DWELLING . . . . . 1 IN OWN YARD/PLOT . . . . . 2 ELSEWHERE 3	→ 104
103	How long does it take to go there, get water, and come back?	MINUTES . . . . . [ ][ ][ ] DON'T KNOW 998	
104	What kind of toilet facility do members of your household usually use?	FLUSH OR POUR FLUSH TOILET FLUSH TO PIPED SEWER SYSTEM . . . . . 11 FLUSH TO SEPTIC TANK . . . . . 12 FLUSH TO PIT LATRINE . . . . . 13 FLUSH TO SOMEWHERE ELSE . . . . . 14 FLUSH, DON'T KNOW WHERE . . . . . 15 PIT LATRINE VENTILATED IMPROVED PIT LATRINE . . . . . 21 PIT LATRINE WITH SLAB . . . . . 22 PIT LATRINE WITHOUT SLAB/ OPEN PIT . . . . . 23 COMPOSTING TOILET . . . . . 31 BUCKET TOILET . . . . . 41 HANGING TOILET/HANGING LATRINE . . . . . 51 NO FACILITY/BUSH/FIELD . . . . . 61 OTHER _____ 96 (SPECIFY)	→ 107
105	Do you share this toilet facility with other households?	YES . . . . . 1 NO 2	→ 107
106	How many households use this toilet facility?	NO. OF HOUSEHOLDS IF LESS THAN 10 . . . . . [0][ ] 10 OR MORE HOUSEHOLDS . . . . . 95 DON'T KNOW 98	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
107	Does your household have: Electricity? A radio? A television? A mobile telephone? A land-line telephone? A refrigerator?	YES NO ELECTRICITY . . . . . 1 2 RADIO . . . . . 1 2 TELEVISION . . . . . 1 2 MOBILE TELEPHONE . . . . . 1 2 LAND-LINE TELEPHONE . . . 1 2 REFRIGERATOR 1 2	
108	What type of fuel does your household mainly use for cooking?	ELECTRICITY . . . . . 01 LPG . . . . . 02 NATURAL GAS . . . . . 03 BIOGAS . . . . . 04 KEROSENE . . . . . 05 CHARCOAL . . . . . 07 WOOD . . . . . 08 STRAW/SHRUBS/GRASS . . . . . 09 AGRICULTURAL CROP . . . . . 10 ANIMAL DUNG . . . . . 11 NO FOOD COOKED IN HOUSEHOLD . . . . . 95 OTHER _____ 96 (SPECIFY)	
109	MAIN MATERIAL OF THE FLOOR. RECORD OBSERVATION.	NATURAL FLOOR EARTH/SAND . . . . . 11 DUNG . . . . . 12 RUDIMENTARY FLOOR WOOD PLANKS . . . . . 21 PALM/BAMBOO . . . . . 22 FINISHED FLOOR PARQUET OR POLISHED WOOD . . . . . 31 VINYL OR ASPHALT STRIPS . . . . . 32 CERAMIC TILES . . . . . 33 CEMENT . . . . . 34 CARPET . . . . . 35 OTHER _____ 96 (SPECIFY)	
110	MAIN MATERIAL OF THE ROOF. RECORD OBSERVATION.	NATURAL ROOFING NO ROOF . . . . . 11 THATCH/PALM LEAF . . . . . 12 SOD . . . . . 13 RUDIMENTARY ROOFING RUSTIC MAT . . . . . 21 PALM/BAMBOO . . . . . 22 WOOD PLANKS . . . . . 23 CARDBOARD . . . . . 24 FINISHED ROOFING METAL/IRON/ZINC/CI SHEETS . . . . . 31 WOOD . . . . . 32 CALAMINE/CEMENT FIBER . . . . . 33 CERAMIC TILES . . . . . 34 CEMENT . . . . . 35 ROOFING SHINGLES . . . . . 36 OTHER _____ 96 (SPECIFY)	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
111	MAIN MATERIAL OF THE EXTERIOR WALLS. RECORD OBSERVATION.	NATURAL WALLS NO WALLS . . . . . 11 CANE/PALM/TRUNKS . . . . . 12 DIRT . . . . . 13 RUDIMENTARY WALLS BAMBOO WITH MUD . . . . . 21 STONE WITH MUD . . . . . 22 UNCOVERED ADOBE . . . . . 23 PLYWOOD . . . . . 24 CARDBOARD . . . . . 25 REUSED WOOD . . . . . 26 FINISHED WALLS CEMENT . . . . . 31 STONE WITH LIME/CEMENT . . . . . 32 BRICKS . . . . . 33 CEMENT BLOCKS . . . . . 34 COVERED ADOBE . . . . . 35 WOOD PLANKS/SHINGLES . . . . . 36 OTHER _____ 96 (SPECIFY)	
112	How many rooms in this household are used for sleeping?	ROOMS . . . . . ☐☐	
112A	How many sleeping facilities are currently in use in this household, including any beds, mattresses, mats, or rugs? ASK FOR BOTH INSIDE AND OUTSIDE OF DWELLING.	NUMBER OF SLEEPING FACILITIES ☐☐	
113	Does any member of this household own:	YES NO WATCH . . . . . 1 2 BICYCLE . . . . . 1 2 MOTORCYCLE/SCOOTER . . . 1 2 ANIMAL-DRAWN CART . . . . . 1 2 CAR/TRUCK . . . . . 1 2 BOAT WITH MOTOR . . . . . 1 2 BOAT WITHOUT MOTOR . . . 1 2	
	A watch?		
	A bicycle?		
	A motorcycle or motor scooter?		
	An animal-drawn cart?		
	A car or truck?		
	A boat with a motor?		
	A boat without a motor?		
114	Does any member of this household own any agricultural land?	YES . . . . . 1 NO 2	→ 116
115	How many acres of agricultural land do members of this household own? IF 95 OR MORE, CIRCLE '95'.	ACRES . . . . . ☐☐.☐ 95 OR MORE ACRES . . . . . 95 DON'T KNOW 98	
116	Does this household own any livestock, herds, other farm animals, or poultry?	YES . . . . . 1 NO 2	→ 118

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
117	How many of the following animals does this household own? IF NONE, ENTER '00'. IF 95 OR MORE, ENTER '95'. IF UNKNOWN, ENTER '98'. Cow, calfs, or bulls? Pigs? Goats? Sheep? Fowl: chickens, geese, ducks, turkeys?	COW/BULLS . . . . . [ ][ ] PIGS . . . . . [ ][ ] GOATS . . . . . [ ][ ] SHEEP . . . . . [ ][ ] FOWL . . . . . [ ][ ]	
118	Does any member of this household have a bank account/village savings and loans/osusu?	YES . . . . . 1 NO 2	
118A	When you suspect you have malaria, where to you usually seek advice or treatment? Anywhere else? PROBE TO IDENTIFY EACH TYPE OF SOURCE. IF UNABLE TO DETERMINE IF PUBLIC OR PRIVATE SECTOR, WRITE THE NAME OF THE PLACE. _____ (NAME OF PLACE(S)) _____ (NAME OF PLACE(S))	**PUBLIC SECTOR** GOVT HOSPITAL A GOVT HEALTH CENTER B MOBILE CLINIC C CBP D OTHER PUBLIC SECTOR _____ (SPECIFY) E **PRIVATE MEDICAL SECTOR** PVT HOSPITAL F PVT CLINIC G MISSION/FAITH-BASED HOSPITAL H MISSION/FAITH-BASED CLINIC I PHARMACY J MOBILE CLINIC K OTHER PRIVATE MED. SECTOR _____ (SPECIFY) L **OTHER SOURCE** SHOP M TRADITIONAL HEALER N DRUG PEDDLER O **OTHER** _____ (SPECIFY) X	
118B	CHECK 118B: TWO OR MORE CODES CIRCLED [ ] ↓ ONLY ONE CODE CIRCLED [ ] → 119		
118C	Where is the first place you usually seek advice or treatment? USE LETTER CODE FROM 118A.	FIRST PLACE . . . . . [ ]	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
119	At any time in the past 12 months, has anyone come into your dwelling to spray the interior walls against mosquitoes?	YES . . . . . 1 NO . . . . . 2 DON'T KNOW 8	→ 120A
120	Who sprayed the dwelling?	GOVERNMENT WORKER/PROGRAM . . . . . A PRIVATE COMPANY . . . . . B NONGOVERNMENTAL ORGANIZATION (NGO) . . . . . C OTHER _____ (SPECIFY) X DON'T KNOW . . . . . Z	
120A	Now I would like to talk to you about mosquito nets. What shape of mosquito nets do you prefer, conical or rectangular? SHOW PHOTO OF CONICAL AND RECTANGULAR NETS.	CONICAL . . . . . 1 RECTANGULAR . . . . . 2 EITHER . . . . . 3 DON'T KNOW 8	
121	Does your household have any mosquito nets that can be used while sleeping?	YES . . . . . 1 NO 2	→ 201
122	How many mosquito nets does your household have? IF 7 OR MORE NETS, RECORD '7'.	NUMBER OF NETS	

		NET #1	NET #2	NET #3
123	ASK THE RESPONDENT TO SHOW YOU ALL THE NETS IN THE HOUSEHOLD IF MORE THAN 3 NETS, USE ADDITIONAL QUESTIONNAIRE(S).	OBSERVED ..... 1 NOT OBSERVED ... 2	OBSERVED ..... 1 NOT OBSERVED ... 2	OBSERVED ..... 1 NOT OBSERVED ... 2
123A	OBSERVE OR ASK IF NET IS HANGING.	**OBSERVED** HANGING ..... 1 NOT HANGING . 2 **NOT OBSERVED** HANGING ..... 3 NOT HANGING . 4	**OBSERVED** HANGING ..... 1 NOT HANGING . 2 **NOT OBSERVED** HANGING ..... 3 NOT HANGING . 4	**OBSERVED** HANGING ..... 1 NOT HANGING . 2 **NOT OBSERVED** HANGING ..... 3 NOT HANGING . 4
124	How many months ago did your household get the mosquito net? IF LESS THAN ONE MONTH AGO, RECORD '00'.	MONTHS AGO ... [ ][ ] MORE THAN 36 MONTHS AGO ... 95 NOT SURE 98	MONTHS AGO ... [ ][ ] MORE THAN 36 MONTHS AGO ... 95 NOT SURE 98	MONTHS AGO ... [ ][ ] MORE THAN 36 MONTHS AGO ... 95 NOT SURE 98
124A	Where did you obtain this mosquito net?	NET DISTRIBUTION CAMPAIGN 01 GOVT HOSPITAL/ HEALTH CENTER ..... 02 MOBILE CLINIC ... 03 CBP .... 04 PVT HOSPITAL/ CLINIC .... 05 MISSION/FAITH-BASED HOSPITAL ... 06 MISSION/FAITH-BASED CLINIC . 07 PHARMACY ... 08 PVT MOBILE CLINIC 09 NGO .... 10 SCHOOL .. .. 11 SHOP .... 12 TRADITIONAL HEALER ..... 13 DON'T KNOW 96 **OTHER** ________ 98 (SPECIFY)	NET DISTRIBUTION CAMPAIGN 01 GOVT HOSPITAL/ HEALTH CENTER ..... 02 MOBILE CLINIC ... 03 CBP .... 04 PVT HOSPITAL/ CLINIC .... 05 MISSION/FAITH-BASED HOSPITAL ... 06 MISSION/FAITH-BASED CLINIC . 07 PHARMACY ... 08 PVT MOBILE CLINIC 09 NGO .... 10 SCHOOL .. .. 11 SHOP .... 12 TRADITIONAL HEALER ..... 13 DON'T KNOW 96 **OTHER** ________ 98 (SPECIFY)	NET DISTRIBUTION CAMPAIGN 01 GOVT HOSPITAL/ HEALTH CENTER ..... 02 MOBILE CLINIC ... 03 CBP .... 04 PVT HOSPITAL/ CLINIC .... 05 MISSION/FAITH-BASED HOSPITAL ... 06 MISSION/FAITH-BASED CLINIC . 07 PHARMACY ... 08 PVT MOBILE CLINIC 09 NGO .... 10 SCHOOL .. .. 11 SHOP .... 12 TRADITIONAL HEALER ..... 13 DON'T KNOW 96 **OTHER** ________ 98 (SPECIFY)
125	OBSERVE OR ASK THE BRAND/ TYPE OF MOSQUITO NET. IF BRAND IS UNKNOWN AND YOU CANNOT OBSERVE THE NET, SHOW PICTURES OF TYPICAL NET TYPES/BRANDS	**LONG-LASTING** INSECTICIDE-TREATED NET (LLIN) PERMANET ... 11 OLYSET .... 12 DURANET 13 OTHER/ DK BRAND ... 16 (SKIP TO 128) OTHER BRAND ... 96 DK BRAND 98	**LONG-LASTING** INSECTICIDE-TREATED NET (LLIN) PERMANET ... 11 OLYSET .... 12 DURANET 13 OTHER/ DK BRAND ... 16 (SKIP TO 128) OTHER BRAND ... 96 DK BRAND 98	**LONG-LASTING** INSECTICIDE-TREATED NET (LLIN) PERMANET ... 11 OLYSET .... 12 DURANET 13 OTHER/ DK BRAND ... 16 (SKIP TO 128) OTHER BRAND ... 96 DK BRAND 98

		NET #1	NET #2	NET #3
126	Since you got the net, was it ever soaked or dipped in a liquid to kill or repel mosquitoes?	YES . . . . . 1 NO . . . . . 2 (SKIP TO 128) ← NOT SURE 8	YES . . . . . 1 NO . . . . . 2 (SKIP TO 128) ← NOT SURE 8	YES . . . . . 1 NO . . . . . 2 (SKIP TO 128) ← NOT SURE 8
127	How many months ago was the net last soaked or dipped? IF LESS THAN ONE MONTH AGO, RECORD '00'.	MONTHS AGO . . . ☐☐ MORE THAN 24 MONTHS AGO . . . 95 NOT SURE 98	MONTHS AGO . . . ☐☐ MORE THAN 24 MONTHS AGO . . . 95 NOT SURE 98	MONTHS AGO . . . ☐☐ MORE THAN 24 MONTHS AGO . . . 95 NOT SURE 98
128	Did anyone sleep under this mosquito net last night?	YES . . . . . 1 NO . . . . . 2 (SKIP TO 130) ← NOT SURE 8	YES . . . . . 1 NO . . . . . 2 (SKIP TO 130) ← NOT SURE 8	YES . . . . . 1 NO . . . . . 2 (SKIP TO 130) ← NOT SURE 8
129	Who slept under this mosquito net last night? RECORD THE PERSON'S NAME AND LINE NUMBER FROM THE HOUSEHOLD SCHEDULE.	NAME_____ LINE NO. . . . . ☐☐	NAME_____ LINE NO. . . . . ☐☐	NAME_____ LINE NO. . . . . ☐☐
		NAME_____ LINE NO. . . . . ☐☐	NAME_____ LINE NO. . . . . ☐☐	NAME_____ LINE NO. . . . . ☐☐
		NAME_____ LINE NO. . . . . ☐☐	NAME_____ LINE NO. . . . . ☐☐	NAME_____ LINE NO. . . . . ☐☐
		NAME_____ LINE NO. . . . . ☐☐	NAME_____ LINE NO. . . . . ☐☐	NAME_____ LINE NO. . . . . ☐☐
130		GO BACK TO 123 FOR NEXT NET; OR, IF NO MORE NETS, GO TO 201.	GO BACK TO 123 FOR NEXT NET; OR, IF NO MORE NETS, GO TO 201.	GO TO 123 IN FIRST COLUMN OF A NEW QUESTIONNAIRE; OR, IF NO MORE NETS, GO TO 201.

HEMOGLOBIN MEASUREMENT AND MALARIA TESTING FOR CHILDREN				
201	CHECK COLUMN 9 IN HOUSEHOLD SCHEDULE. RECORD THE LINE NUMBER AND NAME FOR ALL ELIGIBLE CHILDREN 0-5 YEARS IN QUESTION 202. IF MORE THAN SIX CHILDREN, USE ADDITIONAL QUESTIONNAIRE(S).			
		CHILD 1	CHILD 2	CHILD 3
202	NAME FROM COLUMN 2 LINE NUMBER FROM COLUMN 9	NAME _____ LINE NUMBER	NAME _____ LINE NUMBER	NAME _____ LINE NUMBER . . . . .
203	IF MOTHER INTERVIEWED, COPY MONTH AND YEAR OF BIRTH FROM BIRTH HISTORY AND ASK DAY; IF MOTHER NOT INTERVIEWED, ASK: What is (NAME)'s birth date?	DAY . . . . . MONTH . . . . . YEAR	DAY . . . . . MONTH . . . . . YEAR	DAY . . . . . MONTH . . . . . YEAR
204	CHECK 203: CHILD BORN IN JANUARY 2008 OR LATER?	YES . . . . . 1 NO . . . . . 2 (GO TO 203 FOR NEXT CHILD OR, IF NO MORE CHILDREN, END INTERVIEW)	YES . . . . . 1 NO . . . . . 2 (GO TO 203 FOR NEXT CHILD OR, IF NO MORE CHILDREN, END INTERVIEW)	YES . . . . . 1 NO . . . . . 2 (GO TO 203 FOR NEXT CHILD OR, IF NO MORE CHILDREN, END INTERVIEW)
205	CHECK 203: IS CHILD AGE 0-5 MONTHS, I.E., WAS CHILD BORN IN MONTH OF INTERVIEW OR FIVE PREVIOUS MONTHS?	0-5 MONTHS . . . . . 1 (GO TO 203 FOR NEXT CHILD OR, IF NO MORE CHILDREN, END INTERVIEW) OLDER 2	0-5 MONTHS . . . . . 1 (GO TO 203 FOR NEXT CHILD OR, IF NO MORE CHILDREN, END INTERVIEW) OLDER 2	0-5 MONTHS . . . . . 1 (GO TO 203 FOR NEXT CHILD OR, IF NO MORE CHILDREN, END INTERVIEW) OLDER 2
206	LINE NUMBER OF PARENT/ OTHER ADULT RESPONSIBLE FOR THE CHILD (FROM COLUMN 1 OF HOUSEHOLD SCHEDULE). RECORD '00' IF NOT LISTED.	LINE NUMBER	LINE NUMBER	LINE NUMBER . . . . .
207	ASK CONSENT FOR ANEMIA TEST FROM PARENT/OTHER ADULT IDENTIFIED IN 206 AS RESPONSIBLE FOR CHILD.	As part of this survey, we are asking children all over the country to take an **anemia** test. Anemia is a serious health problem that usually results from poor nutrition, infection, or chronic disease. This survey will assist the government to develop programs to prevent and treat anemia. We ask that all children born in 2008 or later take part in anemia testing in this survey and give a few drops of blood from a finger or heel. The prick will cause minimal pain. The equipment used to take the blood is clean and completely safe. It has never been used before and will be thrown away after each test. The blood will be tested for anemia immediately, and the result will be told to you right away. The result will be kept strictly confidential and will not be shared with anyone other than members of our survey team. Do you have any questions? You can say yes to the test, or you can say no. It is up to you to decide. Will you allow (NAME OF CHILD) to participate in the anemia test?		
208	CIRCLE THE APPROPRIATE CODE AND SIGN YOUR NAME.	GRANTED . . . . . 1 _____ (SIGN) REFUSED . . . . . 2 NOT PRESENT . . . . . 5 OTHER 6	GRANTED . . . . . 1 _____ (SIGN) REFUSED . . . . . 2 NOT PRESENT . . . . . 5 OTHER 6	GRANTED . . . . . 1 _____ (SIGN) REFUSED . . . . . 2 NOT PRESENT . . . . . 5 OTHER 6
208A	RESPONDENT SIGNATURE OR THUMB PRINT FOR ANEMIA TESTING CONSENT	SIGNATURE/THUMB PRINT OF RESPONDENT	SIGNATURE/THUMB PRINT OF RESPONDENT	SIGNATURE/THUMB PRINT OF RESPONDENT
208B	WITNESS SIGNATURE OR THUMB PRINT FOR ANEMIA TESTING CONSENT	SIGNATURE/THUMB PRINT OF WITNESS	SIGNATURE/THUMB PRINT OF RESPONDENT	SIGNATURE/THUMB PRINT OF RESPONDENT

		CHILD 1	CHILD 2	CHILD 3
	NAME FROM COLUMN 2	NAME ________________	NAME ________________	NAME ________________
209	ASK CONSENT FOR MALARIA TEST FROM PARENT/OTHER ADULT IDENTIFIED IN 206 AS RESPONSIBLE FOR CHILD.	As part of this survey, we are asking that children all over the country take a test to see if they have **malaria**. Malaria is a serious illness caused by a parasite transmitted by a mosquito bite. This survey will help the government to develop programs to prevent malaria. We ask that all children born in 2008 or later take part in malaria testing in this survey and give a few drops of blood from a finger or heel. The prick will cause minimal pain. The equipment used to take the blood is clean and completely safe. It has never been used before and will be thrown away after each test. (We will use blood from the same finger or heel prick made for the anemia test). One blood drop will be tested for malaria immediately, and the result will be told to you right away. A few blood drops will be collected on a slide(s) and taken to a laboratory for testing. You will not be told the results of the laboratory testing. All results will be kept strictly confidential and will not be shared with anyone other than members of our survey team. Do you have any questions? You can say yes to the test, or you can say no. It is up to you to decide. Will you allow (NAME OF CHILD) to participate in the malaria testing?		
210	CIRCLE THE APPROPRIATE CODE AND SIGN YOUR NAME.	GRANTED . . . . 1 ________ ← (SIGN) REFUSED . . . . 2 NOT PRESENT . . . . . . 5 OTHER 6	GRANTED . . . . 1 ________ ← (SIGN) REFUSED . . . . 2 NOT PRESENT . . . . . . 5 OTHER 6	GRANTED . . . . 1 ________ ← (SIGN) REFUSED . . . . 2 NOT PRESENT . . . . . . 5 OTHER 6
210A	RESPONDENT SIGNATURE OR THUMB PRINT FOR MALARIA TESTING CONSENT	________________ SIGNATURE/THUMB PRINT OF RESPONDENT	________________ SIGNATURE/THUMB PRINT OF RESPONDENT	________________ SIGNATURE/THUMB PRINT OF RESPONDENT
210B	WITNESS SIGNATURE OR THUMB PRINT FOR MALARIA TESTING CONSENT	________________ SIGNATURE/THUMB PRINT OF WITNESS	________________ SIGNATURE/THUMB PRINT OF RESPONDENT	________________ SIGNATURE/THUMB PRINT OF RESPONDENT
211	PREPARE EQUIPMENT AND SUPPLIES ONLY FOR THE TEST(S) FOR WHICH CONSENT HAS BEEN OBTAINED AND PROCEED WITH THE TEST(S).			
212	BAR CODE LABEL FOR MALARIA TEST.	PUT THE 1ST BAR CODE LABEL HERE. NOT PRESENT 99994 REFUSED . . . . . 99995 OTHER . . . . 99996 PUT THE 2ND BAR CODE LABEL ON THE SLIDE AND THE 3RD ON THE TRANSMITTAL FORM.	PUT THE 1ST BAR CODE LABEL HERE. NOT PRESENT 99994 REFUSED . . . . . 99995 OTHER . . . . 99996 PUT THE 2ND BAR CODE LABEL ON THE SLIDE AND THE 3RD ON THE TRANSMITTAL FORM.	PUT THE 1ST BAR CODE LABEL HERE. NOT PRESENT 99994 REFUSED . . . . . 99995 OTHER . . . . 99996 PUT THE 2ND BAR CODE LABEL ON THE SLIDE AND THE 3RD ON THE TRANSMITTAL FORM.
213	RECORD HEMOGLOBIN LEVEL HERE AND IN THE ANEMIA AND MALARIA BROCHURE.	G/DL [ ][ ].[ ] NOT PRESENT . . . . . 994 REFUSED . . . . 995 OTHER 996	G/DL [ ][ ].[ ] NOT PRESENT . . . . . 994 REFUSED . . . . 995 OTHER 996	G/DL [ ][ ].[ ] NOT PRESENT . . . . . 994 REFUSED . . . . 995 OTHER 996
214	RECORD RESULT CODE OF THE MALARIA RDT.	TESTED . . . . 1 NOT PRESENT . . . . . 2 REFUSED . . . . 3 OTHER . . . . 6 (SKIP TO 216)	TESTED . . . . 1 NOT PRESENT . . . . . 2 REFUSED . . . . 3 OTHER . . . . 6 (SKIP TO 216)	TESTED . . . . 1 NOT PRESENT . . . . . 2 REFUSED . . . . 3 OTHER . . . . 6 (SKIP TO 216)
215	RECORD THE RESULT OF THE MALARIA RDT HERE AND IN THE ANEMIA AND MALARIA BROCHURE.	POSITIVE . . . . 1 (SKIP TO 218) NEGATIVE . . . . 2 OTHER 6	POSITIVE . . . . 1 (SKIP TO 218) NEGATIVE . . . . 2 OTHER 6	POSITIVE . . . . 1 (SKIP TO 218) NEGATIVE . . . . 2 OTHER 6

HH-14

		CHILD 1	CHILD 2	CHILD 3
	NAME FROM COLUMN 2	NAME ________	NAME ________	NAME ________
216	CHECK 213: HEMOGLOBIN RESULT	BELOW 7.0 G/DL, SEVERE ANEMIA 1 7.0 G/DL OR ABOVE 2 NOT PRESENT ..... 4 REFUSED .... 5 OTHER .... 6 (SKIP TO 229)	BELOW 7.0 G/DL, SEVERE ANEMIA 1 7.0 G/DL OR ABOVE 2 NOT PRESENT ..... 4 REFUSED .... 5 OTHER .... 6 (SKIP TO 229)	BELOW7.0 G/DL, SEVERE ANEMIA 1 7.0 G/DL OR ABOVE 2 NOT PRESENT ..... 4 REFUSED .... 5 OTHER .... 6 (SKIP TO 229)
217	**<u>SEVERE ANEMIA REFERRAL</u>** STATEMENT	The anemia test shows that (NAME OF CHILD) has severe anemia. Your child is very ill and must be taken to a health facility immediately. SKIP TO 229		
218	Does (NAME) suffer from the any of following illnesses or symptoms: Extreme weakness? Heart problems? Loss of consciousness? Rapid or difficult breathing? Seizures? Abnormal bleeding? Jaundice or yellow skin? Dark urine? IF NONE OF THE ABOVE SYMPTOMS, CIRCLE CODE Y	EXTREME WEAKNESS A HEART PROBLEMS . . . B LOSS OF CONSCIOUSNESS C RAPID BREATHING . . . D SEIZURES .... E BLEEDING .... F JAUNDICE .... G DARK URINE .... H NONE OF ABOVE SYMPTOMS ...... Y	EXTREME WEAKNESS A HEART PROBLEMS . . . B LOSS OF CONSCIOUSNESS C RAPID BREATHING . . . D SEIZURES .... E BLEEDING .... F JAUNDICE .... G DARK URINE .... H NONE OF ABOVE SYMPTOMS ...... Y	EXTREME WEAKNESS A HEART PROBLEMS . . . B LOSS OF CONSCIOUSNESS C RAPID BREATHING . . . D SEIZURES .... E BLEEDING .... F JAUNDICE .... G DARK URINE .... H NONE OF ABOVE SYMPTOMS ...... Y
219	CHECK 218: ANY CODE A-H CIRCLED?	ONLY CODE Y CIRCLED .... 1 ANY CODE A-H CIRCLED ..... 2 (SKIP TO 222)	ONLY CODE Y CIRCLED .... 1 ANY CODE A-H CIRCLED ..... 2 (SKIP TO 222)	ONLY CODE Y CIRCLED .... 1 ANY CODE A-H CIRCLED ..... 2 (SKIP TO 222)
220	CHECK 213: HEMOGLOBIN RESULT	BELOW 7.0 G/DL, SEVERE ANEMIA 1 (SKIP TO 222) 7.0 G/DL OR ABOVE 2 NOT PRESENT ..... 4 REFUSED .... 5 OTHER 6	BELOW 7.0 G/DL, SEVERE ANEMIA 1 (SKIP TO 222) 7.0 G/DL OR ABOVE 2 NOT PRESENT ..... 4 REFUSED .... 5 OTHER 6	BELOW 7.0 G/DL, SEVERE ANEMIA 1 (SKIP TO 222) 7.0 G/DL OR ABOVE 2 NOT PRESENT ..... 4 REFUSED .... 5 OTHER 6
221	In the past two weeks has (NAME) taken or is taking any antimalarial? VERIFY BY ASKING TO SEE TREATMENT. SHOW PHOTOS OF MEDICINE.	YES .... 1 NO .... 2 (SKIP TO 224)	YES .... 1 NO .... 2 (SKIP TO 224)	YES .... 1 NO .... 2 (SKIP TO 224)
221A	Did you obtain the medication from a doctor, nurse, health center, or community health worker?	DOCTOR .... 1 NURSE .... 2 HEALTH CENTER . . . 3 COMMUNITY HEALTH WORKER .... 4 OTHER 6	DOCTOR .... 1 NURSE .... 2 HEALTH CENTER . . . 3 COMMUNITY HEALTH WORKER .... 4 OTHER 6	DOCTOR .... 1 NURSE .... 2 HEALTH CENTER . . . 3 COMMUNITY HEALTH WORKER .... 4 OTHER 6

		CHILD 1	CHILD 2	CHILD 3
	NAME FROM COLUMN 2	NAME ______	NAME ______	NAME ______
221B	Which medication did [NAME] take? PROBE. ASK TO SEE MEDICATION PACKAGE. SHOW PHOTOS OF MEDICINE.	**ANTIMALARIAL DRUGS** SP/FANSIDAR . . . . A COMBINATION WITH ARTEMISININ . . . . . B ARTESUNATE LUMAFANTRINE . . . C ARTESUNATE + AMODIAQUINE (ASAQ, LOOSE OR CO-BLISTER) . . . . . D CHLOROQUINE . . . . . E AMODIAQUINE . . . . . F QUININE . . . . G OTHER ANTI-MALARIAL ______ (SPECIFY) . . . . . H **ANTIBIOTIC DRUGS** AMPICILLIN . . . . I AMOXICILLIN . . . . J CEPTRIN . . . . K INJECTION, CRYSTALINE PENACILLIN . . . . L OTHER ANTIBIOTIC ______ (SPECIFY) . . . . . M **ANTIPYRETIC** ASPIRIN . . . . N PARACETAMOL/ PANADOL . . . . . . O NOVALGINE . . . . . . P IBUPROFEN . . . . Q **OTHER** ______ (SPECIFY) . . . X **DON'T KNOW** . . . . Z (SKIP TO 224)	**ANTIMALARIAL DRUGS** SP/FANSIDAR . . . . A COMBINATION WITH ARTEMISININ . . . . . B ARTESUNATE LUMAFANTRINE . . . C ARTESUNATE + AMODIAQUINE (ASAQ, LOOSE OR CO-BLISTER) . . . . . D CHLOROQUINE . . . . . E AMODIAQUINE . . . . . F QUININE . . . . G OTHER ANTI-MALARIAL ______ (SPECIFY) . . . . . H **ANTIBIOTIC DRUGS** AMPICILLIN . . . . I AMOXICILLIN . . . . J CEPTRIN . . . . K INJECTION, CRYSTALINE PENACILLIN . . . . L OTHER ANTIBIOTIC ______ (SPECIFY) . . . . . M **ANTIPYRETIC** ASPIRIN . . . . N PARACETAMOL/ PANADOL . . . . . . O NOVALGINE . . . . . . P IBUPROFEN . . . . Q **OTHER** ______ (SPECIFY) . . . X **DON'T KNOW** . . . . Z (SKIP TO 224)	**ANTIMALARIAL DRUGS** SP/FANSIDAR . . . . A COMBINATION WITH ARTEMISININ . . . . . B ARTESUNATE LUMAFANTRINE . . . C ARTESUNATE + AMODIAQUINE (ASAQ, LOOSE OR CO-BLISTER) . . . . . D CHLOROQUINE . . . . . E AMODIAQUINE . . . . . F QUININE . . . . G OTHER ANTI-MALARIAL ______ (SPECIFY) . . . . . H **ANTIBIOTIC DRUGS** AMPICILLIN . . . . I AMOXICILLIN . . . . J CEPTRIN . . . . K INJECTION, CRYSTALINE PENACILLIN . . . . L OTHER ANTIBIOTIC ______ (SPECIFY) . . . . . M **ANTIPYRETIC** ASPIRIN . . . . N PARACETAMOL/ PANADOL . . . . . . O NOVALGINE . . . . . . P IBUPROFEN . . . . Q **OTHER** ______ (SPECIFY) . . . X **DON'T KNOW** . . . . Z (SKIP TO 224)
221C	For how many days did [NAME] taken the medication? IF 7 DAYS OR MORE, WRITE '7'.	DAYS . . . . [ ] DON'T KNOW . . . . . 8 (SKIP TO 223)	DAYS . . . . [ ] DON'T KNOW . . . . . 8 (SKIP TO 223)	DAYS . . . . [ ] DON'T KNOW . . . . . 8 (SKIP TO 223)
222	**<u>SEVERE MALARIA REFERRAL</u>** STATEMENT	The malaria test shows that (NAME OF CHILD) has malaria. Your child also has symptoms of severe malaria. The malaria treatment I have will not help your child, and I cannot give you the medication. Your child is very ill and must be taken to a health facility right away. SKIP TO 228		
223	**<u>ALREADY TAKING [FIRST LINE MEDICATION] REFERRAL STATEMENT</u>**	You have told me that (NAME OF CHILD) has already received [MECINDE FROM Q221B] for malaria. Therefore, I cannot give you additional [MEDICINE FROM Q221B]. However, the test shows that he/she has malaria. If your child has a fever for two days after the last dose of [MEDICINE FROM Q221B], you should take the child to the nearest health facility for further examination. SKIP TO 228		

		CHILD 1	CHILD 2	CHILD 3
	NAME FROM COLUMN 2	NAME ________________	NAME ________________	NAME ________________
224	READ INFORMATION FOR MALARIA TREATMENT AND CONSENT STATEMENT TO PARENT OR OTHER ADULT RESPONSIBLE FOR THE CHILD.	The malaria test shows that your child has malaria. We can give you free medicine. The medicine is called ACT. ACT is very effective and in a few days it should get rid of the fever and other symptoms. You may choose to give the child the medicine or not. This is up to you. Please tell me whether you accept the medicine or not.		
225	CIRCLE THE APPROPRIATE CODE AND SIGN YOUR NAME.	ACCEPTED MEDICINE 1 ________________ (SIGN) REFUSED . . . . 2 OTHER 6	ACCEPTED MEDICINE 1 ________________ (SIGN) REFUSED . . . . 2 OTHER 6	ACCEPTED MEDICINE 1 ________________ (SIGN) REFUSED . . . . 2 OTHER 6
226	CHECK 225: MEDICATION ACCEPTED	ACCEPTED MEDICINE 1 REFUSED . . . . 2 OTHER . . . . 6 (SKIP TO 228)	ACCEPTED MEDICINE 1 REFUSED . . . . 2 OTHER . . . . 6 (SKIP TO 228)	ACCEPTED MEDICINE 1 REFUSED . . . . 2 OTHER . . . . 6 (SKIP TO 228)
227	TREATMENT FOR CHILDREN WITH POSITIVE MALARIA TESTS	[INSERT DOSAGE INSTRUCTIONS] ALSO TELL THE PARENT/ADULT RESPONSIBLE FOR THE CHILD: If [NAME] has a high fever, fast or difficult breathing, itching, is not able to drink or breastfeed, gets sicker or does not get better in two days, you should take him/her to a health center for treatment right away.		
228	RECORD THE RESULT CODE OF **MALARIA TREATMENT OR REFERRAL.**	MEDICATION GIVEN 1 MEDS REFUSED . . . . . 2 SEVERE MALARIA REFERRAL . . . . 3 ALREADY TAKING ACTS REFERRAL . . . . 4 OTHER 6	MEDICATION GIVEN 1 MEDS REFUSED . . . . . 2 SEVERE MALARIA REFERRAL . . . . 3 ALREADY TAKING ACTS REFERRAL . . . . 4 OTHER 6	MEDICATION GIVEN 1 MEDS REFUSED . . . . . 2 SEVERE MALARIA REFERRAL . . . . 3 ALREADY TAKING ACTS REFERRAL . . . . 4 OTHER 6
229	GO BACK TO 203 IN NEXT COLUMN OF THIS QUESTIONNAIRE OR IN THE FIRST COLUMN OF THE NEXT PAGE; IF NO MORE CHILDREN, END INTERVIEW.			

NATIONAL MALARIA CONTROL PROGRAMME RECOMMENDED TREATMENT FOR UNCOMPLICATED MALARIA FOR CHILDREN WITH POSITIVE MALARIA TESTS

DOSAGE SCHEDULE FOR ASAQ FIXED DOSE COMBINATION TREATMENT

AGE	WEIGHT (KG)	ASAQ COMBINATION	DOSAGE		
			DAY 1	DAY 2	DAY 3
2-11 months	≥ 4.5 kg to < 9.0 kg	25mg Artesunate/67.5mg A	1 tablet	1 tablet	1 tablet
1-5 years	≥ 9.0 kg to < 18.0 k	50mg Artesunate/135mg A	1 tablet	1 tablet	1 tablet
6-13 years	≥ 18.0 kg to < 36.0	100mg Artesunate/270mg	1 tablet	1 tablet	1 tablet

ALSO TELL THE PARENT/ADULT RESPONSIBLE FOR THE CHILD: If [NAME] has a high fever, fast or difficult breathing, is not able to drink or breastfeed, gets sicker or does not get better in two days, you should take him/her to a health professional for treatment right away.

HEMOGLOBIN MEASUREMENT AND MALARIA TESTING FOR CHILDREN				
201	CHECK COLUMN 9 IN HOUSEHOLD SCHEDULE. RECORD THE LINE NUMBER AND NAME FOR ALL ELIGIBLE CHILDREN 0-5 YEARS IN QUESTION 202. IF MORE THAN SIX CHILDREN, USE ADDITIONAL QUESTIONNAIRE(S).			
		CHILD 4	CHILD 5	CHILD 6
202	NAME FROM COLUMN 2 LINE NUMBER FROM COLUMN 9	NAME _____ LINE NUMBER	NAME _____ LINE NUMBER	NAME _____ LINE NUMBER . . . . .
203	IF MOTHER INTERVIEWED, COPY MONTH AND YEAR OF BIRTH FROM BIRTH HISTORY AND ASK DAY; IF MOTHER NOT INTERVIEWED, ASK: What is (NAME)'s birth date?	DAY . . . . . MONTH . . . . . YEAR	DAY . . . . . MONTH . . . . . YEAR	DAY . . . . . MONTH . . . . . YEAR
204	CHECK 203: CHILD BORN IN JANUARY 2008 OR LATER?	YES . . . . . 1 NO . . . . . 2 (GO TO 203 FOR NEXT CHILD OR, IF NO MORE CHILDREN, END INTERVIEW)	YES . . . . . 1 NO . . . . . 2 (GO TO 203 FOR NEXT CHILD OR, IF NO MORE CHILDREN, END INTERVIEW)	YES . . . . . 1 NO . . . . . 2 (GO TO 203 FOR NEXT CHILD OR, IF NO MORE CHILDREN, END INTERVIEW)
205	CHECK 203: IS CHILD AGE 0-5 MONTHS, I.E., WAS CHILD BORN IN MONTH OF INTERVIEW OR FIVE PREVIOUS MONTHS?	0-5 MONTHS . . . . . 1 (GO TO 203 FOR NEXT CHILD OR, IF NO MORE CHILDREN, END INTERVIEW) OLDER 2	0-5 MONTHS . . . . . 1 (GO TO 203 FOR NEXT CHILD OR, IF NO MORE CHILDREN, END INTERVIEW) OLDER 2	0-5 MONTHS . . . . . 1 (GO TO 203 FOR NEXT CHILD OR, IF NO MORE CHILDREN, END INTERVIEW) OLDER 2
206	LINE NUMBER OF PARENT/ OTHER ADULT RESPONSIBLE FOR THE CHILD (FROM COLUMN 1 OF HOUSEHOLD SCHEDULE). RECORD '00' IF NOT LISTED.	LINE NUMBER	LINE NUMBER	LINE NUMBER . . . . .
207	ASK CONSENT FOR ANEMIA TEST FROM PARENT/OTHER ADULT IDENTIFIED IN 206 AS RESPONSIBLE FOR CHILD.	As part of this survey, we are asking children all over the country to take an **anemia** test. Anemia is a serious health problem that usually results from poor nutrition, infection, or chronic disease. This survey will assist the government to develop programs to prevent and treat anemia. We ask that all children born in 2008 or later take part in anemia testing in this survey and give a few drops of blood from a finger or heel. The prick will cause minimal pain. The equipment used to take the blood is clean and completely safe. It has never been used before and will be thrown away after each test. The blood will be tested for anemia immediately, and the result will be told to you right away. The result will be kept strictly confidential and will not be shared with anyone other than members of our survey team. Do you have any questions? You can say yes to the test, or you can say no. It is up to you to decide. Will you allow (NAME OF CHILD) to participate in the anemia test?		
208	CIRCLE THE APPROPRIATE CODE AND SIGN YOUR NAME.	GRANTED . . . . . 1 _____ (SIGN) REFUSED . . . . . 2 NOT PRESENT . . . . . 5 OTHER 6	GRANTED . . . . . 1 _____ (SIGN) REFUSED . . . . . 2 NOT PRESENT . . . . . 5 OTHER 6	GRANTED . . . . . 1 _____ (SIGN) REFUSED . . . . . 2 NOT PRESENT . . . . . 5 OTHER 6
208A	RESPONDENT SIGNATURE OR THUMB PRINT FOR ANEMIA TESTING CONSENT	SIGNATURE/THUMB PRINT OF RESPONDENT	SIGNATURE/THUMB PRINT OF RESPONDENT	SIGNATURE/THUMB PRINT OF RESPONDENT
208B	WITNESS SIGNATURE OR THUMB PRINT FOR ANEMIA TESTING CONSENT	SIGNATURE/THUMB PRINT OF WITNESS	SIGNATURE/THUMB PRINT OF RESPONDENT	SIGNATURE/THUMB PRINT OF RESPONDENT

		CHILD 4	CHILD 5	CHILD 6
	NAME FROM COLUMN 2	NAME ________	NAME ________	NAME ________
209	ASK CONSENT FOR MALARIA TEST FROM PARENT/OTHER ADULT IDENTIFIED IN 206 AS RESPONSIBLE FOR CHILD.	As part of this survey, we are asking that children all over the country take a test to see if they have **malaria**. Malaria is a serious illness caused by a parasite transmitted by a mosquito bite. This survey will help the government to develop programs to prevent malaria. We ask that all children born in 2008 or later take part in malaria testing in this survey and give a few drops of blood from a finger or heel. The prick will cause minimal pain. The equipment used to take the blood is clean and completely safe. It has never been used before and will be thrown away after each test. (We will use blood from the same finger or heel prick made for the anemia test). One blood drop will be tested for malaria immediately, and the result will be told to you right away. A few blood drops will be collected on a slide(s) and taken to a laboratory for testing. You will not be told the results of the laboratory testing. All results will be kept strictly confidential and will not be shared with anyone other than members of our survey team. Do you have any questions? You can say yes to the test, or you can say no. It is up to you to decide. Will you allow (NAME OF CHILD) to participate in the malaria testing?		
210	CIRCLE THE APPROPRIATE CODE AND SIGN YOUR NAME.	GRANTED .... 1 ________ (SIGN) REFUSED .... 2 NOT PRESENT ..... 5 OTHER 6	GRANTED .... 1 ________ (SIGN) REFUSED .... 2 NOT PRESENT ..... 5 OTHER 6	GRANTED .... 1 ________ (SIGN) REFUSED .... 2 NOT PRESENT ..... 5 OTHER 6
210A	RESPONDENT SIGNATURE OR THUMB PRINT FOR MALARIA TESTING CONSENT	________ SIGNATURE/THUMB PRINT OF RESPONDENT	________ SIGNATURE/THUMB PRINT OF RESPONDENT	________ SIGNATURE/THUMB PRINT OF RESPONDENT
210B	WITNESS SIGNATURE OR THUMB PRINT FOR MALARIA TESTING CONSENT	________ SIGNATURE/THUMB PRINT OF WITNESS	________ SIGNATURE/THUMB PRINT OF RESPONDENT	________ SIGNATURE/THUMB PRINT OF RESPONDENT
211	PREPARE EQUIPMENT AND SUPPLIES ONLY FOR THE TEST(S) FOR WHICH CONSENT HAS BEEN OBTAINED AND PROCEED WITH THE TEST(S).			
212	BAR CODE LABEL FOR MALARIA TEST.	PUT THE 1ST BAR CODE LABEL HERE. NOT PRESENT 99994 REFUSED ..... 99995 OTHER .... 99996 PUT THE 2ND BAR CODE LABEL ON THE SLIDE AND THE 3RD ON THE TRANSMITTAL FORM.	PUT THE 1ST BAR CODE LABEL HERE. NOT PRESENT 99994 REFUSED ..... 99995 OTHER .... 99996 PUT THE 2ND BAR CODE LABEL ON THE SLIDE AND THE 3RD ON THE TRANSMITTAL FORM.	PUT THE 1ST BAR CODE LABEL HERE. NOT PRESENT 99994 REFUSED ..... 99995 OTHER .... 99996 PUT THE 2ND BAR CODE LABEL ON THE SLIDE AND THE 3RD ON THE TRANSMITTAL FORM.
213	RECORD HEMOGLOBIN LEVEL HERE AND IN THE ANEMIA AND MALARIA BROCHURE.	G/DL [ ][ ].[ ] NOT PRESENT .....994 REFUSED ....995 OTHER 996	G/DL [ ][ ].[ ] NOT PRESENT .....994 REFUSED ....995 OTHER 996	G/DL [ ][ ].[ ] NOT PRESENT .....994 REFUSED ....995 OTHER 996
214	RECORD RESULT CODE OF THE MALARIA RDT.	TESTED .... 1 NOT PRESENT ..... 2 REFUSED .... 3 OTHER .... 6 (SKIP TO 216)	TESTED .... 1 NOT PRESENT ..... 2 REFUSED .... 3 OTHER .... 6 (SKIP TO 216)	TESTED .... 1 NOT PRESENT ..... 2 REFUSED .... 3 OTHER .... 6 (SKIP TO 216)
215	RECORD THE RESULT OF THE MALARIA RDT HERE AND IN THE ANEMIA AND MALARIA BROCHURE.	POSITIVE .... 1 (SKIP TO 218) NEGATIVE .... 2 OTHER 6	POSITIVE .... 1 (SKIP TO 218) NEGATIVE .... 2 OTHER 6	POSITIVE .... 1 (SKIP TO 218) NEGATIVE .... 2 OTHER 6

		CHILD 4	CHILD 5	CHILD 6
	NAME FROM COLUMN 2	NAME ________________	NAME ________________	NAME ________________
216	CHECK 213: HEMOGLOBIN RESULT	BELOW 7.0 G/DL, SEVERE ANEMIA 1 7.0 G/DL OR ABOVE 2 NOT PRESENT . . . . . 4 REFUSED . . . . 5 OTHER . . . . 6 (SKIP TO 229)	BELOW 7.0 G/DL, SEVERE ANEMIA 1 7.0 G/DL OR ABOVE 2 NOT PRESENT . . . . . 4 REFUSED . . . . 5 OTHER . . . . 6 (SKIP TO 229)	BELOW7.0 G/DL, SEVERE ANEMIA 1 7.0 G/DL OR ABOVE 2 NOT PRESENT . . . . . 4 REFUSED . . . . 5 OTHER . . . . 6 (SKIP TO 229)
217	**<u>SEVERE ANEMIA REFERRAL</u>** STATEMENT	The anemia test shows that (NAME OF CHILD) has severe anemia. Your child is very ill and must be taken to a health facility immediately. SKIP TO 229		
218	Does (NAME) suffer from the any of following illnesses or symptoms: Extreme weakness? Heart problems? Loss of consciousness? Rapid or difficult breathing? Seizures? Abnormal bleeding? Jaundice or yellow skin? Dark urine? IF NONE OF THE ABOVE SYMPTOMS, CIRCLE CODE Y	EXTREME WEAKNESS A HEART PROBLEMS . . . B LOSS OF CONSCIOUSNESS C RAPID BREATHING . . . D SEIZURES . . . . E BLEEDING . . . . F JAUNDICE . . . . G DARK URINE . . . . H NONE OF ABOVE SYMPTOMS . . . . . . Y	EXTREME WEAKNESS A HEART PROBLEMS . . . B LOSS OF CONSCIOUSNESS C RAPID BREATHING . . . D SEIZURES . . . . E BLEEDING . . . . F JAUNDICE . . . . G DARK URINE . . . . H NONE OF ABOVE SYMPTOMS . . . . . . Y	EXTREME WEAKNESS A HEART PROBLEMS . . . B LOSS OF CONSCIOUSNESS C RAPID BREATHING . . . D SEIZURES . . . . E BLEEDING . . . . F JAUNDICE . . . . G DARK URINE . . . . H NONE OF ABOVE SYMPTOMS . . . . . . Y
219	CHECK 218: ANY CODE A-H CIRCLED?	ONLY CODE Y CIRCLED . . . . 1 ANY CODE A-H CIRCLED . . . . . 2 (SKIP TO 222)	ONLY CODE Y CIRCLED . . . . 1 ANY CODE A-H CIRCLED . . . . . 2 (SKIP TO 222)	ONLY CODE Y CIRCLED . . . . 1 ANY CODE A-H CIRCLED . . . . . 2 (SKIP TO 222)
220	CHECK 213: HEMOGLOBIN RESULT	BELOW 7.0 G/DL, SEVERE ANEMIA 1 (SKIP TO 222) 7.0 G/DL OR ABOVE 2 NOT PRESENT . . . . . 4 REFUSED . . . . 5 OTHER 6	BELOW 7.0 G/DL, SEVERE ANEMIA 1 (SKIP TO 222) 7.0 G/DL OR ABOVE 2 NOT PRESENT . . . . . 4 REFUSED . . . . 5 OTHER 6	BELOW 7.0 G/DL, SEVERE ANEMIA 1 (SKIP TO 222) 7.0 G/DL OR ABOVE 2 NOT PRESENT . . . . . 4 REFUSED . . . . 5 OTHER 6
221	In the past two weeks has (NAME) taken or is taking any antimalarial? VERIFY BY ASKING TO SEE TREATMENT. SHOW PHOTOS OF MEDICINE.	YES . . . . 1 NO . . . . 2 (SKIP TO 224)	YES . . . . 1 NO . . . . 2 (SKIP TO 224)	YES . . . . 1 NO . . . . 2 (SKIP TO 224)
221A	Did you obtain the medication from a doctor, nurse, health center, or community health worker?	DOCTOR . . . . 1 NURSE . . . . 2 HEALTH CENTER . . . 3 COMMUNITY HEALTH WORKER . . . . 4 OTHER 6	DOCTOR . . . . 1 NURSE . . . . 2 HEALTH CENTER . . . 3 COMMUNITY HEALTH WORKER . . . . 4 OTHER 6	DOCTOR . . . . 1 NURSE . . . . 2 HEALTH CENTER . . . 3 COMMUNITY HEALTH WORKER . . . . 4 OTHER 6

		CHILD 4	CHILD 5	CHILD 6
	NAME FROM COLUMN 2	NAME ________	NAME ________	NAME ________
221B	Which medication did [NAME] take? PROBE. ASK TO SEE MEDICATION PACKAGE. SHOW PHOTOS OF MEDICINE.	**ANTIMALARIAL DRUGS** SP/FANSIDAR . . . . A COMBINATION WITH ARTEMISININ . . . . . B ARTESUNATE LUMAFANTRINE . . . C ARTESUNATE + AMODIAQUINE (ASAQ, LOOSE OR CO-BLISTER) . . . . . D CHLOROQUINE . . . . . E AMODIAQUINE . . . . . F QUININE . . . . G OTHER ANTI- MALARIAL ________ . . . . . H SPECIFY **ANTIBIOTIC DRUGS** AMPICILLIN . . . . I AMOXICILLIN . . . . J CEPTRIN . . . . K INJECTION, CRYSTALINE PENACILLIN . . . . L OTHER ANTIBIOTIC ________ . . . . . M SPECIFY **ANTIPYRETIC** ASPIRIN . . . . N PARACETAMOL/ PANADOL . . . . . . O NOVALGINE . . . . . . P IBUPROFEN . . . . Q **OTHER** ________ . . . X SPECIFY **DON'T KNOW** . . . . Z (SKIP TO 224)	**ANTIMALARIAL DRUGS** SP/FANSIDAR . . . . A COMBINATION WITH ARTEMISININ . . . . . B ARTESUNATE LUMAFANTRINE . . . C ARTESUNATE + AMODIAQUINE (ASAQ, LOOSE OR CO-BLISTER) . . . . . D CHLOROQUINE . . . . . E AMODIAQUINE . . . . . F QUININE . . . . G OTHER ANTI- MALARIAL ________ . . . . . H SPECIFY **ANTIBIOTIC DRUGS** AMPICILLIN . . . . I AMOXICILLIN . . . . J CEPTRIN . . . . K INJECTION, CRYSTALINE PENACILLIN . . . . L OTHER ANTIBIOTIC ________ . . . . . M SPECIFY **ANTIPYRETIC** ASPIRIN . . . . N PARACETAMOL/ PANADOL . . . . . . O NOVALGINE . . . . . . P IBUPROFEN . . . . Q **OTHER** ________ . . . X SPECIFY **DON'T KNOW** . . . . Z (SKIP TO 224)	**ANTIMALARIAL DRUGS** SP/FANSIDAR . . . . A COMBINATION WITH ARTEMISININ . . . . . B ARTESUNATE LUMAFANTRINE . . . C ARTESUNATE + AMODIAQUINE (ASAQ, LOOSE OR CO-BLISTER) . . . . . D CHLOROQUINE . . . . . E AMODIAQUINE . . . . . F QUININE . . . . G OTHER ANTI- MALARIAL ________ . . . . . H SPECIFY **ANTIBIOTIC DRUGS** AMPICILLIN . . . . I AMOXICILLIN . . . . J CEPTRIN . . . . K INJECTION, CRYSTALINE PENACILLIN . . . . L OTHER ANTIBIOTIC ________ . . . . . M SPECIFY **ANTIPYRETIC** ASPIRIN . . . . N PARACETAMOL/ PANADOL . . . . . . O NOVALGINE . . . . . . P IBUPROFEN . . . . Q **OTHER** ________ . . . X SPECIFY **DON'T KNOW** . . . . Z (SKIP TO 224)
221C	For how many days did [NAME] taken the medication? IF 7 DAYS OR MORE, WRITE '7'.	DAYS . . . . [ ] DON'T KNOW . . . . . 8 (SKIP TO 223)	DAYS . . . . [ ] DON'T KNOW . . . . . 8 (SKIP TO 223)	DAYS . . . . [ ] DON'T KNOW . . . . . 8 (SKIP TO 223)
222	**<u>SEVERE MALARIA REFERRAL</u>** STATEMENT	The malaria test shows that (NAME OF CHILD) has malaria. Your child also has symptoms of severe malaria. The malaria treatment I have will not help your child, and I cannot give you the medication. Your child is very ill and must be taken to a health facility right away. SKIP TO 228		
223	**<u>ALREADY TAKING [FIRST LINE MEDICATION] REFERRAL STATEMENT</u>**	You have told me that (NAME OF CHILD) has already received [MECINDE FROM Q221B] for malaria. Therefore, I cannot give you additional [MEDICINE FROM Q221B]. However, the test shows that he/she has malaria. If your child has a fever for two days after the last dose of [MEDICINE FROM Q221B], you should take the child to the nearest health facility for further examination. SKIP TO 228		

		CHILD 4	CHILD 5	CHILD 6
	NAME FROM COLUMN 2	NAME ________	NAME ________	NAME ________
224	READ INFORMATION FOR MALARIA TREATMENT AND CONSENT STATEMENT TO PARENT OR OTHER ADULT RESPONSIBLE FOR THE CHILD.	The malaria test shows that your child has malaria. We can give you free medicine. The medicine is called ACT. ACT is very effective and in a few days it should get rid of the fever and other symptoms. You may choose to give the child the medicine or not. This is up to you. Please tell me whether you accept the medicine or not.		
225	CIRCLE THE APPROPRIATE CODE AND SIGN YOUR NAME.	ACCEPTED MEDICINE 1 ________ (SIGN) REFUSED .... 2 OTHER 6	ACCEPTED MEDICINE 1 ________ (SIGN) REFUSED .... 2 OTHER 6	ACCEPTED MEDICINE 1 ________ (SIGN) REFUSED .... 2 OTHER 6
226	CHECK 225: MEDICATION ACCEPTED	ACCEPTED MEDICINE 1 REFUSED .... 2 OTHER .... 6 (SKIP TO 228)	ACCEPTED MEDICINE 1 REFUSED .... 2 OTHER .... 6 (SKIP TO 228)	ACCEPTED MEDICINE 1 REFUSED .... 2 OTHER .... 6 (SKIP TO 228)
227	TREATMENT FOR CHILDREN WITH POSITIVE MALARIA TESTS	[INSERT DOSAGE INSTRUCTIONS] ALSO TELL THE PARENT/ADULT RESPONSIBLE FOR THE CHILD: If [NAME] has a high fever, fast or difficult breathing, itching, is not able to drink or breastfeed, gets sicker or does not get better in two days, you should take him/her to a health center for treatment right away.		
228	RECORD THE RESULT CODE OF **MALARIA TREATMENT OR REFERRAL.**	MEDICATION GIVEN 1 MEDS REFUSED ..... 2 SEVERE MALARIA REFERRAL .... 3 ALREADY TAKING ACTS REFERRAL .... 4 OTHER 6	MEDICATION GIVEN 1 MEDS REFUSED ..... 2 SEVERE MALARIA REFERRAL .... 3 ALREADY TAKING ACTS REFERRAL .... 4 OTHER 6	MEDICATION GIVEN 1 MEDS REFUSED ..... 2 SEVERE MALARIA REFERRAL .... 3 ALREADY TAKING ACTS REFERRAL .... 4 OTHER 6
229	GO BACK TO 203 IN NEXT COLUMN OF THIS QUESTIONNAIRE OR IN THE FIRST COLUMN OF THE NEXT PAGE; IF NO MORE CHILDREN, END INTERVIEW.			

NATIONAL MALARIA CONTROL PROGRAMME RECOMMENDED TREATMENT FOR UNCOMPLICATED MALARIA FOR CHILDREN WITH POSITIVE MALARIA TESTS

DOSAGE SCHEDULE FOR ASAQ FIXED DOSE COMBINATION TREATMENT

AGE	WEIGHT (KG)	ASAQ COMBINATION	DOSAGE		
			DAY 1	DAY 2	DAY 3
2-11 months	≥ 4.5 kg to < 9.0 kg	25mg Artesunate/67.5mg A	1 tablet	1 tablet	1 tablet
1-5 years	≥ 9.0 kg to < 18.0 k	50mg Artesunate/135mg A	1 tablet	1 tablet	1 tablet
6-13 years	≥ 18.0 kg to < 36.0	100mg Artesunate/270mg	1 tablet	1 tablet	1 tablet

ALSO TELL THE PARENT/ADULT RESPONSIBLE FOR THE CHILD: If [NAME] has a high fever, fast or difficult breathing, is not able to drink or breastfeed, gets sicker or does not get better in two days, you should take him/her to a health professional for treatment right away.

INTERVIEWER'S OBSERVATIONS

TO BE FILLED IN AFTER COMPLETING INTERVIEW

COMMENTS ABOUT RESPONDENT:

COMMENTS ON SPECIFIC QUESTIONS:

ANY OTHER COMMENTS:

SUPERVISOR'S OBSERVATIONS

NAME OF SUPERVISOR: _____ DATE: _____

2013 SIERRA LEONE MALARIA INDICATOR SURVEY

WOMAN QUESTIONNAIRE

SIERRA LEONE
MINISTRY OF HEALTH AND SANITATION, NATIONAL MALARIA CONTROL PROGRAMME
STATISTICS SIERRA LEONE
CATHOLIC RELIEF SERVICES

IDENTIFICATION

LOCALITY NAME _____

NAME OF HOUSEHOLD HEAD _____

CLUSTER NUMBER . . . . . | | | |

HOUSEHOLD NUMBER . . . . . | | | |

DISTRICT . . . . . | | | |

PROVINCE . . . . . | |

CHIEFDOM . . . . . | | | |

SECTION . . . . . | | | | | |

ENUMERATION AREA . . . . . | | | | | | | |

URBAN-RURAL (RURAL=1 , URBAN=2) . . . . . | |

NAME AND LINE NUMBER OF WOMAN _____ | | |

INTERVIEWER VISITS

	1	2	3	FINAL VISIT
DATE				DAY:		| MONTH:		| YEAR: 2013
INTERVIEWER'S NAME				INT. NUMBER:		
RESULT*				RESULT:	
NEXT VISIT: DATE				TOTAL NUMBER OF VISITS:	
TIME				

*RESULT CODES:

1	COMPLETED	4	REFUSED		
2	NOT AT HOME	5	PARTLY COMPLETED	7	OTHER _____ (SPECIFY)
3	POSTPONED	6	INCAPACITATED		

SUPERVISOR	OFFICE EDITOR	KEYED BY
NAME _____		

INTRODUCTION AND CONSENT

Hello. My name is _____. I am working with the Ministry of Health and Sanitation (MoHS). We are conducting a survey about malaria all over Sierra Leone. The information we collect will help the government to plan health services. Your household was selected for the survey. I would like to ask you some questions about your household. The questions usually take about 15 to 20 minutes. All of the answers you give will be confidential and will not be shared with anyone other than members of our survey team. You don't have to be in the survey, but we hope you will agree to answer the questions since your views are important. Should you have any questions, feel free to call any of the following contact person(s):

In case you need more information about the survey, you may contact the person listed on this card.

GIVE CARD WITH CONTACT INFORMATION

2013 SLMIS Principle Investigator, Dr. Foday Sahr; 076480288; fsahr@yahoo.com
Chairman of Ethics Committee, Professor Hector G. Morgan; 076629251; hmorg2007@yahoo.com
Director of Research-MoHS, Dr. Donald Bash-Taqi; 076603256; dabashtaqi@gmail.com
National Malaria Control Programme (NMCP), Dr. Samuel Smith; 076611042; samueljuana@yahoo.com
Catholic Relief Services, Emily Bostick; 078611399; emily.bostick@crs.org

As part of the survey we would first like to ask some questions about your household. All of the answers you give will be confidential. As part of this survey, we are asking that children all over the country take an anemia test. Anemia is a serious health problem that usually results from poor nutrition, infection, or disease. This survey will help the government to develop programs to prevent and treat anemia. As part of this survey, we are asking that children all over the country take a test to see if they have malaria. Malaria is a serious illness caused by a parasite transmitted by a mosquito bite. If the malaria test is positive, treatment will be offered. This survey will help the government to develop programs to prevent malaria. Participation in the survey is completely voluntary. If we should come to any question you don't want to answer, just let me know and I will go on to the next question; or you can stop the interview at any time. However, we hope you will participate in the survey because your views are important.

At this time, do you want to ask me anything about the survey?
May I begin the interview now?

Signature of interviewer: _____ Date: _____

Signature/thumb print of respondent: _____ Date: _____

Signature/thumb print of witness: _____ Date: _____

RESPONDENT AGREES TO BE INTERVIEWED . . . 1 ↓ RESPONDENT DOES NOT AGREE TO BE INTERVIEWED 2 → END

SECTION 1. RESPONDENT'S BACKGROUND

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
101	RECORD THE TIME.	HOUR . . . . . [ ][ ] MINUTES . . . . . [ ][ ]	
102	In what month and year were you born?	MONTH . . . . . [ ][ ] DON'T KNOW MONTH . . . . . 98 YEAR . . . . . [ ][ ][ ][ ] DON'T KNOW YEAR 9998	
103	How old were you at your last birthday? COMPARE AND CORRECT 102 AND/OR 103 IF INCONSISTENT.	AGE IN COMPLETED YEARS [ ][ ]	
104	Have you ever attended school?	YES . . . . . 1 NO 2	→ 108
105	What is the highest level of school you attended: primary, junior secondary,senoir secondary, vocational, commercial, nursing, technical, teaching or higher?	PRIMARY . . . . . 1 JUNIOR SECONDARY . . . . . 2 SENIOR SECONDARY . . . . . 3 VOCATIONAL/COMMERCIAL/NURSING/ TECHNICAL/TEACHING . . . . . 4 HIGHER 5	
106	What is the highest (grade/form/year) you completed at that level? IF COMPLETED LESS THAN ONE YEAR AT THAT LEVEL, RECORD '00'.	GRADE/FORM/YEAR . . . . . [ ][ ]	
107	CHECK 105: PRIMARY ☐ ↓ SECONDARY OR HIGHER ☐ → 109		
108	Now I would like you to read this sentence to me. SHOW CARD TO RESPONDENT. IF RESPONDENT CANNOT READ WHOLE SENTENCE, PROBE: Can you read any part of the sentence to me?	CANNOT READ AT ALL . . . . . 1 ABLE TO READ ONLY PARTS OF SENTENCE . . . . . 2 ABLE TO READ WHOLE SENTENCE 3 NO CARD WITH REQUIRED LANGUAGE _____ 4 (SPECIFY LANGUAGE) BLIND/VISUALLY IMPAIRED 5	
109	What is your religion?	CHRISTIAN 1 MUSLIM 2 TRADITIONAL 3 NONE 4 OTHER _____ 6 (SPECIFY)	
110	What is your ethnicity?	KRIO . . . . . 11 MENDE . . . . . 12 TEMNE . . . . . 13 LIMBA . . . . . 14 FULLAH . . . . . 15 KISSI . . . . . 16 SUSU . . . . . 17 LOKO . . . . . 18 KONO . . . . . 19 MADINGO . . . . . 20 YALUNKE . . . . . 21 KURANKO . . . . . 22 SHERBRO . . . . . 23 OTHER _____ 96 (SPECIFY)	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
111	In the past six months, have you seen or heard any messages about malaria?	YES . . . . . 1 NO 2	→ 201
112	Where have you seen or heard these messages: a. Government clinic/hospital? b. Community health worker? c. Friends or family? d. In your home? e. Drama groups? f. Peer educators? g. Communiity meeting? h. Town crier? i. Posters or billboards? j. On tv? k. On the radio? l. In the newspaper? m Faith/religious leader? n. Anywhere else?	**YES** **NO** GOVT CLINIC/HOSPITAL . . . 1 2 COMMUINTY HEALTH WORKER . . . . . 1 2 FRIENDS/FAMILY . . . . . 1 2 AT HOME . . . . . 1 2 DRAMA GROUPS . . . . . 1 2 PEER EDUCATORS 1 2 COMMUNITY MEETING . . . 1 2 TOWN CRIER . . . . . 1 2 POSTERS/BILLBOARDS . . . 1 2 TV . . . . . 1 2 RADIO . . . . . 1 2 NEWSPAPER . . . . . 1 2 FAITH/RELIGIOUS LEADER . 1 2 OTHER _____ 1 2 (SPECIFY)	
113	What type of malaria messages/information did you see or hear? CIRCLE ALL RESPONSES MENTIONED. PROBE: Anything else?	FIGHT MALARIA . . . . . A MALARIA IS DANGEROUS . . . . . B MALARIA CAN KILL . . . . . C MOSQUITOES SPREAD MALARIA . . . D SLEEPING UNDER MOSQUITO NET IS IMPORTANT . . . . . E WHO SHOULD SLEEP UNDER A MOSQUITO NET . . . . . F SEEK TREATMENT FOR FEVER G SEEK TREATMENT FOR FEVER WITHIN 24 HOURS/PROMPTLY . . . H IMPORTANCE OF INDOOR RESIDUAL SPRAYING (IRS) . . . . . I NOT PLASTERING WALLS AFTER IRS J ENVIRONMENTAL SANTINATION ACTIVITIES . . . . . K OTHER _____ X (SPECIFY) DON'T KNOW . . . . . Z	

SECTION 2. REPRODUCTION

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
201	Now I would like to ask about all the births you have had during your life. Have you ever given birth?	YES . . . . . 1 NO 2	→ 206
202	Do you have any sons or daughters to whom you have given birth who are now living with you?	YES . . . . . 1 NO 2	→ 204
203	How many sons live with you? And how many daughters live with you? IF NONE, RECORD '00'.	SONS AT HOME . . . . . [ ][ ] DAUGHTERS AT HOME . . . . . [ ][ ]	
204	Do you have any sons or daughters to whom you have given birth who are alive but do not live with you?	YES . . . . . 1 NO 2	→ 206
205	How many sons are alive but do not live with you? And how many daughters are alive but do not live with you? IF NONE, RECORD '00'.	SONS ELSEWHERE . . . . . [ ][ ] DAUGHTERS ELSEWHERE	
206	Have you ever given birth to a boy or girl who was born alive but later died? IF NO, PROBE: Any baby who cried or showed signs of life but did not survive?	YES . . . . . 1 NO 2	→ 208
207	How many boys have died? And how many girls have died? IF NONE, RECORD '00'.	BOYS DEAD . . . . . [ ][ ] GIRLS DEAD . . . . . [ ][ ]	
208	SUM ANSWERS TO 203, 205, AND 207, AND ENTER TOTAL. IF NONE, RECORD '00'.	TOTAL BIRTHS . . . . . [ ][ ]	
209	CHECK 208: Just to make sure that I have this right: you have had in TOTAL _____ births during your life. Is that correct? YES ☐ NO ☐ → PROBE AND CORRECT 201-208 AS NECESSARY.		
210	Now I'd like to ask you about your more recent births. How many births have you had in the last 6 years? IF NONE, CIRCLE '00.'	TOTAL IN THE LAST 6 YEARS . . . . . [ ][ ] NONE 00	→ 224

211 Now I would like to record the names of all your births **in the last six years**, whether still alive or not, starting with the most recent one you had.

RECORD NAMES OF ALL THE BIRTHS IN THE LAST 6 YEARS IN 212. RECORD TWINS AND TRIPLETS ON SEPARATE ROWS.

212 What name was given to your (most recent/previous) baby? RECORD NAME. BIRTH HISTORY NUMBER	213 Is (NAME) a boy or a girl?	214 Were any of these births twins?	215 In what month and year was (NAME) born? PROBE: When is his/her birthday?	216 Is (NAME) still alive?	217 IF ALIVE: How old was (NAME) at his/her last birthday? RECORD AGE IN COMPLETED YEARS.	218 IF ALIVE: Is (NAME) living with you?	219 IF ALIVE: RECORD HOUSE-HOLD LINE NUMBER OF CHILD (RECORD '00' IF CHILD NOT LISTED IN HOUSE-HOLD).	220 Were there any other live births between (NAME) and (NAME OF PREVIOUS BIRTH), including any children who died after birth?
01	BOY 1 GIRL 2	SING 1 MULT 2	MONTH YEAR	YES . . . . 1 NO . . . . 2 (NEXT BIRTH)	AGE IN YEARS	YES . . . 1 NO 2	HOUSEHOLD LINE NUMBER (NEXT BIRTH)	
02	BOY 1 GIRL 2	SING 1 MULT 2	MONTH YEAR	YES . . . . 1 NO . . . . 2 → 220	AGE IN YEARS	YES . . . 1 NO 2	HOUSEHOLD LINE NUMBER	YES . . . . . 1 ADD BIRTH NO . . . . . 2 NEXT BIRTH
03	BOY 1 GIRL 2	SING 1 MULT 2	MONTH YEAR	YES . . . . 1 NO . . . . 2 → 220	AGE IN YEARS	YES . . . 1 NO 2	HOUSEHOLD LINE NUMBER	YES . . . . . 1 ADD BIRTH NO . . . . . 2 NEXT BIRTH
04	BOY 1 GIRL 2	SING 1 MULT 2	MONTH YEAR	YES . . . . 1 NO . . . . 2 → 220	AGE IN YEARS	YES . . . 1 NO 2	HOUSEHOLD LINE NUMBER	YES . . . . . 1 ADD BIRTH NO . . . . . 2 NEXT BIRTH
05	BOY 1 GIRL 2	SING 1 MULT 2	MONTH YEAR	YES . . . . 1 NO . . . . 2 → 220	AGE IN YEARS	YES . . . 1 NO 2	HOUSEHOLD LINE NUMBER	YES . . . . . 1 ADD BIRTH NO . . . . . 2 NEXT BIRTH
06	BOY 1 GIRL 2	SING 1 MULT 2	MONTH YEAR	YES . . . . 1 NO . . . . 2 → 220	AGE IN YEARS	YES . . . 1 NO 2	HOUSEHOLD LINE NUMBER	YES . . . . . 1 ADD BIRTH NO . . . . . 2 NEXT BIRTH
07	BOY 1 GIRL 2	SING 1 MULT 2	MONTH YEAR	YES . . . . 1 NO . . . . 2 → 220	AGE IN YEARS	YES . . . 1 NO 2	HOUSEHOLD LINE NUMBER	YES . . . . . 1 ADD BIRTH NO 2

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
221	Have you had any live births since the birth of (NAME OF MOST RECENT BIRTH)? IF YES, RECORD BIRTH(S) IN TABLE.	YES . . . . . 1 NO 2	
222	COMPARE 210 WITH NUMBER OF BIRTHS IN HISTORY ABOVE AND MARK: NUMBERS ARE SAME ☐ → NUMBERS ARE DIFFERENT ☐ → (PROBE AND RECONCILE.)		
223	CHECK 215: ENTER THE NUMBER OF BIRTHS IN 2008 OR LATER.	NUMBER OF BIRTHS . . . . . ☐ NONE 0	
224	Are you pregnant now?	YES . . . . . 1 NO . . . . . 2 UNSURE 8	☐ → 226
225	How many months pregnant are you? RECORD NUMBER OF COMPLETED MONTHS.	MONTHS . . . . . ☐☐	
226	CHECK 223: ONE OR MORE BIRTHS IN 2008 OR LATER ☐ ↓ NO BIRTHS IN 2008 OR LATER ☐ → 501 Q. 223 IS BLANK ☐ → 501		

SECTION 3. PREGNANCY AND INTERMITTENT PREVENTATIVE TREATMENT

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
301	CHECK 215: ENTER IN THE TABLE THE NAME AND SURVIVAL STATUS OF THE MOST RECENT BIRTH. Now I would like to ask some questions about your last pregnancy that resulted in a live birth.		
301A	FROM 212 AND 216, LINE 01:	MOST RECENT BIRTH NAME _____ LIVING ☐ DEAD ☐	
302	When you were pregnant with (NAME), did you see anyone for antenatal care for this pregnancy?	YES . . . . . 1 NO 2	→ 304
303	Whom did you see? Anyone else? PROBE TO IDENTIFY EACH TYPE OF PERSON AND RECORD ALL MENTIONED.	**HEALTH PERSONNEL** DOCTOR . . . . . A NURSE/MIDWIFE . . . . . B MCH AIDE . . . . . C COMMUNITY HEALTH OFFICER . . . D **OTHER PERSON** TRADITIONAL BIRTHATTENDANT E COMMUNITY/VILLAGE HEALTH WORKER . . . . . F OTHER _____ X (SPECIFY)	
304	During this pregnancy, did you take any drugs to keep you from getting malaria?	YES . . . . . 1 NO . . . . . 2 DON'T KNOW 8	→ 314
305	What medicine did you take? RECORD ALL MENTIONED. IF TYPE OF DRUG IS NOT DETERMINED, SHOW TYPICAL ANTIMALARIAL DRUGS TO RESPONDENT.	SP/FANSIDAR . . . . . A CHLOROQUINE . . . . . B OTHER _____ X (SPECIFY) DON'T KNOW . . . . . Z	
306	CHECK 305: SP/FANSIDAR TAKEN FOR MALARIA PREVENTION.	CODE 'A' CIRCLED ☐ ↓ CODE 'A' NOT CIRCLED ☐	→ 310
307	How many times did you take SP/Fansidar during this pregnancy?	1 TIME . . . . . 1 2 TIMES . . . . . 2 3 OR MORE TIMES . . . . . 3 DON'T KNOW 8	
308	CHECK 303: ANTENATAL CARE FROM HEALTH PERSONNEL DURING THIS PREGNANCY	CODE 'A', 'B', 'C', OR 'D' CIRCLED ☐ ↓ OTHER ☐	→ 310
309	Did you get the SP/Fansidar during any antenatal care visit, during another visit to a health facility or from another source?	ANTENATAL VISIT . . . . . 1 ANOTHER FACILITY VISIT . . . . . 2 TRADITIONAL BIRTH ATTENDANT . . . 3 COMMUNITY BASED PROVIDER . . . . . 4 OTHER SOURCE 6	
310	CHECK 305: CHLOROQUINE TAKEN.	CODE 'B' CIRCLED ☐ ↓ CODE 'B' NOT CIRCLED ☐	→ 314

311	How many times did you take chloroquine during this pregnancy?	1 TIME . . . . . 1 2 TIMES . . . . . 2 3 OR MORE TIMES . . . . . 3 DON'T KNOW 8	
312	CHECK 303: ANTENATAL CARE FROM HEALTH PERSONNEL DURING THIS PREGNANCY CODE 'A', 'B', 'C', OR 'D' CIRCLED OTHER → 314		
313	Did you get the chloroquine during any antenatal care visit, during another visit to a health facility or from another source?	ANTENATAL VISIT . . . . . 1 ANOTHER FACILITY VISIT . . . . . 2 TRADITIONAL BIRTH ATTENDANT . . . 3 COMMUNITY BASED PROVIDER . . . . . 4 OTHER SOURCE 6	
314	CHECK 215 AND 216: ONE OR MORE LIVING CHILDREN BORN IN 2008 OR LATER → GO TO 401 NO LIVING CHILDREN BORN IN 2008 OR LATER → 501		

SECTION 4. FEVER IN CHILDREN

401	CHECK 215: ENTER IN THE TABLE THE BIRTH HISTORY NUMBER, NAME, AND SURVIVAL STATUS OF EACH BIRTH IN 2008 OR LATER. ASK THE QUESTIONS ABOUT ALL OF THESE BIRTHS. BEGIN WITH THE MOST RECENT BIRTH. (IF THERE ARE MORE THAN 3 BIRTHS, USE AN ADDITIONAL QUESTIONNAIRE). Now I would like to ask some questions about the health of your children born since January 2008. We will talk about each separately.			
402	BIRTH HISTORY NUMBER FROM 212 IN BIRTH HISTORY	MOST RECENT BIRTH BIRTH HISTORY NUMBER [ ][ ]	SECOND MOST RECENT BIRTH BIRTH HISTORY NUMBER [ ][ ]	THIRD MOST RECENT BIRTH BIRTH HISTORY NUMBER [ ][ ]
403	FROM 212 AND 216	NAME ________ LIVING [ ] DEAD [ ] (GO TO 403 IN NEXT COLUMN OR, IF NO MORE BIRTHS, GO TO 429)	NAME ________ LIVING [ ] DEAD [ ] (GO TO 403 IN NEXT COLUMN OR, IF NO MORE BIRTHS, GO TO 429)	NAME ________ LIVING [ ] DEAD [ ] (GO TO 403 IN MOST RECENT COLUMN OF NEW QUESTIONNAIRE; OR, IF NO MORE BIRTHS, GO TO 429)
404	Has (NAME) been ill with a fever at any time in the last 2 weeks?	YES . . . . 1 NO . . . . 2 (GO TO 403 IN NEXT COLUMN OR, IF NO MORE BIRTHS, GO TO 429) DON'T KNOW 8	YES . . . . 1 NO . . . . 2 (GO TO 403 IN NEXT COLUMN OR, IF NO MORE BIRTHS, GO TO 429) DON'T KNOW 8	YES . . . . 1 NO . . . . 2 (GO TO 403 IN MOST RECENT COLUMN OF NEW QUESTIONNAIRE; OR, IF NO MORE BIRTHS, GO TO 429) DON'T KNOW 8
406	Did you seek advice or treatment for the illness from any source?	YES . . . . 1 NO . . . . 2 (SKIP TO 410)	YES . . . . 1 NO . . . . 2 (SKIP TO 410)	YES . . . . 1 NO . . . . 2 (SKIP TO 410)
407	Where did you seek advice or treatment? Anywhere else? PROBE TO IDENTIFY EACH TYPE OF SOURCE. IF UNABLE TO DETERMINE IF PUBLIC OR PRIVATE SECTOR, WRITE THE NAME OF THE PLACE. ________ (NAME OF PLACE(S))	**PUBLIC SECTOR** GOVT HOSPITAL A GOVT HEALTH CENTER . . . . . . B MOBILE CLINIC . C CBP . . . . D OTHER PUBLIC SECTOR ________ E (SPECIFY) **PRIVATE MEDICAL SECTOR** PVT HOSPITAL . F PVT CLINIC . . . . . . G MISSION/FAITH-BASED HOSPITAL . . . H MISSION/FAITH-BASED CLINIC . I PHARMACY . . . J MOBILE CLINIC K OTHER PRIVATE MED. SECTOR ________ L (SPECIFY) **OTHER SOURCE** SHOP . . . . M TRADITIONAL HEALER . . . . . . N DRUG PEDDLER . O **OTHER** ________ X (SPECIFY)	**PUBLIC SECTOR** GOVT HOSPITAL A GOVT HEALTH CENTER . . . . . . B MOBILE CLINIC . C CBP . . . . D OTHER PUBLIC SECTOR ________ E (SPECIFY) **PRIVATE MEDICAL SECTOR** PVT HOSPITAL . F PVT CLINIC . . . . . . G MISSION/FAITH-BASED HOSPITAL . . . H MISSION/FAITH-BASED CLINIC . I PHARMACY . . . J MOBILE CLINIC K OTHER PRIVATE MED. SECTOR ________ L (SPECIFY) **OTHER SOURCE** SHOP . . . . M TRADITIONAL HEALER . . . . . . N DRUG PEDDLER . O **OTHER** ________ X (SPECIFY)	**PUBLIC SECTOR** GOVT HOSPITAL A GOVT HEALTH CENTER . . . . . . B MOBILE CLINIC . C CBP . . . . D OTHER PUBLIC SECTOR ________ E (SPECIFY) **PRIVATE MEDICAL SECTOR** PVT HOSPITAL . F PVT CLINIC . . . . . . G MISSION/FAITH-BASED HOSPITAL . . . H MISSION/FAITH-BASED CLINIC . I PHARMACY . . . J MOBILE CLINIC K OTHER PRIVATE MED. SECTOR ________ L (SPECIFY) **OTHER SOURCE** SHOP . . . . M TRADITIONAL HEALER . . . . . . N DRUG PEDDLER . O **OTHER** ________ X (SPECIFY)

NO.	QUESTIONS AND FILTERS	MOST RECENT BIRTH NAME ________________	SECOND MOST RECENT BIRTH NAME ________________	THIRD MOST RECENT BIRTH NAME ________________
408	CHECK 407:	TWO OR MORE CODES CIRCLED ☐ ONLY ONE CODE CIRCLED ☐ → (SKIP TO 410)	TWO OR MORE CODES CIRCLED ☐ ONLY ONE CODE CIRCLED ☐ → (SKIP TO 410)	TWO OR MORE CODES CIRCLED ☐ ONLY ONE CODE CIRCLED ☐ → (SKIP TO 410)
409	Where did you first seek advice or treatment? USE LETTER CODE FROM 407.	FIRST PLACE . . . ☐	FIRST PLACE . . . ☐	FIRST PLACE . . . ☐
409A	At any time during the illness, did (NAME) have blood taken from his/her finger or heel for testing?	YES . . . . 1 NO . . . . 2 DON'T KNOW 8	YES . . . . 1 NO . . . . 2 DON'T KNOW 8	YES . . . . 1 NO . . . . 2 DON'T KNOW 8
410	At any time during the illness, did (NAME) take any medicines for the illness?	YES . . . . 1 NO . . . . 2 (GO BACK TO 403 IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 429) DON'T KNOW 8	YES . . . . 1 NO . . . . 2 (GO BACK TO 403 IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 429) DON'T KNOW 8	YES . . . . 1 NO . . . . 2 (GO TO 403 IN MOST RECENT COLUMN OF NEW QUESTIONNAIRE; OR, IF NO MORE BIRTHS, GO TO 429) DON'T KNOW 8
411	What medicines did (NAME) take? PROBE: Any other drugs? RECORD ALL MENTIONED. SHOW MEDICINES.	**ANTIMALARIAL DRUGS** SP/FANSIDAR . . . . . . A COMBINATION WITH ARTEMISININ . . . B ARTESUNATE LUMAFANTRINE . C ARTESUNATE + AMODIAQUINE (ASAQ, LOOSE OR CO-BLISTER) . . . D CHLOROQUINE . . . E AMODIAQUINE . . . F QUININE . . . . G OTHER ANTI-MALARIAL ____________ . . . H (SPECIFY) **ANTIBIOTIC DRUGS** AMPICILLIN . . . . I AMOXICILLIN . . . . . . J SEPTRIN . . . . K INJECTION, CRYSTALINE PENACILLIN . . . . . . L OTHER ANTIBIOTIC ____________ . . . M (SPECIFY) **ANTIPYRETIC** ASPIRIN . . . . N PARACETAMOL/ PANADOL . . . . O NOVALGINE . . . . P IBUPROFEN . . . . . . Q **OTHER** ____________ . X (SPECIFY) **DON'T KNOW** . . . . Z	**ANTIMALARIAL DRUGS** SP/FANSIDAR . . . . . . A COMBINATION WITH ARTEMISININ . . . B ARTESUNATE LUMAFANTRINE . C ARTESUNATE + AMODIAQUINE (ASAQ, LOOSE OR CO-BLISTER) . . . D CHLOROQUINE . . . E AMODIAQUINE . . . F QUININE . . . . G OTHER ANTI-MALARIAL ____________ . . . H (SPECIFY) **ANTIBIOTIC DRUGS** AMPICILLIN . . . . I AMOXICILLIN . . . . . . J SEPTRIN . . . . K INJECTION, CRYSTALINE PENACILLIN . . . . . . L OTHER ANTIBIOTIC ____________ . . . M (SPECIFY) **ANTIPYRETIC** ASPIRIN . . . . N PARACETAMOL/ PANADOL . . . . O NOVALGINE . . . . P IBUPROFEN . . . . . . Q **OTHER** ____________ . X (SPECIFY) **DON'T KNOW** . . . . Z	**ANTIMALARIAL DRUGS** SP/FANSIDAR . . . . . . A COMBINATION WITH ARTEMISININ . . . B ARTESUNATE LUMAFANTRINE . C ARTESUNATE + AMODIAQUINE (ASAQ, LOOSE OR CO-BLISTER) . . . D CHLOROQUINE . . . E AMODIAQUINE . . . F QUININE . . . . G OTHER ANTI-MALARIAL ____________ . . . H (SPECIFY) **ANTIBIOTIC DRUGS** AMPICILLIN . . . . I AMOXICILLIN . . . . . . J SEPTRIN . . . . K INJECTION, CRYSTALINE PENACILLIN . . . . . . L OTHER ANTIBIOTIC ____________ . . . M (SPECIFY) **ANTIPYRETIC** ASPIRIN . . . . N PARACETAMOL/ PANADOL . . . . O NOVALGINE . . . . P IBUPROFEN . . . . . . Q **OTHER** ____________ . X (SPECIFY) **DON'T KNOW** . . . . Z

NO.	QUESTIONS AND FILTERS	MOST RECENT BIRTH NAME ______	SECOND MOST RECENT BIRTH NAME ______	THIRD MOST RECENT BIRTH NAME ______
412	CHECK 411: ANY CODE A-H CIRCLED?	YES ☐ NO ☐ (GO BACK TO 403 IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 429)	YES ☐ NO ☐ (GO BACK TO 403 IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 429)	YES ☐ NO ☐ (GO TO 403 IN MOST RECENT COLUMN OF NEW QUESTIONNAIRE; OR, IF NO MORE BIRTHS, GO TO 429)
413	CHECK 411: SP/FANSIDAR ('A') GIVEN	CODE 'A' CIRCLED ☐ CODE 'A' NOT CIRCLED ☐ (SKIP TO 415)	CODE 'A' CIRCLED ☐ CODE 'A' NOT CIRCLED ☐ (SKIP TO 415)	CODE 'A' CIRCLED ☐ CODE 'A' NOT CIRCLED ☐ (SKIP TO 415)
414	How long after the fever started did (NAME) first take (SP/Fansidar)?	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . 3 DON'T KNOW . . . 8	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . 3 DON'T KNOW . . . 8	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . 3 DON'T KNOW . . . 8
414A	For how many days did (NAME) take SP/Fansidar? IF 7 DAYS OR MORE, WRITE '7'.	DAYS . . . . ☐ DON'T KNOW 8	DAYS . . . . ☐ DON'T KNOW 8	DAYS . . . . ☐ DON'T KNOW 8
415	CHECK 411: COMBINATION WITH ARTEMISININ ('B') GIVEN	CODE 'B' CIRCLED ☐ CODE 'B' NOT CIRCLED ☐ (SKIP TO 417)	CODE 'B' CIRCLED ☐ CODE 'B' NOT CIRCLED ☐ (SKIP TO 417)	CODE 'B' CIRCLED ☐ CODE 'B' NOT CIRCLED ☐ (SKIP TO 417)
416	How long after the fever started did (NAME) first take combination with artemisinin?	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . 3 DON'T KNOW . . . 8	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . 3 DON'T KNOW . . . 8	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . 3 DON'T KNOW . . . 8
416A	For how many days did (NAME) take combination with artemisinin? IF 7 DAYS OR MORE, WRITE '7'.	DAYS . . . . ☐ DON'T KNOW 8	DAYS . . . . ☐ DON'T KNOW 8	DAYS . . . . ☐ DON'T KNOW 8
417	CHECK 411: ARTESUNATE LUMAFANTRINE ('C') GIVEN	CODE 'C' CIRCLED ☐ CODE 'C' NOT CIRCLED ☐ (SKIP TO 419)	CODE 'C' CIRCLED ☐ CODE 'C' NOT CIRCLED ☐ (SKIP TO 419)	CODE 'C' CIRCLED ☐ CODE 'C' NOT CIRCLED ☐ (SKIP TO 419)
418	How long after the fever started did (NAME) first take artesunate lumafantrine?	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . 3 DON'T KNOW . . . 8	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . 3 DON'T KNOW . . . 8	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . 3 DON'T KNOW . . . 8

NO.	QUESTIONS AND FILTERS	MOST RECENT BIRTH NAME __________	SECOND MOST RECENT BIRTH NAME __________	THIRD MOST RECENT BIRTH NAME __________
418A	For how many days did (NAME) take artesunate lumafantrine? IF 7 DAYS OR MORE, WRITE '7'.	DAYS . . . . [ ] DON'T KNOW 8	DAYS . . . . [ ] DON'T KNOW 8	DAYS . . . . [ ] DON'T KNOW 8
419	CHECK 411: ARTESUNATE + AMODIAQUINE (ASAQ, LOOSE OR CO-BLISTER) ('D') GIVEN	CODE 'D' CIRCLED [ ] CODE 'D' NOT CIRCLED [ ] (SKIP TO 421)	CODE 'D' CIRCLED [ ] CODE 'D' NOT CIRCLED [ ] (SKIP TO 421)	CODE 'D' CIRCLED [ ] CODE 'D' NOT CIRCLED [ ] (SKIP TO 421)
420	How long after the fever started did (NAME) first take ASAQ?	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . 3 DON'T KNOW . . . 8	SAME DAY . . . . 000 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . 3 DON'T KNOW . . . 8	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . 3 DON'T KNOW . . . 8
420A	For how many days did (NAME) take ASAQ? IF 7 DAYS OR MORE, WRITE '7'.	DAYS . . . . [ ] DON'T KNOW 8	DAYS . . . . [ ] DON'T KNOW 8	DAYS . . . . [ ] DON'T KNOW 8
421	CHECK 411: CHLOROQUINE ('E') GIVEN	CODE 'E' CIRCLED [ ] CODE 'E' NOT CIRCLED [ ] (SKIP TO 423)	CODE 'E' CIRCLED [ ] CODE 'E' NOT CIRCLED [ ] (SKIP TO 423)	CODE 'E' CIRCLED [ ] CODE 'E' NOT CIRCLED [ ] (SKIP TO 423)
422	How long after the fever started did (NAME) first take chloroquine?	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . 3 DON'T KNOW . . . 8	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . 3 DON'T KNOW . . . 8	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . 3 DON'T KNOW . . . 8
422A	For how many days did (NAME) take chloroquine? IF 7 DAYS OR MORE, WRITE '7'.	DAYS . . . . [ ] DON'T KNOW 8	DAYS . . . . [ ] DON'T KNOW 8	DAYS . . . . [ ] DON'T KNOW 8
423	CHECK 411: AMODIAQUINE ('F') GIVEN	CODE 'F' CIRCLED [ ] CODE 'F' NOT CIRCLED [ ] (SKIP TO 425)	CODE 'F' CIRCLED [ ] CODE 'F' NOT CIRCLED [ ] (SKIP TO 425)	CODE 'F' CIRCLED [ ] CODE 'F' NOT CIRCLED [ ] (SKIP TO 425)
424	How long after the fever started did (NAME) first take amodiaquine?	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . 3 DON'T KNOW . . . 8	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . 3 DON'T KNOW . . . 8	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . 3 DON'T KNOW . . . 8

NO.	QUESTIONS AND FILTERS	MOST RECENT BIRTH NAME ____________	SECOND MOST RECENT BIRTH NAME ____________	THIRD MOST RECENT BIRTH NAME ____________
424A	For how many days did (NAME) take amodiaquine? IF 7 DAYS OR MORE, WRITE '7'.	DAYS . . . . [ ] DON'T KNOW 8	DAYS . . . . [ ] DON'T KNOW 8	DAYS . . . . [ ] DON'T KNOW 8
425	CHECK 411: QUININE ('G') GIVEN	CODE 'G' CIRCLED [ ] ↓ CODE 'G' NOT CIRCLED [ ] (SKIP TO 427)	CODE 'G' CIRCLED [ ] ↓ CODE 'G' NOT CIRCLED [ ] (SKIP TO 427)	CODE 'G' CIRCLED [ ] ↓ CODE 'G' NOT CIRCLED [ ] (SKIP TO 427)
426	How long after the fever started did (NAME) first take quinine?	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . 3 DON'T KNOW . . . 8	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . 3 DON'T KNOW . . . 8	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . 3 DON'T KNOW . . . 8
426A	For how many days did (NAME) take quinine? IF 7 DAYS OR MORE, WRITE '7'.	DAYS . . . . [ ] DON'T KNOW 8	DAYS . . . . [ ] DON'T KNOW 8	DAYS . . . . [ ] DON'T KNOW 8
427	CHECK 411: OTHER ANTIMALARIAL ('H') GIVEN	CODE 'H' CIRCLED [ ] ↓ CODE 'H' NOT CIRCLED [ ] ↓ (GO BACK TO 403 IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 429)	CODE 'H' CIRCLED [ ] ↓ CODE 'H' NOT CIRCLED [ ] ↓ (GO BACK TO 403 IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 429)	CODE 'H' CIRCLED [ ] ↓ CODE 'H' NOT CIRCLED [ ] ↓ (GO TO 403 IN MOST RECENT COLUMN OF NEW QUESTIONNAIRE; OR, IF NO MORE BIRTHS, GO TO 429)
428	How long after the fever started did (NAME) first take (OTHER ANTIMALARIAL)?	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . 3 DON'T KNOW . . . 8	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . 3 DON'T KNOW . . . 8	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . 3 DON'T KNOW . . . 8
428A	For how many days did (NAME) take (OTHER ANTIMALARIAL)? IF 7 DAYS OR MORE, WRITE '7'.	DAYS . . . . [ ] DON'T KNOW 8	DAYS . . . . [ ] DON'T KNOW 8	DAYS . . . . [ ] DON'T KNOW 8
429		GO BACK TO 403 IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 501.	GO BACK TO 403 IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 501.	GO TO 403 IN MOST RECENT COLUMN OF NEW QUESTIONNAIRE; OR, IF NO MORE BIRTHS, GO TO 501.

SECTION 5. KNOWLEDGE OF MALARIA

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
501	Have you ever heard of an illness called malaria? USE LOCAL NAME FOR MALARIA.	YES . . . . . 1 NO 2	→ 508
502	In your opinion, what causes malaria? CIRCLE ALL MENTIONED. PROBE: Anything else?	MOSQUITO BITES . . . . . A EATING IMMATURE SUGARCANE . . . B EATING COLD FOOD . . . . . C EATING DIRTY FOOD . . . . . D DRINKING BEER/PALM WINE . . . . . E DRINKING DIRTY WATER . . . . . F GETTING SOAKED WITH RAIN . . . . . G COLD OR CHANGING WEATHER . . . H WITCHCRAFT . . . . . I INJECTIONS/DRUGS . . . . . J EATING ORANGES OR MANGOS . . . K EATING PLENTY OIL . . . . . L SHARING RAZORS/BLADES . . . . . M BED BUGS . . . . . N DIRTY SURROUNDINGS . . . . . O OTHER _____ X (SPECIFY) DON'T KNOW . . . . . Z	
503	Can you tell me any symptoms of malaria? CIRCLE ALL MENTIONED. PROBE: Anything else?	FEVER . . . . . A EXCESSIVE SWEATING . . . . . B FEELING COLD . . . . . C HEADACHE . . . . . D NAUSEA AND VOMITING . . . . . E DIARRHEA . . . . . F DIZZINESS . . . . . G LOSS OF APPETITE . . . . . H BODY ACHE OR JOINT PAIN . . . . . I PALE EYES . . . . . J BODY WEAKNESS . . . . . K REFUSING TO EAT OR DRINK . . . . . L JAUNDICE . . . . . M DARK URINE . . . . . N LOW BLOOD (ANEMIA) . . . . . O OTHER _____ X (SPECIFY) DON'T KNOW . . . . . Z	
504	Can you tell me any danger symptoms for severe malaria? CIRCLE ALL MENTIONED. PROBE: Anything else?	SHIVERING/SHAKING/CONVULTIONS A VOMITING EVERYTHING . . . . . B CONFUSION . . . . . C LOW BLOOD (ANEMIA) . . . . . D DIFFICULTY BREATHING . . . . . E DIZZINESS . . . . . F JAUNDICE . . . . . G OTHER _____ X (SPECIFY) DON'T KNOW . . . . . Z	
505	How can someone protect themselves against malaria? CIRCLE ALL MENTIONED. PROBE: Anything else?	SLEEP UNDER REGULAR MOSQUITO NET . . . . . A SLEEP UNDER A TREATED NET . . . . . B USE MOSQUITO REPELLENT . . . . . C AVOID MOSQUITO BITES . . . . . D TAKE PREVENTIVE MEDICATION . . . E INDOOR RESIDUAL SPRAY (IRS) . . . F USE MOSQUITO COILS . . . . . G CUT GRASS AROUND HOUSE . . . . . H ELIMINATE STAGNANT WATER . . . . . I KEEP SURROUNDINGS CLEAN . . . . . J BURN LEAVES . . . . . K CUT THE GRASS . . . . . L DON'T DRINK DIRTY WATER . . . . . M DON'T EAT BAD FOOD (IMMATURE SUGARCANE/LEFTOVER FOOD) . N USE MOSQUITO SCREENS ON WINDOWS . . . . . O DON'T GET SOAKED IN RAIN . . . . . P STORE BOUGHT INSECT KILLER . . . Q OTHER _____ X (SPECIFY) DON'T KNOW . . . . . Z	

505A	Is it better to sleep under an untreated or treated net?	UNTREATED . . . . . 1 TREATED . . . . . 2 DON'T KNOW 8	
506	In your opinion, which people are most at risk of getting malaria? CIRCLE ALL MENTIONED. PROBE: Anything else?	CHILDREN . . . . . A ADULTS . . . . . B PREGNANT WOMEN . . . . . C OLDER ADULTS . . . . . D ANYONE . . . . . E OTHER_____ X (SPECIFY) OTHER_____ Y (SPECIFY) DON'T KNOW . . . . . Z	
507	What medicines are used to treat malaria ? CIRCLE ALL MENTIONED. PROBE: Anything else?	ACT . . . . . A CHLOROQUINE . . . . . B SP/FANSIDAR . . . . . C QUININE . . . . . D ASPIRIN, PANADOL, PARACETAMOL E TRADITIONAL MEDICINE/HERBS . . . . . F OTHER_____ X (SPECIFY) DON'T KNOW . . . . . Z	
508	RECORD THE TIME.	HOUR . . . . .  MINUTES	

INTERVIEWER'S OBSERVATIONS

TO BE FILLED IN AFTER COMPLETING INTERVIEW

COMMENTS ABOUT RESPONDENT:

COMMENTS ON SPECIFIC QUESTIONS:

ANY OTHER COMMENTS:

SUPERVISOR'S OBSERVATIONS

NAME OF SUPERVISOR: _____ DATE: _____


Malaria
Pf