Republic of South Sudan

Malaria Indicator Survey (MIS) 2017

REPUBLIC OF SOUTH SUDAN

Malaria Indicator Survey 2017

Final Report

‘

Ministry of Health

Juba, South Sudan

CONTENTS

TABLES AND FIGURES iv

FOREWORD vi

ACKNOWLEDGEMENT vii

ACRONYMS AND ABBREVIATIONS viii

READING AND UNDERSTANDING THE 2017 x

SOUTH SUDAN MALARIA INDICATOR SURVEY (SSMIS) x

MAP OF SOUTH SUDAN 1

1 INTRODUCTION 2

1.1 Country Profile 2

1.3 Objectives of the 2017 South Sudan Malaria Indicator Survey 3

1.4 Methodology of the South Sudan Malaria Indicator Survey 3

1.5 Challenges and Limitations 8

1.6 Response Rates 10

1.7 Recommendations for next SSMIS 11

2 CHARACTERISTICS OF HOUSEHOLDS AND WOMEN 12

2.1 Household Population and Composition 12

2.2 Drinking Water Sources and Treatment 18

2.3 Sanitation 20

2.4 Housing Characteristics 22

2.5 Household Wealth 26

2.6 Educational attainment of women 27

2.7 Literacy of Women 29

3 MALARIA PREVENTION 31

3.1 Background on Malaria Control in South Sudan 31

3.2 Ownership of Insecticide-Treated Nets 32

3.3 Household Access and Use of ITNs 35

3.5 Malaria in Pregnancy 43

3.5 Media exposure 44

4 MALARIA IN CHILDREN 47

4.1 Care Seeking for Fever in Children 47

4.2 Diagnostic Testing of Children with Fever 49

4.3 Use of Recommended Antimalarials 50
4.4 Prevalence of Low Haemoglobin in Children 52
4.5 Prevalence of Malaria in Children 54
REFERENCES 57
APPENDIX A: DETAIL ON TECHNICAL ISSUES 58
APPENDIX B: KEY PARTNERS AND SURVEY PERSONNEL 60
APPENDIX C: QUESTIfONNAIRES 64

TABLES AND FIGURES

Table 1.1 Distribution of South Sudan population by statistical areas 3

Table 1.2 Trainings and participants 6

Table 1.3 Enumeration areas and accessibility by statistical area 9

Table 1.3 Results of the household and individual interviews 10

Table 2.1 Household population by age, sex, and residence, general population 13

Table 2.1B Household population by age, sex, and residence, PoC and IDP 14

Figure 2.1 Population pyramid, general population 15

Table 2.2 Household composition 16

Table 2.3 Background characteristics of respondents 17

Table 2.4 Household drinking water, general population 18

Table 2.4B Household drinking water, PoC and IDP 19

Table 2.5 Household sanitation facilities 21

Table 2.6 Household characteristics, general population 23

Table 2.6B Household characteristics, PoC and IDP 24

Table 2.7 Household possessions 25

Table 2.8 Wealth quintiles 27

Table 2.9 Educational attainment of survey respondents 28

Table 2.10 Literacy 30

Table 3.1 Household possession of mosquito nets 33

Table 3.2 Source of mosquito nets 34

Table 3.3 Access to an insecticide-treated net (ITN) 36

Table 3.4 Access to an ITN 37

Table 3.5 Use of mosquito nets by persons in the household 38

Table 3.6 Use of existing ITNs 39

Table 3.7 Use of mosquito nets by children 41

Table 3.8 Use of mosquito nets by pregnant women 42

Table 3.9 Use of intermittent preventive treatment (IPTp) by women during pregnancy 44

Table 3.10 Media exposure to malaria messages 46

Table 4.1 Prevalence, diagnosis, and prompt treatment of children with fever 48

Table 4.2 Source of advice or treatment for children with fever 49

Table 4.3 Type of antimalarial drugs used 51

Table 4.4 Coverage of testing for anaemia and malaria in children 53

Table 4.5 Haemoglobin <7.0 g/dl in children 54
Table 4.6 Prevalence of malaria in children 56

FOREWORD

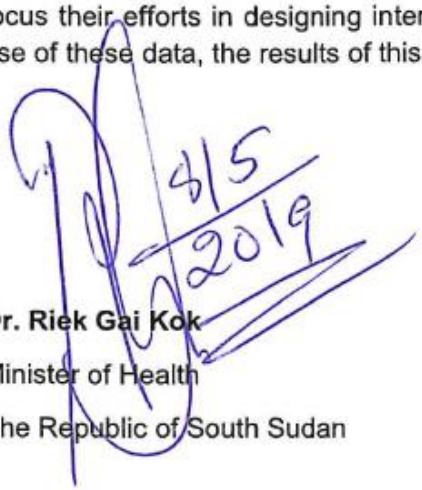
Malaria continues to be a major public health problem in the Republic of South Sudan. According to the Malaria Indicator Survey 2013, the parasite prevalence range was 30% for children under 5 and 15% for pregnant women. Its effects are greatest among children under age 5 and pregnant women. The Ministry of Health, in collaboration with its partners, has been implementing the Malaria Control Strategic Plan 2013 – 2021.

The Ministry of Health of the Republic of South Sudan, together with partner organisations, has mounted a concerted response focused on scaling up malaria prevention, diagnosis and treatment interventions– especially for pregnant women and children under 5 years who are particularly vulnerable. Considerable funding support for malaria control and prevention has been received from the Global Fund to fight AIDS, Tuberculosis and Malaria (GFATM) and other donors.

The 2017 South Sudan Malaria Indicator Survey (2017 SSMIS) is the country's third nationally representative assessment of the coverage attained by key malaria interventions. These interventions are used in combination with measures of malaria-related burden and anaemia prevalence testing among children under age 5 and pregnant women.

Special gratitude goes to the supervisors, interviewers, nurses, laboratory technicians, and drivers for their tireless efforts. The commitment of the entire field staff of the 2017 SSMIS to ensuring a successful conduct of the survey is commendable. We are also grateful to the respondents for their cooperation in the survey.

These results represent the combined work of various agencies contributing to the overall scale up of malaria interventions. We would like to request that all partners make use of the information presented in this report as they implement projects to overcome the challenges depicted here. The report presents national and Statistical area estimates and thus provides a good representation of malaria situation in South Sudan, The National Malaria Control Programme and all stakeholders will now know where to focus their efforts in designing interventions for malaria control. To ensure better understanding and use of these data, the results of this survey will be shared at different planning levels.



Dr. Riek Gai Kok

Minister of Health

The Republic of South Sudan

ACKNOWLEDGEMENT

I offer my sincere appreciation to the Honourable Minister of Health, Dr Riek Gai Kok, and the Honourable Ministers of the State for Health, for their continued support and encouragement.

My appreciation also goes to the Global Fund to Fight AIDS, TB and Malaria (GFATM) and donor community for their funding contribution and collaboration in the implementation of the survey.

I acknowledge the efforts of the Director General, Directors, of Ministry of Health at National and State level, for their leadership and commitment to the success of the survey.

I also thank the Country Coordination Mechanism (CCM), Principal Investigator, members of the Survey Management Committee, and the Survey Implementation Committee for their commitment and dedication to the successful implementation of the survey.

My special thanks go to the National Malaria Control Programme (NMCP), Ministry of Health (MoH); regional and country offices of Population Service International (PSI); National Bureau of Statistics (NBS); State Ministries of Health; County Health Departments, grassroots communities, and traditional rulers for their contributions to the success of the survey.

I express my deepest thanks to all the Public Health Laboratory team that provided support during the survey, particularly the National Public Health Laboratory (NPL), and the World Health Organization, for their support to the survey.

I am grateful to all the state coordinators and supervisors, quality control officers, national monitors, data collectors, and drivers for their hard work and commitment during the implementation of the survey.

Finally, I appreciate the South Sudan people for their cooperation and participation in the survey.

Dr. Makur Matur Kariom

Undersecretary for Ministry of Health

The Republic of South Sudan

ACRONYMS AND ABBREVIATIONS

ACT	Artemesinin-combination therapy
ANC	Antenatal Care
AS+AQ	Artesunate plus Amodiaquine
DG	Director General
DFID	Department for International Development
DHS	Demographic and Health Survey
EA	Enumeration Area
GFATM	Global Fund AIDS Tuberculosis and Malaria
GPS	Global Positioning System
Hb	Haemoglobin
HRP	Histidine Rich Protein
HSSP	Health Sector Strategic Plan
HSDP	Health Sector Development Plan
IDP	Internally Displaced Persons
IMA	Interchurch Medical Assistance
IPT	Intermittent Preventive Treatment
IPTp	Intermittent preventive treatment during pregnancy
IPTp3+	Intermittent preventive treatment during pregnancy, 3+ doses
IRS	Indoor Residual Spraying
ITN	Insecticide Treated Net
LLIN	Long Lasting Insecticide Treated Net
MC	Malaria Consortium
M&E	Monitoring and Evaluation
MIS	Malaria Indicator Survey
MOH	Ministry of Health
NGO	Non-Governmental Organisation
NBS	National Bureau of Statistics
NMCP	National Malaria Control Programme
PoC	Protection of Civilians
PSI	Population Services International
RDT	Rapid Diagnostic Test
SEA	Standard Enumeration Areas
SA	Statistical Area
SP	Sulphadoxine-pyrimethamine

SPLA	Sudan People's Liberation Army
SSMIS	South Sudan Malaria Indicator Survey
ToT	Training of Trainers
TWG	Technical Working Group
UNDP	United Nations Development Programme
WHO	World Health Organization

READING AND UNDERSTANDING THE 2017 SOUTH SUDAN MALARIA INDICATOR SURVEY (SSMIS)

The 2017 South Sudan Malaria Indicator Survey (2017 SSMIS) report is very similar in content to the 2013 South Sudan Malaria Indicator Survey (2013 SSMIS) 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 introduce the organisation of Malaria Indicator Survey (MIS) tables, the presentation of background characteristics, and a 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 as having malaria, by background characteristics, for general population and PoC[1] and IDP[2] populations, South Sudan 2017

3 Background characteristic	Malaria prevalence according to RDT 2		Malaria prevalence according to microscopy	
	RDT positive	Number of children	Microscopy positive	Number of children
General population				
Age in months				
6-8	19.9	251	*	*
9-11	24.0	288	*	*
12-17	25.0	488	*	*
18-23	31.4	567	*	*
24-35	32.7	1,127	*	*
36-47	35.6	1,295	*	*
48-59	37.2	755	*	*
Sex				
Male	31.3	1,787	*	*
Female	32.8	1,508	*	*
Residence				
Urban	24.8	840	*	*
Rural 5	32.1	3,597	*	*
Statistical area				
Upper Nile	10.1	444	2.7	187
Jonglei	26.6	414	9.7	391
Unity	15.5	579	8.4	609
Warrap	44.6	520	31.6	560
Northern Bahr el-Ghazal	53.1	633	32.5	748
Western Bahr el-Ghazal	49.4	488	32.5	507
Lakes	7.1	425	12.5	264
Western Equatoria	14.2	408	20.7	479
Central Equatoria	43.8	438	6.4	393
Eastern Equatoria	46.2	422	24.9	490
Education[3]				
No education	33.4	3,622	*	*
Primary	28.2	925	*	*
Secondary	26.2	187	*	*
More than secondary	21.6	37	*	*
Wealth quintile				
Lowest	34.1	487	*	*
Second	37.3	400	*	*
Middle	24.3	407	*	*
Fourth	26.2	435	*	*
Highest	21.8	403	*	*
Total 4	32.0	4,771	20.7	4,628
PoC and IDP				
PoC[1]	33.7	86	*	*
IDP[2]	18.4	87	*	*
Total	23.7	173	*	*

RDT = Rapid Diagnostic Test

* Due to data matching issues with laboratory data, malaria microscopy results are only shown by statistical area and for the total population. Breakdowns by household characteristics could not be reliably produced.

[1] Protection of Civilians: Households living in PoCivilian sites administered by the UN.

[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

[3] For women who are not interviewed, information on education is taken from the Household Questionnaire. Excludes children whose mothers are not listed in the Household Questionnaire.

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 aged 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 categorised. In this table, the first column of data shows children who tested positive for malaria according to the rapid diagnostic test (RDT). The second column lists the number of children aged 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 aged 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, statistical area, 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 aged 6-59 months who tested positive for malaria according to the different tests. In this case, 32% of children aged 6-59 months tested positive for malaria according to RDT, while 21%t ested positive for malaria according to microscopy. In some tables there are additional rows for Protection of Civilian (PoC) and Internally Displaced Persons (IDP) populations.

Step 5: To find out what percentage of children aged 6-59 in rural areas tested positive for malaria according to RDT, draw two imaginary lines, as shown on the table. This shows that 32% of children aged 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 South Sudan. Resources are often limited; knowing how malaria prevalence varies among different groups can help programme planners and policy makers determine how to most effectively use resources.

EXAMPLE 2: USE OF MOSQUITO NETS BY PREGNANT WOMEN

Table 3.8 Use of mosquito nets by pregnant women

Percentage of pregnant women age 15-49 who, the night before the survey, slept under a mosquito net (treated or untreated) and under an insecticide-treated net (ITN); and among pregnant women age 15-49 in households with at least one ITN, percentage who slept under an ITN the night before the survey, according to background characteristics, for general population and PoC[1] and IDP[2] populations, South Sudan 2017

	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 an ITN[3] last night	Number of pregnant women	Percentage who slept under an ITN[3] last night	Number of pregnant women
General population				
Residence				
Urban	76.3	118	92.8	97
Rural	53.4	625	83.9	398
Statistical area				
Upper Nile	60.0	100	76.9	78
Jonglei	38.4	73	(90.3)	31
Unity	42.0	112	88.7	53
Warrap	67.8	87	81.9	72
Northern Bahr el-Ghaza	64.4	73	79.7	59
Western Bahr el-Ghaza	45.2	62	(76.5)	37
Lakes	77.0	61	(100.0)	47
Western Equatoria	(80.0)	45	(94.7)	38
Central Equatoria	70.8	72	91.1	56
Eastern Equatoria	36.2	58	*	24
Wealth quintile				
Lowest	54.2	153	89.2	93
Second	54.0	137	87.1	85
Middle	57.3	164	85.5	110
Fourth	52.6	152	81.6	98
Highest	67.9	137	85.3	109
Total	57.1	743	85.7	495
PoC and IDP				
PoC[1]	*	15	*	14
IDP[2]	*	11	*	11
Total	(96.2)	26	(100.0)	25

a b 3 4

Notes: 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. Due to a data merging issue (see Challenges and Limitations in Chapter 1) educational status was not available for pregnant women.

[1] Protection of Civilians: Households living in PoC sites administered by the UN.
[2] Internally Displaced Persons: Households living in IDP settlements administered by various
[3] An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment. In the 2013 SSMIS, this was known as a long-lasting insecticidal net (LLIN).

Step 1: Read the title and subtitle. In this case, the table is about two separate groups of pregnant women: all pregnant women aged 15-49 in all households (a) and pregnant women aged 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 aged 15-49 in all households (a), and then isolate the columns that refer only to pregnant women aged 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 aged 15-49 in all households were interviewed? It's 743. Now look at the second panel. How many pregnant women aged 15-49 in households with at least one ITN were interviewed? It's 495.

Step 4: Only 743 pregnant women aged 15-49 in all households and 495 pregnant women in households with at least one ITN were interviewed in the 2017 SSMIS. 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 aged 15-49 in all households in Western Equatoria statistical area slept under an ITN the night before the survey? 60%. 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 aged 15-49 in Eastern Equatoria 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 is 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 is reliable.

EXAMPLE 3: UNDERSTANDING SAMPLING WEIGHTS IN 2017 SSMIS TABLES

A sample is a group of people who have been selected for a survey. In the 2017 SSMIS, the sample was designed to represent the national population aged 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 2017 SSMIS, the survey sample is representative at the national and statistical area levels, and for urban and rural areas.

Table 2.3 Background characteristics of respondents

Percent distribution of women age 15-49 by selected background c population and PoC and IDP populations, South Sudan 2017

	General population		
	Women		
Background characteristic	Weighted percent	Weighted number	Unweighted number
Statistical area	3	2	1
Upper Nile	13.5	615	524
Jonglei	14.5	663	421
Unity	3.4	153	226
Warrap	11.4	522	482
Northern Bahr el-Ghazal	8.3	380	518
Western Bahr el-Ghazal	3.6	165	492
Lakes	9.7	440	512
Western Equatoria	6.6	302	450
Central Equatoria	17.1	780	644
Eastern Equatoria	11.8	538	468
Total 15-49	100.0	4,453	4,453

To generate statistics that are representative of the country as a whole and the 10 statistical areas, the number of women surveyed in each statistical area should contribute to the size of the total (national) sample in proportion to size of the statistical area. However, if some statistical areas have small populations, then a sample allocated in proportion to each statistical area's population may not include sufficient women from each statistical area for analysis. To solve this problem, statistical areas with small populations are oversampled. For example, let's say that you have enough money to interview 4,453 women and want to produce results that are representative of South Sudan as a whole and the statistical areas for the 2017 SSMIS (as in Table 2.3). However, the total population of South Sudan is not evenly distributed among the statistical areas: some statistical area are heavily populated while others are not. Thus, statistical areas with less population were oversampled.

A sampling statistician determines how many women should be interviewed in each statistical area 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 statistical area.

With this distribution of interviews, some statistical areas are overrepresented, and some statistical areas are underrepresented. For example, the population in Jonglei statistical area is about 15% of the population in South Sudan, while Western Equatoria's population contributes only 7% of the population in South Sudan. But as the blue column shows, the number of women interviewed in Jonglei accounts for only about 9% of the total sample of women interviewed (421/4,453) and the number of women interviewed in Western Equatoria statistical area accounts for 10% of the total sample of women interviewed (450/4,453). This unweighted distribution of women does not accurately represent the population.

In order to get statistics that are representative of South Sudan, the distribution of the women in the sample needs to be weighted (or mathematically adjusted) such that it resembles the true distribution of the population in the country. Women from a small statistical area, Western Equatoria, should only contribute a small amount to the national total. Women from a larger statistical area, like Jonglei, should contribute much more. Therefore, DHS statisticians mathematically calculate a "weight" which is used to adjust the number of women from each statistical area so that each statistical area's contribution to the total is proportional to the actual population of the statistical area.

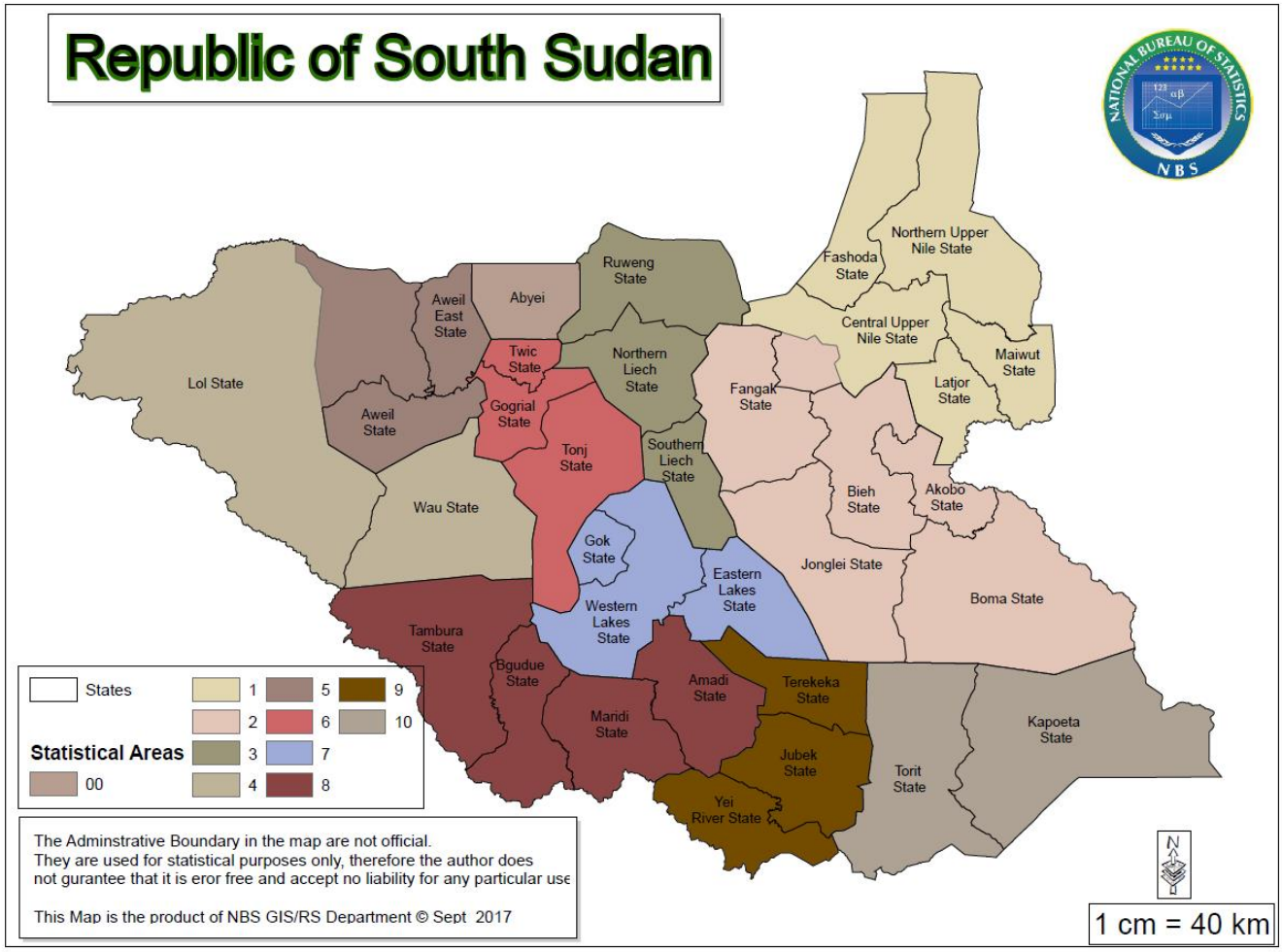
The numbers in the **purple column (2)** represent the "weighted" values. The weighted values can be smaller or larger than the unweighted values at statistical area level. The total national sample size of

4,453 women has not changed after weighting, but the distribution of the women in the statistical areas has been changed to represent their contribution to the total population size.

How do statisticians weight each category? They consider 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 South Sudan, you would see that women in each statistical area 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 Equatoria and the proportion of women who live in Jonglei.

With sampling and weighting, it is possible to interview enough women to provide reliable statistics at national and statistical levels. In general, only the weighted numbers are shown in each of the 2017 SSMIS tables, so don't be surprised if these numbers seem low: they may actually represent a larger number of women interviewed.

MAP OF SOUTH SUDAN



1 INTRODUCTION

1.1 Country Profile

After decades of conflict between the northern and southern regions, Sudan was engulfed in two phases of civil war from 1955 to 1972 and 1983 to 2005, which resulted in the loss of 2.5 million lives. A Comprehensive Peace Agreement was signed in January 2005 between the Sudanese government and the Sudan People's Liberation Movement/Army (SPLM/A). One of the key clauses was the recognition of South Sudan's right to hold a referendum on whether to remain part of Sudan or secede to form a new nation. A referendum was held in January 2011 and resulted in a 99% approval of the option to secede. The Republic of South Sudan was established on July 9th, 2011 and is therefore the youngest country in Africa.

The renewed conflicts in December 2013 and July 2016 have undermined the development gains achieved since independence and worsened the humanitarian situation. Hundreds of thousands of people have been killed, more than 4.2 million people have been displaced both internally and to neighbouring countries, and about 5.3 million (nearly half the population) face severe food insecurity. Without conflict resolution and a framework for peace and security, the country's longer-term development and prosperity are called into question (World Bank 2018).

1.1.1 Geography

South Sudan is a land-locked country in East Africa, bordering six malaria-endemic countries: Central African Republic in the west, Democratic Republic of Congo in the southwest, Ethiopia in the east, Kenya in the southeast, Uganda in the south, and Sudan in the north. The country covers an area of approximately 650,000 km^2 of land mass, between 8° and 18° south latitude and between 20° and 35° east longitude.

The total population was about 11.9 million in 2017, as projected from the 2008 Population Census. At independence in 2011, South Sudan had 10 states, while the three regions that were used prior to independence were used for the design of the 2013 SSMIS. Today South Sudan has 32 states, with each of the former 10 states having been subdivided. The states are the basic planning levels for health service delivery.

The climate is tropical with average temperatures ranging between 20°C and 37°C and relative humidity between 26% and 88%. Annual rainfall ranges between 1,000 mm in the South and 400 mm in the northern parts. Similarly, the duration of the rainy season varies from 7–8 months in the South to 5–6 months in the northern region. Malaria is endemic across the entire country with year-round transmission but peaking towards the end of the rainy season from September to November.

1.1.2 Population

In the 2008 Population and Housing Census, South Sudan's population stood at 8.3 million. An annual population growth rate of 3.77% each year during the 2008-2017 period. South Sudan's population is characterised as very young. The 2008 population census reports that 53% of the population is under age 18 and only 4% is age 65 or older (NBS 2012). This is attributed to high fertility and declining mortality.

Table 1.1 presents trends in basic demographic indicators for South Sudan for selected years from 2008 to 2017. The population was projected to have grown from 8.3 million people in 2008 to 11.9 million people in 2017 according to the National Bureau of Statistics estimates published in 2015. Because of the length of time since the last census and the conflict in the intervening years, the population distribution may have shifted.

Table 1.1 Distribution of South Sudan population by statistical areas

Population by statistical area from 2008 Southern Sudan Population and Housing Census and 2017 population projections from the National Bureau of Statistics

	2008	2017
Statistical areas		
Upper Nile	964,353	1,385,479
Jonglei	1,358,602	1,873,176
Unity	585,801	877,313
Warrap	972,928	1,379,959
Northern Bahr el-Ghazal	720,898	1,023,383
Western Bahr el-Ghazal	333,431	473,636
Lakes	695,730	1,053,177
Western Equatoria	619,029	803,264
Central Equatoria	1,103,557	1,574,711
Eastern Equatoria	906,161	1,393,765
Total	8,260,490	11,868,209

Source: Southern Sudan Population and Housing Census (2008), and Population Projections for South Sudan, 2015-2020 (2015).

1.3 Objectives of the 2017 South Sudan Malaria Indicator Survey

The main objective of the 2017 SSMIS was to measure progress achieved in key malaria indicators since the 2013 SSMIS. The primary objectives as outlined in the study protocol were the following:

1. To assess the coverage of core malaria control interventions (net ownership and use, IRS coverage, effective treatment of fever within 24 hours of onset in children under 5 years, access and use of intermittent preventive treatment during pregnancy) targeted in the National Malaria Strategic Plan 2014/15 – 2020/21 as a follow-up on the 2013 MIS findings.
2. To determine the prevalence and type of malaria parasites in children under 5 years and pregnant women.
3. To determine the prevalence of anaemia in children under 5 years and pregnant women.
4. To assess knowledge, attitudes, and practices regarding malaria in the general population.

The secondary objective was to strengthen the capacity of the NMCP and partners for future implementation of the survey.

1.4 Methodology of the South Sudan Malaria Indicator Survey

The 2017 SSMIS is the third survey of its kind carried out in South Sudan. The first Malaria Indicator Survey was implemented in 2009 (NMCP *et al.;* 2009) and the second in 2013 (NMCP *et al.;* 2013). As with the previous Malaria Indicator Surveys, the 2017 survey was designed to follow the Roll Back Malaria Monitoring and Evaluation Working Group guidelines. It was also designed to support the implementation of the South Sudan National Malaria Strategy 2014 – 2021 and the South Sudan Health Policy Document 2016 – 2022 through the measurement of standardised indicators.

The 2017 SSMIS was carried out from 5th December to 31st December 2017 in all ten statistical areas, with the exception of only 17 EAs in Unity statistical area where due to security challenges, data

collection was interrupted and could only be conducted from 7th to 19th April 2018. In all, there was a nationally representative sample of 5,190 households. All women aged 15-49 in the selected households were eligible for individual interviews. They were asked questions about prevention of malaria during pregnancy and treatment of childhood fever. In addition, the survey included testing for anaemia and malaria among children aged 6 to 59 months using a finger- or heel-prick blood sample and testing for anaemia in pregnant women. The results of anaemia and malaria rapid diagnostic testing were available immediately and were provided to the children's parents or guardians. Thin and thick blood smears were collected in the field and transported to the Public Health Reference Laboratory (PHRL) in Juba where they were tested for the presence of malaria parasites.

1.4.1 Survey organisation

The 2017 SSMIS was implemented by the Ministry of Health, National Malaria Control Programme (NMCP) department in collaboration with other stakeholders. A Technical Working Group (TWG) was set up comprising of stakeholders from WHO, National Bureau of Statistics (NBS), Population Services International (PSI), Malaria Consortium and Interchurches Medical Assistance (IMA). Funding for the survey came from the Global Fund to fight AIDS, Tuberculosis and Malaria (GFATM). The MOH was responsible for general administrative management of the survey, including overseeing day-to-day operations. The Ministry took primary responsibility for organizing the Technical Working Group and developing the survey protocol, participating along with NBS in recruiting, training, and monitoring field staff.

The National Bureau of Statistics assisted the MOH in the design of the 2017 SSMIS, especially in sample design and selection. They provided technical input in recruitment of field staff, data collection, survey methodology and design, sample size, questionnaire customisation, development of manuals for supervisors and interviewers, and training of interviewers. The NBS also led the preparation of adequate enumeration area (EA) maps and statistical area planning maps (soft and hard copies) that were used during the field work. The 2017 SSMIS was the first nationally representative household survey to be completed using mobile data collection in South Sudan. NBS programmed the questionnaires using the Census and Survey Programme (CSPro) data collection software and helped with training on mobile data collection.

1.4.2 Sample design

The design for the survey was a two-stage representative probability sampling that produced estimates for the country, for rural and urban settings separately, and for each of the 10 statistical areas.

South Sudan is administratively divided into 32 states and each state is subdivided into Counties, Payams, and Bomas. Bomas are comprised of one or more enumeration areas (EAs). The primary sampling units (PSUs) were the EAs, the smallest geographic statistical areas which are census operational segments identified on maps, with an average of 186 households in the urban areas and 138 households in the rural areas.

To balance a practical sample size with a survey that would be informative for malaria control decision-making, the 2017 SSMIS was stratified into 10 statistical areas (SAs) which correspond with the 10 former states, rather than the current 32 states. This provides more detailed information than the three regions into which the 2013 SSMIS was stratified.

For each of the 10 statistical areas, 28 EAs were selected using population proportional to size (PPS) sampling, for a total of 280 clusters. Of these, 210 were rural and 70 were urban. For the 2017 SSMIS, these EAs were selected with stratification by urban and rural areas in proportion with the population of urban and rural EAs in each SA.

The second stage involved selection of a sample of 20 households using systematic sampling from each of the selected clusters. Prior to household selection, some of the urban clusters were updated by NBS. This entailed undertaking a household listing in each of the selected clusters to update the list of residential households within it. As part of the listing, NBS also updated the necessary maps and

recorded the geographic coordinates of each cluster. Only selected households were interviewed, and replacement of nonresponding households was not allowed. In the data analysis, which included comparing the GPS coordinates to map files of enumeration areas, some deviations from the intended sampling were observed. These are described in the limitations section. Further details on the sample design are provided in **Appendix B**.

1.4.3 Supplementary sample of Protection of Civilians sites and Internally Displaced populations

To ensure that protection of camps (PoCs) and Internally Displaced Persons (IDPs) populations including PoCs and IDPs were represented for decision-making, additional samples outside the main sampling frame were taken and were analysed and presented separately. Two clusters were selected in each of 5 PoC areas, and 20 households were selected from each cluster. In total,10 PoC clusters and four IDPs clusters were also selected.

Results from the general population and PoC and IDP populations were not combined in the analysis and are presented separately in the 2017 SSMIS data tables. To aid comparisons, results from PoC and IDP populations are presented in the same tables as the general population where space allows. Where tables are too large with the supplementary samples included, a separate table is included. For example, **Table 2.10** presents literacy of women in the general population, while **Table 2.10B** presents the same data on the PoC and IDP samples.

1.4.4 Questionnaires

Three types of questionnaires were used in the 2017 SSMIS: a household questionnaire, a woman's questionnaire, and a biomarker questionnaire. Core questionnaires were developed by the Roll Back Malaria Monitoring and Evaluation Reference Group in collaboration with ICF International. These were adapted for use in South Sudan by the SSMIS Technical Working Group. The questionnaires were adapted in English and then translated into Arabic, a language widely spoken across the country. A team from NBS programmed the questionnaires in CSPro for data collection in tablets. Interviewers had the option of conducting each survey in either English or Arabic. In a few areas where neither English nor Arabic was spoken, interviewers from that area used local language for the interviews.

The household questionnaire was used to list all the usual members and visitors in the selected households. Some basic information was collected on the characteristics of each person listed, including age, sex, and relationship to the head of the household. Data from the roster in the household questionnaire was used to identify women aged 15-49 years eligible for the individual interview and children aged 6 - 59 months eligible for anaemia and malaria testing. The household questionnaire also collected information on characteristics of the household's dwelling unit, such as the source of water, type of toilet facilities, materials used for the floor, roof, and walls of the house, ownership of various durable goods, and ownership and use of mosquito nets.

The woman's questionnaire was used to collect information from women aged 15-49 years on background characteristics, reproductive history for the last 5 years, antenatal care (ANC) and preventive malaria treatment for the most recent birth, fever prevalence, care-seeking and treatment among children 6-59 months old.

A biomarker's questionnaire was used to record haemoglobin measurements and results of malaria rapid diagnostic testing for children 6-59 months old and pregnant women. The questionnaires used are provided in **Appendix C.**

1.4.5 Anaemia and malaria testing

The 2017 SSMIS incorporated three biomarkers. Finger or heel-prick blood samples were collected from children 6-59 months old and the pregnant women to perform on the spot testing for anaemia and malaria, and thick and thin blood smears were prepared to be read in the laboratory to determine the presence of malaria parasitaemia. Each team included two laboratory technicians who were responsible for implementing the malaria and anaemia testing and for making the blood smears. Health workers were also responsible for ensuring that children who tested positive for malaria via the rapid diagnostic

test (RDT) but did not show signs of complicated malaria were offered a full course of medicine according to standard procedures for malaria treatment in South Sudan. Written, informed consent for testing was sought from the parent/guardian of all children.

Anaemia testing: Because there is a strong correlation between malaria infection and anaemia, the 2017 SSMIS included anaemia testing for children 6-59 months old. After obtaining consent, blood samples were collected using a single-use, spring-loaded, retractable, sterile lancet to make a finger or heel-prick. Laboratory technicians then used a microcuvette to collect a drop of blood. Haemoglobin analysis was carried out on site using a battery-operated portable HemoCue® 301+ analyser, which produces results in less than a minute, and the results were given to the child's parent/guardian verbally and in written form. Children who had a haemoglobin level under 7.0 g/dl (severe anaemia) were given a referral letter and recommendation to be taken to a health facility for follow up care. Results of the anaemia test were recorded in the biomarker questionnaire in the tablet as well as in a brochure that was left in the household to explain the causes and prevention of anaemia.

Malaria rapid diagnostic tests: One of the major objectives of the 2017 SSMIS was to provide information on the prevalence of malaria infection among children 6-59 months old and pregnant women. Using the same finger or heel-prick used for anaemia testing, another drop of blood was tested immediately using *CAREStart* RDTs, which tests for Plasmodium falciparum only. The results were provided to the child's parent/guardian in both oral and written form and were recorded in the biomarker questionnaire. Children who tested positive for malaria using the RDT were offered a full course of Artesunate Amodiaquine (ASAQ), in accord with National Guidelines for the Treatment of Malaria in South Sudan. The drug was provided by NMCP. The health workers provided a referral to a healthcare facility for children who tested positive and showed signs and symptoms of complicated malaria.

Malaria microscopy using blood smears: In addition to the RDT, both thick and thin blood smears were taken from all children and pregnant women in the field to be tested later in the laboratory for the presence of malaria parasites. The tablet automatically generated an eight-digit code including the statistical area, cluster number, household number and line number of the individual child or woman. This number was automatically recorded in the tablet, and manually recorded on the slides using a metal pen/grease lead pencil. The blood smears were dried, and thin smear fixed, and packed carefully in the field. They were periodically sent to the Public Health Reference Laboratory in Juba for microscopic examination.

1.4.5 Training

Table 1.2. Trainings and participants

Training	Number of participants
Master training – to train those who would conduct the ToT (2 days)	15
Training of Trainers (ToT) – to train those who would do the statistical area trainings (7 days)	35
Statistical area trainings	450-500

The training for 2017 SSMIS fieldwork was done in three sections, including a 2 days master training to train those who would conduct the Training of Trainers (ToT), 7-day ToT, and the final 7-day statistical area-level training in which those trained in the ToT trained the interviewers at the statistical area level. The master survey training took place from 30th to 31st October. The ToT was done from 3rd to 10th November, while statistical area training was from 20th November to 1st December 2017. The number of people in each training is shown in **Table 1.2**. While the first two trainings were done in Juba the statistical area trainings were done in 6 venues in former state capitals. A total of between 450-500 trainees participated in the training. These included 70 team supervisors, over 140 interviewers and over 140 health workers (laboratory technicians), plus reserves. The training schedule included sessions on survey background, interviewing techniques, the questionnaire, and testing procedures.

Team supervisors and the interviewers were trained on the content of the questionnaires, consent procedures, interviewing skills, and collection and transfer of data using the tablets. Health workers were trained on consent procedures, on conducting the anaemia and malaria testing, as well as making

the thick and thin blood smears. The health workers received a practical training at the public reference laboratory. The health workers were trained on administering Artesunate Amodiaquine (ASAQ) to those who tested positive for malaria, according to the national guidelines, and how to refer complicated malaria cases.

As part of the ToT and statistical area-level trainings, there was a day of practice in urban and rural clusters not included in the sample survey. The NBS Statistical Area Coordinators provided support in identifying local cluster boundaries. Following the ToT, a pretest was completed to field test the data collection programme on the tablets, questionnaires, translations, and survey procedures, following which minor changes in skip patterns were implemented in the CSPro programming. During the statistical area-level trainings, seventy field teams were trained to conduct the pretest. The pretest fieldwork took place from 2nd to 3rd December 2017, following which changes were made in the system of recording blood slide numbers because of the lack of barcoded slides.

A separate training was conducted for the PoC and IDP populations data collection teams, including 5 teams for PoC data collection and 1 team for IDP data collection.

1.4.6 Fieldwork

Primary fieldwork took a period of 4 weeks from 5th to 31st December 2017. Seventy teams, each comprised of a supervisor, two interviewers, and two laboratory technicians, completed the fieldwork. Each team was allocated clusters in the different statistical areas and counties according to their local language competency and logistical feasibility. The teams spent an average of 3 days in a cluster. Initially the teams conducted a household listing of all the household in the selected EA from which the systematic sample was drawn by the field supervisor for subsequent data collection. At the end of December 2017, data collection was finalised in 9 of the 10 statistical areas, and, due to accessibility, 17 out of 28 EAs data had not been collected in the Unity statistical area. Due to insecurity, the remaining data in the Unity statistical area was collected 7th to 21st April 2018, before which a refresher training was held.

Details of the assigned clusters and sampled households were provided to field teams to enable them to properly identify the selected households; in each cluster, field teams were facilitated by the NBS Statistical Area Coordinators and a village guide. Where eligible respondents were absent from their home, up to two additional call-back visits were made on different days to facilitate the participation of the respondents. Taking blood samples can be a sensitive issue in some communities. Therefore, national and state-level radio broadcasts were made with information about the 2017 SSMIS.

Fieldwork was supervised by a team of national supervisors from NMCP and NBS and statistical area supervisors who visited the teams in the field to ensure that the survey was conducted according to the protocol and to provide solutions to any challenges encountered.

1.4.7 Data Processing

The 2017 SSMIS used Samsung tablet computers with data entry programmes developed in CSPro by NBS. Tablets were Bluetooth-enabled to facilitate the electronic transfer of household assignment among field team members and the transfer of completed questionnaires to team supervisors for transfer to the central office. A server developed by NBS was to be used to transfer encrypted data from the field to the central office in Juba throughout the course of the survey, but there were challenges in implementation. Each tablet was fitted with a micro-SD card for encrypted data back-up and data was manually transferred via Bluetooth from the tablets to a central database at the end of fieldwork.

The CSPro databases for the main surveys were exported to Stata format, and additional data cleaning and analysis were conducted in Stata version 13. Results from the laboratory microscopy reading of the bloods smears were first entered onto paper forms, then entered into Microsoft Excel spreadsheets. The laboratory data was also imported from Excel into Stata for data cleaning and analysis.

1.4.8 Ethical considerations

The protocol for the 2017 SSMIS was approved by the Ministry of Health Ethical Review Committee. All data and other information were maintained confidentially to the greatest extent possible. All data sets remain the property of the National Malaria Control Programme. The list of the identification numbers and respondents' names were stored separately during fieldwork and were removed from the electronic database during analysis. The blood samples were stored only with code identifiers to protect the identity of the respondent.

Oral informed consent was sought, during which the risks and benefits of participation in the survey were explained to potential respondents. The risk of participation was minimal and was limited to temporary discomfort associated with either discussion of potentially sensitive information or with the finger or heel-prick blood collection. The benefits of participation in the survey included anaemia and malaria testing for children and treatment or referral as appropriate. Also, the results will benefit NMCP's and MOH's ability to monitor key health indicators and will provide evidence for decision-making that will enable NMCP to improve its policies and interventions. There was no compensation to respondents to participate.

1.5 Challenges and Limitations

During the period of data collection, the MIS team faced substantial challenges due to insecurity and due to capacity constraints in survey execution. These challenges, strategies to mitigate them, and the resultant limitations in the quality of the final survey are described transparently below.

1.5.1 Sampling challenges

Insecurity and access to EAs: Insecurity limited accessibility to some enumeration areas. In addition, insecurity led to population movements that may make the last census (2008) a less than ideal sampling universe on which to base a nationally representative survey. An initial sample of 280 EAs were selected with 28 clusters for each of the 10 statistical areas from the list of 10,000 EAs, minus EAs where the population was known to have moved or evacuated. On review, this sample included many areas that were inaccessible, so it was discarded.

An exclusion list of 1,939 out of 9,127 EAs (21.2%) that were not accessible due to insecurity, flooding, or other reasons was removed from the main list of EAs. A fresh random selection of 280 EAs were made from the list of 7,188 accessible EAs. The number and percentage of EAs that were inaccessible by statistical area are shown in **Table 1.3.**

Of the sample of 280, 238 had data collected during the fieldwork in December 2017. Of the 45 EAs that were not visited in December 2017, 17 were in the Unity statistical area. A replacement sample of 17 EAs was selected for Unity, and data was collected in these EAs in April 2018.

Unauthorised EA replacements: During the household listing process GPS coordinates were collected, and it was noted in the data analysis stage that in some cases, survey teams substituted one EA for another due to difficulties in reaching the selected EAs. Details are included in **Annex A.**

Table 1.3. Enumeration areas and accessibility by statistical area

Number of enumeration areas by statistical area and the number of percentage of EAs that were inaccessible due to population displacement, flooding, insecurity, or other reasons, South Sudan 2017

Statistical area	Number of EAs	Number of inaccessible EAs	Percentage of EAs that were inaccessible
Upper Nile	839	444	52.9
Jonglei	1,152	399	34.6
Unity	631	152	24.1
Warrap	1,375	164	11.9
Northern Bahr el-Ghazal	1,113	0	0.0
Western Bahr el-Ghazal	402	45	11.2
Lakes	819	0	0.0
Western Equatoria	794	3	0.4
Central Equatoria	1,106	540	48.8
Eastern Equatoria	896	192	21.4
Total	9,127	1,939	21.2

1.5.2 Questionnaire challenges

Net type classification: In the 2017 MIS, the question on the types of nets was modified, with the intention of increasing recall of net type by survey respondents. Rather than asking about specific brands of nets, interviewers asked about 'hard' vs. 'soft' nets, as they are commonly classified in South Sudan. This required additional calculations to derive the indicators on Insecticide Treated Nets (ITNs); these calculations are detailed in the nets section in Chapter 3, Malaria Prevention.

ACT question: For children who had received treatment, the type of treatment received was classified as "Any ACT" vs. a list of specific monotherapies. Due to a questionnaire issue, rates of ACTs may be overreported in the 2017 MIS. Details are described in Chapter 4.

Data merging and sample sizes: The 2017 SSMIS was the first nationally representative household survey implemented with mobile/electronic data collection in South Sudan, and some challenges specific to the data collection method were encountered. Due to limitations with how the questionnaire was implemented in CSPro, some of the women's surveys and biomarker surveys for children and pregnant women could not be merged with the relevant household data. This may lead to apparent discrepancies in sample sizes in the result tables. Details are described in Annex A.

1.5.3 Other challenges and limitations

Response rates for eligible women and children: Interviewers were trained to interview all eligible women in a household. Response rates for eligible women are typically close to 100% in Malaria Indicator Surveys. However, due to challenges in the cascaded training of trainers and difficulties in oversight due to accessibility, interviewers did not consistently interview all eligible women in the household. Nationally, 77% of eligible women were interviewed, but these rates varied substantially by statistical area, ranging from 38% in Unity statistical area to 98% in Lakes statistical area. This is likely indicative of variable quality of training and supervision by statistical area; as noted above, Unity statistical area had inaccessibility issues. For similar reasons response rates for eligible children were lower than expected and varied by statistical area. Overall, 60% of eligible children were interviewed. Details of response rates are included in **Table 1.2** and **Annex A**.

Other limitations: Because the 2017 SSMIS included some children under 59 months who were attending school, especially in urban areas, and because fieldwork was completed during the school year, field teams faced challenges with logistics and timing to reach children.

Respondents had to recall from memory the name of any antimalarial medicine given for the last fever episode in young children, introducing potential recall bias.

Finally, the 2017 SSMIS is a cross-sectional survey, so it is not possible to establish a cause and effect relationship between measured behaviours and any programme or policy.

1.6 Response Rates

In the 2017 SSMIS, **Table 1.4** shows a total of 5,225 households were selected for the survey, out of which 5,219 were occupied, and 5,190 were interviewed. This gave a 99% household response rate. The total number of households interviewed in urban settings were 1,552 compared to 3,638 households in rural areas. In the interviewed households, 7,073 eligible women were identified of whom 5,426 were successfully interviewed, yielding a response rate of 77%. The household response rate between urban and rural areas have a slight difference. This relatively low response rate was due to challenges in the cascaded training for the 2017 SSMIS; for more details, see the Challenges and Limitations section.

For the supplementary sample of PoC and IDP households, 221 household were selected, 215 were occupied, and 211 were interviewed. This gave a 98% response rate. This included 144 PoC households and 67 IDP households. In the interviewed households, 284 eligible women were identified of whom 160 were successfully interviewed yielding response rate of 56%. The household response rate in the POCs was 43% and 86% in IDPs.

Table 1.4 Results of the household and individual interviews

Number of households, number of interviews, and response rates, according to residence (unweighted), for the general population and for PoC and IDP populations, South Sudan 2017

	General population			PoC and IDP		
Result	Urban	Rural	Total	PoC[3]	IDP[4]	Total
Household interviews						
Households selected	982	4,281	5,263	154	67	221
Households occupied	979	4,278	5,257	149	67	216
Households interviewed	975	4,253	5,228	144	67	211
Household response rate[1]	99.6	99.4	99.4	96.6	100.0	97.7
Interviews with women age 15-49						
Number of eligible women	1,592	5,481	7,073	193	91	284
Number of eligible women interviewed	1,040	3,650	4,690	86	83	169
Eligible women response rate[2]	65.3	66.7	70.2	44.6	91.2	59.5

[1] Households interviewed/households occupied
[2] Respondents interviewed/eligible respondents
[3] Protection of Civilians: Households living in PoC sites administered by the UN.
[4] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

1.7 Recommendations for next SSMIS

As described above, the MIS team faced substantial challenges to capacity constraints and accessibility of survey areas. To mitigate against the reoccurence of similar issues, the following recommendations are made for fieldwork for the next SSMIS:

1) Preparations such as procurement of survey materials, recruitment of survey personnel, and finalisation of the survey questionnaires should begin substantially earlier than with the 2017 SSMIS. The MIS team should allow a minimum of nine months between protocol finalization and the finalisation of the report to ensure there is sufficient time for robust training of field staff and high-quality data collection, cleaning, analysis, and report-writing.

2) The MIS team should ensure there are multiple rounds of checks of the final questionnaires against the standard MIS materials and desired indicators, to ensure that any changes made to the questionnaire will allow the calculation of all desired indicators.

3) The MIS team should use a modern, user-friendly survey software (such as Open Data Kit or other commonly available software) to ensure that the electronic implementation of the questionnaire is reliable (i.e., without crashing). At the same time, the electronic implementation of the questionnaire should be as easy for enumerators to use as possible, eliminating potential errors around entering unique IDs or other information multiple times. The final implementation should be checked through survey pre-testing.

4) The MIS team should use a commerical or nonprofit server for data transmission during data collection. An external server solution is desirable because of guranteed uptime and robust backups. The server should use appropriate encryption protocols for protection of the data. Ownership of the data would remain with NMCP.

5) In combination with the use of a robust server solution described above, real-time data checks should be implemented to ensure that all survey procedures are being followed and enumerator training is sufficient.

6) The MIS team should consider laboratory materials that will result in better performance (lower rates of fixing due to the heat) of blood smears taken in the field. If stronger methods and materials are not feasible or available, the team may consider not including microscopy in the next MIS.

7) Overall, the MIS team should consult with stakeholders on how to ensure that capacity is bult throughout the process of implementing the survey and conducting the data analysis.

If these recommendations are followed many of the challenges and limitations encountered in implementing the 2017 SSMIS may be avoided.

2 CHARACTERISTICS OF HOUSEHOLDS AND WOMEN

Information on the socioeconomic characteristics of the household population in the 2017 SSMIS provides context to interpret demographic and health indicators and can indicate the representativeness of the survey. This information also sheds light on the living conditions of the population.

This chapter presents 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 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

Age and sex are important demographic variables and are the primary basis of demographic classification. **Table 2.1** shows the distribution of the de facto household population in the 2017 SSMIS by 5-year age groups, according to sex and residence. In the 2017 SSMIS, 32,358 people stayed overnight in 5,191 households (**Table 2.2**). The population sex ratio is 93 males per 100 females.

By residence, there were 93 males per 100 females in urban areas and 94 males per 100 females in rural areas. The population of South Sudan is very young, 68% of the population is less than 25 years of age. Fifty-one percent of the population is under age of 15 years, 47% of the population is between age 15 and age 64, and only 3% of the population is age 65 and above.

The age and sex distributions for PoC and IDP populations are shown in **Table 2.1B**. In the 2017 SSMIS, in the PoC and IDP populations, 1,224 people stayed overnight in 211 households. The population sex ratio among the PoC and IDP populations group is 94 males per 100 females. The age distribution is similar to the general population, with 66% of the population being less than 25 years of age and 48% being less than 15 years of age.

Table 2.1 Household population by age, sex, and residence, general population

Percent distributions of the de facto household population by various age groups and percentage of the de facto household population age 10-19, according to sex and residence, for general population, South Sudan 2017

	Urban			Rural			Total		
Age	Male	Female	Total	Male	Female	Total	Male	Female	Total
<5	16.6	15.2	15.9	19.1	17.1	18.1	18.6	16.7	17.6
5-9	17.0	15.7	16.3	19.9	18.3	19.1	19.3	17.8	18.5
10-14	14.6	14.9	14.8	15.0	14.5	14.7	14.9	14.5	14.7
15-19	11.5	12.0	11.7	9.5	9.4	9.4	9.9	9.9	9.9
20-24	8.3	8.0	8.2	5.4	7.3	6.4	6.0	7.5	6.8
25-29	6.2	8.4	7.3	4.8	7.6	6.3	5.1	7.8	6.5
30-34	6.3	6.6	6.5	4.4	6.3	5.4	4.8	6.4	5.6
35-39	5.7	6.0	5.9	5.2	5.4	5.3	5.3	5.6	5.5
40-44	3.2	2.9	3.0	3.8	2.8	3.3	3.6	2.8	3.2
45-49	3.2	2.2	2.7	3.7	2.3	3.0	3.6	2.3	2.9
50-54	2.8	3.5	3.2	2.4	3.6	3.0	2.5	3.6	3.1
55-59	1.7	1.2	1.5	1.6	1.5	1.6	1.6	1.5	1.6
60-64	1.0	1.0	1.0	1.7	1.4	1.5	1.5	1.3	1.4
65-69	1.0	0.8	0.9	1.3	0.8	1.0	1.2	0.8	1.0
70-74	0.3	0.6	0.5	0.8	0.6	0.7	0.7	0.6	0.6
75-79	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.3	0.4
80 +	0.3	0.4	0.4	0.9	0.7	0.8	0.7	0.6	0.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Dependency age groups									
0-14	48.2	45.7	47.0	54.0	49.9	51.9	52.8	49.0	50.8
15-64	49.8	52.0	50.9	42.6	47.8	45.3	44.2	48.6	46.5
65+	2.0	2.3	2.1	3.4	2.3	2.8	3.1	2.3	2.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Child and adult populations									
0-17	56.0	53.0	54.5	60.3	55.6	57.9	59.4	55.0	57.1
18+	44.0	47.0	45.5	39.7	44.4	42.1	40.6	45.0	42.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Adolescents 10-19	26.1	26.9	26.5	24.5	23.8	24.2	24.9	24.5	24.6
Number of persons	3,314	3,444	6,758	12,316	13,284	25,600	15,630	16,728	32,358

Table 2.1B Household population by age, sex, and residence, PoC and IDP

Percent distributions of the de facto household population by various age groups and percentage of the de facto household population age 10-19, according to sex and residence, for PoC and IDP populations, South Sudan 2017

	PoC[1]			IDP[2]			Total		
Age	Male	Female	Total	Male	Female	Total	Male	Female	Total
<5	15.7	15.2	15.3	12.1	14.9	15.4	14.6	15.1	15.3
5-9	18.8	17.7	17.8	22.7	20.1	20.7	20.0	18.5	18.7
10-14	14.1	14.6	14.7	14.1	14.6	14.9	14.1	14.6	14.7
15-19	11.6	11.1	11.1	11.6	9.9	9.9	11.6	10.7	10.7
20-24	6.3	7.1	7.2	7.1	6.0	6.1	6.5	6.8	6.8
25-29	6.7	6.1	6.1	7.6	5.7	6.1	7.0	6.0	6.1
30-34	7.6	5.8	5.7	7.1	6.5	6.6	7.5	6.0	6.0
35-39	6.3	5.4	5.3	8.6	7.6	8.0	7.0	6.0	6.1
40-44	3.7	3.9	3.9	2.5	3.1	2.8	3.3	3.7	3.6
45-49	2.5	3.4	3.5	1.5	3.9	3.6	2.2	3.6	3.5
50-54	0.9	2.5	2.5	3.5	4.7	3.9	1.7	3.2	2.9
55-59	4.6	4.4	4.4	0.0	0.5	0.6	3.2	3.2	3.2
60-64	0.7	1.0	1.0	0.5	1.8	1.1	0.6	1.2	1.0
65-69	0.0	0.6	0.6	1.0	0.5	0.6	0.0	0.4	0.4
70-74	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1
75-79	0.2	0.4	0.4	0.0	0.0	0.0	0.2	0.2	0.2
80 +	0.2	0.7	0.6	0.0	0.0	0.0	0.5	0.7	0.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Dependency age groups									
0-14	48.6	47.6	47.7	49.0	49.6	51.0	48.7	48.2	48.7
15-64	50.9	50.7	50.6	50.0	49.9	48.5	50.6	50.4	50.0
65+	0.5	1.8	1.7	1.0	0.5	0.6	0.6	1.4	1.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Child and adult populations									
0-17	56.7	55.8	56.0	55.6	55.6	57.0	56.3	55.7	56.3
18+	43.3	44.2	44.0	44.4	44.4	43.0	43.7	44.3	43.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Adolescents 10-19	25.7	25.7	25.8	25.8	24.5	24.8	25.7	25.2	25.5
Number of persons	432	841	838	198	383	363	630	1,224	1,224

[1] Protection of Civilians: Households living in PoC sites administered by the UN.

[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

The population pyramid in **Figure 2.1** shows the population distribution by sex and by five-year age groups for the general population. The broad base of the pyramid shows that the South Sudan population is young, which is typical of developing countries with a high fertility rate and low life expectancy.

Household headship, number of usual members, and mean size of households are shown in **Table 2.2.** The majority of households (59%) in South Sudan are headed by men, while 59% of PoC and 39% of IDP households were headed by men. The mean size of households in the general population is 6.05 members, with 6.80 members on average in urban households and 5.87 members on average in rural households. The mean sizes of PoC and IDP households are 5.82 and 5.42 members, respectively.

Figure 2.1 Population pyramid, general population

Percent distribution of the de facto household population by 5-year age groups, according to sex, for general population, South Sudan 2017

Age	Male	Female	Total
<5	18.5	16.7	17.5
5-9	19.2	17.8	18.5
10-14	14.9	14.5	14.7
15-19	9.9	10.0	10.0
20-24	6.1	7.5	6.8
25-29	5.1	7.8	6.5
30-34	4.8	6.4	5.6
35-39	5.3	5.6	5.5
40-44	3.6	2.8	3.2
45-49	3.7	2.3	3.0
50-54	2.6	3.5	3.1
55-59	1.7	1.5	1.6
60-64	1.5	1.3	1.4
65-69	1.2	0.8	1.0
70-74	0.7	0.6	0.6
75-79	0.4	0.3	0.4
80+	0.7	0.6	0.7
Total	100.0	100.0	100.0
Number	16,224	17,358	33,582

Table 2.2 Household composition

Percent distribution of households by sex of head of household and by household size and mean size of households, according to residence, for general population and PoC and IDP populations, South Sudan 2017

	General population			PoC and IDP		
	Residence		Total	Type		Total
Characteristic	Urban	Rural		PoC[1]	IDP[2]	
Household headship						
Male	57.1	59.0	58.6	59.0	38.8	52.6
Female	42.9	41.0	41.4	41.0	61.2	47.4
Total	100.0	100.0	100.0	100.0	100.0	100.0
Number of usual members						
1	5.4	4.2	4.4	7.7	3.2	6.3
2	2.7	5.1	4.7	6.3	3.2	5.4
3	6.5	9.5	8.9	7.0	6.5	6.8
4	11.5	11.9	11.8	11.9	24.2	15.6
5	12.6	14.2	13.9	13.3	14.5	13.7
6	10.4	14.0	13.3	16.8	11.3	15.1
7	13.5	12.7	12.8	12.6	21.0	15.1
8	9.0	11.3	10.9	6.3	1.6	4.9
9+	28.3	17.2	19.3	18.2	14.5	17.1
Total	100.0	100.0	100.0	100.0	100.0	100.0
Mean size of households	6.80	5.87	6.05	5.82	5.42	5.69
Number of households	976	4,215	5,191	144	67	211

[1] Protection of Civilians: Households living in PoC sites administered by the UN.

[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

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

Table 2.3 Background characteristics of respondents

Percent distribution of women age 15-49 by selected background characteristics, for general population and PoC and IDP populations, South Sudan 2017

	General population			PoC[1] and IDP[2]	
	Women			Women	
Background characteristic	Weighted percent	Weighted number	Unweighted number	Unweighted percent	Unweighted number
Age					
15-19	14.9	678	700	8.1	13
20-24	17.0	774	810	13.8	22
25-29	20.6	937	992	24.4	39
30-34	18.5	844	856	18.8	30
35-39	15.9	725	758	19.4	31
40-44	7.8	354	365	10.6	17
45-49	5.4	246	256	5.0	8
Residence					
Urban	20.8	949	994	51.3	82
Rural	79.2	3,608	3,459	48.8	78
Statistical area					
Upper Nile	13.5	615	524	3.8	6
Jonglei	14.5	663	421	48.8	78
Unity	3.4	153	226	2.5	4
Warrap	11.4	522	482		
Northern Bahr el-Ghazal	8.3	380	518		
Western Bahr el-Ghazal	3.6	165	492		
Lakes	9.7	440	512	45.0	72
Western Equatoria	6.6	302	450		
Central Equatoria	17.1	780	644		
Eastern Equatoria	11.8	538	468		
Education					
No education	66.6	3,036	3,127	75.6	121
Primary	25.4	1,156	1,227	21.9	35
Secondary	6.7	307	327	1.9	3
More than secondary	1.3	59	56	0.6	1
Wealth quintile					
Lowest	20.5	936	875		
Second	20.4	931	925		
Middle	18.2	830	809	2.5	4
Fourth	18.8	859	867	20.6	33
Highest	22.0	1,002	977	76.9	123
Total 15-49	100.0	4,453	4,453	100.0	160

[1] Protection of Civilians: Households living in PoC stes administered by the UN.

[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

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

2.2 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. Households that use bottled or sachet water for drinking are classified as using an improved source only if their water for cooking and handwashing come 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. **Table 2.4** shows sources of drinking water for households and the population. 71% of households and 72% of the population in South Sudan have an improved source of drinking water.

Access to an improved source of drinking water did not vary by residence (urban versus rural). The most common source of drinking water is tubewells/boreholes, accounting for 60% of households'

Table 2.4 Household drinking water, general population

Percent distribution of households and de jure population by source of drinking water and by time to obtain drinking water, according to residence, for general population, South Sudan 2017

Characteristic	Households			Population		
	Urban	Rural	Total	Urban	Rural	Total
Source of drinking water						
Improved source	**71.0**	**71.1**	**71.1**	**70.1**	**72.7**	**72.2**
Piped into dwelling/yard/plot	1.9	0.9	1.1	1.7	1.1	1.2
Piped to neighbor	1.4	0.2	0.4	1.5	0.2	0.5
Public tap/standpipe	17.6	4.7	7.1	17.0	4.8	7.3
Tubewell/borehole	45.2	63.7	60.2	45.6	65.1	61.0
Protected dug well	4.2	1.0	1.6	3.6	0.9	1.5
Protected spring	0.2	0.5	0.5	0.2	0.6	0.5
Rainwater	0.0	0.0	0.0	0.0	0.0	0.0
Bottled water, improved source for cooking/handwashing[1]	0.3	0.0	0.1	0.3	0.0	0.1
Unimproved source	**29.0**	**28.6**	**28.7**	**29.9**	**27.0**	**27.6**
Unprotected dug well	6.8	7.9	7.7	7.8	6.9	7.1
Unprotected spring	0.9	0.6	0.7	0.6	0.6	0.6
Tanker truck/cart with small tank	16.5	1.1	4.0	17.9	1.4	4.8
Surface water	4.8	18.9	16.3	3.7	18.1	15.1
Bottled water, unimproved source for cooking/handwashing[1]	0.0	0.0	0.0	0.0	0.0	0.0
Other source	0.0	0.3	0.2	0.0	0.3	0.2
Total	100.0	100.0	100.0	100.0	100.0	100.0
Time to obtain drinking water (round trip)						
Water on premises	9.6	7.5	7.9	10.0	7.4	8.0
Less than 30 minutes	62.4	52.3	54.2	60.7	52.7	54.4
30 minutes or longer	28.0	40.2	37.9	29.4	39.8	37.7
Total	100.0	100.0	100.0	100.0	100.0	100.0
Number	975	4,215	5,190	6,758	25,648	32,406

[1] Households using bottled water for drinking are classified as using an improved or unimproved source according to their water source for cooking and handwashing.

water sources nationally. 45% of urban households use tubewells/boreholes, while 64% of urban households use tubewells/boreholes. Unimproved sources provided the drinking water for 29% of households nationally. The most common unimproved water source for urban households is tanker trucks/carts with a small tank (17% of urban households), while the most common unimproved source for rural households is surface water (19% of rural households). Nationally, 38% of households get their drinking water from a source that is more than 30 minutes round trip away.

Table 2.4B shows the percent distribution of PoC and IDP households and of the PoC and IDP populations by sources of drinking water. 77% of PoC households and 100% of IDP households have an improved source of drinking water. 23% of PoC households obtain their drinking water from an unimproved source, namely a tanker truck or cart with a small tank. All IDP households get drinking water from a public tap/standpipe or a tubewell/borehole.

Table 2.4B Household drinking water, PoC and IDP

Percent distribution of households and de jure population by source of drinking water and by time to obtain drinking water, according to residence, for PoC[1] and IDP[2] populations, South Sudan 2017

Characteristic	Households			Population		
	PoC	IDP	Total	PoC	IDP	Total
Source of drinking water						
Improved source	**77.1**	**100.0**	**84.4**	**81.1**	**100.0**	**87.0**
Piped into dwelling/yard/plot	4.2	0.0	2.8	3.0	0.0	3.7
Piped to neighbor	4.2	0.0	2.8	4.2	0.0	5.1
Public tap/standpipe	65.3	71.6	67.3	71.8	35.0	76.8
Tubewell/borehole	3.5	28.4	11.4	2.1	10.6	23.2
Protected dug well	0.0	0.0	0.0	0.0	0.0	0.0
Protected spring	0.0	0.0	0.0	0.0	0.0	0.0
Rainwater	0.0	0.0	0.0	0.0	0.0	0.0
Bottled water, improved source for cooking/handwashing[3]	0.0	0.0	0.0	0.0	0.0	0.0
Unimproved source	**22.9**	**0.0**	**15.6**	**18.9**	**0.0**	**13.0**
Unprotected dug well	0.0	0.0	0.0	0.0	0.0	0.0
Unprotected spring	0.0	0.0	0.0	0.0	0.0	0.0
Tanker truck/cart with small tank	22.9	0.0	15.6	18.9	0.0	13.0
Surface water	0.0	0.0	0.0	0.0	0.0	0.0
Bottled water, unimproved source for cooking/handwashing[3]	0.0	0.0	0.0	0.0	0.0	0.0
Other source	0.0	0.0	0.0	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
Time to obtain drinking water (round trip)						
Water on premises	71.5	0.0	48.8	73.1	0.0	50.2
Less than 30 minutes	28.5	100.0	51.2	26.9	100.0	49.8
30 minutes or longer	0.0	0.0	0.0	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
Number	144	67	211	841	383	1,224

[1] Protection of Civilians: Households living in PoC sites administered by the UN.

[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

[3] Households using bottled water for drinking are classified as using an improved or unimproved source according to their water source for cooking and handwashing.

2.3 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; pit latrines with slabs; and composting toilets.

***Sample*:** Households

Nationally, only 14% 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 8% of households use an improved facility shared with other households (**Table 2.5**). Nearly two-thirds (64%) of households use open defecation (no toilet facilities).

The most common facilities for households with improved sanitation were pit latrines with a slab (7% of households) and ventilated improved pit latrines (4%). Household in urban areas are more likely to use improved non-shared facilities (27%) compared to rural households with 9%. Open defecation is used by 30% of urban households and 72% of rural households.

The majority (88%) of households in PoC and IDP areas have unimproved sanitation. Overall 12% of households in POCs and IDPs have improved sanitation.

Table 2.5 Household sanitation facilities

Percent distribution of households and de jure population by type of toilet/latrine facilities, according to residence, South Sudan 2017

	General population						PoC and IDP					
	Households			Population			Households			Population		
Type and location of toilet/latrine facility	Urban	Rural	Total	Urban	Rural	Total	PoC[1]	IDP[2]	Total	PoC[1]	IDP[2]	Total
Improved sanitation	**27.2**	**9.1**	**12.5**	**30.9**	**8.9**	**13.5**	**1.5**	**(31.5)**	**10.9**	**0.2**	**38.6**	**12.3**
Flush/pour flush to piped sewer system	0.9	0.2	0.3	1.5	0.2	0.5	0.7	(1.5)	0.9	0.1	1.8	0.7
Flush/pour flush to septic tank	1.2	0.0	0.3	2.1	0.0	0.5	0.0	(0.0)	0.0	0.0	0.0	0.0
Flush/pour flush to a pit latrine	0.9	0.0	0.2	1.3	0.1	0.3	0.0	(0.0)	0.0	0.0	0.0	0.0
Ventilated improved pit (VIP) latrine	11.3	1.9	3.7	12.1	2.1	4.2	0.7	(0.7)	10.0	0.1	36.8	11.6
Pit latrine with a slab	9.9	6.7	7.3	10.7	6.2	7.1	0.1	(0.1)	0.0	0.0	0.0	0.0
Composting toilet	2.9	0.3	0.8	3.1	0.4	1.0	0.0	(0.0)	0.0	0.0	0.0	0.0
Unimproved sanitation	**72.8**	**90.9**	**87.5**	**69.1**	**91.1**	**86.5**	**98.6**	**(98.6)**	**89.1**	**99.8**	**61.4**	**87.7**
Shared facility[3]	**18.8**	**6.0**	**8.4**	**17.7**	**5.9**	**8.3**	**91.0**	**(91.0)**	**71.1**	**91.6**	**27.4**	**71.5**
Flush/pour flush to piped sewer system	0.2	0.1	0.1	0.4	0.1	0.2	0.7	(0.7)	0.9	0.4	0.3	0.3
Flush/pour flush to septic tank	0.4	0.0	0.1	0.3	0.0	0.1	56.9	(56.9)	47.4	60.5	27.2	50.1
Flush/pour flush to a pit latrine	0.2	0.0	0.1	0.1	0.0	0.1	32.6	(32.6)	22.3	30.0	0.0	20.6
Ventilated improved pit (VIP) latrine	6.4	2.5	3.3	6.4	2.5	3.3	0.7	(0.7)	0.5	0.7	0.0	0.5
Pit latrine with a slab	8.6	3.1	4.2	8.0	3.0	4.0	0.0	(0.0)	0.0	0.0	0.0	0.0
Composting toilet	3.0	0.2	0.7	2.3	0.3	0.7	0.0	(0.0)	0.0	0.0	0.0	0.0
Unimproved facility	**23.7**	**12.5**	**14.6**	**22.8**	**11.6**	**13.9**	**6.3**	**(1.5)**	**4.7**	**5.9**	**1.6**	**4.6**
Flush/pour flush not to sewer/ septic tank/pit	1.3	0.0	0.3	1.3	0.1	0.3	5.6	(1.5)	4.3	5.8	1.6	4.5
Pit latrine without slab/open pit	21.2	8.5	10.9	20.5	7.8	10.5	0.7	(0.0)	0.5	0.1	0.0	0.1
Bucket	0.1	0.0	0.0	0.1	0.0	0.0	0.0	(0.0)	0.0	0.0	0.0	0.0
Hanging toilet/hanging latrine	1.0	4.0	3.4	0.9	3.7	3.1	0.0	(0.0)	0.0	0.0	0.0	0.0
Open defecation (no facility/bush/field)	**30.4**	**72.3**	**64.4**	**28.7**	**73.6**	**64.2**	**1.4**	**(38.8)**	**13.3**	**2.3**	**32.4**	**11.7**
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.1	(100.1)	100.0	100.0	100.0	100.0
Number of households/population with a toilet/latrine facility	679	1,167	1,846	4,818	6,768	11,586	142	41	183	822	259	1,081

Numbers in parentheses are based on 25-49 unweighted cases.

[1] Protection of Civilians: Households living in PoC sites administered by the UN.

[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

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

2.4 Housing Characteristics

The 2017 SSMIS 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.

Overall, only 4% of households in the general population have electricity (**Table 2.6**). Households in urban areas (10%) were more likely to have electricity than in rural areas (3%). Access to electricity is also limited for PoC and IDP households, with 1% of PoC and 5% of IDP households having electricity (**Table 2.6B**).

The most common flooring material in South Sudan is earth/sand (74%), followed by dung (21%). Flooring material for PoC and IDP households are similar to the general population: 72% of PoC households and 78% of IDP households have earth/sand floors, followed by dung (16% of PoC and 21% of IDP).

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. In South Sudan, 77% of households use either one or two rooms for sleeping.

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 (97%) for households in South Sudan, with the major sources being wood and charcoal.

Table 2.6 Household characteristics, general population

Percent distribution of households and de jure population by housing characteristics and percentage using solid

	General population					
	Households			Population		
Housing characteristic	Urban	Rural	Total	Urban	Rural	Total
Electricity						
Yes	9.6	3.0	4.2	10.7	3.0	4.6
No	90.4	97.0	95.8	89.3	97.0	95.4
Total	100.0	100.0	100.0	100.0	100.0	100.0
Flooring material						
Earth/sand	65.6	75.4	73.6	64.1	74.3	72.2
Dung	16.9	22.1	21.2	15.7	23.4	21.8
Wood planks	0.8	0.3	0.4	0.6	0.3	0.3
Palm/bamboo	0.0	0.1	0.1	0.0	0.1	0.1
Parquet or polished wood	1.3	0.0	0.3	1.1	0.1	0.3
Vinyl or asphalt strips	0.9	0.1	0.3	1.0	0.1	0.3
Ceramic tiles	8.4	0.3	1.8	10.1	0.4	2.4
Cement	4.2	1.1	1.7	5.2	1.0	1.9
Carpet	1.5	0.3	0.6	1.9	0.3	0.6
Other	0.2	0.1	0.1	0.4	0.1	0.1
Total	100.0	100.0	100.0	100.0	100.0	100.0
Rooms used for sleeping						
One	28.2	37.1	35.4	19.3	30.0	27.8
Two	32.8	36.6	35.9	31.3	37.6	36.3
Three or more	39.0	26.4	28.7	49.4	32.3	35.9
Total	100.0	100.0	100.0	100.0	100.0	100.0
Cooking fuel						
Electricity	0.5	0.1	0.2	0.5	0.1	0.2
LPG/natural gas/biogas	0.0	0.0	0.0	0.0	0.0	0.0
Kerosene	0.0	0.0	0.0	0.0	0.0	0.0
Coal/lignite	0.3	0.0	0.1	0.3	0.0	0.1
Charcoal	54.3	8.6	17.2	53.8	8.7	18.1
Wood	41.3	88.0	79.2	42.0	87.8	78.2
Straw/shrubs/grass	3.2	2.7	2.8	3.3	2.8	2.9
Agricultural crop	0.0	0.2	0.2	0.0	0.2	0.2
Animal dung	0.0	0.2	0.2	0.0	0.2	0.2
Other fuel	0.0	0.1	0.1	0.0	0.0	0.0
No food cooked in household	0.4	0.0	0.1	0.1	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
Percentage using solid fuel for cooking[1]	96.4	96.8	96.8	96.5	96.7	96.5
Total	1,546	3,635	5,181	9,048	21,115	30,163
Number of households/population	975	4,215	5,190	6,758	25,640	32,398

LPG = Liquefied petroleum gas

[1] Includes coal/lignite, charcoal, wood, straw/shrubs/grass, agricultural crops, and animal dung.

Table 2.6B Household characteristics, PoC and IDP

Percent distribution of households and de jure population by housing characteristics and percentage using solid fuel for cooking, according to residence, for PoC[1] and IDP[2] populations. South Sudan 2017

	PoC and IDP					
	Households			Population		
Housing characteristic	PoC[1]	IDP[2]	Total	PoC[1]	IDP[2]	Total
Electricity						
Yes	0.7	4.5	1.9	0.8	5.2	2.2
No	99.3	95.5	98.1	99.2	94.8	97.8
Total	100.0	100.0	100.0	100.0	100.0	100.0
Flooring material						
Earth/sand	72.2	77.6	73.9	77.3	83.8	79.3
Dung	16.0	20.9	17.5	13.8	14.9	14.1
Wood planks	0.0	0.0	0.0	0.0	0.0	0.0
Palm/bamboo	1.4	0.0	0.9	1.5	0.0	1.1
Parquet or polished wood	0.7	0.0	0.5	0.2	0.0	0.2
Vinyl or asphalt strips	0.0	0.0	0.0	0.0	0.0	0.0
Ceramic tiles	0.0	0.0	0.0	0.0	0.0	0.0
Cement	0.0	0.0	0.0	0.0	0.0	0.0
Carpet	0.0	0.0	0.0	0.0	0.0	0.0
Other	9.7	1.5	7.1	7.1	1.3	5.3
Total	100.0	100.0	100.0	100.0	100.0	100.0
Rooms used for sleeping						
One	48.6	34.3	44.1	45.1	27.9	39.7
Two	31.3	37.3	33.2	31.2	37.1	33.0
Three or more	20.1	28.4	22.7	23.8	35.0	27.3
Total	100.0	100.0	100.0	100.0	100.0	100.0
Cooking fuel						
Electricity	0.0	0.0	0.0	0.0	0.0	0.0
LPG/natural gas/biogas	0.0	0.0	0.0	0.0	0.0	0.0
Kerosene	0.0	0.0	0.0	0.0	0.0	0.0
Coal/lignite	0.0	0.0	0.0	0.0	0.0	0.0
Charcoal	42.4	22.4	36.0	38.3	25.3	34.2
Wood	56.9	77.6	63.5	61.6	74.7	65.7
Straw/shrubs/grass	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural crop	0.0	0.0	0.0	0.0	0.0	0.0
Animal dung	0.0	0.0	0.0	0.0	0.0	0.0
Other fuel	0.7	0.0	0.5	0.1	0.0	0.1
No food cooked in household	0.0	0.0	0.0	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
Percentage using solid fuel for cooking[3]	99.3	100.0	99.5	99.9	100.0	99.9
Total	143	67	210	839	294	1,133
Number of households/population	144	67	211	841	383	1,224

LPG = Liquefied petroleum gas

[1] Protection of Civilians: Households living in PoC sites administered by the UN.

[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

[3] Includes coal/lignite, charcoal, wood, straw/shrubs/grass, agricultural crops, and animal dung.

The 2017 SSMIS also included information on ownership of household goods, means of transport, agricultural land, and bank accounts (**Table 2.7**). Urban households are more likely than rural households to own a radio (33% versus 12%), television (12% versus 2%), mobile telephone (70%

versus 32%). Among the PoC and IDP households, 15% of PoC and 16% of IDP households own radios. 40% of PoC households and 37% of IDP households own a mobile phone.

Most households did not own a means of transport: 15% of households in the general population, 1% of PoC households, and 6% of IDP households own a bicycle. Motorcycle/scooters are more commonly owned in urban households (15%) than in rural households (6%). 6% of urban households and 1% of rural households owned a car.

26% of urban households and 75% of rural households own agricultural land, while only 1% of PoC households and 2% of IDP households own agricultural land. Farm animals are owned by 17% of urban households and 54% of rural households. 4% of PoC households and 33% of IDP households own farm animals.

Access to the formal financial sector is low, with 5% of households nationally owning a bank account. In urban areas, 14% of households have a bank account, whereas just 2% of rural households have a bank account.

Table 2.7 Household possessions

Percentage of households possessing various household effects, means of transportation, agricultural land and livestock/farm animals, according to residence, for general population and PoC and IDP populations, South Sudan 2017

	General population			PoC and IDP		
	Residence			Type		
Possession	Urban	Rural	Total	PoC[1]	IDP[2]	Total
Household effects						
Radio	32.5	12.4	16.2	14.6	16.4	15.2
Television	12.2	2.3	4.1	1.4	3.0	0.9
Mobile phone	70.4	32.3	39.4	40.3	37.3	39.3
Non-mobile telephone	0.9	1.2	1.2	1.4	3.0	0.9
Computer	7.9	1.7	2.9	0.7	1.5	0.5
Refrigerator	3.7	0.9	1.4	0.0	0.0	0.0
Means of transport						
Bicycle	14.4	14.6	14.6	0.7	6.0	2.4
Animal drawn cart	0.4	1.3	1.1	0.0	0.0	0.0
Motorcycle/scooter	15.3	5.6	7.4	2.1	4.5	1.4
Car/truck	5.9	1.0	1.9	0.0	0.0	0.0
Boat with a motor	0.9	1.1	1.0	0.0	0.0	0.0
Ownership of agricultural land	25.6	75.0	65.8	1.4	1.5	1.4
Ownership of farm animals[3]	16.7	54.1	47.1	3.5	32.8	12.8
Ownership of bank account	14.3	2.4	4.6	0.7	6.0	2.4
Number of households	1,552	3,638	5,190	144	67	211

[1] Protection of Civilians: Households living in PoC sites administered by the UN.

[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

[3] Cows, bulls, other cattle, horses, donkeys, mules, goats, sheep, chickens, or other poultry.

2.5 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

The distribution of households by wealth quintile and residence, and by wealth quintile and statistical area, is shown in **Table 2.8**. By definition, 20% of the total household population in the general population is in each wealth quintile. However, the population distributions are unequal when stratifying by urban and rural areas. Fifty-eight percent of the population in urban areas is in the highest quintile compared with only 10% of the population in rural areas being in the highest quintile. On the other hand, only 1% of the urban population falls in the lowest wealth quintile, compared with 25% of the rural population.

At the statistical area level, Warrap has the highest percentage of population in the lowest quintile (43%). Central Equatoria statistical area has the highest percentage of population in the highest wealth quintile (34%).

The wealth quintiles generated for the general population were also applied to the PoC and IDP households. For instance, 25% of PoC households were in the top wealth quintile (compared to 20% of the general population). Just 10% of IDP households were in the top wealth quintile, while 55% of IDP households were in the lowest quintile.

Table 2.8 Wealth quintiles

Percent distribution of the de jure population by wealth quintiles and the Gini Coefficient, according to residence and region, for general population and PoC and IDP populations, South Sudan 2017

Residence/region	Wealth quintile					Total	Number of persons	Gini Coefficient
	Lowest	Second	Middle	Fourth	Highest			
Residence								
Urban	1.2	2.5	9.0	28.7	58.6	100.0	6,635	0.24
Rural	24.8	24.9	22.9	17.7	9.7	100.0	24,749	0.36
Statistical area								
Upper Nile	9.1	6.7	23.9	28.5	31.8	100.0	3,032	28.8
Jonglei	15.1	17.4	32.0	26.0	9.4	100.0	2,487	30.9
Unity	24.8	16.7	20.5	30.9	7.0	100.0	3,421	31.2
Warrap	41.8	27.4	12.7	9.9	8.1	100.0	3,712	42.6
Northern Bahr el-Ghazal	14.8	37.2	16.4	15.9	15.7	100.0	4,001	27.3
Western Bahr el-Ghazal	10.8	19.6	23.6	14.4	31.6	100.0	3,063	30.2
Lakes	32.3	29.7	17.7	14.0	6.3	100.0	3,434	33.2
Western Equatoria	1.3	5.9	30.8	34.8	27.2	100.0	2,293	30.4
Central Equatoria	19.1	11.4	11.1	14.4	44.0	100.0	3,423	30.9
Eastern Equatoria	18.0	18.5	20.1	19.9	23.6	100.0	2,518	33.6
Total	20.0	20.0	20.0	20.0	20.0	100.0	31,384	0.35
PoC and IDP								
PoC[1]	3.1	25.9	24.7	21.2	25.1	100.0	841	0.19
IDP[2]	54.8	0.0	18.3	17.2	9.7	100.0	383	0.19
Total	19.3	17.8	22.7	19.9	20.3	100.0	1,224	0.17

[1] Protection of Civilians: Households living in PoC sites administered by the UN.

[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

2.6 Educational attainment of women

Studies have consistently shown that educational attainment has a strong effect on health behaviours and attitudes. In general, the higher the level of education that a woman attains, the more knowledgeable she is about the use of health facilities and health care services for herself, her children, and her family. **Table 2.9** presents general educational characteristics of women and shows the relationship between the respondent's level of education and other background characteristics.

Generally, younger women have attained more education and have reached higher levels of education than older women. For example, only 36% of women aged 15-19 years have never been to school compared to 80% of women aged 45-49 years. In addition, younger women were much more likely than older women to have completed secondary school. 13% of women aged 15-19 years have completed secondary school compared to 8% of women aged 45-49 years.

By residence, 73% of women in rural areas have no education compared to 43% in urban setting. Likewise, 17% women in urban areas have completed secondary education compared to 4% in rural areas.

Table 2.9 Educational attainment of survey respondents

Percent distribution of women age 15-49 by highest level of schooling attended or completed, according to background characteristics, for general population and PoC[1] and IDP[2] populations, South Sudan 2017

Background characteristic	Highest level of schooling								
	No education	Some primary	Completed primary	Some secondary	Completed secondary	More than secondary	Missing	Total	Number of women
Age									
15-19	36.0	23.0	28.7	0.0	12.3	0.0	0.0	100.0	700
20-24	53.7	17.8	15.6	0.4	11.7	0.9	0.0	100.0	810
25-29	69.7	10.5	10.6	0.3	6.6	2.3	0.1	100.0	992
30-34	78.4	9.8	8.6	0.4	2.1	0.7	0.0	100.0	856
35-39	81.5	5.5	7.8	0.0	3.3	1.7	0.1	100.0	758
40-44	79.5	9.3	7.4	0.8	1.9	1.1	0.0	100.0	365
45-49	78.9	7.0	5.5	0.0	7.4	1.2	0.0	100.0	256
Residence									
Urban	43.1	19.0	15.9	0.8	17.1	4.1	0.0	100.0	994
Rural	72.9	10.4	12.3	0.1	3.9	0.4	0.0	100.0	3,459
Statistical area									
Upper Nile	61.8	15.3	17.2	0.2	4.2	1.0	0.4	100.0	524
Jonglei	86.7	7.1	4.5	0.5	1.0	0.2	0.0	100.0	421
Unity	83.6	8.4	5.8	0.0	1.8	0.4	0.0	100.0	226
Warrap	82.6	7.3	7.3	0.0	2.7	0.2	0.0	100.0	482
Ghazal	76.8	10.8	9.1	0.0	2.5	0.8	0.0	100.0	518
Ghazal	63.6	15.9	9.6	1.4	8.1	1.4	0.0	100.0	492
Lakes	82.0	6.3	6.4	0.2	5.1	0.0	0.0	100.0	512
Western Equatoria	37.1	21.8	29.1	0.0	11.6	0.4	0.0	100.0	450
Central Equatoria	49.7	13.8	16.3	0.2	15.5	4.5	0.0	100.0	644
Eastern Equatoria	56.6	15.0	18.4	0.0	8.8	1.3	0.0	100.0	468
Wealth quintile									
Lowest	84.8	6.2	6.9	0.1	2.1	0.0	0.0	100.0	875
Second	82.3	7.2	8.2	0.1	2.1	0.0	0.1	100.0	925
Middle	75.4	10.4	11.1	0.1	2.8	0.1	0.0	100.0	809
Fourth	61.9	14.6	17.0	0.2	6.1	0.1	0.0	100.0	867
Highest	30.5	22.2	21.7	0.7	19.5	5.3	0.0	100.0	977
Total	66.7	12.3	13.1	0.3	6.8	1.2	0.0	100.0	4,737
PoC and IDP									
PoC[1]	76.8	13.4	3.7	0.0	2.4	1.2	2.4	100.0	82
IDP[2]	85.9	7.7	3.8	1.3	0.0	0.0	1.3	100.0	78
Total	81.3	10.6	3.8	0.6	1.3	0.6	1.9	100.0	160

[1] Protection of Civilians: Households living in PoC sites administered by the UN.

[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

Note: Median years of education completed is not included in this table because for the general population and most subgroupings the median value is zero.

By statistical area, more than half of women in 9 out of 10 statistical areas have no education. In Western Equatoria 36% of women have no education. On the contrary, less than 10% of women in 8 out of 10 statistical areas have completed secondary education. In Western Equatoria 12% of women had completed secondary education, while in Central Equatoria 15% of women have. In the standard

MIS tables, median years of education is typically included in Table 2.9, but for all of these groups with more than half of the group having no education, median years completed is zero.

Women in higher wealth quintiles are more likely to have completed some education. In the lowest wealth quintile, 85% of women have no education, whereas only 31% of women in the top wealth quintile have no education. The PoC and IDP populations are less educated than the general population. While 66% of women in the general population have no education, 77% of PoC women and 86% of IDP women have no education

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 aged 15-49 years

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 2017 SSMIS results show that, overall, 20% of women aged 15-49 years in South Sudan were literate (**Table 2.10**).

Literacy is higher in the younger age groups: for women aged 15-19 years of age, 42% are literate, while only 7% of women aged 45-49 are literate. By residence, 31% of urban women are literate whereas 17% of rural women were literate. The statistical area with the highest literacy is Central Equatoria, with 31% literacy for women aged 15-49 years, whereas Jonglei has the lowest literacy rate at 11%. Literacy also varied by wealth quintile, increasing from 13% in the lowest wealth quintile to 37% in the highest wealth quintile.

Table 2.10 Literacy

Percent distribution of women age 15-49 by level of schooling attended and level of literacy, and percentage literate, according to background characteristics, for general population and PoC[1] and IDP[2] populations, South Sudan 2017

		No schooling, primary or secondary school								
Background characteristic	Higher than secondary schooling	Can read a whole sentence	Can read part of a sentence	Cannot read at all	No card with required language	Blind/ visually impaired	Missing	Total	Percentage literate[3]	Number of women
Age										
15-19	0.0	17.1	23.3	46.1	1.0	0.1	12.3	100.0	41.4	700
20-24	0.9	6.3	17.8	61.5	1.9	0.0	11.7	100.0	26.8	810
25-29	2.3	3.1	10.5	75.8	1.6	0.1	6.6	100.0	17.5	992
30-34	0.7	3.0	9.8	83.3	1.1	0.0	2.1	100.0	14.6	856
35-39	1.7	1.8	5.7	86.8	0.7	0.0	3.3	100.0	9.9	758
40-44	1.1	1.9	8.8	86.0	0.3	0.0	1.9	100.0	12.1	365
45-49	1.2	0.4	5.5	85.2	0.4	0.0	7.4	100.0	7.4	256
Residence										
Urban	4.1	8.6	17.7	52.3	0.2	0.0	17.1	100.0	31.1	994
Rural	0.4	4.5	10.9	78.9	1.4	0.1	3.9	100.0	17.4	3,459
Statistical area										
Upper Nile	1.0	6.1	15.3	72.3	1.1	0.0	4.2	100.0	24.2	524
Jonglei	0.2	3.3	7.6	87.6	0.0	0.2	1.0	100.0	11.2	421
Unity	0.4	4.0	10.6	83.2	0.0	0.0	1.8	100.0	15.5	226
Warrap	0.2	4.6	7.3	85.3	0.0	0.0	2.7	100.0	12.0	482
Northern Bahr el-Ghazal	0.8	2.1	10.2	84.2	0.0	0.2	2.5	100.0	13.3	518
Western Bahr el-Ghazal	1.4	6.1	12.4	71.1	0.8	0.0	8.1	100.0	21.3	492
Lakes	0.0	5.9	6.8	82.0	0.2	0.0	5.1	100.0	13.1	512
Western Equatoria	0.4	5.3	22.0	60.2	0.4	0.0	11.6	100.0	28.2	450
Central Equatoria	4.5	5.4	14.8	53.6	6.2	0.0	15.5	100.0	31.2	644
Eastern Equatoria	1.3	9.2	15.0	65.6	0.2	0.0	8.8	100.0	25.9	468
Wealth quintile										
Lowest	0.0	2.7	7.1	85.4	2.6	0.1	2.1	100.0	12.5	875
Second	0.0	3.2	7.4	85.9	1.3	0.1	2.1	100.0	12.2	925
Middle	0.1	3.7	10.4	81.8	1.1	0.0	2.8	100.0	15.8	809
Fourth	0.1	6.3	15.0	71.9	0.6	0.0	6.1	100.0	22.1	867
Highest	5.3	10.3	21.3	43.2	0.3	0.0	19.5	100.0	37.8	977
Total	1.2	5.3	12.3	73.4	1.1	0.0	6.6	100.0	5.3	4,737
PoC and IDP										
PoC[1]	1.2	3.7	25.6	65.9	1.2	2.4	0.0	100.0	31.7	82
IDP[2]	0.0	1.3	7.7	91.0	0.0	0.0	0.0	100.0	9.0	78
Total	0.6	2.5	16.9	78.1	0.6	1.3	0.0	100.0	20.6	160

[1] Protection of Civilians: Households living in PoC sites administered by the UN.

[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

[3] Refers to women who attended schooling higher than the secondary level and women who can read a whole sentence or part of a sentence.

3 MALARIA PREVENTION

This chapter describes the population coverage rates of some of the key malaria control interventions in South Sudan, including the ownership and use of insecticide-treated nets (ITNs) and intermittent preventive treatment in pregnancy (IPTp).

3.1 Background on Malaria Control in South Sudan

Malaria is endemic throughout South Sudan and continues to be a major public health problem. Transmission of malaria in South Sudan occurs throughout the year and peaks on rainfall, except in urban cities. South Sudan's rainy season lasts for about six to eight months (April to November). Recently, South Sudan experienced an upsurge of malaria cases in the country late in 2015 and the gradual increase in malaria cases reported in previous years. It is critical that the NMCP updates its data on malaria prevalence and current intervention coverage and use, to ensure proper planning and channelling of future interventions and resources.

Estimating the burden of malaria is highly needed for evidence-based planning of malaria control. In South Sudan, malaria has been the subject of a large amount of epidemiological, entomological and biomedical research. Malaria surveillance, as part of the general reporting of health events from health facilities or specific surveillance for epidemic preparedness, provided a wide range of information (Abdalla 2007).

3.1.1 Health Sector Development Plan

The South Sudan Health Sector Development Plan (HSDP) 2012-2016 provides for the overall vision and strategic direction for development in the health sector. It is adapted to the South Sudan Development Plan (SSDP), drawing its vision from the social and human development pillar goal of the former, which is to promote the well-being and dignity of all people of South Sudan, by progressively accelerating universal access to basic services. The overall goal of the HSDP is to contribute to the reduction of maternal and infant mortality and improve the overall health status, as well as the quality of life of the South Sudanese population" (Ministry of Health 2012).

Malaria control is also emphasised in the Health Policy Document 2016 – 2022. To this end, the Ministry of Health of the Republic of South Sudan, through the National Malaria Control Programme (NMCP), has developed a detailed Malaria Strategic Plan 2014/15 – 2020/21 aimed at significantly scaling up malaria control interventions towards the achievement of two goals:

1. To reduce reported malaria morbidity and mortality by 80% of the 2013 levels, by 2021;
2. To reduce malaria parasite prevalence by 50% of the 2013 levels, by 2021.

The Malaria Strategic Plan 2014/15 – 2020/21 includes these six objectives:

1. To ensure 80% of health facilities routinely report on core malaria indicators, by 2021
2. To strengthen and sustain the management and coordination capacity of the malaria programme at all levels, by 2021
3. To establish malaria emergency preparedness and ensure timely malaria control responses in all communities affected by conflict, natural disaster or epidemics, by 2021
4. To ensure that 100% of the population at risk are covered by recommended malaria prevention methods, by 2021
5. To increase to at least 80%, community and health worker knowledge, attitudes and practices on malaria prevention and control, by 2019
6. To achieve 100% parasitological diagnosis and treatment of all presented malaria cases according to the national guidelines, by 2021

The main interventions in the strategy are vector control (which includes provision of long-lasting insecticide nets, targeted indoor residual spraying (IRS), and larva source management (LCM)); prevention of malaria in pregnancy by provision of intermittent preventive treatment in pregnancy (IPTp); malaria case management (diagnosis and treatment); epidemic-preparedness and response; surveillance, monitoring, evaluation, and operational research; advocacy, communication, and social mobilisation; and programme management (MOH 2014).

3.2 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 South Sudan.

In the 2017 SSMIS, rather than asking about specific brands of nets, interviewers asked about 'hard' vs. 'soft' nets, as they are commonly classified in South Sudan. Due to this questionnaire limitation, a combination of the 'hard' vs. 'soft' classification, net source, and prior information was used to derive the ITN indicator as follows: First, all 'hard' nets available in South Sudan are ITNs, so they were all classified as ITNs. Second, all nets obtained from mass distribution campaigns, Expanded Program on Immunisation (EPI), ANC, health facilities, and Non-governmental Organisation (NGOs) in South Sudan were also classified as ITNs. Together these two classifications indicated that a minimum of 86% of nets sampled were ITNs. Third, the remaining nets (14%) were an unknown mixture of 'soft' or other/unknown nets. In the 2013 SSMIS, of nets that were soft (based on classification of the brands in the 2013 data by material texture) or other/unknown and which were obtained from sources other than mass distribution, EPI, ANC, health facilities, and NGOs, 86% were ITNs. Based on the assumption that the mix of ITNs vs. non-ITNs for the subset of nets with these characteristics has remained similar, 85% of the 14% soft or unknown nets from these sources were randomly selected and classified as ITNs. This results in 98% of the nets in the 2017 SSMIS being classified as ITNs.

In the 2017 SSMIS, the percentage of household with at least one mosquito net (any type) is 64% (**Table 3.1**). Sixty-three percent of households have at least one insecticide-treated net (ITN). The average number of ITNs per household is 1.67. The percentage of household with full household ITN coverage, i.e. at least one ITN for every two people who stayed in the house the previous night, is 28%.

By background characteristics: Seventy-nine percent of urban household own at least one mosquito net of any kind, while 61% of rural households have at least one mosquito net of any kind. 78% of urban households own at least one ITN in the urban areas, while 59% of households in rural areas own at least one ITN. The average number of nets ITNs per household was 2.49 in urban areas and 1.48 in rural areas. In urban areas, 41% of households had at least one ITN for every two persons who stayed in the household the night prior to the survey, while this full household ITN coverage indicator was 25% in rural areas.

Table 3.1 Household possession of mosquito nets

Percentage of households with at least one mosquito net (treated or untreated) and insecticide-treated net (ITN); average number of nets and ITNs per household; and percentage of households with at least one net and ITN per two persons who stayed in the household last night, according to background characteristics, for general population and PoC[1] and IDP[2] populations. South Sudan

Background characteristic	Percentage of households with at least one mosquito net		Average number of nets per household		Number of house-holds	Percentage of households with at least one mosquito 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)[3]	Any mosquito net	Insecticide-treated mosquito net (ITN)[3]		Any mosquito net	Insecticide-treated mosquito net (ITN)[3]	
General population								
Residence								
Urban	79.0	77.5	2.55	2.49	975	41.6	41.0	948
Rural	60.5	59.4	1.51	1.48	4,215	25.0	24.6	3,978
Statistical area								
Upper Nile	61.6	61.4	1.98	1.97	500	38.7	38.7	483
Jonglei	46.3	46.1	1.19	1.17	458	22.9	22.6	433
Unity	55.8	54.3	1.34	1.31	541	19.8	19.6	506
Warrap	75.7	71.8	2.14	2.04	547	24.0	22.5	520
Northern Bahr el-Ghaza	79.7	78.1	2.47	2.41	557	31.7	31.1	521
Western Bahr el-Ghaza	46.1	45.5	1.28	1.26	512	21.9	21.3	506
Lakes	73.8	73.4	1.56	1.55	504	17.7	17.7	458
Western Equatoria	66.1	65.5	1.43	1.41	501	42.6	42.6	474
Central Equatoria	86.8	85.9	2.60	2.54	552	45.3	44.7	512
Eastern Equatoria	42.7	41.1	0.85	0.83	518	17.0	16.4	513
Wealth quintile								
Lowest	62.7	61.7	1.59	1.56	1,077	19.7	19.3	1,012
Second	56.7	55.6	1.34	1.31	1,079	17.9	17.4	1,012
Middle	52.6	52.0	1.19	1.18	1,076	23.3	23.2	1,016
Fourth	66.8	65.2	1.76	1.73	1,033	32.1	31.6	987
Highest	83.9	82.2	2.78	2.70	925	50.6	49.8	899
Total	63.9	62.8	1.70	1.67	5,190	28.2	27.8	4,926
PoC and IDP								
PoC[1]	86.1	83.5	1.94	1.88	144	37.6	14.9	141
IDP[2]	77.6	75.3	2.21	2.14	67	46.9	6.3	64
Total	83.4	75.3	1.97	1.18	211	40.5	15.2	205

[1] Protection of Civilians: Households living in PoC sites administered by the UN.

[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

[3] An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment. In the 2013 SSMIS, this was known as a long-lasting insecticidal net (LLIN).

The percentage of households with full household ITN coverage was highest in Central Equatoria, with 45% of households having at least one mosquito net for every two persons. Eastern Equatoria (16%) and Lakes (18%) had the lowest coverage on the full household ITN coverage indicator.

Households in the higher wealth quintiles had higher full ITN coverage. Only 19% of households in the lowest wealth quintile had full ITN coverage, while 50% of households in the highest wealth quintile had full ITN coverage.

In the PoC and IDP populations, 84% of PoC households had at least one ITN, while 75% of IDP households had at least one ITN. The average number of ITNs per household was 1.88 in PoC households and 2.14 in IDP households. Only 15% of PoC households and 6% of IDP households had full ITN coverage.

Trends: Overall, ownership of at least one ITN by households declined slightly from 66% in 2013 SSMIS to 63% in 2017 SSMIS. The average number of ITNs declined slightly from 1.8 in 2013 SSMIS to 1.67 in 2017 SSMIS. Notably, average household size declined from 6.5 to 6.05 in the same period.

The average number of ITNs per household in urban areas declined from 2.6 to 2.49. The average number of ITNs per household in rural areas declined 1.8 to 1.48.

3.2.1 Sources of ITNs

The sources of mosquito nets recorded in the 2017 SSMIS are presented in **Table 3.2**. Over two-thirds of ITNs (68%) came from mass distribution campaigns. ANC visits and immunisation visits both accounted for 4% of ITNs. 22% of ITNs came from shops or markets. Most non-ITN nets came from markets or shops. Nets sourced from shops/markets were most common in Warrap statistical area (52% of nets) and Northern Bahr el-Ghazal statistical area (38% of nets). Jonglei and Lakes had the lowest share of nets obtained from shops/markets, with 8% of nets in both statistical areas being from that source.

Table 3.2 Source of mosquito nets

Percent distribution of mosquito nets by source of net, according to background characteristics, for general population and PoC[1] and IDP[2]

Background characteristic	Mass distribution campaign	ANC visit	Immuni-zation visit	Govern-ment health facility	Private health facility	Shop/ market	Comm-unity health worker	Religious institution	Other	Don't know	Total	Number of mosquito nets
General population												
Type of net												
ITN[3]	68.2	4.1	4.3	0.4	0.3	21.5	0.2	0.1	0.8	0.2	100.0	8,651
Other[4]	0.0	0.0	0.0	0.0	0.0	99.5	0.0	0.0	0.5	0.0	100.0	184
Residence												
Urban	65.0	4.2	4.2	0.4	0.5	24.2	0.4	0.1	0.8	0.1	100.0	3,536
Rural	68.0	3.8	4.2	0.3	0.2	22.4	0.1	0.0	0.8	0.2	100.0	5,299
Statistical area												
Upper Nile	62.7	4.8	13.7	1.1	2.6	10.8	1.4	0.0	2.2	0.6	100.0	991
Jonglei	88.3	2.9	0.0	0.2	0.6	7.9	0.0	0.0	0.0	0.2	100.0	545
Unity	68.3	1.5	13.8	0.1	0.0	15.9	0.0	0.0	0.1	0.3	100.0	725
Warrap	41.0	4.5	1.3	0.2	0.0	52.1	0.5	0.0	0.3	0.2	100.0	1,169
Northern Bahr el-Ghazal	58.1	2.6	0.8	0.0	0.0	37.8	0.0	0.0	0.7	0.0	100.0	1,376
Western Bahr el-Ghazal	74.8	2.7	6.9	0.3	0.0	15.0	0.0	0.0	0.2	0.2	100.0	655
Lakes	89.3	2.0	0.3	0.1	0.0	7.8	0.0	0.0	0.4	0.1	100.0	784
Western Equatoria	73.5	6.3	4.2	0.0	0.0	14.5	0.0	0.0	1.4	0.1	100.0	716
Central Equatoria	70.7	4.2	1.2	0.8	0.0	22.2	0.0	0.3	0.7	0.0	100.0	1,434
Eastern Equatoria	67.3	10.9	3.0	0.5	0.0	15.7	0.0	0.2	2.3	0.2	100.0	440
Wealth quintile												
Lowest	60.0	4.1	5.7	0.5	0.7	27.7	0.2	0.1	0.9	0.1	100.0	2,298
Second	71.7	5.4	6.0	0.4	0.1	15.0	0.7	0.1	0.6	0.0	100.0	1,390
Middle	72.7	3.9	1.7	0.2	0.5	19.0	0.0	0.0	1.8	0.2	100.0	1,481
Fourth	72.6	3.8	2.1	0.1	0.2	20.4	0.0	0.0	0.5	0.3	100.0	1,684
Highest	61.9	3.0	4.7	0.5	0.0	28.9	0.3	0.0	0.4	0.3	100.0	1,982
Total	66.8	4.0	4.2	0.4	0.3	23.1	0.2	0.1	0.8	0.2	100.0	8,835
PoC and IDP												
PoC[1]	82.8	2.2	5.7	0.4	0.7	6.1	1.4	0.7	0.0	0.0	100.0	279
IDP[2]	98.6	0.0	0.7	0.0	0.0	0.7	0.0	0.0	0.0	0.0	100.0	148
Total	88.3	1.4	4.0	0.2	0.5	4.2	0.9	0.5	0.0	0.0	100.0	427

ANC = Antenatal care

[1] Protection of Civilians: Households living in PoC sites administered by the UN.

[2] Internally Displaced Persons: Households living in IDP settlements administered by various

[3] An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment. In the 2013 SSMIS, this was known as a long-lasting insecticidal net (LLIN).

[4] Any net that is not an ITN

Shops/markets were a source of nets for all wealth quintiles, including 28% of nets owned by households in the lowest quintile and 29% of nets in the highest wealth quintile. Sources of nets were similar between urban and rural households, with 65% of nets in urban areas and 68% of nets in urban areas sourced from mass campaigns.

For the PoC population, 83% of nets came from mass campaigns and only 6% from shops/markets. For the IDP population, 99% of nets came from mass campaigns.

Trends: In the 2013 SSMIS, nets were classified slightly differently, make some comparisons difficult. In the 2013 SSMIS net source options included government health facilities, NGOs, shops, community-based distributors or outreach, vendors, or others (i.e., mass campaign, ANC, and immunisation visit were not options). The most direct comparison is with shops/markets, which were the source of 13% of mosquito nets (any type) in 2013 and 23% of nets in 2017.

3.3 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.

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

Percent distribution of the de facto household population by number of ITNs the household owns, and percentage with access to an ITN, according to number of persons who stayed in the household the night before the survey, for general population and PoC[1] and IDP[2] populations, South Sudan 2017

	Number of persons who stayed in the household the night before the survey								
Number of ITNs[3]	1	2	3	4	5	6	7	8+	Total
General population									
0	32.9	42.9	45.4	40.5	39.4	42.5	34.7	30.6	35.3
1	43.9	29.7	24.4	17.7	14.3	10.1	9.5	6.2	10.4
2	9.0	20.6	18.2	24.1	24.2	20.2	18.5	12.9	17.0
3	4.7	4.0	7.4	11.0	13.4	15.3	19.7	17.1	15.7
4	4.7	1.7	2.0	5.9	4.7	7.0	9.3	12.1	9.1
5	2.0	1.1	0.3	0.6	2.8	2.6	4.6	7.8	5.1
6	0.0	0.0	1.3	0.3	0.8	1.9	1.4	5.1	3.1
7	2.7	0.0	1.0	0.0	0.4	0.4	2.3	8.2	4.4
8+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	217	456	1,325	2,351	3,416	3,946	4,424	14,667	30,802
Percentage with access to an ITN[3,4]	67.5	42.3	32.3	30.9	28.9	25.2	27.1	25.9	54.8
PoC[1] and IDP[2]									
0	*	*	(20.5)	22.5	13.7	20.6	29.1	8.3	16.6
1	*	*	(20.5)	8.5	15.8	22.8	3.3	5.6	11.5
2	*	*	(59.1)	57.4	37.7	33.9	23.0	16.6	29.3
3	*	*	(0.0)	5.4	16.4	19.4	25.4	33.4	22.5
4	*	*	(0.0)	6.2	9.6	3.3	16.0	19.1	12.3
5	*	*	(0.0)	0.0	6.8	0.0	0.0	5.2	2.8
6	*	*	(0.0)	0.0	0.0	0.0	3.3	7.2	2.7
7	*	*	(0.0)	0.0	0.0	0.0	0.0	4.7	2.3
8+	*	*	(0.0)	0.0	0.0	0.0	0.0	0.0	0.0
Total	*	*	(0.0)	100.0	100.0	100.0	100.0	100.0	100.0
Number	13	22	44	129	146	180	213	446	1,193
Percentage with access to an ITN[3,4]	84.6	68.2	43.2	42.6	43.8	28.3	31.0	30.5	69.7

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] Protection of Civilians: Households living in PoC sites administered by the UN.

[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

[3] An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment. In the 2013 SSMIS, this was known as a long-lasting insecticidal net (LLIN).

[4] 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 3.3 shows that 35% of the total households who stayed in the household the night before the survey owned 0 nets, 10% had 1 net, 17% had 2 nets, and 16% had 3 nets. For PoC and IDP households, 17% of the total households owned 0 nets, 12% had 1 net, 29% had 2 nets, and 23% had 3 nets.

Overall, only 55% of the general population has access to an ITN (**Table 3.4**). Access is higher in urban areas, with 74% of the general population having access to an ITN, whereas only 50% of the rural population have access to an ITN. ITN access ranges from 34% in Eastern Equatoria statistical area to 79% in Central Equatoria. Households in higher wealth quintiles have greater access to ITNs: 47% of the population in the lowest wealth quintile have access to an ITN, whereas 83% of the population in the highest wealth quintile have access to an ITN. 65% of the PoC population and 75% of the IDP population have access to an ITN.

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 South Sudan. The National Malaria Control Programme Strategic Plan 2014/2015-2020/2021 prioritises increasing ITN ownership with at least one ITN from the 2014 baseline of 60% to 100% by the year 2020 (MoH 2014/2015-2020/2021).

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.

Table 3.4 Access to an ITN

Percentage of the de facto population with access to an ITN in the household, according to background characteristics, for general population and PoC[1] and IDP[2] populations, South Sudan 2017

Background characteristic	Percentage of the de facto population with access to an ITN[3]	De facto Population
General population		
Residence		
Urban	73.5	6,614
Rural	49.7	24,279
Statistical area		
Upper Nile	63.9	3,314
Jonglei	43.7	2,699
Unity	40.7	3,694
Warrap	56.2	3,847
Northern Bahr el-Ghazal	65.9	3,891
Western Bahr el-Ghazal	43.6	2,919
Lakes	53.2	3,544
Western Equatoria	66.2	2,228
Central Equatoria	79.2	3,433
Eastern Equatoria	34.3	2,516
Wealth quintile		
Lowest	46.9	6,848
Second	42.1	6,422
Middle	43.2	5,728
Fourth	58.7	6,299
Highest	83.3	6,788
Total	54.8	30,892
PoC and IDP		
PoC[1]	65.4	832
IDP[2]	75.3	361
Total	68.4	1,193

[1] Protection of Civilians: Households living in PoC sites administered by the UN.
[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.
[3] Percentage of de facto household population who could sleep under an ITN if each ITN in the household were used by up to two people.

Overall, 39% of the household population in the general population slept under an ITN the previous night (**Table 3.5**). 49% of the urban population slept under an ITN the previous night, whereas only 37% of the rural population slept under an ITN the previous night.

ITN use was higher in the PoC and IDP populations. 63% of the PoC population and 65% of the IDP population slept under an ITN the previous night.

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) and under an insecticide-treated net (ITN); and among the de facto household population in households with at least one ITN, percentage who slept under an ITN the night before the survey, according to background characteristics, for general population and PoC[1] and IDP[2] populations, South Sudan 2017

	Household population			Household population in households with at least one ITN[3]	
Background characteristic	Percentage who slept under any mosquito net last night	Percentage who slept under an ITN[3] last night	Number of persons	Percentage who slept under an ITN[3] last night	Number of persons
General population					
Residence					
Urban	49.5	48.5	6,047	62.4	4,696
Rural	37.5	36.7	24,747	63.1	14,370
Statistical area					
Upper Nile	38.0	37.9	3,653	65.2	2,118
Jonglei	30.5	30.0	4,478	70.4	1,907
Unity	25.7	25.3	2,461	49.4	1,256
Warrap	50.7	48.2	4,315	68.8	3,018
Northern Bahr el-Ghazal	47.3	46.1	3,135	66.1	2,181
Western Bahr el-Ghazal	29.1	28.6	1,130	64.2	503
Lakes	34.3	34.0	3,068	45.8	2,275
Western Equatoria	36.9	36.5	1,577	55.2	1,043
Central Equatoria	60.1	59.2	3,998	68.4	3,449
Eastern Equatoria	28.8	28.0	2,988	63.4	1,317
Wealth quintile					
Lowest	39.6	38.9	6,961	64.5	4,195
Second	35.5	34.6	6,197	64.6	3,314
Middle	31.6	31.1	5,812	61.5	2,930
Fourth	42.5	41.7	5,988	63.4	3,937
Highest	50.4	49.0	5,843	60.9	4,692
Total	39.9	39.0	30,800	62.9	19,066
PoC and IDP*					
PoC[1]	63.2	62.7	838	74.9	698
IDP[2]	64.8	64.8	362	81.8	286
Total	63.4	63.0	1,200	76.9	984

*Note: Estimates by age and gender for the general population could not be generated due to data limitations related to merging datasets.

[1] Protection of Civilians: Households living in PoC sites administered by the UN.

[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

[3] An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment. In the 2013 SSMIS, this was known as a long-lasting insecticidal net (LLIN).

Most existing ITNs are being used, as shown in **Table 3.6.** 86% of existing ITNs were used the previous night, with similar numbers for the urban and rural populations. The percentage of existing ITNs used the previous night ranged from 77% in Upper Nile to 99% in Lakes statistical area.

Use of existing ITNs was also high in the PoC and IDP populations. 98% of existing ITNs in the PoC population and 99% of existing ITNs in the IDP population were used the previous night.

Trends: ITN usage has decreased slightly from 2013 to 2017. In 2013, 44% of the general population slept under an ITN the previous night, whereas in 2017 39% of the general population slept under an ITN the previous night.

Table 3.6 Use of existing ITNs

Percentage of insecticide-treated nets (ITNs) that were used by anyone the night before the survey, according to background characteristics, for general population and PoC[1] and IDP[2] populations, South Sudan 2017

Background characteristic	Percentage of existing ITNs[3] used last night	Number of ITNs[3]
General population		
Residence		
Urban	87.4	3,451
Rural	85.4	5,200
Statistical area		
Upper Nile	76.6	984
Jonglei	91.6	537
Unity	87.0	708
Warrap	82.7	1,118
Northern Bahr el-Ghazal	78.2	1,342
Western Bahr el-Ghazal	86.5	643
Lakes	99.2	780
Western Equatoria	92.5	707
Central Equatoria	88.7	1,402
Eastern Equatoria	91.9	430
Wealth quintile		
Lowest	87.5	2,231
Second	87.3	1,371
Middle	85.0	1,458
Fourth	84.1	1,656
Highest	86.7	1,935
Total	86.2	8,651
PoC and IDP		
PoC[1]	98.2	277
IDP[2]	99.3	148
Total	98.6	425

[1] Protection of Civilians: Households living in PoC sites administered by the UN.

[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

[3] An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment. In the 2013 SSMIS, this was known as a long-lasting insecticidal net (LLIN).

3.4 Use of ITNs by children and pregnant women

Malaria is endemic in South Sudan 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 South Sudan 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).

Table 3.7 shows the percentage of children aged 6 - 59 months who slept under an ITN the night before the survey. Overall, 42% of children aged 6-59 months in South Sudan slept under an ITN the previous night. 55% of children in PoC areas and 70% of children in IDP areas slept under an ITN the night before the survey.

Children aged 6-59 months were more likely to have slept under an ITN in urban areas (52%) than in rural areas (39%). The highest coverage was in Central Equatoria statistical area, with 60% of children aged 6-59 months sleeping under an ITN the previous night, compared to 22% for Unity. Children aged 6-59 months in the highest wealth quintile were more likely (50%) to sleep under a net the previous night than children in the lowest wealth quintile (39%).

ITN use by pregnant women in shown in **Table 3.8.** In the general population, 51% of pregnant women slept under an ITN the previous night. 69% of urban pregnant women and 46% of rural pregnant women slept under an ITN the previous night.

Trends: The percentage of children under 5 who slept under an ITN the previous night decreased slightly from 46% in 2013 to 42% in 2017. The percentage of pregnant women who slept under an ITN was similar in the two surveys, with 50% in 2013 and 51% in 2017.

Table 3.7 Use of mosquito nets by children

Percentage of children aged 6-59 months who, the night before the survey, slept under a mosquito net (treated or untreated) and under an insecticide-treated net (ITN); and among children aged 6-59 months in households with at least one ITN, percentage who slept under an ITN the night before the survey, according to background characteristics, for general population and PoC[1] and IDP[2] populations, South Sudan 2017

	Children aged 6-59 months in all households			Children aged 6-59 months in households with at least one ITN[3]	
Background characteristic	Percentage who slept under any mosquito net last night	Percentage who slept under an ITN[3] last night	Number of children	Percentage who slept under an ITN[3] last night	Number of children
General population					
Age in months					
<12	46.8	45.2	861	73.7	550
12-23	44.0	43.4	892	67.6	573
24-35	38.4	37.9	1,232	67.4	704
36-47	44.0	43.2	1,368	69.5	865
48-59	41.3	40.4	1,392	67.8	850
Sex					
Male	43.0	42.0	2,929	68.6	1,823
Female	42.1	41.4	2,816	69.5	1,719
Residence					
Urban	52.5	51.6	1,055	65.5	838
Rural	39.8	38.9	4,505	69.9	2,555
Statistical area					
Upper Nile	41.3	41.0	581	71.0	338
Jonglei	32.9	32.3	520	73.9	241
Unity	21.9	21.9	712	40.0	390
Warrap	51.7	49.1	655	73.9	456
Northern Bahr el-Ghaza	51.2	49.9	697	72.3	493
Western Bahr el-Ghaza	27.5	27.3	565	67.2	229
Lakes	49.2	48.8	623	65.0	470
Western Equatoria	45.1	45.1	390	65.7	268
Central Equatoria	60.6	59.5	546	71.9	460
Eastern Equatoria	35.0	33.9	454	80.7	197
Wealth quintile					
Lowest	39.8	39.2	1,314	70.2	737
Second	38.7	37.7	1,217	73.9	639
Middle	35.0	34.5	1,086	67.0	572
Fourth	48.9	48.1	1,066	68.2	759
Highest	51.8	50.2	1,060	66.5	835
Total	42.6	41.7	5,745	69.0	3,542
PoC and IDP					
PoC[1]	54.8	54.8	126	67.0	103
IDP[2]	70.2	70.2	57	87.0	46
Total	59.6	59.6	183	73.2	149

Note: Table is based on children who stayed in the household the night before the interview. Due to challenges in matching data between individuals and households, some children could not be matched to nets in the same household, resulting in a possible small underestimate in the indicators in this table.

[1] Protection of Civilians: Households living in PoC sites administered by the UN.

[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

[3] An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment. In the 2013 SSMIS, this was known as a long-lasting insecticidal net (LLIN).

Table 3.8 Use of mosquito nets by pregnant women

Percentage of pregnant women age 15-49 who, the night before the survey, slept under a mosquito net (treated or untreated) and under an insecticide-treated net (ITN); and among pregnant women age 15-49 in households with at least one ITN, percentage who slept under an ITN the night before the survey, according to background characteristics, for general population and PoC[1] and IDP[2] populations, South Sudan 2017

	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 an ITN[3] last night	Number of pregnant women	Percentage who slept under an ITN[3] last night	Number of pregnant women
General population				
Residence				
Urban	68.9	78	82.8	64
Rural	46.4	337	73.3	215
Statistical area				
Upper Nile	(59.3)	27	*	18
Jonglei	(52.6)	38	*	21
Unity	*	22	*	16
Warrap	63.49	63	(80.9)	49
Northern Bahr el-Ghaza	66.13	62	(87.4)	47
Western Bahr el-Ghaza	(42.9)	42	*	19
Lakes	27.12	59	(34.9)	46
Western Equatoria	(35.9)	39	(45.2)	31
Central Equatoria	(64.7)	34	88	25
Eastern Equatoria	(31.4)	35	*	13
Wealth quintile				
Lowest	38.6	79	67.8	46
Second	54.4	98	80.2	63
Middle	46.4	84	72.6	56
Fourth	52.6	77	73.8	56
Highest	63.2	83	82.3	64
Total	51.0	421	75.9	285
PoC and IDP				
PoC[1]	*	5	*	5
IDP[2]	*	1	*	1
Total	*	6	*	6

Notes: 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. Due to a data merging issue (see Challenges and Limitations in Chapter 1) educational status was not available for pregnant women. Note: Table is based on children who stayed in the household the night before the interview. Due to challenges in matching data between individuals and households, some women could not be matched to nets in the same household, resulting in a possible small underestimate in the indicators in this table.

[1] Protection of Civilians: Households living in PoC sites administered by the UN.

[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

[3] An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment. In the 2013 SSMIS, this was known as a long-lasting insecticidal net (LLIN).

3.5 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 South Sudan, 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 (ANC) visits to prevent malaria. IPTp helps prevent maternal malaria episodes, maternal and foetal anaemia, placental parasitaemia, low birth weight, and neonatal mortality. WHO recommends IPTp for all pregnant women beginning in the second trimester (WHO 2016).

Sulphadoxine-pyrimethamine (SP), also known as Fansidar, is the recommended drug for IPTp in South Sudan. For over 10 years, the Ministry of Health has been implementing IPTp, defined as provision of at least two doses of SP/Fansidar to protect the mother and her child from malaria during routine ANC visits in the second and third trimesters of pregnancy (IPTp2+). In 2014 the National Malaria Control Programme adopted the 2012 WHO recommendation to administer one dose of SP/Fansidar at each 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+)

Sixty-seven 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 (**Table 3.9**). Fifty-seven percent of these women received two or more doses of SP/Fansidar, and 31% received three or more doses of SP/Fansidar. In the PoC and IDP populations, the sample size of pregnant women was too small to generate reliable estimates for these indicators.

By residence, the use of IPTp was higher in urban areas (73% received one or more doses of SP/Fansidar) than in rural areas (64%). 38% of women in urban areas received three or more doses, compared to 28% in rural areas.

Trends: Coverage of IPTp has generally increased from 2013 to 2017. The percentage of women with a live birth in the previous 2 years who received one dose of SP/Fansidar increase from 38% to 67%, while the percentage of women with at least two doses of SP/Fansidar increase from 32% to 57%.

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 that resulted in the last live birth, received one or more doses of SP/Fansidar, received two or more doses of SP/Fansidar, and received three or more doses of SP/Fansidar, according to background characteristics, for general population and PoC[1] and IDP[2] populations, South Sudan 2017

Background characteristic	Percentage who received one or more doses of SP/Fansidar	Percentage who received two or more doses of SP/Fansidar	Percentage who received three or more doses of SP/Fansidar	Number of women with a live birth in the 2 years preceding the survey
General population				
Residence				
Urban	72.8	61.9	38.3	394
Rural	64.4	54.4	28.1	1,017
Statistical area				
Upper Nile	47.5	37.6	23.8	181
Jonglei	70.4	53.1	36.7	98
Unity	70.0	60.0	18.6	70
Warrap	66.9	60.1	47.2	163
Northern Bahr el-Ghazal	66.9	60.0	30.8	130
Western Bahr el-Ghazal	63.9	59.4	23.3	180
Lakes	69.9	48.9	14.2	219
Western Equatoria	78.9	73.4	42.2	128
Central Equatoria	64.9	49.6	24.4	131
Eastern Equatoria	79.3	77.5	62.2	111
Education				
No education	61.8	52.1	26.1	1,033
Primary	54.5	54.5	27.3	11
Secondary	80.5	68.8	43.8	308
More than secondary	84.7	69.5	49.2	59
Wealth quintile				
Lowest	77.4	65.8	42.4	243
Second	58.5	51.2	28.0	246
Middle	66.7	55.1	27.1	321
Fourth	61.2	51.5	27.1	291
Highest	70.3	59.4	31.9	310
Total	66.8	56.5	31.0	1,411
PoC and IDP				
PoC[1]	*	*	*	17
IDP[2]	*	*	*	21
Total	(57.9)	(42.1)	(26.3)	38

[1] Protection of Civilians: Households living in PoC sites administered by the UN.
[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

3.5 Media exposure

In the general population, 46% of interviewed women reported seeing or hearing a message about malaria in the 6 months preceding the survey (**Table 3.10**). When asked the source of malaria messages seen or heard in the past 6 months, 39% mentioned community health workers, 27% mentioned health facilities, 24% mentioned community events, and 20% mentioned radio.

Exposure to messages about malaria was similar between urban (48%) and rural (45%) areas. Exposure to malaria messages differed by statistical area, ranging from 20% in Upper Nile to 76 in Western Equatoria statistical area.

Exposure to malaria messages was higher in the PoC and IDP populations: 67% of women in PoC areas and 65% of women in IDP areas reported seeing or hearing a malaria message in the previous six months.

Media exposure questions were not included in the 2013 SSMIS so a comparison of trends is not possible.

Table 3.10 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, for general population and PoC[1] and IDP[2] populations, South Sudan 2017

Background characteristic	Radio	Television	Poster/ Billboard	Community health worker	Community event	Health facility	Any source	Number of women
General population								
Age								
15-19	22.1	8.2	11.7	38.9	24.4	25.3	42.5	669
20-24	20.5	7.7	9.5	40.1	23.4	29.1	46.6	755
25-29	19.0	6.0	7.2	41.6	26.5	28.7	47.7	928
30-34	19.5	4.3	7.0	38.9	22.9	24.8	45.5	809
35-39	20.7	4.3	6.8	39.5	25.1	27.2	48.6	716
40-44	15.5	6.2	4.1	33.7	21.7	25.8	44.0	341
45-49	18.3	8.5	7.2	28.1	20.4	24.3	35.7	235
Residence								
Urban	28.7	15.4	10.6	40.6	20.6	26.7	47.8	1,430
Rural	15.6	1.9	6.7	37.9	25.7	26.9	44.5	3,023
Statistical area								
Upper Nile	8.7	7.7	5.9	20.4	12.8	7.5	29.1	506
Jonglei	3.0	3.8	0.5	22.8	17.7	12.2	29.9	395
Unity	20.5	1.0	17.1	46.7	26.7	24.3	53.8	210
Warrap	18.8	1.7	4.3	46.5	33.4	28.7	50.1	467
Northern Bahr el-Ghazal	31.0	4.1	4.3	23.5	13.0	40.4	32.3	468
Western Bahr el-Ghazal	13.0	4.0	5.0	29.7	21.7	30.2	33.5	424
Lakes	35.1	0.2	30.4	60.0	47.4	52.4	70.0	473
Western Equatoria	31.8	4.0	0.5	75.9	24.8	34.7	80.4	424
Central Equatoria	20.5	18.8	7.9	27.9	14.7	15.3	36.4	634
Eastern Equatoria	13.9	8.6	6.4	44.5	33.4	25.7	48.9	452
Education								
No education	13.6	2.1	5.7	36.3	23.9	25.9	42.2	2,952
Primary	25.5	8.5	4.3	29.8	29.8	17.0	48.9	47
Secondary	29.7	9.9	9.7	43.7	24.0	28.4	52.2	1,096
More than secondary	39.7	27.9	21.5	45.8	25.4	31.3	52.8	358
Wealth quintile								
Lowest	29.5	20.2	10.5	35.9	20.1	26.9	45.5	887
Second	17.0	5.0	7.6	35.3	17.7	21.9	41.1	817
Middle	17.4	2.3	6.0	42.4	27.0	31.3	48.3	906
Fourth	17.7	2.9	5.9	36.2	23.0	24.1	42.1	931
Highest	17.2	0.9	9.9	44.0	31.9	29.6	50.3	912
Total	19.8	6.2	7.9	38.8	24.1	26.9	45.6	4,453
PoC and IDP								
PoC[1]	39.0	0.0	6.1	62.2	31.7	50.0	67.1	82
IDP[2]	44.9	0.0	3.8	32.1	20.5	23.1	65.4	78
Total	41.9	0.0	5.0	47.5	26.3	36.9	66.3	160

[1] Protection of Civilians: Households living in PoC sites administered by the UN.

[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

4 MALARIA IN CHILDREN

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 aged 6-59 months is also assessed.

4.1 Care Seeking for Fever in Children

Care seeking for children aged 6 to 59 months with fever
Percentage of children aged 6 to 59 months 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 aged 6 to 59 months with a fever in the 2 weeks before the survey

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. Forty-three percent of children aged 6 to 59 months had fever in the 2 weeks preceding the survey. Advice or treatment was sought for 78% 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 24% of the febrile children (**Table 4.1**).

Among children with recent fever for whom care was sought, most received advice or treatment in the public sector (89%). Just 11% received advice or treatment in the private sector. Sample sizes for children with recent fever in PoC and IDP areas were too small to report these indicators (**Table 4.2**).

Patterns by background characteristics: Care-seeking is higher for urban children (86%) than for rural children (76%). There are no observed differences between fever prevalence or care seeking by sex. Timely care (the same day or next day) was sought for 22% of male children and 27% of female children. The sample size of children for whom care was sought was generally low enough to make comparisons difficult.

The percentage of children aged 6 to 59 months for whom advice or treatment was sought the same day or the next day is 24%. Children from households in higher wealth quintiles are more likely to receive advice or care and to receive it quickly. While care is sought for 71% of children in the lowest wealth quintile, care is sought for 88% of children in the highest quintile. Timely care was sought for 18% of children in the lowest wealth quintile and 35% of children in the highest quintile.

Trends: Care seeking increased substantially between 2013 and 2017. The percentage of children with fever in the two weeks preceding the survey was similar between 2013 (45%) and 2017 (42%). The percentage for whom advice or treatment was sought increased from 57% in 2013 to 78% in 2017.

Table 4.1 Prevalence, diagnosis, and prompt treatment 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, percentage for whom advice or treatment was sought, percentage for whom advice or treatment was sought the same or next day following the onset of fever, and percentage who had blood taken from a finger or heel for testing, according to background characteristics, for general population and for PoC[1] and IDP[2] populations, South Sudan 2017

	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[3]	Percentage for whom advice or treatment was sought the same or next day[3]	Percentage who had blood taken from a finger or heel for testing	Number of children
General population						
Age in months						
<12	38.3	201	76.6	20.8	48.1	77
12-23	48.6	216	78.1	19.0	44.8	105
24-35	37.7	204	76.6	24.7	53.2	77
36-47	44.6	224	77.0	26.0	48.0	100
48-59	47.4	133	85.7	31.7	49.2	63
Sex						
Male	42.5	499	78.3	21.7	48.6	212
Female	43.8	479	78.6	26.2	48.1	210
Residence						
Urban	39.6	202	86.3	32.5	70.0	80
Rural	44.1	776	76.6	21.9	43.3	342
Statistical area						
Upper Nile	40.4	99	(90.0)	(22.5)	(87.5)	40
Jonglei	72.3	65	(80.9)	(27.7)	(42.6)	47
Unity	41.8	55	*	*	*	23
Warrap	40.6	96	(76.9)	(23.1)	(25.6)	39
Northern Bahr el-Ghazal	47.8	67	(68.8)	(21.9)	(53.1)	32
Western Bahr el-Ghazal	32.3	127	(68.3)	(26.8)	(41.5)	41
Lakes	69.9	166	79.3	12.9	34.5	116
Western Equatoria	24.3	140	(76.5)	(8.8)	(58.8)	34
Central Equatoria	36.5	85	(77.4)	(41.9)	(61.3)	31
Eastern Equatoria	24.4	78	*	*	*	19
Mother's education						
No education	46.0	707	75.7	22.8	42.8	325
Primary	37.1	232	88.4	27.9	68.6	86
Secondary	(18.8)	32	*	*	*	6
More than secondary	*	7	*	*	*	5
Wealth quintile						
Lowest	50.3	197	71.7	18.2	28.3	99
Second	44.6	231	72.8	19.4	45.6	103
Middle	40.2	194	79.5	25.6	43.6	78
Fourth	43.5	177	85.7	26.0	59.7	77
Highest	36.3	179	87.7	35.4	75.4	65
Total	43.1	978	78.4	23.9	48.3	422
PoC and IDP						
PoC[1]	*	20	*	*	*	3
IDP[2]	*	7	*	*	*	3
Total	*	27	*	*	*	6

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] Protection of Civilians: Households living in PoC sites administered by the UN.

[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

[3] Includes advice or treatment from the following sources: puvlic sector, private medical sector, shop, and market. Excludes advice or treatment from a traditional practitioner

4.2 Diagnostic Testing of Children with Fever

The 2017 SSMIS asked 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 hell for testing during the illness. This measure is used as a proxy measure for diagnostic testing for malaria.

In the 2017 SSMIS, 48% of children under age 5 with fever had blood taken from a finger or heel for testing. Seventy percent of urban febrile children had blood taken from a finger or heel for testing, versus only 43% from rural areas. Similarly, children from the highest wealth quintile are more likely (75%) to have blood taken for testing than children from the lowest wealth quintile (28%).

Trends The percentage of children who had blood taken from a finger or heel for testing increased from 28% in the 2013 SSMIS to 48% in the 2017 SSMIS. This shows that children are increasingly being tested for malaria.

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 5 with fever in the 2 weeks preceding the survey for whom advice or treatment was sought, the percentage for whom advice or treatment was sought from specific sources, for general population and for PoC[1] and IDP[2] populations, South Sudan 2017

	Percentage for whom advice or treatment was sought from each source:	
Source	Among children with fever	Among children with fever for whom advice or treatment was sought
General population		
Public sector		
Government hospital	22.3	28.4
Government health center	18.2	23.3
Government health post	20.1	25.7
Mobile Clinic	0.7	0.9
Fieldworker/CHW	0.2	0.3
Other public sector	8.5	10.9
Private medical sector		
Private hospital/clinic	2.1	2.7
Pharmacy	3.6	4.5
Private doctor	1.4	1.8
Mobile Clinic	0.7	0.9
Fieldworker/CHW	0.5	0.6
Other private medical sector	0.0	0.0
Other	0.0	0.0
Number of children	422	331
PoC and IDP		
PoC[1]	*	*
IDP[2]	*	*
Number of children	6	3

CHW = Community health worker

[1] Protection of Civilians: Households living in PoC sites administered by the UN.

[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

4.3 Use of Recommended Antimalarials

Artemisinin-based combination therapy (ACT) for children aged 6 to 59 months with fever
Among children aged 6 to 59 months 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 aged 6 to 59 months 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 South Sudan.

In the 2013 SSMIS a list of ACTs was included to facilitate identification of ACTs, whereas in the 2017 SSMIS interviewers were trained with a list of commonly available ACTs, but this was not included in the response options on the questionnaire. This led to apparently high misclassification of the most common ACT, artesunate amodiaquine, as artesunate monotherapy or amodiauqine monotherapy. In the analysis, amodiaquine and artesunate reported as received from any source other than a hospital were first reclassified as “any ACT”. Even with this reclassification, rates of artesunate and amodiaquine monotherapies remained higher than expected, indicating there was likely misclassification for those who received treatment at hospitals as well. In the final tables, all artesunate and amodiaquine monotherapies are reclassified as “any ACT”. This likely results in some over-reporting of ACT usage.

According to the results shown in **Table 4.3**, 61% of children aged 6 to 59 months with recent fever who received an antimalarial took an ACT.

Trends: The percentage of children receiving any ACT increased strongly between 2013 and 2017. In the 2013 SSMIS, just 20% of children under age five with a fever received an ACT, compared to 61% in the 2017 SSMIS. This is attributable to both increased care-seeking, and a higher likelihood that children for whom care is sought will receive an ACT.

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, percentage who took specific antimalarial drugs, according to background characteristics, for general population and for PoC[1] and IDP[2] populations, South Sudan 2017

	Percentage of children who took:							Number of children with fever who took any antimalarial drug
Background characteristic	Any ACT	SP/ Fansidar	Chloro-quine	Amodia-quine*	Quinine pills	Artesun-ate*	Other anti-malarial	
General population								
Age in months								
<6	(50.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	22
6-11	(38.7)	(100.0)	(9.7)	(0.0)	(0.0)	(0.0)	(3.2)	31
12-23	51.9	100.0	2.5	0.0	7.6	0.0	3.8	79
24-35	72.9	100.0	3.4	0.0	6.8	0.0	5.1	59
36-47	63.9	100.0	0.0	0.0	0.0	0.0	1.4	72
48-59	73.6	100.0	3.8	0.0	11.3	0.0	1.9	53
Sex								
Male	59.1	6.9	2.5	0.0	5.0	0.0	1.9	159
Female	62.4	7.6	3.2	0.0	4.5	0.0	3.8	157
Residence								
Urban	50.0	1.5	4.5	0.0	9.1	0.0	7.6	66
Rural	63.6	8.8	2.4	0.0	3.6	0.0	1.6	250
Statistical area								
Upper Nile	(29.6)	(0.0)	(0.0)	(0.0)	(11.1)	(0.0)	(0.0)	27
Jonglei	(71.1)	(15.8)	(2.6)	(0.0)	(5.3)	(0.0)	(0.0)	38
Unity	*	*	*	*	*	*	*	20
Warrap	(55.6)	(7.4)	(3.7)	(0.0)	(0.0)	(0.0)	(0.0)	27
Northern Bahr el-Ghazal	*	*	*	*	*	*	*	20
Western Bahr el-Ghazal	(41.4)	(3.4)	(0.0)	(0.0)	(10.3)	(0.0)	(6.9)	29
Lakes	70.0	12.2	4.4	0.0	4.4	0.0	0.0	90
Western Equatoria	(84.6)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	26
Central Equatoria	(32.0)	(0.0)	(8.0)	(0.0)	(4.0)	(0.0)	(24.0)	25
Eastern Equatoria	*	*	*	*	*	*	*	14
Mother's education								
No education	63.2	8.1	3.4	0.0	4.7	0.0	0.9	234
Primary	56.2	5.5	0.0	0.0	5.5	0.0	8.2	73
Secondary	*	*	*	*	*	*	*	5
More than secondary	*	*	*	*	*	*	*	4
Wealth quintile								
Lowest	63.4	15.5	7.0	0.0	5.3	0.0	0.0	71
Second	59.2	5.3	1.3	0.0	5.5	0.0	0.0	76
Middle	67.3	3.6	1.8	0.0	0.0	0.0	0.0	55
Fourth	66.1	6.5	1.6	0.0	3.8	0.0	0.0	62
Highest	46.2	3.8	1.9	0.0	6.7	0.0	0.0	52
Total	60.8	7.3	2.8	0.0	4.7	0.0	2.8	316
PoC and IDP								
PoC[1]	*	*	*	*	*	*	*	2
IDP[2]	*	*	*	*	*	*	*	1
Total	*	*	*	*	*	*	*	3

ACT = Artemisinin-based combination therapy

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.

* Due to an issue with questionnaire design, ACT treatments were misclassified as amodiaquine and artesunate monotherapies for many respondents. These answers were recoded as "Any ACTs". Details are described in Chapter 4.

[1] Protection of Civilians: Households living in PoC sites administered by the UN.

[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

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 7 grams per decilitre (g/dl) of blood.
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 8 g/dl (RBM 2003).

Among eligible children age 6-59 months from interviewed households, almost all (97%) consented and were tested for anaemia (**Table 4.4)**. **Table 4.5** presents results of anaemia testing in the 2017 SSMIS, using a cut-off of <7.0 g/dl. Due to data entry and data cleaning issues, anaemia rates for Lakes and Western Equatoria statistical areas could not reliably be reported. Results of anaemia testing for these statistical areas were excluded in Table 4.5 both in the analysis by statistical area and in the other analyses.

Seven percent of children aged 6-59 months had haemoglobin lower than 7.0 g/dl. Anaemia was generally more prevalent. Anaemia was higher in urban children (10%) than in rural children (6%). It did not differ substantially by wealth quintile. By statistical area, anaemia ranged from 3% in Central Equatoria to 18% in Western Bahr el-Ghazal.

Trends: The percentage of children with severe anaemia stayed roughly similar between 2013 and 2017. In the 2013 SSMIS a threshold of 8.0 g/dl was used for severe anaemia, and 8% of children were below that threshold. In the 2017 SSMIS, with a more severe cut-off of 7.0 dg/dl, anaemia prevalence was 7%.

Table 4.4 Coverage of testing for anemia and malaria in children

Percentage of eligible children age 6-59 months who were tested for anemia and for malaria, by background characteristics (unweighted), for general population and PoC[1] and IDP[2] populations, South Sudan 2017

Background characteristic	Percentage tested for: Anemia	Malaria with RDT	Malaria by microscopy	Number of children
General population				
Age in months				
6-8	99.6	67.9	90.5	252
9-11	96.6	76.9	91.9	295
12-17	98.2	71.2	91.9	493
18-23	96.7	75.1	93.0	575
24-35	96.8	73.9	91.3	1,147
36-47	97.0	71.8	90.9	1,310
48-59	97.6	68.9	85.6	763
Sex				
Male	96.9	71.3	89.5	2,384
Female	97.6	72.4	90.8	2,241
Residence				
Urban	93.2	71.9	87.2	851
Rural	98.5	70.9	90.5	3,647
Statistical area				
Upper Nile	97.2	96.3	98.0	461
Jonglei	97.6	97.9	99.5	423
Unity	97.2	97.0	98.8	599
Warrap	99.6	1.3*	99.6	520
Northern Bahr el-Ghazal	99.5	99.4	99.7	637
Western Bahr el-Ghazal	87.4	99.4	100.0	491
Lakes	99.3	14.7*	0.0*	428
Western Equatoria	96.8	36.7*	99.3	409
Central Equatoria	98.4	66.3*	99.1	442
Eastern Equatoria	99.3	99.3	100.0	425
Mother's education[3]				
No education	97.8	73.7	89.5	3,698
Primary	95.9	67.6	94.8	923
Secondary	94.9	68.4	89.3	177
More than secondary	89.2	70.3	97.3	37
Wealth quintile				
Lowest	98.8	63.2	84.5	1,040
Second	98.6	71.5	88.0	934
Middle	98.4	73.6	89.7	894
Fourth	96.3	76.0	92.0	820
Highest	94.3	71.7	96.8	771
Total	97.2	72.3*	90.5*	4,835
PoC and IDP				
PoC[1]	78.7	90.4	90.4	94
IDP[2]	100.0	61.4	59.0	83
Total	89.1	96.0	97.0	177

RDT = Rapid Diagnostic Test

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. Number of children by sex does not sum to

* For some Statistical Areas, unique identifier and data matching issues prevented matching mRDT and miscroscopy results with survey results, resulting in low percentages of reported tested in this table.

[1] Protection of Civilians: Households living in PoC sites administered by the UN.

[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

[3] For women who are not interviewed, information on education is taken from the Household Questionnaire. Excludes children whose mothers are not listed in the Household Questionnaire.

Table 4.5 Haemoglobin <7.0 g/dl in children

Percentage of children age 6-59 months with haemoglobin lower than 7.0 g/dl, according to background characteristics, South Sudan 2017

Background characteristic	Haemoglobin <7.0 g/dl	Number of children
General population		
Age in months		
6-8	5.6	177
9-11	6.6	229
12-17	3.7	356
18-23	10.0	429
24-35	8.6	887
36-47	6.1	948
48-59	7.9	504
Sex		
Male	7.2	1550
Female	6.9	1780
Residence		
Urban	10.4	576
Rural	5.8	2637
PoC and IDP		
PoC[2]	4.7	86
IDP[3]	*	5
Total	4.4	91

Background characteristic	Haemoglobin <7.0 g/dl	Number of children
Statistical area		
Upper Nile	8.4	452
Jonglei	4.5	421
Unity	3.7	590
Warrap	12.7	221
Northern Bahr el-Ghazal	4.4	635
Western Bahr el-Ghazal	17.7	491
Lakes	*	312
Western Equatoria	*	350
Central Equatoria	3.1	295
Eastern Equatoria	5.6	425
Wealth quintile		
Lowest	7.8	721
Second	4.4	682
Middle	4.7	654
Fourth	7.0	582
Highest	9.0	535
Total	7.2	3530

Note: Table is based on children who stayed in the household the night before the interview. haemoglobin is measured in grams per deciliter (g/dl). An asterisk indicates a figure is based on fewer than 25 cases and has been suppressed. Number of children by sex does not sum to same as total number of children due to missing sex responses.

* Due to data entry and data cleaning issues, results for Lakes and Western Equatoria statistical areas could not be reliably reported and were excluded from analysis by other background characteristics.

[1] Includes children whose mothers are deceased

[2] Protection of Civilians: Households living in PoC sites administered by the UN.

[3] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

4.5 Prevalence of Malaria in Children

Malaria prevalence in children
Percentage of children aged 6-59 months infected with malaria according to microscopy results.
Sample: Children aged 6-59 months

In South Sudan, 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 2017 SSMIS, 32% of children aged 6-59 months were positive for malaria parasites according to rapid diagnostic tests (RDTs), as shown in **Table 4.6**. Microscopy tests were done in conjunction with RDTs. However, there were severe challenges in this matching of microscopy results to RDT results, as described in the challenges and limitations section above. Microscopy results could be matched by statistical area, but in a high percentage of cases could not be matched to a specific household. Thus, microscopy results are presented only for the national total and for the analyses by statistical area. National malaria prevalence by microscopy was 21%, substantially lower than prevalence by RDT.

Patterns by background characteristics: Malaria prevalence by RDT generally increased from the youngest groups (6-8 months old have 20% prevalence) to older groups (48-59 months old have 37% prevalence). The prevalence of malaria according to RDT does not vary substantially by sex, with 31% prevalence for male children 6-59 months vs. 33% prevalence for female children.

Malaria prevalence is higher among rural children, who have 32% prevalence by RDT, compared to 25% prevalence for urban children 6-59 months. Malaria prevalence varied substantially between statistical areas, with Northern Bahr el-Ghazal (53%) and Western Bahr el-Ghazal (49%) having the highest prevalence by RDT, while Upper Nile (10%) and Lakes (7%) had the lowest prevalence by RDT. Malaria prevalence by microscopy was generally substantially lower than prevalence from RDTs for each statistical area. The only exception was Lakes statistical area, which had an RDT prevalence of 7% and a microscopy prevalence of 13%. Children born to mothers with no education have a high malaria prevalence at 33% while children born of mothers with secondary education had prevalence of 22%.

Malaria prevalence for PoC and IDP populations was similar or slightly lower, though small samples make comparisons difficult.

Trends: The prevalence of malaria in children aged 6-59 months RDT positive increased slightly from 30% in 2013 to 32% in 2017. The general patterns of differing malaria prevalence by urban vs. rural residence remained the same between 2013 and 2017.

Table 4.6 Prevalence of malaria in children

Percentage of children age 6-59 months classified as having malaria, by background characteristics, for general population and PoC[1] and IDP[2] populations, South Sudan 2017

Background characteristic	Malaria prevalence according to RDT		Malaria prevalence according to microscopy	
	RDT positive	Number of children	Microscopy positive	Number of children
General population				
Age in months				
6-8	19.9	251	*	*
9-11	24.0	288	*	*
12-17	25.0	488	*	*
18-23	31.4	567	*	*
24-35	32.7	1,127	*	*
36-47	35.6	1,295	*	*
48-59	37.2	755	*	*
Sex				
Male	31.3	1,787	*	*
Female	32.8	1,508	*	*
Residence				
Urban	24.8	840	*	*
Rural	32.1	3,597	*	*
Statistical area				
Upper Nile	10.1	444	2.7	187
Jonglei	26.6	414	9.7	391
Unity	15.5	579	8.4	609
Warrap	44.6	520	31.6	560
Northern Bahr el-Ghazal	53.1	633	32.5	748
Western Bahr el-Ghazal	49.4	488	32.5	507
Lakes	7.1	425	12.5	264
Western Equatoria	14.2	408	20.7	479
Central Equatoria	43.8	438	6.4	393
Eastern Equatoria	46.2	422	24.9	490
Education[3]				
No education	33.4	3,622	*	*
Primary	28.2	925	*	*
Secondary	26.2	187	*	*
More than secondary	21.6	37	*	*
Wealth quintile				
Lowest	34.1	487	*	*
Second	37.3	400	*	*
Middle	24.3	407	*	*
Fourth	26.2	435	*	*
Highest	21.8	403	*	*
Total	32.0	4,771	20.7	4,628
PoC and IDP				
PoC[1]	33.7	86	*	*
IDP[2]	18.4	87	*	*
Total	23.7	173	*	*

RDT = Rapid Diagnostic Test

* Due to data matching issues with laboratory data, malaria microscopy results are only shown by statistical area and for the total population. Breakdowns by household characteristics could not be reliably produced.

[1] Protection of Civilians: Households living in PoCivilian sites administered by the UN.

[2] Internally Displaced Persons: Households living in IDP settlements administered by various agencies.

[3] For women who are not interviewed, information on education is taken from the Household Questionnaire. Excludes children whose mothers are not listed in the Household Questionnaire.

REFERENCES

Abdalla SI, Malik EM, Ali KM. “The burden of malaria in South Sudan: Incidence, mortality and disability-adjusted life years.” *Malar J 2007* Jul 28;6:97.

Doolan, D. L., C. Dobano, and J. K. Baird. 2009. “Acquired Immunity to Malaria.” *Clin Microbio 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, Republic of South Sudan, Health Sector Development Plan 2012-2016.

Ministry of Health, Republic of South Sudan, South Sudan Malaria Control Strategic Plan 2014/16-2021/22. Ministry of Health, Republic of South Sudan, Health Sector Development Plan 2012-2016.

National Bureau of Statistics, 2015. Population Projections for South Sudan 2015-2020.

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.

South Sudan 2013 Malaria Indicator Survey Report.

APPENDIX A: DETAIL ON TECHNICAL ISSUES

Note on table sample sizes and data merging: There were limitations in how the electronic data collection was implemented using CSPro, resulting in some lost data from mothers, children, and pregnant women. The modules of the surveys for these subgroups were set up as separate questionnaire instances on the same tablets, where a unique identifier consisting of SA, cluster numbers, and household line number allowed for the matching of household members to general data on the clusters. However, in the case of enumerator error in entering these three variables either in the household survey or in the sub-modules, matching by these variables alone was not possible. To mitigate this error, data was matched between the household dataset and the sub-modules using text strings from individuals' names. This allowed additional cases to be matched. All data for these sub-modules was used in national analysis and analysis by SA. For analysis by urban vs. rural and by wealth index only data that had been matched to households could be used. This results in some discrepancies between the sample sizes of different groups within different tables.

Response rates for women and children by statistical area: Of women who were eligible to be interviewed only 70% were successfully interviewed (**Table A1**). This is substantially less than is typically achieved in Malaria Indicator Surveys. Rates for children being interviewed were also low, with 78% of eligible children interviewed. Response rates varied substantially by statistical area, ranging from 27% in Unity statistical area to 87% in Western Equatoria statistical area. This may indicate that variations in the quality of enumerator training and supervision contributed to the differing response rates.

Table A1. Eligible response rate by statistical area for women and children

Number of eligible women, number of women interviewd, and response rate, according to statistical area (unweighted), for the general population, South Sudan 2017

	Eligible	Interviewed	Response rate
Women			
Upper Nile	770	555	72.1
Jonglei	654	558	85.3
Unity	874	236	27.0
Warrap	784	521	66.5
Northern Bahr el-Ghazal	865	550	63.6
Western Bahr el-Ghazal	672	511	76.0
Lakes	785	602	76.7
Western Equatoria	527	458	86.9
Central Equatoria	845	666	78.8
Eastern Equatoria	598	492	82.3
Total	7,374	5,149	69.8
Children			
Upper Nile	709	495	69.8
Jonglei	652	549	84.2
Unity	843	666	79.0
Warrap	750	614	81.9
Northern Bahr el-Ghazal	879	718	81.7
Western Bahr el-Ghazal	714	577	80.8
Lakes	791	558	70.5
Western Equatoria	459	449	97.8
Central Equatoria	707	453	64.1
Eastern Equatoria	549	443	80.7
Total	7,053	5,522	78.3

The distribution of enumeration areas and households in the sampling frame are displayed in **Table A2**.

Table A2. Enumeration areas and households

Distribution of the enumeration areas and households in the sampling frame by region and residence, South Sudan 2017

	Number of enumeration areas in frame			Number of households in frame		
	Urban	Rural	Total	Urban	Rural	Total
Statistical area						
Upper Nile	17	28	45	87	418	505
Jonglei	3	32	35	66	407	473
Unity	7	31	38	100	441	541
Warrap	1	37	38	40	511	551
Northern Bahr el-Ghazal	8	36	44	118	439	557
Western Bahr el-Ghazal	13	19	32	187	334	521
Lakes	4	29	33	103	401	504
Western Equatoria	4	31	35	81	420	501
Central Equatoria	8	26	34	140	412	552
Eastern Equatoria	3	31	34	60	460	520
Total	68	300	368	982	4,243	5,225

APPENDIX B: KEY PARTNERS AND SURVEY PERSONNEL

Partners

Ministry of Health, Republic of South Sudan

National Bureau of Statistics, Republic of South Sudan

Population Services International (PSI)

World Health Organization

Malaria Consortium

Interchurches Medical Assistance (IMA

Survey Personnel

Name	Designation and Organisation
Dr. Richard Lako	Principal Investigator
Dr. Harriet Pasquale	Co-Principal Investigator
Wilson John Sebit	Co-Principal Investigator
Adwok Chol	Co-Principal Investigator
Dr. Pinyi Nyimol Aupur	Director General of Preventive Health Services, MoH
Dr. Thuou Loi	Director General of International Health & Coordination, MoH
Dr. Lul Lojok	Director General of Public Health Laboratory, MoH
Margaret Labanya	Director General National Bureau of Statistics of South Sudan
Dr. Kediende Chong	Chairman Country Coordinating Mechanism South Sudan
Isaac Maper	NMCP Deputy Director NMCP
Dr. Margaret Betty	GHSC (Global Health Supply Chain)
Charles Agono	NBS - Director Mapping and GIS
Julius Sebit	NBS - Sampling Expert
John Kongor	NBS – IT
Jimmy Simon	NBS – IT
Mathew Tut	PHL
Khoti Gausi	WHO IST, Harare regional office, South and Eastern Africa
Deric Zanera	WHO MIS Consultant
Dr. Charimari Lincoln	WHO Malaria Representative
Gerishon Gachoki	PSI Country Representative

Brett Keller	PSI Regional Researcher, East Africa
Stephen Poyer	PSI Research Advisor, Malaria
Dr. Peter Hayombe	PSI MIS Coordination Consultant
Herbert Kere	PSI PMU M&E Manager
Juliana Bol	PSI Data Analysis Consultant
Dr. Martina Jervase	NMCP Case Management Specialist
Bakhit Sebit	Central Supervisor - Western Bhar el Ghazal
Thon Mayen	Central Supervisor - Jonglei
Dhieu Marial	Central Supervisor - Lakes
Constantino Dogale	Central Supervisor - Warrap
Peter Kon	Central Supervisor - Northern Bhar el Ghazal
Victor E. Misaka	Central Supervisor - Western Equatoria
Valeriano Lagu	Central Supervisor - Eastern Equatoria
Lea Muja	Central Supervisor - Central Equatoria
Esther Keji Isaac	Central Supervisor - Unity
Mark Y. Lual	Central Supervisor - Upper Nile
Charles Stanley Mazinda	PHL Parasitologist
Chaplain Monaji	PHL Laboratory Technologist/ Technician
Charity Ritti	PHL Laboratory Technologist/ Technician
Andrew Lazaro	PHL Laboratory Technologist/ Technician
Achan Atem	PHL Laboratory Technologist/ Technician
Edema John Mark	PHL Laboratory Technologist/ Technician
Bakhita Wani	PHL Laboratory Technologist/ Technician
Rebecca Namach	PHL Laboratory Technologist/ Technician
Josephine Iteng	PHL Laboratory Technologist/ Technician
Poni Grace	PHL Laboratory Technologist/ Technician
Rose Achiro Lorim	PHL Laboratory Technologist/ Technician
Manasseh Ayawa Justin	PHL Laboratory Technologist/ Technician
Clement Koma Dosteo	PHL Laboratory Technologist/ Technician

Interviewers

Abraham Kor Ater
Abraham Mayuom Chol
Abuoi Maiwak
Achan Atem Majok
Adhel Deng Wol
Adut Bosco Kajok
Adwok Chol Awur
Agange Nemollo Ochalla
Agnes Bayoa Aloysioris
Aguet Elizabeth
Agul Ujieth Nyang
Ahok Santo Garang
Ajiith Bok
Akech Albeto Makuach
Akech Mangar Akech
Akol Deng Akol
Akot Wol Kuot
Akuien Chol Akuien
Akuoch Albino Chiech
Alich Aluk Alich
Alier Kon Deng
Alue Tom Albert
Amin Opiew Nyigwa
Angelina Adut Agol
Angelo Goup Thon Kouch
Angoot Chuth
Angwey Ajang John
Aporomon Doreena Mathya
Arok Ngong Joseph
Arop Manyang
Arun Atuer Jok
Atap Dhieu Kuel
Ather Martin Ather
Athieng Cecilia Paul
Aurwei Maker Malual
Awar Athuai
Ayom Thiong Akuei
Ayuang Kuel Bol
Ayuen Mabut Nyok
Bakhit Sebit
Bakhit Sebit Saleh
Barnabas Bol Apioth
Benjamin Majok Makuei
Benjamin Makur Gawer
Benson Anyiec
Benson Bol Bak
Chol Thuch Gai
Chuol Duol Kuou
Clement Tong Lual
Constantino Dogale
Daniel Akec Achut
Daniel Deng Galuak
Daniel John Ojulu
Daniel Kuach Atuer
Daniel Malek Ajok
Daniel Tong Kuel
David Arop Mabok
David Deng Deng
David Kur Malieth
De Santos Athian
Deng Ariik Thon
Deng Garang Akechak
Deng James Mangaar
Dhieu Marial Gum
Doreen Martha
Duol Biem
Elizabeth Nyaluak Rial
Felix Lobur Wilson
Fermino Saad Arop
Gabriel Garang Akoon
Gabriel Mach Garang
Garang Deng Dong
Garang Deng Kon
Garang Kuol Mabior
Gatluak Malual
Genaro Joseph Genaro
Gordon Pandit Mapuor
Gumjuer Thii
Hakim Idris Ida
Haya Salam
Hong Wekdit
Isaac Majok Manguen
Isaiah Nhial
Jaach Chol
Jacob Allani Rachu
James Chol Garang
James Lual Garang
James Mabor Majok
James Rin Agok
James Tiel Madhieu
Jeremiah Yel Yel
Jiji Jowang Taktak
Joseph Dak Deng
Joseph Deng Aguer
Joseph Deng Akok
Joseph Velentino Oliha
Joshua Lony Gatdet
Julius Sebit
Juma Nyagirech Korok
Kan Ajak
Kepa Simon Lojuan
Koma Richard Laku
Kongor Micheal Kiir
Koro Mel Koro
Kueth Choul Yach
Kuir Garang Atem
Kuol Ajok Alier
Kuol Gabriel Manyang
Lagu Valeriano
Lam Francis Gabriel
Lazaro Atem
Lea Muja
Lino Lual Dau
Lomude Denis
Lotila Gain Ngare
Luka Lual Chol
Luke Loyen Lochul
Mabior Abraham Reech
Mabior Paul Malaak
Mabok Tong
Machar Kunyuk
Magok Ayuel Santo
Majok Diing Wol
Majur Liok
Makhor Dak Chol
Makop Dak Akucpiir
Makuac Akuel
Malong Guot
Malou Aweer
Malual Loch
Mangar Ayiei
Mangok Chol
Mansuk Moses Timon
Mansuk Timon
Manyang Majok Garang
Manyiel Lul
Marial Bai
Marial Moses Mathiang
Moses Ater Nuer
Moses Chol Ater
Moses Dharojok Obongol
Moundit Mur
Naivasha Kuol
Nhiak Apollo Madok
Okello Okony Okumo
Omot Nyigwo Akway
Onyango Johny Ukal
Pandek Deu Deng
Peter Aberec Riak
Peter Bol Adut
Peter Kon Thil
Peter Mangar Lual
Peter Mayen Juol
Peter Tong Noon
Philip Kau Manyiel
Philiph Bakhit Layek
Phillip Ezekiel Kutjok
Rachiel Ajier Akol
Rejoice Opal Adwok
Rumrol Juol
Salwa Ali Ibrahim
Samuel Achier Dut
Samuel Maketh Lual
Santino Kiron Thewa
Santino Lual Ngor
Selwa Ali Ibrahim
Simon Nyok Mach
Simon Ochalla Wello
Susan Akuol Gor
Suzy Agrey Abas
Teresa Ajah Ajak
Thon Mayen Thon
Thuch Achol John
Tiar Aliet
Tito Kuot
Tong Mayom Chiech
Turuk Koang Nyuel
Uyon Chol
Valentino Garang Deng
Valentino Makuei
Victor E. Miska
Victoria Abua
Victoria Cornelious
Victoria Reech Kuol

Bibian John Nyibil
Bol Adut
Bol Mawien
Bul Mamer Mabior
Cecilia Athieng
Cecilia Konga
Celerino Peter Ocele
Chacha Oleyo Iboni
Chan Malek
Charity Riti
Charles Agono Mona
Charles Peter
Chimel Thii
Chol Manyiel Majuot
Jimi Simon Lako
John Akec
John Akol Andrew
John Akol Thou
John Awel Akoi
John Kongor Majak
John Mading Mangar
John Makol Anyieth
John Mangar Agau
John Mathieng Atot
John Opiti Nyibil
Jok Duot Deu
Jok Kelei
Joseph Bol Kur
Marial Ngab
Mariano Ngor Atuer
Marina David
Mario Mayen Bol
Marko Anyuon Wol
Marol Buol
Martha Peter Koul
Mary Akuol Magok
Mathiang Bol
Mayena Dhot
Mayiei Makoi
Michael Wiel
Moi Alex Lasu
Monika Nyentoch Marol
Wani Paulinho
Wath Thok
William Maduok Mayol
William Wieu Akoon
Wol Afred Wol
Wol Alfred
Wori Moses Kwori
Zechariah Malual Mading

APPENDIX C: QUESTIONNAIRES

The 2017 SSMIS questionnaires are included in the following pages, starting with the Household Questionnaire, followed by the Woman's Questionnaire, the Biomarker Questionnaire for Children and the Biomarker Questionnaire for Pregnant Women.

FORMATTING DATE: 11 October 2017
ENGLISH LANGUAGE: 12 October 2017

MALARIA INDICATOR SURVEY
HOUSEHOLD QUESTIONNAIRE

SOUTH SUDAN
NATIONAL MINISTRY OF HEALTH

IDENTIFICATION (1)

REGION _____

STATISTICAL STATES _____

STATE _____

COUNTY _____

PAYAM _____

BOMA _____

CLUSTER ..... 1 RURAL
..... 2 URBAN
..... 3 POC
..... 4 IDPS

EUMERATION AREA (EA) NUMBER .....

HOUSEHOLD NUMBER .....

HOUSEHOLD COORDINATES..... .....

N __ __ . __ __ _____°
E __ __ __ . __ __ __ __°

INTERVIEWER VISITS

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

*RESULT CODES:

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

TOTAL PERSONS IN HOUSEHOLD

TOTAL ELIGIBLE WOMEN

LINE NO. OF RESPONDENT TO HOUSEHOLD QUESTIONNAIRE

LANGUAGE OF QUESTIONNAIRE** _____

LANGUAGE OF QUESTIONNAIRE** _____

**LANGUAGE CODES:
01 ENGLISH
02 ARABIC

SUPERVISOR		INTERVIEWER	
NAME	NUMBER	NAME	NUMBER

INTRODUCTION AND CONSENT

Hello. My name is _____. I am working with Ministry of Health. We are conducting a survey about malaria all over South Sudan. 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 35 to 40 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

Do you have any questions?
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

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

HOUSEHOLD SCHEDULE

LINE NO.	USUAL RESIDENTS AND VISITORS	RELATIONSHIP TO HEAD OF HOUSEHOLD	SEX	RESIDENCE		AGE	ELIGIBILITY	
1	2	3	4	5	6	7	8	9
	Please give me the names of the persons who usually live in your household and guests of the household who stayed here last night, starting with the head of the household. AFTER LISTING THE NAMES AND RECORDING THE RELATIONSHIP AND SEX FOR EACH PERSON, ASK QUESTIONS 2A-2C TO BE SURE THAT THE LISTING IS COMPLETE. THEN ASK APPROPRIATE QUESTIONS IN COLUMNS 5-9 FOR EACH PERSON.	What is the relationship of (NAME) to the head of the household? SEE CODES BELOW.	Is (NAME) male or female?	Does (NAME) usually live here?	Did (NAME) stay here last night?	How old is (NAME)? IF 95 OR MORE, RECORD '95'.	CIRCLE LINE NUMBER OF ALL WOMEN AGE 15-49	CIRCLE LINE NUMBER OF ALL CHILDREN AGE 6-59 MONTHS
			M F	Y N	Y N	IN YEARS		
01			1 2	1 2	1 2		01	01
02			1 2	1 2	1 2		02	02
03			1 2	1 2	1 2		03	03
04			1 2	1 2	1 2		04	04
05			1 2	1 2	1 2		05	05
06			1 2	1 2	1 2		06	06
07			1 2	1 2	1 2		07	07
08			1 2	1 2	1 2		08	08
09			1 2	1 2	1 2		09	09
10			1 2	1 2	1 2		10	10

2A)	Just to make sure that I have a complete listing: are there any other people such as small children or infants that we have not listed?	YES ☐ →	ADD TO TABLE	NO ☐
2B)	Are there any other people who may not be members of your family, such as domestic servants, lodgers, or friends who usually live here?	YES ☐ →	ADD TO TABLE	NO ☐
2C)	Are there any guests or temporary visitors staying here, or anyone else who stayed here last night, who have not been listed?	YES ☐ →	ADD TO TABLE	NO ☐

CODES FOR Q. 3: RELATIONSHIP TO HEAD OF HOUSEHOLD

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

11			M F 1 2	Y N 1 2	Y N 1 2	IN YEARS	11	11
12			1 2	1 2	1 2		12	12
13			1 2	1 2	1 2		13	13
14			1 2	1 2	1 2		14	14
15			1 2	1 2	1 2		15	15
16			1 2	1 2	1 2		16	16
17			1 2	1 2	1 2		17	17
18			1 2	1 2	1 2		18	18
19			1 2	1 2	1 2		19	19
20			1 2	1 2	1 2		20	20

ICK HERE IF CONTINUATION SHEET USED ☐

CODES FOR Q. 3: RELATIONSHIP TO HEAD OF HOUSEHOLD

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

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
101 (2)	What is the main source of drinking water for members of your household?	**PIPED WATER** PIPED INTO DWELLING . . . . . 11 PIPED TO YARD/PLOT . . . . . 12 PIPED TO NEIGHBOR . . . . . 13 PUBLIC TAP/STANDPIPE . . . . . 14 TUBE WELL OR BOREHOLE . . . . . 21 **DUG WELL** PROTECTED WELL . . . . . 31 UNPROTECTED WELL . . . . . 32 **WATER FROM SPRING** PROTECTED SPRING . . . . . 41 UNPROTECTED SPRING . . . . . 42 RAINWATER . . . . . 51 TANKER TRUCK . . . . . 61 CART WITH SMALL TANK . . . . . 71 SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/ IRRIGATION CHANNEL) . . . . . 81 BOTTLED WATER . . . . . 91 OTHER _____ 96 (SPECIFY)	→ 105 → 103 → 103
102	What is the main source of water used by your household for other purposes such as cooking and handwashing?	**PIPED WATER** PIPED INTO DWELLING . . . . . 11 PIPED TO YARD/PLOT . . . . . 12 PIPED TO NEIGHBOR . . . . . 13 PUBLIC TAP/STANDPIPE . . . . . 14 TUBE WELL OR BOREHOLE . . . . . 21 **DUG WELL** PROTECTED WELL . . . . . 31 UNPROTECTED WELL . . . . . 32 **WATER FROM SPRING** PROTECTED SPRING . . . . . 41 UNPROTECTED SPRING . . . . . 42 RAINWATER . . . . . 51 TANKER TRUCK . . . . . 61 CART WITH SMALL TANK . . . . . 71 SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/ IRRIGATION CHANNEL) . . . . . 81 OTHER _____ 96 (SPECIFY)	→ 105
103	Where is that water source located?	IN OWN DWELLING . . . . . 1 IN OWN YARD/PLOT . . . . . 2 ELSEWHERE 3	→ 105
104	How long does it take to go there, get water, and come back?	MINUTES . . . . . [ ][ ][ ] DON'T KNOW 998	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
105 (3)	What kind of toilet facility do members of your household usually use? IF NOT POSSIBLE TO DETERMINE, ASK PERMISSION TO OBSERVE THE FACILITY.	**FLUSH OR POUR FLUSH TOILET** FLUSH TO PIPED SEWER SYSTEM . . . . . 11 FLUSH TO SEPTIC TANK . . . . . 12 FLUSH TO PIT LATRINE . . . . . 13 FLUSH TO SOMEWHERE ELSE . . . . . 14 FLUSH, DON'T KNOW WHERE . . . . . 15 **PIT LATRINE** VENTILATED IMPROVED PIT LATRINE . . . . 21 PIT LATRINE WITH SLAB . . . . . 22 PIT LATRINE WITHOUT SLAB/OPEN PIT . . 23 COMPOSTING TOILET . . . . . 31 BUCKET TOILET . . . . . 41 HANGING TOILET/HANGING LATRINE . . . . . 51 NO FACILITY/BUSH/FIELD . . . . . 61 OTHER _____ 96 (SPECIFY)	→ 108
106	Do you share this toilet facility with other households?	YES . . . . . 1 NO 2	→ 108
107	Including your own household, how many households use this toilet facility?	NO. OF HOUSEHOLDS IF LESS THAN 10 . . . . . 0 [ ] 10 OR MORE HOUSEHOLDS . . . . . 95 DON'T KNOW 98	
108	What type of fuel does your household mainly use for cooking?	ELECTRICITY . . . . . 01 LPG . . . . . 02 NATURAL GAS . . . . . 03 BIOGAS . . . . . 04 KEROSENE . . . . . 05 COAL, LIGNITE . . . . . 06 CHARCOAL . . . . . 07 WOOD . . . . . 08 STRAW/SHRUBS/GRASS . . . . . 09 AGRICULTURAL CROP . . . . . 10 ANIMAL DUNG . . . . . 11 NO FOOD COOKED IN HOUSEHOLD . . . . . 95 OTHER _____ 96 (SPECIFY)	
109	How many rooms in this household are used for sleeping?	ROOMS . . . . . [ ][ ]	
110	Does this household own any livestock, herds, other farm animals, or poultry?	YES . . . . . 1 NO 2	→ 112
111 (4)	How many of the following animals does this household own? IF NONE, RECORD '00'. IF 95 OR MORE, RECORD '95'. IF UNKNOWN, RECORD '98'.		
	a) Milk cows or bulls?	a) COWS/BULLS . . . . . [ ][ ]	
	b) Other cattle?	b) OTHER CATTLE . . . . . [ ][ ]	
	c) Horses, donkeys, or mules?	c) HORSES/DONKEYS/MULES . . . . . [ ][ ]	
	d) Goats?	d) GOATS . . . . . [ ][ ]	
	e) Sheep?	e) SHEEP . . . . . [ ][ ]	
	f) Chickens or other poultry?	f) CHICKENS/POULTRY . . . . . [ ][ ]	
	g) Pigs	g) PIGS . . . . . [ ][ ]	
	h Others	h) OTHERS_____ [ ][ ]	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
112	Does any member of your household own any agricultural land?	YES . . . . . 1 NO 2	→ 114
113	How many hectares of agricultural land do members of this household own? IF 95 OR MORE, CIRCLE '950'.	HECTARES . . . . . [ ][ ] . [ ] 95 OR MORE HECTARES . . . . . 950 DON'T KNOW 998	
114 (5)	Does your household have: a) Electricity? b) A radio? c) A television? d) A non-mobile telephone? e) A computer? f) A refrigerator? [ADD ADDITIONAL ITEMS. SEE FOOTNOTE 5.]	YES NO a) ELECTRICITY . . . . . 1 2 b) RADIO . . . . . 1 2 c) TELEVISION . . . . . 1 2 d) NON-MOBILE TELEPHONE . . . . . 1 2 e) COMPUTER . . . . . 1 2 f) REFRIGERATOR 1 2	
115	Does any member of this household own: a) A watch? b) A mobile phone? c) A bicycle? d) A motorcycle or motor scooter? e) An animal-drawn cart? f) A car or truck? g) A boat with a motor?	YES NO a) WATCH . . . . . 1 2 b) MOBILE PHONE . . . . . 1 2 c) BICYCLE . . . . . 1 2 d) MOTORCYCLE/SCOOTER . . . . . 1 2 f) ANIMAL-DRAWN CART . . . . . 1 2 g) CAR/TRUCK . . . . . 1 2 h) BOAT WITH MOTOR 1 2	
116	Does any member of this household have a bank account?	YES . . . . . 1 NO 2	
119	Does your household have any mosquito nets?	YES . . . . . 1 NO 2	→ 131
120	How many mosquito nets does your household have? IF 7 OR MORE NETS, RECORD '7'.	NUMBER OF NETS . . . . . [ ]	

		NET #1	NET #2	NET #3
121	ASK THE RESPONDENT TO SHOW YOU ALL THE NETS IN THE HOUSEHOLD. MAKE IT TO CAPTURE UP TO 7 NETS	OBSERVED .... 1 NOT OBSERVED 2	OBSERVED .... 1 NOT OBSERVED 2	OBSERVED .... 1 NOT OBSERVED 2
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)** SOFT BRAND .... 11 HARD BRAND .... 12 OTHER/DON'T KNOW BRAND .... 16 OTHER TYPE .... 96 DON'T KNOW TYPE .. 98	**LONG-LASTING INSECTICIDE-TREATED NET (LLIN)** SOFT BRAND .... 11 HARD BRAND .... 12 OTHER/DON'T KNOW BRAND .... 16 OTHER TYPE .... 96 DON'T KNOW TYPE .. 98	**LONG-LASTING INSECTICIDE-TREATED NET (LLIN)** SOFT BRAND .... 11 HARD BRAND .... 12 OTHER/DON'T KNOW BRAND .... 16 OTHER TYPE .... 96 DON'T KNOW TYPE .. 98
126 (6)	Did you get the net through a [NMCP/MOH MASS DISTRIBUTION CAMPAIGN], during an antenatal care visit, or during an immunization visit?	YES, [NMCP/MOH MASS DIST. CAMPAIGN] .... 1 YES, ANC .... 2 YES, IMMUNIZATION VISIT .... 3 (SKIP TO 128) NO 4	YES, [NMCP/MOH MASS DIST. CAMPAIGN] .... 1 YES, ANC .... 2 YES, IMMUNIZATION VISIT .... 3 (SKIP TO 128) NO 4	YES, [NMCP/MOH MASS DIST. CAMPAIGN] .... 1 YES, ANC .... 2 YES, IMMUNIZATION VISIT .... 3 (SKIP TO 128) NO 4
127	Where did you get the net?	GOVERNMENT HEALTH FACILITY .... 01 PRIVATE HEALTH FACILITY .... 02 PHARMACY .... 03 SHOP/MARKET ..... 04 CHW/SOCIAL MOBILISERS .... 05 RELIGIOUS INSTITUTION ..... 06 SCHOOL .... 07 OTHER .... 96 DON'T KNOW 98	GOVERNMENT HEALTH FACILITY .... 01 PRIVATE HEALTH FACILITY .... 02 PHARMACY .... 03 SHOP/MARKET ..... 04 CHW/SOCIAL MOBILISERS .... 05 RELIGIOUS INSTITUTION ..... 06 SCHOOL .... 07 OTHER .... 96 DON'T KNOW 98	GOVERNMENT HEALTH FACILITY .... 01 PRIVATE HEALTH FACILITY .... 02 PHARMACY .... 03 SHOP/MARKET ..... 04 CHW/SOCIAL MOBILISERS .... 05 RELIGIOUS INSTITUTION ..... 06 SCHOOL .... 07 OTHER .... 96 DON'T KNOW 98
128	Did anyone sleep under this mosquito net last night?	YES .... 1 NO .... 2 (SKIP TO 130) NOT SURE 8	YES .... 1 NO .... 2 (SKIP TO 130) NOT SURE 8	YES .... 1 NO .... 2 (SKIP TO 130) NOT SURE 8

MOSQUITO NETS

		NET #1	NET #2	NET #3
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. .....
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.

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
131 (3)	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 (3)	OBSERVE MAIN MATERIAL OF THE ROOF OF THE DWELLING. RECORD OBSERVATION.	**NATURAL ROOFING** NO ROOF . . . . . 11 GRASS THATCH/PALM LEAF . . . . . 12 SOD . . . . . 13 **RUDIMENTARY ROOFING** RUSTIC MAT . . . . . 21 PALM/BAMBOO . . . . . 22 WOOD PLANKS . . . . . 23 CARDBOARD . . . . . 24 **FINISHED ROOFING** METAL . . . . . 31 WOOD . . . . . 32 CALAMINE/CEMENT FIBER . . . . . 33 CERAMIC TILES . . . . . 34 CEMENT . . . . . 35 ROOFING SHINGLES . . . . . 36 IRON SHEET..... 37 OTHER _____ 96 (SPECIFY)	
133 (3)	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 OTHER _____ 96 (SPECIFY)	
134	RECORD THE TIME AT THE END OF INTERVIEW.	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

HOUSEHOLD: FOOTNOTES

(1) This section should be adapted for country-specific survey design.
(2) Countries that use sachet water (small plastic bags of water) as a source of drinking water should add SACHET WATER as a separate coding category after BOTTLED WATER and with no skip instruction. Similarly, countries that have water kiosks should add WATER KIOSK as a separate coding category with no skip instruction.
(3) Coding categories to be developed locally; however, the broad categories must be maintained.
(4) Add other country-specific animals, such as oxen, water buffalo, camels, llamas, alpacas, pigs, ducks, geese, or elephants.
(5) Each country should add to the list at least five items of furniture (such as a table, chair, sofa, bed, armoire, cupboard, or cabinet). In addition, each country should add at least four additional household appliances so that the list includes at least three items that even a poor household may have, at least three items that a middle income household may have, and at least three items that a high income household may have. Some possible additions are clock, water pump, grain grinder, fan, blender, water heater, generator, washing machine, microwave oven, DVD player, CD player, camera, air conditioner or cooler, and sewing machine.
(6) Adapt question locally to use the name of the mass distribution campaign.

FORMATTING DATE: 30 Jun 2016
ENGLISH LANGUAGE: 1 October 2017

MALARIA INDICATOR SURVEY
WOMAN'S QUESTIONNAIRE

SOUTH SUDAN
NATIONAL MALARIA CONTROL PROGRAME

IDENTIFICATION (1)

STATITICAL STATE _____

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 | | | |
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** | |
LANGUAGE OF INTERVIEW** | |

LANGUAGE OF QUESTIONNAIRE** _____

**LANGUAGE CODES:
01 ENGLISH
02 ARABIC

SUPERVISOR

NAME _____ NUMBER | | | | |

INTRODUCTION AND CONSENT

Hello. My name is _____. I am working with [NAME OF ORGANIZATION]. We are conducting a survey about malaria all over [NAME OF COUNTRY]. The information we collect will help the government to plan health services. Your household was selected for the survey. The questions usually take about 35 to 40 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 the card that has already been given to your household.

Do you have any questions?
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

SECTION 1. RESPONDENT'S BACKGROUND

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
101	RECORD THE TIME.	HOURS . . . . . ☐☐ MINUTES . . . . . ☐☐	
102	In what month and year were you born?	MONTH . . . . . ☐☐ DON'T KNOW MONTH . . . . . 98 YEAR . . . . . ☐☐☐☐ DON'T KNOW YEAR 9998	
103	How old were you at your last birthday? COMPARE AND CORRECT 102 AND/OR 103 IF INCONSISTENT.	AGE IN COMPLETED YEARS . . . . . ☐☐	
104	Have you ever attended school?	YES . . . . . 1 NO 2	→ 108
105 (2)	What is the highest level of school you attended: primary, secondary, or higher?	PRIMARY . . . . . 1 SECONDARY . . . . . 2 HIGHER 3	
NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
106 (2)	What is the highest [GRADE/FORM/YEAR] you completed at that level? IF COMPLETED LESS THAN ONE YEAR AT THAT LEVEL, RECORD '00'.	[GRADE/FORM/YEAR] . . . . . ☐☐	
107	CHECK 105: PRIMARY OR SECONDARY ☐ ↓ HIGHER ☐ →		109
108 (3)	Now I would like you to read this sentence to me. SHOW CARD TO RESPONDENT. IF RESPONDENT CANNOT READ WHOLE SENTENCE, PROBE: Can you read any part of the sentence to me?	CANNOT READ AT ALL . . . . . 1 ABLE TO READ ONLY PART OF THE SENTENCE . . . . . 2 ABLE TO READ WHOLE SENTENCE . . . . . 3 NO CARD WITH REQUIRED LANGUAGE _____ 4 (SPECIFY LANGUAGE) BLIND/VISUALLY IMPAIRED 5	

SECTION 1. RESPONDENT'S BACKGROUND

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES			SKIP
109	In the past six months, have you seen or heard any messages about malaria?	YES	1		
		NO	2		→ 201
110	Have you seen or heard these messages:		YES	NO	
	a) On the radio?	RADIO	1	2	
	b) On the television?	TELEVISION	1	2	
	c) On a poster or billboard?	POSTER/BILLBOARD	1	2	
	d) From a community health worker?	COMMUNITY HEALTH WORKER	1	2	
	e) At a community event?	COMMUNITY EVENT	1	2	
	f) Anywhere else?	ANYWHERE ELSE	1	2	

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	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	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 ☐		→ 225
211	Now I'd like to ask you about your more recent births. How many births have you had in 2013-2017? RECORD NUMBER OF LIVE BIRTHS IN 2013-2017	TOTAL IN 2013-2017 . . . . . [ ][ ] NONE 00	→ 225

212 Now I would like to record the names of all your births in 2013-2017, whether still alive or not, starting with the most recent one you had.
RECORD IN 213 THE NAMES OF ALL THE BIRTHS BORN IN 2013-2017. RECORD TWINS AND TRIPLETS ON SEPARATE ROWS. 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 COMP-LETED 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 ☐☐ ☐☐☐☐ MONTHS	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 ☐☐ ☐☐☐☐ MONTHS	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 ☐☐ ☐☐☐☐ MONTHS	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 ☐☐ ☐☐☐☐ MONTHS	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 ☐☐ ☐☐☐☐ MONTHS	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)

SECTION 2. REPRODUCTION

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
222	Have you had any live births since the birth of (NAME OF MOST RECENT BIRTH)?"	YES . . . . . 1 → (RECORD BIRTH(S) IN TABLE) NO 2	
223	COMPARE 211 WITH NUMBER OF BIRTHS IN BIRTH HISTORY NUMBERS ARE SAME ☐ ↓ NUMBERS ARE DIFFERENT ☐ → (PROBE AND RECONCILE)		
224 (4)	CHECK 216: ENTER THE NUMBER OF BIRTHS IN 2013-2017	NUMBER OF BIRTHS . . . . . ☐☐ NONE 0	
225	Are you pregnant now?	YES . . . . . 1 NO . . . . . 2 UNSURE 8	→ 227
226	How many months pregnant are you? RECORD NUMBER OF COMPLETED MONTHS.	MONTHS . . . . . ☐☐	
227 (4)	CHECK 224: ONE OR MORE BIRTHS IN 2013-2017 ☐ → (GO TO 301) NO BIRTHS IN 2013-2017 ☐		→ 428
	Q. 224 IS BLANK ☐		→ 428

SECTION 3. PREGNANCY AND INTERMITTENT PREVENTIVE TREATMENT

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
301	RECORD THE NAME AND SURVIVAL STATUS OF THE MOST RECENT BIRTH FROM 213 AND 217,	MOST RECENT BIRTH NAME _____ LIVING ☐ DEAD ☐	
302	Now I would like to ask you some questions about your last pregnancy that resulted in a live birth. When you got pregnant with (NAME), did you see anyone for antenatal care for this pregnancy?	YES . . . . . 1 NO 2	→ 304
303 (5)	Whom did you see? Anyone else? PROBE TO IDENTIFY EACH TYPE OF PERSON AND RECORD ALL MENTIONED.	**HEALTH PERSONNEL** DOCTOR . . . . . A NURSE/MIDWIFE . . . . . B CERTIFIED NURSE . . . . . C **OTHER PERSON** TRADITIONAL BIRTH ATTENDANT . . . . . D COMMUNITY/VILLAGE HEALTH WORKER . . . E OTHER _____ X (SPECIFY)	
304	During this pregnancy, did you take SP/Fansidar to keep you from getting malaria?	YES . . . . . 1 NO . . . . . 2 DON'T KNOW 8	→ 307
305	How many times did you take SP/Fansidar during this pregnancy?	TIMES . . . . . ☐☐	
306	Did you get the SP/Fansidar during any antenatal care visit, during another visit to a health facility or from another source? IF MORE THAN ONE SOURCE, RECORD THE HIGHEST SOURCE ON THE LIST.	ANTENATAL VISIT . . . . . 1 ANOTHER FACILITY VISIT . . . . . 2 OTHER SOURCE 6	
307 (4)	CHECK 216 AND 217: ONE OR MORE LIVING CHILDREN BORN IN 2013-2017 ☐ → (GO TO 401) NO LIVING CHILDREN BORN IN 2013-2017 ☐		→ 429

SECTION 4. FEVER IN CHILDREN

401 (4) CHECK 213: RECORD THE BIRTH HISTORY NUMBER IN 402 AND THE NAME AND SURVIVAL STATUS IN 403 FOR EACH BIRTH IN 2013-2017. ASK THE QUESTIONS ABOUT ALL OF THESE BIRTHS. BEGIN WITH THE MOST RECENT BIRTH.

Now I would like to ask some questions about the health of your children born since January 2013. (We will talk about each separately.)

		MOST RECENT BIRTH	NEXT MOST RECENT BIRTH
402	BIRTH HISTORY NUMBER FROM 213 IN BIRTH HISTORY.	BIRTH HISTORY NUMBER	BIRTH HISTORY NUMBER . . . . .
403	FROM 213 AND 217:	NAME _____ LIVING ☐ DEAD ☐ (SKIP TO 428)	NAME _____ LIVING ☐ DEAD ☐ (SKIP TO 428)
404	Has (NAME) been ill with a fever at any time in the last 2 weeks?	YES . . . . . 1 NO . . . . . 2 (SKIP TO 428) DON'T KNOW 8	YES . . . . . 1 NO . . . . . 2 (SKIP TO 428) DON'T KNOW 8
405	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
406	Did you seek advice or treatment for the illness from any source?	YES . . . . . 1 NO . . . . . 2 (SKIP TO 411)	YES . . . . . 1 NO . . . . . 2 (SKIP TO 411)
407 (5)	Where did you seek advice or treatment? PROBE TO IDENTIFY THE TYPE OF SOURCE. IF UNABLE TO DETERMINE IF PUBLIC OR PRIVATE SECTOR, WRITE THE NAME OF THE PLACE(S). _____ (NAME OF PLACE)	**PUBLIC SECTOR** GOVERNMENT HOSPITAL . . A GOVERNMENT HEALTH CENTER . . . . . B GOVERNMENT HEALTH POST . . . . . C MOBILE CLINIC . . . . . D FIELDWORKER/CHW . . . . E OTHER PUBLIC SECTOR _____ F (SPECIFY) **PRIVATE MEDICAL SECTOR** PRIVATE HOSPITAL/ CLINIC . . . . . G PHARMACY . . . . . H PRIVATE DOCTOR . . . . . I MOBILE CLINIC . . . . . J FIELDWORKER/CHW . . . . K OTHER PRIVATE MEDICAL SECTOR _____ L (SPECIFY) **OTHER SOURCE** SHOP . . . . . M TRADITIONAL PRACTITIONER . . . . . N MARKET . . . . . O ITINERANT DRUG SELLER . . . . . P OTHER _____ X (SPECIFY)	**PUBLIC SECTOR** GOVERNMENT HOSPITAL . . A GOVERNMENT HEALTH CENTER . . . . . B GOVERNMENT HEALTH POST . . . . . C MOBILE CLINIC . . . . . D FIELDWORKER/CHW . . . . E OTHER PUBLIC SECTOR _____ F (SPECIFY) **PRIVATE MEDICAL SECTOR** PRIVATE HOSPITAL/ CLINIC . . . . . G PHARMACY . . . . . H PRIVATE DOCTOR . . . . . I MOBILE CLINIC . . . . . J FIELDWORKER/CHW . . . . K OTHER PRIVATE MEDICAL SECTOR _____ L (SPECIFY) **OTHER SOURCE** SHOP . . . . . M TRADITIONAL PRACTITIONER . . . . . N MARKET . . . . . O ITINERANT DRUG SELLER . . . . . P OTHER _____ X (SPECIFY)

SECTION 4. FEVER IN CHILDREN

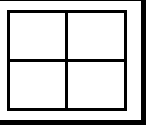
NO.	QUESTIONS AND FILTERS	MOST RECENT BIRTH NAME_____	NEXT MOST RECENT BIRTH NAME _____
408	CHECK 407:	TWO OR MORE CODES CIRCLED ↓ / ONLY ONE CODE CIRCLED → (SKIP TO 410)	TWO OR MORE CODES CIRCLED ↓ / ONLY ONE CODE CIRCLED → (SKIP TO 410)
409	Where did you first seek advice or treatment? USE LETTER CODE 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 428) DON'T KNOW 8	YES . . . . . 1 NO . . . . . 2 → (SKIP TO 428) DON'T KNOW 8
412 (6)	What drugs did (NAME) take? Any other drugs? RECORD ALL MENTIONED.	**ANTIMALARIAL DRUGS** ARTEMISININ COMBINATION THERAPY (ACT) . . . . A SP/FANSIDAR . . . . . B CHLOROQUINE . . . . . C AMODIAQUINE . . . . . D QUININE PILLS . . . . . E INJECTION/IV . . . . . F ARTESUNATE RECTAL . . . . . G INJECTION/IV . . . . . H OTHER ANTIMALARIAL _____ I (SPECIFY) **ANTIBIOTIC DRUGS** PILL/SYRUP . . . . . J INJECTION/IV . . . . . K **OTHER DRUGS** ASPIRIN . . . . . L ACETAMINOPHEN . . . . . M IBUPROFEN . . . . . N OTHER _____ X (SPECIFY) DON'T KNOW . . . . . Z	**ANTIMALARIAL DRUGS** ARTEMISININ COMBINATION THERAPY (ACT) . . . . A SP/FANSIDAR . . . . . B CHLOROQUINE . . . . . C AMODIAQUINE . . . . . D QUININE PILLS . . . . . E INJECTION/IV . . . . . F ARTESUNATE RECTAL . . . . . G INJECTION/IV . . . . . H OTHER ANTIMALARIAL _____ I (SPECIFY) **ANTIBIOTIC DRUGS** PILL/SYRUP . . . . . J INJECTION/IV . . . . . K **OTHER DRUGS** ASPIRIN . . . . . L ACETAMINOPHEN . . . . . M IBUPROFEN . . . . . N OTHER _____ X (SPECIFY) DON'T KNOW . . . . . Z
413	CHECK 412: ANY CODE A-I CIRCLED?	YES ↓ / NO → (SKIP TO 428)	YES ↓ / NO → (SKIP TO 428)

SECTION 4. FEVER IN CHILDREN

NO.	QUESTIONS AND FILTERS	MOST RECENT BIRTH NAME_____	NEXT MOST RECENT BIRTH NAME _____
414	CHECK 412: ARTEMISININ COMBINATION THERAPY ('A') 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 an artemisinin combination therapy?	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: SP/FANSIDAR ('B') 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 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
418	CHECK 412: CHLOROQUINE ('C') 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 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
420	CHECK 412: AMODIAQUINE ('D') 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 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

SECTION 4. FEVER IN CHILDREN

NO.	QUESTIONS AND FILTERS	MOST RECENT BIRTH NAME_____	NEXT MOST RECENT BIRTH NAME _____
422	CHECK 412: QUININE ('E' OR 'F') GIVEN	CODE 'E' OR 'F' CIRCLED CODE 'E' OR 'F' NOT CIRCLED (SKIP TO 424)	CODE 'E' OR 'F' CIRCLED CODE 'E' OR 'F' NOT CIRCLED (SKIP TO 424)
423	How long after the fever started did (NAME) first take quinine?	SAME DAY . . . . . 0 NEXT DAY . . . . . 1 TWO DAYS AFTER FEVER . . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . . 3 DON'T KNOW 8	SAME DAY . . . . . 0 NEXT DAY . . . . . 1 TWO DAYS AFTER FEVER . . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . . 3 DON'T KNOW 8
424	CHECK 412: ARTESUNATE ('G' OR 'H') GIVEN	CODE 'G' OR 'H' CIRCLED CODE 'G' OR 'H' NOT CIRCLED (SKIP TO 426)	CODE 'G' OR 'H' CIRCLED CODE 'G' OR 'H' NOT CIRCLED (SKIP TO 426)
425	How long after the fever started did (NAME) first take artesunate?	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
426	CHECK 412: OTHER ANTIMALARIAL ('I') GIVEN	CODE 'I' CIRCLED CODE 'I' NOT CIRCLED (SKIP TO 428)	CODE 'I' CIRCLED CODE 'I' NOT CIRCLED (SKIP TO 428)
427	How long after the fever started did (NAME) first take (OTHER ANTIMALARIAL)?	SAME DAY . . . . . 0 NEXT DAY . . . . . 1 TWO DAYS AFTER FEVER . . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . . 3 DON'T KNOW 8	SAME DAY . . . . . 0 NEXT DAY . . . . . 1 TWO DAYS AFTER FEVER . . . . . 2 THREE OR MORE DAYS AFTER FEVER . . . . . 3 DON'T KNOW 8
428		GO BACK TO 403 IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 429.	GO TO 403 IN FIRST COLUMN OF NEW QUESTIONNAIRE; OR, IF NO MORE BIRTHS, GO TO 429.

429	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

Women's Questionnaire: NOTES

(1) This section should be adapted for country-specific survey design.
(2) Revise according to the local education system.
(3) Each card should have four simple sentences appropriate to the country (e.g., "Parents love their children.", "Farming is hard work.", "The child is reading a book.", "Children work hard at school."). Cards should be prepared for every language in which respondents are likely to be literate.
(4) Year of fieldwork is assumed to be 2017. For fieldwork beginning in 2018, all references to calendar years should be increased by one; for example, 2012 should be changed to 2013, 2013 should be changed to 2014, and similarly for all years throughout the
(5) Coding categories to be developed locally; however, the broad categories must be maintained. Additions to the codes under the private medical sector heading may include religious affiliated sources and NGO sources.
(6) Coding categories to be developed locally and revised based on the pretest. All antimalarials commonly used in the country should be included in the response categories. Common brand names of drugs, such as Bayer, Tylenol or Paracetamol, should be added to the response categories for aspirin, acetaminophen, or ibuprofen as appropriate.

YEAR OF FIELDWORK:	2017
FIVE YEARS BEFORE SURVEY:	2013
CHILD OLDER THAN 5:	2012
CHILD UNDER 4:	2015
CHILD UNDER 3:	2015
CHILD UNDER 16:	2002

FORMATTING DATE: November 2017
ENGLISH LANGUAGE: Nov-17

MALARIA INDICATOR SURVEY
BIOMARKER QUESTIONNAIRE

SOUTH SUDAN
NATIONAL MALARIA CONTROL PROGRAMME

IDENTIFICATION (1)

PLACE NAME _____

NAME OF HOUSEHOLD HEAD _____

CLUSTER NUMBER . . . . . | | | | |

HOUSEHOLD NUMBER . . . . . | | | | |

FIELDWORKER VISITS

	1	2	3	FINAL VISIT
DATE				DAY
FIELDWORKER'S NAME				MONTH
				YEAR
NEXT VISIT: DATE				TOTAL NUMBER OF VISITS
TIME				

NOTES:

TOTAL ELIGIBLE CHILDREN

LANGUAGE OF QUESTIONNAIRE** | |

LANGUAGE OF INTERVIEW** | |

NATIVE LANGUAGE OF RESPONDENT** | |

TRANSLATOR (YES = 1, NO = 2)

LANGUAGE OF QUESTIONNAIRE** _____

**LANGUAGE CODES:
01 ENGLISH
02 ARABIC

SUPERVISOR

NAME _____ NUMBER | | | | |

101	CHECK COLUMN 9 IN HOUSEHOLD QUESTIONNAIRE. RECORD THE LINE NUMBER AND NAME FOR ALL ELIGIBLE CHILDREN 6-59 MONTHS IN QUESTION 102; IF MORE THAN SIX CHILDREN, USE ADDITIONAL QUESTIONNAIRE(S).			
		CHILD 1	CHILD 2	CHILD 3
102	CHECK HOUSEHOLD QUESTIONNAIRE: LINE NUMBER FROM COLUMN 9.	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 (2)	CHECK 103: CHILD BORN IN 2013-2017?	YES . . . . . 1 NO . . . . . 2 (SKIP TO 130) ←	YES . . . . . 1 NO . . . . . 2 (SKIP TO 130) ←	YES . . . . . 1 NO . . . . . 2 (SKIP TO 130) ←
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 130) ← OLDER 2	0-5 MONTHS . . . . . 1 (SKIP TO 130) ← OLDER 2	0-5 MONTHS . . . . . 1 (SKIP TO 130) ← OLDER 2
106	LINE NUMBER OF PARENT/OTHER ADULT RESPONSIBLE FOR THE CHILD FROM COLUMN 1 OF	LINE NUMBER . . . . . ☐☐ (RECORD '00' IF NOT LISTED	LINE NUMBER . . . . . ☐☐ (RECORD '00' IF NOT LISTED	LINE NUMBER . . . . . ☐☐ (RECORD '00' IF NOT LISTED
107 (2)	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 2013 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.		
108	CIRCLE THE CODE AND SIGN YOUR NAME.	GRANTED . . . . . 1 _____ ← (SIGN) REFUSED . . . . . 2 NOT PRESENT/OTHE . 3	GRANTED . . . . . 1 _____ ← (SIGN) REFUSED . . . . . 2 NOT PRESENT/OTHE . 3	GRANTED . . . . . 1 _____ ← (SIGN) REFUSED . . . . . 2 NOT PRESENT/OTHE . 3

HEMOGLOBIN MEASUREMENT AND MALARIA TESTING FOR CHILDREN AGE 6-59 MONTHS

		CHILD 1	CHILD 2	CHILD 3
	CHECK HOUSEHOLD QUESTIONNAIRE: LINE NUMBER FROM COLUMN 9.	LINE NUMBER . . . . . . [ ][ ] NAME ________	LINE NUMBER . . . . . . [ ][ ] NAME ________	LINE NUMBER . . . . . . [ ][ ] NAME ________

109 (2)	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 2013 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 slide(s) and taken to a laboratory for testing. You will not be told the results of the laboratory testing. All results will be kept strictly confidential and will not be shared with anyone other than members of our survey team. Do you have any questions? You can say yes 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 FIELDWORKER NUMBER.	GRANTED . . . . 1 REFUSED . . . . 2 ________ (SIGN AND ENTER YOUR FIELDWORKER [ ][ ][ ][ ] NOT PRESENT/OTHE . 3	GRANTED . . . . 1 REFUSED . . . . 2 ________ (SIGN AND ENTER YOUR FIELDWORKER [ ][ ][ ][ ] NOT PRESENT/OTHE . 3	GRANTED . . . . 1 REFUSED . . . . 2 ________ (SIGN AND ENTER YOUR FIELDWORKER [ ][ ][ ][ ] NOT PRESENT/OTHE . 3
111	PREPARE EQUIPMENT AND SUPPLIES ONLY FOR THE TEST(S) FOR WHICH CONSENT HAS BEEN OBTAINED AND PROCEED WITH THE TEST(S).			
112 (3)	PLACE BAR CODE LABEL FOR MALARIA LAB TEST.	PUT THE 1ST BAR CODE LABEL HERE. NOT PRESENT . . 99994 REFUSEI . . . . 99995 OTHER . . . . 99996 PUT THE 2ND BAR CODE LABEL ON THE SLIDE AND THE 3RD ON THE TRANSMITTAL	PUT THE 1ST BAR CODE LABEL HERE. NOT PRESENT . . 99994 REFUSEI . . . . 99995 OTHER . . . . 99996 PUT THE 2ND BAR CODE LABEL ON THE SLIDE AND THE 3RD ON THE TRANSMITTAL	PUT THE 1ST BAR CODE LABEL HERE. NOT PRESENT . . 99994 REFUSEI . . . . 99995 OTHER . . . . 99996 PUT THE 2ND BAR CODE LABEL ON THE SLIDE AND THE 3RD ON THE TRANSMITTAL
113	RECORD HEMOGLOBIN LEVEL HERE AND IN THE ANEMIA AND MALARIA PAMPHLET.	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 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	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

		CHILD 1	CHILD 2	CHILD 3
	CHECK HOUSEHOLD QUESTIONNAIRE: LINE NUMBER FROM COLUMN 9.	LINE NUMBER . . . . . . [ ][ ] NAME ______________	LINE NUMBER . . . . . . [ ][ ] NAME ______________	LINE NUMBER . . . . . . [ ][ ] NAME ______________
116	CHECK 113: HEMOGLOBIN RESULT	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVE . . 2 NOT PRESENT . . . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVE . . 2 NOT PRESENT . . . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVE . . 2 NOT PRESENT . . . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)
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 130)		
118 (4)	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: HEMOGLOBIN RESULT	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVE . . 2 NOT PRESENT . . . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVE . . 2 NOT PRESENT . . . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVE . . 2 NOT PRESENT . . . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)
121 (5)	In the past two weeks has (NAME) taken or is taking [FIRST LINE MEDICATION] given by a doctor or health center 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)

		CHILD 1	CHILD 2	CHILD 3
	CHECK HOUSEHOLD QUESTIONNAIRE: LINE NUMBER FROM COLUMN 9.	LINE NUMBER . . . . . . ☐☐ NAME ________	LINE NUMBER . . . . . . ☐☐ NAME ________	LINE NUMBER . . . . . . ☐☐ NAME ________

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 taked to a health facility right away. (SKIP TO 128)		
123 (5)	ALREADY TAKING [FIRST LINE MEDICATION] REFERRAL STATEMENT	You have told me that (NAME OF CHILD) had already received [FIRST LINE OF MEDICATION] for malaria. Therefore, I cannot give you additional [FIRST LINE OF MEDICATION]. However, the test shows that he/she has malaria. If your child has a fever for two days after the last dose of [FIRST LINE MEDICATION], you should take the child to the nearest health facility for further examination. (SKIP TO 130)		
124 (2)	READ INFORMATION FOR MALARIA TREATMENT AND CONSENT STATEMENT TO	The malaria test shows that your child has malaria. We can give you free medicine. The medicine is called [FIRST LINE OF MEDICATION]. [FIRST LINE OF MEDICATION] is very effective and in a few days it should get rid of the fever and other symptoms. You do not have to give the child the medicine. This is up to you. Please tell me whether you accept the medicine or not.		
125	CIRCLE THE APPROPRIATE CODE AND SIGN YOUR NAME.	ACCEPTED MEDICIN . 1 ________ (SIGN) REFUSED . . . . 2 OTHER 6	ACCEPTED MEDICIN . 1 ________ (SIGN) REFUSED . . . . 2 OTHER 6	ACCEPTED MEDICIN . 1 ________ (SIGN) REFUSED . . . . 2 OTHER 6
126	CHECK 125: MEDICATION ACCEPTED	ACCEPTED MEDICIN . 1 REFUSED . . . . 2 OTHER . . . . 6 (SKIP TO 130)	ACCEPTED MEDICIN . 1 REFUSED . . . . 2 OTHER . . . . 6 (SKIP TO 130)	ACCEPTED MEDICIN . 1 REFUSED . . . . 2 OTHER . . . . 6 (SKIP TO 130)
127 (5)	READ INFORMATION FOR MALARIA TREATMENT AND CONSENT STATEMENT TO PARENT/OTHER ADULT.	[INSERT DOSAGE INSTRUCTIONS] ALSO TELL THE PARENT/OTHER 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 113: HEMOGLOBIN RESULT	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVI . . 2 NOT PRESENT . . . . . . 3 REFUSEI . . . . 4 OTHER . . . . 6 (SKIP TO 130)	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVI . . 2 NOT PRESENT . . . . . . 3 REFUSEI . . . . 4 OTHER . . . . 6 (SKIP TO 130)	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVI . . 2 NOT PRESENT . . . . . . 3 REFUSEI . . . . 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 103 IN NEXT COLUMN OF THIS QUESTIONNAIRE OR IN THE FIRST COLUMN OF THE NEXT PAGE; IF NO MORE CHILDREN, END INTERVIEW.			

101	CHECK COLUMN 9 IN HOUSEHOLD QUESTIONNAIRE. RECORD THE LINE NUMBER AND NAME FOR ALL ELIGIBLE WOMEN 15-49 YEARS IN QUESTION 102; IF MORE THAN SIX CHILDREN, USE ADDITIONAL QUESTIONNAIRE(S).			
		MOTHER 1	MOTHER 2	MOTHER 3
102	CHECK HOUSEHOLD QUESTIONNAIRE: LINE NUMBER FROM COLUMN 9.	LINE NUMBER . . . . . ☐☐ NAME _____	LINE NUMBER . . . . . ☐☐ NAME _____	LINE NUMBER . . . . . ☐☐ NAME _____
103	IF MOTHER INTERVIEWED: COPY MOTHERS'S DATE OF BIRTH (DAY, MONTH, AND YEAR) FROM BIRTH HISTORY. IF MOTHER NOT INTERVIEWED What is (NAME)'s date of birth?	DAY . . . . . ☐☐ MONTH . . . . . ☐☐ YEAR . . ☐☐☐☐	DAY . . . . . ☐☐ MONTH . . . . . ☐☐ YEAR . . ☐☐☐☐	DAY . . . . . ☐☐ MONTH . . . . . ☐☐ YEAR . . ☐☐☐☐
104 (2)	CHECK 103: CHILD BORN IN 2013-2017?	YES . . . . . 1 NO . . . . . 2 → (SKIP TO 130)	YES . . . . . 1 NO . . . . . 2 → (SKIP TO 130)	YES . . . . . 1 NO . . . . . 2 → (SKIP TO 130)
105	CHECK 103: MOTHERS AGE 15-49 YEARS	0-5 MONTHS . . . . . 1 → (SKIP TO 130) OLDER 2	0-5 MONTHS . . . . . 1 → (SKIP TO 130) OLDER 2	0-5 MONTHS . . . . . 1 → (SKIP TO 130) OLDER 2
106	LINE NUMBER OF PREGNANT ADULT	LINE NUMBER . . . . . ☐☐ (RECORD '00' IF NOT LISTED)	LINE NUMBER . . . . . ☐☐ (RECORD '00' IF NOT LISTED)	LINE NUMBER . . . . . ☐☐ (RECORD '00' IF NOT LISTED)
107 (2)	ASK CONSENT FOR ANEMIA TEST	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 2013 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.		
108	CIRCLE THE CODE AND SIGN YOUR NAME.	GRANTED . . . . . 1 _____ (SIGN) REFUSED . . . . . 2 NOT PRESENT/OTHE . 3	GRANTED . . . . . 1 _____ (SIGN) REFUSED . . . . . 2 NOT PRESENT/OTHE . 3	GRANTED . . . . . 1 _____ (SIGN) REFUSED . . . . . 2 NOT PRESENT/OTHE . 3

HEMOGLOBIN MEASUREMENT AND MALARIA TESTING FOR MOTHERS AGE 15-49

		MOTHER 1	MOTHER 2	MOTHER 3
	CHECK HOUSEHOLD QUESTIONNAIRE: LINE NUMBER FROM COLUMN 9.	LINE NUMBER . . . . . . [ ][ ] NAME ______________	LINE NUMBER . . . . . . [ ][ ] NAME ______________	LINE NUMBER . . . . . . [ ][ ] NAME ______________

109 (2)	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 2013 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 slide(s) and taken to a laboratory for testing. You will not be told the results of the laboratory testing. All results will be kept strictly confidential and will not be shared with anyone other than members of our survey team. Do you have any questions? You can say yes 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 FIELDWORKER NUMBER.	GRANTED . . . . 1 REFUSED . . . . 2 ____________ (SIGN AND ENTER YOUR FIELDWORKER [ ][ ][ ][ ] NOT PRESENT/OTHE . 3	GRANTED . . . . 1 REFUSED . . . . 2 ____________ (SIGN AND ENTER YOUR FIELDWORKER [ ][ ][ ][ ] NOT PRESENT/OTHE . 3	GRANTED . . . . 1 REFUSED . . . . 2 ____________ (SIGN AND ENTER YOUR FIELDWORKER [ ][ ][ ][ ] NOT PRESENT/OTHE . 3
111	PREPARE EQUIPMENT AND SUPPLIES ONLY FOR THE TEST(S) FOR WHICH CONSENT HAS BEEN OBTAINED AND PROCEED WITH THE TEST(S).			
112 (3)	PLACE BAR CODE LABEL FOR MALARIA LAB TEST.	CAPTURE BARCODE NOT PRESENT . . 99994 REFUSEI . . . . 99995 OTHER . . . . 99996 PUT THE 2ND BAR CODE LABEL ON THE SLIDE AND THE 3RD ON THE TRANSMITTAL	CAPTURE BARCODE NOT PRESENT . . 99994 REFUSEI . . . . 99995 OTHER . . . . 99996 PUT THE 2ND BAR CODE LABEL ON THE SLIDE AND THE 3RD ON THE TRANSMITTAL	CAPTURE BARCODE NOT PRESENT . . 99994 REFUSEI . . . . 99995 OTHER . . . . 99996 PUT THE 2ND BAR CODE LABEL ON THE SLIDE AND THE 3RD ON THE TRANSMITTAL
113	RECORD HEMOGLOBIN LEVEL HERE AND IN THE ANEMIA AND MALARIA PAMPHLET.	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 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	POSITIVE 1 (SKIP TO 118) NEGATIVE . . . . 4 OTHER 6	POSITIVE 1 (SKIP TO 118) NEGATIVE . . . . 4 OTHER 6	POSITIVE 1 (SKIP TO 118) NEGATIVE . . . . 4 OTHER 6

		MOTHER 1	MOTHER 2	MOTHER 3
	CHECK HOUSEHOLD QUESTIONNAIRE: LINE NUMBER FROM COLUMN 9.	LINE NUMBER . . . . . . [ ][ ] NAME ______________	LINE NUMBER . . . . . . [ ][ ] NAME ______________	LINE NUMBER . . . . . . [ ][ ] NAME ______________
116	CHECK 113: HEMOGLOBIN RESULT	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVE . . 2 NOT PRESENT . . . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVE . . 2 NOT PRESENT . . . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVE . . 2 NOT PRESENT . . . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)
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 130)		
118 (4)	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: HEMOGLOBIN RESULT	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVE . . 2 NOT PRESENT . . . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVE . . 2 NOT PRESENT . . . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVE . . 2 NOT PRESENT . . . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)
121 (5)	In the past two weeks has (NAME) taken or is taking [FIRST LINE MEDICATION] given by a doctor or health center 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)

		MOTHER 1	MOTHER 2	MOTHER 3
	CHECK HOUSEHOLD QUESTIONNAIRE: LINE NUMBER FROM COLUMN 9.	LINE NUMBER . . . . . ☐☐ NAME _____	LINE NUMBER . . . . . ☐☐ NAME _____	LINE NUMBER . . . . . ☐☐ NAME _____

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 taked to a health facility right away. (SKIP TO 128)		
123 (5)	ALREADY TAKING [FIRST LINE MEDICATION] REFERRAL STATEMENT	You have told me that (NAME OF CHILD) had already received [FIRST LINE OF MEDICATION] for malaria. Therefore, I cannot give you additional [FIRST LINE OF MEDICATION]. However, the test shows that he/she has malaria. If your child has a fever for two days after the last dose of [FIRST LINE MEDICATION], you should take the child to the nearest health facility for further examination. (SKIP TO 130)		
124 (2)	READ INFORMATION FOR MALARIA TREATMENT AND CONSENT STATEMENT TO	The malaria test shows that your child has malaria. We can give you free medicine. The medicine is called [FIRST LINE OF MEDICATION]. [FIRST LINE OF MEDICATION] is very effective and in a few days it should get rid of the fever and other symptoms. You do not have to give the child the medicine. This is up to you. Please tell me whether you accept the medicine or not.		
125	CIRCLE THE APPROPRIATE CODE AND SIGN YOUR NAME.	ACCEPTED MEDICIN . 1 _____ (SIGN) REFUSED . . . . . 2 OTHER 6	ACCEPTED MEDICIN . 1 _____ (SIGN) REFUSED . . . . . 2 OTHER 6	ACCEPTED MEDICIN . 1 _____ (SIGN) REFUSED . . . . . 2 OTHER 6
126	CHECK 125: MEDICATION ACCEPTED	ACCEPTED MEDICIN . 1 REFUSED . . . . . 2 OTHER . . . . . 6 (SKIP TO 130)	ACCEPTED MEDICIN . 1 REFUSED . . . . . 2 OTHER . . . . . 6 (SKIP TO 130)	ACCEPTED MEDICIN . 1 REFUSED . . . . . 2 OTHER . . . . . 6 (SKIP TO 130)
127 (5)	READ INFORMATION FOR MALARIA TREATMENT AND CONSENT STATEMENT TO PARENT/OTHER ADULT.	[INSERT DOSAGE INSTRUCTIONS] ALSO TELL THE PARENT/OTHER 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 113: HEMOGLOBIN RESULT	BELOW 7.0 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 103 IN NEXT COLUMN OF THIS QUESTIONNAIRE OR IN THE FIRST COLUMN OF THE NEXT PAGE; IF NO MORE CHILDREN, END INTERVIEW.			

FIELDWORKER'S OBSERVATIONS

TO BE FILLED IN AFTER COMPLETING BIOMARKERS

SUPERVISOR'S OBSERVATIONS

EDITOR'S OBSERVATIONS

(1) This section should be adapted for country-specific survey design.
(2) Year of fieldwork is assumed to be 2017. For fieldwork beginning in 2018, all references to calendar years should be increased by one; for example, 2013 should be changed to 2013, 2013 should be changed to 2014, and similarly for all years throughout the
(3) This question should be deleted in surveys that do not collect blood smears.
(4) This is a list of generic symptoms indicative of severe malaria. Symptoms should be revised according to the country's national malaria treatment guidelines.
(5) The referral statement should be revised to reflect the country's national malaria treatment guidelines in reference to antimalarial treatment failure.

YEAR OF FIELDWORK:	2017
FIVE YEARS BEFORE SURVEY:	2013
CHILD OLDER THAN 5:	2012
CHILD UNDER 4:	2014
CHILD UNDER 3:	2015
CHILD UNDER 16:	2002

FORMATTING DATE: November 2017
ENGLISH LANGUAGE: Nov-17

MALARIA INDICATOR SURVEY
BIOMARKER QUESTIONNAIRE

SOUTH SUDAN
NATIONAL MALARIA CONTROL PROGRAMME

IDENTIFICATION (1)

PLACE NAME _____

NAME OF HOUSEHOLD HEAD _____

CLUSTER NUMBER . . . . . [ ][ ][ ][ ]

HOUSEHOLD NUMBER . . . . . [ ][ ][ ][ ]

FIELDWORKER VISITS

	1	2	3	FINAL VISIT
DATE				DAY [ ][ ]
FIELDWORKER'S NAME				MONTH [ ][ ]
				YEAR [ ][ ][ ][ ]
NEXT VISIT: DATE				TOTAL NUMBER OF VISITS [ ]
TIME				

NOTES:

_____

_____

_____

_____

_____

TOTAL ELIGIBLE CHILDREN [ ][ ]

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

LANGUAGE OF QUESTIONNAIRE** _____

**LANGUAGE CODES:
01 ENGLISH
02 ARABIC

SUPERVISOR

_____ [ ][ ][ ][ ]
NAME NUMBER

Note: Brackets [ ] indicate items that should be adapted on a country-specific basis.

101	CHECK COLUMN 9 IN HOUSEHOLD QUESTIONNAIRE. RECORD THE LINE NUMBER AND NAME FOR ALL ELIGIBLE WOMEN AGED 15-49 YEARS IN QUESTION 102; IF MORE THAN SIX WOMEN, USE ADDITIONAL QUESTIONNAIRE(S).			
		WOMAN 1	WOMAN 2	WOMAN 3
102	CHECK HOUSEHOLD QUESTIONNAIRE: LINE NUMBER FROM COLUMN 9.	LINE NUMBER . . . . . ☐☐ NAME _____	LINE NUMBER . . . . . ☐☐ NAME _____	LINE NUMBER . . . . . ☐☐ NAME _____
103	COPY WOMAN'S DATE OF BIRTH (DAY, MONTH, AND YEAR) FROM BIRTH HISTORY. What is your (NAME)'s date of birth?	DAY . . . . . ☐☐ MONTH . . . . . ☐☐ YEAR . . ☐☐☐☐	DAY . . . . . ☐☐ MONTH . . . . . ☐☐ YEAR . . ☐☐☐☐	DAY . . . . . ☐☐ MONTH . . . . . ☐☐ YEAR . . ☐☐☐☐
104 (2)	CHECK 103: WOMAN AGE 15-49 YEARS	YES . . . . . 1 NO . . . . . 2 (SKIP TO 130)	YES . . . . . 1 NO . . . . . 2 (SKIP TO 130)	YES . . . . . 1 NO . . . . . 2 (SKIP TO 130)
105	CHECK 103: WOMAN AGE 15-49 YEARS	15-49 YEARS . . . . . 1 (SKIP TO 130) OLDER 2	15-49 YEARS . . . . . 1 (SKIP TO 130) OLDER 2	15-49 YEARS . . . . . 1 (SKIP TO 130) OLDER 2
106	LINE NUMBER OF PREGNANT WOMAN 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 (2)	ASK CONSENT FOR ANEMIA TEST FROM WOMAN.	As part of this survey, we are asking 'reference dates'! 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 women of age 15-49 Years 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 (NAME OF WOMAN) 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

HEMOGLOBIN MEASUREMENT AND MALARIA TESTING FOR PREGNANT WOMEN AGED 15-49 YEARS

		WOMAN 1	WOMAN 2	WOMAN 3
	CHECK HOUSEHOLD QUESTIONNAIRE: LINE NUMBER FROM COLUMN 9.	LINE NUMBER . . . . . ☐☐ NAME _____	LINE NUMBER . . . . . ☐☐ NAME _____	LINE NUMBER . . . . . ☐☐ NAME _____
109 (2)	ASK CONSENT FOR MALARIA TEST FROM THE PREGNANT WOMAN.	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 women aged 15-49 Years 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 slide(s) and taken to a laboratory for testing. You will not be told the results of the laboratory testing. All results will be kept strictly confidential and will not be shared with anyone other than members of our survey team. Do you have any questions? You can say yes or no. It is up to you to decide. Will you allow (NAME OF WOMAN) to participate in the malaria test?		
110	CIRCLE THE CODE, SIGN YOUR NAME, AND ENTER YOUR FIELDWORKER NUMBER.	GRANTED . . . . . 1 REFUSED . . . . . 2 (SIGN AND ENTER YOUR FIELDWORKER NUMBER) ☐☐☐☐ NOT PRESENT/OTHER . 3	GRANTED . . . . . 1 REFUSED . . . . . 2 (SIGN AND ENTER YOUR FIELDWORKER NUMBER) ☐☐☐☐ NOT PRESENT/OTHER . 3	GRANTED . . . . . 1 REFUSED . . . . . 2 (SIGN AND ENTER YOUR FIELDWORKER ☐☐☐☐ NOT PRESENT/OTHER . 3
111	PREPARE EQUIPMENT AND SUPPLIES ONLY FOR THE TEST(S) FOR WHICH CONSENT HAS BEEN OBTAINED AND PROCEED WITH THE TEST(S).			
112 (3)	CAPTURE BAR CODE LABEL FOR MALARIA LAB TEST.	CAPTURE BARCODE NOT PRESENT . . 99994 REFUSED . . . . . 99995 OTHER . . . . . 99996 RECORD BAR CODE ON THE TRANSMITTAL FORM.	CAPTURE BARCODE NOT PRESENT . . 99994 REFUSED . . . . . 99995 OTHER . . . . . 99996 RECORD BAR CODE ON THE TRANSMITTAL FORM.	CAPTURE BARCODE NOT PRESENT . . 99994 REFUSED . . . . . 99995 OTHER . . . . . 99996 RECORD BAR CODE ON THE TRANSMITTAL FORM.
113	RECORD HEMOGLOBIN LEVEL HERE AND IN THE ANEMIA AND MALARIA PAMPHLET.	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	CLICK ON THE 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	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

		WOMAN 1	WOMAN 2	WOMAN 3
	CHECK HOUSEHOLD QUESTIONNAIRE: LINE NUMBER FROM COLUMN 9.	LINE NUMBER . . . . . . [ ][ ] NAME ______________	LINE NUMBER . . . . . . [ ][ ] NAME ______________	LINE NUMBER . . . . . . [ ][ ] NAME ______________

116	CHECK 113: HEMOGLOBIN RESULT	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVE . . 2 NOT PRESENT . . . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVE . . 2 NOT PRESENT . . . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVE . . 2 NOT PRESENT . . . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)
117	<u>**SEVERE ANEMIA REFERRAL**</u> RECORD THE RESULT OF THE ANEMIA TEST ON THE REFERRAL FORM.	The anemia test shows that (NAME OF WOMAN) you have severe anemia. Your are very ill and must be taken to a health facility immediately. (SKIP TO 130)		
118 (4)	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: HEMOGLOBIN RESULT	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVE . . 2 NOT PRESENT . . . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVE . . 2 NOT PRESENT . . . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVE . . 2 NOT PRESENT . . . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)
121 (5)	In the past two weeks have you (NAME) taken or is taking ASAQ given by a doctor or health center 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)

		WOMAN 1	WOMAN 2	WOMAN 3
	CHECK HOUSEHOLD QUESTIONNAIRE: LINE NUMBER FROM COLUMN 9.	LINE NUMBER . . . . . . [ ][ ] NAME ______	LINE NUMBER . . . . . . [ ][ ] NAME ______	LINE NUMBER . . . . . . [ ][ ] NAME ______

122	**SEVERE MALARIA REFERRAL** RECORD THE RESULT OF THE MALARIA RDT ON THE REFERRAL FORM.	The malaria test shows that (NAME OF WOMAN) has malaria. Your child also has symptoms of severe malaria. The malaria treatment I have will not help you, and I cannot give you the medication. Your are very ill and must be taked to a health facility right away. (SKIP TO 128)		
123 (5)	ALREADY TAKING [FIRST LINE MEDICATION] REFERRAL STATEMENT	You have told me that you had already received ASAQ for malaria. Therefore, I cannot give you additional ASAQ. However, the test shows that you have malaria. If you have a fever for two days after the last dose of ASAQ, you should go to the nearest health facility for further examination. (SKIP TO 130)		
124 (2)	READ INFORMATION FOR MALARIA TREATMENT AND CONSENT STATEMENT TO	The malaria test shows that you have malaria. We can give you free medicine. The medicine is called ASAQ. ASAQ is very effective and in a few days it should get rid of the fever and other symptoms. You do not have to take the medicine. This is up to you. Please tell me whether you accept the medicine or not.		
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 130)	ACCEPTED MEDICINE . 1 REFUSED . . . . 2 OTHER . . . . 6 (SKIP TO 130)	ACCEPTED MEDICINE . 1 REFUSED . . . . 2 OTHER . . . . 6 (SKIP TO 130)
127 (5)	READ INFORMATION FOR MALARIA TREATMENT AND CONSENT STATEMENT TO PARENT/OTHER ADULT.	ASAQ Fixed Dose Combination Age & weight group Dosage strength Day 1 Day 2 Day 3 2 to 11 months (infant) 4.5kg – 8kg 25mg AS/67.5mg AQ 1 1 1 1 to 5 years (toddler) (SKIP TO 130)		
128	CHECK 113: HEMOGLOBIN RESULT	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVE . . 2 NOT PRESENT . . . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVE . . 2 NOT PRESENT . . . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 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 you have severe anemia. You are very ill and must be taken to a health facility immediately.		
130	GO BACK TO 103 IN NEXT COLUMN OF THIS QUESTIONNAIRE OR IN THE FIRST COLUMN OF THE NEXT PAGE; IF NO MORE PREGNANT WOMEN, END INTERVIEW.			

HEMOGLOBIN MEASUREMENT AND MALARIA TESTING FOR MOTHERS AGED 15-49 YEARS

101	CHECK COLUMN 9 IN HOUSEHOLD QUESTIONNAIRE. RECORD THE LINE NUMBER AND NAME FOR ALL ELIGIBLE WOMEN 15-49 YEARS IN QUESTION 102; IF MORE THAN SIX WOMEN, USE ADDITIONAL QUESTIONNAIRE(S).			
		MOTHER 4	MOTHER 5	MOTHER 6
102	CHECK HOUSEHOLD QUESTIONNAIRE: LINE NUMBER FROM COLUMN 9.	LINE NUMBER . . . . . ☐☐ NAME _____	LINE NUMBER . . . . . ☐☐ NAME _____	LINE NUMBER . . . . . ☐☐ NAME _____
103	COPY MOTHERS'S DATE OF BIRTH (DAY, MONTH, AND YEAR) FROM BIRTH HISTORY. What is your (NAME)'s date of birth?	DAY . . . . . ☐☐ MONTH . . . . . ☐☐ YEAR . . ☐☐☐☐	DAY . . . . . ☐☐ MONTH . . . . . ☐☐ YEAR . . . ☐☐☐☐	DAY . . . . . ☐☐ MONTH . . . . . ☐☐ YEAR . . ☐☐☐☐
104 (2)	CHECK 103: MOTHERS AGE 15-49 YEARS	YES . . . . . 1 NO . . . . . 2 (SKIP TO 130)	YES . . . . . 1 NO . . . . . 2 (SKIP TO 130)	YES . . . . . 1 NO . . . . . 2 (SKIP TO 130)
105	CHECK 103: MOTHERS AGE 15-49 YEARS	15-49 YEARS . . . . . 1 (SKIP TO 130) OLDER 2	15-49 YEARS . . . . . 1 (SKIP TO 130) OLDER 2	15-49 YEARS . . . . . 1 (SKIP TO 130) OLDER 2
106	LINE NUMBER OF PREGNANT ADULT	LINE NUMBER . . . . . ☐☐ (RECORD '00' IF NOT LISTED)	LINE NUMBER . . . . . ☐☐ (RECORD '00' IF NOT LISTED)	LINE NUMBER . . . . . ☐☐ (RECORD '00' IF NOT LISTED)
107 (2)	ASK CONSENT FOR ANEMIA TEST	As part of this survey, we are asking 'reference dates'! 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 women of age 15-49 Years 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 (NAME OF WOMAN) 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

HEMOGLOBIN MEASUREMENT AND MALARIA TESTING FOR MOTHERS AGE 15-49

		MOTHER 1	MOTHER 2	MOTHER 3
	CHECK HOUSEHOLD QUESTIONNAIRE: LINE NUMBER FROM COLUMN 9.	LINE NUMBER . . . . . ☐☐ NAME _____	LINE NUMBER . . . . . ☐☐ NAME _____	LINE NUMBER . . . . . ☐☐ NAME _____
109 (2)	ASK CONSENT FOR MALARIA TEST FROM PREGNANT WOMAN.	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 women aged 15-49 Years 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 slide(s) and taken to a laboratory for testing. You will not be told the results of the laboratory testing. All results will be kept strictly confidential and will not be shared with anyone other than members of our survey team. Do you have any questions? You can say yes or no. It is up to you to decide. Will you allow (NAME OF WOMAN) to participate in the malaria test?		
110	CIRCLE THE CODE, SIGN YOUR NAME, AND ENTER YOUR FIELDWORKER NUMBER.	GRANTED . . . . . 1 REFUSED . . . . . 2 _____ (ENTER YOUR FIELDWORKER NUMBER) ☐☐☐☐ NOT PRESENT/OTHER . 3	GRANTED . . . . . 1 REFUSED . . . . . 2 _____ (ENTER YOUR FIELDWORKER NUMBER) ☐☐☐☐ NOT PRESENT/OTHER . 3	GRANTED . . . . . 1 REFUSED . . . . . 2 _____ (ENTER YOUR FIELDWORKER NUMBER) ☐☐☐☐ NOT PRESENT/OTHER . 3
111	PREPARE EQUIPMENT AND SUPPLIES ONLY FOR THE TEST(S) FOR WHICH CONSENT HAS BEEN OBTAINED AND PROCEED WITH THE TEST(S).			
112 (3)	CAPTURE BAR CODE LABEL FOR MALARIA LAB TEST.	CAPTURE BARCODE NOT PRESENT . . . . . 99994 REFUSED . . . . . 99995 OTHER . . . . . 99996 RECORD BAR CODE ON THE TRANSMITTAL FORM.	CAPTURE BARCODE NOT PRESENT . . 99994 REFUSED . . . . . 99995 OTHER . . . . . 99996 RECORD BAR CODE ON THE TRANSMITTAL FORM.	CAPTURE BARCODE NOT PRESENT . . . . 99994 REFUSED . . . . . 99995 OTHER . . . . . 99996 RECORD BAR CODE ON THE TRANSMITTAL FORM.
113	RECORD HEMOGLOBIN LEVEL HERE AND IN THE ANEMIA AND MALARIA PAMPHLET.	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 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	CLICK THE RESULT OF THE MALARIA RDT HERE AND IN THE ANEMIA AND MALARIA	POSITIVE . . . . . 1 (SKIP TO 118) NEGATIVE . . . . . 4 OTHER 6	POSITIVE . . . . . 1 (SKIP TO 118) NEGATIVE . . . . . 4 OTHER 6	POSITIVE . . . . . 1 (SKIP TO 118) NEGATIVE . . . . . 4 OTHER 6

HEMOGLOBIN MEASUREMENT AND MALARIA TESTING FOR MOTHERS AGE 15-49

		MOTHER 1	MOTHER 2	MOTHER 3
	CHECK HOUSEHOLD QUESTIONNAIRE: LINE NUMBER FROM COLUMN 9.	LINE NUMBER . . . . . ☐☐ NAME _____	LINE NUMBER . . . . . ☐☐ NAME _____	LINE NUMBER . . . . . ☐☐ NAME _____
116	CHECK 113: HEMOGLOBIN RESULT	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVE . . 2 NOT PRESENT . . . . . 3 REFUSED . . . . . 4 OTHER . . . . . 6 (SKIP TO 130)	BELOW 7.0 G/DL, SEVERE ANEMIA . . . . 1 7.0 G/DL OR ABOVE . . . . 2 NOT PRESENT . . . . . 3 REFUSED . . . . . 4 OTHER . . . . . 6 (SKIP TO 130)	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVE . . 2 NOT PRESENT . . . . . 3 REFUSED . . . . . 4 OTHER . . . . . 6 (SKIP TO 130)
117	**SEVERE ANEMIA REFERRAL** RECORD THE RESULT OF THE ANEMIA TEST ON THE REFERRAL FORM.	The anemia test shows that (NAME OF WOMAN) you have severe anemia. Your are very ill and must be taken to a health facility immediately. (SKIP TO 130)		
118 (4)	Does (NAME) suffer from any of the following illnesses or symptoms:	YES NO	YES NO	YES NO
	a) Extreme weakness?	a) EXTREME WEAKNESS 1 2	a) EXTREME WEAKNESS 1 2	a) EXTREME WEAKNESS 1 2
	b) Heart problems?	b) HEART PROBLEMS 1 2	b) HEART PROBLEMS 1 2	b) HEART PROBLEMS 1 2
	c) Loss of consciousness?	c) LOSS OF CONSCIOUS. 1 2	c) LOSS OF CONSCIOUS. 1 2	c) LOSS OF CONSCIOUS. 1 2
	d) Rapid or difficult breathing?	d) RAPID BREATHING 1 2	d) RAPID BREATHING 1 2	d) RAPID BREATHING 1 2
	e) Seizures?	e) SEIZURES 1 2	e) SEIZURES 1 2	e) SEIZURES 1 2
	f) Abnormal bleeding?	f) BLEEDING 1 2	f) BLEEDING 1 2	f) BLEEDING 1 2
	g) Jaundice or yellow skin?	g) JAUNDICE 1 2	g) JAUNDICE 1 2	g) JAUNDICE 1 2
	h) Dark urine?	h) DARK URINE 1 2	h) DARK URINE 1 2	h) DARK URINE 1 2
119	CHECK 118: ANY 'YES' CLICKED?	NO YES (SKIP TO 122)	NO YES (SKIP TO 122)	NO YES (SKIP TO 122)
120	CHECK 113: HEMOGLOBIN RESULT	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVE . . 2 NOT PRESENT . . . . . 3 REFUSED . . . . . 4 OTHER . . . . . 6 (SKIP TO 130)	BELOW 7.0 G/DL, SEVERE ANEMIA . . . . 1 7.0 G/DL OR ABOVE . . . . 2 NOT PRESENT . . . . . 3 REFUSED . . . . . 4 OTHER . . . . . 6 (SKIP TO 130)	BELOW 7.0 G/DL, SEVERE ANEMIA . . 1 7.0 G/DL OR ABOVE . . 2 NOT PRESENT . . . . . 3 REFUSED . . . . . 4 OTHER . . . . . 6 (SKIP TO 130)
121 (5)	In the past two weeks have you (NAME) taken or is taking ASAQ given by a doctor or health center 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)

HEMOGLOBIN MEASUREMENT AND MALARIA TESTING FOR MOTHERS AGE 15-49

		MOTHER 1	MOTHER 2	MOTHER 3
	CHECK HOUSEHOLD QUESTIONNAIRE: LINE NUMBER FROM COLUMN 9.	LINE NUMBER . . . . . ☐☐ NAME _____	LINE NUMBER . . . . . ☐☐ NAME _____	LINE NUMBER . . . . . ☐☐ NAME _____
122	**SEVERE MALARIA REFERRAL** RECORD THE RESULT OF THE MALARIA RDT ON THE REFERRAL FORM.	The malaria test shows that (NAME OF WOMAN) has malaria. Your child also has symptoms of severe malaria. The malaria treatment I have will not help you, and I cannot give you the medication. Your are very ill and must be taked to a health facility right away. (SKIP TO 128)		
123 (5)	ALREADY TAKING ASAQ REFERRAL STATEMENT	You have told me that you had already received ASAQ for malaria. Therefore, I cannot give you additional ASAQ. However, the test shows that you have malaria. If you have a fever for two days after the last dose of ASAQ, you should go to the nearest health facility for further examination. (SKIP TO 130)		
124 (2)	READ INFORMATION FOR MALARIA TREATMENT AND CONSENT STATEMENT TO	The malaria test shows that you have malaria. We can give you free medicine. The medicine is called ASAQ. ASAQ is very effective and in a few days it should get rid of the fever and other symptoms. You do not have to take the medicine. This is up to you. Please tell me whether you accept the medicine or not.		
125	CLICK 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 130)	ACCEPTED MEDICINE . 1 REFUSED . . . . . 2 OTHER . . . . . 6 (SKIP TO 130)	ACCEPTED MEDICINE . 1 REFUSED . . . . . 2 OTHER . . . . . 6 (SKIP TO 130)
127 (5)	READ INFORMATION FOR MALARIA TREATMENT AND CONSENT STATEMENT TO PREGNANT WOMAN.	ASAQ Fixed Dose Combination Age & weight group Dosage strength Day 1 Day 2 Day 3 2 to 11 months (infant) 4.5kg – 8kg 25mg AS/67.5mg AQ 1 1 1 1 to 5 years (toddler) (SKIP TO 130)		
128	CHECK 113: HEMOGLOBIN RESULT	BELOW 7.0 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 you have severe anemia. You are very ill and must be taken to a health facility immediately.		
130	GO BACK TO 103 IN NEXT COLUMN OF THIS QUESTIONNAIRE OR IN THE FIRST COLUMN OF THE NEXT PAGE; IF NO MORE PREGNANT WOMEN, END INTERVIEW.			

FIELDWORKER'S OBSERVATIONS

TO BE FILLED IN AFTER COMPLETING BIOMARKERS

SUPERVISOR'S OBSERVATIONS

EDITOR'S OBSERVATIONS

BIOMARKER: FOOTNOTES

(1) This section should be adapted for country-specific survey design.
(2) Year of fieldwork is assumed to be 2017. For fieldwork beginning in 2018, all references to calendar years should be increased by one; for example, 15-49 Years should be changed to 2013, 2013 should be changed to 2014, and similarly for all years throughout
(3) This question should be deleted in surveys that do not collect blood smears.
(4) This is a list of generic symptoms indicative of severe malaria. Symptoms should be revised according to the country's national malaria treatment guidelines.
(5) The referral statement should be revised to reflect the country's national malaria treatment guidelines in reference to antimalarial treatment failure.

YEAR OF FIELDWORK:	2017
FIVE YEARS BEFORE SURVEY:	49 Years
CHILD OLDER THAN 5:	2012
CHILD UNDER 4:	2014
CHILD UNDER 3:	2015
CHILD UNDER 16:	2002