SIERRA LEONE

Malaria Indicator Survey 2016

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
Rockville, Maryland
United States

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The 2016 Sierra Leone Malaria Indicator Survey (2016 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 June-August 2016. ICF provided technical assistance. Funding for the 2016 SLMIS was provided through CRS with funds from the Global Fund (GF).

Additional information about the 2016 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, 530 Gaither Road, Rockville, MD 20850, United States; Telephone: +1-301-407-6500; Fax: +1-301-407-6501; E-mail: reports@DHSprogram.com; Internet: www.DHSprogram.com.

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CONTENTS

TABLES AND FIGURES

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

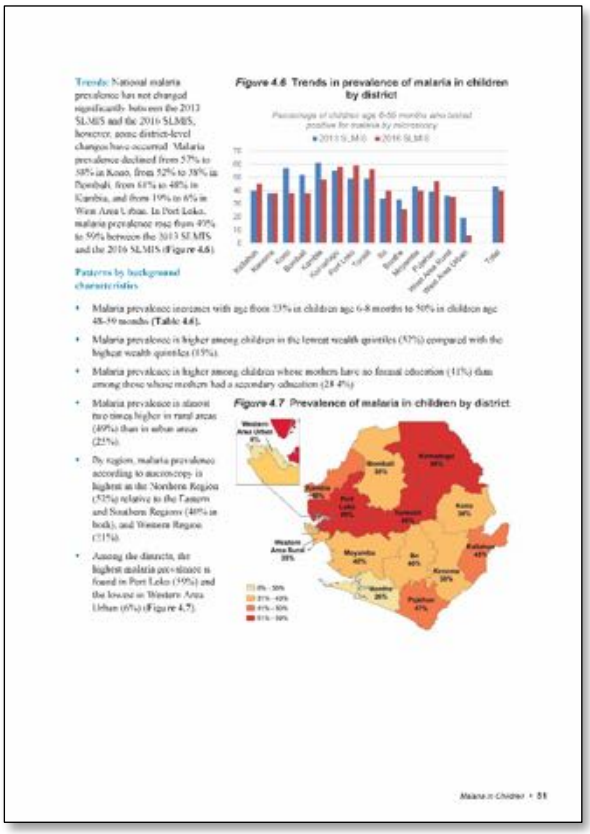
PSM	Procurement and supply management
PSU	Primary sampling unit
RBM	Roll Back Malaria
RBM-MERG	Roll Back Malaria Monitoring & Evaluation Reference Group
RDT	Rapid diagnostic test/testing
SLMIS	Sierra Leone Malaria Indicator Survey
SLPHC	Sierra Leone Population and Housing Census
SP	Sulphadoxine-pyrimethamine
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

READING AND UNDERSTANDING THE 2016 SIERRA LEONE MALARIA INDICATOR SURVEY (SLMIS)

The 2016 Sierra Leone Malaria Indicator Survey (SLMIS) report is very similar in content to the 2013 SLMIS but is presented in a new format. The new style features more figures to highlight trends, subnational patterns, and background characteristics. The text has been simplified to highlight key points in bullets and to clearly identify indicator definitions in boxes.

The tables in this report are located at the end of each chapter instead of being imbedded in the chapter text. This final report is based on approximately 35 tables of data. While the text and figures featured in each chapter highlight some of the most important findings from the tables, not every finding can be discussed or displayed graphically. For this reason, data users should be comfortable reading and interpreting tables.

The following pages provide an introduction to the organization of MIS tables, the presentation of background characteristics, and a brief summary of sampling and understanding denominators. In addition, this section provides some exercises for users as they practice their new skills in interpreting MIS tables.



EXAMPLE 1: PREVALENCE OF MALARIA IN CHILDREN

Table 4.6 Prevalence of malaria in children 1

Percentage of children age 6-59 months classified in two tests as having malaria, by background characteristics, Sierra Leone MIS 2016

3 Background characteristic	Malaria prevalence according to RDT 2		Malaria prevalence according to microscopy	
	RDT positive	Number of children	Microscopy positive	Number of children
Age in months				
6-8	30.3	413	23.3	414
9-11	34.2	378	25.3	379
12-17	43.0	749	30.3	750
18-23	45.6	592	30.1	596
24-35	57.1	1,395	40.0	1,397
36-47	56.3	1,557	46.9	1,560
48-59	63.1	1,559	50.1	1,561
Sex				
Male	53.5	3,316	40.4	3,322
Female	52.0	3,329	39.9	3,336
Mother's interview status				
Interviewed	51.3	5,016	38.2	5,017
Not interviewed[1]	57.1	1,629	46.0	1,641
Residence				
Urban	31.5	2,545	25.2	2,555
Rural	65.9	4,099	49.4	4,103 5
Region				
Eastern	59.8	1,467	40.4	1,468
Northern	64.6	2,362	51.8	2,364
Southern	59.2	1,411	39.5	1,411
Western	18.8	1,404	20.9	1,414
District				
Kailahun	67.0	564	45.0	564
Kenema	59.3	536	37.7	535
Kono	49.5	367	37.5	369
Bombali	47.7	526	37.6	528
Kambia	59.4	265	48.3	265
Koinadugu	78.1	383	57.9	383
Port Loko	69.8	515	58.5	515
Tonkolili	68.3	673	55.7	673
Bo	57.1	594	39.7	593
Bonthe	46.8	184	26.1	184
Moyamba	60.6	330	39.9	330
Pujehun	69.2	304	46.8	304
Western Area Rural	33.5	711	34.9	721
Western Area Urban	3.8	693	6.3	693
Mother's education[2]				
No education	55.2	3,038	41.2	3,040
Primary	57.5	729	43.2	729
Secondary	38.7	1,222	28.4	697
More than secondary	*	26	*	26
Wealth quintile				
Lowest	66.9	1,427	51.7	1,427
Second	68.1	1,433	52.4	1,434
Middle	62.4	1,306	44.9	1,307
Fourth	43.9	1,355	31.8	1,359
Highest	14.4	1,124	14.5	1,131
Total	4 52.7	6,644	40.1	6,658

[1] Includes children whose mothers are deceased.
[2] Excludes children whose mothers are not interviewed.
An asterisk indicates a figure is based on fewer than 25 cases and has been suppressed.

Step 1: Read the title and subtitle. They tell you the topic and the specific population group being described. In this case, the table is about children age 6-59 months who were tested for malaria.

Step 2: Scan the column headings—highlighted in green in Example 1. They describe how the information is categorized. In this table, the first column of data shows children who tested positive for malaria according to the rapid diagnostic test or RDT. The second column lists the number of children age 6-59 months who were tested for malaria using RDT in the survey. The third column shows children who tested positive for malaria

according to microscopy. The last column lists the number of children age 6-59 months who were tested for malaria using microscopy in the survey.

Step 3: Scan the row headings—the first vertical column highlighted in blue in Example 1. These show the different ways the data are divided into categories based on population characteristics. In this case, the table presents prevalence of malaria by age, sex, mother's interview status, urban-rural residence, region, district, mother's educational level, and wealth quintile.

Step 4: Look at the row at the bottom of the table highlighted in red. These percentages represent the totals of children age 6-59 months who tested positive for malaria according to the different tests. In this case, 52.7% of children age 6-59 months tested positive for malaria according to RDT, while 40.1% tested positive for malaria according to microscopy.

Step 5: To find out what percentage of children age 6-59 in rural areas tested positive for malaria according to microscopy, draw two imaginary lines, as shown on the table. This shows that 49.4% of children age 6-59 months in rural areas tested positive for malaria according to microscopy.

Step 6: By looking at patterns by background characteristics, we can see how malaria prevalence varies across Sierra Leone. Resources are often limited; knowing how malaria prevalence varies among different groups can help program planners and policy makers determine how to most effectively use resources.

Practice: Use the table in Example 1 to answer the following questions about malaria prevalence *by microscopy*:

a) Is malaria prevalence higher among boys or girls?

b) Is there a clear pattern in malaria prevalence by age?

c) What are the lowest and highest percentages (range) of malaria prevalence by region?

d) What are the lowest and highest percentages (range) of malaria prevalence by district?

e) Is there a clear pattern in malaria prevalence by mother's education level?

f) Is there a clear pattern in malaria prevalence by wealth quintile?

Answers:

a) There is nearly no difference in malaria prevalence by microscopy between boys (40.4%) and girls (39.9%).

b) Yes, malaria prevalence generally increases with age from 23.3% among children age 6-8 months to 50.1% among children age 48-59 months.

c) Malaria prevalence is lowest in Western Region (20.9%) and highest in Northern Region (51.8%).

d) Malaria prevalence varies from a low of 6.3% in Western Area Urban district to a high of 58.5% in Port Loko.

e) Malaria prevalence is lowest among children whose mothers have secondary education (28.4%).

f) Yes, malaria prevalence generally decreases as household wealth increases; malaria prevalence is highest among children living in households in the second (52.4%) and lowest (51.7%) wealth quintiles and is lowest among children in households in the highest wealth quintile (14.5%).

EXAMPLE 2: USE OF MOSQUITO NETS BY PREGNANT WOMEN

Table 3.8 Use of mosquito nets by pregnant women 1

Percentages of pregnant women age 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 MIS 2016

	2 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 mosquito net last night	Percentage who slept under an ITN[1] last night	Percentage who slept under an LLIN last night	Number of women	Percentage who slept under an ITN[1] last night	Number of women
Residence						
Urban	31.4	30.7	30.7	267	65.7	124
Rural	53.0	52.8	52.8	404	79.0	270
Region						
Eastern	51.2	49.5	49.5	167	76.4	108
Northern	44.7	44.7	44.7	245	73.1	150
Southern	60.9	60.9	60.9	128	84.2	92
Western	19.0	19.0	19.0	130	(56.7)	44
District						
Kailahun	4 (46.2)	(46.2)	(46.2)	49	(77.6)	29
Kenema	(71.8)	(71.8)	(71.8)	55	(92.9)	43
Kono	36.9	32.6	32.6	63	(56.0)	37
Bombali	51.8	51.8	51.8	60	(84.8)	37
Kambia	46.4	46.4	46.4	33	(71.1)	21
Koinadugu	(63.5)	(63.5)	(63.5)	31	(87.6)	23
Port Loko	31.0	31.0	31.0	73	(62.9)	36
Tonkolili	(43.3)	(43.3)	(43.3)	48	(62.5)	33
Bo	67.8	67.8	67.8	64	(90.3)	48
Bonthe	(55.8)	(55.8)	(55.8)	13	*	10
Moyamba	(63.8)	(63.8)	(63.8)	21	*	15
Pujehun	(46.5)	(46.5)	(46.5)	30	(71.7)	20
Western Area Rural	(28.1)	(28.1)	(28.1)	53	*	22
Western Area Urban	(12.6)	(12.6)	(12.6)	77	*	21
Education						
No education	47.4	47.4	47.4	348	82.0	201
Primary	33.5	33.5	33.5	121	56.1	72
Secondary	45.5	44.1	44.1	197	73.3	119
More than secondary	*	*	*	4	4 *	3
Wealth quintile						
Lowest	52.5	52.5	52.5	152	87.5	91
Second	45.3	44.6	44.6	123	66.1	83
Middle	57.2	57.2	57.2	123	80.6	87
Fourth	40.4	39.1	39.1	135	73.3	72
Highest	27.2	27.2	27.2	137	(61.2)	61
Total	44.4	44.0	44.0	3 671	74.8	3 395

a b

Note: Table is based on women who stayed in the household the night before the interview.
Numbers in parentheses are based on 25-49 unweighted cases. An asterisk indicates a figure is based on fewer than 25 cases and has been suppressed.
[1] An insecticide-treated net (ITN) is (1) a factory-treated net that does not require any further treatment (LLIN) or (2) a net that has been soaked with insecticide within the past 12 months.

Step 1: Read the title and subtitle. In this case, the table is about two separate groups of pregnant women: all pregnant women age 15-49 in all households (a) and pregnant women age 15-49 in households with at least one insecticide-treated net (ITN) (b).

Step 2: Identify the two panels. First, identify the columns that refer to all pregnant women age 15-49 in all households (a), and then isolate the columns that refer only to pregnant women age 15-49 in households with at least one ITN (b).

Step 3: Look at the number of women included in this table. How many pregnant women age 15-49 in all households were interviewed? It's 671. Now look at the second panel. How many pregnant women age 15-49 in households with at least one ITN were interviewed? It's 395.

Step 4: Only 671 pregnant women age 15-49 in all households and 395 pregnant women in households with at least one ITN were interviewed in the 2016 SLMIS. Once these pregnant women are further divided into the background characteristic categories, there may be too few cases for the percentages to be reliable.

- What percentage of pregnant women age 15-49 in all households in Kailahun district slept under an ITN the night before the survey? 46.2%. This percentage is in parentheses because there are between 25 and 49 pregnant women (unweighted) in this category. Readers should use this number with caution—it may not be reliable. (For more information on weighted and unweighted numbers, see Example 3.)

- What percentage of pregnant women age 15-49 with more than secondary education in households with at least one ITN slept under an ITN the night before the survey? There is no number in this cell—only an asterisk. This is because fewer than 25 pregnant women with more than secondary education in households with at least one ITN were interviewed in the survey. Results for this group are not reported. The subgroup is too small, and therefore the data are not reliable.

Note: When parentheses or asterisks are used in a table, the explanation will be noted under the table. If there are no parentheses or asterisks in a table, you can proceed with confidence that enough cases were included in all categories that the data are reliable.

EXAMPLE 3: UNDERSTANDING SAMPLING WEIGHTS IN SLMIS TABLES

A sample is a group of people who have been selected for a survey. In the 2016 SLMIS, the sample is designed to represent the national population age 15-49. In addition to national data, most countries want to collect and report data on smaller geographical or administrative areas. However, doing so requires a minimum sample size per area. For the 2015 SLMIS, the survey sample is representative at the national, regional, and district levels, and for urban and rural areas.

Table 2.8 Background characteristics of respondents

Percent distribution of women age 15-49 by selected background characteristics, Sierra Leone MIS 2016

Background characteristic	Women		
	Weighted percent	Weighted number	Unweighted number
District			
Kailahun	7.9	670	526
Kenema	7.7	656	577
Kono	7.2	610	600
Bombali	8. 6	732	675
Kambia	4.3	363	621
Koinadugu	5.1	434	597
Port Loko	7.3	617	540
Tonkolili	8.7	739	696
Bo	8.4	710	547
Bonthe	2.6	225	504
Moyamba	5.3	452	664
Pujehun	4.1	349	564
Western Area Rural	9.5	812	753
Western Area Urban	13.3	1,133	637
Total 15-49	100.0	8,501	8,501

To generate statistics that are representative of the country as a whole and the 14 districts, the number of women surveyed in each district should contribute to the size of the total (national) sample in proportion to size of the district. However, if some districts have small populations, then a sample allocated in proportion to each district's population may not include sufficient women from each district for analysis. To solve this problem, districts with small populations are oversampled. For example, let's say that you have enough money to interview 8,501 women and want to produce results that are representative of Sierra Leone as a whole and its districts (as in Table 2.8). However, the total population of Sierra Leone is not evenly distributed among the districts: some districts, such as Western Area Urban, are heavily populated while others, such as Bonthe are not. Thus, Bonthe must be oversampled.

A sampling statistician determines how many women should be interviewed in each district in order to get reliable statistics. The **blue column (1)** in the table at the right shows the actual number of women interviewed in each district. Within the districts, the number of women interviewed ranges from 504 in Bonthe to 753 in Western Area Rural district. The number of interviews is sufficient to get reliable results in each district.

With this distribution of interviews, some districts are overrepresented and some districts are underrepresented. For example, the population in Western Area Urban district is about 13% of the population in Sierra Leone, while Bonthe's population contributes only 2.6% of the population in Sierra Leone. But as the blue column shows, the number of women interviewed in Western Area Urban accounts for only about 7.5% of the total sample of women interviewed (637/8,501) and the number of women interviewed in Bonthe district accounts 5.9% of the total sample of women interviewed (504/8,501). This unweighted distribution of women does not accurately represent the population.

In order to get statistics that are representative of Sierra Leone, the distribution of the women in the sample needs to be weighted (or mathematically adjusted) such that it resembles the true distribution in the country. Women from a small district, Bonthe, should only contribute a small amount to the national total. Women from a large district, like Western Area Urban, should contribute much more. Therefore, DHS statisticians mathematically calculate a "weight" which is used to adjust the number of women from each district so that each district's contribution to the total is proportional to the actual population of the district. The numbers in the **purple column (2)** represent the "weighted" values. The weighted values can be smaller or larger than the unweighted values at district level. The total national sample size of 8,501 women has not changed after weighting, but the distribution of the women in the districts has been changed to represent their contribution to the total population size.

How do statisticians weight each category? They take into account the probability that a woman was selected in the sample. If you were to compare the **red column (3)** to the actual population distribution of

Sierra Leone, you would see that women in each district are contributing to the total sample with the same weight that they contribute to the population of the country. The weighted number of women in the survey now accurately represents the proportion of women who live in Western Area Urban and the proportion of women who live in Bonthe.

With sampling and weighting, it is possible to interview enough women to provide reliable statistics at national and provincial levels. In general, only the weighted numbers are shown in each of the SLMIS tables, so don't be surprised if these numbers seem low: they may actually represent a larger number of women interviewed.

SIERRA LEONE

INTRODUCTION AND SURVEY METHODOLOGY 1

The 2016 Sierra Leone Malaria Indicator Survey (SLMIS) was conducted by the National Malaria Control Programme (NMCP) of the Ministry of Health and Sanitation (MoHS), in collaboration with Catholic Relief Services (CRS), College of Medicine and Allied Health Sciences University of Sierra Leone (COMAHS-USL), and Statistics Sierra Leone (SSL). Data collection took place from 29 June 2016 to 4 August 2016. ICF (formerly ICF International) provided technical assistance. The 2016 SLMIS was funded by the Global Fund. Other agencies and organisations that facilitated the successful implementation of the survey through technical or logistical support were the World Health Organization (WHO) and the United Nation Children's Fund (UNICEF).

1.1 SURVEY OBJECTIVES

The 2016 SLMIS, a comprehensive, nationally-representative household survey, was designed in line with the Roll Back Malaria Monitoring and Evaluation Working Group (RBM-MERG) guidelines. The primary objective of the survey was to provide up-to-date estimates of basic demographic and health indicators related to malaria. On site in Sierra Leone, the survey team collected data on vector control interventions such as mosquito nets and indoor residual spraying of insecticides, on intermittent preventive treatment of malaria in pregnant women, and on care seeking and treatment of fever in children. Young children were also tested for anaemia and for malaria infection. Knowledge of malaria was assessed among interviewed women. The information collected during the survey will assist policy makers and programme managers in evaluating and designing programmes and strategies for improving malaria control. The broader goal is to improve the health of the country's population and provide estimates of indicators defined in the 2016-2020 National Malaria Strategic Plan (MoHS 2015a).

1.2 SAMPLE DESIGN

The 2016 SLMIS followed a two-stage sample design and was intended to allow estimates of key indicators for the following domains:

- National
- Urban and rural areas
- Four regions: Northern, Southern, Eastern and Western
- Fourteen administrative districts: Bo, Bombali, Bonthe, Kailahun, Kambia, Kenema, Koinadugu, Kono, Moyamba, Port Loko, Pujehun, Tonkolili, Western Area Rural, and Western Area Urban.

Data was disaggregated by district because the health system is managed by district.

The first stage of sampling involved selecting sample points (clusters) from the sampling frame. Enumeration areas (EAs) delineated by Statistics Sierra Leone for the 2015 Sierra Leone Population and Housing Census (SLPHC) were used as the sampling frame (SSL 2016). A total of 336 clusters were selected with probability proportional to size from the 12,856 EAs covered in the 2015 SLPHC. Of these clusters, 99 were in urban areas and 237 in rural areas. Urban areas were oversampled within regions in order to produce robust estimates for that domain.

The second stage of sampling involved systematic selection of households. A household listing operation was undertaken in all of the selected EAs in May 2016, and households to be included in the survey were randomly selected from these lists. Twenty households were selected from each EA, for a total sample size of 6,720 households. Because of the approximately equal sample sizes in each district, the sample is not

self-weighting at the national level. Results shown in this report have been weighted to account for the complex sample design. See Appendix A for additional details on the sampling procedures.

All women age 15-49 who were either permanent residents of the selected households or visitors who stayed in the household the night before the survey were eligible to be interviewed. With the parent's or guardian's consent, children age 6-59 months were tested for anaemia and for malaria infection.

1.3 QUESTIONNAIRES

Three questionnaires—the Household Questionnaire, the Woman's Questionnaire, and the Biomarker Questionnaire—were used for the 2016 SLMIS. Core questionnaires available from the RBM-MERG were adapted to reflect the population and health issues relevant to Sierra Leone. The modifications were decided upon at a series of meetings with various stakeholders from the National Malaria Control Programme (NMCP) and other government ministries and agencies, nongovernmental organisations, and international donors. The questionnaires were in English, and they were programmed onto tablet computers, enabling use of computer-assisted personal interviewing (CAPI) for the survey.

The Household Questionnaire was used to list all the usual members of and visitors to selected households. Basic information was collected on the characteristics of each person listed in the household, including his or her age, sex, and relationship to the head of the household. The data on the age and sex of household members, obtained from the Household Questionnaire, were used to identify women eligible for an individual interview and children age 6-59 months eligible for anaemia and malaria testing. Additionally, the Household Questionnaire captured information on characteristics of the household's dwelling unit, such as the source of water, type of toilet facilities, materials used for the floor, ownership of various durable goods, and ownership and use of mosquito nets.

The Woman's Questionnaire was used to collect information from all women age 15-49. These women were asked questions on the following main topics:

- Background characteristics (age, residential history, education, literacy, religion, and ethnicity)
- Reproductive history for the last 6 years
- Prenatal care and preventive malaria treatment for the most recent birth
- Prevalence and treatment of fever among children under age 5
- Knowledge about malaria (symptoms, causes, how to prevent, and types of antimalarial medications)
- Preferences in mosquito nets and sources of media messages about malaria

The Biomarker Questionnaire was used to record the results of the anaemia and malaria testing of children 6-59 months, as well as the signatures of the fieldworker and the parent or guardian who gave consent.

Consent statements were developed for each tool (the Household, Woman's, and Biomarker questionnaires). Further consent statements were formulated for malaria testing, anaemia testing, and treatment of children with positive malaria rapid diagnostic tests (RDTs). Signatures were obtained for each consent statement on a separate paper form and were confirmed on the digital form with the interviewer's signature at each point of consent.

1.4 ANAEMIA AND MALARIA TESTING

Blood samples for biomarker testing were collected by finger- or heel-prick from children age 6-59 months. Each field team included one laboratory technician who carried out the anaemia and malaria testing and prepared the blood smears. A nurse provided malaria medications for children who tested positive for malaria, in accordance with the approved treatment protocols. The field laboratory technicians requested written, informed consent for each test from the child's parent or guardian before the blood

samples were collected, according to the protocols approved by the Sierra Leone Ethics Committee and the institutional review board at ICF (formerly ICF International).

Anaemia testing. A single-use, retractable, spring-loaded, sterile lancet was used to make a finger- or heel-prick. A drop of blood from this site was then collected in a microcuvette. Haemoglobin analysis was carried out on site using a battery-operated portable HemoCue® analyser, which produces a result in less than one minute. Results were given to the child's parent or guardian verbally and in writing. Parents of children with a haemoglobin level under 8 g/dl were advised to take the child to a health facility for follow-up care and were given a referral letter with the haemoglobin reading to show to staff at the health facility. Results of the anaemia test were recorded on the Biomarker Questionnaire and on a brochure left in the household that also contains information on the causes and prevention of anaemia.

Malaria testing using a rapid diagnostic test (RDT). Using the same finger- or heel-prick that was used for anaemia testing, another drop of blood was tested immediately using the Sierra Leone-approved SD BIOLINE Malaria Ag *P.f.* (HRP-II)™ rapid diagnostic test (RDT). This qualitative test detects the histidine-rich protein II antigen of malaria, *Plasmodium falciparum* (*Pf*), in human whole blood (Standard Diagnostics, Inc.). The parasite, transmitted by a mosquito, is the major cause of malaria in Sierra Leone. The diagnostic test includes a disposable sample applicator that comes in a standard package. A tiny volume of blood is captured on the applicator and placed in the well of the testing device. All field laboratory technicians were trained to perform the RDT in the field, in accordance with manufacturers' instructions. RDT results were available in 20 minutes and recorded as either positive or negative, with faint test lines being considered positive. As with the anaemia testing, malaria RDT results were provided to the child's parent or guardian in oral and written form and were recorded on the Biomarker Questionnaire.

Children who tested positive for malaria were offered a full course of medicine according to standard procedures for uncomplicated malaria treatment in Sierra Leone. To ascertain the correct dose, nurses on each field team were trained to use treatment guidance charts and to ask about any medications the child might already be taking. The nurses were also trained to identify signs and symptom of severe malaria. The nurses provided the age-appropriate dose of ACT along with instructions on how to administer the medicine to the child.

Malaria testing using blood smears. In addition to the RDT, thick blood smears were prepared in the field. Each blood smear slide was given a bar code label, with a duplicate affixed to the Biomarker Questionnaire. An additional copy of the bar code label was affixed to a blood sample transmittal form to track the blood samples from the field to the laboratory. The slides were dried in a dust-free environment and stored in slide boxes. The thick smear slides were collected regularly from the field, along with the completed Biomarker Questionnaires, and transported to the laboratory for logging and microscopic reading. Thick blood smears were stained with Giemsa stain and examined to determine the presence of Plasmodium infection. All stained slides were read by two independent microscopists masked from RDT results. Slides with discrepant RDT results were reanalysed by a third microscopist for final validation.

The microscopic results were quality checked by internal and external quality control processes. Internal quality control consisted of an independent microscopist who read 5% of all slides in the study. External quality control was conducted through the COMAHS-USL laboratory where 10% of samples were independently read.

1.5 PRETEST

The training for the pretest took place from 29 April 2016 to 20 May 2016. Overall, 35 people participated in the training, including four supervisors, four biomarker specialists, four nurses, four data collectors, and four laboratory scientists. CRS, SSL, USL, NMCP, and ICF staff members led the training and served as the supervisory team for the pretest fieldwork. Participants were trained to administer paper questionnaires, use computer-assisted personal interviewing (CAPI), and collect blood samples for anaemia and

parasitaemia testing. The pretest training consisted of the survey overview and objectives, techniques of interviewing, field procedures, a detailed description of all sections of the Household and the Woman's questionnaires, instruction on the CAPI data collection application, and 6 days of field practice. At the end of fieldwork, a debriefing session was held, and the questionnaires and CAPI applications were modified based on the findings from the field.

1.6 TRAINING OF FIELD STAFF

The training, which was coordinated by ICF, CRS, NMCP, SSL, COMAHS-USL, and other members of the technical working group, took place 3-24 June 2016 at the Hill Valley Hotel Conference Centre in Freetown. The NMCP, in collaboration with the SSL, recruited 129 people to attend the 3-week interviewer, supervisor, and biomarker training. All the field staff participated in a 1-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 focused on filling out the Household and Women's Questionnaires using the CAPI application. Two quizzes were administered to assess how well the participants absorbed the training materials, both on the paper questionnaires and using the CAPI application as data collection tools.

During the third week of training, NMCP conducted a briefing on the epidemiology of malaria and the malaria control programme 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 CAPI for data collection, assigning households to interviewers, and transferring data for completed questionnaires in completed clusters to the central data processing centre at CRS headquarters.

ICF conducted a 2-week training of health personnel and laboratory technicians, which focused on preparing blood samples to test for anaemia and using the RDT to test for malaria. The training involved presentation, discussion, and actual testing for anaemia and malaria. The technicians were trained to identify children eligible for testing, administer informed consent, conduct the anaemia and malaria rapid testing, and make a proper thick blood smear. They were also trained to store the blood slides, record test results on the Biomarker Questionnaire, and provide the results to the parents/guardians of the children tested. Finally, health personnel received a briefing on correct treatment protocols.

All participants took part in 3-day field practice exercises in the West Area Rural district and in Aberdeen in the West Area Urban district. Health technicians were also trained on how to record children's anaemia and malaria results on the respective brochures and how to fill in the referral slip for any child who was found to be severely anaemic.

1.7 FIELDWORK

Twenty-eight teams were organised 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 COMHAS-USL laboratory at Jui.

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

Field data collection for the 2016 SL MIS started on 27 June 2016. For maximum supervision, all 28 teams were visited by national monitors, largely members of the technical working group, at least once in every week. Fieldwork was completed on 4 August 2016.

1.8 LABORATORY TESTING

Prior to the start of the field staff training, an ICF staff person worked with the laboratory technicians at the SLMIS Malaria Laboratory at COMAHS-USL to ensure training of the laboratory staff on the MIS protocol. Additionally, ICF staff worked on site with the laboratory staff for one week in May 2016 to assist the team with microscopy.

Standard protocols were used to read blood slides for the presences of malaria parasites. 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. In addition, 10% of the slides were re-read by an independent, external microscopist to ascertain the quality of microscopy reading.

1.9 DATA PROCESSING

Data for the 2016 SLMIS were collected through questionnaires programmed onto the CAPI application. The CAPI were programmed by ICF and loaded with the Household, Biomarker, and Woman's Questionnaires. Using the cloud, the field supervisors transferred data on a daily basis to a central location for data processing at CRS in Freetown. To facilitate communication and monitoring, each field worker was assigned a unique identification number.

ICF provided technical assistance for processing the data using Censuses and Surveys Processing (CSPro) system for data editing, cleaning, weighting, and tabulation. In the CRS central office, data received from the field teams' CAPI applications were registered and checked against any inconsistencies and outliers. Data editing and cleaning included an extensive range of structural and internal consistency checks. Any anomalies were communicated to the CRS so that the CRS and ICF data processing teams could resolve data discrepancies. The corrected results were maintained in master CSPro data files at ICF and used for analysis in producing tables for the final report.

1.10 RESPONSE RATES

Table 1.1 shows that of the 6,720 households selected for the sample, 6,719 were occupied at the time of fieldwork. Among the occupied households, 6,719 were successfully interviewed, yielding a total household response rate of nearly 100%. In the interviewed households, 8,526 eligible women were identified to be eligible for individual interview and 8,501 were successfully interviewed, yielding a response rate of 99.7%.

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 MIS 2016

Result	Residence		Total
	Urban	Rural	
Household interviews			
Households selected	1,980	4,740	6,720
Households occupied	1,980	4,739	6,719
Households interviewed	1,980	4,739	6,719
Household response rate[1]	100.0	100.0	100.0
Interviews with women age 15-49			
Number of eligible women	2,801	5,725	8,526
Number of eligible women interviewed	2,796	5,705	8,501
Eligible women response rate[2]	99.8	99.7	99.7

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

1.11 Malaria Control in the Context of the Ebola Epidemic

In May 2014, Sierra Leone experienced its first cases of Ebola Virus Disease (EVD) in the remote eastern part of the country, at its intersection with Guinea and Liberia. The outbreak quickly progressed from a localised to a generalised epidemic, shifting from the sparsely populated east to more densely-settled urban and peri-urban areas in the west. Epidemiological reports have shown that the number of cases, widespread distribution (all 14 districts), and intense transmission of EVD from May 2014 onwards in Sierra Leone were unprecedented, outpacing the morbidity and mortality figures of neighbouring Guinea and Liberia. By September 2015, there were 8,704 confirmed cases and 3,585 deaths, making Sierra Leone the worst affected country in West Africa and the world (MoHS 2015b).

Evidence shows that the lack of infection prevention and control contributed to the rapid spread of the virus. Additionally, resources meant for other programmes, including malaria, were diverted to the containment of EVD, potentially reversing gains in addressing child mortality (Millennium Development Goal [MDG] 4), maternal mortality (MDG 5), and HIV/AIDS, malaria, and other diseases (MDG 6).

Health workers responding to the Ebola crisis were highly affected by the epidemic, given their high risk of exposure and infection through routine service delivery. By June 2015, 296 health care workers had been infected with EVD, with 221 deaths (74.6%), 11 of whom were specialised physicians. Prior to the EVD outbreak, the ratio of skilled providers to population was very low, at just 3.4:10,000, compared with optimal levels of 25:10,000. This critical loss of front-line health workers has exacerbated already inadequate human resources in the health sector. Increasing the number of skilled workers and their capacity is a central challenge for the post-Ebola recovery period.

The initial clinical presentation of EVD is very similar to that of malaria, i.e., fever, anorexia, fatigue, headache, and joint pains—posing a problem of differential diagnosis for both patients and health care workers. During the outbreak, patients who had signs and symptoms of malaria were often frightened to seek care, either due to fear of having EVD or fear of being mistakenly referred to Ebola holding centres with suspected EVD. In addition, patients with signs and symptoms of malaria were probably more likely to seek self-treatment through the private informal sector or to die at home for lack of access to prompt diagnosis and effective treatment. For cases that were referred, given the similarities of clinical presentation, the likelihood of persons with malaria being retained as suspected Ebola cases in holding centres was very high.

The ability to provide proper case management for malaria during the EVD outbreak was additionally challenged by lack of diagnostic capacity. In many health facilities, testing with RDTs or microscopy was temporarily suspended for fear of contracting Ebola, due to lack of personal protective equipment (PPE) for use by laboratory technicians and personnel performing these tests. Use of RDT did increase somewhat over the duration of the EVD outbreak because health workers got training on infection prevention and control and PPEs were increasingly available.

The EVD outbreak led to a decline in the utilisation of health care facilities for non-Ebola-related health needs, such as antenatal care visits, particularly in urban areas such as Freetown. The Ministry of Health and Sanitation in collaboration with UNICEF conducted the Sierra Leone Health Facility Survey 2014 to assess the impact of the EVD outbreak on Sierra Leone's health system among 1,185 peripheral health units (MoHS 2014). Results showed that 48 of these facilities were closed at the time of assessment, with a similar number reporting temporary closure since the start of the epidemic. Although 96% of peripheral health units were operational in October 2014, the country recorded a drop in the coverage of key maternal and child health interventions, including malaria interventions, between May and September 2014:

- The number of antenatal care visits declined by 27% nationally from May to September 2014. Western Area (33%) and the Northern Province (32%) were the worst affected areas. Among the districts, Kambia witnessed a staggering 48% drop in the number of women coming for the 4th ANC visit. At the other end of the spectrum, Moyamba registered a decline of only 10%.

- The number of insecticide-treated nets (ITNs) distributed during ANC visits dropped by 63% nationally. The period under study coincided with the mass campaign to distribute ITNs to all households in the country (5-11 June 2014). Hence, the decline in ANC-distributed ITNs could also be attributed to the effect of the increasing availability of ITNs in households resulting from the mass campaign.

- The number of women coming to health facilities for delivery also declined significantly, by 27% nationally. Among provinces, the Northern Province experienced the strongest decline at 30%. Among districts, Kambia and Pujehun saw the largest declines at 41% each, whereas in Pujehun, the number of deliveries in health facilities declined by only 5%.

- The number of children under 5 treated for malaria declined by 39% between May and September. This decline took place at the height of the malaria season, during which malaria cases typically spike (in 2013, during the same period, the number of children under 5 coming for malaria treatment had increased by 20%).

The decline in essential child and maternal health interventions observed during the EVD outbreak was probably for multiple reasons. One likely factor is a decreased utilisation of health services, which resulted from a lack of trust in the health staff, a loss of confidence in the health system (as non-Ebola cases would mingle with Ebola cases), and safety-related concerns. Intervention coverage was also affected by the destruction of personal belongings in houses with confirmed Ebola Virus Disease as part of standard decontamination procedures. Beds, furniture, mosquito bed nets, utensils, plates, cups, and window curtains were reportedly burned.

All of these factors likely contributed to the trends in malaria intervention and malaria morbidity measured in the 2016 SLMIS.

CHARACTERISTICS OF HOUSEHOLDS AND WOMEN

2

Key Findings

- ***Drinking water:*** Most urban households (91%) have access to an improved source of drinking water, but only slightly more than half (56%) of rural households do.
- ***Sanitation:*** Almost half of households (49%) use an unimproved toilet facility, 16% use an improved, not shared toilet facility, and 35% use an improved, shared toilet facility.
- ***Household Wealth:*** The majority of households in Western Area region are in the highest wealth quintile (68 %), while the majority of households in Southern region are in the lowest wealth quintile (31%).
- ***Electricity:*** One-fifth of households in Sierra Leone have electricity (47% in urban areas and 3% in rural areas).
- ***Bank Account/Village Savings/Osusu:*** Four in 10 households own a bank account (51% in urban areas and 34% in rural areas).
- ***Literacy:*** Overall, younger women are more likely to be literate than older women. Sixty-four percent of women age 15-24 are literate compared with 20% of women age 45-49.

Information on the socioeconomic characteristics of the household population in the 2016 SLMIS provides context to interpret demographic and health indicators and also can indicate the representativeness of the survey. This information also sheds light on the living conditions of the population.

In this chapter, there is information on source of drinking water, sanitation, wealth, ownership of durable goods, and composition of household population. In addition, the chapter presents characteristics of the survey respondents such as age, education, and literacy. Socioeconomic characteristics are useful for understanding the factors that affect use of health services and other health behaviours related to malaria control.

2.1 DRINKING WATER SOURCES AND TREATMENT

Improved sources of drinking water

Include piped water, public taps, standpipes, tube wells, boreholes, protected dug wells and springs, and rainwater. Because the quality of bottled water is not known, households using bottled water for drinking are classified as using an improved source only if their water source for cooking and handwashing are from an improved source.

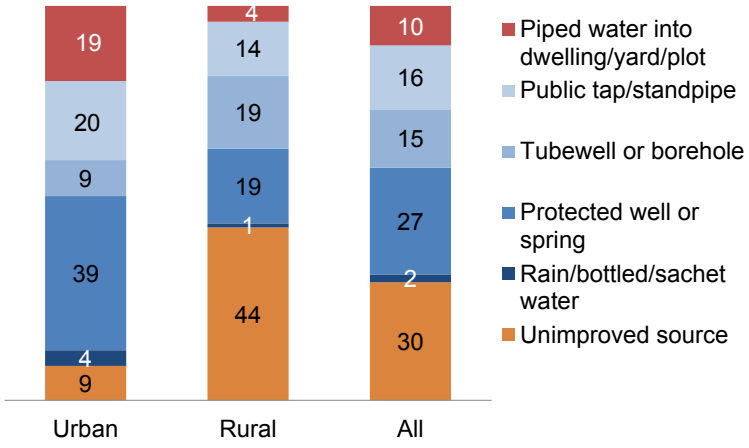
Sample: Households

Improved sources of water protect against outside contamination so that water is more likely to be safe to drink. In Sierra Leone, almost 70% of households have access to an improved source of drinking water (**Table 2.1**). Ninety-one percent of urban households and 56% of rural households have access to improved water sources.

Urban and rural households rely on different sources of drinking water. Only about 1 in 10 urban households have piped water in their dwelling or yard (**Figure 2.1**). A majority (37%) of households in urban areas access drinking water from protected dug wells. In contrast, rural households mainly rely on unimproved sources (44%), followed by protected dug wells (17%). Only 2% of rural households have piped water into their dwelling or yard, and 22% travel 30 minutes or more to fetch drinking water (**Table 2.1**).

***Figure 2.1* Household drinking water by residence**

Percent distribution of households by source of drinking water



Trends: The proportion of households obtaining water from improved sources increased from 56% in the 2013 SLMIS to 70% in the 2016 SLMIS. However, the gains are concentrated in urban households; the proportion of urban households with access to improved drinking water sources increased from 73% to 91%, compared with an increase from 49% to 56% in rural households over the same period.

2.2 SANITATION

Improved toilet facilities

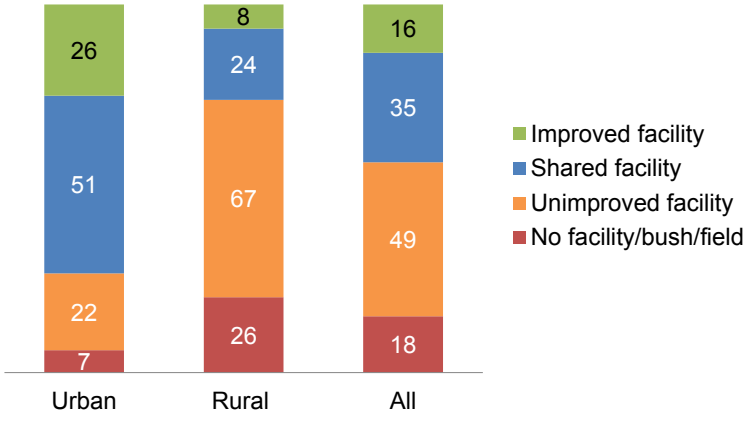
Include any non-shared toilet of the following types: flush/pour flush toilets to piped sewer systems, septic tanks, and pit latrines; ventilated improved pit (VIP) latrines; and pit latrines with slabs

Sample: Households

Nationally, only 16% of households use an improved toilet facility, defined as a non-shared facility constructed to prevent contact with human waste and thus reduce the transmission of cholera, typhoid, and other diseases. Another 35% of households use an improved facility shared with other households (**Table 2.2**). Households in urban areas are more likely to use improved, non-shared facilities (26%) compared with rural households (8%) (**Figure 2.2**). The most commonly used improved, non-shared toilet facility is the pit latrine with a slab (9% of all households). Only 4% of households use an improved, non-shared facility that flushes to a septic tank. This proportion is higher among urban

***Figure 2.2* Household toilet facilities by residence**

Percent distribution of households by type of toilet facilities



households (9%) than among rural households (less than 1%). Almost half (49%) of all households use an unimproved facility, and 18% lack access to any facility and use the bush or a field.

Trends: There has been no marked increase in the proportion of households with improved, non-shared toilet facilities since the 2013 SLMIS (10% in 2013 and 16% in 2016). However, the proportion of households with improved toilet facilities (shared or not shared) increased from 36% in the 2013 SLMIS to 51% in the 2016 SLMIS.

2.3 HOUSING CHARACTERISTICS

The 2016 SLMIS collected data on household features such as access to electricity, flooring material, number of sleeping rooms, and types of fuel used for cooking. The responses to these questions, along with information on ownership of household durable goods, contribute to the creation of the household wealth index and provide information that may be relevant for other health indicators.

Exposure to cooking smoke, especially to smoke produced from solid fuels, is potentially harmful to health. The use of solid fuels for cooking is nearly universal in both rural and urban households in Sierra Leone, with the major sources being charcoal and wood (**Table 2.3**).

Overall, 20% of households in Sierra Leone have access to electricity. Forty-seven percent of urban households and only 3% of rural households have access to electricity. There has been a slight increase in households reporting access to electricity, from 14% in the 2013 SLMIS to 20% in the 2016 SLMIS.

Earth or sand is the most common flooring material in Sierra Leone, used by 49% of all households. As expected, rural households are substantially more likely to have floors made of earth or sand (71%) than are urban households (16 %). Cement is the second most common flooring material, used by 39% of all households. Cement floors are more common in urban households (60%) than in rural households (26%).

The number of rooms a household uses for sleeping is an indicator of socioeconomic level and of crowding in the household, which can facilitate the spread of disease. Forty-five percent of households use three rooms for sleeping, 29% use two rooms, and 25% use only one room. There are slight urban-rural differences in the number of rooms used for sleeping, as 51% of rural households use three or more rooms for sleeping compared with 37% of households in urban areas (**Table 2.3**).

2.4 HOUSEHOLD WEALTH

Wealth index

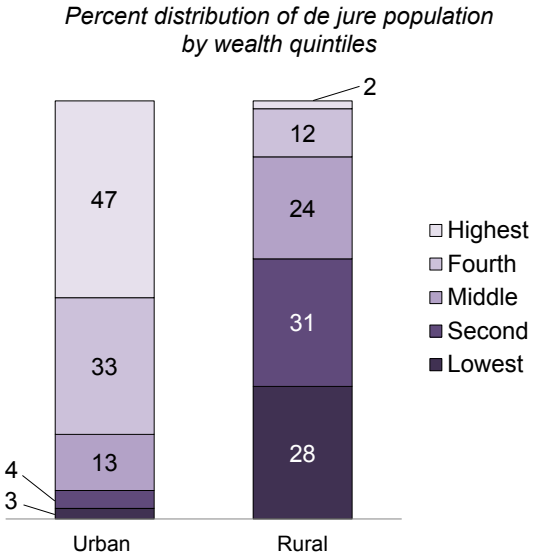
Households are given scores based on the number and kinds of consumer goods they own, ranging from a television to a bicycle or car, plus housing characteristics such as source of drinking water, toilet facilities, and flooring materials. These scores are derived using principal component analysis. National wealth quintiles are compiled by assigning the household score to each usual (de jure) household member, ranking each person in the household population by their score, and then dividing the distribution into five equal categories, each with 20% of the population.

Sample: Households

By definition, 20% of the total household population is in each wealth quintile. However, the population distributions are unequal when stratifying by urban and rural areas. Forty-seven percent of the population in urban areas is in the highest quintile compared with only 2% of the population in rural areas. On the other hand, only 3% of the urban population falls in the lowest wealth quintile, compared with 32% of the rural population (**Figure 2.3**).

Regionally, the Southern Region has the highest percentage of population in the lowest quintile (31%) compared with the Northern Region (27%), the Eastern Region (15%), and the Western Region (1%). At the district-level, Bonthe has the highest percentage of population in the lowest quintile (45%), and the population of Western Area Urban has the highest percentage in the highest wealth quintile (93%) (**Table 2.4**).

Figure 2.3 **Household wealth by residence**



Household Durable Goods

Data from the survey revealed information on ownership of household effects, means of transport, agricultural land, bank accounts (including village savings and loans and osusu, which are traditional group saving schemes). Urban households are more likely than rural households are to own a radio (71% versus 50%), television (43% versus 2%), mobile telephone (90% versus 52%), and motor cycle/scooter (12% versus 9%). Urban households are also more likely to own a bank account or be part of a village savings and loans or osusu (51% versus 34%). In contrast, rural households are more likely than urban households are to own agricultural land (76% versus 25%), and farm animals (62% versus 37%). See **Table 2.5**.

2.5 HOUSEHOLD POPULATION AND COMPOSITION

Household

A person or group of related or unrelated persons who live together in the same dwelling unit(s), who acknowledge one adult male or female as the head of the household, who share the same housekeeping arrangements, and who are considered a single unit.

De facto population

All persons who stayed in the selected households the night before the interview (whether usual residents or visitors)

De jure population

All persons who are usual residents of the selected households, whether or not they stayed in the household the night before the interview

In the 2016 SLMIS, 39,256 people stayed overnight in 6,719 households. The overall sex ratio is 92 males per 100 females. The sex ratio is 88 males per 100 females in urban areas and 95 males to 100 females in rural areas. Sixty percent of the population lives in rural areas.

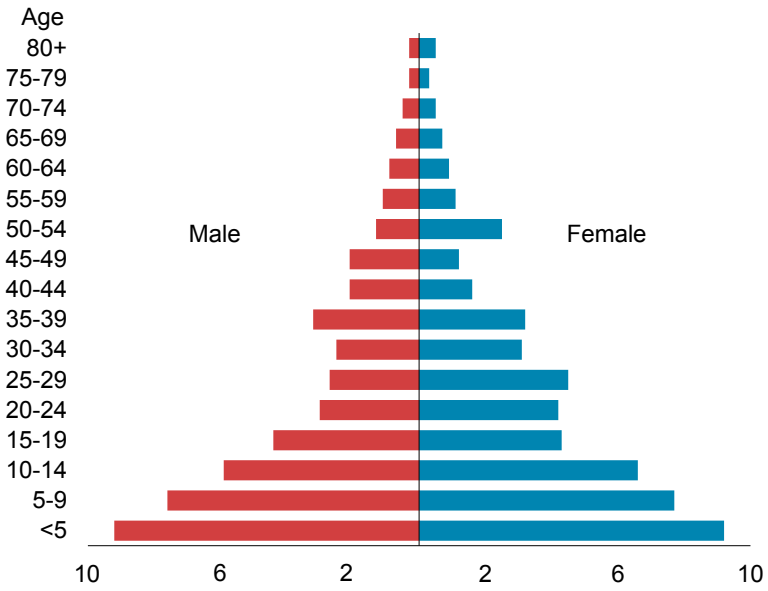
Age and sex are important demographic variables and are the primary basis of demographic classification. **Table 2.6** shows the distribution of the de facto household population in the 2016 SLMIS by 5-year age groups, according to sex and residence.

The population pyramid in **Figure 2.4** shows the population distribution by sex and by 5-year age groups. The broad base of the pyramid shows that Sierra Leone's population is young, which is typical of developing countries with a high fertility rate and low life expectancy. Almost half of the population (46%) is under age 15, 50% is age 15-64, and only 4% of the population is age 65 and older (**Table 2.6**).

On average, households in Sierra Leone consist of six persons (**Table 2.7**). Men predominantly head households in Sierra Leone (75%). The proportion of households headed by women is higher in urban areas than in rural areas (28% versus 23%).

***Figure 2.4* Population pyramid**

Percent distribution of the household population



2.6 Educational Attainment of Women

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 both the use of health facilities and health management for herself and for 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 over half of women age 15-49 have no education. Only 37% of women have completed primary school. Additionally, 35% of women have at least some secondary education and only 1% of women have more than secondary education.

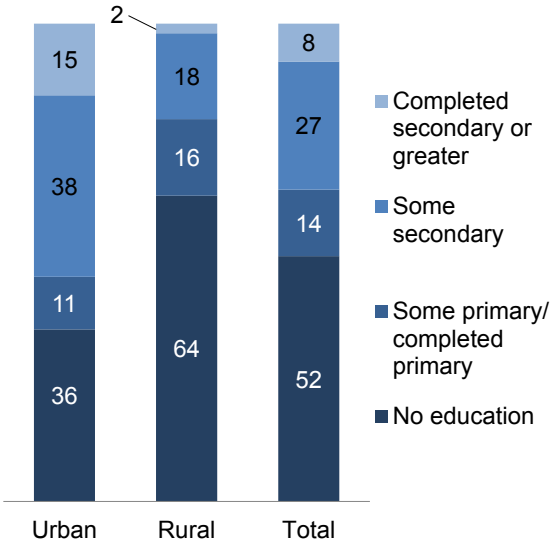
Trends: The percentage of interviewed women with no formal education decreased from 62% in the 2013 SLMIS to 52% in the 2016 SLMIS. The percentage of women with at least some secondary education increased from 28% in 2013 to 35% in 2016.

Patterns by background characteristics

- Women in rural areas are less likely than are those in urban areas to have attended school (36% vs. 64%, respectively) (**Figure 2.5**).
- The Northern Region has the highest proportion of women with no education (60%) compared with 55% in the Eastern Region, 54% in the Southern Region, and 35% in the Western Region.
- By district, Koinadugu has the highest percentage of women with no education (69%) compared with Western Area Urban which has the lowest (28%).
- Results show that women in the lowest household wealth quintile are least likely to be educated; 72% of women in the lowest wealth quintile have no education compared with 27% of women in the highest wealth quintile.

Figure 2.5 Education of survey respondents by urban/rural residence

Percent distribution of women age 15-49 by highest level of schooling attended or completed



Note: Percentages do not add to 100% due to rounding

2.7 LITERACY OF WOMEN

Literacy

Respondents who have attended secondary school or higher are assumed to be literate. All other respondents were given a sentence to read, and they were considered literate if they could read all or part of the sentence.

Sample: Women age 15-49

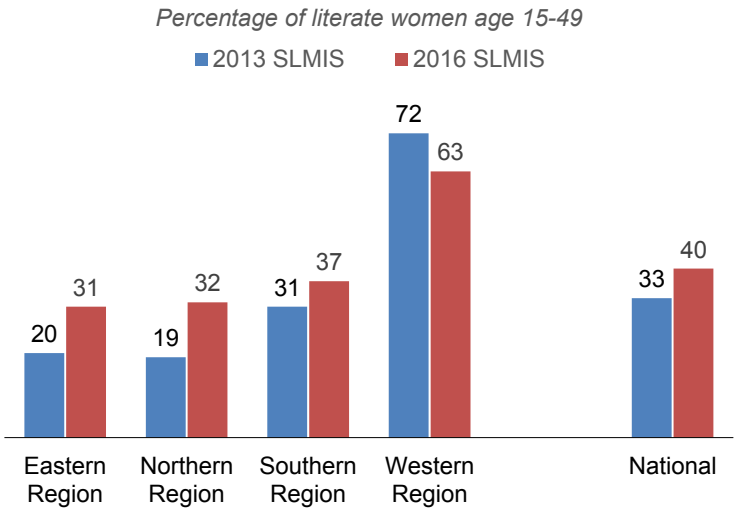
Knowing the level and distribution of literacy among the population is an important factor in the design and delivery of health messages and interventions. The results show that, overall, 40% of women age 15-49 in Sierra Leone are literate (**Table 2.10**).

Trends: Literacy rose from 33% to 40% of interviewed women between the 2013 SLMIS and the 2016 SLMIS. All regions except for Western Region experienced increases in the percentage of literate women between the 2013 SLMIS and the 2016 SLMIS (**Figure 2.6**).

Patterns by background characteristics

- Sixty-four percent of women age 15-24 are literate compared with 20% of women age 45-49.

Figure 2.6 **Trends in literacy by region**



- Women in urban areas are twice as likely as are rural women to be literate (58% versus 25%).
- Women in the Western Region are most likely to be literate (63%) compared with Eastern Region in which only 31% of women are literate.
- Literacy levels vary substantially by district; 70% of women in Western Area Urban are literate, compared with only 25% of women in Koinadugu.
- The literacy rate increases with wealth, rising from 18% of women in the lowest quintile to 69% in the highest quintile.

List of Tables

For detailed information on household population and housing characteristics, see the following tables:

- **Table 2.1 Household drinking water**
- **Table 2.2 Household sanitation facilities**
- **Table 2.3 Household characteristics**
- **Table 2.4 Wealth quintiles**
- **Table 2.5 Household possessions**
- **Table 2.6 Household population by age, sex, and residence**
- **Table 2.7 Household composition**
- **Table 2.8 Background characteristics of respondents**
- **Table 2.9 Educational attainment of women**
- **Table 2.10 Literacy of women**

Table 2.1 Household drinking water

Percent distribution of households and de jure population by source of drinking water, time to obtain drinking water, and treatment of drinking water, according to residence, Sierra Leone MIS 2016

	Households			Population		
Characteristic	Urban	Rural	Total	Urban	Rural	Total
Source of drinking water						
Improved source	**91.3**	**56.0**	**70.1**	**90.8**	**55.2**	**69.5**
Piped into dwelling/yard plot	9.9	2.4	5.4	9.0	2.5	5.1
Piped to neighbour	9.5	1.7	4.8	8.9	1.6	4.5
Public tap/standpipe	20.0	13.7	16.2	19.8	13.4	15.9
Tube well or borehole	9.1	18.6	14.8	9.1	17.8	14.3
Protected dug well	36.6	16.8	24.7	38.0	17.0	25.5
Protected spring	1.9	1.9	1.9	2.3	2.0	2.1
Rain water	1.1	0.8	0.9	1.2	0.8	1.0
Bottled water, improved source for cooking/washing[1]	0.3	0.0	0.1	0.2	0.0	0.1
Sachet water, improved source for cooking/washing[1]	2.8	0.2	1.3	2.2	0.2	1.0
Unimproved source	**8.7**	**44.0**	**29.9**	**9.2**	**44.8**	**30.5**
Unprotected dug well	4.0	6.9	5.7	4.4	7.0	6.0
Unprotected spring	1.7	12.3	8.1	1.8	12.6	8.3
Tanker truck/cart with small tank	0.3	0.1	0.2	0.4	0.1	0.3
Surface water	2.2	24.7	15.7	2.5	24.9	15.9
Bottled water, unimproved source for cooking/washing[1]	0.1	0.0	0.0	0.0	0.0	0.0
Sachet water, unimproved source for cooking/washing[1]	0.4	0.1	0.2	0.2	0.1	0.1
Total	100.0	100.0	100.0	100.0	100.0	100.0
Time to obtain drinking water (round trip)						
Water on premises	39.4	12.0	23.0	39.3	12.2	23.1
Less than 30 minutes	42.2	63.3	54.9	41.5	63.0	54.4
30 minutes or longer	17.4	21.9	20.1	17.7	22.0	20.3
Don't know/missing	1.1	2.8	2.1	1.5	2.8	2.3
Total	100.0	100.0	100.0	100.0	100.0	100.0
Number	2,688	4,031	6,719	15,837	23,700	39,538

[1] Because the quality of bottled water is unknown, households using bottled water for drinking are classified as using an improved or unimproved source according to their water source for cooking and washing.

Table 2.2 Household sanitation facilities

Percent distribution of households and de jure population by type and location of toilet/latrine facilities, according to residence, Sierra Leone MIS 2016

	Households			Population		
Type and location of toilet/latrine facility	Urban	Rural	Total	Urban	Rural	Total
Improved facility						
Flush/pour flush to piped sewer system	0.8	0.1	0.4	0.6	0.2	0.4
Flush/pour flush to septic tank	8.6	0.4	3.7	8.4	0.5	3.6
Flush/pour flush to pit latrine	2.6	0.1	1.1	2.6	0.1	1.1
Ventilated improved pit (VIP) latrine	1.5	0.5	0.9	1.9	0.6	1.1
Pit latrine with slab	12.9	7.1	9.4	14.5	7.8	10.5
Composting toilet	0.1	0.1	0.1	0.1	0.1	0.1
Total	26.4	8.3	15.5	28.1	9.2	16.8
Shared facility[1]						
Flush/pour flush to piped sewer system	0.4	0.1	0.2	0.5	0.1	0.3
Flush/pour flush to septic tank	1.5	0.1	0.6	1.3	0.1	0.6
Flush/pour flush to pit latrine	3.0	0.2	1.3	2.7	0.2	1.2
Ventilated improved pit (VIP) latrine	3.2	0.9	1.8	2.7	0.9	1.6
Pit latrine with slab	42.9	21.6	30.1	41.1	20.6	28.8
Composting toilet	0.4	1.4	1.0	0.4	1.2	0.9
Total	51.4	24.3	35.1	48.7	23.1	33.3
Unimproved facility						
Flush/pour flush not to sewer/septic tank/ pit latrine	0.8	0.0	0.3	0.8	0.0	0.3
Pit latrine without slab/open pit	11.9	36.6	26.7	12.6	37.5	27.5
Bucket	0.9	0.2	0.5	0.8	0.2	0.4
Hanging toilet/hanging latrine	2.1	4.9	3.7	1.9	4.8	3.6
No facility/bush/field	6.5	25.8	18.1	7.0	25.3	17.9
Other	0.1	0.0	0.0	0.1	0.0	0.1
Total	22.2	67.4	49.3	23.2	67.7	49.9
Total	100.0	100.0	100.0	100.0	100.0	100.0
Number	2,688	4,031	6,719	15,837	23,700	39,538

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

Table 2.3 Household characteristics

Percent distribution of households by housing characteristics, percentage using solid fuel for cooking, and percent distribution by frequency of smoking in the home, according to residence, Sierra Leone MIS 2016

Housing characteristic	Residence		Total
	Urban	Rural	
Electricity			
Yes	46.9	2.5	20.3
No	53.1	97.5	79.7
Total	100.0	100.0	100.0
Flooring material			
Earth, sand	16.4	71.2	49.3
Dung	0.2	1.1	0.7
Wood/planks	3.4	0.2	1.5
Palm/bamboo	0.0	0.2	0.2
Parquet or polished wood	0.2	0.5	0.4
Vinyl or asphalt strips	1.6	0.0	0.6
Ceramic tiles	13.6	0.8	5.9
Cement	59.8	25.7	39.3
Carpet	4.7	0.1	2.0
Other	0.1	0.0	0.0
Total	100.0	100.0	100.0
Rooms used for sleeping			
One	32.3	20.3	25.1
Two	30.4	28.8	29.4
Three or more	37.3	50.9	45.4
Total	100.0	100.0	100.0
Cooking fuel			
Electricity	0.3	0.0	0.1
LPG/natural gas/biogas	0.6	0.2	0.4
Kerosene	0.1	0.0	0.0
Coal/lignite	0.2	0.0	0.1
Charcoal	63.9	4.7	28.4
Wood	33.7	94.4	70.1
No food cooked in household	1.1	0.5	0.7
Total	100.0	100.0	100.0
Percentage using solid fuel for cooking[1]	97.9	99.2	98.7
Number	2,688	4,031	6,719

LPG = Liquefied petroleum gas
[1] Includes coal/lignite, charcoal, and wood

Table 2.4 Wealth quintiles

Percent distribution of the de jure population by wealth quintiles, and the Gini Coefficient, according to residence and region, Sierra Leone MIS 2016

Residence/region	Wealth quintile					Total	Number of persons	Gini coefficient
	Lowest	Second	Middle	Fourth	Highest			
Residence								
Urban	2.5	4.3	13.4	32.7	47.1	100.0	15,837	0.23
Rural	31.7	30.5	24.4	11.5	1.9	100.0	23,700	0.29
Region								
Eastern	15.4	25.2	26.9	24.0	8.5	100.0	9,432	0.28
Northern	27.1	26.7	24.2	15.2	6.8	100.0	13,764	0.23
Southern	30.9	20.2	20.4	17.7	10.8	100.0	8,683	0.34
Western	0.5	1.3	3.6	26.3	68.3	100.0	7,658	0.22
District								
Kailahun	21.1	30.7	33.1	14.9	0.3	100.0	3,369	0.21
Kenema	13.6	24.0	26.1	24.8	11.5	100.0	3,109	0.29
Kono	10.8	20.2	20.6	33.5	14.8	100.0	2,955	0.26
Bombali	20.7	23.3	17.7	18.2	20.1	100.0	3,177	0.31
Kambia	31.8	30.6	22.2	11.9	3.5	100.0	1,732	0.24
Koinadugu	39.7	26.5	22.6	11.1	0.2	100.0	2,247	0.22
Port Loko	22.0	23.4	28.0	22.2	4.4	100.0	3,071	0.27
Tonkolili	27.2	30.9	28.6	10.5	2.9	100.0	3,538	0.24
Bo	16.3	19.8	19.0	20.3	24.6	100.0	3,404	0.31
Bonthe	45.2	14.3	18.5	17.6	4.4	100.0	1,283	0.32
Moyamba	42.7	17.0	20.8	17.9	1.6	100.0	2,119	0.32
Pujehun	34.2	28.6	24.0	13.0	0.3	100.0	1,876	0.25
Western Area Rural	1.2	2.9	7.6	52.1	36.3	100.0	3,346	0.23
Western Area Urban	0.0	0.0	0.5	6.3	93.2	100.0	4,313	0.09
Total	20.0	20.0	20.0	20.0	20.0	100.0	39,538	0.30

Table 2.5 Household possessions

Percentage of households possessing various household effects, means of transportation, agricultural land, and livestock/farm animals by residence, Sierra Leone MIS 2016

Possession	Residence		Total
	Urban	Rural	
Household effects			
Radio	70.9	50.1	58.4
Television	43.1	2.2	18.6
Mobile phone	89.7	52.0	67.1
Computer	10.5	0.4	4.4
Non-mobile telephone	0.5	0.1	0.3
Refrigerator	28.9	0.5	11.9
Means of transport			
Bicycle	9.1	6.1	7.3
Animal drawn cart	0.5	0.2	0.3
Motorcycle/scooter	11.9	9.1	10.3
Car/truck	5.2	0.5	2.4
Boat with a motor	0.6	0.7	0.7
Ownership of agricultural land	24.8	76.4	55.7
Ownership of farm animals[1]	36.7	61.6	51.7
Ownership of bank account/ village savings and loans/ osusu	51.2	33.7	40.7
Number	2,688	4,031	6,719

[1] Cows, bulls, other cattle, horses, donkeys, goats, sheep, chickens or other poultry

Table 2.6 Household population by age, sex, and residence

Percent distribution of the de facto household population by 5-year age groups, according to sex and residence, Sierra Leone MIS 2016

	Urban			Rural					
Age	Male	Female	Total	Male	Female	Total	Male	Female	Total
<5	18.7	16.0	17.3	19.7	18.8	19.2	19.3	17.7	18.4
5-9	13.6	13.2	13.4	17.5	15.7	16.6	16.0	14.7	15.3
10-14	12.7	14.0	13.4	12.2	11.7	11.9	12.4	12.6	12.5
15-19	10.6	10.2	10.4	8.3	7.1	7.7	9.2	8.4	8.8
20-24	7.7	9.9	8.8	5.2	6.9	6.1	6.2	8.1	7.2
25-29	6.4	9.6	8.1	5.0	7.9	6.5	5.6	8.6	7.2
30-34	5.9	5.7	5.8	4.8	6.0	5.4	5.3	5.9	5.6
35-39	7.0	5.6	6.3	6.4	6.4	6.4	6.6	6.1	6.4
40-44	4.9	2.7	3.8	4.2	3.3	3.7	4.5	3.0	3.7
45-49	4.0	1.9	2.9	4.5	2.5	3.5	4.3	2.3	3.2
50-54	2.2	4.2	3.3	3.1	5.1	4.1	2.7	4.8	3.8
55-59	2.1	1.9	2.0	2.4	2.3	2.3	2.3	2.1	2.2
60-64	1.4	1.5	1.5	2.1	1.9	2.0	1.8	1.7	1.8
65-69	1.1	1.2	1.1	1.8	1.4	1.6	1.5	1.3	1.4
70-74	0.7	0.7	0.7	1.2	1.3	1.2	1.0	1.0	1.0
75-79	0.5	0.5	0.5	0.8	0.7	0.7	0.7	0.6	0.7
80 +	0.4	0.7	0.6	0.8	1.0	0.9	0.6	0.9	0.8
Don't know/missing	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of persons	7,361	8,381	15,743	11,450	12,063	23,513	18,812	20,444	39,256

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 MIS 2016

Characteristic	Residence		Total
	Urban	Rural	
Household headship			
Male	72.0	76.8	74.9
Female	28.0	23.2	25.1
Total	100.0	100.0	100.0
Number of usual members			
1	4.2	2.9	3.4
2	5.5	4.1	4.7
3	9.7	10.9	10.4
4	16.4	15.1	15.6
5	16.2	17.2	16.8
6	14.3	16.0	15.3
7	10.4	10.9	10.7
8	7.2	7.9	7.6
9+	16.1	15.0	15.4
Total	100.0	100.0	100.0
Mean size of households	5.9	5.9	5.9
Number of households	2,688	4,031	6,719

Note: Table reflects de jure household members, that is, usual residents.

Table 2.8 Background characteristics of respondents

Percent distribution of women age 15-49 by selected background characteristics, Sierra Leone MIS 2016

Background characteristic	Women		
	Weighted percent	Weighted number	Unweighted number
Age			
15-19	19.6	1,665	1,646
20-24	19.5	1,658	1,600
25-29	20.1	1,705	1,669
30-34	14.3	1,218	1,235
35-39	14.2	1,208	1,242
40-44	7.2	608	627
45-49	5.2	439	482
Religion			
Christian	24.9	2,115	1,916
Muslim	75.0	6,373	6,570
Traditional	0.0	4	7
None	0.1	8	8
Ethnic group			
Krio	0.9	81	57
Mande	32.2	2,739	2,890
Temne	33.2	2,824	2,652
Madingo	3.0	254	207
Loko	2.0	166	146
Sherbro	1.4	122	174
Limba	9.9	839	791
Kissi	2.0	167	161
Kono	5.5	465	452
Susu	2.5	214	264
Fullah	3.1	264	248
Krim	0.0	2	1
Yalunka	0.4	31	49
Koranko	3.5	301	381
Vai	0.1	5	8
Other	0.3	27	20
Residence			
Urban	44.2	3,759	2,796
Rural	55.8	4,742	5,705
Region			
Eastern	22.8	1,936	1,703
Northern	33.9	2,884	3,129
Southern	20.4	1,736	2,279
Western	22.9	1,945	1,390
District			
Kailahun	7.9	670	526
Kenema	7.7	656	577
Kono	7.2	610	600
Bombali	8.6	732	675
Kambia	4.3	363	621
Koinadugu	5.1	434	597
Port Loko	7.3	617	540
Tonkolili	8.7	739	696
Bo	8.4	710	547
Bonthe	2.6	225	504
Moyamba	5.3	452	664
Pujehun	4.1	349	564
Western Area Rural	9.5	812	753
Western Area Urban	13.3	1,133	637
Education			
No education	51.7	4,393	4,779
Primary	13.8	1,173	1,197
Secondary	33.5	2,848	2,470
More than secondary	1.0	87	55
Wealth quintile			
Lowest	18.3	1,555	2,017
Second	18.7	1,591	1,893
Middle	18.9	1,604	1,725
Fourth	20.2	1,721	1,501
Highest	23.9	2,029	1,365
Total 15-49	100.0	8,501	8,501

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

Table 2.9 Educational attainment of 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 MIS 2016

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	25.7	14.1	3.8	44.9	10.7	0.8	100.0	6.1	3,323
15-19	15.9	17.1	4.7	55.3	6.8	0.2	100.0	6.3	1,665
20-24	35.5	11.1	2.9	34.4	14.7	1.4	100.0	5.6	1,658
25-29	58.6	11.4	2.2	20.3	6.4	1.1	100.0	-	1,705
30-34	69.8	8.6	1.7	14.7	4.1	1.2	100.0	-	1,218
35-39	74.4	9.2	1.8	10.4	2.8	1.4	100.0	-	1,208
40-44	75.9	4.9	2.9	13.3	2.4	0.6	100.0	-	608
45-49	75.3	6.0	3.4	9.8	3.9	1.6	100.0	-	439
Residence									
Urban	36.3	8.1	2.8	37.8	12.9	2.2	100.0	6.0	3,759
Rural	63.9	13.3	2.9	17.8	2.1	0.1	100.0	-	4,742
Region									
Eastern	55.1	15.0	3.6	22.7	3.4	0.1	100.0	-	1,936
Northern	59.5	11.5	2.3	22.7	3.8	0.3	100.0	-	2,884
Southern	53.6	11.8	2.7	25.2	6.3	0.4	100.0	-	1,736
Western	35.0	5.5	2.9	37.9	15.2	3.6	100.0	6.6	1,945
District									
Kailahun	53.0	21.7	3.2	20.4	1.3	0.3	100.0	-	670
Kenema	61.0	10.1	1.3	23.0	4.5	0.0	100.0	-	656
Kono	51.2	12.9	6.6	24.8	4.5	0.1	100.0	-	610
Bombali	49.5	8.1	2.9	32.9	6.4	0.2	100.0	0.3	732
Kambia	60.0	15.2	1.8	21.8	1.1	0.0	100.0	-	363
Koinadugu	69.4	8.1	0.9	17.4	4.2	0.0	100.0	-	434
Port Loko	59.2	18.1	1.4	19.3	2.0	0.0	100.0	-	617
Tonkolili	63.5	9.6	3.3	18.9	4.0	0.8	100.0	-	739
Bo	45.8	12.5	0.6	30.1	10.1	1.0	100.0	2.4	710
Bonthe	59.5	6.1	6.1	23.2	5.1	0.0	100.0	-	225
Moyamba	56.9	11.9	3.9	22.4	4.9	0.0	100.0	-	452
Pujehun	61.1	13.9	3.4	20.1	1.4	0.1	100.0	-	349
Western Area Rural	44.9	5.9	3.7	35.6	7.4	2.4	100.0	4.7	812
Western Area Urban	27.9	5.2	2.3	39.5	20.8	4.4	100.0	7.2	1,133
Wealth quintile									
Lowest	72.3	12.9	2.5	11.7	0.5	0.0	100.0	-	1,555
Second	63.8	15.0	3.3	16.6	1.2	0.2	100.0	-	1,591
Middle	55.2	13.9	3.2	24.0	3.6	0.1	100.0	-	1,604
Fourth	47.4	8.4	2.2	33.5	8.3	0.3	100.0	2.5	1,721
Highest	27.3	6.3	2.9	42.2	17.5	3.8	100.0	7.0	2,029
Total	51.7	11.0	2.8	26.7	6.8	1.0	100.0	-	8,501

[1] Completed grade 6 at the primary level
[2] Completed grade 6 or 7 at the secondary level

Table 2.10 Literacy of 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 MIS 2016

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	No schooling or primary school: No card with required language	No schooling or primary school: Blind/ visually impaired	Total	Percentage literate[1]	Number of women
Age									
15-24	56.4	1.8	5.2	36.5	0.0	0.0	100.0	63.5	3,323
15-19	62.3	3.3	6.4	28.0	0.0	0.0	100.0	72.0	1,665
20-24	50.5	0.3	4.0	45.1	0.0	0.0	100.0	54.9	1,658
25-29	27.8	0.1	4.2	67.9	0.0	0.0	100.0	32.1	1,705
30-34	19.9	0.0	4.3	75.6	0.1	0.0	100.0	24.3	1,218
35-39	14.6	0.1	3.8	81.4	0.1	0.0	100.0	18.5	1,208
40-44	16.3	0.4	3.2	79.8	0.3	0.0	100.0	19.9	608
45-49	15.3	0.0	4.9	79.7	0.0	0.2	100.0	20.2	439
Residence									
Urban	52.9	0.9	4.4	41.9	0.0	0.0	100.0	58.1	3,759
Rural	20.0	0.7	4.6	74.6	0.1	0.0	100.0	25.3	4,742
Region									
Eastern	26.2	0.7	3.8	69.0	0.2	0.0	100.0	30.8	1,936
Northern	26.8	0.9	4.6	67.7	0.0	0.0	100.0	32.3	2,884
Southern	31.9	0.8	4.3	63.0	0.0	0.0	100.0	37.0	1,736
Western	56.6	0.6	5.3	37.5	0.0	0.0	100.0	62.5	1,945
District									
Kailahun	22.1	0.9	5.2	71.3	0.5	0.0	100.0	28.2	670
Kenema	27.5	0.9	3.8	67.8	0.0	0.0	100.0	32.2	656
Kono	29.3	0.4	2.4	67.8	0.0	0.0	100.0	32.2	610
Bombali	39.5	0.8	5.4	54.3	0.0	0.0	100.0	45.7	732
Kambia	22.9	0.6	5.0	71.6	0.0	0.0	100.0	28.4	363
Koinadugu	21.6	1.0	2.4	75.0	0.0	0.0	100.0	25.0	434
Port Loko	21.2	0.5	5.3	72.9	0.0	0.1	100.0	27.0	617
Tonkolili	23.7	1.5	4.4	70.4	0.1	0.0	100.0	29.5	739
Bo	41.1	0.5	2.3	56.1	0.0	0.0	100.0	43.9	710
Bonthe	28.3	0.2	6.9	64.6	0.0	0.0	100.0	35.4	225
Moyamba	27.3	1.6	6.3	64.8	0.0	0.0	100.0	35.2	452
Pujehun	21.6	0.7	4.0	73.6	0.0	0.0	100.0	26.4	349
Western Area Rural	45.4	1.2	4.9	48.4	0.0	0.0	100.0	51.6	812
Western Area Urban	64.7	0.2	5.5	29.6	0.0	0.0	100.0	70.4	1,133
Wealth quintile									
Lowest	12.3	0.5	5.2	82.0	0.0	0.0	100.0	18.0	1,555
Second	18.0	1.2	5.5	75.2	0.2	0.0	100.0	24.6	1,591
Middle	27.7	0.9	4.0	67.4	0.0	0.0	100.0	32.5	1,604
Fourth	42.1	0.8	2.6	54.4	0.0	0.0	100.0	45.5	1,721
Highest	63.5	0.6	5.3	30.6	0.0	0.0	100.0	69.4	2,029
Total	34.5	0.8	4.5	60.1	0.1	0.0	100.0	39.8	8,501

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

MALARIA PREVENTION 3

Key Findings

Ownership of Insecticide-Treated Nets (ITNs):

- More than half (60%) of households in Sierra Leone own at least one ITN.
- Sixteen percent of households had at least one ITN for every two people.

Sources of ITNs:

- About three-quarters of ITNs owned by households were obtained from mass campaigns, 11% from antenatal care visits, and 5% each from routine immunisation visits and from shops or markets.

Access to an ITN:

- Nearly 4 in 10 people (37%) have access to an ITN. This means 37% of Sierra Leoneans could sleep under an ITN if every ITN in a household were used by two people.

Use of ITNs:

- Thirty-nine percent of the household population, 4% of children under 5, and 44% of pregnant women slept under an ITN the night before the survey.
- In households owning at least one ITN, 63% of the household population, 71% of children under 5, and 75% of pregnant women slept under an ITN the previous night.
- Use of ITNs is high among those with access. Eighty-nine percent of ITNs owned by households were used the night before the survey.

Intermittent Preventive Therapy (IPTp):

- Seventy-one percent of pregnant women received at least two doses, and 31% received at least three doses, of SP/Fansidar for prevention of malaria in pregnancy.

This chapter describes the population coverage rates of some of the key malaria control interventions in Sierra Leone, including the ownership and use of insecticide-treated nets (ITNs) and intermittent preventive treatment in pregnancy (IPTp). Malaria control efforts focus on scaling-up these interventions.

The Sierra Leone Malaria Control Strategic Plan 2016-2020 envisages universal coverage of the population with ITNs through routine distribution and mass campaigns in order to reduce the burden of malaria (MoHS 2015a). ITNs are routinely distributed free of charge to children less than age one on successful completion of Penta 3 immunisation (third dose of a vaccine against diphtheria, pertussis,

tetanus, *Haemophilus influenzae* type b, and hepatitis B) and to pregnant women during the first antenatal care visit.

3.1 OWNERSHIP OF INSECTICIDE-TREATED NETS

Ownership of insecticide-treated nets

Households that have at least one insecticide-treated net (ITN). An ITN is defined as: (1) a factory-treated net that does not require any further treatment (long-lasting insecticidal net or LLIN) or (2) a net that has been soaked with insecticide within the past 12 months.

Sample: Households

Full household ITN coverage

Percentage of households with at least one ITN for every two people.

Sample: Households

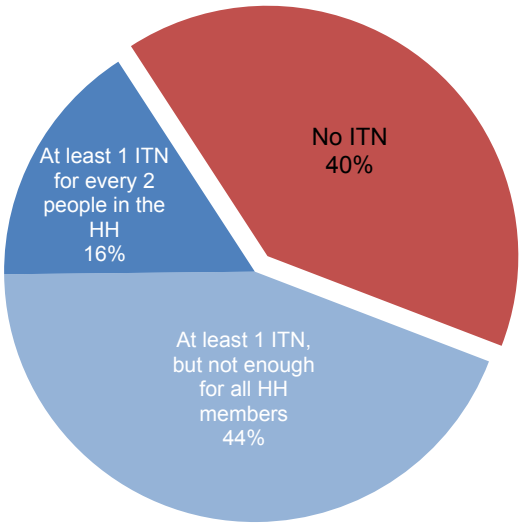
It is well understood that proper use of ITNs protects households and the entire local community from malaria. The distribution and use of ITNs is one of the central interventions for preventing malaria infection in Sierra Leone. The National Malaria Control Programme Strategic Plan 2016-2020 prioritises increasing ITN ownership with at least one ITN from the 2013 baseline of 62% to 100% by the year 2020 (MoHS 2015a).

In addition to reaching all households across the country with ITN distribution, the national strategy aims to provide enough ITNs to cover all household residents. This indicator is operationalised as one ITN for every two household members.

The 2016 SLMIS revealed that 60% of households in Sierra Leone own at least one insecticide-treated net (ITN). Only 16% of households have one net for every two people who stayed in the household the night prior to the survey. Thus to meet strategic goals the scope of distribution needs to expand to reach the 40% of households who do not own any ITNs. In addition, the quantity of ITNs distributed needs to increase to provide sufficient ITNs for the 44% of households that own at least one ITN but have an insufficient supply for the number of household residents (**Figure 3.1; Table 3.1**).

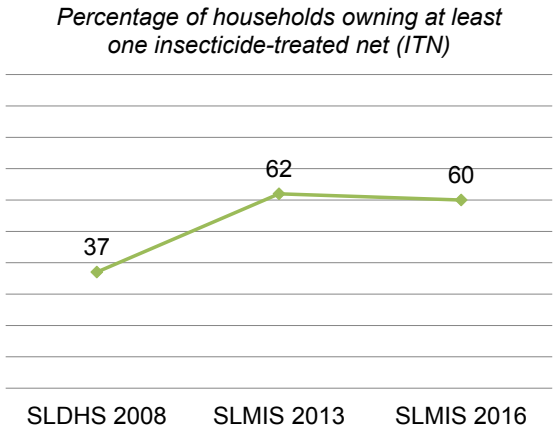
Figure 3.1 **Household ownership of ITNs**

Percent distribution of households



Trends: Ownership of ITNs increased from 37% in the 2008 SLDHS to 62% in the 2013 SLMIS and remained at similar levels in 2016 (60%) (**Figure 3.2**). The percentage of households with enough ITNs to cover the full household population increased from 7% in the 2008 SLDHS to 17% in the 2013 SLMIS and remained at similar levels in 2016 (16%).

Figure 3.2 **Trends in ITN ownership**



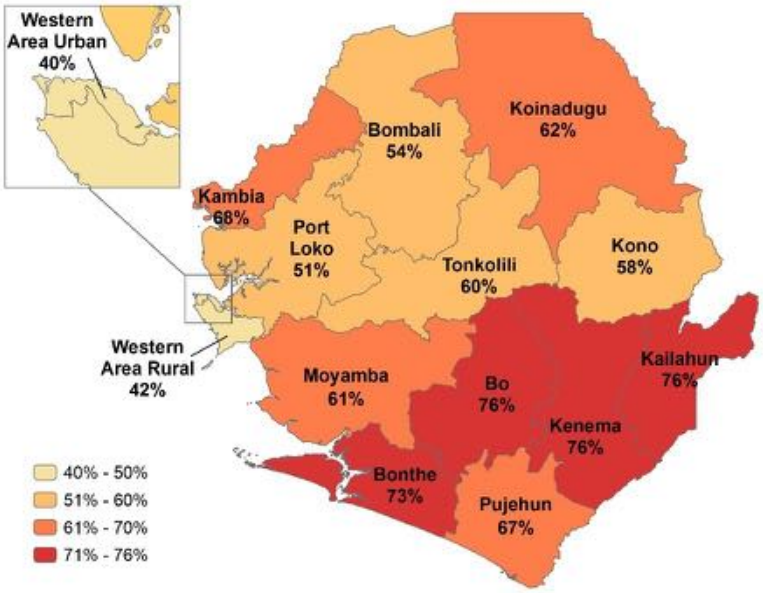
Patterns by background characteristics

Rural households are slightly more likely to own at least one ITN (65%) than urban households (54%). ITN ownership is lower in the Western Region (40%) than in the Eastern, Northern, and Southern regions (70%, 57%, and 70% respectively). A similar regional pattern appears in the percentage of households owning at least one ITN for every two persons (7% in the Western Region compared with 21%, 12%, and 25% in the Eastern, Northern and Southern regions, respectively).

Although no particular or unique pattern was observed on household possession of ITNs by wealth status; 49% of the households in the highest wealth quintile owned at least ITN, compared with 58% of the households in the lowest wealth quintile.

Household ownership of at least one ITN is highest in Bo, Kenema, and Kailahun (76%) districts. Western Area Rural and Western Area Urban were found had the lowest ITN ownership, 42% and 40%, respectively (**Figure 3.3**).

Figure 3.3 **ITN ownership by district**

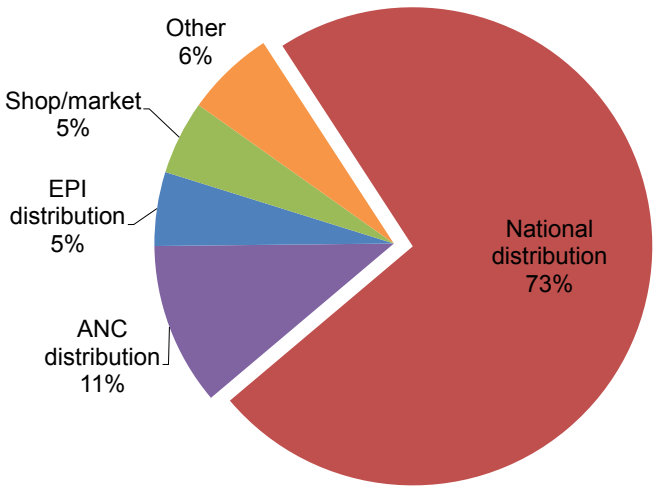


3.1.1 Sources of ITNs

The majority of ITNs owned by households (74%) were obtained from mass distribution campaigns. Eleven percent of ITNs came from routine ANC visits and 5% through the immunisation programme. An additional 5% of ITNs were obtained from shops or markets (**Figure 3.4** and **Table 3.2**).

Figure 3.4 **Sources of ITNs**

Percent distribution of households



3.1.2 Mosquito net preferences

Preferences for various social marketing goods significantly affect the consistent use of products. In this regard, the 2016 SLMIS assessed respondents' preferences for shape, colour, and material of mosquito nets (**Table 3.3**). Most respondents (54%) prefer conical, 44% prefer rectangular, and 2% did not have a clear preference. Sixty-six percent of respondents prefer the nets with blue colour, 25% prefer white, and 7% prefer green nets. Eighty percent of respondents preferred a soft net material, while 20% preferred a hard material.

Trends: Preferences have changed from the 2013 SLMIS, in which 33% preferred conical and 55% preferred rectangular.

3.2 Household Access and Use of ITNs

Access to an ITN

Percentage of the population that could sleep under an ITN if each ITN in the household were used by up to two people.

Sample: *De facto* household population

Use of ITNs

Percentage of population that slept under an ITN the night before the survey.

Sample: *De facto* household population

ITNs act as both a physical and a chemical barrier against mosquitoes. By reducing the vector population, ITNs may help to reduce malaria risk at the community level as well as to individuals who use them.

Access to an ITN is 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. Comparing ITN access and ITN use indicators can help programmes identify if there is a behavioural gap in which available ITNs are not being used. If the difference between these indicators is substantial, the programme may need to focus on behaviour change and how to identify the main drivers or barriers to ITN use to design an appropriate intervention. This analysis helps ITN programmes determine whether they need to achieve higher ITN coverage, promote ITN use, or both.

The majority of Sierra Leoneans (63%) do not have access to an ITN. Overall, only 37% of the population have access to an ITN (37% could sleep under an ITN if each ITN in the household were used by up to two people) (**Table 3.4**). Thirty-nine percent of the population reported using an ITN the night before the survey (**Table 3.5**). Comparing these two population-level indicators, it is evident that the proportion of the population using ITNs is similar to the proportion with access to an ITN (39% and 37%, respectively); there is no gap between ITN access and ITN use at the population level (**Figure 3.5**). ITN use is very high among those with access.

Figure 3.5 **Access to and use of ITNs**

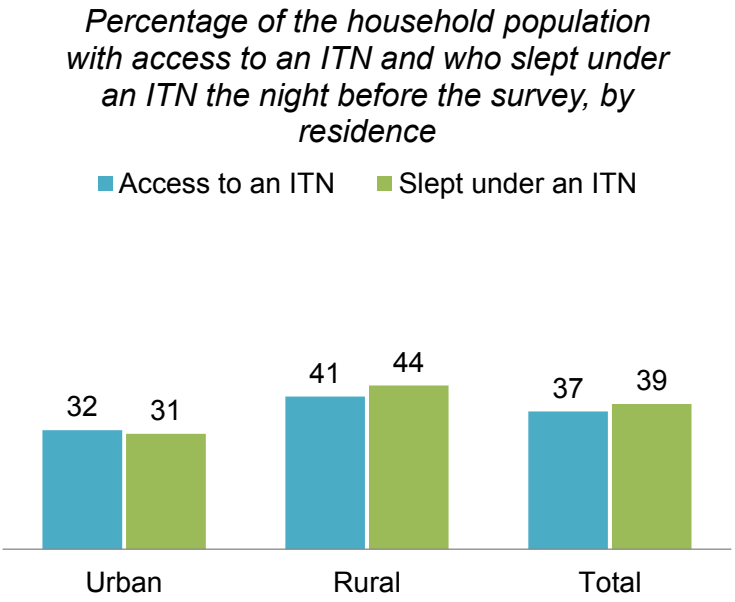
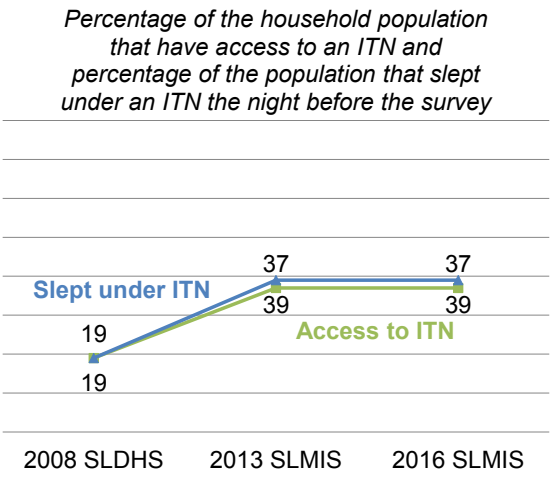


Table 3.6 shows that 89% of the ITNs owned by households were used the night before the survey. In short, although encouraging ITN use behaviours is always desirable, the data show that achieving the strategic goal of universal coverage in Sierra Leone will require emphasis on improving ITN distribution.

Trends: The proportion of the household population with access to an ITN and the proportion using an ITN the night before the survey increased from 19% for both indicators in the 2008 SLDHS to 37% and 39%, respectively, in the 2013 SLMIS. No additional change occurred between the 2013 SLMIS and the 2016 SLMIS (**Figure 3.6**). The levels of ITN use are as high as the levels of ITN access revealing that when nets are available they are being used; this trend has continued across all surveys.

Figure 3.6 **Trends in ITN access and use**



Patterns by background characteristics

- ITN access is higher in the household population in rural areas compared with the population in urban areas (41% and 32%, respectively) and is highest in Bo district (53%) and lowest in Western Area Rural (21%).
- ITN utilisation is higher in household populations in rural compared with urban areas (44% and 31%, respectively). ITN utilisation is highest in household populations in Bo (56%) and Kenema (55%) and lowest in Western Area Rural (21%) and Western Area Urban (19%) (**Figure 3.7**).
- In households owning at least one ITN, populations were most likely to use an ITN in Moyamba (74%) and least likely to use an ITN in Western Area Urban (42%) (**Figure 3.8**).

Figure 3.7 **ITN use by household population**

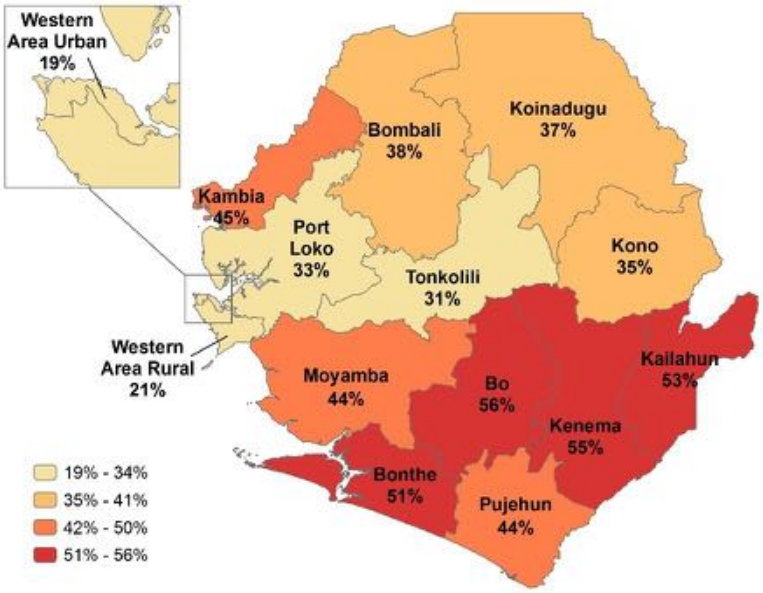
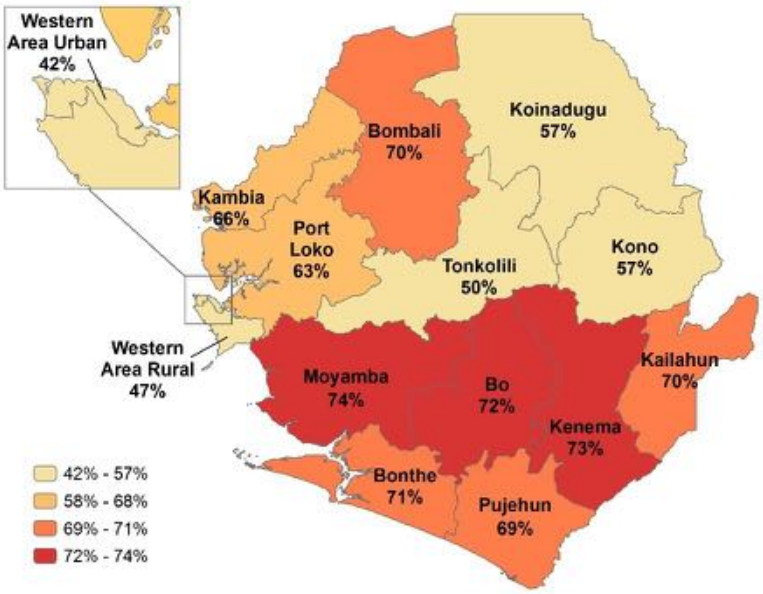


Figure 3.8 **ITN use by household population in households owning ITNs**



3.3 USE OF ITNS BY CHILDREN AND PREGNANT WOMEN

Malaria is endemic in Sierra Leone with transmission occurring year-round. Natural immunity to the disease is acquired over time for those living in high malaria transmission areas (Doolan et al. 2009). Children under 5 are prone to severe malaria infection due to lack of acquired immunity. For about 6 months following birth, antibodies acquired from the mother during pregnancy protect the child, but this maternal immunity is gradually lost when the child starts to develop his/her own immunity to malaria. Age is an important factor in determining levels of acquired immunity to malaria as acquired immunity does not prevent infection but rather protects against severe disease and death. 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 high level of immunity by their fifth birthday. Such children may experience episodes of malaria illness but usually do not suffer from the severe, life-threatening conditions.

Malaria transmission in Sierra Leone is stable and adults usually acquire some degree of immunity; however, pregnancy suppresses immunity and women in their first pregnancies are at increased risk for severe malaria. Malaria in pregnancy is frequently associated with the development of anaemia, which interferes with the maternal-foetus exchange and can lead to low-birth-weight infants, placental parasitaemia, foetal death, abortion, stillbirth, and prematurity (Shulman and Dorman 2003).

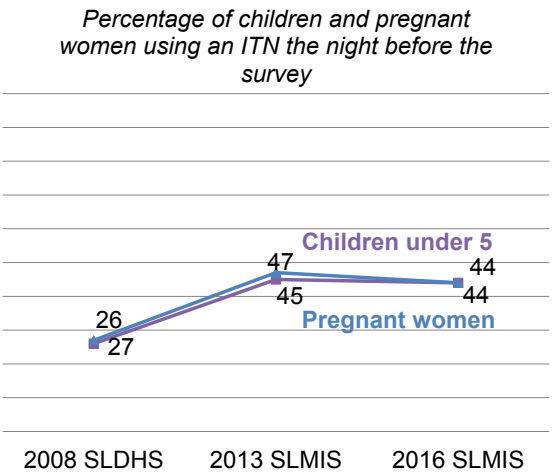
As stated in the Sierra Leone National Strategic Plan 2016-2020, all children under 5 and all pregnant women should sleep under an ITN or LLIN every night to prevent malaria complications. ITNs are distributed free to all pregnant women during their first antenatal visit, to children 12-59 months upon completion of Penta 3 immunisation and to the entire population during mass campaigns (MoHS 2015a).

Table 3.7 and **Table 3.8** show the percentage of children under age 5 and the percentage of pregnant women who slept under an ITN the night before the survey. Overall, 44% of children in Sierra Leone under age 5 and 44% of pregnant women slept under an ITN the previous night.

Not surprisingly, ITN use is higher among children and pregnant women that slept in households that own at least one ITN than among children and pregnant women in all households, as 40% of all households do not own an ITN. In households with at least one ITN, 71% of children under 5 and 75% of pregnant women slept under an ITN the night before the survey (**Table 3.7** and **Table 3.8**).

Trends: Net use increased from 26% to 45% among children under age 5 and from 27% to 47% in pregnant women between the 2008 SLDHS and 2013 SLMIS. Between the 2013 SLMIS and the 2016 SLMIS, levels of ITN use in these populations remained steady (44% ITN use in both children and pregnant women) (**Figure 3.9**).

Figure 3.9 **ITN use by children and pregnant women**

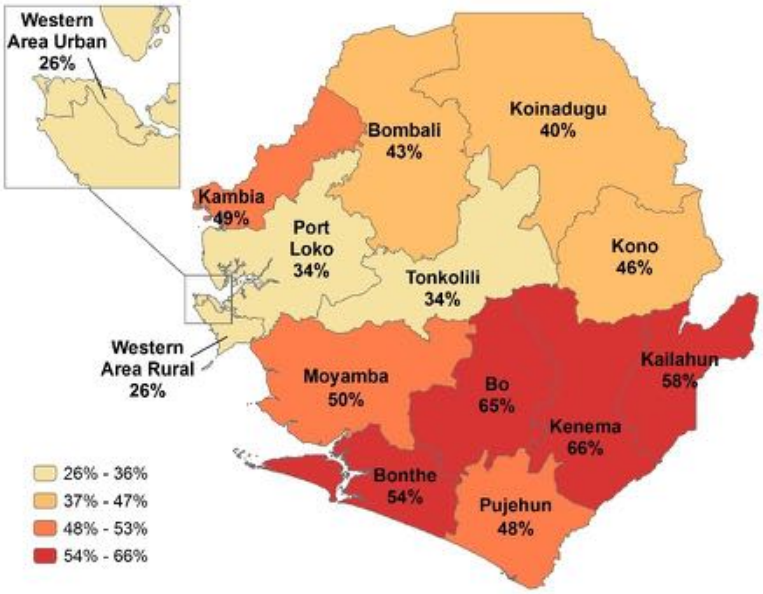


Patterns by background characteristics

- ITN use among children under 5 decreases with age. Forty-eight percent of children less than 12 months slept under an ITN the night before the survey, compared with 41% of children age 48-59 months.
- Children in rural areas are more likely than children in urban areas to use ITNs (48% and 38%, respectively). The same pattern is seen in ITN use by pregnant women (53% and 31% for rural and urban, respectively).

- ITN use is highest in children living in the Southern (56%) and Eastern (59%) regions compared with the Northern Region (40%) and Western Region (26%). A similar pattern in ITN use among pregnant women is evident with the highest use in Southern and Eastern regions (61% and 51%) followed by Northern Region (45%) and Western Region (19%).

Figure 3.10 **ITN use by children under 5**



- By district, ITN use ranges from 26% in Western Area Urban and Western Area Rural to 66% in Kenema for children under 5 (**Figure 3.10**) and 13% in Western Area Urban to 72% in Kenema for pregnant women.

3.4 MALARIA IN PREGNANCY

Intermittent preventive treatment (IPTp) during pregnancy (IPTp2+)
Percentage of women who took at least two doses of SP/Fansidar with at least one dose received during an antenatal care visit during their last pregnancy.
Sample: Women age 15-49 with a live birth in the 2 years before the survey

Intermittent preventive treatment (IPTp) during pregnancy (IPTp3+)
Percentage of women who took at least three doses of SP/Fansidar with at least one dose received during an antenatal care visit during their last pregnancy.
Sample: Women age 15-49 with a live birth in the 2 years before the survey

Malaria infection during pregnancy is a major public health problem in Sierra Leone, with substantial risks for the mother, her foetus, and the neonate. Intermittent preventive treatment of malaria in pregnancy (IPTp) is a full therapeutic course of antimalarial medicine given to pregnant women at routine antenatal care visits to prevent malaria. IPTp helps prevent maternal malaria episodes, maternal and foetal anaemia, placental parasitaemia, low birth weight, and neonatal mortality.

The World Health Organization (WHO) recommends a three-pronged approach for reducing the negative health effects associated with malaria in pregnancy (MIP): prompt diagnosis and treatment of confirmed infection, use of long-lasting insecticidal nets (LLINs), and IPTp (WHO 2004).

Sulfadoxine-pyrimethamine (SP), also known as Fansidar, is the recommended drug for IPTp in Sierra Leone. For over 10 years, the Ministry of Health and Sanitation (MOHS) has been implementing IPTp, defined as provision of at least two doses of sulfadoxine-pyrimethamine (SP)/Fansidar to protect the mother and her child from malaria during routine antenatal care visits in the second and third trimesters of pregnancy (IPTp2+). In 2016 the National Malaria Control Programme adopted the 2012 WHO recommendation to administer one dose of SP/Fansidar at each antenatal care (ANC) visit after the first trimester, with at least 1 month between doses (WHO 2012a; WHO 2012b). The household survey indicator used to measure coverage of this intervention is the percentage of women with a live birth in the

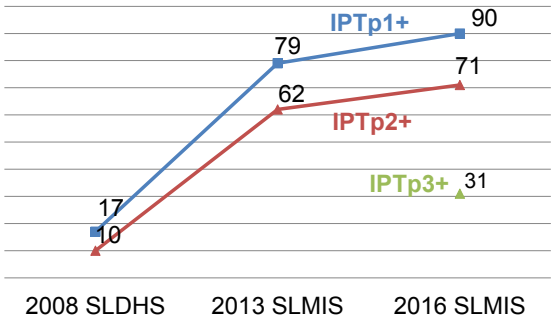
2 years preceding the survey who received three or more doses of SP/Fansidar to prevent malaria during her most recent pregnancy (IPTp3+).

Ninety percent of women with a live birth in the 2, years preceding the survey received one or more doses of SP/Fansidar during an ANC visit to prevent malaria. Seventy-one percent of these women received two or more doses of SP/Fansidar, at least one during an ANC visit, and 31% received three or more doses of SP/Fansidar, at least one during an ANC visit (**Table 3.9**).

Trends: The percentage of women receiving IPTp1+ has increased from 17% in the 2008 SLDHS to 79% in the 2013 SLMIS to 90% in the current survey. The proportion of women receiving two or more doses of SP/Fansidar for IPTp has increased from 10% in the 2008 SLDHS to 62% in the 2013 SLMIS and 71% in the 2016 SLMIS. IPTp3+ was 31% in the 2016 SLMIS which is the baseline for this indicator from which to measure future progress (**Figure 3.11**).

Figure 3.11 **Trends in IPTp use by pregnant women**

Percentage of women with a live birth in the 2 years before the survey who received at least 1, 2, or 3 doses of SP/Fansidar with at least one during an ANC visit



Patterns by background characteristics

- The use of IPTp2+ is lower in urban than in rural areas. Seventy-six percent of women in rural areas received at least two doses of SP/Fansidar, compared with only 64% of women in urban areas.
- IPTp2+ coverage decreases with increasing wealth quintile; 76% of women in the lowest wealth quintile received at least two doses of IPTp, compared with 58% of women in the highest wealth quintile.
- With respect to region of residence, IPTp2+ coverage was similarly high in Eastern, Northern and Southern regions (73%, 76%, 73%, respectively) but was much lower (60%) in the Western Region.
- IPTp2+ coverage ranged from 51% in Western Area Urban to 87% in Kambia.

List of Tables

For detailed information on malaria, see the following tables:

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- **Table 3.2 Source of mosquito nets**
- **Table 3.3 Preferences of mosquito nets**
- **Table 3.4 Access to an insecticide-treated net (ITN)**
- **Table 3.5 Use of mosquito nets by persons in the household**
- **Table 3.6 Use of existing ITNs**
- **Table 3.7 Use of mosquito nets by children**
- **Table 3.8 Use of mosquito nets by pregnant woman**
- **Table 3.9 Use of Intermittent Preventive Treatment (IPTp) by women during pregnancy**

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 MIS 2016

Background characteristic	Percentage of households with at least one mosquito net			Average number of nets per household			Number of households	Percentage of households with at least one net for every two persons who stayed in the household last night			Number of households with at least one person who stayed in the household last night
	Any mosquito net	Insecticide-treated mosquito net (ITN)[1]	Long-lasting insecticidal net (LLIN)	Any mosquito net	Insecticide-treated mosquito net (ITN)[1]	Long-lasting insecticidal net (LLIN)		Any mosquito net	Insecticide-treated mosquito net (ITN)[1]	Long-lasting insecticidal net (LLIN)	
Residence											
Urban	54.5	53.7	53.7	1.0	1.0	1.0	2,688	11.4	11.1	11.1	2,687
Rural	66.0	64.8	64.7	1.3	1.3	1.3	4,031	20.0	19.6	19.6	4,031
Region											
Eastern	71.9	70.5	70.5	1.4	1.3	1.3	1,663	21.8	21.3	21.3	1,663
Northern	59.5	57.5	57.5	1.2	1.1	1.1	2,230	13.0	12.3	12.3	2,230
Southern	70.5	70.4	70.3	1.5	1.5	1.5	1,496	25.1	25.0	25.0	1,496
Western	41.0	41.0	41.0	0.6	0.6	0.6	1,330	6.5	6.5	6.5	1,329
District											
Kailahun	77.0	75.8	75.8	1.4	1.4	1.4	620	24.3	24.0	24.0	620
Kenema	76.0	75.8	75.8	1.5	1.4	1.4	558	26.9	26.7	26.7	558
Kono	60.8	57.8	57.8	1.1	1.1	1.1	485	12.7	11.6	11.6	485
Bombali	53.7	53.7	53.7	1.1	1.1	1.1	531	15.0	14.7	14.7	531
Kambia	68.8	67.6	67.6	1.4	1.4	1.4	273	14.1	14.0	14.0	273
Koinadugu	61.9	61.9	61.9	1.1	1.1	1.1	350	6.9	6.9	6.9	350
Port Loko	53.6	51.1	51.1	0.9	0.9	0.9	556	15.1	13.9	13.9	556
Tonkolili	65.2	60.1	60.1	1.4	1.3	1.3	520	12.3	11.1	11.1	520
Bo	76.4	76.4	76.4	1.6	1.6	1.6	631	27.2	27.2	27.2	631
Bonthe	72.8	72.7	72.7	1.6	1.6	1.6	216	31.0	31.0	31.0	216
Moyamba	60.8	60.8	60.8	1.4	1.4	1.4	340	19.4	19.4	19.4	339
Pujehun	67.4	67.2	66.5	1.4	1.4	1.4	310	22.7	22.6	22.5	310
Western Area Rural	42.0	42.0	42.0	0.7	0.7	0.7	495	3.7	3.7	3.7	495
Western Area Urban	40.4	40.4	40.4	0.6	0.6	0.6	835	8.1	8.1	8.1	834
Wealth quintile											
Lowest	59.5	57.8	57.7	1.1	1.0	1.0	1,432	15.9	15.3	15.3	1,432
Second	68.6	67.9	67.9	1.3	1.3	1.3	1,338	20.7	20.5	20.5	1,338
Middle	70.7	69.7	69.6	1.5	1.5	1.5	1,244	19.6	19.4	19.4	1,244
Fourth	60.8	59.4	59.4	1.2	1.2	1.2	1,266	14.7	14.0	14.0	1,266
Highest	48.9	48.6	48.6	0.9	0.9	0.9	1,440	12.4	12.2	12.2	1,439
Total	61.4	60.3	60.3	1.2	1.2	1.2	6,719	16.6	16.2	16.2	6,718

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

Table 3.2 Source of mosquito nets

Percent distribution of mosquito nets by source of net, according to background characteristics, Sierra Leone MIS 2016

Background characteristic	Mass distribution campaign	ANC visit	Immunisation visit	Government hospital/ health centre	Mobile clinic	Community health worker	Private hospital/ clinic	Mission/ faith-based hospital	Mission/ faith-based clinic	PVT mobile clinic	NGO	Pharmacy	Shop/ market	School	Other	Don't know/ missing	Total	Number of mosquito nets
Type of net																		
ITN[1]	73.6	10.6	4.7	2.0	0.2	1.1	0.1	0.0	0.0	0.0	0.9	0.2	4.8	0.2	1.6	0.0	100.0	7,799
Other[2]	34.7	11.7	5.7	10.9	0.0	0.3	0.8	0.0	0.0	0.0	0.0	0.0	26.4	0.0	9.5	0.0	100.0	135
Residence																		
Urban	64.3	10.2	4.6	3.5	0.2	1.7	0.2	0.1	0.1	0.0	1.7	0.4	9.6	0.4	3.0	0.1	100.0	2,648
Rural	77.2	10.8	4.8	1.5	0.1	0.7	0.1	0.0	0.0	0.0	0.4	0.1	3.0	0.1	1.1	0.0	100.0	5,287
Region																		
Eastern	64.4	14.1	7.0	3.4	0.1	1.5	0.1	0.2	0.0	0.1	1.4	0.1	4.7	0.2	2.5	0.1	100.0	2,261
Northern	75.9	11.6	4.4	1.2	0.2	0.2	0.1	0.0	0.0	0.0	1.1	0.0	3.4	0.0	1.7	0.0	100.0	2,578
Southern	83.2	6.7	3.3	0.7	0.2	1.2	0.0	0.0	0.0	0.0	0.1	0.4	3.2	0.4	0.7	0.0	100.0	2,231
Western	59.9	8.8	3.5	5.2	0.0	2.0	0.2	0.0	0.2	0.0	0.7	0.2	16.8	0.0	2.6	0.0	100.0	864
District																		
Kailahun	61.9	11.2	5.5	7.7	0.3	3.0	0.3	0.1	0.1	0.1	3.5	0.0	3.2	0.0	3.1	0.0	100.0	897
Kenema	69.3	15.0	11.1	0.6	0.0	0.4	0.0	0.3	0.0	0.0	0.0	0.2	2.2	0.2	0.5	0.2	100.0	817
Kono	61.2	17.6	3.5	0.8	0.0	0.6	0.0	0.0	0.0	0.0	0.3	0.1	10.6	0.7	4.5	0.0	100.0	547
Bombali	80.2	13.5	0.4	0.4	0.0	0.2	0.0	0.0	0.0	0.0	1.0	0.0	2.7	0.0	1.6	0.0	100.0	572
Kambia	84.0	8.0	5.2	0.1	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.2	0.0	100.0	375
Koinadugu	76.9	5.8	8.7	1.5	0.0	0.8	0.0	0.0	0.0	0.3	5.0	0.0	0.7	0.0	0.2	0.0	100.0	390
Port Loko	66.8	15.3	2.8	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	10.3	0.0	2.7	0.0	100.0	526
Tonkolili	74.3	12.3	6.1	2.0	0.7	0.0	0.5	0.0	0.0	0.0	0.0	0.1	1.2	0.0	2.6	0.2	100.0	715
Bo	80.8	5.5	1.6	1.4	0.4	1.8	0.0	0.0	0.0	0.0	0.1	1.0	5.6	0.8	1.1	0.0	100.0	981
Bonthe	95.0	1.7	1.0	0.7	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.5	0.0	100.0	353
Moyamba	79.9	11.9	6.5	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.1	0.7	0.0	100.0	468
Pujehun	82.6	8.1	5.7	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0	0.0	100.0	429
Western Area Rural	44.2	16.8	3.8	2.7	0.0	2.4	0.0	0.0	0.0	0.0	0.4	0.0	27.3	0.0	2.4	0.0	100.0	354
Western Area Urban	70.7	3.2	3.2	6.9	0.0	1.8	0.4	0.0	0.3	0.0	0.9	0.4	9.4	0.0	2.7	0.0	100.0	510
Wealth quintile																		
Lowest	76.6	11.2	5.6	1.8	0.1	0.7	0.0	0.0	0.0	0.1	0.3	0.0	2.1	0.1	1.3	0.1	100.0	1,530
Second	75.2	13.3	4.2	1.8	0.2	0.7	0.1	0.0	0.1	0.0	0.5	0.0	2.8	0.0	1.2	0.0	100.0	1,751
Middle	74.5	11.4	5.7	1.5	0.1	1.1	0.2	0.2	0.0	0.1	1.5	0.0	1.9	0.0	1.9	0.0	100.0	1,893
Fourth	72.8	9.7	4.2	2.6	0.1	1.0	0.0	0.0	0.0	0.0	0.9	0.2	6.5	0.0	1.9	0.1	100.0	1,517
Highest	63.1	6.2	3.8	3.5	0.3	1.9	0.2	0.0	0.1	0.0	0.9	0.8	15.6	1.0	2.6	0.0	100.0	1,244
Total	72.9	10.6	4.7	2.2	0.1	1.0	0.1	0.0	0.0	0.0	0.8	0.2	5.2	0.2	1.7	0.0	100.0	7,935

ANC = Antenatal care

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

[2] Any net that is not an ITN

Table 3.3 Preferences of mosquito net

Percent distribution of household by preferred shape of mosquito net, by preferred colour of mosquito net and by preferred hardness of mosquito material, according to background characteristics, Sierra Leone MIS 2016

Background characteristic	Preferred shape					Preferred colour					Preferred hardness of net material				
	Conical	Rect-angular	Either	Don't know	Total	White	Blue	Green	Other	Total	Soft (poly-ester)	Hard (poly-ethyl-ene)	Don't know	Total	Number
Residence															
Urban	65.1	33.5	1.4	0.1	100.0	31.0	62.7	4.5	1.8	100.0	84.8	14.8	0.4	100.0	2,688
Rural	46.6	51.2	2.3	0.0	100.0	21.7	67.7	7.9	2.7	100.0	77.1	22.8	0.1	100.0	4,031
Region															
Eastern	55.9	42.1	2.0	0.0	100.0	27.0	64.4	6.2	2.4	100.0	70.7	29.3	0.0	100.0	1,663
Northern	43.0	54.2	2.8	0.0	100.0	23.3	66.5	6.5	3.7	100.0	77.1	22.8	0.2	100.0	2,230
Southern	55.9	43.1	1.1	0.0	100.0	18.7	69.9	10.2	1.3	100.0	88.7	11.2	0.1	100.0	1,496
Western	67.8	30.8	1.2	0.2	100.0	34.5	61.5	2.9	1.1	100.0	87.7	11.7	0.6	100.0	1,330
District															
Kailahun	55.2	42.7	2.1	0.0	100.0	25.3	62.1	8.4	4.2	100.0	57.1	42.9	0.0	100.0	620
Kenema	49.4	48.8	1.8	0.0	100.0	22.7	69.7	7.1	0.6	100.0	76.0	24.0	0.0	100.0	558
Kono	64.4	33.5	2.1	0.0	100.0	34.3	61.2	2.4	2.0	100.0	82.0	18.0	0.0	100.0	485
Bombali	48.1	51.0	1.0	0.0	100.0	19.8	72.8	6.9	0.5	100.0	83.3	16.7	0.0	100.0	531
Kambia	32.7	63.6	3.6	0.0	100.0	32.3	60.7	4.7	2.3	100.0	79.5	19.6	0.9	100.0	273
Koinadugu	60.9	38.9	0.2	0.0	100.0	13.2	77.1	2.4	7.3	100.0	65.4	34.6	0.0	100.0	350
Port Loko	29.7	68.1	2.2	0.0	100.0	25.3	67.0	6.1	1.6	100.0	68.5	31.5	0.0	100.0	556
Tonkolili	45.4	47.9	6.7	0.0	100.0	26.9	55.4	10.1	7.7	100.0	86.6	13.2	0.2	100.0	520
Bo	68.4	30.0	1.6	0.0	100.0	17.7	71.6	8.3	2.4	100.0	90.1	9.7	0.2	100.0	631
Bonthe	47.1	51.3	1.6	0.1	100.0	21.2	65.9	12.1	0.8	100.0	89.8	9.9	0.3	100.0	216
Moyamba	37.9	62.1	0.0	0.0	100.0	19.5	68.4	11.9	0.2	100.0	80.9	19.1	0.0	100.0	340
Pujehun	56.2	43.0	0.8	0.0	100.0	18.1	70.6	10.6	0.7	100.0	93.6	6.4	0.0	100.0	310
Western Area Rural	69.0	29.4	1.0	0.5	100.0	26.0	70.5	2.1	1.4	100.0	88.5	10.8	0.8	100.0	495
Western Area Urban	67.1	31.6	1.2	0.0	100.0	39.5	56.1	3.4	0.9	100.0	87.3	12.2	0.6	100.0	835
Wealth quintile															
Lowest	39.9	56.9	3.3	0.0	100.0	19.0	68.6	8.6	3.7	100.0	74.7	25.2	0.1	100.0	1,432
Second	47.6	50.3	2.1	0.0	100.0	22.0	68.1	7.3	2.6	100.0	75.1	24.7	0.2	100.0	1,338
Middle	50.6	47.5	1.8	0.0	100.0	22.7	66.3	8.8	2.2	100.0	81.7	18.3	0.0	100.0	1,244
Fourth	61.4	37.4	1.2	0.0	100.0	25.8	68.0	4.6	1.5	100.0	83.3	16.7	0.0	100.0	1,266
Highest	70.3	28.4	1.1	0.2	100.0	37.0	58.1	3.4	1.5	100.0	86.4	12.9	0.7	100.0	1,440
Total	54.0	44.1	1.9	0.0	100.0	25.4	65.7	6.5	2.3	100.0	80.2	19.6	0.2	100.0	6,719

Table 3.4 Access to an insecticide-treated net (ITN)

Percentage of the de facto population with access to an ITN in the household, by background characteristics, Sierra Leone MIS 2016

Background characteristic	Percent with access to an ITN[1,2]	De facto population
Residence		
Urban	31.5	15,743
Rural	40.9	23,513
Region		
Eastern	44.5	9,317
Northern	34.6	13,704
Southern	46.8	8,632
Western	21.6	7,603
District		
Kailahun	49.3	3,363
Kenema	48.9	3,058
Kono	34.4	2,896
Bombali	34.1	3,146
Kambia	41.3	1,733
Koinadugu	34.0	2,229
Port Loko	31.1	3,064
Tonkolili	35.3	3,532
Bo	52.5	3,406
Bonthe	48.1	1,287
Moyamba	41.2	2,102
Pujehun	41.8	1,837
Western Area Rural	20.6	3,326
Western Area Urban	22.4	4,278
Wealth quintile		
Lowest	35.7	7,855
Second	41.0	7,836
Middle	43.7	7,877
Fourth	36.1	7,837
Highest	29.3	7,851
Total	37.1	39,256

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

Table 3.5 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 MIS 2016

	Household population				Household population in households with at least one ITN[1]	
Background characteristic	Percentage who slept under any mosquito net last night	Percentage who slept under an ITN[1] last night	Percentage who slept under an LLIN last night	Number of persons	Percentage who slept under an ITN[1] last night	Number of persons
Age[2]						
<5	44.9	44.1	44.1	7,365	71.3	4,554
5-14	32.3	31.8	31.8	10,789	50.8	6,745
15-34	36.0	35.5	35.4	11,302	59.2	6,765
35-49	47.7	47.0	46.9	5,194	75.8	3,216
50+	45.0	44.4	44.4	4,561	72.8	2,785
Sex						
Male	37.1	36.5	36.5	18,812	59.9	11,475
Female	41.3	40.6	40.6	20,444	65.8	12,615
Residence						
Urban	31.5	31.1	31.1	15,743	54.9	8,917
Rural	44.5	43.7	43.6	23,513	67.7	15,173
Region						
Eastern	48.7	48.1	48.1	9,317	67.7	6,616
Northern	37.2	35.8	35.8	13,704	60.4	8,131
Southern	49.9	49.8	49.7	8,632	71.6	6,007
Western	19.4	19.4	19.4	7,603	44.2	3,336
District						
Kailahun	54.0	53.1	53.1	3,363	69.9	2,556
Kenema	55.4	55.4	55.4	3,058	73.4	2,309
Kono	35.4	34.5	34.5	2,896	57.1	1,752
Bombali	38.1	38.0	38.0	3,146	69.9	1,712
Kambia	45.9	45.4	45.3	1,733	66.2	1,190
Koinadugu	37.1	37.1	37.1	2,229	57.2	1,445
Port Loko	33.9	32.6	32.6	3,064	63.1	1,581
Tonkolili	35.1	31.1	31.1	3,532	49.9	2,202
Bo	55.7	55.7	55.7	3,406	72.2	2,630
Bonthe	51.4	51.3	51.3	1,287	70.6	935
Moyamba	44.3	44.3	44.3	2,102	74.1	1,258
Pujehun	44.3	44.2	43.7	1,837	68.6	1,184
Western Area Rural	20.7	20.6	20.6	3,326	46.6	1,468
Western Area Urban	18.5	18.5	18.5	4,278	42.3	1,868
Wealth quintile						
Lowest	40.8	39.8	39.7	7,855	69.7	4,485
Second	45.2	44.7	44.6	7,836	65.7	5,325
Middle	46.4	45.7	45.7	7,877	66.1	5,454
Fourth	37.7	37.0	37.0	7,837	61.6	4,703
Highest	26.2	26.0	26.0	7,851	49.6	4,122
Total	39.3	38.6	38.6	39,256	63.0	24,090

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

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

[2]Excludes 23 persons for whom age information was not available.

Table 3.6 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 MIS 2016

Background characteristic	Percentage of existing ITNs[1] used last night	Number of ITNs[1]
Residence		
Urban	86.4	2,609
Rural	90.2	5,191
Region		
Eastern	90.4	2,215
Northern	92.1	2,492
Southern	88.5	2,230
Western	77.4	863
District		
Kailahun	91.0	887
Kenema	90.1	806
Kono	89.9	522
Bombali	92.2	570
Kambia	97.1	370
Koinadugu	93.1	390
Port Loko	90.0	506
Tonkolili	90.2	655
Bo	89.2	981
Bonthe	91.3	352
Moyamba	88.1	468
Pujehun	84.9	428
Western Area Rural	88.8	353
Western Area Urban	69.5	510
Wealth quintile		
Lowest	92.9	1,493
Second	90.5	1,722
Middle	89.4	1,869
Fourth	90.4	1,484
Highest	79.5	1,231
Total	89.0	7,799

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

Table 3.7 Use of mosquito nets by children

Percentage of children under age 5 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 age 5 in households with at least one ITN, the percentage who slept under an ITN the night before the survey, by background characteristics, Sierra Leone MIS 2016

	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 mosquito net last night	Percentage who slept under an ITN[1] last night	Percentage who slept under an LLIN last night	Number of children	Percentage who slept under an ITN[1] last night	Number of children
Age in months						
<12	49.2	48.0	48.0	1,413	76.4	888
12-23	46.8	46.1	46.1	1,364	76.0	828
24-35	45.0	43.8	43.8	1,412	72.0	859
36-47	43.1	42.7	42.7	1,581	67.1	1,006
48-59	41.1	40.6	40.6	1,596	66.6	972
Sex						
Male	44.5	43.8	43.8	3,680	70.9	2,276
Female	45.3	44.4	44.4	3,686	71.8	2,278
Residence						
Urban	38.3	37.6	37.6	2,777	67.0	1,560
Rural	48.9	48.0	48.0	4,588	73.6	2,994
Region						
Eastern	58.8	57.8	57.8	1,648	76.9	1,239
Northern	40.3	38.8	38.8	2,650	65.5	1,570
Southern	56.0	56.0	55.9	1,559	79.8	1,094
Western	26.2	26.2	26.2	1,509	60.8	652
District						
Kailahun	60.0	58.1	58.1	617	74.4	482
Kenema	66.4	66.4	66.4	592	81.5	482
Kono	47.0	45.9	45.9	439	73.4	275
Bombali	43.4	43.4	43.4	562	78.6	310
Kambia	49.2	48.7	48.5	299	70.0	207
Koinadugu	40.3	40.3	40.3	428	63.2	273
Port Loko	35.2	34.2	34.2	606	66.5	311
Tonkolili	38.7	34.3	34.3	755	55.4	468
Bo	64.5	64.5	64.5	634	81.6	501
Bonthe	54.4	54.4	54.4	220	76.4	157
Moyamba	49.5	49.5	49.5	356	84.8	208
Pujehun	48.3	48.1	47.7	349	73.5	229
Western Area Rural	26.4	26.4	26.4	784	62.1	334
Western Area Urban	26.1	26.1	26.1	724	59.4	318
Wealth quintile						
Lowest	44.7	43.4	43.3	1,601	76.7	906
Second	50.1	49.6	49.5	1,606	70.7	1,126
Middle	50.9	50.2	50.2	1,458	71.1	1,029
Fourth	42.6	41.4	41.4	1,495	71.5	865
Highest	34.0	33.9	33.9	1,205	64.9	629
Total	44.9	44.1	44.1	7,365	71.3	4,554

Note: Table is based on children who stayed in the household the night before the interview.
[1] An insecticide-treated net (ITN) is (1) a factory-treated net that does not require any further treatment (LLIN) or (2) a net that has been soaked with insecticide within the past 12 months.

Table 3.8 Use of mosquito nets by pregnant women

Percentages of pregnant women age 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 MIS 2016

	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 mosquito net last night	Percentage who slept under an ITN[1] last night	Percentage who slept under an LLIN last night	Number of women	Percentage who slept under an ITN[1] last night	Number of women
Residence						
Urban	31.4	30.7	30.7	267	65.7	124
Rural	53.0	52.8	52.8	404	79.0	270
Region						
Eastern	51.2	49.5	49.5	167	76.4	108
Northern	44.7	44.7	44.7	245	73.1	150
Southern	60.9	60.9	60.9	128	84.2	92
Western	19.0	19.0	19.0	130	(56.7)	44
District						
Kailahun	(46.2)	(46.2)	(46.2)	49	(77.6)	29
Kenema	(71.8)	(71.8)	(71.8)	55	(92.9)	43
Kono	36.9	32.6	32.6	63	(56.0)	37
Bombali	51.8	51.8	51.8	60	(84.8)	37
Kambia	46.4	46.4	46.4	33	(71.1)	21
Koinadugu	(63.5)	(63.5)	(63.5)	31	(87.6)	23
Port Loko	31.0	31.0	31.0	73	(62.9)	36
Tonkolili	(43.3)	(43.3)	(43.3)	48	(62.5)	33
Bo	67.8	67.8	67.8	64	(90.3)	48
Bonthe	(55.8)	(55.8)	(55.8)	13	*	10
Moyamba	(63.8)	(63.8)	(63.8)	21	*	15
Pujehun	(46.5)	(46.5)	(46.5)	30	(71.7)	20
Western Area Rural	(28.1)	(28.1)	(28.1)	53	*	22
Western Area Urban	(12.6)	(12.6)	(12.6)	77	*	21
Education						
No education	47.4	47.4	47.4	348	82.0	201
Primary	33.5	33.5	33.5	121	56.1	72
Secondary	45.5	44.1	44.1	197	73.3	119
More than secondary	*	*	*	4	*	3
Wealth quintile						
Lowest	52.5	52.5	52.5	152	87.5	91
Second	45.3	44.6	44.6	123	66.1	83
Middle	57.2	57.2	57.2	123	80.6	87
Fourth	40.4	39.1	39.1	135	73.3	72
Highest	27.2	27.2	27.2	137	(61.2)	61
Total	44.4	44.0	44.0	671	74.8	395

Note: Table is based on women who stayed in the household the night before the interview.
Numbers in parentheses are based on 25-49 unweighted cases. An asterisk indicates a figure is based on fewer than 25 cases and has been suppressed.
[1] An insecticide-treated net (ITN) is (1) a factory-treated net that does not require any further treatment (LLIN) or (2) a net that has been soaked with insecticide within the past 12 months.

Table 3.9 Use of Intermittent Preventive Treatment (IPTp) by women during pregnancy

Percentage of women age 15-49 with a live birth in the 2 years preceding the survey who, during the pregnancy preceding the last birth, received one or more doses of SP/Fansidar at least one of which was received during an ANC visit, received two or more doses of SP/Fansidar at least one of which was received during an ANC visit, and received three or more doses of SP/Fansidar at least one of which was received during an ANC visit, according to background characteristics, Sierra Leone MIS 2016

Background characteristic	Percentage who received one or more doses of SP/Fansidar[1]	Percentage who received two or more doses of SP/Fansidar[1]	Percentage who received three or more doses of SP/Fansidar[1]	Number of women with a live birth in the 2years preceding the survey
Residence				
Urban	90.9	64.1	24.7	938
Rural	89.9	75.9	34.9	1,513
Region				
Eastern	92.1	72.6	32.7	571
Northern	88.0	75.7	36.0	918
Southern	92.3	73.2	30.8	455
Western	90.7	60.3	20.3	507
District				
Kailahun	86.1	67.8	45.5	213
Kenema	94.0	77.5	27.3	185
Kono	97.4	73.3	22.8	172
Bombali	89.2	83.0	17.2	187
Kambia	96.8	86.6	40.3	119
Koinadugu	72.3	60.9	38.7	143
Port Loko	84.3	66.1	38.0	203
Tonkolili	94.3	81.1	44.3	268
Bo	90.2	76.3	32.4	154
Bonthe	93.2	72.4	35.6	72
Moyamba	95.6	84.4	31.5	116
Pujehun	91.1	58.1	24.7	112
Western Area Rural	90.4	67.5	23.4	288
Western Area Urban	91.1	50.7	16.2	219
Education				
No education	89.3	73.2	31.8	1,387
Primary	92.7	71.5	35.3	375
Secondary	90.9	67.8	27.2	675
More than secondary	*	*	*	14
Wealth quintile				
Lowest	90.7	76.2	36.1	543
Second	89.2	74.0	34.3	512
Middle	90.6	73.5	36.6	493
Fourth	91.3	71.4	27.3	510
Highest	89.4	58.4	17.6	392
Total	90.3	71.3	31.0	2,451

Note: An asterisk indicates a figure is based on fewer than 25 cases and has been suppressed.

[1] Received the specified number of doses of SP/Fansidar, at least one of which was received during an ANC visit

MALARIA IN CHILDREN 4

Key Findings

Fever prevalence:

- One in four children under age 5 had fever in the 2 weeks before the survey (27%).

Care-seeking for fever:

- Advice or treatment was sought for 71% of children with fever in the 2 weeks before the survey.

Source of advice or treatment:

- Among children with recent fever for whom care was sought, 88% received advice or treatment from the public sector, 11% from the private sector, and only 2% elsewhere.

Testing:

- Fifty-one percent of children with a recent fever received a finger or heel prick for testing.

Type of antimalarial drug used:

- Among children under 5 with a recent fever who received an antimalarial, 97% received artemisinin combination therapy.

Severe anaemia:

- One in10 children age 6-59 months has a haemoglobin level less than 8g/dl.

Malaria:

- Four in ten children age 6-59 months tested positive for malaria via microscopy.

This chapter presents data useful for assessing how well fever management strategies are implemented. Specific topics include care seeking for febrile children, diagnostic testing of children with fever, and therapeutic use of antimalarial drugs. Prevalence of anaemia and malaria among children age 6-59 months is also assessed.

4.1 CARE SEEKING FOR FEVER IN CHILDREN

Care seeking for children under 5 with fever

Percentage of children under 5 with a fever in the 2 weeks before the survey for whom advice or treatment was sought from a health provider, a health facility, or a pharmacy.

Sample: Children under 5 with a fever in the 2 weeks before the survey

One of the key case management objectives of the National Malaria Control Programme (NMCP) is to ensure that all suspected malaria cases have access to confirmatory diagnosis and receive effective treatment (MOHS 2015a).

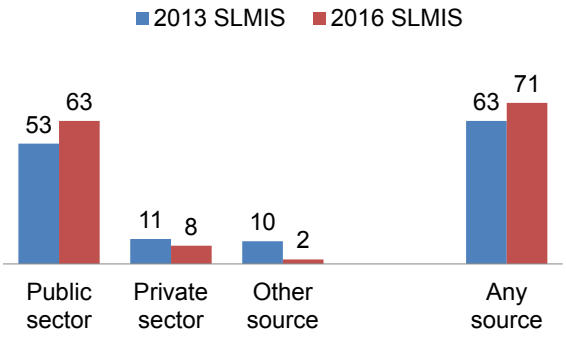
Fever is a key symptom of malaria and other acute infections in children. Malaria fevers require prompt and effective treatment to prevent malaria morbidity and mortality. Twenty-seven percent of children under age 5 had fever in the 2 weeks preceding the survey. Advice or treatment was sought for 71% of the children with fever in the 2 weeks preceding the survey, and timely care seeking (the same or next day following fever onset) occurred for 50% of the febrile children (**Table 4.1**).

Among children with recent fever for whom care was sought, most received advice or treatment from the public health sector (88%); among these children seeking care from public health facilities, 67% sought care from a government health centre, and 15% from a government hospital. Only 11% sought advice from a private sector source (**Table 4.2**).

Trends: The percentage of children who sought care from a health provider, a health facility, or a pharmacy increased from 63% in the 2013 SLMIS to 71% in the 2016 SLMIS. The change appears to be driven by an increase in care seeking from public sources, which rose from 53% to 63% between the 2013 SLMIS and the 2016 SLMIS **(Figure 4.1)**.

Figure 4.1 **Trends in care seeking for fever in children by source of care**

Percent of children under age 5 with fever in the 2 weeks preceding the survey for whom advice or treatment was sought from specific sources.



Patterns by background characteristics

- Care seeking for children with fever was more common for those less than age 12 months compared with older children age 48-59 months (79% and 62%, respectively) **(Table 4.1).**
- The percentage of children with fever for whom advice or treatment was sought was high in the Southern, Eastern, and Northern regions (76%, 75%, and 71%, respectively) but was only 58% in Western Region.
- Pujehun had the highest percentage of children for whom advice or treatment was sought (85%) while West Area Rural had the lowest (50%).
- Similarly, the percentage of children under 5 for whom advice or treatment was sought the same or next day following fever onset varied from 85% in Pujehun to 28% in West Area Rural.

4.2 Diagnostic Testing of Children with Fever

Diagnosis of malaria in children under 5 with fever

Percentage of children under 5 with a fever in the 2 weeks before the survey who had blood taken from a finger or heel for testing. This is a proxy measure of diagnostic testing for malaria.

Sample: Children under 5 with a fever in the 2 weeks before the survey

National Malaria Control Programme policy recommends prompt parasitological confirmation by microscopy or, alternatively, by rapid diagnostic tests (RDTs) for all patients suspected of malaria before treatment is started (MoHS 2015c). Adherence to this policy cannot be directly measured through household surveys; however, the 2016 SLMIS asked interviewed women with children under 5 who had a

fever in the 2 weeks before the survey if the child had blood taken from a finger or heel for testing during the illness. This information is used as a proxy measure for adherence to the NMCP policy of conducting diagnostic testing for all suspected malaria cases.

In the 2016 SLMIS, 51% of children with a fever in the 2 weeks before the survey had blood taken from a finger or heel, presumably for malaria testing (**Table 4.1**).

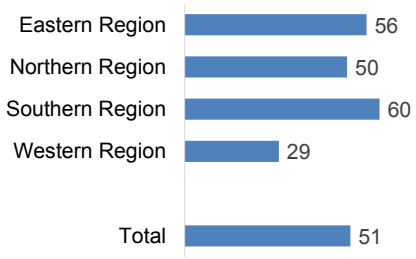
Trends: The percentage of children who had blood taken from a finger or heel for testing increased from 40% in the 2013 SLDHS to 51% in the 2016 SLMIS. This shows improved adherence to the malaria treatment policy of testing before treatment.

Patterns by background characteristics

- The percentage of children with recent fever who had blood taken from a finger or heel for testing decreases with increasing age. Fifty-nine percent of children less than age 12 months had blood taken from a finger or heel for testing, compared with 43% of children age 48-59 months.
- Fifty-four percent of children under age 5 with recent fever from rural areas had blood taken from a finger or heel for testing, compared with 47% in urban areas.
- Sixty percent of children under 5 with recent fever in the Southern Region had blood taken from a finger or heel for testing, compared with only 29% in the Western Region (**Figure 4.2**).

Figure 4.2 **Diagnostic testing of children with fever by region**

Percent of children under age 5 with fever in the 2 weeks preceding the survey who had blood taken from a finger or heel for testing



- At the district level, the percentage of children under 5 with recent fever who had blood taken from a finger or heel for testing was greatest in Moyamba and Pujehun (71%) and lowest in Western Area Urban (27%).

4.3 USE OF RECOMMENDED ANTIMALARIALS

Artemisinin-based combination therapy (ACT) for children under 5 with fever

Among children under 5 with a fever in the 2 weeks before the survey who took any antimalarial drugs, the percentage who took an artemisinin-based combination therapy (ACT).

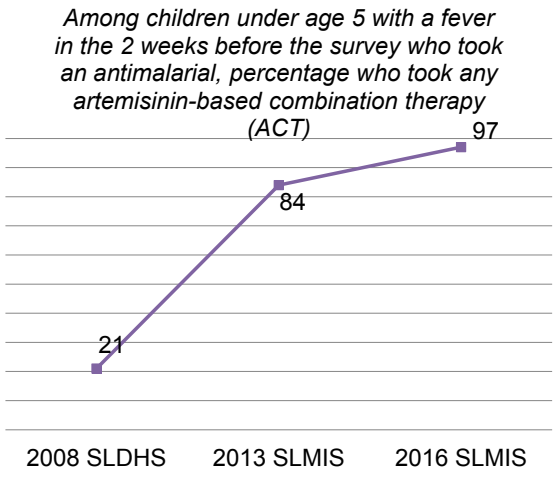
Sample: Children under 5 with a fever in the 2 weeks before the survey who took any antimalarial drug

Artemisinin-based combination therapy (ACT) is the recommended first-line antimalarial drug for the treatment of uncomplicated malaria in Sierra Leone. This policy has been recommended since 2004 and implemented since 2006 (MOHS 2015).

According to the results shown in **Table 4.3**, most children under age 5 with recent fever who received an antimalarial took an ACT, either artesunate + amodiaquine (ASAQ) or artemether + lumefantrine (AL) (97%). One percent of children with fever who received an antimalarial took SP/Fansidar, 1% took chloroquine, 1% took amodiaquine, and 1% took other antimalarials while less than 1% took quinine or artesunate. The distribution of antimalarial drug use by children under age 5 with recent fever did not vary substantially by background characteristics (**Table 4.3**).

Trends: There has been a large increase in the percentage of children under age 5 using ACTs among those with recent fever who received any antimalarials, from 21% in the 2008 SLDHS to 84% in the 2013 SLMIS to 97% in the 2016 SLMIS (**Figure 4.3**).

Figure 4.3 **Trends in ACT use by children under age 5**



4.4 PREVALENCE OF LOW HAEMOGLOBIN IN CHILDREN

Prevalence of low haemoglobin in children

Percentage of children age 6-59 months who had a haemoglobin measurement of less than 8 grams per decilitre (g/dl) of blood. The cutoff of 8 g/dl is often used to classify malaria-related anaemia.

Sample: Children age 6-59 months

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. Other causes of anaemia include intestinal worms, haemoglobinopathy, and sickle cell disease. Although anaemia is not specific to malaria, trends in anaemia prevalence can reflect malaria morbidity, and they respond to changes in the coverage of malaria interventions (Korenromp 2004). Malaria interventions have been associated with a 60% reduction in the risk of anaemia using a cut-off of 8g/dl (RBM 2003).

Among eligible children age 6-59 months from interviewed households, almost all (99%) consented and were tested for anaemia (**Table 4.4**).

Trends: The national prevalence of haemoglobin <8g/dl in children age 6-59 months has not changed from the 2008 SLDHS to the 2013 SLMIS to the 2016 SLMIS (10% in each case).

Patterns by background characteristics

- The prevalence of low haemoglobin in children age 6-59 months is almost twice as high in rural compared with urban areas (12% and 7%, respectively) **(Figure 4.4)**.
- Koinadugu has the highest percentage of children age 6-59 months with low haemoglobin (20%) and Kono and West Area Urban have the lowest (3% and 2%, respectively).
- The prevalence of low haemoglobin in children age 6-59 months decreases with increasing wealth quintile, from 13% among children in the lowest wealth quintile to 3% among children in the highest (**Figure 4.5**).

Figure 4.4 **Prevalence of low haemoglobin in children by district**

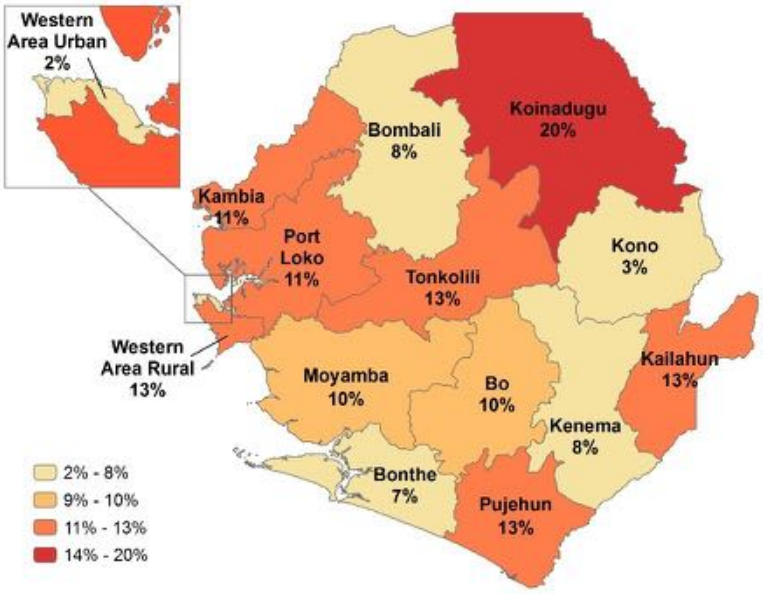
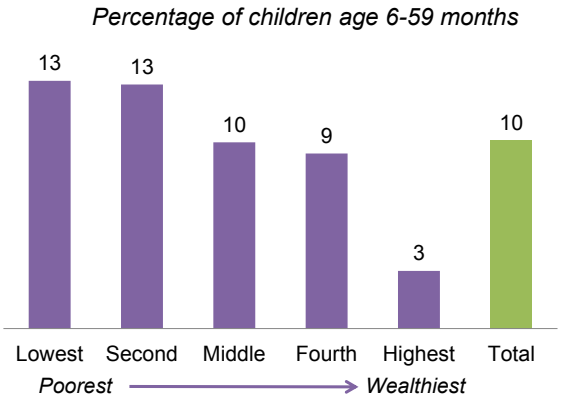


Figure 4.5 **Low haemoglobin among children by household wealth**



4.5 PREVALENCE OF MALARIA IN CHILDREN

Malaria prevalence in children

Percentage of children age 6-59 months infected with malaria according to microscopy results.

Sample: Children age 6-59 months

As is the case in many other countries in sub-Saharan Africa, malaria is the leading cause of death in Sierra Leone among children under 5. Malaria transmission is high throughout the year, contributing to development of partial immunity within the first 2 years of life. However, many people, 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 and other associated morbidity among the infected individuals.

In the 2016 SLMIS, 40% of children age 6-59 months were positive for malaria parasites according to microscopy results (**Table 4.6**). Rapid diagnostic tests (RDTs) were done in conjunction with microscopy to facilitate treatment of infected children during the survey fieldwork. Results from these RDTs are also presented in Table 4.6 for reference. Fifty-three percent of children age 6-59 months tested positive for malaria antigens using RDTs.

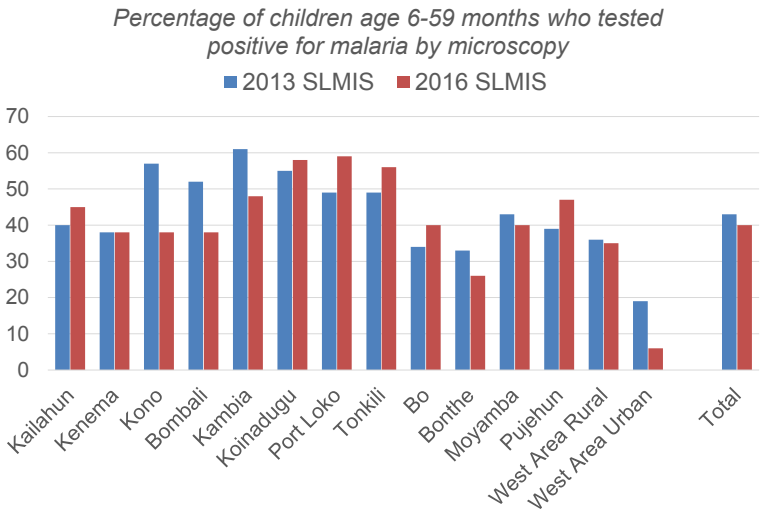
The differences in malaria prevalence observed between the RDT and microscopy results are expected. Microscopic detection of malaria parasites depends on the visualisation of stained parasites under a microscope, whereas the diagnosis of malaria by RDT relies on the interaction between a parasite antigen present in the blood and an antibody in the RDT formulation. Therefore, direct comparisons of malaria results from microscopy with those from RDTs should be avoided. The First Response SD Bioline, 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, its persistence often leads to higher malaria prevalence estimates detected using RDTs compared with those measured using microscopy.

Another factor likely to affect comparisons of malaria prevalence estimates is the season of data collection. There are two major seasons, a summer rainy season (May-October) with heavy rains in July and August, and a dry season from November to April. Despite these seasonal fluctuations, the tropical climate in Sierra Leone has rainfall patterns, temperature, and humidity that supports continuous malaria transmission all year round.

The 2016 SLMIS was conducted in July and August of 2016 at the peak of malaria season. Normally a spike in malaria cases occurs during these months. The 2013 SLMIS, in comparison, was conducted in February and March 2013, during the dry period when malaria transmission is lower.

Trends: National malaria prevalence has not changed significantly between the 2013 SLMIS and the 2016 SLMIS; however, some district-level changes have occurred. Malaria prevalence declined from 57% to 38% in Kono, from 52% to 38% in Bombali, from 61% to 48% in Kambia, and from 19% to 6% in West Area Urban. In Port Loko, malaria prevalence rose from 49% to 59% between the 2013 SLMIS and the 2016 SLMIS (**Figure 4.6**).

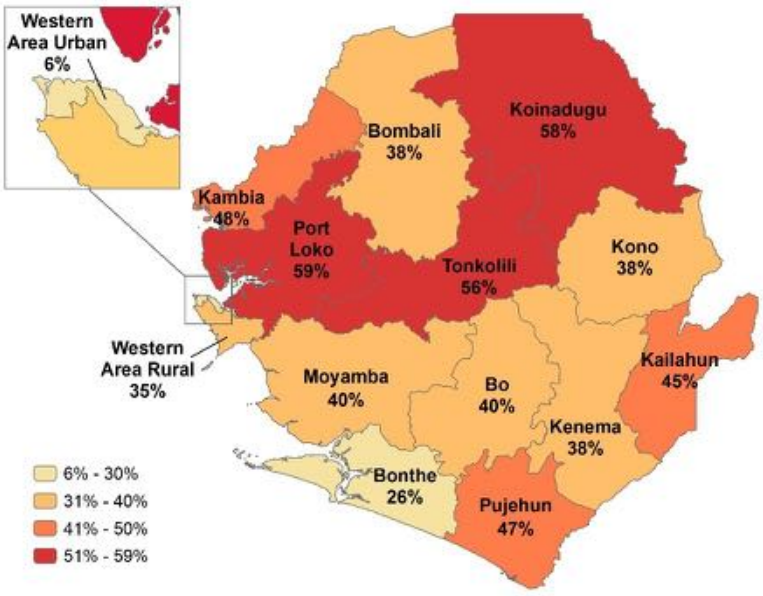
Figure 4.6 **Trends in prevalence of malaria in children by district**



Patterns by background characteristics

- Malaria prevalence increases with age from 23% in children age 6-8 months to 50% in children age 48-59 months **(Table 4.6).**
- Malaria prevalence is higher among children in the lowest wealth quintiles (52%) compared with the highest wealth quintiles (15%).
- Malaria prevalence is higher among children whose mothers have no formal education (41%) than among those whose mothers had a secondary education (28.4%).
- Malaria prevalence is almost two times higher in rural areas (49%) than in urban areas (25%).
- By region, malaria prevalence according to microscopy is highest in the Northern Region (52%) relative to the Eastern and Southern Regions (40% in both), and Western Region (21%).
- Among the districts, the highest malaria prevalence is found in Port Loko (59%) and the lowest in Western Area Urban (6%) (**Figure 4.7**).

Figure 4.7 **Prevalence of malaria in children by district**



List of Tables

For detailed information on malaria, see the following tables:

Table 4.1 Prevalence, care seeking and diagnosis of children with fever

Percentage of children under age 5 with fever in the 2 weeks preceding the survey; and among children under age 5 with fever, the percentage for whom advice or treatment was sought, the percentage for whom advice or treatment was sought the same or next day, and the percentage for whom blood was taken from a finger or heel for testing, Sierra Leone MIS 2016

	Children under age 5		Children under age 5 with fever			
Background characteristic	Percentage with fever in the 2 weeks preceding the survey	Number of children	Percentage for whom advice or treatment was sought[1]	Percentage for whom advice or treatment was sought the same or next day	Percentage who had blood taken from a finger or heel for testing	Number of children
Age in months						
<12	24.9	1,281	79.4	54.7	58.9	318
12-23	33.5	1,174	75.6	53.7	57.1	394
24-35	29.1	1,037	68.1	45.0	46.7	302
36-47	23.8	1,194	68.5	53.8	46.1	285
48-59	22.0	1,119	61.6	41.4	42.9	246
Sex						
Male	26.8	2,881	70.5	48.3	49.6	774
Female	26.4	2,922	72.2	52.3	52.7	771
Residence						
Urban	24.2	2,236	69.0	46.3	46.7	540
Rural	28.2	3,568	72.6	52.4	53.5	1,005
Region						
Eastern	29.3	1,295	74.8	53.8	56.3	380
Northern	27.6	2,117	70.8	49.1	49.7	585
Southern	32.8	1,167	75.9	56.5	59.5	383
Western	16.1	1,225	57.7	34.9	29.4	198
District						
Kailahun	30.4	489	69.8	50.8	54.9	149
Kenema	19.2	444	71.7	62.1	56.8	85
Kono	40.3	362	81.6	52.0	57.4	146
Bombali	31.0	454	81.4	61.5	56.3	141
Kambia	26.9	261	82.0	50.9	69.8	70
Koinadugu	30.6	347	53.6	38.6	43.5	106
Port Loko	16.9	491	54.8	40.0	28.7	83
Tonkolili	32.7	565	75.6	48.9	50.0	185
Bo	35.0	461	65.4	42.4	47.1	161
Bonthe	23.6	163	80.8	55.8	58.2	38
Moyamba	28.1	271	81.0	46.9	70.8	76
Pujehun	39.5	271	86.4	84.8	70.5	107
Western Area Rural	18.1	673	50.1	28.0	30.8	122
Western Area Urban	13.8	552	(69.9)	(46.0)	(27.1)	76
Mother's education						
No education	26.5	3,467	69.4	50.3	52.0	917
Primary	27.9	843	71.0	44.3	49.5	235
Secondary	26.4	1,408	77.1	54.2	51.4	374
More than secondary	*	27	*	*	*	5
Wealth quintile						
Lowest	28.1	1,251	64.6	44.7	48.0	352
Second	28.7	1,250	74.5	52.9	53.7	359
Middle	29.4	1,144	76.3	55.4	58.2	336
Fourth	24.3	1,204	72.8	53.5	54.0	293
Highest	21.5	955	67.5	42.1	36.3	206
Total	26.6	5,804	71.4	50.3	51.1	1,545

[1] Excludes advice or treatment from a traditional practitioner

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

Table 4.2 Source of advice or treatment for children with fever

Percentage of children under age 5 with fever in the 2 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 MIS 2016

Background characteristic	Percentage for whom advice or treatment was sought from each source:		
	Among children with fever	Among children with fever for whom advice or treatment was sought	Among children with fever who took any ACT the same or next day
Any public sector source	**63.0**	**87.5**	**83.4**
Government hospital	10.9	15.2	11.1
Government health centre	47.9	66.5	67.2
Mobile clinic	1.3	1.8	0.9
Community health worker	4.1	5.7	5.1
Any private sector source	**8.2**	**11.3**	**8.6**
Private hospital	1.0	1.4	1.0
Private clinic	1.4	1.9	2.0
Mission/faith based hospital	0.9	1.2	1.4
Mission/faith based clinic	0.2	0.3	0.3
Pharmacy	4.0	5.6	2.8
Mobile clinic	0.4	0.5	0.5
Other private medical sector	0.3	0.4	0.6
Any other source	**1.6**	**2.2**	**0.6**
Shop	0.1	0.1	0.2
Traditional healer	0.3	0.4	0.1
Drug peddler	0.9	1.3	0.2
Other	0.3	0.4	0.1
Number of children	1,545	1,112	693

CHW = Community health worker

Table 4.3 Type of antimalarial drugs used

Among children under age 5 with fever in the 2 weeks preceding the survey who took any antimalarial medication, the percentage who took specific antimalarial drugs, by background characteristics, Sierra Leone MIS 2016

Background characteristic	Percentage of children who took:							Number of children with fever who took anti-malarial drug
	Any ACT[1]	SP/Fansidar	Chloroquine	Amodia-quine	Quinine pills	Artesunate rectal	Other anti-malarial	
Age in months								
<6	(95.8)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(4.2)	29
6-11	93.1	0.5	3.0	3.4	0.0	0.0	0.9	133
12-23	98.7	1.3	0.4	1.1	0.1	0.4	0.9	231
24-35	95.8	0.7	1.3	1.3	0.3	0.4	1.2	175
36-47	98.7	1.2	0.4	0.8	1.1	1.0	1.0	173
48-59	94.0	1.3	2.8	0.4	1.2	0.2	0.8	135
Sex								
Male	96.4	0.7	1.9	0.7	0.6	0.4	0.8	427
Female	96.5	1.2	0.8	1.9	0.4	0.4	1.4	449
Residence								
Urban	93.8	2.1	2.9	2.3	0.5	1.0	1.5	306
Rural	97.9	0.4	0.5	0.7	0.5	0.1	0.9	570
Region								
Eastern	99.2	0.3	0.3	0.0	0.3	0.0	1.2	219
Northern	95.3	1.3	1.2	2.6	0.7	0.3	1.7	325
Southern	98.5	0.3	0.2	0.7	0.6	0.4	0.1	240
Western	88.5	3.2	7.2	1.6	0.0	2.0	1.5	92
District								
Kailahun	100.0	0.0	0.0	0.0	0.0	0.0	0.0	77
Kenema	98.1	0.0	0.0	0.0	0.0	0.0	1.9	58
Kono	99.3	0.7	0.9	0.0	0.7	0.0	1.8	84
Bombali	98.6	1.4	0.0	0.0	0.0	0.0	1.4	83
Kambia	92.5	4.7	2.1	1.3	0.0	1.6	2.0	52
Koinadugu	100.0	0.0	1.1	5.6	0.0	0.0	4.0	51
Port Loko	(86.3)	(2.2)	(4.0)	(7.5)	(0.0)	(0.0)	(0.0)	29
Tonkolili	94.4	0.0	1.1	2.4	2.2	0.0	1.1	110
Bo	98.1	0.0	0.5	1.5	0.0	0.0	0.0	90
Bonthe	100.0	0.0	0.0	0.0	0.0	0.0	0.0	25
Moyamba	97.7	1.5	0.0	0.5	1.5	2.1	0.0	50
Pujehun	99.0	0.0	0.0	0.0	0.8	0.0	0.2	76
Western Area Rural	(81.8)	(0.0)	(14.5)	(0.6)	(0.0)	(0.0)	(3.1)	46
Western Area Urban	(95.1)	(6.4)	(0.0)	(2.5)	(0.0)	(3.9)	(0.0)	47
Mother's education								
No education	96.8	0.5	1.5	1.0	0.4	0.0	1.3	510
Primary	96.7	2.0	0.9	0.9	0.5	2.8	1.3	131
Secondary	96.1	1.1	1.2	2.2	0.7	0.0	0.5	232
More than secondary	*	*	*	*	*	*	*	3
Wealth quintile								
Lowest	97.2	0.4	1.0	0.4	0.9	0.4	0.7	183
Second	98.5	0.3	0.5	0.5	0.5	0.0	1.2	210
Middle	96.7	0.2	0.2	3.2	0.0	0.1	1.3	210
Fourth	95.3	1.2	4.0	0.0	0.1	0.0	1.6	161
Highest	92.6	4.4	1.9	2.5	1.2	2.4	0.3	112
Total	96.5	1.0	1.3	1.3	0.5	0.4	1.1	876

[1]ACT = Artemisinin-based combination therapy (artesunate + amodiaquine (ASAQ) or artemether + lumefantrine (AL))
Numbers in parentheses are based on 25-49 unweighted cases. An asterisk indicates a figure is based on fewer than 25 cases and has been suppressed.

Table 4.4 Coverage of testing for anaemia and malaria

Percentage of eligible children age 6-59 months who were tested for anaemia and malaria, by background characteristics, Sierra Leone MIS 2016

Background characteristic	Percentage tested for			Number of children
	Anaemia	Malaria by RDT	Malaria by microscopy	
Age in months				
6-8	98.4	98.2	98.4	420
9-11	99.3	99.1	99.3	382
12-17	98.6	98.3	98.4	762
18-23	99.4	98.8	99.4	600
24-35	98.9	98.8	98.9	1,412
36-47	98.7	98.5	98.7	1,581
48-59	98.4	98.2	98.3	1,587
Sex				
Male	98.6	98.4	98.6	3,369
Female	98.9	98.6	98.8	3,375
Mother's interview status				
Interviewed	98.7	98.6	98.7	5,085
Not interviewed[1]	99.0	98.2	98.9	1,659
Residence				
Urban	98.9	98.6	98.9	2,582
Rural	98.6	98.5	98.6	4,162
Region				
Eastern	99.0	98.9	99.0	1,484
Northern	98.2	98.1	98.2	2,407
Southern	98.6	98.5	98.5	1,432
Western	99.6	98.8	99.6	1,421
District				
Kailahun	99.5	99.5	99.5	567
Kenema	98.7	98.7	98.5	543
Kono	98.8	98.1	98.8	374
Bombali	99.8	99.4	99.8	529
Kambia	96.0	96.0	96.0	276
Koinadugu	98.7	98.7	98.7	388
Port Loko	96.4	96.4	96.4	534
Tonkolili	99.0	99.0	99.0	680
Bo	99.8	99.6	99.6	596
Bonthe	94.9	94.9	94.9	194
Moyamba	98.4	98.4	98.4	335
Pujehun	98.9	98.9	98.9	307
Western Area Rural	99.3	97.9	99.3	726
Western Area Urban	99.8	99.8	99.8	694
Mother's education[2]				
No education	98.6	98.5	98.6	3,083
Primary	98.4	98.2	98.2	742
Secondary	99.1	99.1	99.1	1,233
More than secondary	*	*	*	26
Wealth quintile				
Lowest	98.7	98.7	98.7	1,446
Second	98.7	98.5	98.6	1,455
Middle	98.2	98.1	98.2	1,331
Fourth	98.7	98.4	98.7	1,376
Highest	99.7	99.0	99.7	1,135
Total	98.8	98.5	98.7	6,744

[1] Includes children whose mothers are deceased.
[2] Excludes children whose mothers are not interviewed.
An asterisk indicates a figure is based on fewer than 25 cases and has been suppressed.

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 MIS 2016

Background characteristic	Haemoglobin <8.0 g/dl	Number of children
Age in months		
6-8	10.6	414
9-11	11.9	379
12-17	13.1	750
18-23	9.9	596
24-35	11.9	1,397
36-47	9.1	1,560
48-59	7.5	1,562
Sex		
Male	10.9	3,322
Female	9.2	3,337
Mother's interview status		
Interviewed	10.1	5,017
Not interviewed[1]	10.1	1,642
Residence		
Urban	6.7	2,555
Rural	12.2	4,104
Region		
Eastern	8.6	1,469
Northern	12.3	2,364
Southern	10.2	1,411
Western	7.8	1,414
District		
Kailahun	13.1	564
Kenema	7.6	536
Kono	3.0	369
Bombali	8.4	528
Kambia	11.0	265
Koinadugu	20.2	383
Port Loko	10.5	515
Tonkolili	12.9	673
Bo	9.8	594
Bonthe	6.8	184
Moyamba	10.2	330
Pujehun	13.0	304
Western Area Rural	13.2	721
Western Area Urban	2.2	693
Mother's education[2]		
No education	10.4	3,039
Primary	12.4	730
Secondary	8.0	1,222
More than secondary	*	26
Wealth quintile		
Lowest	13.3	1,428
Second	13.1	1,435
Middle	10.0	1,306
Fourth	9.4	1,359
Highest	3.1	1,131
Total	10.1	6,659

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 decilitre (g/dl).

[1] Includes children whose mothers are deceased

[2] Excludes children whose mothers are not interviewed

An asterisk indicates a figure is based on fewer than 25 cases and has been suppressed.

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 MIS 2016

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	30.3	413	23.3	414
9-11	34.2	378	25.3	379
12-17	43.0	749	30.3	750
18-23	45.6	592	30.1	596
24-35	57.1	1,395	40.0	1,397
36-47	56.3	1,557	46.9	1,560
48-59	63.1	1,559	50.1	1,561
Sex				
Male	53.5	3,316	40.4	3,322
Female	52.0	3,329	39.9	3,336
Mother's interview status				
Interviewed	51.3	5,016	38.2	5,017
Not interviewed[1]	57.1	1,629	46.0	1,641
Residence				
Urban	31.5	2,545	25.2	2,555
Rural	65.9	4,099	49.4	4,103
Region				
Eastern	59.8	1,467	40.4	1,468
Northern	64.6	2,362	51.8	2,364
Southern	59.2	1,411	39.5	1,411
Western	18.8	1,404	20.9	1,414
District				
Kailahun	67.0	564	45.0	564
Kenema	59.3	536	37.7	535
Kono	49.5	367	37.5	369
Bombali	47.7	526	37.6	528
Kambia	59.4	265	48.3	265
Koinadugu	78.1	383	57.9	383
Port Loko	69.8	515	58.5	515
Tonkolili	68.3	673	55.7	673
Bo	57.1	594	39.7	593
Bonthe	46.8	184	26.1	184
Moyamba	60.6	330	39.9	330
Pujehun	69.2	304	46.8	304
Western Area Rural	33.5	711	34.9	721
Western Area Urban	3.8	693	6.3	693
Mother's education[2]				
No education	55.2	3,038	41.2	3,040
Primary	57.5	729	43.2	729
Secondary	38.7	1,222	28.4	697
More than secondary	*	26	*	26
Wealth quintile				
Lowest	66.9	1,427	51.7	1,427
Second	68.1	1,433	52.4	1,434
Middle	62.4	1,306	44.9	1,307
Fourth	43.9	1,355	31.8	1,359
Highest	14.4	1,124	14.5	1,131
Total	52.7	6,644	40.1	6,658

[1] Includes children whose mothers are deceased.
[2] Excludes children whose mothers are not interviewed.
An asterisk indicates a figure is based on fewer than 25 cases and has been suppressed.

MALARIA KNOWLEDGE 5

Key Findings

- ***General knowledge:*** 98% of women have heard of malaria.
- ***Knowledge of causes:*** 94% of women report mosquito bites as a cause of malaria.
- ***Knowledge of symptoms:*** 69% of women recognise fever as a symptom of malaria.
- ***Knowledge of symptoms of severe malaria:*** 92% of women recognise at least one symptom of severe malaria.
- ***Knowledge of prevention:*** 90% report use of treated mosquito nets as a prevention method.
- ***Knowledge of treatment:*** 85% report ACT as medication to treat malaria.
- ***Correct knowledge of malaria:*** 85% of women know the symptoms, preventive measures, and treatment for malaria.
- ***Media exposure to malaria messages:*** 82% of women saw or heard a message about malaria in the 6 months before the survey.

This chapter presents data that are useful for assessing general knowledge about malaria, including signs and symptoms, causes, and preventive measures.

5.1 General Knowledge of Malaria

General knowledge of malaria
Percentage of interviewed women who have heard of malaria
Sample: Women age 15-49

In Sierra Leone knowledge about malaria is high among women. In the 2016 SLMIS, 98% of women had heard of malaria (**Table 5.1**). A series of additional questions assessing knowledge of specific aspects of malaria risk, prevention, and treatment were asked of women who reported having heard of the disease.

Trends: The percentage of women who have heard about malaria has not changed significantly from the 2013 SLMIS to the 2016 SLMIS (96% and 98%, respectively).

Patterns by background characteristics

- A significant proportion of women have heard of malaria regardless of age, region, urban or rural residence, educational level, and household wealth quintile.

- The percentage of women who have heard of malaria is lowest in Moyamba (87%) and Bonthe (90%) districts compared with over 95% in all other districts.

5.2 KNOWLEDGE OF CAUSES OF MALARIA

Knowledge of causes of malaria
Percentage of interviewed women who recognise mosquito bites as a cause of malaria.
Sample: Women age 15-49 who have heard of malaria

Even though almost all women mentioned mosquito bites as a cause of malaria (94%), almost half (47%) volunteered additional responses that are not actual causes of the disease (**Table 5.2**). Common responses included 'dirty surroundings' (26%), 'cold or changing weather' (10%), and 'drinking dirty water' (7%), which could be considered misconceptions of causes of malaria.

Trends: Among women who have heard of malaria, the percentage who mentioned mosquito bites as a cause of malaria continues to be high compared with the previous MIS. The trend did not change significantly from the 2013 SLMIS to the 2016 SLMIS (91% and 94%, respectively).

Patterns by background characteristics

- Knowledge of mosquito bites as the cause of malaria was high among women across all subgroups.
- The belief that cold or changing weather can cause malaria was more prevalent among rural women than among urban women (14% vs. 5%), but the inverse was true for the belief that dirty surroundings cause malaria (22% among rural women, 31% among urban women).
- There are few variations between women in urban and rural locations, among women from various wealth quintiles, and among women with low versus high levels of education regarding misconceptions about causes of malaria.

5.3 KNOWLEDGE OF SYMPTOMS OF MALARIA AND OF SEVERE MALARIA

Knowledge of symptoms of malaria
Percentage of interviewed women who identify fever as a symptom of malaria
Sample: Women age 15-49 who have heard of malaria

Knowledge of symptoms of severe malaria
Percentage of interviewed women who identify any of the symptoms of malaria
Sample: Women age 15-49 who have heard of malaria

When women were asked if they knew any symptoms of malaria, 69% of women identified fever as a symptom of malaria, 33% identified loss of appetite, 30% said body weakness, and 29% mentioned headache. A much smaller percentage of women mentioned other symptoms. However, one-third of women did not mention fever, which is considered to be the most common and earliest symptom of malaria (**Table 5.3**). Women were also asked to identify symptoms of severe malaria. Ninety-two percent were able to identify at least one symptom of severe malaria (**Table 5.4).** Forty-two percent of women who

had heard of malaria mentioned vomiting everything, 38% mentioned convulsion, 29% anaemia, and 11% confusion[1] as symptoms of severe malaria.

Trends: The percentage of women who mentioned fever as a symptom of malaria has remained fairly stable from the 2013 SLMIS to the 2016 SLMIS (64% and 69%, respectively).

Patterns by background characteristics

- The percentage of women who recognise fever as a symptom of malaria is lowest in the Eastern Region (64%), and is highest in the Southern Region (75%).
- The percentage of women recognising fever as a symptom of malaria is lowest in Kono (50%) followed by Port Loko (54%), and is highest in Moyamba and Bombali (87%, and 85%, respectively).
- Knowledge of any of the symptoms of severe malaria is highest in women in Port Loko (99%), Koinadugu, Bombali, and Pujehun (98% in each) and is lowest in women in Western Area Urban (81%).

5.4 KNOWLEDGE OF MALARIA PREVENTION

Knowledge of malaria prevention

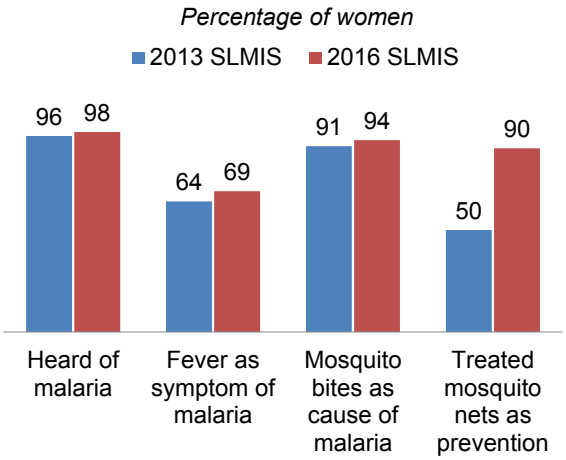
Percentage of interviewed women who cite sleeping under a treated net as a way to avoid getting malaria

Sample: Women age 15-49 who have heard of malaria

Nine in ten women who have heard of malaria cited sleeping under a treated net as a way of avoiding malaria. Seventeen percent of women also mentioned other effective ways of avoiding malaria, such as indoor residual spraying (IRS) and taking preventive medication. Nine percent of women mentioned ineffective malaria prevention methods such as burning leaves, not drinking dirty water, not eating bad food (immature sugarcane/leftover food), and not getting soaked with rain (**Table 5.5**).

Trends: The percentage of women who have heard of malaria who cited sleeping under a treated net as a way to avoid getting malaria increased from 50% in the 2013 SLMIS to 90% in the 2016 SLMIS.

Figure 5.1 **Trends in knowledge of symptoms, causes, and prevention of malaria**



Patterns by background characteristics

- The percentage of women reporting sleeping under treated nets as a way to avoid malaria does not vary much by background characteristics such as age, urban and rural residence, region, education, or household wealth quintile.
- The percentage of women in Kailahun recognising the use of a treated net as a means of preventing malaria is lowest among all of the districts (79%), followed by Port Loko (84%), compared with Kenema and Pujehun in which 95% of women mentioned sleeping under treated nets.

[1] Confusion here means '**altered consciousness**' as in the national treatment guidelines.

5.5 KNOWLEDGE OF MALARIA TREATMENT

Knowledge of malaria treatment

Percentage of interviewed women who mention ACT as a drug to treat malaria

Sample: Women age 15-49 who have heard of malaria

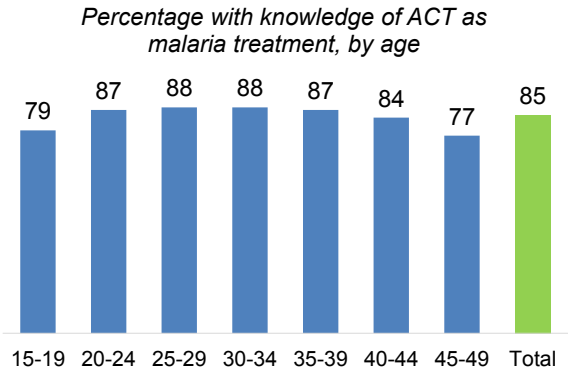
Knowledge of malaria treatment is high among women in Sierra Leone regardless of their background characteristics. When women were asked what medicines are used to treat malaria, 85% mentioned ACT. Other responses included SP/Fansidar (12%), chloroquine (8%), and quinine (7%). Approximately 19% of women mentioned traditional medicine or herbs as treatment for malaria, and 15% mentioned aspirin, Panadol, or paracetamol. Only 4% of women did not know any treatments for malaria (**Table 5.6**).

Trends: The percentage of women who reported that an ACT can used to treat malaria increased from 69% in the 2013 SLMIS to 85% in the 2016 SLMIS.

Patterns by background characteristics

- Knowledge of ACT as a malaria treatment was lowest among the youngest and oldest age groups of women (79% among women age 15-19 and 77% among women age 45-49).
- The percentage of women who mentioned ACT as a malaria treatment ranged from a low of 71% in Port Loko to a high of 98% in Pujehun.
- There is little variation between women of different levels of education regarding knowledge on correct treatment of malaria, with 85% of least educated women and 87% of highest educated women (above secondary level) having correct knowledge on malaria treatment.

Figure 5.2 **Knowledge of malaria treatment**



- There is little variation between women of different income levels in their knowledge of treatment of malaria; the percentage ranges from 79% of women in the lowest wealth quintile to 85% of women in the highest wealth quintile.
- Women in rural locations are more liable to mention traditional medicine or herbs as malaria treatment compared with women in urban locations (25% and 12%, respectively).
- The percentage of women who mentioned traditional medicine or herbs as a malaria treatment declined with increasing levels of education (24% of women with no education compared with 0% of women with more than secondary education). Similar patterns were seen for household wealth; 33% of women in the lowest wealth quintile mentioned traditional medicine or herbs as a malaria treatment compared with only 8% of those in the highest wealth quintile.

5.6 CORRECT KNOWLEDGE OF MALARIA

Correct knowledge of malaria

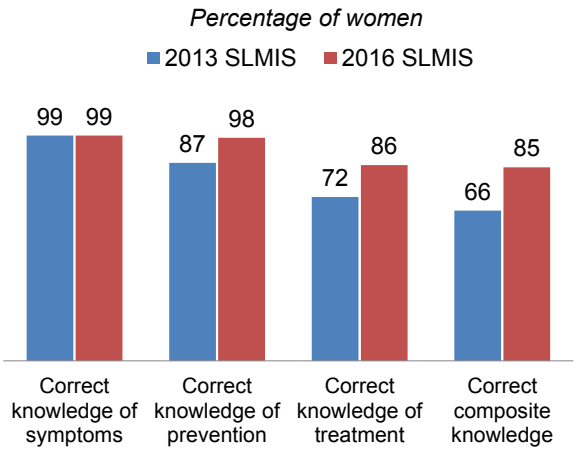
Percentage of interviewed women with complete composite knowledge of malaria

Sample: Women age 15-49 who have heard of malaria

Correct knowledge of malaria is defined based on responses correctly identifying symptoms of malaria, preventive measures, and treatment, either alone or in combination with another response as defined in the notes in **Table 5.7**. Definitions are consistent with those used in the 2013 SLMIS[2]. The percentage of women with correct knowledge of malaria is high and does not vary greatly by background characteristics. Almost all women recognise the correct symptoms of malaria (99%), recognise the correct ways of preventing malaria (98%), and recognise the correct treatment of malaria (86%). The composite measure shows 85% of women with correct composite knowledge of malaria in all domains.

Trends: From the 2013 SLMIS to the 2016 SLMIS, the percentage of women who mentioned the correct knowledge of symptoms of malaria did not change (99%). The percentage who mentioned the correct knowledge of preventive measures increased from 87% to 98%, the percentage who mentioned correct knowledge of treatment increased from 72% to 86%, and those who had correct knowledge in all domains increased from 66% to 85%.

Figure 5.3 **Trends in composite malaria knowledge**



Patterns by background characteristics

- Correct knowledge of malaria was lowest among the youngest and oldest age groups of women (79% among women age 15-19 and 76% among women age 45-49 years).
- The percentage of women with correct knowledge of malaria ranged from a low of 72% in Port Loko to a high of 97% in Pujehun.
- The percentage of women with complete knowledge of malaria increased with increasing levels of education (84% of women with no education compared with 91% of women with more than secondary education). Similar patterns were seen for household wealth; 78% of women in the lowest wealth quintile compared with 87% of those in the highest wealth quintile had complete knowledge of malaria.

[2] Correct knowledge of malaria includes responses of the following symptoms of malaria: fever, excessive sweating, feeling cold, headache, nausea/vomiting, diarrhoea, dizziness, loss of appetite, body ache/joint pain/body weakness, pale eyes, jaundice, dark urine, or anaemia. Correct knowledge of prevention includes responses of the following measures: 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. Correct knowledge of treatment includes responses of ACT or quinine. Correct composite knowledge includes the correct responses for symptoms of malaria, preventative measures, and treatment according to the definitions specified above.

5.7 KNOWLEDGE OF SPECIFIC GROUPS MOST AFFECTED BY MALARIA

Specific groups most affected by malaria

Percentage of interviewed women who indicated children under 5 and pregnant women as most likely to be affected by malaria

Sample: Women age 15-49 who have heard of malaria

Nationally, 82% of all the women interviewed recognise that children are most affected by malaria, and 39% recognise that pregnant women are also most likely to be affected by malaria (**Table 5.8**). Twenty-three percent of women responded that anyone is likely to be affected, 22% mentioned adults, and 13% mentioned older adults.

Trends: In the 2013 SLMIS 78% of women interviewed mentioned children as the group most likely to be affected by malaria, and 43% mentioned pregnant women; this may be compared with 82% and 39%, respectively, in the 2016 SLMIS.

Patterns by background characteristics

- The percentage of women responding that children were most likely to be affected by malaria did not differ greatly by background characteristics.
- There are district-level variations in the percentage of women responding that children were most likely to be affected by malaria ranging from a low of 70% of women in Port Loko to a high of 91% of women in Moyamba and Kenema.
- Similarly, there are district-level variations in the percentage of women responding that pregnant women were most likely to be affected by malaria. These ranged from a low of 25% of women in Western Area Urban and 27% of women in Kailahun to a high of 64% of women in Kenema.

5.8 EXPOSURE TO MALARIA MESSAGES

Exposure to malaria messages

Percentage of interviewed women who heard a message about malaria in the past 6 months

Sample: Women age 15-49

Eighty-two percent of interviewed women reported seeing or hearing a message about malaria in the 6 months preceding the survey. When asked the source of malaria messages seen or heard in the past 6 months, 69% of interviewed women age 15-49 mentioned government hospitals/clinics, 71% mentioned sources accessed at the home[3], 65% mentioned peer sources[4], and 55% mentioned radio (**Table 5.9**). The less common sources are community meetings[5] (35%), posters or billboards (26%), television (11%), newspapers (8%), and other unspecified sources (23%).

Trends: In the 2013 SLMIS, 99.6% of interviewed women heard a malaria message in the 6 months before the survey compared with 82% in the 2016 SLMIS. The percentage of women hearing malaria messages by radio declined from 70% in the 2013 SLMIS to 55% in the 2016 SLMIS.

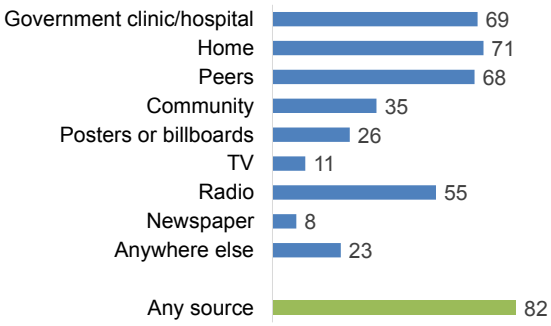
[3] Community health clubs, community health workers, at home, or from friends or family.
[4] School health club or peer educators
[5] Drama groups, community meetings, town criers, or faith/religious leaders

Patterns by background characteristics

- The percentage of women seeing or hearing malaria messages is lowest in Southern Region (72%) and highest in the Northern Region (88%).
- At the district level, the percentage of women seeing or hearing malaria messages ranges from 59% in Bonthe to 95% or greater in Western Area Urban, Pujehun, and Tonkolili.

Figure 5.4 Source of malaria messages

Percentage of women who saw or heard malaria messages in the past 6 months, by source



List of Tables

For detailed information on malaria, see the following tables:

- **Table 5.1 General knowledge of malaria**
- **Table 5.2 Knowledge of causes of malaria**
- **Table 5.3 Knowledge of malaria symptoms**
- **Table 5.4 Knowledge of symptoms of severe malaria**
- **Table 5.5 Knowledge of ways to avoid malaria**
- **Table 5.6 Knowledge of malaria treatment**
- **Table 5.7 Correct knowledge of malaria**
- **Table 5.8 Knowledge of specific groups most affected by malaria**
- **Table 5.9 Media exposure to malaria messages**

Table 5.1 General knowledge of malaria

Percentage of women age 15-49 who reported having heard of malaria, and of those who have heard of malaria, percentage who can recognise 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 MIS 2016

Background characteristic	Percentage of women who have heard of malaria	Number of women	Percentage who recognise 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 who have heard of malaria
Age						
15-19	95.9	1,665	68.8	92.8	88.1	1,598
20-24	97.7	1,658	69.9	94.0	91.1	1,620
25-29	97.7	1,705	68.9	94.3	92.4	1,666
30-34	99.1	1,218	70.6	94.9	89.3	1,206
35-39	97.2	1,208	69.5	93.4	87.9	1,174
40-44	98.4	608	67.9	93.4	87.4	598
45-49	98.2	439	66.8	90.2	87.1	431
Residence						
Urban	98.8	3,759	70.2	95.2	90.5	3,716
Rural	96.5	4,742	68.4	92.3	88.9	4,578
Region						
Eastern	97.1	1,936	64.4	90.4	86.5	1,880
Northern	98.4	2,884	69.8	93.1	90.3	2,838
Southern	94.9	1,736	75.3	96.3	92.7	1,647
Western	99.1	1,945	68.0	95.3	88.9	1,928
District						
Kailahun	95.4	670	68.3	87.4	79.2	639
Kenema	97.8	656	74.2	95.4	95.1	642
Kono	98.3	610	49.5	88.1	85.0	599
Bombali	98.2	732	84.9	95.3	96.3	718
Kambia	98.9	363	69.2	92.3	92.3	359
Koinadugu	96.9	434	72.7	92.6	87.0	420
Port Loko	98.3	617	53.5	91.6	84.4	606
Tonkolili	99.4	739	67.1	92.9	90.2	735
Bo	99.8	710	66.6	95.2	92.1	709
Bonthe	90.4	225	75.7	97.2	91.0	203
Moyamba	86.6	452	86.9	98.0	92.3	392
Pujehun	98.4	349	79.7	96.1	95.4	344
Western Area Rural	98.8	812	73.0	95.3	90.2	802
Western Area Urban	99.4	1,133	64.5	95.3	88.0	1,126
Education						
No education	97.1	4,393	68.7	92.7	88.6	4,267
Primary	96.1	1,173	65.0	90.9	87.9	1,128
Secondary	98.8	2,848	71.6	96.0	91.7	2,812
More than secondary	100.0	87	74.8	99.3	92.3	87
Wealth quintile						
Lowest	95.8	1,555	69.8	92.4	88.6	1,490
Second	97.1	1,591	65.9	91.9	87.8	1,546
Middle	97.1	1,604	70.1	91.9	88.1	1,558
Fourth	98.0	1,721	70.4	95.4	92.2	1,686
Highest	99.2	2,029	69.7	95.8	90.7	2,013
Total	97.6	8,501	69.2	93.6	89.6	8,293

Table 5.2 Knowledge of causes of malaria

Among women age 15-49, the percentage who cite specific causes of malaria, according to background characteristics, Sierra Leone MIS 2016

Background characteristic	Knowledge of what causes 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	Witchcraft	Injections/ drugs	Eating oranges or mangos	Eating plenty oil	Sharing razors/ blades	Bed bugs	Dirty surround-ings	Other	Any miscon-ception[1]	Don't know	Number of women
Age																			
15-19	92.8	0.9	1.8	6.0	0.8	7.0	2.7	8.5	0.5	0.3	5.6	1.8	0.4	2.8	27.9	1.3	49.8	2.4	1,598
20-24	94.0	0.6	1.2	4.9	1.2	6.2	2.6	8.4	0.3	0.3	5.4	1.4	0.4	1.5	26.6	0.8	45.1	0.9	1,620
25-29	94.3	0.7	1.6	4.4	0.8	5.5	4.2	10.2	0.5	0.3	4.5	2.0	0.2	2.3	25.1	1.2	44.9	0.9	1,666
30-34	94.9	0.9	1.7	4.7	0.8	7.5	5.1	11.7	0.8	0.7	4.8	1.4	0.2	2.6	21.9	2.5	47.2	1.0	1,206
35-39	93.4	0.6	0.7	4.7	0.8	6.7	3.5	11.5	0.4	0.0	4.9	1.7	0.0	3.0	24.0	1.9	46.2	1.3	1,174
40-44	93.4	0.2	1.5	4.9	1.3	6.3	4.0	12.1	0.6	0.4	4.5	1.5	0.3	4.1	29.5	0.5	51.7	2.0	598
45-49	90.2	0.8	1.5	6.4	0.8	7.3	4.5	13.1	1.1	0.5	4.0	1.7	0.3	2.6	26.3	1.9	50.9	2.2	431
Residence																			
Urban	95.2	0.5	1.2	4.7	0.6	6.8	2.6	5.0	0.3	0.1	5.3	2.3	0.2	1.1	30.5	1.1	45.9	1.1	3,716
Rural	92.3	0.9	1.7	5.3	1.2	6.3	4.5	14.4	0.7	0.5	4.7	1.1	0.3	3.7	21.8	1.7	48.3	1.7	4,578
Region																			
Eastern	90.4	0.5	2.1	5.0	0.2	7.9	6.6	16.0	0.7	0.1	2.6	0.6	0.1	1.3	34.9	1.9	57.4	2.1	1,880
Northern	93.1	1.0	1.6	5.8	1.9	5.7	3.6	13.1	0.8	0.7	6.8	2.0	0.4	4.4	18.3	1.4	46.6	1.5	2,838
Southern	96.3	0.6	1.1	4.4	0.5	6.7	2.9	6.8	0.3	0.0	2.5	0.1	0.3	2.7	22.5	1.8	40.8	0.6	1,647
Western	95.3	0.5	0.9	4.4	0.5	6.3	1.6	3.2	0.1	0.2	6.7	3.6	0.1	0.8	30.3	0.7	43.6	1.3	1,928
District																			
Kailahun	87.4	1.2	1.7	3.6	0.3	7.1	5.1	16.9	1.2	0.3	2.9	1.4	0.3	2.0	16.9	3.0	44.9	3.3	639
Kenema	95.4	0.1	1.8	2.5	0.4	5.3	3.7	13.4	0.0	0.0	2.6	0.0	0.0	0.3	58.5	0.7	70.9	1.2	642
Kono	88.1	0.1	2.8	9.2	0.0	11.4	11.3	18.0	1.0	0.0	2.4	0.4	0.2	1.6	29.0	2.0	56.3	1.9	599
Bombali	95.3	1.6	1.8	5.9	4.2	5.0	1.7	7.4	0.2	0.2	6.7	1.0	0.0	2.0	26.4	0.4	48.0	1.0	718
Kambia	92.3	0.4	0.6	7.2	1.4	3.8	4.2	14.5	1.6	0.0	1.9	0.0	0.0	0.6	10.8	0.4	35.4	2.0	359
Koinadugu	92.6	0.2	2.8	7.0	0.3	6.7	2.6	25.1	1.4	0.0	7.7	1.4	0.1	2.1	15.8	2.2	53.8	0.7	420
Port Loko	91.6	2.0	1.7	7.8	1.3	8.6	2.2	8.0	1.2	2.6	9.1	6.7	1.6	4.7	19.6	2.2	52.0	0.9	606
Tonkolili	92.9	0.4	1.3	2.8	1.1	4.6	6.7	15.4	0.4	0.5	6.6	0.3	0.0	9.7	14.6	1.7	42.0	2.6	735
Bo	95.2	0.0	0.8	1.4	0.0	3.8	2.0	2.2	0.0	0.0	2.1	0.0	0.1	4.2	23.8	1.8	35.0	0.7	709
Bonthe	97.2	0.9	1.4	4.5	1.0	3.9	0.3	6.6	0.8	0.0	1.1	0.0	2.1	0.5	8.9	0.0	26.0	1.7	203
Moyamba	98.0	2.1	2.4	7.3	1.2	11.2	3.8	2.9	0.0	0.0	4.6	0.3	0.1	0.7	21.3	0.0	46.7	0.0	392
Pujehun	96.1	0.0	0.2	7.4	0.5	9.3	5.4	20.8	1.1	0.0	1.5	0.0	0.0	3.2	29.2	4.8	54.9	0.4	344
Western Area Rural	95.3	0.6	0.6	4.9	0.6	5.0	2.9	4.6	0.2	0.4	7.0	0.7	0.2	0.3	26.2	0.7	41.7	1.0	802
Western Area Urban	95.3	0.5	1.0	4.1	0.4	7.2	0.6	2.2	0.0	0.0	6.6	5.7	0.0	1.2	33.2	0.8	45.0	1.4	1,126
Education																			
No education	92.7	0.8	1.5	4.9	1.2	6.7	4.6	12.8	0.9	0.4	5.7	1.4	0.3	3.1	21.9	1.5	47.2	1.7	4,267
Primary	90.9	0.9	1.7	5.1	1.0	5.9	3.7	11.4	0.4	0.7	4.0	1.8	0.4	2.8	23.4	1.8	47.3	1.3	1,128
Secondary	96.0	0.6	1.2	4.9	0.5	6.3	2.3	6.1	0.1	0.1	4.2	2.0	0.2	1.5	31.8	1.2	47.0	1.1	2,812
More than secondary	99.3	0.0	2.1	12.1	2.1	15.8	0.0	0.7	0.0	0.0	3.0	0.0	0.0	5.8	43.1	0.0	50.6	0.0	87
Wealth quintile																			
Lowest	92.4	1.0	2.4	5.5	1.5	6.9	4.8	16.6	0.9	0.5	4.4	0.9	0.3	4.1	16.7	1.8	47.2	1.7	1,490
Second	91.9	0.5	1.9	5.2	1.1	6.7	5.7	15.5	0.6	0.5	5.8	1.3	0.4	3.8	21.5	2.1	49.6	1.5	1,546
Middle	91.9	1.1	1.1	5.1	1.1	5.3	3.8	11.1	0.7	0.3	4.1	0.8	0.2	3.0	24.6	1.8	47.1	1.9	1,558
Fourth	95.4	0.3	1.1	5.6	0.8	7.3	2.8	7.5	0.5	0.3	4.7	1.4	0.4	1.5	28.7	0.7	46.4	0.8	1,686
Highest	95.8	0.7	1.0	4.0	0.3	6.5	1.7	3.0	0.0	0.0	5.5	3.4	0.1	0.8	34.0	1.0	46.1	1.2	2,013
Total	93.6	0.7	1.5	5.0	0.9	6.5	3.6	10.2	0.5	0.3	5.0	1.7	0.2	2.5	25.7	1.4	47.2	1.4	8,293

[1] Excludes mosquito bites and don't know

Table 5.3 Knowledge of malaria symptoms

Among women who have ever heard of malaria, percentage of women age 15-49 who know various symptoms of malaria, by background characteristics, Sierra Leone MIS 2016

Background characteristic	Knowledge of malaria symptoms																	
	Fever	Excessive sweating	Feeling cold	Headache	Nausea and vomiting	Diarrhoea	Dizziness	Loss of appetite	Body ache or joint pain	Pale eyes	Body weakness	Refusing to eat or drink	Jaundice	Dark urine	Anaemia	Other	Don't know	Number of women
Age																		
15-19	68.8	11.6	40.6	31.9	21.4	4.4	12.9	27.4	23.0	18.6	26.7	1.1	3.9	11.5	1.9	0.9	1.0	1,598
20-24	69.9	16.5	43.0	29.7	23.3	3.7	15.4	31.5	25.9	15.5	30.3	0.9	2.8	8.5	1.4	1.1	0.5	1,620
25-29	68.9	16.1	37.7	24.9	18.5	3.9	16.2	33.9	28.5	16.9	29.9	1.1	2.9	8.1	2.2	0.7	0.7	1,666
30-34	70.6	14.2	40.5	27.3	20.2	4.6	15.6	35.3	31.1	17.7	29.2	0.7	3.9	8.1	1.8	0.8	1.1	1,206
35-39	69.5	16.8	42.9	26.3	20.6	2.7	16.6	37.9	30.2	15.8	31.3	1.0	2.6	7.2	2.1	1.6	0.4	1,174
40-44	67.9	17.8	44.1	35.2	19.9	2.2	15.2	32.8	34.2	18.9	30.0	2.0	2.6	7.8	1.8	1.8	0.7	598
45-49	66.8	13.2	48.3	31.3	18.5	4.4	15.9	32.3	28.3	18.5	31.5	1.8	2.1	7.3	3.2	1.3	0.2	431
Residence																		
Urban	70.2	11.8	34.6	31.1	23.3	3.3	17.9	38.9	31.1	14.4	32.7	0.5	3.1	8.7	1.3	0.6	0.3	3,716
Rural	68.4	17.8	47.0	27.0	18.5	4.2	13.1	27.9	25.5	19.3	27.0	1.6	3.2	8.6	2.5	1.4	1.0	4,578
Region																		
Eastern	64.4	13.3	47.4	26.0	17.7	3.3	16.6	34.1	26.5	17.9	37.2	0.2	4.2	7.5	1.9	2.0	1.7	1,880
Northern	69.8	20.4	42.5	27.6	22.9	4.7	12.7	30.6	27.3	18.9	24.0	2.7	3.1	9.9	2.8	1.0	0.5	2,838
Southern	75.3	15.0	49.5	29.4	15.4	3.4	13.9	22.7	21.2	18.3	24.7	0.3	2.3	7.1	1.6	1.2	0.3	1,647
Western	68.0	9.2	27.1	32.9	24.8	3.4	19.0	43.4	36.2	12.7	34.5	0.2	2.8	9.3	0.9	0.3	0.4	1,928
District																		
Kailahun	68.3	6.0	39.2	20.5	6.3	4.5	19.0	25.3	11.5	11.0	33.0	0.2	0.7	2.9	2.5	1.0	1.7	639
Kenema	74.2	26.5	64.8	44.1	28.6	2.2	21.1	49.9	47.6	17.3	39.9	0.0	1.9	8.4	1.5	0.8	0.7	642
Kono	49.5	6.7	37.7	12.3	18.1	3.0	9.3	26.8	20.0	25.8	38.8	0.5	10.4	11.5	1.9	4.3	2.8	599
Bombali	84.9	8.6	34.4	31.5	28.3	6.4	12.0	25.8	15.0	14.8	21.9	0.5	2.7	7.2	3.0	1.0	0.1	718
Kambia	69.2	21.8	37.2	25.6	34.3	2.7	16.5	35.0	44.0	21.4	20.7	0.7	0.5	5.0	1.0	0.4	1.1	359
Koinadugu	72.7	17.0	43.4	15.0	11.2	4.3	2.2	17.5	18.9	8.9	35.1	0.0	3.7	10.0	2.6	0.4	0.4	420
Port Loko	53.5	16.5	38.5	31.4	16.6	4.0	15.6	33.7	24.7	20.2	21.5	2.1	2.2	7.3	2.2	0.2	0.4	606
Tonkolili	67.1	36.3	55.9	28.8	24.0	4.7	15.1	37.9	38.0	26.4	23.3	7.9	5.4	16.8	4.1	2.1	0.7	735
Bo	66.6	20.5	54.8	32.1	13.5	0.3	13.7	19.3	22.6	14.0	26.6	0.4	0.9	4.5	0.9	0.4	0.5	709
Bonthe	75.7	13.1	39.6	26.8	20.7	12.0	19.7	19.1	12.6	15.8	18.4	1.0	4.5	8.6	0.7	0.6	0.7	203
Moyamba	86.9	14.1	55.4	36.2	14.8	3.9	7.5	28.3	23.3	15.9	24.1	0.2	2.1	3.2	1.2	0.0	0.0	392
Pujehun	79.7	6.0	37.6	17.7	16.8	4.1	18.0	25.2	21.0	31.7	25.1	0.1	4.0	16.0	4.3	4.5	0.0	344
Western Area Rural	73.0	10.2	26.0	32.4	24.5	5.6	18.6	41.2	31.4	18.2	32.3	0.1	3.1	12.5	1.4	0.5	0.0	802
Western Area Urban	64.5	8.5	27.9	33.3	24.9	1.8	19.3	45.0	39.6	8.8	36.0	0.3	2.6	7.0	0.6	0.1	0.6	1,126
Education																		
No education	68.7	17.1	44.8	27.3	19.0	3.7	14.2	31.2	28.5	16.3	27.0	1.3	2.5	7.1	1.9	1.1	0.8	4,267
Primary	65.0	12.1	39.6	25.9	17.3	4.4	14.1	27.8	21.3	20.1	27.3	1.1	2.8	8.2	2.4	1.8	1.0	1,128
Secondary	71.6	13.3	37.5	32.1	24.5	3.8	17.2	37.1	29.3	17.1	34.5	0.8	4.3	10.9	1.8	0.7	0.5	2,812
More than secondary	74.8	17.1	28.6	36.5	25.6	0.0	24.7	38.2	44.3	23.7	24.7	0.0	4.3	16.2	1.2	0.0	0.0	87
Wealth quintile																		
Lowest	69.8	18.0	45.7	26.0	15.7	4.4	11.9	25.7	23.5	17.0	24.7	1.8	2.9	7.3	2.5	1.0	1.1	1,490
Second	65.9	18.8	48.5	26.2	19.6	4.3	14.5	28.6	27.0	19.0	27.2	1.7	2.8	10.3	2.4	1.2	0.9	1,546
Middle	70.1	15.8	44.7	27.1	19.5	4.3	13.7	28.7	26.7	20.6	29.6	1.5	3.4	9.0	2.3	1.7	0.9	1,558
Fourth	70.4	13.5	38.1	29.4	21.4	3.9	16.0	36.5	25.4	18.0	30.2	0.6	4.0	8.0	1.7	1.1	0.3	1,686
Highest	69.7	10.9	33.1	33.7	25.4	2.5	18.9	41.4	35.2	12.4	34.3	0.2	2.6	8.6	1.0	0.5	0.5	2,013
Total	69.2	15.1	41.4	28.8	20.7	3.8	15.3	32.8	28.0	17.1	29.5	1.1	3.1	8.6	1.9	1.1	0.7	8,293

Table 5.4 Knowledge of symptoms of severe malaria

Among women who have ever heard of malaria, percentage of women age 15-49 who know various symptoms of severe malaria, by background characteristics, Sierra Leone MIS 2016

Background characteristic	Knowledge of malaria symptoms among women who have heard of malaria, percentage who cite specific symptoms of severe malaria										
	At least one symptom[1]	Shivering/ shaking/ convulsion	Vomiting everything	Confusion	Low blood (anaemia)	Difficulty breathing	Dizziness	Jaundice	Other	Don't know	Number of women
Age											
15-19	91.1	37.8	44.7	10.5	27.8	4.8	19.6	26.0	3.0	7.9	1,598
20-24	90.0	35.5	42.9	12.0	25.6	5.3	19.2	27.7	4.2	8.5	1,620
25-29	90.1	35.9	41.8	8.9	27.6	5.3	18.9	26.5	3.9	8.3	1,666
30-34	92.8	37.0	37.1	11.1	31.7	4.9	19.9	31.0	2.7	6.3	1,206
35-39	94.2	40.0	42.4	10.3	31.3	5.2	18.6	30.8	3.1	4.8	1,174
40-44	95.0	40.6	44.4	12.5	30.8	7.3	18.7	24.9	5.2	3.9	598
45-49	93.9	41.9	39.4	9.5	31.1	5.3	21.0	26.5	5.2	4.1	431
Residence											
Urban	89.4	33.2	39.5	10.4	22.8	4.5	18.4	30.4	3.4	9.1	3,716
Rural	93.8	41.1	44.1	10.8	33.6	5.9	20.0	25.6	3.9	5.2	4,578
Region											
Eastern	89.6	41.4	46.8	10.2	34.7	5.6	26.6	28.1	9.3	6.2	1,880
Northern	96.3	40.4	43.6	10.8	37.9	8.4	19.7	26.3	1.7	3.4	2,838
Southern	93.8	41.3	48.7	12.9	21.8	3.2	15.9	23.1	2.5	5.6	1,647
Western	85.7	26.5	29.4	8.9	15.5	2.2	14.4	33.6	2.1	14.0	1,928
District											
Kailahun	90.7	38.6	40.8	9.9	31.3	2.9	23.2	12.1	12.1	3.5	639
Kenema	90.8	56.2	55.9	16.0	47.9	9.8	32.7	37.5	3.3	8.6	642
Kono	87.2	28.4	43.6	4.4	24.3	4.0	23.7	35.1	12.8	6.4	599
Bombali	98.3	44.7	48.2	11.0	35.3	2.8	14.3	26.4	0.7	1.7	718
Kambia	95.9	38.6	51.9	8.0	32.5	1.8	24.9	22.4	3.8	3.5	359
Koinadugu	97.6	43.2	34.0	9.0	27.2	5.4	19.1	21.3	2.4	1.7	420
Port Loko	98.7	29.0	46.4	10.0	37.1	18.6	28.7	19.5	0.6	1.0	606
Tonkolili	92.0	44.8	38.3	13.5	49.8	10.5	15.6	36.6	2.0	8.0	735
Bo	92.1	23.8	46.1	13.1	16.3	4.9	17.8	21.8	1.7	7.1	709
Bonthe	92.9	48.2	50.4	3.0	9.6	2.7	16.9	38.2	2.8	5.6	203
Moyamba	93.8	62.1	56.5	23.9	26.2	2.3	9.1	9.7	0.0	6.2	392
Pujehun	97.7	49.8	44.1	6.1	35.5	0.8	19.1	32.2	6.7	2.0	344
Western Area Rural	92.3	41.1	29.9	5.2	18.2	1.6	20.3	30.1	2.3	7.6	802
Western Area Urban	80.9	16.1	28.9	11.5	13.5	2.6	10.1	36.1	2.0	18.5	1,126
Education											
No education	92.3	40.4	41.8	10.5	29.7	5.5	18.9	25.9	3.0	6.7	4,267
Primary	91.0	34.7	43.0	10.8	28.7	4.6	19.7	25.1	5.4	6.5	1,128
Secondary	91.4	34.2	42.4	10.5	27.1	5.2	19.5	31.4	4.0	7.5	2,812
More than secondary	92.7	44.0	32.6	18.6	36.5	6.9	25.6	37.3	0.0	7.3	87
Wealth quintile											
Lowest	93.0	41.5	44.7	10.2	31.1	5.9	18.7	22.5	3.9	5.5	1,490
Second	94.2	41.3	43.9	9.6	36.3	5.3	21.6	26.5	4.1	4.7	1,546
Middle	93.3	40.5	43.5	12.8	32.1	6.6	20.8	27.9	4.9	5.1	1,558
Fourth	93.6	40.1	42.9	10.4	27.9	5.3	20.7	27.4	3.3	4.9	1,686
Highest	86.5	27.4	36.8	10.3	19.5	3.7	15.6	32.9	2.4	12.9	2,013
Total	91.8	37.6	42.0	10.6	28.8	5.3	19.3	27.8	3.7	6.9	8,293

[1] Respondent had heard of malaria and cited shivering/shaking/convulsion, vomiting everything, confusion, low blood (anaemia), difficulty breathing, dizziness, and/or jaundice as a symptom of severe malaria.

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 MIS 2016

Background characteristic	Sleep under a treated net	Use mosquito to repellent	Avoid mosquito bites	Take preventive medication	Indoor residual spray (IRS)	Use mosquito coils	Cut the grass around the house	Eliminate stagnant water	Keep surroundings clean	Cut the grass	Use mosquito screens on the windows	Store bought insect killer	Misconceptions[1]	Other	Don't know	Number of women
Age																
15-19	88.1	5.0	15.6	15.6	2.6	12.0	10.3	14.8	42.7	4.9	0.6	0.0	7.7	1.7	1.0	1,598
20-24	91.1	4.6	14.7	15.0	1.8	13.8	9.7	12.2	43.4	5.6	0.7	0.1	7.8	1.0	1.1	1,620
25-29	92.4	4.0	17.4	11.9	2.8	15.3	8.5	13.4	42.3	5.5	0.6	0.0	8.4	1.5	0.8	1,666
30-34	89.3	3.5	18.8	15.4	2.1	12.8	8.1	14.4	45.6	5.5	0.2	0.0	8.1	1.1	1.7	1,206
35-39	87.9	4.6	17.4	16.7	2.4	12.4	8.7	14.6	45.0	5.9	0.5	0.8	8.9	1.5	1.3	1,174
40-44	87.4	4.1	22.3	13.6	2.8	13.8	11.8	17.5	45.6	8.7	0.4	0.0	10.5	1.9	1.8	598
45-49	87.1	3.9	18.9	13.0	4.4	10.7	7.3	14.0	42.9	4.7	0.3	0.0	11.7	2.7	2.2	431
Residence																
Urban	90.5	5.1	14.3	15.5	4.0	17.2	7.2	14.3	49.3	5.9	0.9	0.1	7.5	1.3	1.0	3,716
Rural	88.9	3.7	19.5	13.8	1.3	10.0	10.9	13.9	39.2	5.5	0.2	0.1	9.2	1.6	1.5	4,578
Region																
Eastern	86.5	6.1	27.6	11.2	1.7	7.6	14.3	25.6	49.5	12.9	0.3	0.3	14.8	2.3	2.1	1,880
Northern	90.3	3.3	17.4	17.8	2.2	13.9	7.6	11.3	39.4	4.1	0.2	0.0	9.0	0.8	1.0	2,838
Southern	92.7	4.2	13.4	11.9	1.6	7.5	11.3	9.6	39.2	2.4	0.1	0.0	3.0	1.7	0.7	1,647
Western	88.9	4.3	9.8	15.5	4.4	22.7	4.8	10.9	48.3	3.6	1.6	0.2	6.3	1.4	1.4	1,928
District																
Kailahun	79.2	8.5	16.1	10.0	0.6	4.1	6.0	20.9	40.4	5.3	0.3	0.0	7.6	2.1	3.5	639
Kenema	95.1	7.9	48.3	13.5	3.0	15.2	32.1	36.4	62.2	29.7	0.5	0.0	24.8	0.6	0.9	642
Kono	85.0	1.5	17.9	10.1	1.6	3.2	4.1	18.9	45.6	3.0	0.2	0.9	11.6	4.4	1.7	599
Bombali	96.3	3.3	3.8	9.1	1.7	8.5	1.5	7.4	57.0	1.1	0.4	0.0	8.1	0.3	0.9	718
Kambia	92.3	1.7	20.4	6.2	1.6	10.7	15.4	10.1	36.7	10.0	0.1	0.0	10.1	0.5	0.3	359
Koinadugu	87.0	4.2	18.7	19.4	0.4	2.3	3.8	8.9	43.0	1.5	0.0	0.0	9.3	0.6	1.1	420
Port Loko	84.4	2.4	28.3	16.6	4.0	21.1	9.5	12.0	22.3	5.1	0.2	0.2	9.0	0.7	0.8	606
Tonkolili	90.2	4.3	19.4	31.9	2.5	21.4	10.4	16.4	35.6	4.9	0.1	0.0	9.4	1.5	1.6	735
Bo	92.1	1.1	12.8	6.7	2.4	8.3	3.1	4.7	38.5	2.3	0.0	0.0	2.5	2.1	0.9	709
Bonthe	91.0	2.8	8.1	15.8	1.4	10.6	22.5	12.3	28.4	0.9	0.2	0.0	2.1	0.7	1.7	203
Moyamba	92.3	13.1	20.8	20.3	1.4	8.6	9.1	8.1	40.4	0.9	0.3	0.0	1.0	0.0	0.1	392
Pujehun	95.4	1.4	9.5	10.7	0.4	2.9	23.9	19.6	45.6	5.1	0.2	0.0	6.7	3.5	0.2	344
Western Area Rural	90.2	3.7	11.7	10.1	2.2	28.1	7.4	16.0	43.6	5.4	2.5	0.4	7.5	1.3	1.8	802
Western Area Urban	88.0	4.7	8.5	19.3	6.0	18.8	2.9	7.3	51.6	2.3	0.9	0.2	5.4	1.5	1.0	1,126
Education																
No education	88.6	3.4	18.3	13.5	1.4	12.7	10.5	13.6	39.8	6.5	0.5	0.1	9.5	1.3	1.7	4,267
Primary	87.9	4.0	17.3	12.6	2.2	12.0	8.3	12.6	39.8	5.0	0.1	0.5	7.6	1.6	1.4	1,128
Secondary	91.7	5.7	15.6	16.6	4.0	14.5	7.6	15.7	50.7	4.6	0.8	0.0	7.4	1.6	0.6	2,812
More than secondary	92.3	8.9	11.9	28.1	12.5	14.8	6.3	7.4	62.0	5.7	0.0	2.9	3.1	2.0	0.7	87
Wealth quintile																
Lowest	88.6	4.0	18.1	14.8	1.0	8.8	11.2	12.5	35.4	4.5	0.1	0.2	8.5	1.4	2.1	1,490
Second	87.8	3.0	19.8	14.2	1.3	10.8	10.4	14.5	41.7	6.2	0.3	0.1	10.0	1.7	1.5	1,546
Middle	88.1	4.8	20.3	14.5	1.5	10.1	10.9	15.0	40.7	7.9	0.3	0.2	10.2	1.8	1.1	1,558
Fourth	92.2	4.2	16.7	11.8	2.2	15.8	9.8	16.2	45.7	5.8	0.9	0.0	8.0	1.4	1.1	1,686
Highest	90.7	5.3	12.4	17.2	5.5	18.7	5.1	12.6	52.1	4.3	0.9	0.2	6.3	1.1	0.8	2,013
Total	89.6	4.3	17.2	14.6	2.5	13.2	9.2	14.1	43.7	5.7	0.5	0.1	8.5	1.5	1.3	8,293

[1] Respondent had heard of malaria and cited burn leaves, don't drink dirty water, don't eat bad food (immature sugarcane/leftover food), and/or don't get soaked with rain as ways to avoid 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 MIS 2016

Background characteristic	ACT (AS+AQ and AL)	Chloroquine	SP/Fansidar	Quinine	Aspirin/ Panadol/ paracetamol	Traditional medicine/ herbs	Other	Don't know	Number of women
Age									
15-19	78.8	8.4	9.2	7.2	15.2	17.3	1.8	7.9	1,598
20-24	87.0	6.7	13.1	7.3	13.9	16.2	1.3	2.7	1,620
25-29	87.7	8.6	13.8	4.9	13.8	19.2	1.6	2.6	1,666
30-34	87.9	8.6	14.9	6.3	16.5	17.2	0.8	2.6	1,206
35-39	87.1	9.3	13.1	5.8	14.6	22.1	2.1	2.5	1,174
40-44	83.9	7.9	10.1	10.1	14.2	25.6	2.2	2.6	598
45-49	76.6	9.6	10.3	6.2	13.9	30.4	2.3	4.7	431
Residence									
Urban	86.2	10.5	14.4	8.6	15.0	12.2	2.0	3.9	3,716
Rural	83.9	6.5	10.8	4.9	14.3	25.2	1.4	3.6	4,578
Region									
Eastern	85.8	12.4	11.8	12.8	13.7	15.4	1.9	5.7	1,880
Northern	82.3	6.8	10.5	3.1	17.6	29.6	1.8	2.0	2,838
Southern	87.3	5.5	12.9	4.0	10.9	14.8	1.6	3.6	1,647
Western	86.0	9.0	15.4	7.8	14.4	12.2	1.2	4.4	1,928
District									
Kailahun	80.7	9.6	4.8	4.3	10.5	17.3	1.9	6.3	639
Kenema	96.7	15.7	14.8	30.0	16.8	11.4	0.8	1.8	642
Kono	79.5	11.8	16.1	3.4	13.8	17.7	3.0	9.3	599
Bombali	91.6	6.3	12.2	5.7	26.9	16.0	3.2	1.7	718
Kambia	76.2	4.6	9.1	4.2	12.3	23.1	2.0	1.9	359
Koinadugu	85.5	6.4	3.7	1.7	17.3	32.4	2.4	1.0	420
Port Loko	71.0	10.9	13.5	1.9	17.0	35.2	0.4	4.4	606
Tonkolili	83.6	5.1	10.9	1.9	11.7	40.0	1.2	1.0	735
Bo	82.3	4.8	6.9	3.8	14.2	16.9	2.5	7.3	709
Bonthe	82.9	10.0	14.4	10.4	11.5	17.8	0.0	2.7	203
Moyamba	89.5	7.0	19.9	3.7	5.2	18.4	0.0	0.3	392
Pujehun	97.6	2.5	16.6	0.9	10.2	4.7	2.3	0.4	344
Western Area Rural	89.9	6.7	4.2	4.9	17.3	19.4	0.8	3.9	802
Western Area Urban	83.3	10.7	23.3	9.9	12.3	7.0	1.5	4.8	1,126
Education									
No education	85.0	8.0	10.9	5.4	15.5	24.2	1.0	3.2	4,267
Primary	82.7	6.1	11.9	3.3	14.4	21.9	2.5	4.5	1,128
Secondary	85.7	9.5	14.8	9.5	13.4	11.8	2.3	4.4	2,812
More than secondary	87.1	10.2	14.1	12.6	15.2	0.0	2.0	1.4	87
Wealth quintile									
Lowest	79.4	5.8	10.2	3.8	15.3	32.8	1.5	2.8	1,490
Second	85.4	7.2	10.4	4.7	15.2	25.2	1.1	3.2	1,546
Middle	86.7	8.1	10.1	6.5	12.1	19.3	1.9	3.6	1,558
Fourth	87.6	8.7	12.1	6.9	17.0	16.2	1.1	3.7	1,686
Highest	85.1	10.8	17.6	9.9	13.7	7.7	2.4	5.0	2,013
Total	84.9	8.3	12.4	6.6	14.6	19.4	1.6	3.7	8,293

Table 5.7 Correct knowledge of malaria

Percentage of women age 15-49 who have heard of malaria and have correct knowledge of malaria indicators, by background characteristics, Sierra Leone MIS 2016

Background characteristic	Knowledge of indicators				Number of women
	Correct knowledge of symptoms of malaria[1]	Correct knowledge of preventative measures[2]	Correct knowledge of treatments[3]	Correct knowledge in all domains[4]	
Age					
15-19	98.9	97.6	80.1	79.0	1,598
20-24	99.5	98.1	88.2	86.8	1,620
25-29	99.3	98.0	88.6	87.3	1,666
30-34	98.8	97.6	88.4	86.8	1,206
35-39	99.6	97.4	88.2	86.6	1,174
40-44	99.3	97.4	85.0	83.5	598
45-49	99.8	96.3	78.1	76.0	431
Residence					
Urban	99.6	98.3	87.7	86.6	3,716
Rural	98.9	97.2	84.6	82.9	4,578
Region					
Eastern	98.2	96.1	86.4	84.1	1,880
Northern	99.5	98.2	83.2	81.9	2,838
Southern	99.7	98.7	88.4	87.3	1,647
Western	99.6	97.6	87.7	86.6	1,928
District					
Kailahun	98.1	93.7	81.8	79.1	639
Kenema	99.3	99.1	97.1	95.9	642
Kono	97.1	95.4	79.8	76.9	599
Bombali	99.9	98.2	92.4	90.8	718
Kambia	98.9	99.0	77.7	76.4	359
Koinadugu	99.6	97.3	86.3	84.4	420
Port Loko	99.6	98.9	72.1	71.8	606
Tonkolili	99.3	97.5	84.0	83.0	735
Bo	99.5	98.2	84.5	82.9	709
Bonthe	99.3	97.6	83.7	82.3	203
Moyamba	100.0	99.9	89.8	89.7	392
Pujehun	100.0	98.8	97.6	96.5	344
Western Area Rural	100.0	97.7	90.7	88.8	802
Western Area Urban	99.4	97.6	85.6	85.1	1,126
Education					
No education	99.2	97.1	85.7	83.8	4,267
Primary	98.9	97.4	83.4	82.1	1,128
Secondary	99.5	98.5	87.3	86.5	2,812
More than secondary	100.0	99.3	91.3	90.6	87
Wealth quintile					
Lowest	98.9	96.8	80.2	78.3	1,490
Second	99.0	97.2	86.1	84.7	1,546
Middle	99.1	97.5	87.4	85.5	1,558
Fourth	99.7	98.1	88.3	86.7	1,686
Highest	99.5	98.4	87.1	86.7	2,013
Total	99.3	97.7	86.0	84.6	8,293

[1] Includes responses for women who mention the following symptoms of malaria: fever, excessive sweating, feeling cold, headache, nausea and vomiting, diarrhoea, dizziness, loss of appetite, body ache or joint pain, pale eyes, body weakness, refusing to eat or drink, jaundice, dark urine, or anaemia.

[2] Includes responses for women who mention a treated mosquito net/treated 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, preventive measures, and treatment.

Table 5.8 Knowledge of specific groups most affected by malaria

Among women age 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 MIS 2016

Background characteristic	Children	Adults	Pregnant woman	Older adults	Anyone	Other	Don't know	Number of women
Age								
15-19	78.8	23.3	35.3	11.6	26.8	2.0	1.2	1,598
20-24	82.9	21.6	41.7	15.0	21.6	1.6	1.1	1,620
25-29	83.2	20.2	39.0	11.3	21.5	2.0	1.5	1,666
30-34	83.9	20.3	42.2	12.1	20.7	1.8	1.2	1,206
35-39	82.9	23.2	36.8	11.9	22.8	2.9	1.6	1,174
40-44	80.4	20.3	37.2	14.2	23.5	2.1	1.4	598
45-49	82.9	21.3	40.4	13.2	22.7	2.4	2.0	431
Residence								
Urban	83.1	20.1	36.5	14.3	23.1	1.9	1.0	3,716
Rural	81.4	22.7	40.8	11.2	22.6	2.2	1.6	4,578
Region								
Eastern	85.4	26.3	40.4	14.9	15.8	3.8	2.4	1,880
Northern	79.8	19.9	41.8	12.2	25.3	1.8	1.3	2,838
Southern	84.7	27.7	42.2	8.5	21.5	1.3	1.1	1,647
Western	80.3	14.1	30.4	14.4	27.2	1.3	0.7	1,928
District								
Kailahun	78.2	12.4	27.1	9.8	14.4	3.9	1.9	639
Kenema	90.8	52.8	63.5	22.4	11.2	2.7	2.7	642
Kono	87.3	12.9	29.9	12.3	22.0	4.8	2.8	599
Bombali	87.9	24.4	49.5	12.4	15.7	2.3	2.0	718
Kambia	72.3	15.0	47.6	12.7	34.8	1.7	1.7	359
Koinadugu	79.4	12.5	30.0	8.0	23.9	0.7	0.6	420
Port Loko	69.9	14.0	46.4	13.9	22.5	0.7	0.7	606
Tonkolili	83.8	27.0	34.3	12.8	33.0	2.8	1.4	735
Bo	81.4	36.6	38.0	7.6	26.8	1.0	0.9	709
Bonthe	86.3	20.0	33.3	20.4	4.9	5.0	4.5	203
Moyamba	91.3	22.7	52.0	6.1	10.3	0.2	0.2	392
Pujehun	83.3	19.8	44.9	5.8	33.3	0.9	0.4	344
Western Area Rural	71.5	11.4	37.8	5.9	30.4	0.6	0.5	802
Western Area Urban	86.5	16.1	25.1	20.5	24.9	1.9	0.8	1,126
Education								
No education	81.3	22.1	39.2	12.6	22.2	2.7	2.0	4,267
Primary	82.6	20.5	37.0	9.4	21.9	1.9	1.3	1,128
Secondary	83.3	21.3	39.1	13.7	24.2	1.2	0.5	2,812
More than secondary	80.3	19.6	46.2	18.3	19.6	0.0	0.0	87
Wealth quintile								
Lowest	79.8	22.8	40.1	9.2	23.3	2.6	2.2	1,490
Second	82.7	21.2	41.2	13.4	23.6	2.1	1.6	1,546
Middle	83.4	23.6	42.2	13.2	19.1	2.2	1.2	1,558
Fourth	79.1	20.2	38.7	10.5	23.4	2.4	1.5	1,686
Highest	85.0	20.5	33.8	15.8	24.1	1.2	0.6	2,013
Total	82.1	21.6	38.9	12.6	22.8	2.0	1.4	8,293

Table 5.9 Media exposure to malaria messages

Percentage of women age 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 2016

Background characteristic	Government clinic/ hospital	Home[1]	School[2]	Community[3]	Posters or billboards	On TV	On the radio	In the newspaper	Anywhere else	Any source	Number of women
Age											
15-19	57.8	66.5	32.5	32.3	30.4	11.1	54.3	9.7	19.8	77.5	1,665
20-24	70.3	70.1	20.5	34.7	27.8	12.3	54.2	7.9	20.9	81.8	1,658
25-29	73.4	71.2	14.9	32.1	23.2	10.6	53.5	7.5	24.6	82.4	1,705
30-34	73.8	74.2	18.1	39.0	25.4	12.4	58.9	7.5	25.4	85.5	1,218
35-39	72.6	73.4	13.8	36.8	24.5	10.7	54.6	6.9	24.1	83.8	1,208
40-44	66.9	72.6	14.7	38.4	23.7	9.2	55.0	6.4	25.6	82.3	608
45-49	60.5	71.7	13.2	38.4	20.8	11.0	53.3	7.3	18.9	82.3	439
Residence											
Urban	67.3	70.8	29.0	32.2	30.4	21.3	58.4	14.0	22.8	81.4	3,759
Rural	69.6	71.0	12.2	37.4	22.3	3.2	51.9	3.0	22.7	82.4	4,742
Region											
Eastern	72.8	64.6	11.0	30.6	26.6	3.6	54.2	3.6	16.6	80.3	1,936
Northern	70.6	77.7	18.8	46.1	30.5	8.1	56.8	6.0	24.2	87.5	2,884
Southern	60.9	63.6	15.2	23.8	14.6	3.5	47.9	1.5	23.1	71.8	1,736
Western	68.2	73.7	33.4	33.4	28.5	30.3	58.6	20.4	26.5	84.4	1,945
District											
Kailahun	68.7	54.1	2.1	15.3	8.9	1.5	43.5	2.6	10.8	78.2	670
Kenema	80.8	67.3	14.4	36.7	38.8	5.8	58.7	6.5	23.2	85.1	656
Kono	68.5	73.2	17.2	40.9	32.9	3.6	61.1	1.5	16.0	77.5	610
Bombali	60.1	62.5	30.4	41.1	36.6	25.3	55.9	18.6	24.9	66.9	732
Kambia	67.4	79.9	16.3	63.1	28.1	4.2	57.6	5.8	22.3	89.3	363
Koinadugu	64.3	74.2	17.1	41.0	32.4	0.8	56.2	1.2	3.4	92.9	434
Port Loko	67.4	80.3	15.7	33.1	5.5	3.4	49.9	1.3	24.3	94.3	617
Tonkolili	89.1	91.6	12.1	56.3	45.6	1.1	63.7	0.4	36.4	98.2	739
Bo	50.8	58.3	23.4	14.7	10.1	5.7	44.7	2.0	14.6	62.3	710
Bonthe	49.7	49.6	14.6	25.6	16.2	2.0	29.6	1.6	1.0	58.9	225
Moyamba	59.1	57.5	8.8	23.8	18.8	3.6	42.2	1.7	35.8	73.6	452
Pujehun	90.9	91.1	7.0	41.1	17.2	0.1	73.4	0.4	38.3	97.4	349
Western Area Rural	56.4	55.3	18.4	23.6	17.8	8.8	49.4	8.5	36.1	68.9	812
Western Area Urban	76.6	86.9	44.1	40.5	36.2	45.6	65.2	29.0	19.6	95.4	1,133
Education											
No education	71.4	72.3	10.0	36.9	20.6	5.0	50.1	3.1	24.0	83.1	4,393
Primary	64.0	65.1	16.6	30.3	18.6	7.7	50.0	3.7	19.4	77.7	1,173
Secondary	66.2	70.8	34.6	33.7	35.9	20.7	63.2	15.4	21.8	81.6	2,848
More than secondary	67.9	84.5	57.0	56.6	69.4	63.1	84.3	56.4	36.7	93.9	87
Wealth quintile											
Lowest	67.5	67.1	9.1	33.4	18.0	2.3	38.9	1.8	20.4	81.3	1,555
Second	73.8	74.6	13.4	39.6	24.5	3.2	54.2	3.4	24.6	85.7	1,591
Middle	67.9	69.2	15.3	39.2	25.2	3.0	57.2	3.8	22.4	80.3	1,604
Fourth	67.3	67.7	21.2	30.2	26.8	5.9	57.6	5.7	22.6	78.8	1,721
Highest	66.9	75.0	34.8	33.8	32.8	35.3	63.2	20.9	23.6	83.6	2,029
Total	68.6	70.9	19.6	35.1	25.9	11.2	54.8	7.8	22.8	82.0	8,501

[1] Respondents saw or heard a message about malaria in the past 6 months from a community health club, a community health worker, at home, or from friends or family.
[2] Respondents saw or heard a message about malaria in the past 6 months from a school health club or peer educators.
[3] Respondents saw or heard a message about malaria in the past 6 months at a community meeting or from drama groups, a town crier, or faith/religious leaders.

REFERENCES

Doolan, D. L., C. Dobano, and J. K. Baird. 2009. "Acquired Immunity to Malaria." *Clin. Microbiol. Rev.* 22: 13-36.

Korenromp, E. L., J. Armstrong-Schellenberg, B. Williams, B. Nahlen, R. W. Snow. 2004. "Impact of Malaria Control on Childhood Anemia in Africa – A Quantitative Review." *Trop Med Int Health* 9(10): 1050-1065.

Ministry of Health and Sanitation [Sierra Leone]. 2014. Sierra Leone Health Facility Survey 2014. Assessing the Impact of the EVD outbreak on Health Systems in Sierra Leone Survey. http://www.unicef.org/emergencies/ebola/files/SL_Health_Facility_Survey_2014Dec3.pdf

Ministry of Health and Sanitation [Sierra Leone]. 2015a. Sierra Leone Malaria Control Strategic Plan 2016-2020. Freetown, Sierra Leone: Ministry of Health and Sanitation.

Ministry of Health and Sanitation [Sierra Leone]. 2015b. *Ebola Virus Disease - Situation Report: Summary of Laboratory Results. 31 January 2015.* Freetown, Sierra Leone: Ministry of Health and Sanitation.

Ministry of Health and Sanitation [Sierra Leone]. 2015c. National Malaria Control Policy Document, Revised Version.

Moody, A. 2002. "Rapid Diagnostic Tests for Malaria Parasites." *Clinical Microbiology Review* 15:66-78.

National Malaria Control Programme (NMCP), Statistics Sierra Leone, University of Sierra Leone, Catholic Relief Services, and ICF International. 2013. *Sierra Leone Malaria Indicator Survey*. Freetown, Sierra Leone: NMCP, SSL, CRS, and ICF International.

Roll Back Malaria Partnership. 2003. Monitoring and Evaluation Reference Group Anemia Task Force Meeting Minutes. Presented at WHO Headquarters. Geneva: 2003 Oct 27-28.

Shulman, C. E., and E. K. Dorman. 2003. "Importance and Prevention of Malaria in Pregnancy." *Trans R Soc Trop Med Hyg* 97(1):30–55.

Statistics Sierra Leone. 2016. *2015 Sierra Leone Population and Housing Census. Provisional Results. March 2016.* https://www.statistics.sl/wp-content/uploads/2016/06/2015-Census-Provisional-Result.pdf.

Statistics Sierra Leone (SSL) and ICF Macro. 2009. Sierra Leone Demographic and Health Survey 2008. Calverton, Maryland, USA: Statistics Sierra Leone (SSL) and ICF Macro.

World Health Organization. 2004. A Strategic Framework for Malaria Prevention and Control during Pregnancy in the African Region. Geneva: World Health Organziation.

World Health Organization. 2012a. WHO Evidence Review Group: Intermittent Preventive Treatment of Malaria in Pregnancy (IPTp) with Sulfadoxine-Pyrimethamine (SP). WHO Headquarters, Geneva, 9-11 July 2012. Meeting report. Geneva: World Health Organization. http://www.who.int/malaria/mpac/sep2012/iptp_sp_erg_meeting_report_july2012.pdf

World Health Organization. 2012b. Global Malaria Programme. Updated WHO Policy Recommendation (October 2012) *Intermittent Preventive Treatment of Malaria in Pregnancy Using Sulfadoxine-Pyrimethamine (IPTp-SP).* http://who.int/malaria/iptp_sp_updated_policy_recommendation_en_102012.pdf?ua=1

SAMPLE DESIGN

Appendix A

A.1 INTRODUCTION

The 2016 Sierra Leone Malaria Indicator Survey (SLMIS) is a representative probability sample designed to produce estimates for the country as a whole, for urban and rural areas separately, for each region, and for each of the 14 districts in Sierra Leone. The 14 districts are distributed over the country's four regions as follows:

1. Eastern Region: Kailahun, Kenema, and Kono
2. Northern Region: Bombali, Kambia, Koinadugu, Port Loko, and Tonkolili
3. Southern Region: Bo, Bonthe, Moyamba, and Pujehun
4. Western Region: Western Area Rural and Western Area Urban

A.2 SAMPLE FRAME

The sampling frame used for the 2016 SLMIS is the 2015 Sierra Leone Population and Housing Census. A total of 12,858 enumeration areas (EAs) were constructed for the census, with complete coverage of the country's territory. A final complete list of EAs is available in the Statistics Sierra Leone. This list includes each EA's identification information and number of households from the census summary sheets. Table A.1 shows the household population distribution by district and by type of residence. In Sierra Leone, 38.5% of residential households are in urban areas, and 35.6% are in the Northern Region.

Table A.1 Households

Distribution of households in the census frame by district and residence, Sierra Leone MIS 2016

Domain	Population in frame			Percent of total population	Percent urban
	Urban	Rural	Total		
Eastern Region	87,982	191,196	279,178	22.53	31.51
Kailahun District	28,015	62,873	90,888	7.34	30.82
Kenema District	42,763	69,254	112,017	9.04	38.18
Kono District	17,204	59,069	76,273	6.16	22.56
Northern Region	96,084	345,445	441,529	35.64	21.76
Bombali District	23,880	67,963	91,843	7.41	26.00
Kambia District	16,854	42,693	59,547	4.81	28.30
Koinadugu District	13,108	59,724	72,832	5.88	18.00
Port Loko District	22,817	89,718	112,535	9.08	20.28
Tonkolili District	19,425	85,347	104,772	8.46	18.54
Southern Region	44,509	218,493	263,002	21.23	16.92
Bo District	31,457	73,851	105,308	8.50	29.87
Bonthe District	7,111	35,363	42,474	3.43	16.74
Moyamba District	3,889	55,771	59,660	4.82	6.52
Pujehun District	2,052	53,508	55,560	4.48	3.69
Western Region	248,531	6,626	255,157	20.60	97.40
Western Area Rural	59,703	6,626	66,329	5.35	90.01
Western Area Urban	188,828	0	188,828	15.24	100.00
Sierra Leone	**477,106**	**761,760**	**1,238,866**	**100.00**	**38.51**

Table A.2 shows the distribution of EAs and average EA size (number of residential households) by district and by type of residence. On average, each EA has 96 households (90 in urban areas and 101 in rural areas). The EA average size is 20 households per cluster. Therefore, a 2016 SLMIS cluster corresponds to a census EA.

Table A.2 Enumeration areas

Number of EAs and average EA size by district and by type of residence, Sierra Leone MIS 2016

Domain	Number of EAs			Average EA size		
	Urban	Rural	Total	Urban	Rural	Total
Eastern Region						
Kailahun District	275	616	891	102	102	102
Kenema District	441	678	1,119	97	102	100
Kono District	201	586	787	86	101	97
Northern Region						
Bombali District	289	695	984	83	98	93
Kambia District	200	376	576	84	114	103
Koinadugu District	147	601	748	89	99	97
Port Loko District	300	854	1,154	76	105	98
Tonkolili District	207	861	1,068	94	99	98
Southern Region						
Bo District	323	708	1,031	97	104	102
Bonthe District	71	392	463	100	90	92
Moyamba District	37	579	616	105	96	97
Pujehun District	33	549	582	62	97	95
Western Region						
Western Area Rural	635	65	700	94	102	95
Western Area Urban	2,139	0	2,139	88	0	88
Sierra Leone	**5,298**	**7,560**	**12,858**	**90**	**101**	**96**

A.3 SAMPLE DESIGN AND IMPLEMENTATION

The sample for the 2016 SLMIS was a stratified sample selected in two stages. In the first stage, 336 EAs were selected with stratified probability proportional to size (PPS) sampling from the sampling frame. EA size was the number of residential households in the EA as recorded in the census. Stratification was achieved by separating every district into urban and rural areas; separate strata were assigned for major towns such as Kenema, Koidu, Makeni, Bo, and Bonthe. Therefore the 2016 SLMIS contained 32 sampling strata (13 rural and 19 urban). Samples were selected independently in each stratum, and a predetermined number of EAs were selected (see Table A.3). Implicit stratification was achieved in each of the explicit sampling strata by sorting the sampling frame according to chiefdoms and sections within the stratum and using the PPS selection procedure.

A household listing operation was carried out in all of the selected EAs before the main survey. In the household listing operation, the 336 selected EAs were visited to draw a location map and a detailed sketch map and to record on the household listing forms the address and the name of the head of the household for all residential households found in the EA. The resulting list of households served as the sampling frame for the selection of households in the second stage. In the second stage, for each selected EA, a fixed number of 20 households was selected from the list created during the household listing. Household selection was performed in the central office prior to the main survey. All women age 15-49 and their young children under age 5 in the selected households were eligible for the interview.

Table A.3 shows the sample allocation of clusters by district and by type of residence. There were 24 clusters in each district. These 24 clusters were then allocated to urban and rural areas and major towns. Among the 336 clusters selected, 99 were in urban areas and 237 were in rural areas. Table A.3 also shows the number of households selected according to sampling strata. The total number of households selected in the 2016 SLMIS was 6,720, 1,980 in urban areas and 4,740 in rural areas.

Table A.3 Sample allocation

Sample allocation of clusters and selected households by district, by town, and by type of residence, Sierra Leone MIS 2016

	Sample cluster allocation			Selected household allocation		
Domain	Urban	Rural	Total	Urban	Rural	Total
Eastern Region						
Kailahun District	4	20	24	80	400	480
Kenema District	3	16	19	60	320	380
Kenema Town (Kenema)	5	0	5	100	0	100
Koidu Town (Kono)	6	0	6	120	0	120
Kono District	2	16	18	40	320	360
Northern Region						
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)	4	0	4	80	0	80
Port Loko District	4	20	24	80	400	480
Tonkolili District	4	20	24	80	400	480
Southern Region						
Bo District	2	15	17	40	300	340
Bo Town (Bo)	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 Region						
Western Area Rural	14	10	24	280	200	480
Western Area Urban	24	0	24	480	0	480
Sierra Leone	**99**	**237**	**336**	**1,980**	**4,740**	**6,720**

Table A.4 shows the expected number of eligible women and the expected number of interviewed women by district and type of residence. The total expected number of interviewed women in the 2016 SLMIS was 7,500, with 2,618 women residing in urban areas and 4,882 in rural areas.

Table A.4 Sample allocation of women

Expected number of women age 15-49 found and interviewed by district, by town, and by type of residence, Sierra Leone MIS 2016

	Expected number of eligible women age 15-49			Expected number of interviewed women age 15-49		
Domain	Urban	Rural	Total	Urban	Rural	Total
Eastern Region						
Kailahun District	109	422	531	106	412	518
Kenema District	82	338	420	79	330	409
Kenema Town (Kenema)	136	0	136	132	0	132
Koidu Town (Kono)	164	0	164	159	0	159
Kono District	55	338	393	53	330	383
Northern Region						
Bombali District	55	380	435	53	371	424
Kambia District	109	422	531	106	412	518
Koinadugu District	55	465	520	53	453	506
Makeni (Bombali)	109	0	109	106	0	106
Port Loko District	109	422	531	106	412	518
Tonkolili District	109	422	531	106	412	518
Southern Region						
Bo District	55	316	371	53	308	361
Bo Town (Bo)	191	0	191	185	0	185
Bonthe District	82	422	504	79	412	491
Bonthe Town (Bonthe)	27	0	27	26	0	26
Moyamba District	109	422	531	106	412	518
Pujehun District	109	422	531	106	412	518
Western Region						
Western Area Rural	382	211	593	370	206	576
Western Area Urban	655	0	655	634	0	634
Sierra Leone	**2,702**	**5,002**	**7,704**	**2,618**	**4,882**	**7,500**

A.4 SAMPLE PROBABILITIES AND SAMPLE WEIGHTS

Because of the non-proportional allocation of the sample to the different reporting domains, sampling weights will be required for any analysis using the 2016 SLMIS data to ensure the actual representativeness of the sample. Since the 2016 SLMIS sample was a two-stage stratified cluster sample, sampling weights were calculated based on sampling probabilities that were calculated separately for each sampling stage and for each cluster. We used the following notations:

P_{1hi}: first-stage sampling probability of the i^{th} cluster in stratum h
P_{2hi}: second-stage sampling probability within the i^{th} cluster (households)
P_{hi}: overall sampling probability for any households of the i^{th} cluster in stratum h

Let a_h be the number of clusters selected in stratum h, M_{hi} the number of households according to the sampling frame in the i^{th} cluster, and $\sum M_{hi}$ the total number of structures in stratum h. The probability of selecting the i^{th} cluster in stratum h is calculated as follows:

$$\frac{a_h M_{hi}}{\sum M_{hi}}$$

Let b_{hi} be the proportion of households in the selected cluster compared to the total number of households in EA i in stratum h if the EA is segmented; otherwise, $b_{hi} = 1$. Then the probability of selecting cluster i in the sample is:

$$P_{1hi} = \frac{a_h M_{hi}}{\sum M_{hi}} \times b_{hi}$$

Let L_{hi} be the number of households listed in the household listing operation in cluster i in stratum h, and let g_{hi} be the number of households selected in that cluster. The second-stage selection probability for each household in the cluster is calculated as follows:

$$P_{2hi} = \frac{g_{hi}}{L_{hi}}$$

The overall selection probability for each household in cluster i of stratum h is therefore the product of the two-stage selection probabilities:

$$P_{hi} = P_{1hi} \times P_{2hi}$$

The sampling weight for each household in cluster i of stratum h is the inverse of its overall selection probability:

$$W_{hi} = 1 / P_{hi}$$

A spreadsheet containing all of the sampling parameters and selection probabilities was constructed to facilitate the calculation of sampling weights. Household sampling weights and individual sampling weights were obtained by adjusting the above-calculated weight to compensate for household nonresponse and individual nonresponse, respectively. These weights were further normalized at the national level to produce equal numbers of unweighted and weighted cases for both households and individuals. The normalized weights are valid for estimations of proportions and means at any aggregation level but are not valid for estimations of totals.

ESTIMATES OF SAMPLING ERRORS Appendix B

The estimates from a sample survey are affected by two types of errors: non-sampling errors and sampling errors. Non-sampling 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 2016 Sierra Leone Malaria Indicator Survey (SLMIS) to minimize this type of error, non-sampling 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 2016 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.

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 or minus two times the standard error of that statistic in 95% 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 2016 SLMIS sample is the result of a multi-stage stratified design, and, consequently, it was necessary to use more complex formulas. Sampling errors are computed in either ISSA or SAS, using programs developed by ICF Macro. These programs use the Taylor linearization method of variance estimation for survey estimates that are means, proportions, or ratios.

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:

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

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 is the overall sampling fraction, which is so small that it is ignored.

In addition to the standard error, the design effect (DEFT) for each estimate is also calculated. The design effect 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. Relative standard errors and confidence limits for the estimates are also calculated.

Sampling errors for the 2016 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, for each of the country regions (Eastern, Northern, Southern, and Western), and for each of the country's 14 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 through B.22 present the value of the statistic (R), its standard error (SE), the number of unweighted (N) and weighted (WN) cases, the design effect (DEFT), the relative standard error (SE/R), and the 95% confidence limits (R ± 2SE) for each variable. The DEFT is considered undefined when the standard error considering a simple random sample is zero (when the estimate is close to 0 or 1).

The confidence interval (e.g., as calculated for children with a fever in the last 2weeks) can be interpreted as follows: the overall average from the national sample is 0.266, and its standard error is 0.009. Therefore, to obtain the 95% confidence limits, one adds and subtracts twice the standard error to the sample estimate, that is, $0.266 \pm 2 \times 0.009$. There is a high probability (95%) that the true proportion of children with a fever in the last 2 weeks is between 0.248 and 0.284.

For the total sample, the value of the DEFT, averaged over all variables, is 1.74. This means that, due to multi-stage clustering of the sample, the average standard error is increased by a factor of 1.74 over that in an equivalent simple random sample.

Table B.2 Sampling errors: Total sample, Sierra Leone MIS 2016

Variable	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.517	0.013	8,501	8,501	2.360	0.025	0.491	0.542
At least some secondary education	0.345	0.014	8,501	8,501	2.699	0.040	0.317	0.373
Ownership of at least one ITN	0.603	0.010	6,719	6,719	1.732	0.017	0.583	0.624
Child slept under an ITN last night	0.441	0.013	7,429	7,365	1.691	0.029	0.416	0.467
Pregnant women slept under an ITN last night	0.440	0.026	661	671	1.302	0.058	0.389	0.491
Received 2+ doses of SP/Fansidar during antenatal visit	0.713	0.017	2,554	2,451	1.851	0.024	0.680	0.747
Child has fever in last 2 weeks	0.266	0.009	5,960	5,804	1.439	0.033	0.248	0.284
Child sought care/treatment from a health facility	0.714	0.017	1,639	1,545	1.402	0.024	0.680	0.748
Child took ACT	0.449	0.018	1,639	1,545	1.313	0.039	0.414	0.484
Child has anaemia (Haemoglobin <8.0 g/dl)	0.101	0.006	6,655	6,659	1.435	0.056	0.089	0.112
Child has malaria (based on rapid test)	0.527	0.014	6,644	6,644	1.951	0.026	0.499	0.555
Child has malaria (based on microscopy test)	0.401	0.012	6,654	6,658	1.733	0.029	0.378	0.424

Table B.3 Sampling errors: Urban sample, Sierra Leone MIS 2016

Variable	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.363	0.021	2,796	3,759	2.309	0.058	0.320	0.405
At least some secondary education	0.529	0.025	2,796	3,759	2.609	0.047	0.479	0.578
Ownership of at least one ITN	0.537	0.019	1,980	2,688	1.719	0.036	0.498	0.576
Child slept under an ITN last night	0.376	0.025	2,004	2,777	1.832	0.066	0.326	0.426
Pregnant women slept under an ITN last night	0.307	0.042	187	267	1.254	0.137	0.223	0.391
Received 2+ doses of SP/Fansidar during antenatal visit	0.641	0.037	687	938	2.021	0.057	0.567	0.714
Child has fever in last 2 weeks	0.242	0.014	1,655	2,236	1.284	0.060	0.213	0.270
Child sought care/treatment from a health facility	0.690	0.034	436	540	1.402	0.050	0.622	0.759
Child took ACT	0.427	0.032	436	540	1.249	0.076	0.363	0.492
Child has anaemia (Haemoglobin <8.0 g/dl)	0.067	0.010	1,815	2,555	1.426	0.143	0.048	0.087
Child has malaria (based on rapid test)	0.315	0.029	1,810	2,545	2.210	0.091	0.258	0.372
Child has malaria (based on microscopy test)	0.252	0.020	1,815	2,555	1.716	0.077	0.213	0.291

Table B.4 Sampling errors: Rural sample, Sierra Leone MIS 2016

Variable	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.639	0.012	5,705	4,742	1.961	0.020	0.614	0.664
At least some secondary education	0.200	0.012	5,705	4,742	2.200	0.058	0.176	0.223
Ownership of at least one ITN	0.648	0.012	4,739	4,031	1.771	0.019	0.623	0.672
Child slept under an ITN last night	0.480	0.013	5,425	4,588	1.465	0.027	0.454	0.507
Pregnant women slept under an ITN last night	0.528	0.027	474	404	1.173	0.052	0.473	0.583
Received 2+ doses of SP/Fansidar during antenatal visit	0.759	0.014	1,867	1,513	1.361	0.018	0.731	0.786
Child has fever in last 2 weeks	0.282	0.011	4,305	3,568	1.540	0.040	0.259	0.304
Child sought care/treatment from a health facility	0.726	0.018	1,203	1,005	1.332	0.025	0.690	0.762
Child took ACT	0.460	0.020	1,203	1,005	1.339	0.044	0.419	0.501
Child has anaemia (Haemoglobin <8.0 g/dl)	0.122	0.007	4,840	4,104	1.386	0.056	0.108	0.135
Child has malaria (based on rapid test)	0.659	0.012	4,834	4,099	1.566	0.017	0.636	0.682
Child has malaria (based on microscopy test)	0.494	0.013	4,839	4,103	1.660	0.026	0.468	0.520

Table B.5 Sampling errors: Eastern Region sample, Sierra Leone MIS 2016

Variable	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.551	0.018	1,703	1,936	1.521	0.033	0.515	0.588
At least some secondary education	0.262	0.020	1,703	1,936	1.833	0.075	0.223	0.301
Ownership of at least one ITN	0.705	0.019	1,440	1,663	1.600	0.027	0.667	0.744
Child slept under an ITN last night	0.578	0.025	1,426	1,648	1.549	0.044	0.528	0.629
Pregnant women slept under an ITN last night	0.495	0.062	144	167	1.453	0.125	0.372	0.619
Received 2+ doses of SP/Fansidar during antenatal visit	0.726	0.035	495	571	1.740	0.048	0.657	0.795
Child has fever in last 2 weeks	0.293	0.021	1,144	1,295	1.469	0.070	0.252	0.334
Child sought care/treatment from a health facility	0.748	0.034	348	380	1.348	0.045	0.680	0.815
Child took ACT	0.480	0.032	348	380	1.104	0.066	0.417	0.543
Child has anaemia (Haemoglobin <8.0 g/dl)	0.086	0.011	1,267	1,469	1.400	0.129	0.063	0.108
Child has malaria (based on rapid test)	0.598	0.028	1,266	1,467	1.804	0.046	0.543	0.653
Child has malaria (based on microscopy test)	0.404	0.022	1,266	1,468	1.449	0.053	0.361	0.447

Table B.6 Sampling errors: Northern Region sample, Sierra Leone MIS 2016

Variable	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.595	0.016	3,129	2,884	1.863	0.028	0.562	0.627
At least some secondary education	0.268	0.017	3,129	2,884	2.131	0.063	0.234	0.301
Ownership of at least one ITN	0.575	0.018	2,399	2,230	1.776	0.031	0.539	0.611
Child slept under an ITN last night	0.388	0.019	2,863	2,650	1.631	0.049	0.350	0.426
Pregnant women slept under an ITN last night	0.447	0.035	276	245	1.117	0.079	0.377	0.517
Received 2+ doses of SP/Fansidar during antenatal visit	0.757	0.018	1,022	918	1.317	0.024	0.722	0.793
Child has fever in last 2 weeks	0.276	0.015	2,349	2,117	1.471	0.053	0.247	0.305
Child sought care/treatment from a health facility	0.708	0.023	653	585	1.230	0.033	0.662	0.754
Child took ACT	0.427	0.027	653	585	1.302	0.064	0.373	0.482
Child has anaemia (Haemoglobin <8.0 g/dl)	0.123	0.008	2,560	2,364	1.167	0.064	0.107	0.139
Child has malaria (based on rapid test)	0.646	0.017	2,558	2,362	1.605	0.026	0.612	0.680
Child has malaria (based on microscopy test)	0.518	0.017	2,560	2,364	1.585	0.033	0.484	0.552

Table B.7 Sampling errors: Southern Region sample, Sierra Leone MIS 2016

Variable	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.536	0.032	2,279	1,736	3.030	0.059	0.472	0.599
At least some secondary education	0.319	0.031	2,279	1,736	3.194	0.098	0.257	0.382
Ownership of at least one ITN	0.704	0.017	1,920	1,496	1.677	0.025	0.669	0.739
Child slept under an ITN last night	0.560	0.020	2,017	1,559	1.396	0.036	0.519	0.600
Pregnant women slept under an ITN last night	0.609	0.045	158	128	1.153	0.074	0.519	0.698
Received 2+ doses of SP/Fansidar during antenatal visit	0.732	0.026	635	455	1.450	0.036	0.680	0.785
Child has fever in last 2 weeks	0.328	0.020	1,542	1,167	1.581	0.062	0.288	0.369
Child sought care/treatment from a health facility	0.759	0.030	492	383	1.432	0.040	0.699	0.820
Child took ACT	0.495	0.040	492	383	1.685	0.080	0.416	0.574
Child has anaemia (Haemoglobin <8.0 g/dl)	0.102	0.009	1,795	1,411	1.275	0.093	0.083	0.121
Child has malaria (based on rapid test)	0.592	0.017	1,795	1,411	1.355	0.029	0.558	0.626
Child has malaria (based on microscopy test)	0.395	0.021	1,795	1,411	1.685	0.053	0.353	0.437

Table B.8 Sampling errors: Western Region sample, Sierra Leone MIS 2016

Variable	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.350	0.033	1,390	1,945	2.561	0.094	0.284	0.416
At least some secondary education	0.566	0.035	1,390	1,945	2.606	0.061	0.497	0.636
Ownership of at least one ITN	0.410	0.033	960	1,330	2.050	0.079	0.345	0.475
Child slept under an ITN last night	0.262	0.032	1,123	1,509	1.881	0.123	0.198	0.327
Pregnant women slept under an ITN last night	0.190	0.049	83	130	1.194	0.256	0.093	0.287
Received 2+ doses of SP/Fansidar during antenatal visit	0.603	0.059	402	507	2.277	0.097	0.485	0.720
Child has fever in last 2 weeks	0.161	0.015	925	1,225	1.139	0.095	0.131	0.192
Child sought care/treatment from a health facility	0.577	0.066	146	198	1.509	0.114	0.445	0.710
Child took ACT	0.361	0.053	146	198	1.218	0.146	0.256	0.467
Child has anaemia (Haemoglobin <8.0 g/dl)	0.078	0.017	1,033	1,414	1.620	0.217	0.044	0.112
Child has malaria (based on rapid test)	0.188	0.029	1,025	1,404	1.911	0.154	0.130	0.246
Child has malaria (based on microscopy test)	0.209	0.030	1,033	1,414	1.953	0.142	0.149	0.268

Table B.9 Sampling errors: Kailahun sample, Sierra Leone MIS 2016

Variable	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.530	0.022	526	670	1.020	0.042	0.485	0.574
At least some secondary education	0.221	0.032	526	670	1.742	0.143	0.157	0.284
Ownership of at least one ITN	0.758	0.029	480	620	1.477	0.038	0.700	0.816
Child slept under an ITN last night	0.581	0.042	470	617	1.587	0.073	0.497	0.665
Pregnant women slept under an ITN last night	0.462	0.147	37	49	1.811	0.318	0.168	0.755
Received 2+ doses of SP/Fansidar during antenatal visit	0.678	0.073	162	213	2.002	0.107	0.533	0.823
Child has fever in last 2 weeks	0.304	0.032	374	489	1.326	0.107	0.239	0.369
Child sought care/treatment from a health facility	0.698	0.064	120	149	1.401	0.091	0.571	0.825
Child took ACT	0.435	0.041	120	149	0.868	0.095	0.352	0.517
Child has anaemia (Haemoglobin <8.0 g/dl)	0.131	0.016	423	564	0.974	0.123	0.099	0.164
Child has malaria (based on rapid test)	0.670	0.034	423	564	1.368	0.050	0.603	0.738
Child has malaria (based on microscopy test)	0.450	0.026	423	564	1.015	0.058	0.398	0.502

Table B.10 Sampling errors: Kenema sample, Sierra Leone MIS 2016

Variable	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.610	0.034	577	656	1.689	0.056	0.542	0.679
At least some secondary education	0.275	0.033	577	656	1.761	0.119	0.210	0.341
Ownership of at least one ITN	0.758	0.030	480	558	1.519	0.039	0.698	0.817
Child slept under an ITN last night	0.664	0.042	510	592	1.518	0.063	0.580	0.748
Pregnant women slept under an ITN last night	0.718	0.058	48	55	0.873	0.081	0.602	0.834
Received 2+ doses of SP/Fansidar during antenatal visit	0.775	0.035	161	185	1.075	0.045	0.704	0.845
Child has fever in last 2 weeks	0.192	0.034	395	444	1.606	0.175	0.125	0.259
Child sought care/treatment from a health facility	0.717	0.074	75	85	1.376	0.103	0.570	0.864
Child took ACT	0.620	0.057	75	85	1.003	0.093	0.505	0.735
Child has anaemia (Haemoglobin <8.0 g/dl)	0.076	0.024	460	536	1.973	0.322	0.027	0.124
Child has malaria (based on rapid test)	0.593	0.048	460	536	1.803	0.080	0.498	0.688
Child has malaria (based on microscopy test)	0.377	0.036	459	535	1.410	0.096	0.305	0.449

Table B.11 Sampling errors: Kono sample, Sierra Leone MIS 2016

Variable	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.512	0.037	600	610	1.798	0.072	0.438	0.585
At least some secondary education	0.293	0.031	600	610	1.650	0.105	0.232	0.355
Ownership of at least one ITN	0.578	0.035	480	485	1.559	0.061	0.507	0.648
Child slept under an ITN last night	0.459	0.044	446	439	1.509	0.095	0.371	0.547
Pregnant women slept under an ITN last night	0.326	0.081	59	63	1.308	0.249	0.164	0.488
Received 2+ doses of SP/Fansidar during antenatal visit	0.733	0.045	172	172	1.323	0.061	0.643	0.823
Child has fever in last 2 weeks	0.403	0.041	375	362	1.553	0.102	0.321	0.485
Child sought care/treatment from a health facility	0.816	0.033	153	146	0.956	0.040	0.750	0.882
Child took ACT	0.444	0.055	153	146	1.245	0.124	0.334	0.555
Child has anaemia (Haemoglobin <8.0 g/dl)	0.030	0.011	384	369	1.271	0.371	0.008	0.052
Child has malaria (based on rapid test)	0.495	0.047	383	367	1.716	0.095	0.401	0.589
Child has malaria (based on microscopy test)	0.375	0.053	384	369	2.080	0.141	0.269	0.480

Table B.12 Sampling errors: Bombali sample, Sierra Leone MIS 2016

Variable	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.495	0.035	675	732	1.814	0.071	0.425	0.565
At least some secondary education	0.395	0.043	675	732	2.261	0.108	0.310	0.480
Ownership of at least one ITN	0.537	0.043	480	531	1.861	0.079	0.452	0.622
Child slept under an ITN last night	0.434	0.055	530	562	1.962	0.126	0.325	0.543
Pregnant women slept under an ITN last night	0.518	0.086	58	60	1.251	0.165	0.346	0.689
Received 2+ doses of SP/Fansidar during antenatal visit	0.830	0.034	182	187	1.172	0.040	0.762	0.897
Child has fever in last 2 weeks	0.310	0.034	439	454	1.404	0.108	0.243	0.377
Child sought care/treatment from a health facility	0.814	0.036	142	141	0.996	0.044	0.741	0.886
Child took ACT	0.479	0.056	142	141	1.177	0.117	0.366	0.591
Child has anaemia (Haemoglobin <8.0 g/dl)	0.084	0.020	501	528	1.425	0.233	0.045	0.123
Child has malaria (based on rapid test)	0.477	0.040	499	526	1.528	0.085	0.396	0.557
Child has malaria (based on microscopy test)	0.376	0.031	501	528	1.360	0.082	0.314	0.438

Table B.13 Sampling errors: Kambia sample, Sierra Leone MIS 2016

Variable	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.600	0.032	621	363	1.632	0.054	0.536	0.665
At least some secondary education	0.229	0.032	621	363	1.907	0.141	0.164	0.293
Ownership of at least one ITN	0.676	0.040	480	273	1.856	0.059	0.597	0.756
Child slept under an ITN last night	0.487	0.052	520	299	1.986	0.107	0.383	0.591
Pregnant women slept under an ITN last night	0.464	0.082	62	33	1.198	0.177	0.300	0.628
Received 2+ doses of SP/Fansidar during antenatal visit	0.866	0.032	205	119	1.322	0.036	0.803	0.930
Child has fever in last 2 weeks	0.269	0.027	451	261	1.202	0.099	0.216	0.322
Child sought care/treatment from a health facility	0.820	0.042	116	70	1.211	0.052	0.735	0.905
Child took ACT	0.655	0.068	116	70	1.538	0.105	0.518	0.792
Child has anaemia (Haemoglobin <8.0 g/dl)	0.110	0.016	460	265	1.069	0.143	0.078	0.141
Child has malaria (based on rapid test)	0.594	0.066	460	265	2.605	0.112	0.461	0.727
Child has malaria (based on microscopy test)	0.483	0.049	460	265	2.027	0.102	0.385	0.582

Table B.14 Sampling errors: Koinadugu sample, Sierra Leone MIS 2016

Variable	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.694	0.019	597	434	1.012	0.028	0.656	0.732
At least some secondary education	0.216	0.018	597	434	1.048	0.082	0.180	0.251
Ownership of at least one ITN	0.619	0.034	480	350	1.543	0.055	0.550	0.687
Child slept under an ITN last night	0.403	0.044	598	428	1.708	0.109	0.315	0.491
Pregnant women slept under an ITN last night	0.635	0.081	46	31	1.063	0.128	0.473	0.798
Received 2+ doses of SP/Fansidar during antenatal visit	0.609	0.038	206	143	1.089	0.062	0.533	0.685
Child has fever in last 2 weeks	0.306	0.032	506	347	1.473	0.106	0.241	0.371
Child sought care/treatment from a health facility	0.536	0.064	147	106	1.492	0.119	0.409	0.664
Child took ACT	0.368	0.056	147	106	1.372	0.152	0.256	0.479
Child has anaemia (Haemoglobin <8.0 g/dl)	0.202	0.023	536	383	1.232	0.115	0.156	0.249
Child has malaria (based on rapid test)	0.781	0.029	536	383	1.471	0.038	0.723	0.840
Child has malaria (based on microscopy test)	0.579	0.041	536	383	1.707	0.070	0.498	0.660

Table B.15 Sampling errors: Port Loko sample, Sierra Leone MIS 2016

Variable	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.592	0.041	540	617	1.918	0.069	0.511	0.674
At least some secondary education	0.212	0.038	540	617	2.174	0.181	0.136	0.289
Ownership of at least one ITN	0.511	0.041	479	556	1.800	0.081	0.428	0.593
Child slept under an ITN last night	0.342	0.035	516	606	1.221	0.102	0.272	0.411
Pregnant women slept under an ITN last night	0.310	0.061	66	73	0.994	0.196	0.189	0.431
Received 2+ doses of SP/Fansidar during antenatal visit	0.661	0.040	171	203	1.118	0.060	0.581	0.740
Child has fever in last 2 weeks	0.169	0.027	420	491	1.423	0.159	0.115	0.222
Child sought care/treatment from a health facility	0.548	0.066	74	83	1.132	0.120	0.416	0.680
Child took ACT	0.256	0.071	74	83	1.357	0.278	0.113	0.398
Child has anaemia (Haemoglobin <8.0 g/dl)	0.105	0.017	439	515	1.182	0.164	0.070	0.139
Child has malaria (based on rapid test)	0.698	0.033	439	515	1.410	0.047	0.632	0.764
Child has malaria (based on microscopy test)	0.585	0.038	439	515	1.485	0.066	0.508	0.662

Table B.16 Sampling errors: Tonkolili sample, Sierra Leone MIS 2016

Variable	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.635	0.034	696	739	1.833	0.053	0.568	0.702
At least some secondary education	0.237	0.030	696	739	1.839	0.125	0.177	0.296
Ownership of at least one ITN	0.601	0.036	480	520	1.590	0.059	0.530	0.673
Child slept under an ITN last night	0.343	0.033	699	755	1.529	0.097	0.276	0.410
Pregnant women slept under an ITN last night	0.433	0.074	44	48	0.960	0.170	0.286	0.581
Received 2+ doses of SP/Fansidar during antenatal visit	0.811	0.033	258	268	1.349	0.041	0.744	0.877
Child has fever in last 2 weeks	0.327	0.024	533	565	1.092	0.073	0.280	0.375
Child sought care/treatment from a health facility	0.756	0.041	174	185	1.218	0.054	0.674	0.837
Child took ACT	0.413	0.048	174	185	1.163	0.115	0.318	0.509
Child has anaemia (Haemoglobin <8.0 g/dl)	0.129	0.013	624	673	0.960	0.101	0.103	0.155
Child has malaria (based on rapid test)	0.683	0.027	624	673	1.299	0.039	0.629	0.737
Child has malaria (based on microscopy test)	0.557	0.029	624	673	1.365	0.052	0.499	0.615

Table B.17 Sampling errors: Bo sample, Sierra Leone MIS 2016

Variable	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.458	0.062	547	710	2.893	0.135	0.334	0.583
At least some secondary education	0.411	0.057	547	710	2.704	0.139	0.296	0.526
Ownership of at least one ITN	0.764	0.025	480	631	1.283	0.033	0.715	0.814
Child slept under an ITN last night	0.645	0.025	491	634	0.917	0.039	0.595	0.696
Pregnant women slept under an ITN last night	0.678	0.061	53	64	0.893	0.090	0.556	0.800
Received 2+ doses of SP/Fansidar during antenatal visit	0.763	0.046	129	154	1.187	0.061	0.670	0.855
Child has fever in last 2 weeks	0.350	0.041	375	461	1.499	0.117	0.268	0.432
Child sought care/treatment from a health facility	0.654	0.054	126	161	1.148	0.083	0.546	0.763
Child took ACT	0.386	0.079	126	161	1.760	0.204	0.229	0.543
Child has anaemia (Haemoglobin <8.0 g/dl)	0.098	0.018	456	594	1.181	0.182	0.062	0.133
Child has malaria (based on rapid test)	0.571	0.022	456	594	0.852	0.038	0.527	0.614
Child has malaria (based on microscopy test)	0.397	0.038	456	593	1.534	0.095	0.321	0.472

Table B.18 Sampling errors: Bonthe sample, Sierra Leone MIS 2016

Variable	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.595	0.031	504	225	1.400	0.052	0.533	0.656
At least some secondary education	0.283	0.030	504	225	1.492	0.106	0.223	0.343
Ownership of at least one ITN	0.727	0.036	480	216	1.757	0.049	0.655	0.798
Child slept under an ITN last night	0.544	0.041	491	220	1.393	0.076	0.461	0.626
Pregnant women slept under an ITN last night	0.558	0.105	30	13	1.094	0.188	0.348	0.768
Received 2+ doses of SP/Fansidar during antenatal visit	0.724	0.037	164	72	1.046	0.051	0.651	0.798
Child has fever in last 2 weeks	0.236	0.031	372	163	1.340	0.132	0.173	0.298
Child sought care/treatment from a health facility	0.808	0.041	86	38	0.983	0.050	0.727	0.890
Child took ACT	0.572	0.039	86	38	0.700	0.068	0.494	0.650
Child has anaemia (Haemoglobin <8.0 g/dl)	0.068	0.013	414	184	1.070	0.194	0.042	0.095
Child has malaria (based on rapid test)	0.468	0.038	414	184	1.520	0.082	0.392	0.545
Child has malaria (based on microscopy test)	0.261	0.026	414	184	1.159	0.099	0.210	0.313

Table B.19 Sampling errors: Moyamba sample, Sierra Leone MIS 2016

Variable	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.569	0.034	664	452	1.788	0.060	0.501	0.638
At least some secondary education	0.273	0.038	664	452	2.209	0.140	0.196	0.349
Ownership of at least one ITN	0.608	0.037	480	340	1.669	0.061	0.534	0.683
Child slept under an ITN last night	0.495	0.044	511	356	1.447	0.089	0.406	0.583
Pregnant women slept under an ITN last night	0.638	0.101	30	21	1.176	0.159	0.435	0.841
Received 2+ doses of SP/Fansidar during antenatal visit	0.844	0.042	164	116	1.494	0.049	0.761	0.927
Child has fever in last 2 weeks	0.281	0.037	392	271	1.577	0.132	0.207	0.355
Child sought care/treatment from a health facility	0.810	0.055	116	76	1.259	0.068	0.699	0.920
Child took ACT	0.422	0.060	116	76	1.205	0.141	0.302	0.541
Child has anaemia (Haemoglobin <8.0 g/dl)	0.102	0.013	474	330	0.963	0.130	0.075	0.128
Child has malaria (based on rapid test)	0.606	0.045	474	330	1.796	0.074	0.516	0.696
Child has malaria (based on microscopy test)	0.399	0.042	474	330	1.694	0.106	0.314	0.483

Table B.20 Sampling errors: Pujehun sample, Sierra Leone MIS 2016

Variable	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.611	0.031	564	349	1.490	0.050	0.549	0.672
At least some secondary education	0.216	0.038	564	349	2.155	0.174	0.141	0.291
Ownership of at least one ITN	0.672	0.042	480	310	1.974	0.063	0.587	0.757
Child slept under an ITN last night	0.481	0.044	524	349	1.607	0.091	0.394	0.569
Pregnant women slept under an ITN last night	0.465	0.106	45	30	1.410	0.228	0.253	0.676
Received 2+ doses of SP/Fansidar during antenatal visit	0.581	0.060	178	112	1.639	0.104	0.460	0.701
Child has fever in last 2 weeks	0.395	0.034	403	271	1.330	0.086	0.327	0.463
Child sought care/treatment from a health facility	0.864	0.034	164	107	1.268	0.039	0.797	0.931
Child took ACT	0.684	0.040	164	107	1.070	0.058	0.604	0.763
Child has anaemia (Haemoglobin <8.0 g/dl)	0.130	0.019	451	304	1.184	0.150	0.091	0.169
Child has malaria (based on rapid test)	0.692	0.030	451	304	1.324	0.044	0.631	0.753
Child has malaria (based on microscopy test)	0.468	0.037	451	304	1.456	0.079	0.393	0.542

Table B.21 Sampling errors: Western Area Rural sample, Sierra Leone MIS 2016

Variable	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.449	0.048	753	812	2.631	0.107	0.353	0.545
At least some secondary education	0.454	0.045	753	812	2.484	0.100	0.364	0.545
Ownership of at least one ITN	0.420	0.045	480	495	1.990	0.107	0.330	0.510
Child slept under an ITN last night	0.264	0.054	725	784	2.544	0.205	0.156	0.373
Pregnant women slept under an ITN last night	0.281	0.091	38	53	1.423	0.322	0.100	0.463
Received 2+ doses of SP/Fansidar during antenatal visit	0.675	0.097	277	288	3.353	0.143	0.482	0.869
Child has fever in last 2 weeks	0.181	0.021	614	673	1.257	0.118	0.138	0.223
Child sought care/treatment from a health facility	0.501	0.085	103	122	1.707	0.170	0.331	0.672
Child took ACT	0.266	0.052	103	122	1.166	0.195	0.162	0.370
Child has anaemia (Haemoglobin <8.0 g/dl)	0.132	0.033	655	721	2.043	0.249	0.066	0.198
Child has malaria (based on rapid test)	0.335	0.043	647	711	1.984	0.128	0.249	0.421
Child has malaria (based on microscopy test)	0.349	0.044	655	721	2.049	0.125	0.262	0.436

Table B.22 Sampling errors: Western Area Urban sample, Sierra Leone MIS 2016

Variable	R	SE	N	WN	DEFT	SE/R	R-2SE	R+2SE
No education	0.279	0.040	637	1,133	2.235	0.143	0.199	0.358
At least some secondary education	0.647	0.042	637	1,133	2.227	0.066	0.562	0.731
Ownership of at least one ITN	0.404	0.045	480	835	1.983	0.110	0.315	0.493
Child slept under an ITN last night	0.261	0.033	398	724	1.232	0.127	0.194	0.327
Pregnant women slept under an ITN last night	0.126	0.050	45	77	0.996	0.396	0.026	0.226
Received 2+ doses of SP/Fansidar during antenatal visit	0.507	0.039	125	219	0.873	0.077	0.429	0.586
Child has fever in last 2 weeks	0.138	0.020	311	552	0.972	0.146	0.097	0.178
Child sought care/treatment from a health facility	0.699	0.077	43	76	1.070	0.110	0.546	0.853
Child took ACT	0.514	0.101	43	76	1.260	0.197	0.311	0.716
Child has anaemia (Haemoglobin <8.0 g/dl)	0.022	0.009	378	693	1.232	0.400	0.004	0.040
Child has malaria (based on rapid test)	0.038	0.008	378	693	0.918	0.220	0.021	0.055
Child has malaria (based on microscopy test)	0.063	0.020	378	693	1.640	0.312	0.024	0.103

Table C.1 Household age distribution

Single-year age distribution of the de facto household population by sex (weighted), Sierra Leone 2016

	Women		Men			Women		Men	
Age	Number	Percent	Number	Percent	Age	Number	Percent	Number	Percent
0	696	3.4	683	3.6	37	153	0.7	180	1.0
1	682	3.3	645	3.4	38	196	1.0	257	1.4
2	656	3.2	714	3.8	39	129	0.6	107	0.6
3	768	3.8	800	4.3	40	372	1.8	428	2.3
4	812	4.0	783	4.2	41	52	0.3	82	0.4
5	539	2.6	573	3.0	42	76	0.4	182	1.0
6	679	3.3	648	3.4	43	86	0.4	95	0.5
7	723	3.5	705	3.7	44	37	0.2	53	0.3
8	610	3.0	614	3.3	45	225	1.1	465	2.5
9	455	2.2	462	2.5	46	59	0.3	98	0.5
10	621	3.0	660	3.5	47	48	0.2	71	0.4
11	354	1.7	297	1.6	48	86	0.4	111	0.6
12	563	2.8	555	2.9	49	45	0.2	62	0.3
13	523	2.6	394	2.1	50	435	2.1	266	1.4
14	522	2.6	420	2.2	51	145	0.7	46	0.2
15	357	1.7	493	2.6	52	218	1.1	102	0.5
16	355	1.7	317	1.7	53	97	0.5	56	0.3
17	297	1.5	302	1.6	54	81	0.4	45	0.2
18	395	1.9	373	2.0	55	226	1.1	222	1.2
19	303	1.5	247	1.3	56	93	0.5	86	0.5
20	558	2.7	422	2.2	57	41	0.2	43	0.2
21	216	1.1	149	0.8	58	50	0.2	53	0.3
22	341	1.7	259	1.4	59	23	0.1	30	0.2
23	326	1.6	162	0.9	60	236	1.2	222	1.2
24	218	1.1	169	0.9	61	19	0.1	15	0.1
25	746	3.7	393	2.1	62	44	0.2	36	0.2
26	220	1.1	147	0.8	63	26	0.1	29	0.2
27	312	1.5	197	1.0	64	28	0.1	39	0.2
28	317	1.5	199	1.1	65	145	0.7	161	0.9
29	168	0.8	112	0.6	66	17	0.1	12	0.1
30	624	3.1	471	2.5	67	24	0.1	55	0.3
31	102	0.5	74	0.4	68	59	0.3	35	0.2
32	221	1.1	198	1.1	69	19	0.1	20	0.1
33	119	0.6	110	0.6	70+	528	2.6	436	2.3
34	143	0.7	136	0.7	Don't know/ missing	18	0.1	26	0.1
35	585	2.9	551	2.9					
36	181	0.9	153	0.8	Total	20,444	100.0	18,812	100.0

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 2016

Age group	Household population of women age 10-54	Interviewed women age 15-49		Percentage of eligible women interviewed
		Number	Percentage	
10-14	2,584	-	-	-
15-19	1,708	1,706	19.7	99.9
20-24	1,660	1,657	19.1	99.8
25-29	1,762	1,757	20.3	99.7
30-34	1,210	1,206	13.9	99.6
35-39	1,245	1,245	14.4	100.0
40-44	623	622	7.2	99.9
45-49	463	462	5.3	99.8
50-54	976	-	-	-
15-49	8,670	8,654	100.0	99.8

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 2016

Subject	Percentage with information missing	Number of cases
Month Only (Births in the 15 years preceding the survey)	0.64	6,699
Month and Year (Births in the 15 years preceding the survey)	0.09	6,699
Age at Death (Deceased children born in the 15 years preceding the survey)	0.00	243
Respondent's education (All women age 15-49)	0.00	8,501
Anaemia (Living children age 6-59 months from the Household Questionnaire)	1.81	6,782

[1] Both year and age missing

Table C.4 Births by calendar years

Number of births, percentage with complete birth date, sex ratio at birth, and calendar year ratio by calendar year, according to living (L), dead (D), and total (T) children (weighted), Sierra Leone 2016

Calendar year	Number of births			Percentage with complete birth date[1]			Sex ratio at birth[2]			Calendar year ratio[3]		
	L	D	T	L	D	T	L	D	T	L	D	T
2016	630	22	652	100.0	100.0	100.0	103.1	111.5	103.4	-	-	-
2015	1,374	36	1,411	99.6	91.9	99.4	95.2	93.9	95.1	-	-	-
2014	1,112	59	1,172	99.3	96.2	99.2	96.6	143.9	98.5	88.1	133.8	89.6
2013	1,151	52	1,203	99.0	93.5	98.8	104.1	112.8	104.5	103.9	97.8	103.6
2012	1,104	47	1,151	99.5	94.4	99.3	99.9	132.1	101.0	98.7	121.5	99.4
2011	1,086	26	1,112	99.6	86.8	99.3	103.7	134.4	104.3	196.8	109.4	193.2
2012-2016	5,371	217	5,588	99.4	94.8	99.3	99.2	120.7	100.0	-	-	-
All	6,456	243	6,699	99.5	94.0	99.3	100.0	122.1	100.7	-	-	-

na = Not applicable
[1] Both year and month of birth given
[2] (Bm/Bf)x100, where Bm and Bf are the numbers of male and female births, respectively
[3] [2Bx/(Bx-1+Bx+1)]x100, where Bx is the number of births in calendar year x

SURVEY PERSONNEL

Appendix D

2016 SIERRA LEONE MIS TECHNICAL WORKING GROUP

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

Dr. Mohamed Samai, University of Sierra Leone
Role in SLMIS: Co-Principal Investigator

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Role in SLMIS: Project Manager

Dr. Adikali A. Kamara, Deputy Program Manager, National Malaria Control Program,
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Dr. Foday Daffae, Director, Directorate for Disease Prevention and Control in MOHS
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Mr. Francis Tommy, Principal Statistician, Statistics Sierra Leone
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Mr. Sahr Yambasu, Principal Statistician/Census Manager, Statistics Sierra Leone
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Mr. Ebrima Jarju, GF R10 Project Director, Catholic Relief Services
Role in SLMIS: Project Manager

Dr. Ngozi Kennedy, Health Specialist, UNICEF
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Mr. Wogba E.P. Kamara , Senior M&E Specialist, DPPI/MOHS
Role in SLMIS: Monitoring & Evaluation Officer

Dr. Louisa Ganda, National Programme Officer, World Health Organization
Role in SLMIS: TWG Member

Mr. Alpha S. Swaray, Medical Microbiologist, Ministry of Health and Sanitation
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Sia Sessie, Microscopist

Mohamed I. Fornah, Microscopist

Alusine Fornah, Microscopist

Tamba Yollah, Microscopist

Mustapha Baion, Microscopist

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Mr. Alhaji Kamara, Catholic Relief Services

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Moiyatu Momoh

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Fancess Kemokai

2016 SIERRA LEONE MIS LOGISTICS OFFICERS

Unisa Kamara

Thomas M. Turay

2016 SIERRA LEONE MIS BIOMARKER SUPERVISORS

Edwina Conteh

Jerikatu Bangura

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Mariama Rashidatu Osman	Interviewer
Augustine Genda	Biomarker
Mohamed Kallay	Runner

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Regina V. Lamin	Biomarker
Abu Bakarr Fawundu	Runner

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Aminata Kamara	Biomarker
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Hawa Conteh	Interviewer
Rugiatu Bangura	Biomarker
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Francess Nasu Jimmy	Interviewer
Ross E. P. Stevens	Biomarker
Mohamed Sankoh	Runner

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Victoria Dixie Luke	Nurse
Osman Koroma	Interviewer
Zainab Juheh Bah	Biomarker
Mohamed Sankoh	Runner

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Memunatu K. Kamara	M&E Assistant
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Dominic Lumeh	Zonal Coordinator, East
Yayah Mansaray	Zonal Coordinator, South
Michael K. Mansaray	Zonal Coordinator, North
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Yayah Kamara	Logistics Officer

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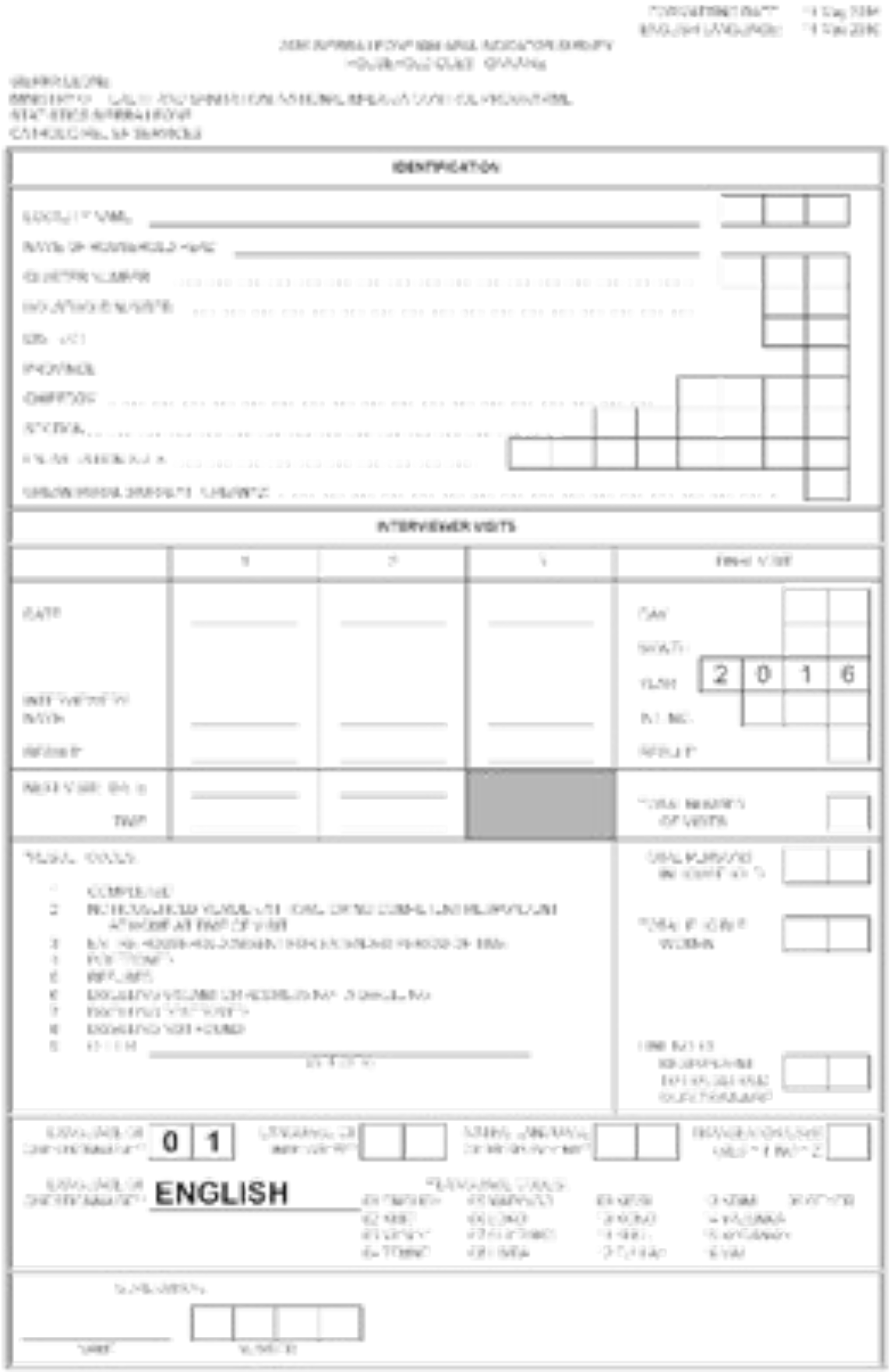
Geoffrey Lutwama	Data Processing Specialist
Han Raggers	Data Processing Specialist
Mahmoud Elkasabi	Sampling Statistician
Nancy Johnson	Senior Editor
Chris Gramer	Report Production Specialist
Teresa Duberry	Report Production Specialist
Toni Jones	Biomarker Supplies Procurement Coordinator
Elizabeth Britton	Electronics Supplies Procurement Coordinator
Trinadh Dontamsetti	GIS Specialist
Matthew Pagan	GIS Specialist

QUESTIONNAIRES

Appendix **E**


IDENTIFICATION
INTERVIEWER VISITS
2016
01
ENGLISH

INTRODUCTION AND CONSENT

Hello. My name is ______________________________________. I am working with the Ministry of Health and Sanitations (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. If I ask you 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.

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

GIVE CARD WITH CONTACT INFORMATION

2016 SLMIS Principle Investigator: Dr. Foday Sahr; +232 76 400265; Email: fodaysahr@gmail.com
Chairman of Ethics Committee: Professor Hector G. Morgan; +232 76 626234; Email: hmorg2007@yahoo.com
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Catholic Relief Services: Mr. Ebrima Jarjou; +232 79 250626; Email: ebrima.jarjou@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?

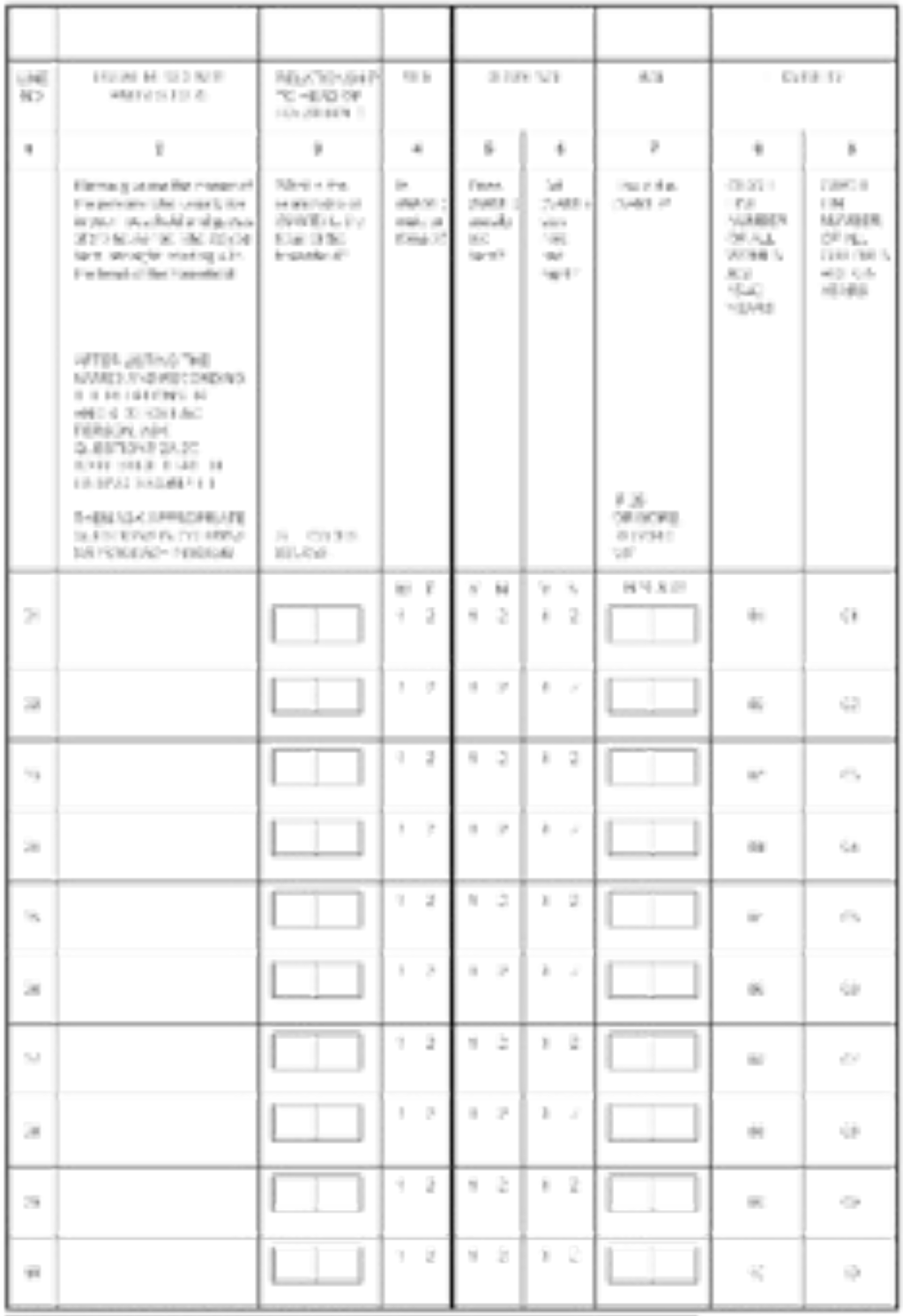
SIGNATURE OF INTERVIEWER ______________________________ DATE ________________

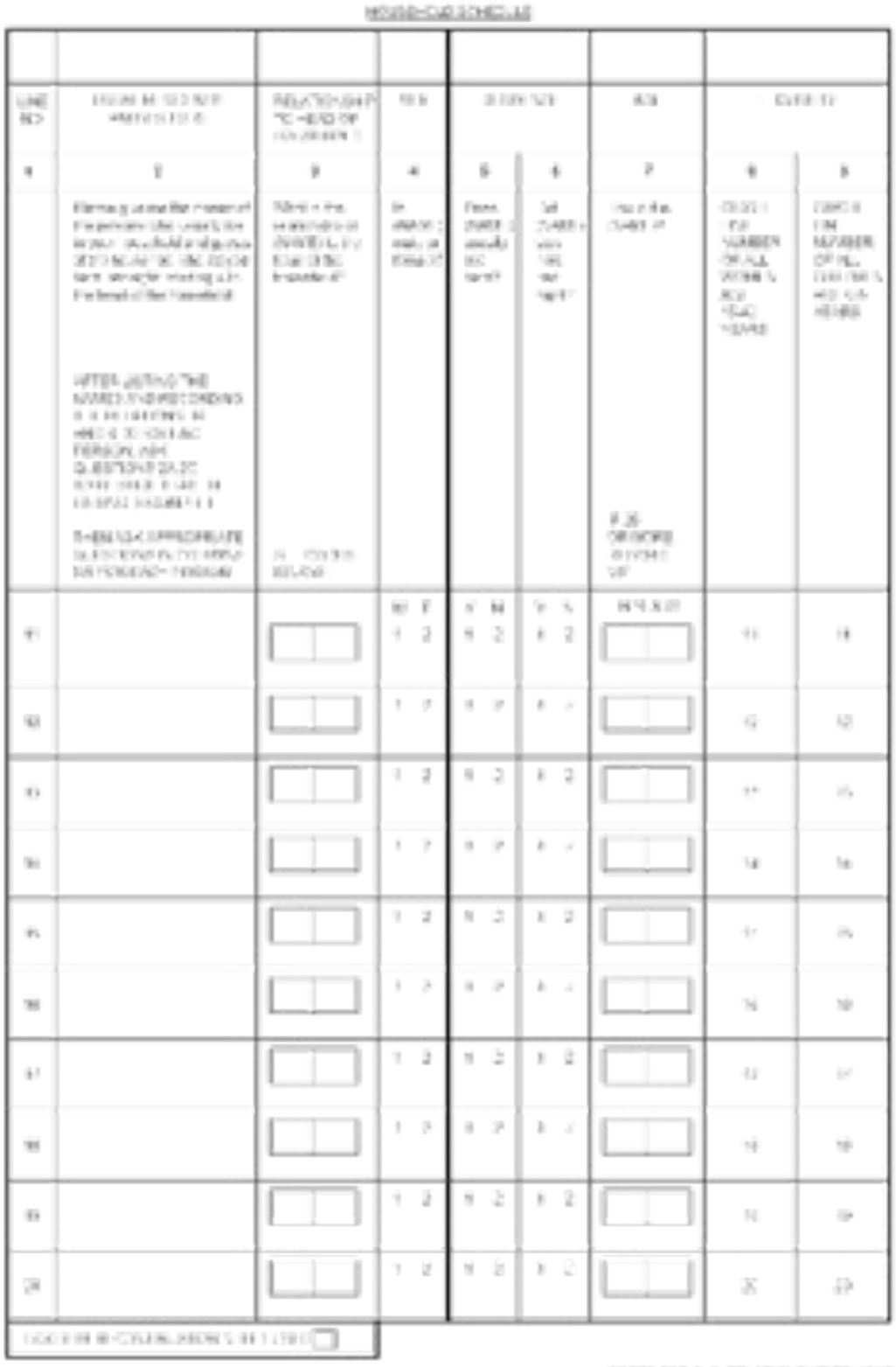
RESPONDENT AGREES TO BE INTERVIEWED . . . 1 ↓

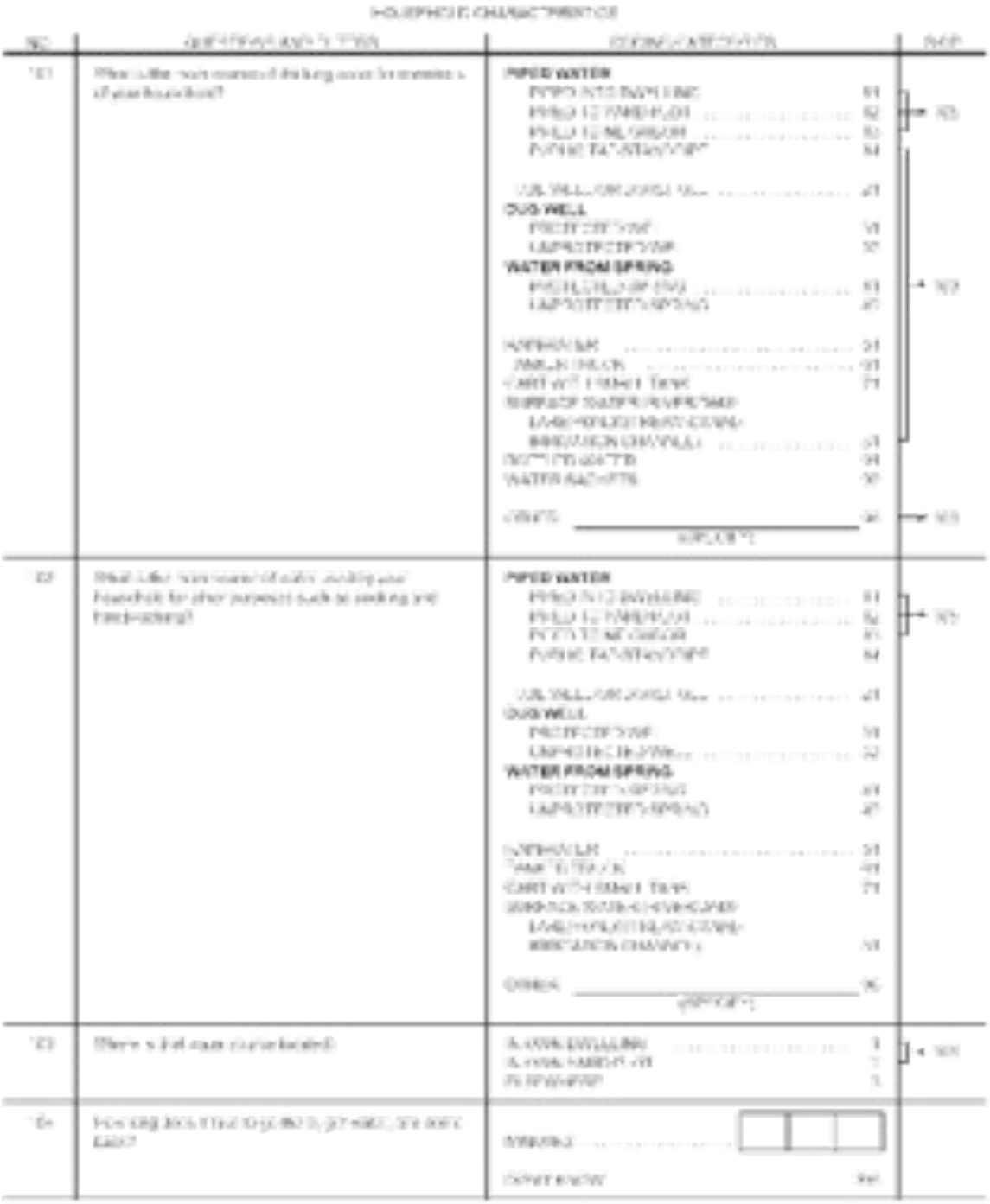
RESPONDENT DOES NOT AGREE TO BE INTERVIEWED . . . 2 → END

102	RECORD THE TIME.	HOURS . . . . [ ][ ] MINUTES . . . . [ ][ ]

HH-3







HOUSEHOLD CHARACTERISTICS

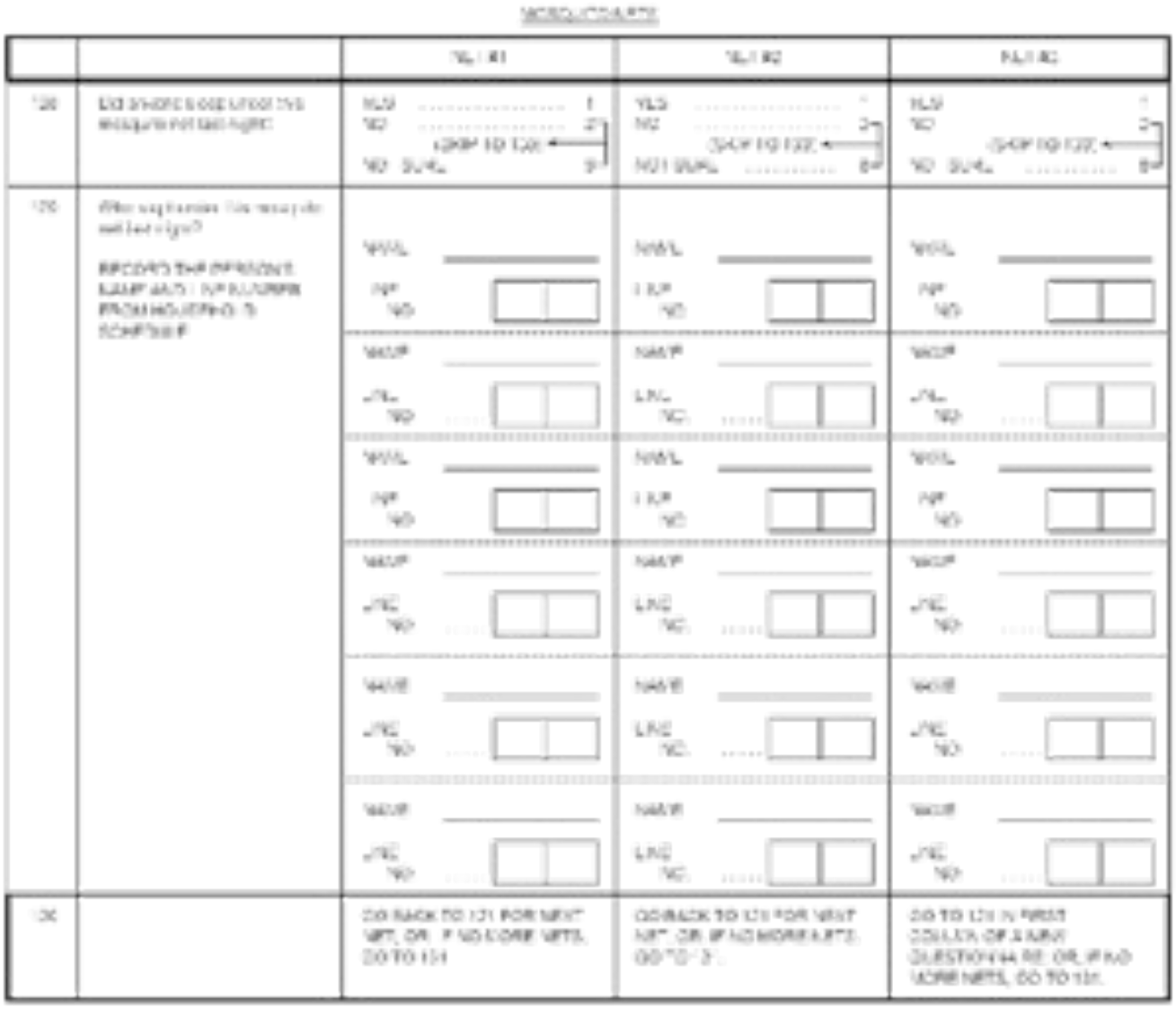
NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
[illegible]	[illegible]	**FLUSH OR POUR FLUSH TOILET** [illegible] 11 [illegible] 12 [illegible] 13 [illegible] 14 [illegible] 15 **PIT LATRINE** [illegible] 21 [illegible] 22 [illegible] 23 [illegible] 31 [illegible] 41 [illegible] 51 [illegible] 61 OTHER 96 (SPECIFY)	[illegible]
[illegible]	[illegible]	YES 1 NO 2	[illegible]
[illegible]	[illegible]	[illegible] 0 [illegible] [illegible]	
[illegible]	[illegible]	[illegible] OTHER 96 (SPECIFY)	
[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	YES 1 NO 2	[illegible]

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	

[illegible]

		NET #1	NET #2	NET #3
121	ASK THE RESPONDENT TO SHOW YOU ALL THE NETS IN THE HOUSEHOLD. IF MORE THAN 3 NETS, USE ADDITIONAL QUESTIONNAIRE(S).	**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
122	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
123	OBSERVE OR ASK BRAND/TYPE OF MOSQUITO NET. IF BRAND IS UNKNOWN AND YOU CANNOT OBSERVE THE NET, SHOW PICTURES OF TYPICAL NET TYPES/BRANDS TO RESPONDENT.	**LONG-LASTING INSECTICIDE-TREATED NET (LLIN)** PERMANET . . . . . . 11 OLYSET . . . . 12 DURANET . . . . 13 OTHER/DON'T KNOW BRAND . . . . 16 (SKIP TO 126) OTHER TYPE . . . . 96 DON'T KNOW TYPE . . . 98	**LONG-LASTING INSECTICIDE-TREATED NET (LLIN)** PERMANET . . . . . . 11 OLYSET . . . . 12 DURANET . . . . 13 OTHER/DON'T KNOW BRAND . . . . 16 (SKIP TO 126) OTHER TYPE . . . . 96 DON'T KNOW TYPE . . . 98	**LONG-LASTING INSECTICIDE-TREATED NET (LLIN)** PERMANET . . . . . . 11 OLYSET . . . . 12 DURANET . . . . 13 OTHER/DON'T KNOW BRAND . . . . 16 (SKIP TO 126) OTHER TYPE . . . . 96 DON'T KNOW TYPE . . . 98
124	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 126) NOT SURE 8	YES . . . . 1 NO . . . . 2 (SKIP TO 126) NOT SURE 8	YES . . . . 1 NO . . . . 2 (SKIP TO 126) NOT SURE 8
125	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
126	Did you get the net through the June-July 2014 mass distribution campaign, during an antenatal care visit, or during an immunization visit?	YES, JUNE-JULY 2014 MASS DIST. CAMPAIGN . . . . . . 1 YES, ANC . . . . 2 YES, IMMUNIZATION VISIT . . . . 3 (SKIP TO 128) NO 4	YES, JUNE-JULY 2014 MASS DIST. CAMPAIGN . . . . . . 1 YES, ANC . . . . 2 YES, IMMUNIZATION VISIT . . . . 3 (SKIP TO 128) NO 4	YES, JUNE-JULY 2014 MASS DIST. CAMPAIGN . . . . . . 1 YES, ANC . . . . 2 YES, IMMUNIZATION VISIT . . . . 3 (SKIP TO 128) NO 4
127	Where did you get the net?	GOVT HOSPITAL/HEALTH CENTER . . . . 01 MOBILE CLINIC . . . . 02 COMMUNITY HEALTH WORKER . . . 03 PVT HOSPITAL/CLINIC . . . . 04 MISSION/FAITH-BASED HOSPITAL . . . . . 05 MISSION/FAITH-BASED CLINIC . . . . . . 06 PHARMACY . . . . 07 PVT MEDICAL STORE . . . 08 NGO . . . . 09 DONOR . . . . 10 SHOP . . . . 11 TRADITIONAL HEALER . . . . 12 DON'T KNOW . . . . 98 OTHER ______________ 96 (SPECIFY)	GOVT HOSPITAL/HEALTH CENTER . . . . 01 MOBILE CLINIC . . . . 02 COMMUNITY HEALTH WORKER . . . 03 PVT HOSPITAL/CLINIC . . . . 04 MISSION/FAITH-BASED HOSPITAL . . . . . 05 MISSION/FAITH-BASED CLINIC . . . . . . 06 PHARMACY . . . . 07 PVT MEDICAL STORE . . . 08 NGO . . . . 09 DONOR . . . . 10 SHOP . . . . 11 TRADITIONAL HEALER . . . . 12 DON'T KNOW . . . . 98 OTHER ______________ 96 (SPECIFY)	GOVT HOSPITAL/HEALTH CENTER . . . . 01 MOBILE CLINIC . . . . 02 COMMUNITY HEALTH WORKER . . . 03 PVT HOSPITAL/CLINIC . . . . 04 MISSION/FAITH-BASED HOSPITAL . . . . . 05 MISSION/FAITH-BASED CLINIC . . . . . . 06 PHARMACY . . . . 07 PVT MEDICAL STORE . . . 08 NGO . . . . 09 DONOR . . . . 10 SHOP . . . . 11 TRADITIONAL HEALER . . . . 12 DON'T KNOW . . . . 98 OTHER ______________ 96 (SPECIFY)



		NET #1	NET #2	NET #3
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 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. [ ][ ]
		NAME ______ LINE NO. [ ][ ]	NAME ______ LINE NO. [ ][ ]	NAME ______ LINE NO. [ ][ ]
		NAME ______ LINE NO. [ ][ ]	NAME ______ LINE NO. [ ][ ]	NAME ______ LINE NO. [ ][ ]
130		GO BACK TO 121 FOR NEXT NET; OR, IF NO MORE NETS, GO TO 131	GO BACK TO 121 FOR NEXT NET; OR, IF NO MORE NETS, GO TO 131	GO TO 121 IN FIRST COLUMN OF A NEW QUESTIONNAIRE; OR, IF NO MORE NETS, GO TO 131.

ADDITIONAL HOUSEHOLD CHARACTERISTICS

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
131	OBSERVE MAIN MATERIAL OF THE FLOOR OF THE DWELLING. 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)	
132	OBSERVE MAIN MATERIAL OF THE ROOF OF THE DWELLING. 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** ZINC .... 31 WOOD .... 32 CALAMINE/CEMENT FIBER .... 33 CERAMIC TILES .... 34 CEMENT .... 35 ROOFING SHINGLES .... 36 OTHER ______________________ 96 (SPECIFY)	
133	OBSERVE MAIN MATERIAL OF THE EXTERIOR WALLS OF THE DWELLING. 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 ZINC .... 37 OTHER ______________________ 96 (SPECIFY)	
134	RECORD THE TIME.	HOURS .... [ ][ ] MINUTES .... [ ][ ]	

INTERVIEWER'S OBSERVATIONS

TO BE FILLED IN AFTER COMPLETING INTERVIEW

COMMENTS ABOUT INTERVIEW:

COMMENTS ON SPECIFIC QUESTIONS:

ANY OTHER COMMENTS:

SUPERVISOR'S OBSERVATIONS

EDITOR'S OBSERVATIONS

FORMATTING DATE: 11 May 2016
ENGLISH LANGUAGE: 11 May 2016

2016 SIERRA LEONE MALARIA INDICATOR SURVEY
BIOMARKER 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

BIOMARKER VISITS

	1	2	3	FINAL VISIT
DATE BIOMARKER NAME	________ ________	________ ________	________ ________	DAY MONTH YEAR BIOMARKER NUMBER
NEXT VISIT: DATE TIME	________ ________	________ ________		TOTAL NUMBER OF VISITS
NOTES:				TOTAL ELIGIBLE CHILDREN

LANGUAGE OF QUESTIONNAIRE** 0 1 | LANGUAGE OF INTERVIEW** | NATIVE LANGUAGE OF RESPONDENT** | TRANSLATOR (YES = 1, NO = 2)

LANGUAGE OF QUESTIONNAIRE: **ENGLISH**

**LANGUAGE CODES:

01 ENGLISH	05 MANDINGO	09 KISSI	13 KRIM	96 OTHER
02 KRIO	06 LOKO	10 KONO	14 YALUNKA	
03 MENDE	07 SHERBRO	11 SUSU	15 KORANKO	
04 TEMNE	08 LIMBA	12 FULLAH	16 VAI	

INTERVIEWER		SUPERVISOR	
NAME	NUMBER	NAME	NUMBER

BIO 1

101	CHECK COLUMN 9 IN HOUSEHOLD QUESTIONNAIRE. RECORD THE LINE NUMBER AND NAME FOR ALL ELIGIBLE CHILDREN 0-5 YEARS IN QUESTION 102. IF MORE THAN SIX CHILDREN, USE ADDITIONAL QUESTIONNAIRE(S).			
		CHILD 1	CHILD 2	CHILD 3
102	CHECK HOUSEHOLD QUESTIONNAIRE. LINE NUMBER AND NAME FROM COLUMN 2	LINE NUMBER . . . . . . [ ][ ] NAME ______	LINE NUMBER . . . . . . [ ][ ] NAME ______	LINE NUMBER . . . . . . [ ][ ] NAME ______
103	IF MOTHER INTERVIEWED, COPY CHILD'S DATE OF BIRTH (DAY, MONTH, AND YEAR) FROM BIRTH HISTORY. IF MOTHER NOT INTERVIEWED ASK: What is (NAME)'s date of birth?	DAY [ ][ ] MONTH . . . . . . [ ][ ] YEAR . . . [ ][ ][ ][ ]	DAY [ ][ ] MONTH . . . . . . [ ][ ] YEAR . . . [ ][ ][ ][ ]	DAY [ ][ ] MONTH . . . . . . [ ][ ] YEAR . . . [ ][ ][ ][ ]
104	CHECK 103: CHILD BORN IN 2011 [illegible] 2016?	YES . . . 1 NO . . . 2 (SKIP TO [illegible])	YES . . . 1 NO . . . 2 (SKIP TO [illegible])	YES . . . 1 NO . . . 2 (SKIP TO [illegible])
105	CHECK 103: CHILD AGE 0-5 MONTHS, I.E., WAS CHILD BORN IN MONTH OF INTERVIEW OR 5 PREVIOUS MONTHS?	0-5 MONTHS . . . 1 (SKIP TO [illegible]) OLDER . . . 2	0-5 MONTHS . . . 1 (SKIP TO [illegible]) OLDER . . . 2	0-5 MONTHS . . . 1 (SKIP TO [illegible]) OLDER . . . 2
106	LINE NUMBER OF PARENT/OTHER ADULT RESPONSIBLE FOR THE CHILD FROM COLUMN 1 OF HOUSEHOLD SCHEDULE	LINE NUMBER . . . . . . [ ][ ] (RECORD 00 IF NOT LISTED)	LINE NUMBER . . . . . . [ ][ ] (RECORD 00 IF NOT LISTED)	LINE NUMBER . . . . . . [ ][ ] (RECORD 00 IF NOT LISTED)
107	ASK CONSENT FOR ANEMIA TEST FROM PARENT/OTHER ADULT.	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 2011 or later take part in anemia testing in this survey and give a few drops of blood from a finger or heel. 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 or no. It is up to you to decide. Will you allow (NAME OF CHILD) to participate in the anemia test?		
108	CIRCLE THE CODE AND SIGN YOUR NAME.	GRANTED . . . 1 ______ (SIGN) REFUSED . . . 2 NOT PRESENT/OTHER . . . 3	GRANTED . . . 1 ______ (SIGN) REFUSED . . . 2 NOT PRESENT/OTHER . . . 3	GRANTED . . . 1 ______ (SIGN) REFUSED . . . 2 NOT PRESENT/OTHER . . . 3
108A	PARENT/RESPONSIBLE ADULT SIGNATURE OR THUMBPRINT FOR ANEMIA TESTING CONSENT	______ SIGNATURE/THUMBPRINT OF PARENT/RESPONSIBLE ADULT	______ SIGNATURE/THUMBPRINT OF PARENT/RESPONSIBLE ADULT	______ SIGNATURE/THUMBPRINT OF PARENT/RESPONSIBLE ADULT
108B	WITNESS SIGNATURE OR THUMBPRINT FOR ANEMIA TESTING CONSENT	______ SIGNATURE OR THUMBPRINT OF WITNESS	______ SIGNATURE OR THUMBPRINT OF WITNESS	______ SIGNATURE OR THUMBPRINT OF WITNESS

HAEMOGLOBIN MEASUREMENT AND MALARIA TESTING FOR CHILDREN AGE [illegible]

		CHILD 1	CHILD 2	CHILD 3
	CHECK HOUSEHOLD QUESTIONNAIRE: LINE NUMBER FROM COLUMN 9 NAME FROM COLUMN 2	LINE NUMBER [ ][ ] NAME ______	LINE NUMBER [ ][ ] NAME ______	LINE NUMBER [ ][ ] NAME ______
109	ASK CONSENT FOR MALARIA TEST FROM PARENT/OTHER ADULT	As part of this survey, we are asking children all over the country to 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 assist the government to develop programs to prevent malaria. We ask that all children born in 201[illegible] or later take part in malaria testing in this survey and give a few drops of blood from a finger or heel. 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 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 or no. It is up to you to decide. Will you allow (NAME OF CHILD) to participate in the malaria test?		
110	CIRCLE THE CODE, SIGN YOUR NAME, AND ENTER YOUR BIOMARKER NUMBER.	GRANTED ..... 1 REFUSED ..... 2 (SIGN AND ENTER YOUR BIOMARKER NUMBER) [ ][ ][ ][ ] NOT PRESENT/OTHER .. 3	GRANTED ..... 1 REFUSED ..... 2 (SIGN AND ENTER YOUR BIOMARKER NUMBER) [ ][ ][ ][ ] NOT PRESENT/OTHER .. 3	GRANTED ..... 1 REFUSED ..... 2 (SIGN AND ENTER YOUR BIOMARKER NUMBER) [ ][ ][ ][ ] NOT PRESENT/OTHER .. 3
110A	PARENT/RESPONSIBLE ADULT SIGNATURE OR THUMB PRINT FOR MALARIA TESTING CONSENT	SIGNATURE/THUMB PRINT OF PARENT/RESPONSIBLE ADULT	SIGNATURE/THUMB PRINT OF PARENT/RESPONSIBLE ADULT	SIGNATURE/THUMB PRINT OF PARENT/RESPONSIBLE ADULT
110B	WITNESS SIGNATURE OR THUMB PRINT FOR MALARIA TESTING CONSENT	SIGNATURE/THUMB PRINT OF WITNESS	SIGNATURE/THUMB PRINT OF WITNESS	SIGNATURE/THUMB PRINT OF WITNESS
111	PREPARE EQUIPMENT AND SUPPLIES ONLY FOR THE TEST(S) FOR WHICH CONSENT HAS BEEN OBTAINED AND PROCEED WITH THE TEST(S).			
112	PLACE BAR CODE LABEL FOR MALARIA RDT 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 AND THE 4TH ON THE MALARIA RDT	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 AND THE 4TH ON THE MALARIA RDT	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 AND THE 4TH ON THE MALARIA RDT

[illegible] 2

		CHILD 1	CHILD 2	CHILD 3
	CHECK HOUSEHOLD QUESTIONNAIRE: LINE NUMBER FROM COLUMN 9. NAME FROM COLUMN 2	LINE NUMBER [ ][ ] NAME ____________	LINE NUMBER [ ][ ] NAME ____________	LINE NUMBER [ ][ ] NAME ____________
113	RECORD HAEMOGLOBIN LEVEL HERE AND IN THE ANAEMIA 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
114	CIRCLE THE TEST CODE FOR THE MALARIA RDT	TESTED ..... 1 NOT PRESENT ..... 2 REFUSED ..... 3 OTHER ..... 6 (SKIP TO 116)	TESTED ..... 1 NOT PRESENT ..... 2 REFUSED ..... 3 OTHER ..... 6 (SKIP TO 116)	TESTED ..... 1 NOT PRESENT ..... 2 REFUSED ..... 3 OTHER ..... 6 (SKIP TO 116)
115	RECORD THE RESULT OF THE MALARIA RDT HERE AND IN THE ANAEMIA AND MALARIA BROCHURE.	POSITIVE ..... 1 (SKIP TO 118) NEGATIVE ..... 2 OTHER 6	POSITIVE ..... 1 (SKIP TO 118) NEGATIVE ..... 2 OTHER 6	POSITIVE ..... 1 (SKIP TO 118) NEGATIVE ..... 2 OTHER 6
116	CHECK 113: HAEMOGLOBIN RESULT	BELOW 8 G/DL, SEVERE ANAEMIA ..... 1 8 G/DL OR ABOVE ..... 2 NOT PRESENT ..... 3 REFUSED ..... 4 OTHER ..... 6 (SKIP TO 118)	BELOW 8 G/DL, SEVERE ANAEMIA ..... 1 8 G/DL OR ABOVE ..... 2 NOT PRESENT ..... 3 REFUSED ..... 4 OTHER ..... 6 (SKIP TO 118)	BELOW 8 G/DL, SEVERE ANAEMIA ..... 1 8 G/DL OR ABOVE ..... 2 NOT PRESENT ..... 3 REFUSED ..... 4 OTHER ..... 6 (SKIP TO 118)
117	SEVERE ANAEMIA REFERRAL RECORD THE RESULT OF THE ANAEMIA TEST ON THE REFERRAL FORM	The anaemia test shows that (NAME OF CHILD) has severe anaemia. Your child is very ill and must be taken to a health facility immediately. (SKIP TO 130)		
118	Does (NAME) suffer from any of the following illnesses or symptoms: a) Extreme weakness? b) Heart problems? c) Loss of consciousness? d) Rapid or difficult breathing? e) Seizures? f) Abnormal bleeding? g) Jaundice or yellow skin? h) Dark urine?	YES NO a) EXTREME WEAKNESS 1 2 b) HEART PROBLEMS 1 2 c) LOSS OF CONSCIOUS 1 2 d) RAPID BREATHING 1 2 e) SEIZURES 1 2 f) BLEEDING 1 2 g) JAUNDICE 1 2 h) DARK URINE 1 2	YES NO a) EXTREME WEAKNESS 1 2 b) HEART PROBLEMS 1 2 c) LOSS OF CONSCIOUS 1 2 d) RAPID BREATHING 1 2 e) SEIZURES 1 2 f) BLEEDING 1 2 g) JAUNDICE 1 2 h) DARK URINE 1 2	YES NO a) EXTREME WEAKNESS 1 2 b) HEART PROBLEMS 1 2 c) LOSS OF CONSCIOUS 1 2 d) RAPID BREATHING 1 2 e) SEIZURES 1 2 f) BLEEDING 1 2 g) JAUNDICE 1 2 h) DARK URINE 1 2
119	CHECK 118: ANY YES CIRCLED?	NO [ ] YES [ ] (SKIP TO 122)	NO [ ] YES [ ] (SKIP TO 122)	NO [ ] YES [ ] (SKIP TO 122)
120	CHECK 113: HAEMOGLOBIN RESULT	BELOW 8 G/DL, SEVERE ANAEMIA ..... 1 (SKIP TO 122) 8 G/DL OR ABOVE ..... 2 NOT PRESENT ..... 3 REFUSED ..... 4 OTHER 6	BELOW 8 G/DL, SEVERE ANAEMIA ..... 1 (SKIP TO 122) 8 G/DL OR ABOVE ..... 2 NOT PRESENT ..... 3 REFUSED ..... 4 OTHER 6	BELOW 8 G/DL, SEVERE ANAEMIA ..... 1 (SKIP TO 122) 8 G/DL OR ABOVE ..... 2 NOT PRESENT ..... 3 REFUSED ..... 4 OTHER 6

HQ-4

		CHILD 1	CHILD 2	CHILD 3
	CHECK HOUSEHOLD QUESTIONNAIRE: LINE NUMBER FROM COLUMN 9, NAME FROM COLUMN 2	LINE NUMBER [ ][ ] NAME ______	LINE NUMBER [ ][ ] NAME ______	LINE NUMBER [ ][ ] NAME ______
121	In the past two weeks has (NAME) taken or is taking ACT to treat the malaria? VERIFY BY ASKING TO SEE TREATMENT	YES ... 1 (SKIP TO 123) NO ... 2 (SKIP TO 124)	YES ... 1 (SKIP TO 123) NO ... 2 (SKIP TO 124)	YES ... 1 (SKIP TO 123) NO ... 2 (SKIP TO 124)
122	**SEVERE MALARIA REFERRAL** RECORD THE RESULT OF THE MALARIA RDT ON THE REFERRAL FORM.	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 128)		
123	ALREADY TAKING ACT REFERRAL STATEMENT	You have told me that (NAME OF CHILD) had already received ACT for malaria. Therefore, I cannot give you additional ACT. However, the test shows that he/she has malaria. [illegible] (SKIP TO 128)		
124	READ INFORMATION FOR MALARIA TREATMENT AND CONSENT STATEMENT TO PARENT/RESPONSIBLE ADULT	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. [illegible]		
125	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
126	CHECK 125: MEDICATION ACCEPTED?	ACCEPTED MEDICINE ... 1 REFUSED ... 2 OTHER ... 6 (SKIP TO 128)	ACCEPTED MEDICINE ... 1 REFUSED ... 2 OTHER ... 6 (SKIP TO 128)	ACCEPTED MEDICINE ... 1 REFUSED ... 2 OTHER ... 6 (SKIP TO 128)
127	TREATMENT FOR CHILDREN WITH POSITIVE MALARIA TEST	ALSO, TELL THE PARENT/RESPONSIBLE ADULT: 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. (SKIP TO 130)		
128	CHECK 112: HEMOGLOBIN RESULT	BELOW 8.0 G/DL, SEVERE ANEMIA ... 1 8.0 G/DL OR ABOVE ... 2 NOT PRESENT ... 3 REFUSED ... 4 OTHER ... 6 (SKIP TO 130)	BELOW 8.0 G/DL, SEVERE ANEMIA ... 1 8.0 G/DL OR ABOVE ... 2 NOT PRESENT ... 3 REFUSED ... 4 OTHER ... 6 (SKIP TO 130)	BELOW 8.0 G/DL, SEVERE ANEMIA ... 1 8.0 G/DL OR ABOVE ... 2 NOT PRESENT ... 3 REFUSED ... 4 OTHER ... 6 (SKIP TO 130)
129	SEVERE ANEMIA REFERRAL RECORD THE RESULT OF THE ANEMIA TEST ON THE REFERRAL FORM.	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.		
130	GO BACK TO 120 IN NEXT COLUMN OF THIS QUESTIONNAIRE OR IN THE FIRST COLUMN OF THE NEXT PAGE; IF NO MORE CHILDREN, END INTERVIEW.			

DOSAGE SCHEDULE FOR ASAQ FIXED DOSAGE COMBINATION TREATMENT

AGE	WEIGHT	ASAQ COMBINATION	DOSAGE DAY 1	DOSAGE DAY 2	DOSAGE DAY 3
2-11 months	[illegible]	25mg Artesunate/67.5mg Amodiaquine	1 tablet	1 tablet	1 tablet
1-5 years	[illegible]	50mg Artesunate/135mg Amodiaquine	1 tablet	1 tablet	1 tablet

HEMOGLOBIN MEASUREMENT AND MALARIA TESTING FOR CHILDREN AGE 0-5

101	CHECK COLUMN 9 IN HOUSEHOLD QUESTIONNAIRE: RECORD THE LINE NUMBER AND NAME FOR ALL ELIGIBLE CHILDREN 0-5 YEARS IN QUESTION 102. IF MORE THAN 3 CHILDREN, USE ADDITIONAL QUESTIONNAIRE(S).			
		CHILD 1	CHILD 2	CHILD 3
102	CHECK HOUSEHOLD QUESTIONNAIRE: LINE NUMBER FROM COLUMN 9. NAME FROM COLUMN 2.	LINE NUMBER ☐☐ NAME ______	LINE NUMBER ☐☐ NAME ______	LINE NUMBER ☐☐ NAME ______
103	IF MOTHER INTERVIEWED, COPY CHILD'S DATE OF BIRTH (DAY, MONTH, AND YEAR) FROM [illegible] HISTORY. IF MOTHER NOT INTERVIEWED ASK: What is (NAME)'s date of birth?	DAY ☐☐ MONTH ☐☐ YEAR ☐☐☐☐	DAY ☐☐ MONTH ☐☐ YEAR ☐☐☐☐	DAY ☐☐ MONTH ☐☐ YEAR ☐☐☐☐
104	CHECK 103: CHILD BORN IN [illegible]?	YES 1 NO 2 (SKIP TO 110)	YES 1 NO 2 (SKIP TO 110)	YES 1 NO 2 (SKIP TO 110)
105	CHECK 103: CHILD AGE 0-5 MONTHS, I.E., WAS CHILD BORN IN MONTH OF INTERVIEW OR 5 PREVIOUS MONTHS?	0-5 MONTHS 1 (SKIP TO 110) OLDER 2	0-5 MONTHS 1 (SKIP TO 110) OLDER 2	0-5 MONTHS 1 (SKIP TO 110) OLDER 2
106	LINE NUMBER OF PARENT/OTHER ADULT RESPONSIBLE FOR THE CHILD (FROM COLUMN 1 OF HOUSEHOLD SCHEDULE).	LINE NUMBER ☐☐ (RECORD '00' IF NOT LISTED)	LINE NUMBER ☐☐ (RECORD '00' IF NOT LISTED)	LINE NUMBER ☐☐ (RECORD '00' IF NOT LISTED)
107	ASK CONSENT FOR ANEMIA TEST FROM PARENT/OTHER ADULT.	As part of this survey, we are asking children all over the country to take an anemia test. [illegible] The blood will be tested for anemia immediately, and the result will be told to you right away. [illegible] Do you have any questions? You can say yes or no. It is up to you to decide. Will you allow (NAME OF CHILD) to participate in the anemia test?		
108	CIRCLE THE CODE AND SIGN YOUR NAME.	GRANTED 1 ______ (SIGN) REFUSED 2 NOT PRESENT/OTHER 3	GRANTED 1 ______ (SIGN) REFUSED 2 NOT PRESENT/OTHER 3	GRANTED 1 ______ (SIGN) REFUSED 2 NOT PRESENT/OTHER 3
108A	PARENT/RESPONSIBLE ADULT SIGNATURE OR THUMB PRINT FOR ANEMIA TESTING CONSENT	______ SIGNATURE/THUMB PRINT OF PARENT/RESPONSIBLE ADULT	______ SIGNATURE/THUMB PRINT OF PARENT/RESPONSIBLE ADULT	______ SIGNATURE/THUMB PRINT OF PARENT/RESPONSIBLE ADULT
108B	WITNESS SIGNATURE OR THUMB PRINT FOR ANEMIA TESTING CONSENT	______ SIGNATURE/THUMB PRINT OF WITNESS	______ SIGNATURE/THUMB PRINT OF WITNESS	______ SIGNATURE/THUMB PRINT OF WITNESS

HEMOGLOBIN MEASUREMENT AND MALARIA TESTING FOR CHILDREN AGE 0-5

		CHILD 4	CHILD 5	CHILD 6
	CHECK HOUSEHOLD QUESTIONNAIRE LINE NUMBER FROM COLUMN 9. NAME FROM COLUMN 2.	LINE NUMBER . . . . . . [ ][ ] NAME ________	LINE NUMBER . . . . . . [ ][ ] NAME ________	LINE NUMBER . . . . . . [ ][ ] NAME ________
109	ASK CONSENT FOR MALARIA TEST FROM PARENT/OTHER ADULT	[illegible] [illegible] Do you have any questions? You can say yes to the test or you can decide [illegible]. Will you allow (NAME OF CHILD) to participate in the malaria test?		
110	CIRCLE THE CODE, SIGN YOUR NAME, AND ENTER YOUR BIOMARKER NUMBER.	GRANTED . . . . . . 1 REFUSED . . . . . . 2 (SIGN AND ENTER YOUR BIOMARKER NUMBER) [ ][ ][ ][ ] NOT PRESENT/OTHER . . 3	GRANTED . . . . . . 1 REFUSED . . . . . . 2 (SIGN AND ENTER YOUR BIOMARKER NUMBER) [ ][ ][ ][ ] NOT PRESENT/OTHER . . 3	GRANTED . . . . . . 1 REFUSED . . . . . . 2 (SIGN AND ENTER YOUR BIOMARKER NUMBER) [ ][ ][ ][ ] NOT PRESENT/OTHER . . 3
110A	PARENT/RESPONSIBLE ADULT SIGNATURE OR THUMB PRINT FOR MALARIA TESTING CONSENT	________ SIGNATURE/THUMB PRINT OF PARENT/RESPONSIBLE ADULT	________ SIGNATURE/THUMB PRINT OF PARENT/RESPONSIBLE ADULT	________ SIGNATURE/THUMB PRINT OF PARENT/RESPONSIBLE ADULT
110B	WITNESS SIGNATURE OR THUMB PRINT FOR MALARIA TESTING CONSENT	________ SIGNATURE/THUMB PRINT OF WITNESS	________ SIGNATURE/THUMB PRINT OF WITNESS	________ SIGNATURE/THUMB PRINT OF WITNESS
111	PREPARE EQUIPMENT AND SUPPLIES ONLY FOR THE CHILD(REN) FOR WHOM CONSENT HAS BEEN OBTAINED AND PROCEED WITH THE TESTING.			
112	PLACE 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 AND THE 4TH ON THE MALARIA KIT	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 AND THE 4TH ON THE MALARIA KIT	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 AND THE 4TH ON THE MALARIA KIT

HEMOGLOBIN MEASUREMENT AND MALARIA TESTING FOR CHILDREN AGE 0-5

		CHILD 4	CHILD 5	CHILD 6
	CHECK HOUSEHOLD QUESTIONNAIRE: LINE NUMBER FROM COLUMN 1. NAME FROM COLUMN 2.	LINE NUMBER . . . . . . [ ][ ] NAME ____________	LINE NUMBER . . . . . . [ ][ ] NAME ____________	LINE NUMBER . . . . . . [ ][ ] NAME ____________
113	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
114	CIRCLE THE TEST CODE FOR THE MALARIA RDT.	TESTED . . . . 1 NOT PRESENT . . . . 2 REFUSED . . . . 3 OTHER . . . . 6 (SKIP TO 116)	TESTED . . . . 1 NOT PRESENT . . . . 2 REFUSED . . . . 3 OTHER . . . . 6 (SKIP TO 116)	TESTED . . . . 1 NOT PRESENT . . . . 2 REFUSED . . . . 3 OTHER . . . . 6 (SKIP TO 116)
115	RECORD THE RESULT OF THE MALARIA RDT HERE AND IN THE ANEMIA AND MALARIA BROCHURE.	POSITIVE . . . . 1 (SKIP TO 116) NEGATIVE . . . . 2 OTHER 6	POSITIVE . . . . 1 (SKIP TO 116) NEGATIVE . . . . 2 OTHER 6	POSITIVE . . . . 1 (SKIP TO 116) NEGATIVE . . . . 2 OTHER 6
116	CHECK 113: HEMOGLOBIN RESULT	BELOW 8 G/DL, SEVERE ANEMIA . . . . . 1 8 G/DL OR ABOVE . . . . 2 NOT PRESENT . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO [illegible])	BELOW 8 G/DL, SEVERE ANEMIA . . . . . 1 8 G/DL OR ABOVE . . . . 2 NOT PRESENT . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO [illegible])	BELOW 8 G/DL, SEVERE ANEMIA . . . . . 1 8 G/DL OR ABOVE . . . . 2 NOT PRESENT . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO [illegible])
117	SEVERE ANEMIA REFERRAL RECORD THE RESULT OF THE ANEMIA TEST ON THE REFERRAL FORM.	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 [illegible])		
118	Does (NAME) suffer from any of the following illnesses or symptoms: a) Extreme weakness? b) Heart problems? c) Loss of consciousness? d) Rapid or difficult breathing? e) Seizures? f) Abnormal bleeding? g) Jaundice or yellow skin? h) Dark urine?	YES NO a) EXTREME WEAKNESS 1 2 b) HEART PROBLEMS 1 2 c) LOSS OF CONSCIOUS 1 2 d) RAPID BREATHING 1 2 e) SEIZURES 1 2 f) BLEEDING 1 2 g) JAUNDICE 1 2 h) DARK URINE 1 2	YES NO a) EXTREME WEAKNESS 1 2 b) HEART PROBLEMS 1 2 c) LOSS OF CONSCIOUS 1 2 d) RAPID BREATHING 1 2 e) SEIZURES 1 2 f) BLEEDING 1 2 g) JAUNDICE 1 2 h) DARK URINE 1 2	YES NO a) EXTREME WEAKNESS 1 2 b) HEART PROBLEMS 1 2 c) LOSS OF CONSCIOUS 1 2 d) RAPID BREATHING 1 2 e) SEIZURES 1 2 f) BLEEDING 1 2 g) JAUNDICE 1 2 h) DARK URINE 1 2
119	CHECK 118: ANY 'YES' CIRCLED?	NO [ ] YES [ ] (SKIP TO [illegible])	NO [ ] YES [ ] (SKIP TO [illegible])	NO [ ] YES [ ] (SKIP TO [illegible])
120	CHECK 113: HEMOGLOBIN RESULT	BELOW 8 G/DL, SEVERE ANEMIA . . . . 1 (SKIP TO 122) 8 G/DL OR ABOVE . . . . 2 NOT PRESENT . . . . 3 REFUSED . . . . 4 OTHER 6	BELOW 8 G/DL, SEVERE ANEMIA . . . . 1 (SKIP TO 122) 8 G/DL OR ABOVE . . . . 2 NOT PRESENT . . . . 3 REFUSED . . . . 4 OTHER 6	BELOW 8 G/DL, SEVERE ANEMIA . . . . 1 (SKIP TO 122) 8 G/DL OR ABOVE . . . . 2 NOT PRESENT . . . . 3 REFUSED . . . . 4 OTHER 6

[illegible]

HEMOGLOBIN MEASUREMENT AND MALARIA TESTING FOR CHILDREN AGE 0-5

		CHILD 4	CHILD 5	CHILD 6
	CHECK HOUSEHOLD QUESTIONNAIRE LINE NUMBER FROM COLUMN 1. NAME FROM COLUMN 2.	LINE NUMBER ...... [ ][ ] NAME ________	LINE NUMBER ...... [ ][ ] NAME ________	LINE NUMBER ...... [ ][ ] NAME ________
[illegible]	[illegible] ACT [illegible]? VERIFY BY ASKING TO SEE TREATMENT	YES 1 (SKIP TO [illegible]) NO 2 (SKIP TO [illegible])	YES 1 (SKIP TO [illegible]) NO 2 (SKIP TO [illegible])	YES 1 (SKIP TO [illegible]) NO 2 (SKIP TO [illegible])
122	SEVERE MALARIA REFERRAL RECORD THE RESULT OF THE MALARIA RDT ON THE REFERRAL FORM	[illegible] (SKIP TO 128)		
[illegible]	ALREADY TAKING ACT REFERRAL STATEMENT	[illegible] (SKIP TO [illegible])		
124	READ INFORMATION FOR MALARIA TREATMENT AND CONSENT STATEMENT TO [illegible]	[illegible]		
125	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
126	CHECK 125: MEDICATION ACCEPTED	ACCEPTED MEDICINE ... 1 REFUSED ... 2 OTHER ... 6 (SKIP TO [illegible])	ACCEPTED MEDICINE ... 1 REFUSED ... 2 OTHER ... 6 (SKIP TO [illegible])	ACCEPTED MEDICINE ... 1 REFUSED ... 2 OTHER ... 6 (SKIP TO [illegible])
127	TREATMENT FOR CHILDREN WITH POSITIVE MALARIA TEST	ALSO TELL THE PARENT/RESPONSIBLE ADULT: [illegible] (SKIP TO [illegible])		
[illegible]	CHECK [illegible]: HEMOGLOBIN RESULT	[illegible] 1 [illegible] 2 NOT PRESENT 3 REFUSED 4 OTHER 6 (SKIP TO [illegible])	[illegible] 1 [illegible] 2 NOT PRESENT 3 REFUSED 4 OTHER 6 (SKIP TO [illegible])	[illegible] 1 [illegible] 2 NOT PRESENT 3 REFUSED 4 OTHER 6 (SKIP TO [illegible])
129	SEVERE ANEMIA REFERRAL RECORD THE RESULT OF THE ANEMIA TEST ON THE REFERRAL FORM	[illegible]		
[illegible]	[illegible]			

DOSAGE SCHEDULE FOR ASAQ FIXED-DOSE COMBINATION TREATMENT

AGE	WEIGHT	ASAQ COMBINATION	DOSAGE DAY 1	DAY 2	DAY 3
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

2016 SIERRA LEONE MALARIA INDICATOR SURVEY
WOMAN'S 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	☐☐
NAME AND LINE NUMBER OF WOMAN ______________________	☐☐

INTERVIEWER VISITS				
	1	2	3	FINAL VISIT
DATE	________	________	________	DAY ☐☐ MONTH ☐☐ YEAR 2 0 1 6
INTERVIEWER'S NAME	________	________	________	INT. NO. ☐☐☐
RESULT*	________	________	________	RESULT* ☐
NEXT VISIT: DATE	________	________		TOTAL NUMBER OF VISITS ☐
TIME	________	________		

*RESULT CODES:
1 COMPLETED
2 NOT AT HOME
3 POSTPONED
4 REFUSED
5 PARTLY COMPLETED
6 INCAPACITATED
7 OTHER ______________ (SPECIFY)

LANGUAGE OF QUESTIONNAIRE** 0 1 | LANGUAGE OF INTERVIEW** ☐☐ | NATIVE LANGUAGE OF RESPONDENT** ☐☐ | TRANSLATOR USED (YES = 1, NO = 2) ☐

LANGUAGE OF QUESTIONNAIRE** ENGLISH

**LANGUAGE CODES:
01 ENGLISH
02 KRIO
03 MENDE
04 TEMNE
05 MANDINGO
06 LOKO
07 SHERBRO
08 LIMBA
09 KISSI
10 KONO
11 SUSU
12 FULLAH
13 KRIM
14 YALUNKA
15 KORANKO
16 VAI
96 OTHER

SUPERVISOR

________ (NAME) ☐☐☐☐ (NUMBER)

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

GIVE CARD WITH CONTACT INFORMATION

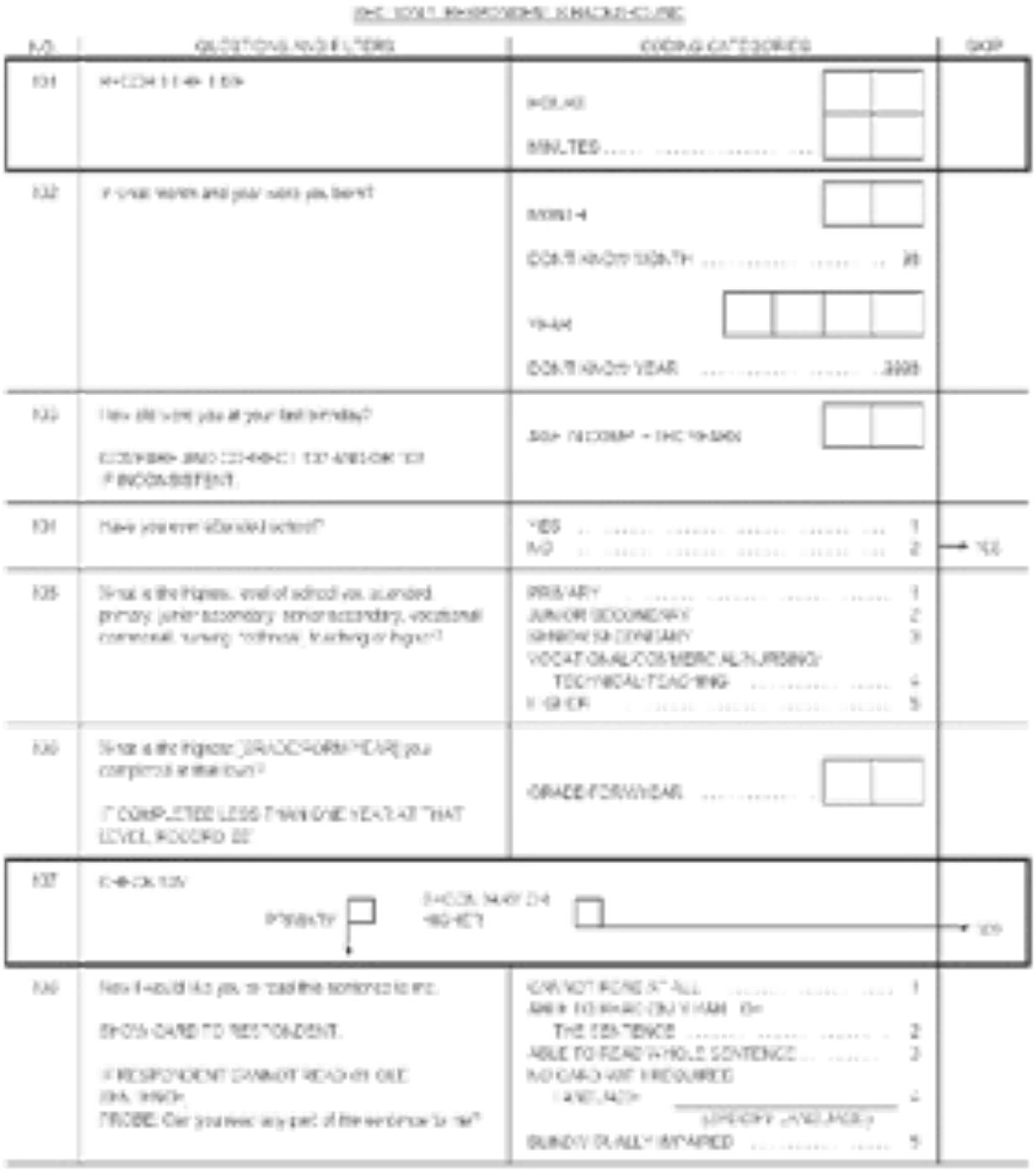
2016 SLMIS Principle Investigator: Dr. Foday Sahr; +232 76 460288; Email: fodaysahr1@gmail.com
Chairman of Ethics Committee: Professor Hector G. Morgan; +232 76 629291; Email: hemorg2007@yahoo.com
Director of Policy, Planning, & Information: Dr. Samuel A.S. Kargbo; +232 76 680274; Email: saskargbo@gmail.com
National Malaria Control Programme (NMCP): Dr. Samuel Juana Smith; +232 76 611042; Email: samueljuana@yahoo.com
Catholic Relief Services: Mr. Ebrima Jaljou; +232 79 258836; Email: ebrima.jaljou@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.
At this time, do you want to ask me anything about the survey?
May I begin the interview now?

SIGNATURE OF INTERVIEWER _____ DATE _____

RESPONDENT AGREES TO BE IN HOUSEHOLD → 1

RESPONDENT DOES NOT AGREE TO BE INTERVIEWED → 2 → END



[illegible]

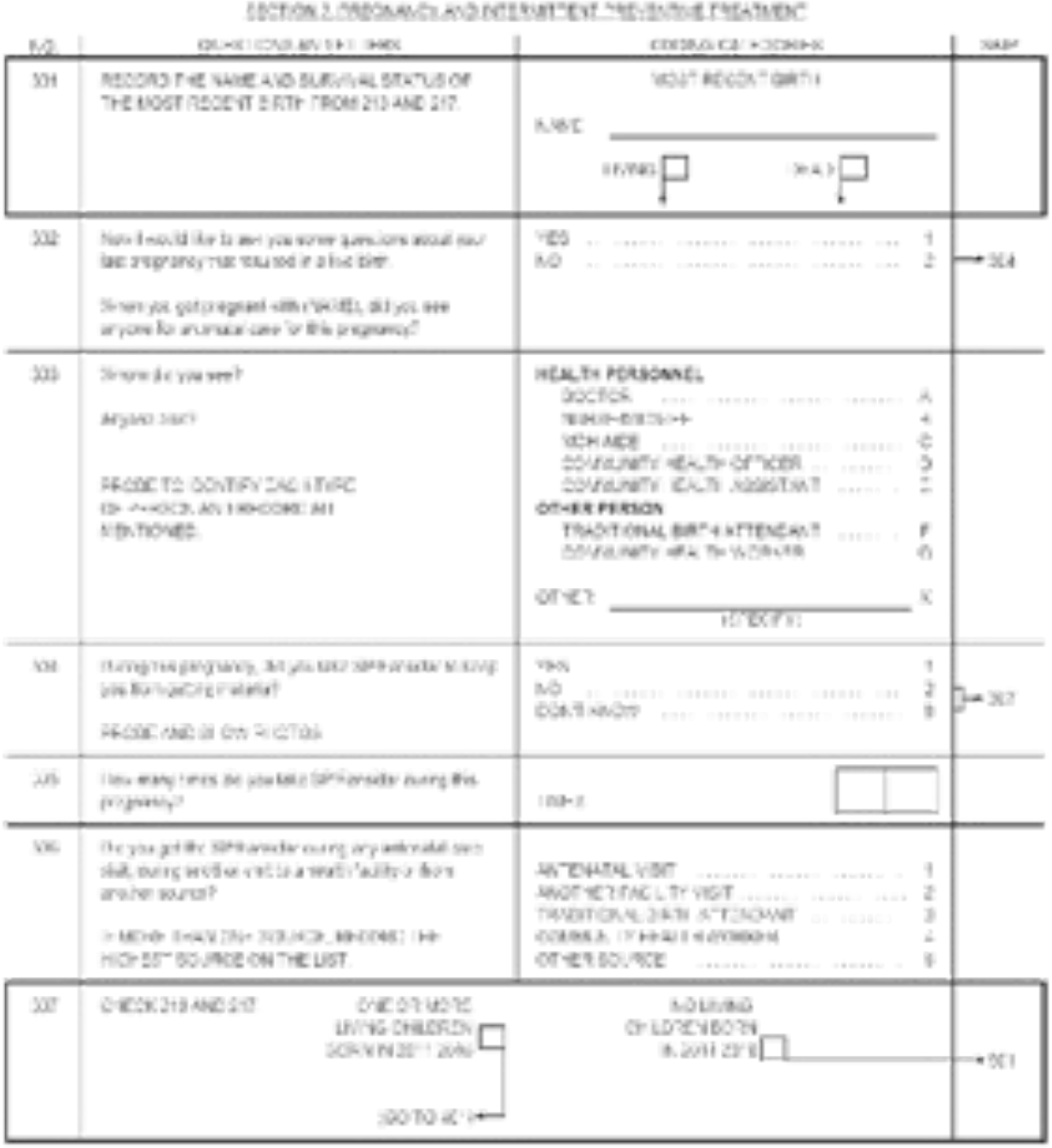
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	What is your religion?	[illegible] MUSLIM 2 TRADITIONAL 3 [illegible] 4 [illegible] _____ 96 (SPECIFY)	
[illegible]	What is your ethnicity?	[illegible] 01 [illegible] 02 [illegible] 03 [illegible] 04 [illegible] 05 [illegible] 06 [illegible] 07 [illegible] 08 [illegible] 09 [illegible] 10 [illegible] 11 [illegible] 12 [illegible] 13 [illegible] 14 [illegible] 15 [illegible] _____ 96 (SPECIFY)	

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	a) How many sons live with you? b) And how many daughters live with you? IF NONE, RECORD '00'.	a) SONS AT HOME . . . . . [ ][ ] b) 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	a) How many sons are alive but do not live with you? b) And how many daughters are alive but do not live with you? IF NONE, RECORD '00'.	a) SONS ELSEWHERE . . . . . [ ][ ] b) 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, who made any movement, sound, or effort to breathe, or who showed any other signs of life even if for a very short time?	YES . . . . . 1 NO 2	 → 208
207	a) How many boys have died? b) And how many girls have died? IF NONE, RECORD '00'.	a) BOYS DEAD . . . . . [ ][ ] b) 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	CHECK 208: ONE OR MORE BIRTHS [ ] ↓ NO BIRTHS [ ] →		226
211	Now I'd like to ask you about your more recent births. How many births have you had in 2011-2015? RECORD NUMBER OF LIVE BIRTHS 2011-2015	TOTAL IN 2011-2015 . . . . . [ ][ ] NONE 00	 → 226

212 Now I would like to record the names of all your births in [illegible], whether still alive or not, starting with the most recent one you had.
[illegible]
IF THERE ARE MORE THAN 5 BIRTHS, USE AN ADDITIONAL QUESTIONNAIRE STARTING WITH THE SECOND ROW.

213 What name was given to your (most recent/previous) baby? RECORD NAME. BIRTH HISTORY NUMBER	214 Is (NAME) a boy or a girl?	215 Were any of these births twins?	216 On what day, month, and year was (NAME) born?	217 Is (NAME) still alive?	218 IF ALIVE: How old was (NAME) at (NAME)'s last birthday? RECORD AGE IN COMPLETED YEARS.	219 IF ALIVE: Is (NAME) living with you?	220 IF ALIVE: RECORD HOUSEHOLD LINE NUMBER OF CHILD. RECORD '00' IF CHILD NOT LISTED IN HOUSEHOLD	221 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	DAY 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	DAY MONTH YEAR	YES 1 NO 2 → (SKIP TO 221)	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	DAY MONTH YEAR	YES 1 NO 2 → (SKIP TO 221)	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	DAY MONTH YEAR	YES 1 NO 2 → (SKIP TO 221)	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	DAY MONTH YEAR	YES 1 NO 2 → (SKIP TO 221)	AGE IN YEARS	YES 1 NO 2	HOUSEHOLD LINE NUMBER	YES 1 → (ADD BIRTH) NO 2 → (NEXT BIRTH)



431	CHECK 213: RECORD THE BIRTH HISTORY NUMBER IN 432 AND THE NAME AND SURVIVAL STATUS IN 433 FOR EACH BIRTH IN 2011-2016. ASK THE QUESTIONS ABOUT ALL OF THESE BIRTHS. BEGIN WITH THE LAST BIRTH. IF THERE ARE MORE THAN 2 BIRTHS, USE ADDITIONAL QUESTIONNAIRE(S). Now I would like to ask some questions about the health of your children born from 2011-2016. (We will talk about each separately.)		
432	BIRTH HISTORY NUMBER FROM 213 IN BIRTH HISTORY.	LAST BIRTH BIRTH HISTORY NUMBER	NEXT-TO-LAST BIRTH BIRTH HISTORY NUMBER ....
433	FROM 213 AND 217:	NAME __________ LIVING / DEAD (SKIP TO 433)	NAME __________ LIVING / DEAD (SKIP TO 433)
434	Has (NAME) been ill with a fever at any time in the last 2 weeks?	YES .... 1 NO .... 2 (SKIP TO 433) DON'T KNOW 8	YES .... 1 NO .... 2 (SKIP TO 433) DON'T KNOW 8
435	At any time during the illness, did (NAME) have blood taken from (NAME)'s finger or heel for testing?	YES .... 1 NO .... 2 DON'T KNOW 8	YES .... 1 NO .... 2 DON'T KNOW 8
436	Did you seek advice or treatment for the illness from any source?	YES .... 1 NO .... 2 (SKIP TO [illegible])	YES .... 1 NO .... 2 (SKIP TO [illegible])
437	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(S). __________ (NAME OF PLACE)	**PUBLIC SECTOR** GOVT. HOSPITAL .... A GOVT. HEALTH CENTER .... B MOBILE CLINIC .... C COMMUNITY HEALTH WORKER .... D OTHER PUBLIC SECTOR ______ (SPECIFY) .... E **PRIVATE SECTOR** PVT. HOSPITAL .... F PVT. CLINIC .... G MISSION/FAITH-BASED HOSPITAL .... H MISSION/FAITH-BASED CLINIC .... I PHARMACY .... J MOBILE CLINIC .... K OTHER PRIVATE MEDICAL SECTOR ______ (SPECIFY) .... L **OTHER SOURCE** SHOP .... M TRADITIONAL HEALER .... N DRUG PEDDLER .... O **OTHER** ______ (SPECIFY) X	**PUBLIC SECTOR** GOVT. HOSPITAL .... A GOVT. HEALTH CENTER .... B MOBILE CLINIC .... C COMMUNITY HEALTH WORKER .... D OTHER PUBLIC SECTOR ______ (SPECIFY) .... E **PRIVATE SECTOR** PVT. HOSPITAL .... F PVT. CLINIC .... G MISSION/FAITH-BASED HOSPITAL .... H MISSION/FAITH-BASED CLINIC .... I PHARMACY .... J MOBILE CLINIC .... K OTHER PRIVATE MEDICAL SECTOR ______ (SPECIFY) .... L **OTHER SOURCE** SHOP .... M TRADITIONAL HEALER .... N DRUG PEDDLER .... O **OTHER** ______ (SPECIFY) X

NO.	QUESTIONS AND FILTERS	LAST BIRTH NAME ______	NEXT-TO-LAST 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)
409	Where did you first seek advice or treatment? USE LETTER CODE FROM 407.	FIRST PLACE ☐	FIRST PLACE ☐
410	How many days after the illness began did you first seek advice or treatment for (NAME)? IF THE SAME DAY RECORD '00'.	DAYS ☐☐	DAYS ☐☐
411	At any time during the illness, did (NAME) take any drugs for the illness?	YES 1 NO 2 (SKIP TO [illegible]) DON'T KNOW 8	YES 1 NO 2 (SKIP TO [illegible]) DON'T KNOW 8
412	What drugs did (NAME) take? Any other drugs? RECORD ALL MENTIONED.	**ANTIMALARIAL DRUGS** ARTESUNATE + AMODIAQUINE (ASAQ) (ACT) A ARTEMETHER + LUMEFANTRINE (ALU) (ACT) B SP/FANSIDAR C CHLOROQUINE D AMODIAQUINE E QUININE F ARTESUNATE G OTHER ANTI-MALARIAL ______ H (SPECIFY) **ANTIBIOTIC DRUGS** AMPICILLIN I AMOXICILLIN J SEPTRIN K INJECTION CRYSTALINE PENICILLIN L OTHER ANTIBIOTIC ______ M (SPECIFY) **ANTIPYRETIC** ASPIRIN N PARACETAMOL/PANADOL O NOVALGINE P IBUPROFEN Q **OTHER** ______ X (SPECIFY) **DON'T KNOW** Z	**ANTIMALARIAL DRUGS** ARTESUNATE + AMODIAQUINE (ASAQ) (ACT) A ARTEMETHER + LUMEFANTRINE (ALU) (ACT) B SP/FANSIDAR C CHLOROQUINE D AMODIAQUINE E QUININE F ARTESUNATE G OTHER ANTI-MALARIAL ______ H (SPECIFY) **ANTIBIOTIC DRUGS** AMPICILLIN I AMOXICILLIN J SEPTRIN K INJECTION CRYSTALINE PENICILLIN L OTHER ANTIBIOTIC ______ M (SPECIFY) **ANTIPYRETIC** ASPIRIN N PARACETAMOL/PANADOL O NOVALGINE P IBUPROFEN Q **OTHER** ______ X (SPECIFY) **DON'T KNOW** Z
413	CHECK 412: ANY CODE A-H CIRCLED?	YES ☐ / NO ☐ (SKIP TO [illegible])	YES ☐ / NO ☐ (SKIP TO [illegible])

NO.	QUESTIONS AND FILTERS	LAST BIRTH NAME ____________	NEXT-TO-LAST BIRTH NAME ____________
414	CHECK 412: ARTESUNATE + AMODIAQUINE (W) GIVEN	CODE 'A' CIRCLED ☐ CODE 'A' NOT CIRCLED ☐ (SKIP TO 416)	CODE 'A' CIRCLED ☐ CODE 'A' NOT CIRCLED ☐ (SKIP TO 416)
415	How long after the fever started did (NAME) first take artesunate + 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
416	CHECK 412: ARTEMETHER + LUMEFANTRINE (X) GIVEN	CODE 'B' CIRCLED ☐ CODE 'B' NOT CIRCLED ☐ (SKIP TO 418)	CODE 'B' CIRCLED ☐ CODE 'B' NOT CIRCLED ☐ (SKIP TO 418)
417	How long after the fever started did (NAME) first take artemether lumefantrine?	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
418	CHECK 412: SP/FANSIDAR (Y) GIVEN	CODE 'C' CIRCLED ☐ CODE 'C' NOT CIRCLED ☐ (SKIP TO 420)	CODE 'C' CIRCLED ☐ CODE 'C' NOT CIRCLED ☐ (SKIP TO 420)
419	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
420	CHECK 412: CHLOROQUINE (Z) GIVEN	CODE 'D' CIRCLED ☐ CODE 'D' NOT CIRCLED ☐ (SKIP TO 422)	CODE 'D' CIRCLED ☐ CODE 'D' NOT CIRCLED ☐ (SKIP TO 422)
421	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

NO.	[illegible]	LAST DRTI NAME= _____	NEXT TO LAST DRT I NAME= _____
422	CHECK 412: [illegible] GIVEN	CODE IF CIRCLED CODE IF NOT CIRCLED [illegible]	CODE IF CIRCLED CODE IF NOT CIRCLED [illegible]
423	How long after the fever started did [illegible] take [illegible]?	SAME DAY ..... 0 NEXT DAY ..... 1 TWO DAYS AFTER FEVER ..... 2 THREE OR MORE DAYS AFTER FEVER ..... 3 DON'T KNOW 9	SAME DAY ..... 0 NEXT DAY ..... 1 TWO DAYS AFTER FEVER ..... 2 THREE OR MORE DAYS AFTER FEVER ..... 3 DON'T KNOW 9
424	CHECK 412: QUININE (P) GIVEN	CODE IF CIRCLED CODE IF NOT CIRCLED [illegible]	CODE IF CIRCLED CODE IF NOT CIRCLED [illegible]
425	How long after the fever started did [illegible] take quinine?	SAME DAY ..... 0 NEXT DAY ..... 1 TWO DAYS AFTER FEVER ..... 2 THREE OR MORE DAYS AFTER FEVER ..... 3 DON'T KNOW 9	SAME DAY ..... 0 NEXT DAY ..... 1 TWO DAYS AFTER FEVER ..... 2 THREE OR MORE DAYS AFTER FEVER ..... 3 DON'T KNOW 9
426	CHECK 412: ACTEMISUNATE (G) GIVEN	CODE IF CIRCLED CODE IF NOT CIRCLED [illegible]	CODE IF CIRCLED CODE IF NOT CIRCLED [illegible]
427	How long after the fever started did [illegible] take [illegible]?	SAME DAY ..... 0 NEXT DAY ..... 1 TWO DAYS AFTER FEVER ..... 2 THREE OR MORE DAYS AFTER FEVER ..... 3 DON'T KNOW 9	SAME DAY ..... 0 NEXT DAY ..... 1 TWO DAYS AFTER FEVER ..... 2 THREE OR MORE DAYS AFTER FEVER ..... 3 DON'T KNOW 9
428	CHECK 412: [illegible] GIVEN	CODE IF CIRCLED CODE IF NOT CIRCLED [illegible]	CODE IF CIRCLED CODE IF NOT CIRCLED [illegible]
429	How long after the fever started did [illegible] take [illegible]?	SAME DAY ..... 0 NEXT DAY ..... 1 TWO DAYS AFTER FEVER ..... 2 THREE OR MORE DAYS AFTER FEVER ..... 3 DON'T KNOW 9	SAME DAY ..... 0 NEXT DAY ..... 1 TWO DAYS AFTER FEVER ..... 2 THREE OR MORE DAYS AFTER FEVER ..... 3 DON'T KNOW 9
430		GO BACK TO 402 IN NEXT COLUMN [illegible] GO TO 501	GO TO 402 IN NEXT COLUMN, OR [illegible] MORE DRTIS, 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	→ 506
502	In your opinion, what causes malaria? CIRCLE ALL MENTIONED PROBE: Anything else?	[illegible] ..... A [illegible] ..... B [illegible] ..... C [illegible] ..... D [illegible] ..... E [illegible] ..... F [illegible] ..... G [illegible] ..... H [illegible] ..... I [illegible] ..... J [illegible] ..... K [illegible] ..... L [illegible] ..... M [illegible] ..... N [illegible] ..... O OTHER _____ X (SPECIFY) DON'T KNOW ..... Z	
503	Can you tell me any symptoms of malaria? CIRCLE ALL MENTIONED PROBE: Anything else?	[illegible] ..... A [illegible] ..... B [illegible] ..... C [illegible] ..... D [illegible] ..... E [illegible] ..... F [illegible] ..... G [illegible] ..... H [illegible] ..... I [illegible] ..... J [illegible] ..... K [illegible] ..... L [illegible] ..... M [illegible] ..... N [illegible] ..... 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?	[illegible] ..... A [illegible] ..... B [illegible] ..... C [illegible] ..... D [illegible] ..... E [illegible] ..... F [illegible] ..... G OTHER _____ X (SPECIFY) DON'T KNOW ..... Z	

505	How can someone protect themselves against malaria? CIRCLE ALL MENTIONED PROBE: Anything else?	SLEEP UNDER A TREATED NET ..... A USE MOSQUITO REPELLENT ..... B AVOID MOSQUITO BITES ..... C TAKE PREVENTIVE MEDICATION ..... D INDOOR RESIDUAL SPRAY (IRS) ..... E USE MOSQUITO COILS ..... F CUT GRASS AROUND HOUSE ..... G ELIMINATE STAGNANT WATER ..... H KEEP SURROUNDINGS CLEAN ..... I BURN LEAVES ..... J CUT THE GRASS ..... K DON'T DRINK DIRTY WATER ..... L DON'T EAT BAD FOOD (IMMATURE SUGARCANE/LEFTOVER FOOD) ..... M USE MOSQUITO SCREENS ON WINDOWS ..... N DON'T GET SOAKED IN RAIN ..... O STORE BOUGHT INSECT KILLER ..... P 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 (ASAQ and AL) ..... A CHLOROQUINE ..... B SP/FANSIDAR ..... C QUININE ..... D ASPIRIN, PANADOL, PARACETAMOL ..... E TRADITIONAL MEDICINE/HERBS ..... F OTHER ______ X (SPECIFY) DON'T KNOW ..... Z	
508A	**Do you have a mosquito net?**	**YES ..... 1** **NO 2**	**→ 510**
508	**Did you sleep under a mosquito net last night?**	**YES ..... 1** **NO 2**	**→ 510**
509	What are the reasons you did not sleep under a mosquito net last night? Any other reason?	DO NOT LIKE THE SMELL/TOO HOT ..... A DO NOT LIKE THE SHAPE ..... B DO NOT LIKE THE SIZE ..... C PREFER A DIFFERENT COLOR ..... D NET IS TORN/HAS HOLES ..... E NET IS NOT HUNG/NOT FACILITY TO HANG ..... F IT IS NOT NEEDED/NOT SEEING MOSQUITOES ..... G OTHER ______ X (SPECIFY) DON'T KNOW ..... Z	
510	In the past six months, have you seen or heard any messages about malaria?	YES ..... 1 NO 2	→ 512

			YES	NO
[illegible]	Have you seen or heard these messages from:			
	a) Government clinic/hospital?	GOVT CLINIC/HOSPITAL	1	2
	b) Community health worker?	COMMUNITY HEALTH WORKER	1	2
	c) Community health club?	COMMUNITY HEALTH CLUB	1	2
	d) School health club	SCHOOL HEALTH CLUB	1	2
	e) In your home?	AT HOME	1	2
	f) Drama groups?	DRAMA GROUPS	1	2
	g) Peer educators?	PEER EDUCATORS	1	2
	h) Community meeting?	COMMUNITY MEETING	1	2
	i) Town crier?	TOWN CRIER	1	2
	j) Posters or billboards?	POSTERS/BILLBOARDS	1	2
	k) On TV?	TV	1	2
	l) On the radio?	RADIO	1	2
	m) In the newspaper?	NEWSPAPER	1	2
	n) Faith/religious leader?	FAITH/RELIGIOUS LEADER	1	2
	o) Friends or family?	FRIENDS/FAMILY	1	2
	p) Anywhere else?	OTHER ______ (SPECIFY)	1	2
[illegible]	RECORD THE TIME.	HOUR / MINUTES		

INTERVIEWER'S OBSERVATIONS

TO BE FILLED IN AFTER COMPLETING INTERVIEW

COMMENTS ABOUT INTERVIEW:

COMMENTS ON SPECIFIC QUESTIONS:

ANY OTHER USEFUL INFO:

[illegible]

[illegible]