Malawi

Malaria Indicator Survey 2021

Malawi
Malaria Indicator Survey
2021

Ministry of Health
National Malaria Control Programme
Lilongwe, Malawi

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The Global Fund
To Fight AIDS, Tuberculosis and Malaria

The 2021 Malawi Malaria Indicator Survey (2021 MMIS) was implemented by the Malawi Ministry of Health through the National Malaria Control Programme (NMCP). Financial support for the survey was provided by the Global Fund (GF). The government of Malawi provided financial assistance in terms of in form of personnel, office space, and logistical support. National Statistic Office (NSO) provided technical assistance as it provides technical assistance in the implementation of population and health surveys in the country.

Additional information about the 2021 MMIS may be obtained from the National Malaria Control Programme, P/Bag 65, Mtunthama Drive, Lilongwe, Malawi.

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TABLES AND FIGURES

PREFACE

Malaria is a major health problem in Malawi where an estimated 6 million cases occur each year. Children under age 5 and pregnant women are most likely to have severe illness. Ministry of Health (MoH), in collaboration with partners, developed the Malawi Health Sector Strategic Plan (MHSSP) 2017-2022, which articulates the priorities for health sector development in the past 5 years and prioritizes malaria. In line with that emphasis, the National Malaria Control Program (NMCP) has just finished the implementation of the developed National Malaria Strategic Plan (NMSP) 2017–2022 with the goal of universal coverage of malaria interventions to reduce morbidity and mortality by 50% in 2022. Progress would continue towards attainment of the national vision of a malaria-free Malawi.

We strive for progress in achieving prompt, effective malaria treatment. We hope to improve access to early intervention and treatment by village clinic services, using insecticide-treated nets (ITN), spraying inside residences, managing the environment, encouraging changes in social behaviour, and preventing malaria in pregnancy. We had set for ourselves high targets for these interventions, and we were confident that we would achieve our strategic goals of halving the incidence of malaria and deaths, as well as reducing the prevalence of malaria and malaria-related anaemia.

Malaria Indicator Survey (MIS) is essential measure of progress towards these goals. Without measurement, we can only guess about progress. The 2021 Malawi Malaria Indicator Survey (2021 MMIS) is the country's fifth nationally representative assessment of the coverage attained by key malaria interventions. Interventions are reported in combination with measures of malaria-related burden and anaemia prevalence testing among children under age 5.

Overall, there has been considerable progress in universal coverage of interventions and controlling malaria. We noted a decline in malaria prevalence from 24% in 2017 to 10.5% in 2021. Results of the 2021 MMIS also show improvement on use of intermittent preventive treatment during pregnancy (IPTp) by pregnant women age 15-49. The percentage of women who took two or more doses of SP/Fansidar for prevention of malaria in pregnancy increased from 77% in 2017 to 81% in 2021 while those who took three or more increased from 43% in 2017 to 56% in 2021. Despite all these achievements, ITN ownership has decreased from 82% in 2017 to 55% in 2021 because the 2021 MMIS occurred 3 years after the 2018 mass LLIN distribution campaign.

These results represent the combined work of all partners contributing to the overall universal coverage of malaria interventions. I would like to request that partners make use of the information presented in this report as they implement projects to surmount the challenges depicted here.

Finally, I would like to thank the NMCP for taking a leading role in this survey and thank all of those who travelled to various areas of Malawi, including the most remote parts of the country, to collect data. Most important, I thank the survey respondents for their contributions to this survey. Together, we can make Malawi free of malaria.

Dr. Storn Kabuluzi
Director of Community and Promotive Health Services
Ministry of Health

FORWARD

This report presents the main results of the 2021 Malawi Malaria Indicator Survey (2021 MMIS) that was conducted from 3rd May – 30th June, 2021 that was preceded by Listing and Mapping (March – April, 2021) by the NMCP, with technical support from National Statistical Office (NSO) and Malawi Liverpool Wellcome Trust (MLWT). The 2021 MMIS was successfully conducted by the large teams of enumerators and supervisors after undergoing rigorous training prior to their deployment. The planning and organizational structure put in place ensured good coverage of selected households and respondents. The 2021 MMIS was the first one to be conducted and analyzed locally following all required steps and measures laid down by DHS MEASURE. The data was collected and captured on tablets and transmitted to the NSO server electronically via internet. This process is very efficient and reduces time for data processing and cleaning as these processes are done at data capture stage in the field. The report presents basic results of the malaria indicators: ITN ownership and use, intermittent preventive treatment for pregnant women (IPT*p*) coverage, antimalarial medications among children age 6-59 months, prevalence of malaria and anaemia among children aged 6-59 months, knowledge, attitudes, and practices of malaria in the adult population and trends of key malaria indicators. The contents of the report include survey implementation and methodology, households and women characteristics, malaria prevention, malaria in children, malaria knowledge and messaging. I wish to acknowledge the dedication and professionalism portrayed by NMCP staff in handling the 2021 MMIS operation. My gratitude also goes to the Government, the cooperating partner – the Global Fund and the general public for the cooperation and support they rendered to make the 2021 MMIS a success.

Dr Michael Kayange

Programme Manager (Malaria)

ACRONYMS AND ABBREVIATIONS

ACT	artemisinin-based combination therapy
CAPI	computer-assisted personal interviewing
CCAP	Church of Central Africa Presbyterian
CHAM	Christian Health Association of Malawi
CSPro	Census and Survey Processing System
DHS	Demographic and Health Survey
EA	enumeration area
IPTp	intermittent preventive treatment (of malaria) in pregnancy
ITN	insecticide-treated net
LA	lumefantrine-artemether
MERG	monitoring and evaluation reference group
MMIS	Malawi malaria indicator survey
MIS	malaria indicator survey
MoH	Ministry of Health
NMCP	national malaria control programme
NSO	national statistical office
PMI	US President's Malaria Initiative
RBM	Roll Back Malaria
RDT	rapid diagnostic test
SP	sulphadoxine-pyrimethamine
USAID	United States Agency for International Development
WHO	World Health Organization

READING AND UNDERSTANDING TABLES FROM THE 2017 MALAWI MALARIA INDICATOR SURVEY (MMIS)

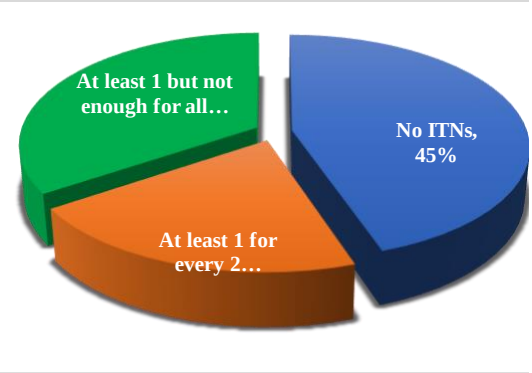
The 2021 Malawi Malaria Indicator Survey (MMIS) report is very similar in content to the 2017 MMIS is presented in a similar format. The style features more figures to highlight trends, subnational patterns, and background characteristics. Large colourful maps display data by regions within Malawi. The text has been simplified to highlight key points in bullets and to clearly identify indicator definitions in boxes.

Although the text and figures featured in each chapter highlight some of the most important findings, not every finding can be discussed or displayed graphically. For this reason, 2021 MMIS data users should be comfortable reading and interpreting data tables.

The following pages provide an introduction to the organization of the 2021 MMIS tables, the presentation of background characteristics, and a brief summary of sampling procedures used and understanding denominators. In addition, this section provides some exercises for users as they practice their new skills in interpreting 2021 MMIS tables.

Figure 3.1 **Household ownership of ITNs**

Percent distribution of households



Patterns by background characteristics

- The percentage of households with at least one ITN increases as household wealth slightly increases
- Households in urban areas are more likely than households in rural areas to have at least one ITN for every two persons who stayed in the house the prior night (29% and 19%, respectively) (**Table 3.1**).
- The percentage of households with at least

Example 1: ITN Use

A measure taken from all household members

Table 3.6 Use of existing ITNs 1

Percentage of insecticide-treated nets (ITNs) that were used by anyone the night before the survey, according to background characteristics, Malawi MIS 2021

2

Background characteristic 3	Percentage of existing ITNs[1] used last night	Number of ITNs[1]
Residence		
Urban	84.9	668
Rural	82.7	2,648
Region		
Northern Region	81.7	465
Central Region	83.3	1,033
Southern Region	83.4	1,817
Wealth quintile		
Lowest	81.2	860
Second	84.9	690
Middle	85.6	666
Fourth	82.2	537
Highest	81.9	563
Total	83.1	3,316

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[1] An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment. In the MMIS 2017, this was known as a long-lasting insecticidal net (LLIN).

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 ITN use by household members last night. ITN Use were measured for all household members who were present in the household.

Step 2: Scan the column headings – highlighted in green in Example 1. They describe how the information is categorized. In this table, the first column of data shows percentage of existing ITNs used last night. The second column lists the number of ITNs that were used.

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 use of existing ITNs residence, region and wealth quintile.

Step 4: Look at the row at the bottom of the table highlighted in yellow. These percentages represent the totals of ITNs used. In this case, 83.1 percent of existing ITNs were used last night before the survey.

Step 5: To find out what percentage of ITNs that were used in rural areas last night before the survey, draw two imaginary lines, as shown on the table. This shows that 82.7% of ITNs in rural areas were used last night before the survey.

Step 6: By looking at patterns by background characteristics, we can see how low ITN Use varies across Malawi. Resources are often limited; knowing how ITN varies among different categories can help programme planners and policy makers determine how to most effectively use resources.

**For the purpose of this tutorial, data are presented exactly as they appear in the table including decimal places. However, the text in the remainder of this report rounds data to the nearest whole percentage point.*

Practice: Use the table in Example 1 to answer the following questions about ITN use:

a) Is ITN Use more common among regions?
b) Is there a clear pattern of ITN Use by Wealth Quintiles?
c) What are the lowest and highest percentages (range) of ITN Use by region?

Example 2: Use of Mosquito Nets by Pregnant Women

A Question Asked of a Subgroup of Survey Respondents

Table 3.8 Use of mosquito nets by pregnant women 1

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, Malawi MIS 2021

2	Among pregnant women age 15-49 in all households			Among pregnant women age 15-49 in households with at least one ITN[1]	
	Percentage who slept under any mosquito net last night	Percentage who slept under an ITN[1] last night	Number of pregnant women	Percentage who slept under an ITN[1] last night	Number of pregnant women
Residence					
Urban	51.7	45.6	40	71.4	26
Rural	52.7	49.3	222	78.1	140
Region					
Northern Region	66.0	55.8	30	86.2	20
Central Region	36.2	30.9	109	67.9	50
Southern Region	63.7	62.9	123	79.9	97
Education					
No education	27.1	27.1	14	59.9	6
Primary	52.1	50.1	172	78.5	110
Secondary	57.9	49.9	73	75.4	48
More than secondary	61.4	42.5	4	100.0	2
Wealth quintile					
Lowest	51.0	48.4	83	71.1	57
Second	48.0	40.7	60	85.4	29
Middle	59.3	58.2	65	92.0	41
Fourth	56.7	53.0	29	80.0	19
Highest	45.8	39.4	25	48.7	20
Total	52.5	48.7	263	77.1	166

a b 4 3

Note: Table is based on women who stayed in the household the night before the interview.

[1] An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment. In the MMIS 2017, 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: (a) all pregnant women age 15-49 in all households and (b) pregnant women age 15-49 in households with at least one insecticide-treated net (ITN).

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

Step 3: Look at the number of women included in this table. How many pregnant women age 15-49 in all households were interviewed? It's 263. Now look at the second panel. How many pregnant women age 15-49 in households with at least one ITN were interviewed? It's 166.

Step 4: Only 263 pregnant women age 15-49 in all households and 166 pregnant women in households with at least one ITN were interviewed in the 2021 MMIS. These pregnant women are further divided into the background characteristic categories.

- What percentage of pregnant women age 15-49 in all households in the lowest wealth quintile slept under an ITN the night before the survey? 51.0%.
- What percentage of pregnant women age 15-49 with no education in households with at least one ITN slept under an ITN the night before the survey? 59.9%.

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

Example 3: Understanding Sampling Weights in 2021 MMIS Tables

A sample is a group of people who have been selected for a survey. In the 2021 MMIS, the sample is designed to represent the national population age 15-49. In addition to national data, most countries want to collect and report data on smaller geographical or administrative areas. However, doing so requires a minimum sample size per area. For the 2021 MMIS, the survey sample is representative at the national and regional levels, and for urban and rural areas.

Table 2.8 Background characteristics of respondents

Percent distribution of women age 15-49 by selected background characteristics, Malawi MIS 2021

	Women		
Background characteristic	Weighted percent 3	Weighted number 2	Unweighted number 1
Residence			
Urban	18.9	712	1,654
Rural	81.1	3,053	2,111
Total 15-49	**100**	**3,765**	**3,765**

To generate statistics that are representative of the country as a whole and the three regions, the number of women surveyed in each residential area should contribute to the size of the total (national) sample in proportion to size of the residential area. However, if some residential areas have small populations, then a sample allocated in proportion to each residence's population may not include sufficient women from each residential area for analysis. To solve this problem, residence with small populations are oversampled. For example, let's say that you have enough money to interview 3,860 women and want to produce results that are representative of Malawi as a whole and its residences (as in Table 2.8). However, the total population of Malawi is not evenly distributed among the residence: residence, such as urban, are heavily populated while rural are not. Thus, rural must be oversampled.

A sampling statistician determines how many women should be interviewed in each residence 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 residence. Within the residences, the number of women interviewed were 1,654 in urban and 2, 111 in rural. The number of interviews is sufficient to get reliable results in each region.

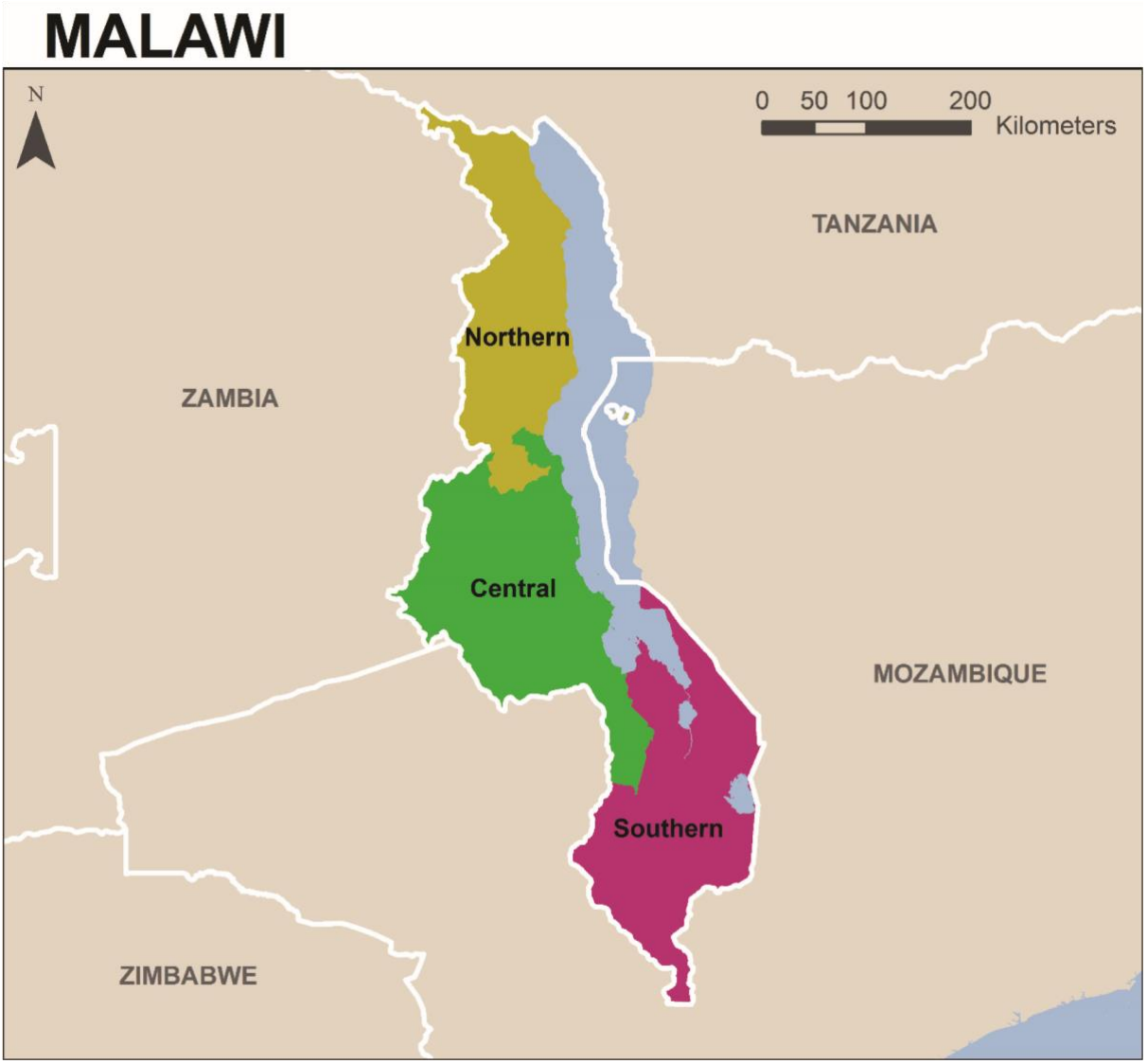
With this distribution of interviews, one residence was overrepresented while the other is underrepresented. For example, the population in rural is 81.1% of the population in Malawi, while urban's population contributes only 18.9%. But as the blue column shows, the number of women interviewed in urban accounts for only about 44% of the total sample of women interviewed (1,654/3,765) and the number of women interviewed in rural accounts for 56% of the total sample of women interviewed (2,111/3,765). This unweighted distribution of women does not accurately represent the population.

In order to get statistics that are representative of Malawi, the distribution of the women in the sample needs to be weighted (or mathematically adjusted) such that it resembles the true distribution in the country. Women from urban, that has smaller population of women, should only contribute a small amount to the national total. Women from rural, that has a larger women population, should contribute much more. Therefore, DHS statisticians

mathematically calculate a “weight” which is used to adjust the number of women from each residential area so that each residence’s contribution to the total is proportional to the actual population of the residential 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 residential level. The total national sample size of 3,765 women has not changed after weighting, but the distribution of the women in the residential areas has been changed to represent their contribution to the total population size.

How do statisticians weight each category? They take into account the probability that a woman was selected in the sample. If you were to compare the **green column (3)** to the actual population distribution of Malawi, you would see that women in each residence 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 urban and the proportion of women who live in rural.

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



• *Map of Malawi*

INTRODUCTION AND SURVEY METHODOLOGY 1

The 2021 Malawi Malaria Indicator Survey (MMIS) was implemented by the Ministry of Health through the National Malaria Control Program (NMCP) with funding from the Global Fund (GF). Data collection took place from 12 April to 21 June, 2021. NSO provided technical assistance as it provides technical assistance in the implementation of population and health surveys in the country.

1.1 SURVEY OBJECTIVES

The 2021 MMIS, a comprehensive, nationally-representative household survey, was designed in accord with the Roll Back Malaria Monitoring and Evaluation Working Group (RBM-MERG) guidelines. The primary objective of the 2021 MMIS project was to provide up-to-date estimates of basic demographic and health indicators related to malaria. Specifically, the 2021 MMIS collected information on mosquito nets, intermittent preventive treatment of malaria in pregnant women (*IPTp*), and care seeking behaviour and treatment of fever in children. Young children were also tested for anaemia and for malaria infection. Knowledge of malaria was assessed among interviewed women. The information collected through the 2021 MMIS is intended to assist policy makers and program managers in evaluating and designing programs and strategies for improving the health of the country's population.

1.2 SAMPLE DESIGN

The 2021 MMIS followed a two-stage sample design and allows estimates of key malaria indicators for the country as a whole, for urban and rural areas separately, and for each of the 3 administrative regions in Malawi: Northern, Central, and Southern. The *first stage* of sampling involved selecting sample points (clusters/enumeration areas) from the sampling frame. There were 18, 483 enumeration areas (EAs) delineated for the 2018 Population and Housing Census that were used as the sampling frame. A total of 150 clusters were selected, with probability proportional to size, from the EAs covered in the 2018 Population and Housing Census. Of these clusters, 60 were in urban areas and 90 in rural areas. Urban areas were oversampled within regions to produce robust estimates for each area or domain. A household listing operation was undertaken in all selected EAs between February and March 2021, and households to be included in the survey were randomly selected from these lists in the second stage. The *second stage* of sampling involved equal probability systematic selection of households from the updated listed households. Twenty-five households were selected from each EA, for a total sample size of 3,750 households that were included in the interviews. Because of the approximately equal sample sizes in each region, the sample is not self-weighting at the national level. Results shown in this report have been weighted to account for the complex sample design. See Appendix A for additional details on the sampling procedures. All women age 15-49 who were either permanent residents of the selected households or visitors who stayed in the household the night before the survey were eligible to be interviewed. With the parent's or guardian's consent, children age 6-59 months were tested for anaemia and for malaria infection.

1.3 QUESTIONNAIRES

Data was primarily collected using three types of questionnaires: the Household Questionnaire, the Woman's Questionnaire, and the Biomarker Questionnaire. Core questionnaires available from the RBMMERG were adapted to reflect the population and health issues relevant to Malawi. The modifications were determined at a series of meetings with various stakeholders from the National Malaria Control Programme (NMCP) and other government ministries and agencies, nongovernmental organisations, and international donors. The questionnaires in English and two local Malawian languages (Chichewa and Chitumbuka) were programmed onto tablet computers, enabling use of computer-assisted personal interviewing (CAPI) for the survey.

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

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

♣ Background characteristics (age, residential history, education, literacy, religion, and ethnicity)

♣ Reproductive history for the last 6 years

♣ Preventive malaria treatment for the most recent birth

♣ Prevalence and treatment of fever among children under age 5

♣ Knowledge about malaria (symptoms, causes, and how to prevent)

♣ Sources of media messages about malaria

The Biomarker Questionnaire was used to record the results of the anaemia and malaria testing of children 6-59 months, as well as the signatures of the fieldworker and the parent or guardian who gave consent. Consent statements were developed for each tool (Household, Woman's, and Biomarker Questionnaires). Further consent statements were formulated for malaria testing, anaemia testing, and treatment of children with positive malaria rapid diagnostic tests (RDTs). Verbal informed consent was sought from eligible respondents before the administration of the Household Questionnaire and the Individual Questionnaire or the collection of biomarker data. For children age 6-59 months eligible for anaemia and malaria testing, consent was obtained from a parent or guardian, or other responsible adult prior to testing. The survey staff recorded their

unique identification number and signed to indicate that the consent procedure was properly administered, and whether or not the respondent provided their consent.

1.4 ANAEMIA AND MALARIA TESTING

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

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

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

Children who tested positive for malaria were offered a full course of medicine according to standard procedures for uncomplicated malaria treatment in Malawi. To ascertain the correct dose, nurses on each field team were trained to use treatment guidance charts and to ask about any medications the child might already be taking. The nurses were also trained to identify signs and symptoms of severe malaria. The nurses provided the age-appropriate dose of artemisinin-based combination therapy (ACT) along with instructions on how to administer the medicine to the child. They also directly observed administration of the first dose.

Malaria testing using blood smears. In addition to the RDT, thick and thin blood smears were prepared in the field. Each blood smear slide was given a bar code label, with a duplicate affixed to the Biomarker Questionnaire. An additional copy of the bar code label was affixed to a blood

sample transmittal form to track the blood samples from the field to the laboratory. The slides were dried in a dust-free environment and stored in slide boxes. The thick and thin blood smear slides were collected regularly from the field, along with the completed Biomarker Questionnaires, and transported to the laboratory for logging and microscopic reading. The smears were stained with Giemsa stain and examined to determine the presence of Plasmodium infection and parasite density. All stained slides were read by two independent microscopists. Slides with discordant microscopy results were reanalysed by a third microscopist for final validation.

The microscopic results were quality checked by internal and external quality control processes. Internal quality control consisted of an independent microscopist who read 5% of all slides in the study. External quality control was conducted through the Malawi College of Medicine Laboratory where 10% of samples were independently read. Ten percent of DBS were also transported together with blood smears to molecular lab at college of medicine for external quality assurance.

1.5 TRAINING OF FIELD STAFF

A 3-week training for field staff took place from 12th to 30th April, 2021, at the Cross Roads Hotel in Lilongwe. Overall, 60 people attended the training, including 10 field supervisors, 30 interviewers, and 20 laboratory technicians. NMCP and NSO staff members led the training and served as the supervisory team for the fieldwork practice.

During the first week of training, field supervisors and interviewers focused on how to fill out the Household and Woman's questionnaires, conduct mock interviews, and use appropriate interviewing techniques.

During the second week, two parallel training sessions were organized: one for the interviewers and team supervisors and the other for laboratory technicians. The training of interviewers and field supervisors focused on the use of the CAPI application for filling out the Household, Woman's and Biomarker questionnaires, assigning households to interviewers, and transferring data from completed questionnaires to the central data processing centre. Throughout the training, quizzes were administered to assess how well the participants absorbed the training materials, both on using the paper questionnaire and on using the CAPI application as a data collection tool.

Training of laboratory technicians focused on preparing blood samples to test for anaemia and malaria. The training involved presentations, discussion, and actual testing for anaemia and malaria. The technicians were trained to identify children eligible for testing, administer informed consent, conduct the anaemia and malaria rapid tests, make thick and thin blood smears, and administer the correct treatment protocols. They were also trained to store the blood slides, record test results on the Biomarker Questionnaire, and provide the results to the parents or guardians of the children tested. Finally, technicians were trained on how to record children's anaemia and malaria results on the respective brochures and how to fill in the referral slip for any child who was found to be severely anaemic. To help put the importance of the 2021 MMIS into context for the trainees, the training also included presentations given by NMCP staff on epidemiology of malaria and Malawi-specific policies and programs on malaria. All participants took part in 3-day field practice exercises in Lilongwe.

1.6 FIELDWORK

Ten teams were organised for field data collection. Each team consisted of one field supervisor, three health professionals to interview and administer treatment, two laboratory technicians to conduct biomarker testing, and two drivers. The field staff also included national coordinators who collected slides from the field teams and delivered them to the National Reference Health Laboratory. Field data collection for the 2021 MMIS started on 3 May 2021. For maximum supervision, all ten teams were visited by national monitors, at least once a week. Fieldwork was completed on 30 June 2021. Note also that this survey was done in a Covid 19 era and all necessary preventive measures as laid down by National Covid Task Force were strictly followed

1.7 DATA PROCESSING

Data for the 2021 MMIS were collected through questionnaires programmed onto the CAPI application. The CAPI were programmed by NSO and loaded with the Household, Biomarker, and Woman's Questionnaires in all three major languages. Using the cloud, the field supervisors transferred data on a daily basis to a central location for data processing in Lilongwe. To facilitate communication and monitoring, each field worker was assigned a unique identification number. NSO provided technical assistance for processing the data using the Censuses and Surveys Processing (CSPro) system for data editing, cleaning, weighting, and tabulation. In the central office, data received from the field teams' CAPI applications were registered and checked for any inconsistencies. Data editing and cleaning included an extensive range of structural and internal consistency checks. Any anomalies were communicated to team (field) supervisors so that the data processing teams could resolve data discrepancies. The corrected results were maintained in master CSPro data files at NSO and used for analysis in producing tables for the final report.

1.8 RESPONSE RATES

Table 1.1 shows that of the 3,750 households selected for the sample, 3,726 were occupied at the time of fieldwork. Among the occupied households, 3,711 were successfully interviewed, yielding a total household response rate of 99.6%. In the interviewed households, 3,765 eligible women were identified as eligible for individual interview, and 3,707 women were successfully interviewed, yielding a response rate of 99%.

Table 1:1 Results of the households and individual interviews

Number of households, number of interviews and response rates according to residence (unweighted), Malawi MMIS 2021

	Residence		
Results	**Urban**	**Rural**	**Total**
Household Interviews			
Household Selected	1500	2250	3750
Household Occupied	1489	2237	3726
Household Interviewed	1481	2230	3711
*Household Response Rate**	*99.5*	*99.7*	*99.6*
Interviews with Women aged 15 - 49			
Number of eligible women	1654	2111	3765
Number of eligible women interviewed	1635	2074	3709
*Eligible women response rate***	*98.9*	*98.2*	*98.5*

*Households interviewed/Households occupied

**Respondents interviewed/Eligible respondents

CHARACTERISTICS OF HOUSEHOLDS AND WOMEN 2

Key Findings

- ***Drinking Water***: Majority of urban households (97%) have access to an improved source of drinking water while 90% of rural households have access.
- ***Sanitation:*** Only 9% of the households use an improved toilet facility; 16% of the households have a toilet facility that would be classified as improved toilet facility, 75% use an unimproved toilet facility and 6% practice open defecation.
- ***Household Wealth:*** 24% of households in the Northern region are in the middle wealth quintile while majority of households in the Central and Southern regions (30% and 33% respectively) are in the lowest wealth quintile.
- ***Electricity:*** 93% of rural households do not have electricity
- ***Bank Account/Village Savings***: 42% of households have a member with a bank account (80% in urban areas and 35% in rural areas).
- ***Literacy:*** Overall, younger women are more likely to be literate than older women. Eighty-eight percent of women age 15-19 are literate compared with 40% of women age 45-49.

Information on the socioeconomic characteristics of the household population in the 2021 MMIS provides a context to interpret demographic and health indicators and can furnish an approximate indication of the representativeness of the survey. In addition, this information sheds light on the living conditions of the population of Malawi.

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

2.1 DRINKING WATER SOURCES AND TREATMENT

Improved sources of drinking water

Includes piped water, public taps, standpipes, tube wells, boreholes, protected dug wells, springs, and rainwater. Households using bottled water for drinking are classified as using an improved source only if their water for cooking and handwashing is from an improved source.

Sample: Households

Improved sources of water protect against outside contamination so water is more likely to be safe to drink. In Malawi, 91% of households have access to an improved source of drinking water (**Table 2.1**). Ninety-seven percent of urban households and 90% of rural households have access to improved water sources. Urban and rural households rely on different sources of drinking water. Forty-six percent of urban households have piped water in their dwelling or yard, which accounts for the largest percentage of improved water sources for urban households (**Figure 2.1**). In contrast, rural households with access to improved sources of drinking water rely mainly on tube wells or boreholes (70%). Ninety-three percent of urban and 74% of rural households have water on the premises or travel less than 30 minutes to fetch drinking water (**Table 2.1**).

Trends: The proportion of households obtaining water from improved sources increased slightly from 81% in the 2012 MMIS to 83% in the 2014 MMIS, 86% in the 2017 MMIS and then 91% in 2021 MMIS. The increase occurred in both urban and rural households, from 93% in 2012 to 97% in 2021 in urban areas and from 79% in 2012 to 90% in 2021 in rural areas (**Figure 2.2**).

Figure 2.1: Household drinking water by residence

Percent distribution of households by source of drinking water

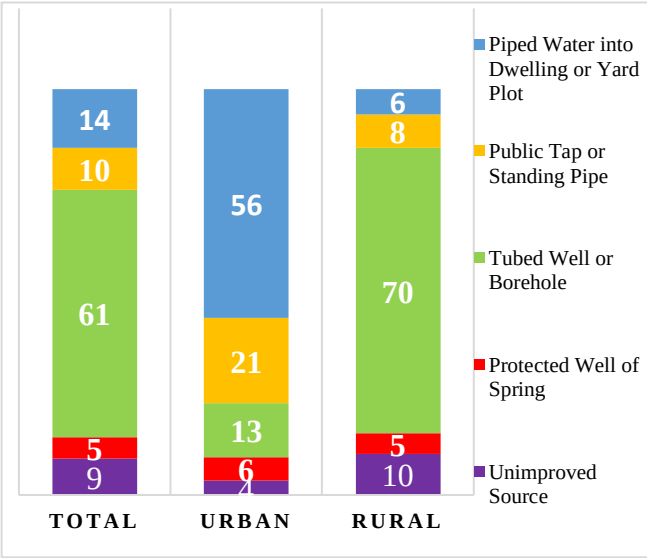
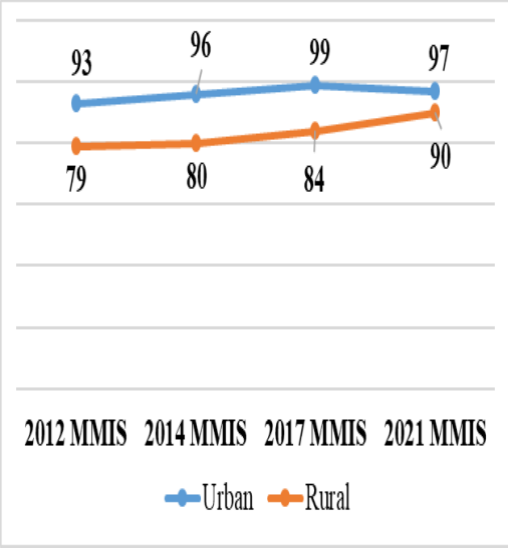


Figure 2.2: Trends in sources of drinking water by residence

Percent obtaining drinking water from improved sources



2.2 SANITATION

Improved toilet facilities

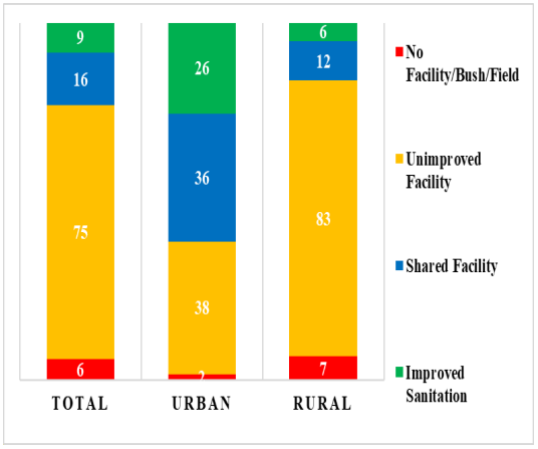
Include any non-shared toilet of the following types: flush/pour flush toilets to piped sewer systems, septic tanks, and pit latrines; ventilated improved pit (VIP) latrines; pit latrines with slabs; and composting toilets

Sample: Households

Nationally, only 9% of households use an improved sanitation facility. Ninety-one percent of households use unimproved sanitation, including 16% of the households that have a toilet facility that would be classified as improved if it were not shared with other households, 75% that use an unimproved toilet facility, and 6% that practice open defecation (**Figure 2.3**). Households in urban areas (26%) are more likely than rural households (6%) to use improved facilities. The most commonly used improved toilet facility is the pit latrine with a slab (8%) (**Table 2.2**).

Figure 2.3 **Household toilet facilities by residence**

Percent distribution of households by type of toilet facilities



Note: Totals may not add to 100 due to rounding.

2.3 HOUSING CHARACTERISTICS

The 2021 MMIS collected data on household features such as access to electricity, flooring material, number of sleeping rooms, and types of fuel used for cooking. The responses to these questions, along with information on ownership of household durable goods, contribute to the creation of the household wealth index and provide information that may be relevant for other health indicators.

Exposure to cooking smoke, especially that produced from solid fuels such as charcoal and firewood, is potentially harmful to health. Both urban and rural households rely on solid cooking fuels, but there are differences in the type of solid fuels they use. The percentage of households using charcoal for cooking is about 5 times higher in urban households than in rural households (68% versus 14%, respectively), while rural households are more likely to use firewood than urban households (85% versus 22%, respectively). (**Table 2.3**).

Overall, at least 1 in 7 (14%) households in Malawi has access to electricity. Fifty-two percent of urban households but only 7% of rural households have access to electricity.

The most common flooring material in Malawi is earth or sand (67%). Cement is the second most common material (30%). By residence, the most common choice in urban areas is cement (72%), while in rural areas it is earth or sand (75%).

The number of rooms a household uses for sleeping is an indicator of socioeconomic level and crowding in the household; crowding can facilitate the spread of diseases. In Malawi, most households (38%) of households use two rooms for sleeping, while 31% use either a single room and similarly 31% of households use three or more rooms for sleeping. In urban areas, 37% use two rooms, while in rural areas 38% use two rooms for sleeping (**Table 2.3**).

Household Durable Goods

Data displayed in **Table 2.4** presents information on ownership of household effects, means of transport, agricultural land and animals, and bank accounts. Urban households are more likely than rural households to own a radio (53% versus 26%), television (43% versus 6%), mobile phone (87% versus 56%), and car or truck (12% versus 1%). Urban households are also more likely than rural households to own a bank account (80% versus 35%). In contrast, rural households are more likely than urban households to own agricultural land (82% versus 32%), farm animals (51% versus 25%), a bicycle (31% vs 30%), and a torch (82% versus 66%).

2.4 HOUSEHOLD WEALTH

Wealth index

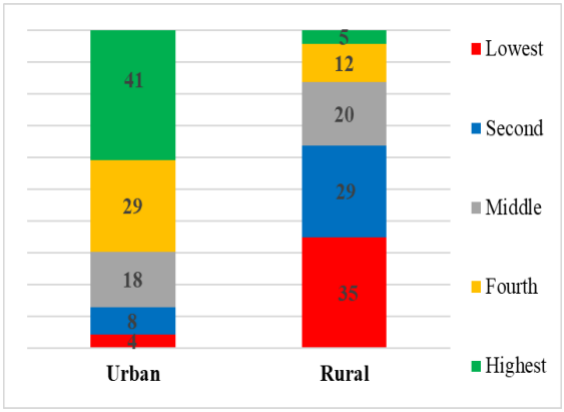
Households are given scores based on the number and kinds of consumer goods they own, ranging from a television to a bicycle or car, and housing characteristics such as source of drinking water, toilet facilities, and flooring materials. These scores are derived using principal component analysis. National 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

There are substantial variations in the distribution of wealth quintiles at residential and regional levels. Rural residences have the highest percentage of population in the lowest quintile (35%) compared with urban ones 4%), while 41% of the urban population is in the highest quintile compared with 5% of the rural population (Figure 2.4). At the regional level, the Southern region has the highest percentage of population in the lowest quintile (33%) as well as the lowest percentage of the population in the highest wealth quintile (8%). The Northern region has the highest percentage of population in the highest wealth quintile (16%) compared with Central (11%) and Southern (8%) regions (**Table 2.5**).

Figure 2.4 **Household wealth by residence**

Percent distribution of de jure population by wealth quintiles



2.5 HOUSEHOLD POPULATION AND COMPOSITION

In the 2021 MMIS, 15,956 people stayed overnight in 3,711 households. The population sex ratio is 95 males per 100 females. By residence, there were 97 males per 100 females in urban areas and 94 males per 100 females in rural areas.

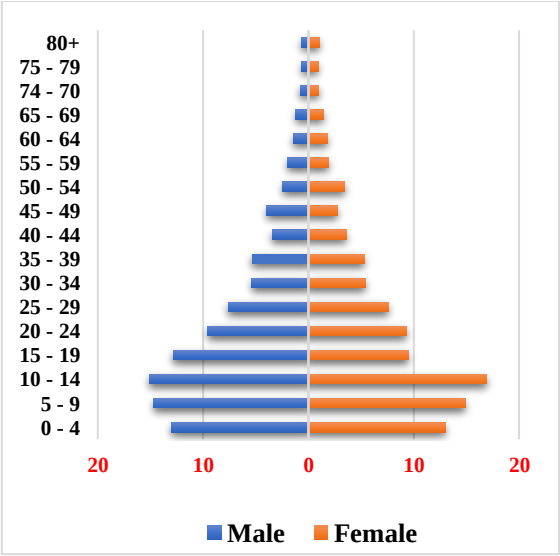
Age and sex are important demographic variables and are the primary basis of demographic classification. **Table 2.6** shows the distribution of the de facto household population in the 2021 MMIS by 5-year age groups, according to sex and residence.

The population in **Figure 2.5** shows the population distribution by sex and by five-year age groups. The broad base of the pyramid shows that the Malawi population is young, which is typical of developing countries with a higher fertility rate and low life expectancy. Fourty-four percent of population is under the age 15, almost half of the population (52%) is between the age of 15 and 64, and only 4% of the population is aged 65 and above (**Table 2.6**).

On average, household in Malawi consist of 4.3 persons (**Table 2.7**). Men are predominantly the head of households in Malawi (72%). The propotion of households headed by women is slighly higher in the rural areas than in urban areas (29% versus 23%).

Figure 2.5 **Population pyramid**

Percent distribution of the household population



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

How data are calculated

All tables are based on the de facto population, unless specified otherwise.

2.6 Background Characteristics of Women Respondents

Table 2.8 shows by background characteristics the weighted and unweighted numbers and the weighted percentage distributions of women age 15-49 who were interviewed in the 2021 MMIS, by background characteristics. More than half of the respondents (60%) are between age 15 and 30, which reflects the youthful population. The majority of respondents are Christians (73%), with Catholic and CCAP forming the largest composition (28%), and 17% are Muslims.

The Chewas form the largest ethnic group (34%). Eighty-one percent of respondents live in rural areas. The largest percentage of respondents lives in the Southern region (46%) followed by the Central region (42%) and the Northern region (12%).

2.7 Educational Attainment of Women

Studies have consistently shown that educational attainment has a strong effect on health behaviours and attitudes. Generally, the higher the level of education a woman has attained, the more knowledgeable she is about both the use of health facilities and health management for herself and for her children.

In general, 10% of women in Malawi have no education (**Figure 2.6**). Twelve percent of women have completed secondary education or attended higher than secondary school. Overall, women have completed a median of 7 years of education (**Table 2.9**).

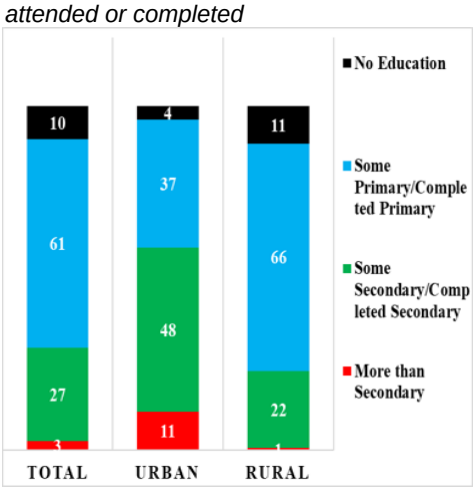
Patterns by background characteristics

- Eleven percent of women in rural areas have no education compared with 4% in urban areas.
- At the regional level, the Southern region recorded the highest percentage of women with no education (11%), while the Northern region had the lowest percentage (3%) of women with no education.
- The percentage of respondents with no education decreases with increasing wealth quintile, from 16% in the lowest quintile to 2% in the highest quintile.

2.8 Literacy of Women

Figure 2.6 **Education of survey respondents**

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



Literacy

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

Sample: **Women age 15-49**

The results show that only 3% of women have higher than secondary education. Amongst those with secondary education or lower including those with no education, 32% can read the whole sentence, 42% can read part of the sentence and 23% cannot read at all. The results show that, overall, 76% of women age 15-49 are literate. (**Table 2.10**).

Patterns by background characteristics

- Literacy is much higher amongst the youngest women age 15-19 (88%) and decreases steadily with age to 40% amongst the oldest women (45-49) (**Table 2.10**).
- Literacy varies by place of residence as 91% of women in urban areas are literate, compared with 73% of rural women.
- Regional differences in literacy are notable; literacy is highest among women in the Northern region (87%) and lowest among women in the Central region (73%).
- By wealth, literacy ranges from 60% among women in the lowest wealth quintile to 94% among women in the highest quintile.

LIST OF TABLES

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

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- **Table 2.2 Household sanitation facilities**
- **Table 2.3 Household characteristics**
- **Table 2.4 Household possessions**
- **Table 2.5 Wealth quintiles**
- **Table 2.6 Household population by age, sex, and residence**
- **Table 2.7 Household composition**
- **Table 2.8 Background characteristics of respondents**
- **Table 2.9 Women's educational attainment**
- **Table 2.10 Women's literacy**

Table 2.1 Household drinking water

Percent distribution of households and de jure population by source of drinking water and by time to obtain drinking water, according to residence, Malawi MIS 2021

	Households			Population		
Characteristic	Urban	Rural	Total	Urban	Rural	Total
Source of drinking water						
Improved source	**96.5**	**90.0**	**91.1**	**96.3**	**89.8**	**90.8**
Piped into dwelling/yard/plot	45.7	3.5	10.4	47.5	3.9	10.8
Piped to neighbor	10.7	2.7	4.0	10.0	2.7	3.9
Public tap/standpipe	21.0	8.2	10.3	20.9	7.9	9.9
Tubewell/borehole	13.2	70.4	61.1	12.2	70.8	61.5
Protected dug well	4.8	4.6	4.6	4.6	4.0	4.1
Protected spring	0.8	0.4	0.5	0.9	0.4	0.5
Rainwater	0.0	0.1	0.1	0.0	0.1	0.1
Bottled water, improved source for cooking/handwashing[1]	0.3	0.1	0.1	0.2	0.1	0.1
Unimproved source	**3.5**	**10.0**	**8.9**	**3.7**	**10.2**	**9.2**
Unprotected dug well	2.8	5.7	5.2	3.0	6.0	5.5
Unprotected spring	0.5	1.5	1.4	0.4	1.5	1.3
Tanker truck/cart with small tank	0.0	0.0	0.0	0.0	0.0	0.0
Surface water	0.3	2.7	2.3	0.3	2.7	2.3
Bottled water, unimproved source for cooking/handwashing[1]	0.0	0.0	0.0	0.0	0.0	0.0
Other source	**0.0**	**0.0**	**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[2]	63.2	15.8	23.5	63.9	16.0	23.6
Less than 30 minutes	29.6	58.2	53.6	28.9	57.5	52.9
30 minutes or longer	7.0	25.1	22.2	7.1	25.7	22.7
Don't know	0.2	0.8	0.7	0.1	0.8	0.7
Total	**100.0**	**100.0**	**100**	**100.0**	**100.0**	**100.0**
Number of households/population	**607**	**3,104**	**3711**	**2,546.5**	**13,410**	**15,956**

[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.

[2] Includes water piped to a neighbor

Table 2.2 Household sanitation facilities

Percent distribution of households and de jure population by type of toilet/latrine facilities, according to residence, Malawi MIS 2021

	Households			Population		
Type and location of toilet/latrine facility	Urban	Rural	Total	Urban	Rural	Total
Improved sanitation	**25.9**	**5.5**	**8.8**	**23.5**	**4.7**	**7.7**
Flush/pour flush to piped sewer system	0.3	0.0	0.0	0.1	0.0	0.0
Flush/pour flush to septic tank	0.3	0.0	0.0	0.3	0.0	0.0
Flush/pour flush to a pit latrine	0.1	0.1	0.1	0.2	0.1	0.1
Ventilated improved pit (VIP) latrine	0.3	0.6	0.5	0.2	0.6	0.5
Pit latrine with a slab	24.8	4.6	7.9	22.6	4.0	7.0
Composting toilet	0.1	0.2	0.1	0.1	0.1	0.1
Unimproved sanitation	**74.1**	**94.5**	**91.2**	**76.2**	**95.0**	**92.0**
Shared facility1	36.4	11.8	15.8	39.5	12.5	16.8
Flush/pour flush to piped sewer system	3.3	0.0	0.5	3.1	0.0	0.5
Flush/pour flush to septic tank	12.9	0.1	2.2	13.6	0.2	2.3
Flush/pour flush to a pit latrine	0.5	0.2	0.3	0.6	0.2	0.3
Ventilated improved pit (VIP) latrine	1.1	1.5	1.4	1.2	1.5	1.4
Pit latrine with a slab	18.6	9.9	11.3	21.0	10.6	12.2
Composting toilet	0.0	0.1	0.0	0.0	0.1	0.0
Unimproved facility	**37.8**	**82.7**	**75.3**	**36.7**	**82.6**	**75.3**
Flush/pour flush not to sewer/ septic tank/pit latrine	0.2	0.0	0.0	0.3	0.0	0.0
Pit latrine without slab/open pit	36.0	75.4	69.0	35.2	76.2	69.6
Bucket	0.0	0.1	0.0	0.0	0.1	0.1
Hanging toilet/hanging latrine	0.0	0.2	0.2	0.1	0.4	0.3
Open defecation (no facility/bush/field)	1.6	6.9	6.1	1.2	5.9	5.1
Total	100.0	100.0	100.0	100.0	100.0	100.0
Number of households/population						
Number of households/population	607	3,104	3,711	2,554	13,441	15,995
Number of households/population with a toilet/latrine facility	598	2,888	3,486	2,516	12,621	15,138

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

Table 2.3 Household characteristics

Percent distribution of households and de jure population by housing characteristics and percentage using solid fuel for cooking, according to residence, Malawi MIS 2021

	Households			Population		
Housing characteristic	Urban	Rural	Total	Urban	Rural	Total
Electricity						
Yes	52.0	6.6	14.0	52.9	7.3	14.6
No	48.0	93.4	86.0	47.1	92.7	85.4
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Flooring material						
Earth/sand	22.9	75.3	66.7	22.3	73.5	65.3
Dung	0.7	2.2	1.9	1.0	2.7	2.5
Wood planks	0.0	0.0	0.0	0.0	0.0	0.0
Palm/bamboo	0.0	0.0	0.0	0.0	0.0	0.0
Parquet or polished wood	0.0	0.1	0.0	0.0	0.1	0.1
Vinyl or asphalt strips	0.0	0.0	0.0	0.0	0.0	0.0
Ceramic tiles	3.7	0.1	0.7	4.0	0.1	0.7
Cement	72.4	21.9	30.2	72.5	22.9	30.9
Carpet	0.2	0.0	0.1	0.2	0.0	0.1
Other	0.1	0.4	0.4	0.1	0.5	0.5
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Rooms used for sleeping						
One	27.6	32.0	31.2	17.1	23.1	22.1
Two	36.5	37.7	37.5	37.4	38.1	37.9
Three or more	35.9	30.4	31.3	45.5	38.9	39.9
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Cooking fuel						
Electricity	9.8	0.3	1.8	8.8	0.2	1.6
LPG/natural gas/biogas	0.4	0.0	0.0	0.3	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	67.5	13.7	22.5	67.9	12.4	21.2
Wood	22.1	85.4	75.0	22.6	86.8	76.5
Straw/shrubs/grass	0.0	0.2	0.2	0.0	0.2	0.2
Agricultural crop	0.3	0.3	0.3	0.4	0.3	0.3
Animal dung	0.0	0.0	0.0	0.0	0.0	0.0
Other fuel	0.0	0.0	0.0	0.0	0.0	0.0
No food cooked in household	0.0	0.1	0.1	0.0	0.1	0.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Percentage using solid fuel for cooking[1]	89.9	99.7	98.1	90.9	99.7	98.3
Percentage using clean fuel for cooking[2]	10.1	0.3	1.9	9.1	0.3	1.7
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Number of households/population	**607**	**3,104**	**3,711**	**2,547**	**13,410**	**15,956**

LPG = Liquefied petroleum gas

[1] Includes coal/lignite, charcoal, wood, straw/shrubs/grass, agricultural crops, and animal dung [LIST ANY ADDITIONAL CATEGORIES INCLUDED IN THE SURVEY QUESTIONNAIRE]

[2] Includes electricity and LPG/natural gas and biogas [LIST ANY ADDITIONAL CATEGORIES INCLUDED IN THE SURVEY QUESTIONNAIRE]

Table 2.4 Household possessions

Percentage of households possessing various household effects, means of transportation, agricultural land and livestock/farm animals, according to residence, Malawi MIS 2021

	Residence		
Possession	Urban	Rural	Total
Household effects			
radio	52.7	26.2	30.6
television	43.4	6.3	12.3
mobile_phone	87.2	56.3	61.3
telephone	2.9	1.0	1.3
computer	14.8	1.5	3.7
refrigerator	27.4	2.1	6.2
koloboyi	2.2	2.2	2.2
paraffin_lamp	2.2	2.3	2.3
bed_mattress	67.3	24.3	31.4
torch	65.5	81.6	79.0
sofa	42.8	8.1	13.7
Means of transport			
Bicycle	29.8	31.2	31.0
Animal drawn cart	0.7	1.9	1.7
Motorcycle/scooter	5.3	4.8	4.9
Car/truck	11.9	1.3	3.0
Boat with a motor	0.2	0.3	0.3
Ownership of agricultural land	31.5	82.2	73.9
Ownership of farm animals1	25.4	51.2	47.0
Number of households	**607**	**3,104**	**3,711**

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

Table 2.5 Wealth quintiles

Percent distribution of the de jure population by wealth quintiles and the Gini Coefficient, according to residence and region, Malawi MIS 2021

	Wealth quintile							
Residence/region	Lowest	Second	Middle	Fourth	Highest	Total	Number of persons	Gini Coefficient
Residence								
Urban	4.3	8.4	17.6	29.1	40.7	100.0	2,547	0.38
Rural	34.7	29.1	20.1	11.7	4.5	100.0	13,410	0.46
Region								
Northern Region	17.1	21.7	23.6	21.3	16.3	100.0	1,938	0.43
Central Region	30.3	26.9	17.5	14.2	11.0	100.0	6,856	0.44
Southern Region	32.8	25.8	20.7	12.8	7.8	100.0	7,162	0.46
Total	**29.8**	**25.8**	**19.7**	**14.4**	**10.2**	**100.0**	**15,956**	0.45

Table 2.6 Household population by age, sex, and residence

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, Malawi MIS 2021

	Urban			Rural			Total		
Age	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
<5	10.7	11.6	11.1	13.5	13.3	13.4	13.0	13.0	13.0
5-9	13.2	13.0	13.1	15.0	15.2	15.1	14.7	14.9	14.8
10-14	12.6	14.6	13.6	15.6	17.4	16.5	15.1	16.9	16.0
15-19	10.9	9.5	10.2	13.2	9.5	11.3	12.8	9.5	11.1
20-24	12.0	11.2	11.6	9.1	9.0	9.0	9.6	9.3	9.4
25-29	8.8	10.5	9.6	7.4	7.1	7.2	7.6	7.6	7.6
30-34	7.5	7.8	7.6	5.0	4.9	5.0	5.4	5.4	5.4
35-39	6.1	6.3	6.2	5.2	5.1	5.1	5.3	5.3	5.3
40-44	5.2	4.5	4.9	3.1	3.4	3.3	3.4	3.6	3.5
45-49	4.5	2.6	3.5	3.8	2.8	3.3	3.9	2.8	3.3
50-54	2.5	3.4	3.0	2.4	3.5	3.0	2.4	3.5	3.0
55-59	1.8	1.4	1.6	2.0	2.0	2.0	2.0	1.9	2.0
60-64	1.8	1.7	1.8	1.4	1.9	1.6	1.4	1.8	1.6
65-69	1.0	0.8	0.9	1.2	1.5	1.4	1.2	1.4	1.3
70-74	0.8	0.5	0.7	0.8	1.1	0.9	0.8	1.0	0.9
75-79	0.4	0.2	0.3	0.7	1.1	0.9	0.6	0.9	0.8
80 +	0.1	0.4	0.3	0.7	1.2	1.0	0.6	1.1	0.9
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Dependency age groups									
0-14	36.4	39.2	37.8	44.1	45.9	45.0	42.8	44.8	43.8
15-64	61.1	58.8	59.9	52.5	49.2	50.8	53.9	50.8	52.3
65+	2.5	2.0	2.2	3.4	4.9	4.2	3.3	4.4	3.9
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	43.1	44.8	44.0	52.9	51.5	52.2	51.3	50.5	50.9
18+	56.9	55.2	56.0	47.1	48.5	47.8	48.7	49.5	49.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Adolescents 10-19	23.5	24.1	23.8	28.8	26.9	27.8	28.0	26.4	27.2
Number of persons	1,251	1,296	2,547	6,510	6,900	13,410	7,761	8,195	15,956

Table 2.7 Household composition

Percent distribution of households by sex of head of household and by household size and mean size of households, according to residence, Malawi MIS 2021

Characteristic	Residence		Total
	Urban	Rural	
Household headship			
Male	77.3	70.9	72.0
Female	22.7	29.1	28.0
Total	100.0	100.0	100.0
Number of usual members			
1	9.7	7.0	7.5
2	11.9	11.4	11.5
3	16.9	20.4	19.8
4	18.9	19.2	19.2
5	17.9	15.3	15.7
6	11.9	12.1	12.0
7	7.7	7.5	7.6
8	3.2	3.7	3.6
9+	2.0	3.4	3.2
Total	**100.0**	**100.0**	**100.0**
Mean size of households	4.2	4.3	4.3
Number of households	607	3,104	3,711

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

Table 2.8 Background characteristics of respondents

Percent distribution of women age 15-49 by selected background characteristics, Malawi MIS 2021

Background characteristic	Women		
	Weighted percent	Weighted number	Unweighted number
Age			
15-19	22.4	830	782
20-24	21.1	781	811
25-29	17.0	629	642
30-34	12.4	458	475
35-39	12.3	455	444
40-44	8.7	324	330
45-49	6.2	231	225
Religion			
Catholic	15.9	591	603
CCAP	12.3	455	645
Anglican	2.6	98	99
Seventh Day/Baptist	6.8	250	247
Other Christian	35.4	1314	1308
Muslim	17.3	643	452
No religion	0.8	29	19
Other	8.9	329	336
Ethnic group			
Chewa	33.7	1248	1002
Tumbuka	8.6	318	841
Lomwe	20.3	753	576
Tonga	1.4	53	120
Yao	15.2	566	411
Sena	1.6	58	75
Nkhonde	0.8	30	78
Ngoni	11.9	441	353
Other	6.5	243	253
Residence			
Urban	18.9	712	1,654
Rural	81.1	3,052	2,111
Region			
Northern Region	12.0	451	1,289
Central Region	42.1	1,584	1,232
Southern Region	45.9	1,729	1,244
Education			
No education	9.6	355	240
Primary	60.5	2245	1962
Secondary	27.3	1011	1307
More than secondary	2.7	99	200
Wealth quintile			
Lowest	28.3	1066	696
Second	25.1	945	683
Middle	20.4	766	763
Fourth	14.2	536	746
Highest	12.0	452	877
Total 15-49	**100.0**	**3,764**	**3,765**

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

na = Not applicable

Table 2.9 Educational attainment of survey respondents

Percent distribution of women age 15-49 by highest level of schooling attended or completed, and median years completed, according to background characteristics, Malawi MIS 2021

Background characteristic	Highest level of schooling							Total	Median years completed	Number of women
	No education	Some primary	Completed primary[1]	Some secondary	Completed secondary[2]	More than secondary	Missing			
Age	9.6	47.4	13.1	17.3	9.9	2.7	0.0	100.0	7.0	830
15-24	3.3	48.2	15.5	21.9	9.9	1.3	0.0	100.0	8.0	781
15-19	2.0	50.0	16.8	26.4	4.7	0.2	0.0	100.0	8.0	629
20-24	4.6	46.3	14.1	17.2	15.4	2.4	0.0	100.0	7.0	458
25-29	9.5	38.3	14.4	18.0	14.5	5.3	0.0	100.0	7.0	455
30-34	7.2	54.6	9.0	15.0	9.3	4.9	0.0	100.0	6.0	324
35-39	13.6	48.0	13.1	14.7	8.5	2.1	0.0	100.0	5.0	231
40-44	16.8	52.3	9.3	9.7	9.4	2.4	0.0	100.0	10.0	712
45-49	40.1	44.7	6.3	3.6	2.8	2.4	0.0	100.0	7.0	3,052
Residence										
Urban	3.8	26.3	10.7	25.1	22.0	11.1	1.0	100.0	8.0	451
Rural	10.7	51.5	13.4	15.2	7.0	0.6	1.6	100.0	7.0	1,584
Region										
Region 1	2.7	38.2	18.3	21.3	13.8	3.8	1.9	100.0	7.0	1,729
Region 2	10.0	47.9	12.1	16.0	9.3	3.4	1.2	100.0	6.0	1,066
Region 3	10.6	47.8	12.3	16.9	9.2	1.6	1.6	100.0	7.0	945
Wealth quintile										
Lowest	16.4	60.3	11.5	8.7	1.6	0.0	1.6	100.0	7.0	766
Second	12.1	53.7	12.9	14.5	4.9	0.1	1.7	100.0	9.0	536
Middle	5.1	48.0	15.1	19.1	11.2	0.2	1.4	100.0	11.0	452
Fourth	3.2	30.9	16.2	29.2	16.1	2.9	1.5	100.0	0.0	0
Highest	1.9	16.4	8.8	24.4	29.7	18.0	0.8	100.0	0.0	0
Total	9.6	47.4	13.1	17.3	9.9	2.7	0.0	100.0	7.0	830

[1] Completed X grade at the primary level

[2] Completed Y grade at the secondary level

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, Malawi MIS 2021

	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[1]	Number of women
Age										
15-24	0.2	40.3	47.4	11.1	1.0	0.0	0.0	100.0	87.9	1,611
15-19	2.4	31.9	47.2	18.5	0.1	0.0	0.0	100.0	81.4	830
20-24	5.3	25.5	46.2	22.1	0.9	0.0	0.0	100.0	77.0	781
25-29	4.9	31.4	39.0	23.9	0.8	0.0	0.0	100.0	75.3	629
30-34	2.1	30.7	37.7	29.5	0.0	0.0	0.0	100.0	70.5	458
35-39	2.4	30.6	33.0	32.2	1.8	0.0	0.0	100.0	66.0	455
40-44	2.4	20.1	17.8	58.8	0.8	0.0	0.0	100.0	40.4	324
45-49	11.2	20.9	58.6	9.0	0.3	0.0	0.0	100.0	90.7	231
Residence										
Urban	0.7	34.2	37.9	26.5	0.8	0.0	0.0	100.0	72.7	712
Rural	3.9	30.3	53.0	12.8	0.1	0.0	0.0	100.0	87.1	3,052
Region										
Northern Region	3.5	29.7	39.8	26.2	0.8	0.0	0.0	100.0	73.0	451
Central Region	1.6	33.8	40.7	23.1	0.8	0.0	0.0	100.0	76.1	1,584
Southern Region	0.0	32.3	28.0	38.7	0.9	0.0	0.0	100.0	60.3	1,729
Wealth quintile										
Lowest	0.1	36.4	34.9	28.2	0.5	0.0	0.0	100.0	71.3	1,066
Second	0.2	35.2	47.5	16.4	0.7	0.0	0.0	100.0	82.9	945
Middle	2.9	30.0	57.9	8.0	1.3	0.0	0.0	100.0	90.8	766
Fourth	18.1	16.0	60.1	5.6	0.1	0.0	0.0	100.0	94.3	536
Highest	2.7	31.6	41.8	23.2	0.7	0.0	0.0	100.0	76.1	452
Total	1.3	36.2	47.3	14.7	0.6	0.0	0.0	100.0	84.7	3,709

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

MALARIA PREVENTION 3

Key Findings

Ownership of insecticide-treated nets (ITNs):

- Fifty-five percent of households in Malawi own at least one ITN.
- Twenty-one percent of households have at least one ITN for every two people.

Sources of ITNs:

- Fourty-six percent of ITNs owned by households were obtained from mass distribution campaigns, twenty% from antenatal care visits, 10% from distribution to newborns at the time of birth and 0.1% from shops or markets.

Access to an ITN:

- Thirty-seven percent of the household population has access to an ITN. This means that at least 1 in 4 people could sleep under an ITN if every ITN in a household were used by up to two people.

Use of ITNs:

- Thirty-seven percent of the household population, 53% of children under 5, and 49% of pregnant women slept under an ITN the night before the survey.
- In households owning at least one ITN, 64% of the household population, 81% of children under 5, and 77% of pregnant women slept under an ITN the previous night.

Intermittent Preventive Therapy (IPTp):

- Fifty-six percent of women age 15-49 with a live birth in the 2 years preceding the survey received at least three doses of SP/Fansidar for prevention of malaria in pregnancy.

This chapter describes the population coverage rates of two key malaria control interventions in Malawi: use of insecticide-treated nets (ITNs) and intermittent preventive treatment in pregnancy (IPTp). Malaria control efforts focus on scaling-up these interventions.

The 2017-2022 Malawi Malaria Control Strategic Plan envisages universal coverage of the population with ITNs through routine distribution and mass campaigns to reduce the burden of malaria. ITNs are routinely given to pregnant women during their first antenatal care visit. They are also given to newborns

delivered at health facilities or at their first visit to a facility or outreach clinic if they did not receive an ITN at birth.

3.1 OWNERSHIP OF INSECTICIDE-TREATED NETS

Ownership of insecticide-treated nets

Households that have at least one insecticide-treated net (ITN). An ITN is defined as a factory-treated net that does not require any further treatment.

Sample: Households

Full household ITN coverage

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

Sample: Households

An ITN is defined as a factory-treated net that does not require any further treatment. In the 2012 and 2014 MMIS an ITN included nets that had been soaked with insecticides within the past 12 months. In the most recent questionnaire changes, The DHS Program dropped questions on retreatment of nets. This was done because bed nets that require annual retreatment and the products used for retreatment are no longer distributed and the distinction between ITNs and long-lasting insecticide-treated nets (LLIN) is no longer meaningful. For the 2021 MMIS, the current ITN was previously known as a LLIN in the 2014 and 2012 Malawi MIS surveys.

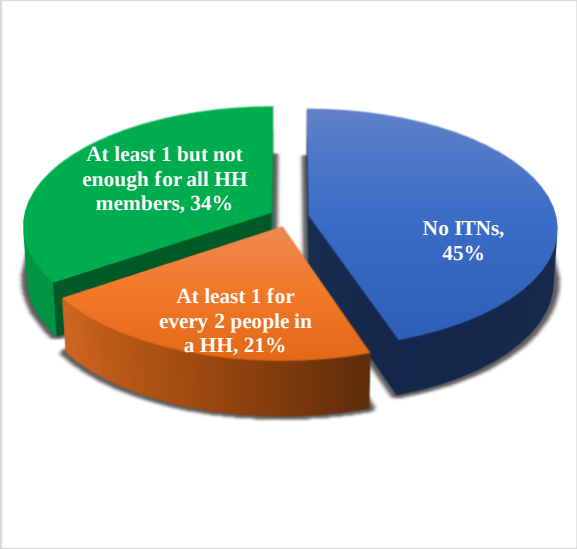
It is well understood that proper use of ITNs protects households and local communities from malaria. The distribution and use of ITNs is the central intervention for preventing malaria infection in Malawi. The 2017-2022 Malawi Malaria Control Strategic Plan prioritizes increasing household ownership of ITNs; from the 2014 baseline level of 70% of households with at least one ITN to cover 95% of households by the year 2022.

To protect people from malaria, the Malawi government, through MoH identified vector control and management as a critical intervention. One of the activities under this strategy is provision and promotion of the use of ITNs. In 2012, NMCP, in collaboration with partners, conducted the first nationwide mass distribution campaign, which was followed by three additional mass distribution campaigns between the years 2014 and 2016. For example, in 2014-16 a total of 8, 661, 990 ITNs were distributed to 12, 233, 548 people in 19 districts. In 2018, 10, 688, 831 ITNs were distributed to 17, 931, 638 people in 28 districts.

In addition to reaching all households across the country with ITN distribution, the national strategy aims to provide enough ITNs to cover all household residents. This indicator is operationalised as one ITN for every two household members. The 2021 MMIS revealed that 55% of households in Malawi own at least one ITN (**Table 3.1**). Twenty-one percent of households have at least one ITN for every two people who stayed in the household the night prior to the survey. It was revealed that a substantial number of households (45%) do not own any ITNs. In addition, the quantity of ITNs distributed needs to increase to provide sufficient ITNs for the 34% of households that own at least one ITN but have an insufficient supply for the number of household residents (**Figure 3.1**).

Figure 3.1 Household ownership of ITNs

Percent distribution of households

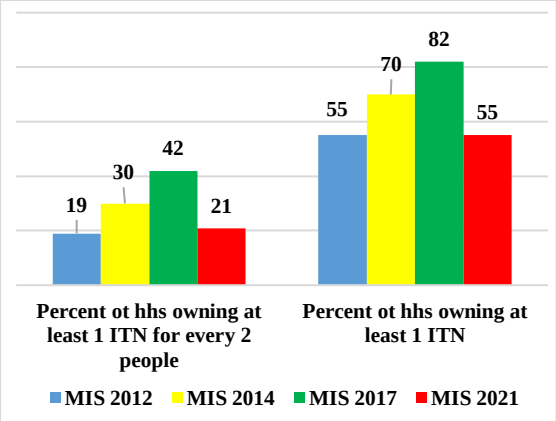


- The percentage of households with at least one ITN increases as household wealth slightly increases
- Households in urban areas are more likely than households in rural areas to have at least one ITN for every two persons who stayed in the house the prior night (29% and 19%, respectively) (**Table 3.1**).
- The percentage of households with at least one ITN is highest in the Southern region (67%) and lowest in the Central region (42%) (Figure 3.4).

Patterns by background characteristics

Figure 3.2 Percent distribution of ITN ownership over MIS years

Percentage of households owning at least one insecticide-treated net (ITN) and percentage of households with at least one net for every two persons



- from 53% in the lowest quintile to 67% in the highest wealth quintile (**Figure 3.3**).

Figure 3.3 ITN ownership by household wealth

Percentage of households with at least one ITN

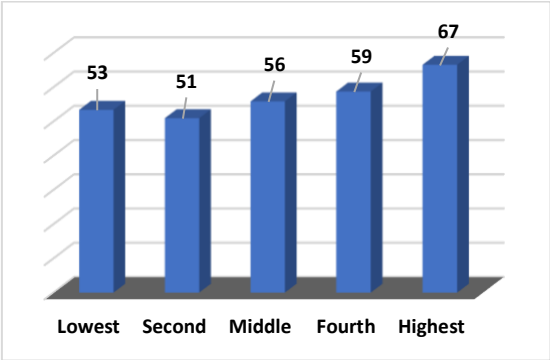
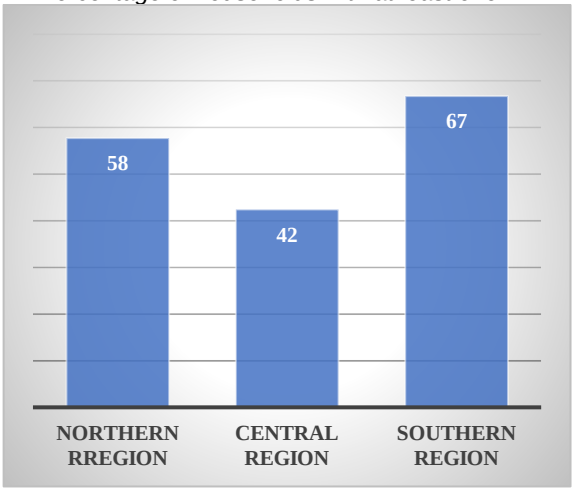


Figure 3.4 ITN ownership by region

Percentage of households with at least one ITN

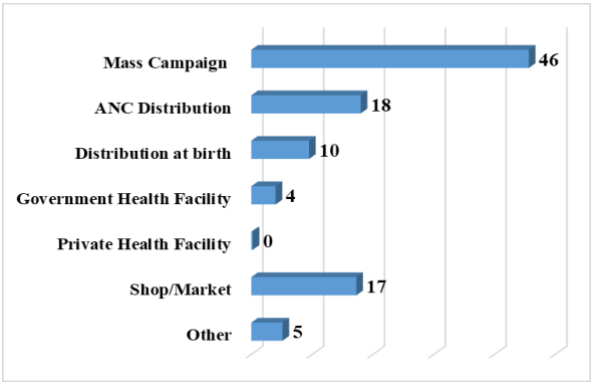


Source of Nets

The majority of ITNs (46%) were obtained from mass distribution campaigns. Another 18% of ITNs came from routine antenatal care (ANC) visits, 10% of ITNs were distributed to newborns at the time of birth, and 17% were purchased from shops or markets, and (**Figure 3.5** and **Table 3.2**).

Figure 3.5 Source of ITN

Percentage distribution of ITNs in interviewed households



3.2 HOUSEHOLD ACCESS AND USE OF ITNS

Access to an ITN

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

Use of ITNs

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

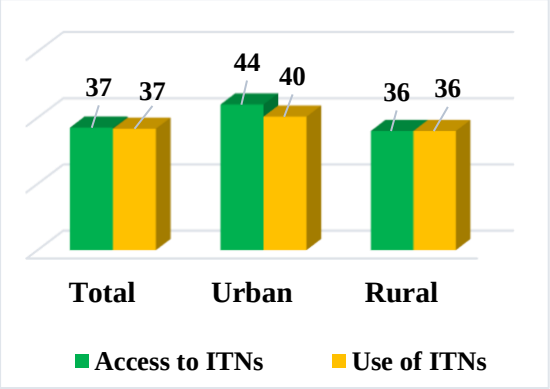
Sample: De facto household population

ITNs act as both a physical and a chemical barrier against mosquitoes. By reducing the vector population, ITNs may help to reduce malaria risk at the community level as well as to individuals who use them. Access to an ITN is measured by the proportion of the population that could sleep under an ITN if each ITN in the household were used by up to two people. Comparing ITN access and ITN use indicators can help programmes identify if there is a behavioural gap in which available ITNs are not being used. If the difference between these indicators is substantial, the programme may need to focus on behaviour change and how to identify the main drivers or barriers to ITN use to design an appropriate intervention. This analysis helps ITN programmes determine whether they need to achieve higher ITN coverage, promote

ITN use, or both. Thirty-seven percent of people in Malawi have access to an ITN, whereas 37% reported having slept under an ITN the night before the survey (**Table 3.4** and **Table 3.5**). Comparing these two population-level indicators, it is evident that they are close to each other at the population level. The gap between access and use of ITNs is slightly higher in urban (four percentage points) than in rural households that is almost the same (**Figure 3.6**).

Figure 3.6 Access to and use of ITN

Percentage of the household population with access to an ITN the night before the survey



Trends: The percentage of the household population with access to an ITN increased from 37% in the 2012 MMIS to 52% in the 2014 MMIS, 63% in the 2017 MMIS and decreased to 37% in the 2021 MMIS, most likely due to the timing of the mass campaign and the MMIS. The percentage of the household population that slept under an ITN the night before the survey increased from 41% in the 2012 MMIS to 53% in the 2014 MMIS, 55% in the 2017 MIS and deceased to 37% in 2021 MMIS. In both 2012 and 2014 MMIS surveys, there was a narrow gap between ITN access and ITN use while results from the 2017 MMIS show a wider gap. Contrary to 2021 MMIS that shows no between access and use (**Figure 3.7**).

In households with at least one ITN, only 64% of the household population slept under an ITN the previous night (**Table 3.5**). Overall, 83% of all existing ITNs were used the night before the survey (**Table 3.6**).

Patterns by background characteristics

- People in urban areas have greater access to ITNs in the household than those in rural areas (44% versus 35%) (**Table 3.4**).
- ITN access ranges from 27% in the Central region to 42% in Northern region and 46% in Southern regions (**Figure 3.8**).

3.3 USE OF ITNS BY CHILDREN AND PREGNANT WOMEN

- Malaria is endemic in Malawi with transmission occurring throughout the year in most areas. The entire population of Malawi is at risk of malaria. Pregnant women, their unborn babies, and children under age 5 are at high risk of the negative consequences of malaria. Children under age 5 are prone to severe malaria infection because they lack acquired immunity. For about 6 months after birth, antibodies acquired from the mother during pregnancy protect the child, although this maternal immunity is gradually lost when the child begins to develop his or her own immunity to malaria. Age is an important factor in determining levels of acquired immunity to malaria because acquired immunity does not prevent infection but protects against severe disease and death. The pace at which immunity develops depend on the exposure to malarial infection. In high malaria-endemic areas, children are thought to attain a high level of immunity by the fifth birthday. These children may experience an episode of malarial illness but usually do not suffer from severe, life-threatening conditions (Shulman and Dorman 2003).

Figure 3.7 Trends in ITN access and use

Percentage of the household population that has access to an ITN and percentage of popualtion that slept under an ITN the night before the survey

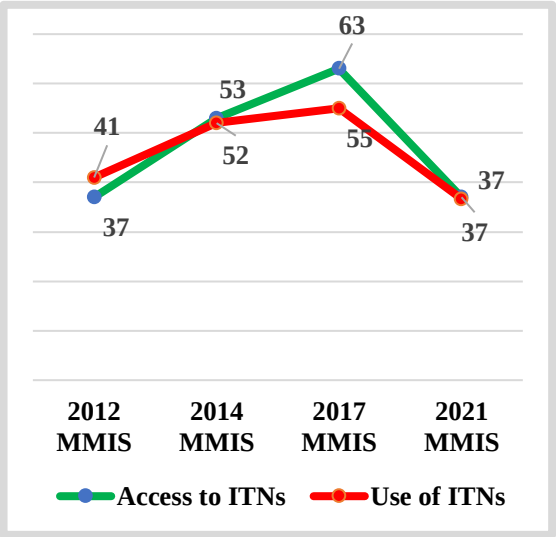
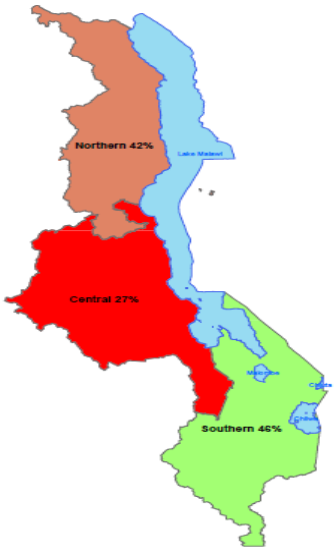


Figure 3.8 ITN access by region

Percentage of the de facto population with access to an ITN



Adults usually acquire some degree of immunity. However, since pregnancy suppresses immunity, 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 may lead to low-birth-weight infants, placental parasitaemia, foetal death, abortion, stillbirth, and prematurity (Shulman and Dorman 2003).

The primary malaria prevention intervention in Malawi is distribution of ITNs and promotion of ITN use. The 2017-Malawi Malaria Control Strategic Plan 2017-2022 emphasizes activities that promote the use of ITNs every night to prevent malaria complications. Strategies for ITN distribution in Malawi are (1) free routine distribution to pregnant women through ANC and to newborns at the time of delivery and (2) mass campaigns every two to three years.

Figure 3.9 ITN use

Percentage who slept under an ITN the night before the survey

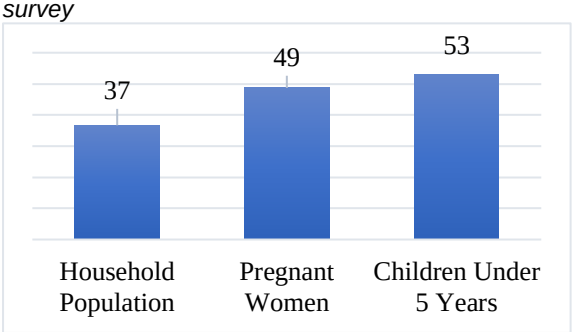


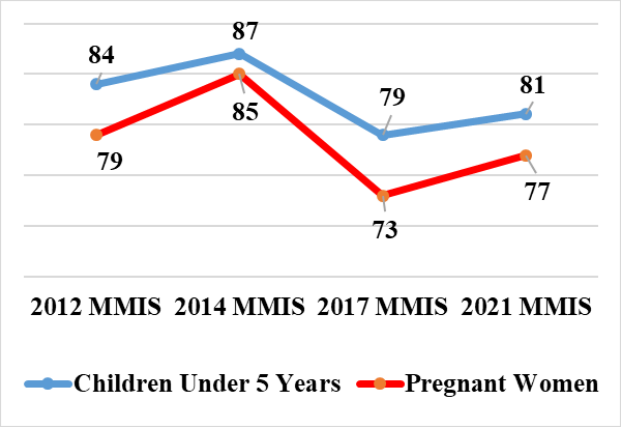
Table 3.7 and **Table 3.8** show the percentage of children under 5 and the percentage of pregnant women who slept under an ITN the night before the survey. Overall, 53% of children in Malawi under age 5 and 49% of pregnant women slept under an ITN the previous night (**Figure 3.9**).

In households with at least one ITN, 81% of children under age 5 and 77% of pregnant women slept under an ITN the night before the survey (**Table 3.7** and **Table 3.8**).

Trends: ITN use among children under age 5 in households with at least one ITN increased between 2012 and 2014 MMIS from 84% to 87%, however, it declined between 2014 and 2017 from 87% to 79% and rose between 2017 and 2021, from 79% to 81%. As with children under age 5, the percentage of pregnant women in households with at least one ITN who slept under an ITN last night increased from 79% in the 2012 MMIS to 85% in the 2014 MMIS, but declined to 73% in the 2017 MMIS and rose to 77% in the 2021 MMIS. (**Figure 3.10**).

Figure 3.10 **Trends in ITN use by children and pregnant women**

Among children under age 5 and pregnant women age 15-49 in households with at least one ITN, percentage who slept under an ITN the night before the survey



Patterns by background characteristics

- Children in urban areas are more likely than children in rural areas to sleep under an ITN among households with at least one ITN (85% and 80%, respectively) (**Table 3.7**).
- The percentage of pregnant women sleeping under an ITN the night before the survey is lowest among those in the Central region (68%) and highest in the Northern region (86%) in the households with at least one ITN (**Table 3.8**).

3.4 MALARIA IN PREGNANCY

Intermittent preventive treatment (IPTp) during pregnancy (IPTp2+)

Percentage of women who took at least two doses of SP/Fansidar 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 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 Malawi, with substantial risks for the mother, her foetus, and the neonate. Intermittent preventive treatment of malaria in pregnancy (IPTp) is a full therapeutic course of antimalarial medicine given to pregnant women at routine antenatal care visits to prevent malaria. IPTp helps prevent maternal malaria episodes, maternal and foetal anaemia, placental parasitaemia, low birth weight, and neonatal mortality.

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

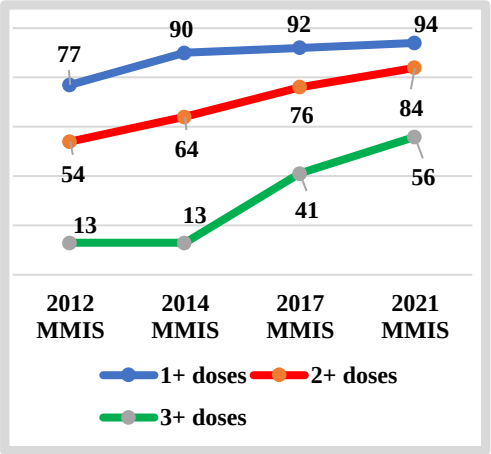
Sulfadoxine-pyrimethamine (SP), also known as Fansidar, is the recommended drug for IPTp in Malawi. For over 10 years, the Malawi Ministry of Health (MoH) has been implementing IPTp, defined as provision of at least two doses of sulfadoxine-pyrimethamine (SP)/Fansidar to protect the mother and her child from malaria during routine antenatal care visits in the second and third trimesters of pregnancy (IPTp2+). In 2016 the National Malaria Control Programme adopted the 2012 WHO recommendation to administer one dose of SP/Fansidar at each antenatal care (ANC) visit after the first trimester, with at least 1 month between doses (WHO 2012a; WHO 2012b). The household survey indicator used to measure coverage of this intervention is the percentage of women with a live birth in the 2 years preceding the survey who received three or more doses of SP/Fansidar to prevent malaria during her most recent pregnancy (IPTp3+).

Ninety-four percent of women with a live birth in the 2 years preceding the survey received one or more doses of SP/Fansidar to prevent malaria. Eighty-four percent of the women received two or more doses of SP/Fansidar, and 56% of the women received three or more doses of SP/Fansidar. (**Table 3.9**).

Trends: The percentage of women receiving IPTp1+ increased from 77% in 2012 MMIS to 90% in the 2014 MMIS, 92% in the 2017 MMIS and to 94% in the current survey. The percentage of women receiving two or more doses of SP/Fansidar for IPTp increased from 54% in in 2012 MMIS to 64% in the 2014 MMIS, 76% in 2017 and to 84% in the 2021 MMIS. There was an increase in IPTp3+ between the 2014 MMIS (13%) to 41% in 2017 and increased further to 56% in 2021 MMIS (**Figure 3.11**).

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

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



Patterns by background characteristics

- The use of IPTp1+ (93% and 95%), IPTp2+ (83% and 84%) and use of IPTp3+ is similar (56%) among women in the urban and rural areas respectively **(Table 3.9)**.
- IPTp3+ coverage ranges from 49% in the Southern region to 64% in the Central region.

3.5 MOSQUITO NET PREFERENCE

Preferences for various social marketing goods significantly affect the consistent use of products. In consideration of this influence, the 2021 MMIS observed actual colour of respondents' mosquito nets as well as assessed respondents' preferences for colour. Additionally, the survey also observed the shape of mosquito nets and assessed respondents' preferred shape. In recent years, nets obtained through the public sector (mass distribution campaigns and/or routine distribution) have been green, while nets obtained through the private sector (shops or markets) are predominantly blue or white.

In assessing the colour of the nets, 69% of the observed nets were green, 17% white, 8.5% light blue and 5% dark blue (**Table 3.10**). However, when the respondents were asked about colour preference, 45% preferred the blue colour, and 35% preferred the green (**Table 3.11**).

In assessing the shape of the nets, 88% of the observed nets were rectangular and 12% were conical (**Table 3.12**). However, 68% of respondents prefer conical, 30% prefer rectangular, and 1% did not have a clear preference (**Table 3.13**).

Among households that preferred conical nets, 84% said that they are easier to hang, 26% said that they fit better around sleeping spaces and 20% said they are stronger. Similarly, among households that preferred rectangular nets, 63% said that these nets are easier to hang, 33% said that they are a better fit around sleeping spaces and 23% said they look nice (**Table 3.14**).

Trends: Preferences in colour have changed from 38% green and 36% blue in the 2012 MMIS to 29% green and 61% blue in the 2017 MMIS and then to 35% green and 45% blue in the 2021 MMIS (**Figure 3.12**).

Additionally, preferences in shape have changed from 76% conical and 21% rectangular in the 2017 MMIS to 68% conical and 30% rectangular in the 2021 MMIS (**Figure 3.13**).

Figure 3.12 **Trends in colour preference**

Percentage of households by preference of colour of mosquito net

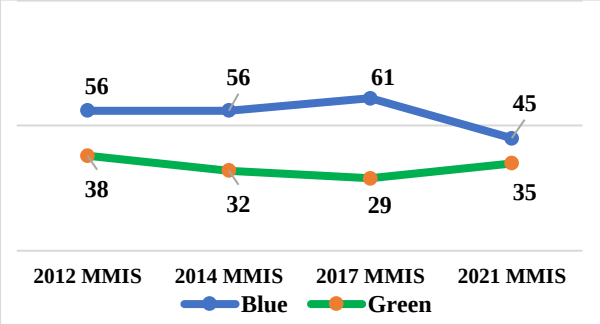
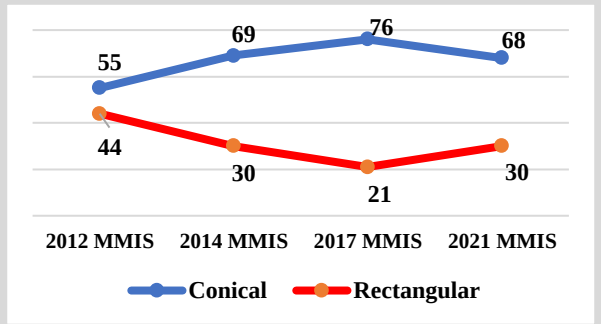


Figure 3.13 **Trends in preferred net**

Percentage of houdeholds by preference of shape of mosquito net



LIST OF TABLES

For detailed information on malaria, see the following tables:

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, Malawi MIS 2021

Background characteristic	Percentage of households with at least one mosquito net		Average number of nets per household		Number of households	Percentage of households with at least one 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)[1]	Any mosquito net	Insecticide-treated mosquito net (ITN)[1]		Any mosquito net	Insecticide-treated mosquito net (ITN)[1]	
Residence								
Urban	67.2	55.9	1.4	1.1	607	36.5	28.7	605
Rural	59.0	55.0	0.9	0.9	3,104	21.2	19.2	3,094
Region								
Northern Region	62.8	57.7	1.2	1.1	420	28.5	25.0	418
Central Region	48.5	42.4	0.8	0.6	1,604	17.0	13.6	1,601
Southern Region	71.0	66.7	1.2	1.1	1,687	28.9	26.5	1,680
Wealth quintile								
Lowest	55.3	53.4	0.8	0.7	1,187	16.3	14.9	1,178
Second	56.7	50.9	0.8	0.7	978	19.1	16.9	976
Middle	60.1	55.9	1.1	1.0	685	23.0	21.0	684
Fourth	65.3	58.7	1.2	1.1	511	30.5	27.7	511
Highest	80.5	66.5	2.1	1.6	350	53.1	40.3	350
Total	60.3	55.2	1.0	0.9	3,711	23.7	20.7	3,699

[1] An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment. In the MMIS 2017, this was known as a long-lasting insecticidal net (LLIN).

Note to survey managers: the second sentence in the footnote should reference the most recent, prior DHS. So, for example, it the current XDHS was conducted in 2017 and the most recent prior one was in 2012, the second sentence of the footnote should read "In the 2012 XDHS, this was known as a long-lasting insectical net (LLIN)."

Table 3.2 Source of mosquito nets

Percent distribution of mosquito nets by source of net, according to background characteristics, Malawi MIS 2021

Background characteristic	Mass distribution campaign	ANC visit	Immuniz a-tion visit	Govern-ment health facility	Private health facility	Pharm acy	Shop/ market	Comm unity health worker	Religious institution	School	CHAM/ Mission	Other	Don't know	Total	Number of mosquito nets
Type of net															
ITN[1]	49.8	20.3	10.0	0.7	3.6	0.0	0.1	0.2	7.5	1.7	0.3	5.4	0.3	100.0	3,316
Other[2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	100.0	407
Residence															
Urban	39.4	8.7	5.0	0.5	4.9	0.0	0.1	0.4	35.3	1.5	0.3	3.7	0.1	100.0	842
Rural	45.9	20.9	10.0	0.7	2.8	0.0	0.0	0.1	12.4	1.5	0.2	5.1	0.4	100.0	2,880
Region															
Northern Region	52.8	12.6	7.1	0.3	5.4	0.0	0.2	0.1	17.4	1.1	0.0	3.0	0.1	100.0	525
Central Region	34.2	18.4	10.5	0.4	5.3	0.0	0.0	0.2	23.0	2.8	0.4	4.3	0.3	100.0	1,237
Southern Region	48.5	19.4	8.4	0.9	1.4	0.0	0.1	0.1	14.3	0.8	0.1	5.6	0.4	100.0	1,961
Wealth quintile															
Lowest	46.1	27.3	13.9	0.1	1.3	0.0	0.0	0.0	7.1	0.2	0.0	3.8	0.3	100.0	904
Second	39.1	21.9	12.9	0.8	3.1	0.0	0.1	0.0	14.7	2.3	0.2	4.8	0.2	100.0	772
Middle	50.6	18.2	7.0	1.4	2.3	0.0	0.1	0.0	11.2	1.4	0.0	7.2	0.5	100.0	726
Fourth	47.3	13.4	5.7	0.6	4.2	0.0	0.0	0.0	20.0	2.7	0.0	5.4	0.7	100.0	600
Highest	39.2	6.3	2.9	0.5	6.0	0.0	0.0	0.8	38.3	1.5	1.0	3.3	0.0	100.0	720
Total	**44.4**	**18.1**	**8.9**	**0.7**	**3.2**	**0.0**	**0.1**	**0.2**	**17.6**	**1.5**	**0.2**	**4.8**	**0.3**	**100.0**	**3,722**

ANC = Antenatal care

[1] An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment. In the MMIS 2017, this was known as a long-lasting insecticidal net (LLIN).

[2] Any net that is not an ITN

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, Malawi MIS 2021

	Number of persons who stayed in the household the night before the survey								
Number of ITNs[1]	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8+**	**Total**
0	62.6	49.5	44.1	41.4	42.9	38.9	38.7	47.2	42.9
1	32.6	38.2	40.2	35.3	25.9	29.7	24.5	17.3	29.7
2	3.6	10.2	11.7	17.6	19.8	15.0	23.6	16.2	16.6
3	0.4	2.0	3.5	3.9	8.6	12.9	8.9	9.1	7.3
4	**0.9**	**0.0**	**0.5**	**1.4**	**2.5**	2.2	3.6	7.7	2.6
5	0.0	0.1	0.0	0.3	0.3	0.4	0.5	1.3	0.4
6	0.0	0.0	0.1	0.1	0.1	0.4	0.0	0.6	0.2
7	0.0	0.0	0.0	0.0	0.0	0.5	0.1	0.7	0.2
8+									
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	277	854	2,203	2,843	2,916	2,678	1,967	2,218	15,956
Percentage with access to an ITN[1,2]	37.4	50.55	42.5	40.9	37.7	36.4	32.4	26.9	37.4

[1] An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment. In the MMIS 2017, this was known as a long-lasting insecticidal net (LLIN).

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

Table 3.4 Access to an ITN

Percentage of the de facto population with access to an ITN in the household, according to background characteristics, Malawi MIS 2021

Background characteristic	Percentage of the de facto population with access to an ITN[1]
Residence	
Urban	44.0
Rural	36.0
Region	
Northern Region	41.8
Central Region	26.8
Southern Region	46.3
Wealth quintile	
Lowest	33.9
Second	31.6
Middle	38.4
Fourth	41.6
Highest	53.5
Total	37.4

[1] 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

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, Malawi MIS 2021

	Household population			Household population in households with at least one ITN[1]	
Background characteristic	Percentage who slept under any mosquito net last night	Percentage who slept under an ITN[1] last night	Number of persons	Percentage who slept under an ITN[1] last night	Number of persons
Age					
<5	58.1	53.3	2,062	81.3	1,352
5-14	31.5	28.3	4,861	50.7	2,711
15-34	40.6	36.6	5,245	64.1	2,995
35-49	47.6	41.8	1,890	72.8	1,086
50+	39.6	35.1	1,625	71.0	804
Sex					
Male	38.5	34.6	7,589	61.8	4,247
Female	43.0	38.6	8,095	66.6	4,701
Residence					
Urban	50.5	40.3	2,518	69.4	1,464
Rural	39.0	36.0	13,166	63.3	7,484
Region					
Northern Region	40.5	35.5	1,901	59.9	1,128
Central Region	32.3	27.7	6,742	63.1	2,964
Southern Region	49.1	45.5	7,042	66.0	4,856
Wealth quintile					
Lowest	37.8	36.2	4,660	63.8	2,642
Second	36.4	32.8	4,017	62.8	2,100
Middle	41.1	37.8	3,110	66.4	1,772
Fourth	41.0	36.3	2,278	62.4	1,327
Highest	59.6	46.1	1,620	67.5	1,107
Total	40.8	36.7	15,684	64.3	8,948

[1] An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment. In the MMIS 2017, this was known as a long-lasting insecticidal net (LLIN).

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, Malawi MIS 2021

Background characteristic	Percentage of existing ITNs[1] used last night	Number of ITNs[1]
Residence		
Urban	84.9	668
Rural	82.7	2,648
Region		
Northern Region	81.7	465
Central Region	83.3	1,033
Southern Region	83.4	1,817
Wealth quintile		
Lowest	81.2	860
Second	84.9	690
Middle	85.6	666
Fourth	82.2	537
Highest	81.9	563
Total	83.1	3,316

[1] An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment. In the MMIS 2017, this was known as a long-lasting insecticidal net (LLIN).

Table 3.7 Use of mosquito nets by children

Percentage of children under age 5 who, the night before the survey, slept under a mosquito net (treated or untreated) and under an insecticide-treated net (ITN); and among children under age 5 in households with at least one ITN, percentage who slept under an ITN the night before the survey, according to background characteristics, Malawi MIS 2021

	Children under age 5 in all households			Children under age 5 in households with at least one ITN[1]	
Background characteristic	Percentage who slept under any mosquito net last night	Percentage who slept under an ITN[1] last night	Number of children	Percentage who slept under an ITN[1] last night	Number of children
Age in months					

<12	73.1	68.5	378	86.8	298
12-23	64.3	59.5	453	83.7	322
24-35	53.4	47.8	450	79.8	269
36-47	52.7	47.3	426	81.0	249
48-59	44.9	42.0	368	70.7	218
Sex					
Male	57.6	52.9	1,011	81.6	655
Female	57.8	53.1	1,064	80.6	702
Residence					
Urban	65.5	54.8	283	85.2	182
Rural	56.5	52.7	1,792	80.4	1,175
Region					
Northern Region	55.4	49.4	217	77.2	139
Central Region	46.3	41.6	878	80.3	455
Southern Region	68.5	64.0	980	82.2	763
Wealth quintile					
Lowest	53.6	51.4	704	78.3	462
Second	57.1	52.0	600	82.8	376
Middle	61.1	56.5	370	84.7	247
Fourth	56.7	51.6	244	79.3	159
Highest	72.6	58.0	157	81.2	112
Total	57.7	53.0	2,075	81.1	1,357

Note: Table is based on children who stayed in the household the night before the interview.
[1] An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment. In the MMIS 2017, 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, Malawi MIS 2021

	Among pregnant women age 15-49 in all households			Among pregnant women age 15-49 in households with at least one ITN[1]	
Background characteristic	Percentage who slept under any mosquito net last night	Percentage who slept under an ITN[1] last night	Number of pregnant women	Percentage who slept under an ITN[1] last night	Number of pregnant women
Residence					
Urban	51.7	45.6	40	71.4	26
Rural	52.7	49.3	222	78.1	140
Region					
Northern Region	66.0	55.8	30	86.2	20

Central Region	36.2	30.9	109	67.9	50
Southern Region	63.7	62.9	123	79.9	97
Education					
No education	27.1	27.1	14	59.9	6
Primary	52.1	50.1	172	78.5	110
Secondary	57.9	49.9	73	75.4	48
More than secondary	61.4	42.5	4	100.0	2
Wealth quintile					
Lowest	51.0	48.4	83	71.1	57
Second	48.0	40.7	60	85.4	29
Middle	59.3	58.2	65	92.0	41
Fourth	56.7	53.0	29	80.0	19
Highest	45.8	39.4	25	48.7	20
Total	52.5	48.7	263	77.1	166

Note: Table is based on women who stayed in the household the night before the interview.

[1] An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment. In the MMIS 2017, this was known as a long-lasting insecticidal net (LLIN).

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, Malawi MIS 2021

Background characteristic	Percentage who received one or more doses of SP/Fansidar[1]	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
Residence				
Urban	93.4	82.9	56.0	117
Rural	94.6	84.1	56.0	755
Region				
Northern Region	94.8	83.3	59.3	86
Central Region	96.6	89.2	63.8	367
Southern Region	92.5	79.5	48.5	419
Education				
No education	89.9	82.6	56.9	92
Primary	95.5	83.9	54.8	579
Secondary	93.6	85.6	58.7	186

More than secondary	92.4	74.4	62.0	14
Wealth quintile				
Lowest	96.8	85.0	54.9	311
Second	93.4	87.4	59.0	240
Middle	94.8	81.3	59.1	161
Fourth	90.4	78.4	48.4	100
Highest	92.6	80.9	54.0	59
Total	94.4	83.9	56.0	872

Note to survey managers: whether or not at least one dose of SP/Fansidar was received during an ANC visit is no longer part of the IPTp indicator.

Table 3.10 Observed colour of mosquito nets
Percent distribution of mosquito nets by observed colour of mosquito net, according to background characteristics, Malawi MIS, 2021

Background characteristic		Observed colour of mosquito net								Number of mosquito nets
		Green	Dark blue	Light blue	Red	Black	White	0ther	Total	
residence	Urban	61.9	7.2	12.0	0.1	0.0	16.7	2.0	100.0	842
	Rural	70.8	3.8	7.4	0.1	0.0	17.3	0.6	100.0	2,880
region	Northern Region	73.0	6.8	3.8	0.1	0.1	14.9	1.3	100.0	525
	Central Region	62.6	3.5	12.7	0.2	0.0	19.5	1.5	100.0	1,237
	Southern Region	71.5	4.6	7.0	0.1	0.0	16.4	0.4	100.0	1,961
Wealth quintile	Lowest	68.0	2.6	7.8	0.0	0.0	21.2	0.3	100.0	904
	Second	71.8	2.7	8.1	0.2	0.0	16.5	0.8	100.0	772
	Middle	76.1	3.8	4.8	0.2	0.1	14.5	0.5	100.0	726
	Fourth	70.0	5.9	7.2	0.0	0.0	16.2	0.7	100.0	600
	Highest	57.9	8.6	14.4	0.1	0.0	16.5	2.5	100.0	720
	Total	68.7	4.6	8.5	0.1	0.0	17.2	0.9	100.0	3,722

Table 3.11 Preferred colour of mosquito nets
Percent distribution of households by preferred colour of mosquito net, according to background characteristic, Malawi MIS 2017

Background characteristic		Preferred colour of mosquito nets								Number of households
		Blue	Green	Red	White	Black	Other	Dont know / no preference	Total	
Residence	Urban	52.6	22.7	0.4	20.4	0.7	1.4	1.7	100.0	607
	Rural	44.0	36.9	0.7	14.7	0.2	0.8	2.7	100.0	3,104
Region	Northern Region	50.0	30.0	0.8	16.0	0.3	1.0	1.9	100.0	420
	Central Region	42.6	36.6	0.9	14.9	0.2	1.1	3.7	100.0	1,604
	Southern Region	46.9	33.9	0.3	16.2	0.4	0.6	1.7	100.0	1,687
Wealth quintile	Lowest	37.6	42.7	1.1	14.7	0.4	0.6	2.9	100.0	1,187
	Second	45.3	36.7	0.5	12.4	0.2	1.0	3.8	100.0	978
	Middle	47.4	32.5	0.5	17.1	0.6	0.6	1.4	100.0	685
	Fourth	52.7	27.6	0.2	17.0	0.0	1.1	1.4	100.0	511
	Highest	57.5	15.7	0.3	22.9	0.3	1.4	1.9	100.0	350
	Total	45.4	34.6	0.6	15.6	0.3	0.9	2.6	100.0	3,711

Table 3.12 Observed shape of mosquito nets
Percent distribution of mosquito nets by observed shape of mosquito net, according to background characteristics, Malawi MIS, 2021

Background characteristic		Observed shape of mosquito net				Number of mosquito nets
		Conical	Rectangular	Other	Total	
Residence	Urban	29.0	71.0	0.0	100.0	842
	Rural	7.1	92.8	0.1	100.0	2,880
Region	Northern Region	11.7	88.2	0.1	100.0	525
	Central Region	16.4	83.6	0.0	100.0	1,237
	Southern Region	9.4	90.5	0.2	100.0	1,961
Wealth quintile	Lowest	4.0	95.7	0.3	100.0	904
	Second	5.4	94.6	0.1	100.0	772
	Middle	6.0	94.0	0.0	100.0	726
	Fourth	12.9	87.1	0.0	100.0	600
	Highest	34.6	65.4	0.0	100.0	720
	Total	12.0	87.9	0.1	100.0	3,722

Table 3.13 Preferred shape of mosquito nets
Percent distribution of households by preferred shape of mosquito net, by background characteristic
Malawi MIS, 2021

Background characteristic		Preferred shape of mosquito nets				Number of households
		Conical	Rectangular	Don't know / no preference	Total	
Residence	Urban	83.9	15.0	1.1	100.0	607
	Rural	65.3	33.2	1.5	100.0	3,104
Region	Northern Region	67.5	31.0	1.6	100.0	420
	Central Region	63.2	34.1	2.6	100.0	1,604
	Southern Region	73.4	26.4	0.2	100.0	1,687
Wealth quintile	Lowest	55.4	42.6	2.0	100.0	1,187
	Second	66.7	31.9	1.4	100.0	978
	Middle	73.1	25.3	1.6	100.0	685
	Fourth	80.9	18.4	0.7	100.0	511
	Highest	88.6	11.0	0.4	100.0	350
	Total	68.3	30.3	1.4	100.0	3,711

Table 3.14 Reasons for preferring a specific shape of mosquito net
Among households that preferred canonical mosquito nets, percentage that reported specific reasons for preferring the canonical shape; and among households that preferred rectangular mosquito nets, percentage that reported specific reasons for preferring the rectangular shape, according to background characteristics Malawi MIS, 2021

		Among households that preferred canonical mosquito nets, percentage that reported that it is because									Among households that preferred rectangular mosquito nets, percentage that reported that it is because								
Background characteristic		they are easier to hang	they are easier to store when not hung	they are easier to travel with outside the household	they are better fit around sleeping place	more people can sleep under net (wider)	they look nicer	they are stronger	there are other reasons	Number of households that preferred mosquito nets in canonical shape	they are easier to hang	they are easier to store when not hung	they are easier to travel with outside the household	they are better fit around sleeping place	more people can sleep under net (wider)	they look nicer	they are stronger	there are other reasons	Number of households that preferred mosquito nets in rectangular shape
residence	Urban	87.3	3.8	0.9	26.0	7.5	7.5	18.0	9.2	510	52.2	2.8	1.4	41.6	1.9	23.1	10.8	12.4	91
	Rural	82.7	2.3	1.5	26.3	9.0	10.2	20.7	8.6	2,025	64.0	1.5	1.5	32.1	3.4	23.9	9.3	8.0	1,032
region	Northern Region	89.5	4.9	2.7	27.5	5.7	10.6	17.1	4.1	283	56.4	2.7	1.4	41.7	1.4	30.0	8.5	5.1	130
	Central Region	87.4	2.0	1.5	23.5	9.5	6.2	17.1	9.8	1,014	69.0	1.1	0.8	34.3	5.0	17.0	7.9	8.6	548
	Southern Region	79.1	2.6	1.0	28.3	8.7	12.3	23.4	8.9	1,237	57.6	2.0	2.3	28.6	1.8	30.4	11.5	9.1	445
Wealth quintile	Lowest	80.0	1.5	1.6	22.4	6.7	9.6	21.6	8.4	658	66.6	0.9	1.7	28.4	3.4	25.7	8.1	7.3	505
	Second	82.1	2.7	1.6	26.5	9.0	10.6	19.3	10.3	652	60.8	2.1	1.1	32.5	3.2	21.7	12.1	8.9	311
	Middle	81.6	4.1	0.8	29.7	11.9	12.6	22.0	7.6	501	62.3	2.5	1.6	35.8	3.4	21.6	8.5	10.5	173
	Fourth	88.1	2.4	1.9	27.8	9.3	6.1	16.9	8.6	413	55.4	1.8	1.5	46.4	4.4	24.5	8.5	6.4	94
	Highest	91.8	2.9	0.6	26.1	6.1	8.1	20.4	8.0	310	57.0	3.8	0.0	48.7	0.0	25.5	9.3	14.1	39
	Total	83.6	2.6	1.4	26.3	8.7	9.7	20.1	8.7	2,535	63.0	1.6	1.5	32.9	3.3	23.8	9.4	8.4	1,123

MALARIA IN CHILDREN 4

Key Findings

- ***Fever prevalence:*** Thirty-seven percent of children under age 5 had a fever in the 2 weeks prior to the survey.
- ***Care-seeking for fever:*** Advice or treatment was sought for 93% of children under age 5 with fever in the 2 weeks before the survey.
- ***Source of advice or treatment:*** Among children under age 5 with fever for whom advice or treatment was sought, 93% were from the public health sector, 7% were from private sector sources.
- ***Testing:*** Fourty-one percent of children under age 5 with a fever had blood taken from a finger or heel for testing.
- ***Type of antimalarial drug used:*** Eighty-nine percent of children under age 5 with fever who took an antimalarial drug in the 2 weeks before the survey were given an Artemisinin-based combination therapy (ACT), the recommended first-line malaria treatment in Malawi.
- ***Severe anaemia:*** One percent of children age 6-59 months were severely anaemic (haemoglobin level less than 8 g/dl).
- ***Malaria:*** Analysis of blood smears by microscopy revealed that 10.5% of children age 6-59 months had malaria parasites.

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

4.1 CARE SEEKING FOR FEVER IN CHILDREN

Care seeking for children under age 5 with fever

Percentage of children under age 5 with a fever in the 2 weeks before the survey for whom advice or treatment was sought from the public health sector, CHAM/mission, private medical sector, shop, market, and itinerant drug seller.

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

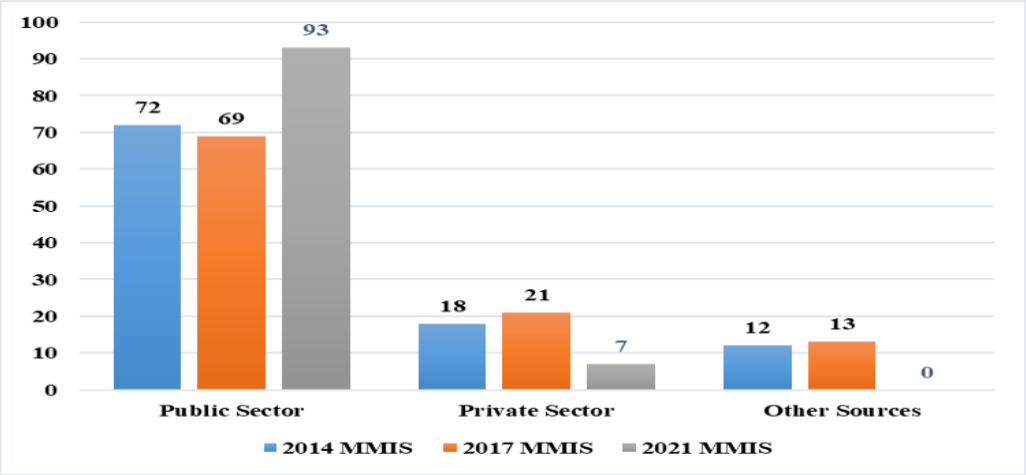
One of the key case management objectives of the National Malaria Control Programme (NMCP) is to ensure that all suspected malaria cases have access to confirmatory diagnosis and receive effective

treatment. Fever is a key symptom of malaria and other acute infections in children. These fevers require prompt and effective treatment to prevent morbidity and mortality. Thirty-seven percent of children under age 5 had fever in the 2 weeks preceding the survey. Advice or treatment was sought for 93% 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 46% of the febrile children (**Table 4.1**).

Among the children with recent fever for whom care was sought, most received advice or treatment from the public health sector (93%), including 30% who sought care from a government health centre, and 42% from a government hospital. Only 8% sought advice from a private health sector (**Table 4.2**).

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

Among children under age 5 with fever for whom advice or treatment was sought, percentage for whom advice or treatment was sought from specific sources



Trends: Among those with fever, advice or treatment seeking was less likely in the 2021 MMIS than in the 2017 MMIS (54% compared to almost none). While the percentage of children with fever in the 2 weeks before the survey for whom advice or treatment was sought from the public sector increased between 2017 and 2021 (from 69% to 93%), the percentage of those for whom advice or treatment was sought in the private sector decreased from 21% to 7% within the same period (**Figure 4.1**).

Patterns by background characteristics

- The percentage of children under age 5 with fever decreases with increasing wealth quintile, dropping from 39% among children in the lowest wealth quintile to 24% among children in the highest wealth quintile.
- The percentage of children under age 5 with fever ranges from 26% in urban areas to 39% in rural areas.
- Advice or treatment for children with fever was sought for 90% of children age <12 months compared with 95% of children age 48-59 months.
- The percentage of children with fever for whom advice or treatment was sought ranges from 93% in the Northern region to 94% in the Southern region.

4.2 Diagnostic Testing of Children with Fever

Diagnosis of malaria in children under 5 with fever

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

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

The Malawi National Malaria Control Programme policy recommends prompt parasitological confirmation before treatment commences. Malaria rapid diagnostic tests (RDTs) are performed for all patients suspected of uncomplicated malaria. Adherence to this policy cannot be directly measured through household surveys; however, the 2021 MMIS asked interviewed women with children under 5 who had a fever in the 2 weeks before the survey if the child had blood taken from a finger or heel for testing during the illness. This information is used as a proxy measure for adherence to the NMCP treatment guidelines of conducting diagnostic testing for all suspected malaria cases.

In the MMIS 2021, 41% of children under age 5 with a fever in the 2 weeks before the survey had blood taken from a finger or heel, presumably for malaria testing (**Table 4.1**).

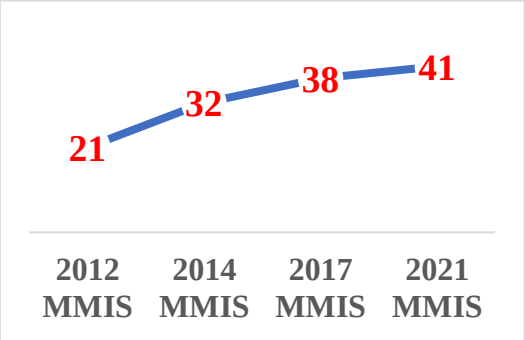
Trends: The percentage of children under age 5 with fever who had blood taken from the finger or heel for testing increased from 21% in the 2012 MMIS to 32% in 2014, 38% in the 2017% and then to 41% in the 2021 MMIS (**Figure 4.2**).

Patterns by background characteristics

- Forty-five percent of children less than age 12-23 months had blood taken from a finger or heel for testing, compared with 35% of children age 48-59 months.
- Forty-three percent of children under age 5 with recent fever in the Southern region had blood taken from a finger or heel for testing, compared with 53% from the Northern region and 36% from the Central region (**Table 4.1**).

Figure 4.2 **Trends in diagnostic testing of children with fever**

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



4.3 USE OF RECOMMENDED ANTIMALARIALS

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

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

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

Artemisinin-based combination therapy (ACT) is the recommended first-line antimalarial drug for the treatment of uncomplicated malaria in Malawi. This policy was first recommended in 2006 and then implemented in 2007 (MoH 2013).

According to the treatment data in **Table 4.3**, 89.2% of children under age 5 with recent fever who received an antimalarial took an ACT.

4.4 PREVALENCE OF LOW HAEMOGLOBIN IN CHILDREN

Prevalence of low haemoglobin in children

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

Anaemia, defined as a reduced level of haemoglobin in blood, decreases the amount of oxygen reaching the tissues and organs of the body and reduces their capacity to function. Anaemia is associated with impaired motor and cognitive development in children. The main causes of anaemia in children are malaria and inadequate intake of iron, folate, vitamin B12, or other nutrients. Other causes of anaemia include intestinal worms, haemoglobinopathy, and sickle cell disease. Although anaemia is not specific to malaria, trends in anaemia prevalence can reflect malaria morbidity, and they respond to changes in the coverage of malaria interventions (Korenromp 2004). Malaria interventions have been associated with a 60% reduction in the risk of anaemia when using a diagnostic cut-off of 8g/dl (RBM 2003).

Among eligible children age 6-59 months from interviewed households, most of them (94%) were tested for anaemia after consent from their parent or responsible adult (**Table 4.4**).

Table 4.5 shows 1% of children age 6-59 months are classified as having severe anaemia, defined as a haemoglobin concentration of less than 8 g/dl.

Patterns by background characteristics

- The prevalence of severe anaemia (haemoglobin <8g/dl) in children age 6-59 months is slightly higher in males as compared with females (1.6% versus 0.7%, respectively) (**Table 4.5**).
- Prevalence of severe anaemia in children aged 6-59 months is worse among households in the lower wealth quintiles compared to those in the higher wealth quintiles.
- Severe anaemia ranges from 0.8% in the Southern region to 1.5% in the Central region.

4.5 PREVALENCE OF MALARIA IN CHILDREN

Malaria prevalence in children

Percentage of children age 6-59 months classified as infected with malaria, according to microscopy results ***Sample:*** Children age 6-59 months

As is the case in many other countries in sub-Saharan Africa, malaria is the leading cause of death in Malawi among children under age 5. Malaria transmission is high throughout the year, contributing to development of partial immunity within the first 2 years of life. However, many people, including children, may have malaria parasites in their blood without showing any signs of infection. Such asymptomatic infection not only contributes to further transmission of malaria but also increases the risk of anaemia and other associated morbidity among the infected individuals.

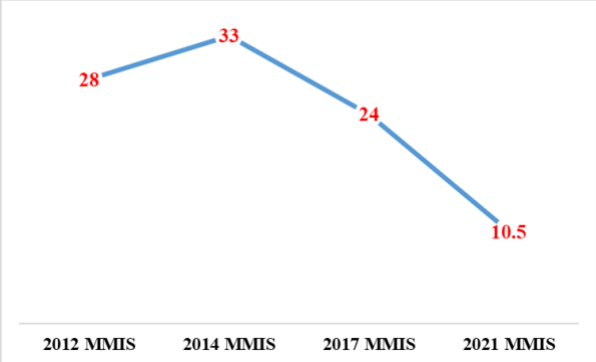
In the 2021 MMIS, 10.5% of children age 6-59 months were positive for malaria parasites according to microscopy results (**Table 4.6**). Among children who tested positive, 96% had a *P. Falciparum* infection, of which 86% were mono-infections. Other species controbuted the remaining 4%, but were found exclusively in rural areas.

(**Table 4.7**). Rapid diagnostic tests (RDTs) were done in conjunction with microscopy to facilitate the treatment of infected children during the survey fieldwork. Results from these RDTs are also presented in **Table 4.6** for reference. Twenty-four percent of children age 6-59 months tested positive for malaria antigens with RDTs. The differences in malaria prevalence observed between RDT and microscopy results are expected. Microscopic detection of malaria parasites depends on the visualization of the stained parasites under microscopy, whereasthe diagnosis of malaria by RDT relies on the interaction between a parasite antigen present in the blood and an antibody in the RDT formulation.

Therefore, direct comparisons of malaria results from microscopy with those from RDTs should be avoided. The SD BIOLINE Malaria Ag P.f/Pan (HRP-II)™ rapid diagnostic test RDT, like many other commercially available RDTs, detects the *P. falciparum*-specific, histidine-rich protein-2 (HRP-2) rather than the parasite itself. The HRP-2 remains in the blood for up to a month after parasite clearance with antimalarials (Moody 2002). In areas highly endemic for *P. falciparum*, its persistence often leads to higher malaria prevalence estimates detected with RDTs compared with those measured by microscopy. Results presented in this section are based on the microscopy analysis of blood samples.

Figure 4.3 Trends in malaria prevalence among children

Percentage of children age 6-59 months who tested positive for malaria by Microscopy



Trends: National malaria prevalence in children under age 5 has decreased by 17.5 percentage points from 28% in 2014 to 10% in 2021. (**Figure 4.3**).

Figure 4.4 **Prevalence of malaria in children by region**

Percentage of children age 6-59 months who tested positive for malaria by microscopy

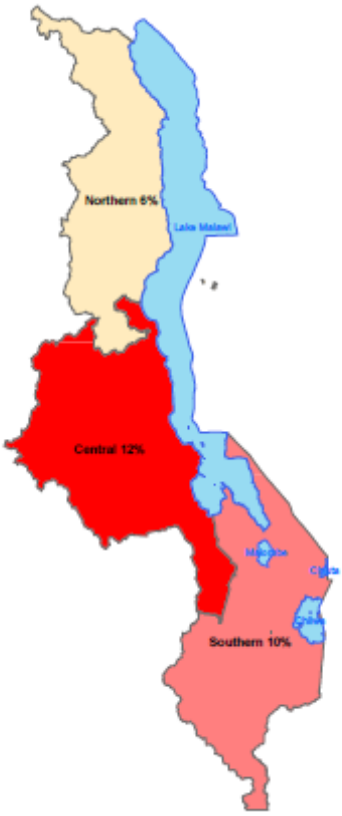
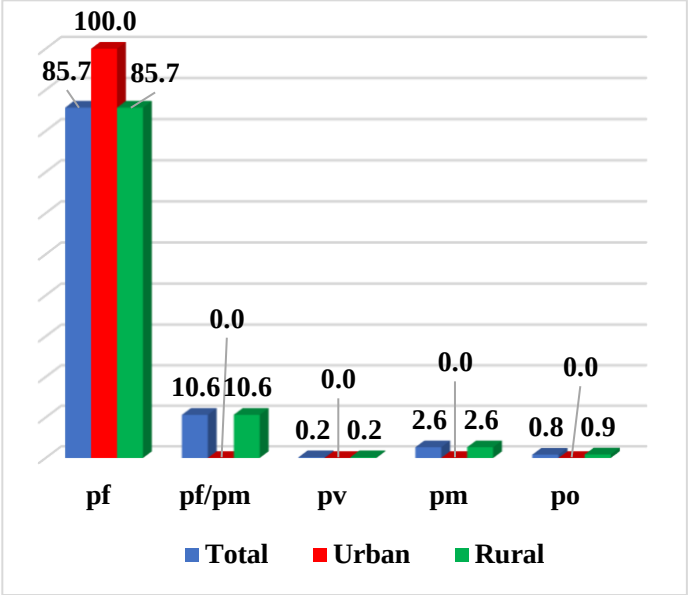


Figure 4.5 **Distribution of malaria species in children**

Percentage of children age 6-59 months who tested positive for malaria by malaria species



Patterns by background characteristics

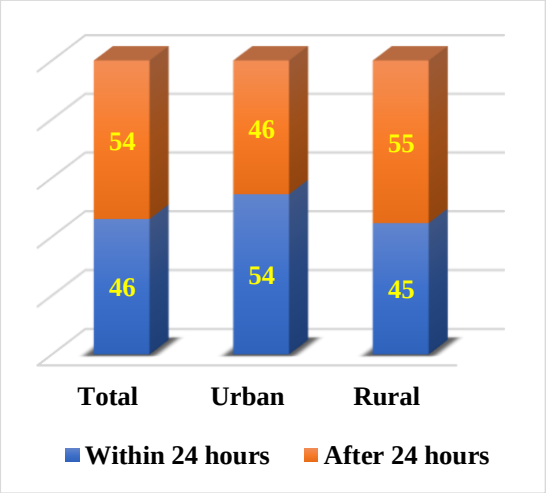
- Malaria prevalence by microscopy ranges from 4% in children age 9-11 months to 14% in children age 48-59 months (**Table 4.6**).
- Malaria prevalence by microscopy is higher among children whose mothers have no formal education (15%) than among those whose mothers have a secondary (4%) or higher (0%) education.
- Malaria prevalence by microscopy is about three times higher in rural areas (12%) than in urban areas (4%).
- By region, malaria prevalence by microscopy is lowest in the Northern region (6%) as compared with the Central (12%) and Southern (10%) regions. (**Figure 4.5**)

The prevalence of malaria in children age 6-59 months by microscopy increases with decreasing wealth quintile, from 4% among those in the highest wealth quintile to 15% amongst those in the lowest wealth quintile.

4.6 MALARIA CARE SEEKING DURATION IN CHILDREN

Prompt diagnosis and timely treatment of malaria within 24 hours after onset of first symptoms can reduce illness progression to severe stages and therefore, decrease mortality. In 2021 MMIS, mothers and care-givers reported times taken for them to seek care for their children when they realize that they have malaria conditons. Figure 4.6 shows that nationally, 46% of under-five children were attended to within 24 hours of their the onset of first symptoms with majority (54%) of those in urban being attended within 24 hours compared to 45% in rural.

Figure 4.6 **Malaria care seeking duration in children**



LIST OF TABLES

For detailed information on malaria, see the following tables:

- **Table 4.1 Prevalence, diagnosis, and prompt treatment of children with fever**
- **Table 4.2 Source of advice or treatment for children with fever**
- **Table 4.3 Types of antimalarial drugs used**
- **Table 4.4 Coverage of testing for haemoglobin and malaria in children**
- **Table 4.5 Haemoglobin <8.0g/dl in children**
- **Table 4.6 Prevalence of malaria in children**
- **Table 4.7 Malaria species from microscopy**

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, Malawi MIS 2021

	Children under age 5		Children under age 5 with fever			
Background characteristic	Percentage with fever in the 2 weeks preceding the survey	Number of children	Percentage for whom advice or treatment was sought[1]	Percentage for whom advice or treatment was sought the same or next day[1]	Percentage who had blood taken from a finger or heel for testing	Number of children
Age in months						
<12	32.4	401	90.1	34.5	31.3	130
12-23	41.5	474	92.8	42.7	45.1	197
24-35	40.7	436	92.9	49.8	45.2	178
36-47	35.2	413	94.2	49.7	43.4	145
48-59	33.7	324	94.6	51.3	34.5	109
Sex						
Male	37.4	1,004	93.8	48.0	40.4	376
Female	36.7	1,044	92.1	43.1	41.5	383
Residence						
Urban	25.5	287	91.2	54.4	40.6	73
Rural	38.9	1,760	93.1	44.6	41.0	685
Region						
Northern Region	34.3	199	93.1	44.2	53.3	68
Central Region	37.6	860	91.2	36.8	36.2	323
Southern Region	37.2	988	94.4	53.5	42.8	367
Mother's education						
No education	35.2	226	89.2	22.1	33.0	79
Primary	41.0	1,338	92.6	46.3	43.6	549
Secondary	27.6	454	96.2	56.0	35.2	125
More than secondary	18.2	29	100.0	67.8	20.2	5
Wealth quintile						
Lowest	39.2	694	91.2	38.5	43.6	272
Second	40.4	588	92.2	43.6	42.0	238
Middle	36.9	376	95.3	52.4	37.5	139
Fourth	30.7	238	96.9	55.9	36.2	73
Highest	24.2	151	93.4	63.5	36.3	37
Total	37.1	2,047	92.9	45.5	40.9	759

[1] Includes advice or treatment from the following sources: [PUBLIC SECTOR, PRIVATE MEDICAL SECTOR, SHOP, MARKET, AND ITINERANT DRUG SELLER]. Excludes advice or treatment from a traditional practitioner

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, Malawi MIS 2021

	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
Public sector		
Government hospital	210	210
Government health center	295	295
Government health post	49	49
Mobile Clinic	15	15
Fieldworker/CHW	40	40
Other public sector	0	0
Private medical sector		
Private hospital/clinic	15	15
Pharmacy	15	15
Private doctor	55	55
Mobile Clinic	3	3
Fieldworker/CHW	0	0
Other private medical sector	9	9
Other private sector		
Shop	0	0
Traditional practitioner	0	0
Market	0	0
Itinerant drug seller	0	0
	0	0
Other	0	0
Number of children	705	705

CHW = Community health worker

Note to survey managers: For a country that does not collect data on malaria, this table should still be run and placed immediately following Table 10.6 (Prevalence and treatment of fever) in Chapter 10.

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, Malawi MIS 2021

Background characteristic	Percentage of children who took:									Number of children with fever who took any antimalarial drug
	Any ACT	SP/ Fansidar	Chloroquine	Amodiaquine	Quinine pills	Quinine injection/IV	Artesunate rectal	Artesunate injection/IV	Other anti-malarial	
Age in months										
<6	75.0	75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42
6-11	92.6	92.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	65
12-23	84.0	84.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	155
24-35	94.7	94.7	0.0	0.0	0.0	0.0	0.0	1.3	0.4	153
36-47	92.1	92.1	0.0	0.4	0.0	0.0	0.0	0.0	1.0	126
48-59	88.7	88.7	0.7	0.0	0.0	0.0	0.0	0.0	1.5	83
Sex										
Male	89.5	89.5	0.2	0.1	0.0	0.0	0.0	0.6	0.0	319
Female	88.9	88.9	0.0	0.0	0.0	0.0	0.0	0.4	1.0	303
Residence										
Urban	70.3	70.3	1.0	0.0	0.0	0.0	0.0	0.0	0.9	64
Rural	91.4	91.4	0.0	0.1	0.0	0.0	0.0	0.6	0.4	558
Region										
Northern Region	84.4	84.4	0.0	0.8	0.0	0.0	0.0	0.0	0.0	56
Central Region	85.4	85.4	0.2	0.0	0.0	0.0	0.0	1.3	1.2	254
Southern Region	93.1	93.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	312
Mother's education										
No education	76.9	76.9	0.0	0.0	0.0	0.0	0.0	0.0	2.0	62
Primary	91.9	91.9	0.0	0.1	0.0	0.0	0.0	0.7	0.4	448
Secondary	85.7	85.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	110
More than secondary	70.2	70.2	17.1	0.0	0.0	0.0	0.0	0.0	0.0	4
Wealth quintile										
Lowest	88.7	88.7	0.0	0.2	0.0	0.0	0.0	0.6	1.1	222
Second	91.6	91.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	191
Middle	92.9	92.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	110
Fourth	83.1	83.1	0.0	0.0	0.0	0.0	0.0	3.0	0.0	67
Highest	79.0	79.0	1.8	0.0	0.0	0.0	0.0	0.0	1.7	34
Total	89.2	89.2	0.1	0.1	0.0	0.0	0.0	0.5	0.5	623

ACT = Artemisinin-based combination therapy

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), Malawi MIS 2021

Background characteristic	Percentage tested for: Anemia	Malaria with RDT	Malaria by microscopy	Number of children
Age in months				
6-8	89.2	89.2	89.2	83
9-11	93.1	93.1	93.1	87
12-17	95.5	95.5	95.5	222
18-23	97.5	97.5	97.5	202
24-35	93.5	93.5	93.5	429
36-47	93.2	93.2	93.2	427
48-59	95.2	95.2	95.2	333
Sex				
Male	94.2	94.2	94.2	898
Female	94.2	94.2	94.2	885
Mother's interview status				
Interviewed	94.3	94.3	94.3	1,602
Not interviewed, but in household	93.1	93.1	93.1	175
Not interviewed, and not in household[1]	100.0	100.0	100.0	6
Residence				
Urban	93.7	93.7	93.7	622
Rural	94.5	94.5	94.5	1,161
Region				
Northern Region	97.0	97.0	97.0	572
Central Region	95.0	95.0	95.0	591
Southern Region	91.0	91.0	91.0	620
Mother's education2				
No education	95.6	95.6	95.6	135
Primary	94.0	94.0	94.0	970
Secondary	95.0	95.0	95.0	462
More than secondary	88.6	88.6	88.6	35
Wealth quintile				
Lowest	92.5	92.5	92.5	428
Second	94.8	94.8	94.8	423
Middle	94.4	94.4	94.4	356
Fourth	95.0	95.0	95.0	318
Highest	95.0	95.0	95.0	258
Total	94.2	94.2	94.2	**1,783**

RDT = Rapid Diagnostic Test (SD Bioline Malaria Pf/Pan Ag)

[1] Includes children whose mothers are deceased

[2] 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 Hemoglobin <8.0 g/dl in children

Percentage of children age 6-59 months with hemoglobin lower than 8.0 g/dl, according to background characteristics, Malawi MIS 2021

Background characteristic	Hemoglobin <8.0 g/dl	Number of children
Age in months		
6-8	1.8	94
9-11	1.0	90
12-17	2.6	227
18-23	1.6	206
24-35	0.7	416
36-47	1.0	404
48-59	0.4	347
Sex		
Male	1.6	881
Female	0.7	902
Mother's interview status		
Interviewed	1.2	1,629
Not interviewed, but in household	0.0	148
Not interviewed, and not in household[1]	0.0	6
Residence		
Urban	0.3	241
Rural	1.3	1,543
Region		
Northern Region	1.3	185
Central Region	1.5	742
Southern Region	0.8	856
Mother's education[2]		
No education	1.1	191
Primary	1.3	1,070
Secondary	1.3	348
More than secondary	0.0	20
Wealth quintile		
Lowest	1.2	593
Second	1.9	524
Middle	0.5	316
Fourth	0.5	215
Highest	0.1	135
Total	1.1	1,783

Note: Table is based on children who stayed in the household the night before the interview. Hemoglobin levels are adjusted for altitude using CDC formulas (CDC, 1998). Hemoglobin is measured in grams per deciliter (g/dl).

[1] Includes children whose mothers are deceased

[2] 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 4.6 Prevalence of malaria in children

Percentage of children age 6-59 months classified in two tests as having malaria, by background characteristics, Malawi MIS 2021

Background characteristic	Malaria prevalence according to RDT		Malaria prevalence according to microscopy	
	RDT positive	Number of children	Microscopy positive	Number of children
Age in months				
6-8	5.0	93.8	2.0	85
9-11	10.4	90.1	3.6	84
12-17	16.6	227.5	9.6	221
18-23	26.9	205.5	9.5	202
24-35	23.9	420.3	7.6	386
36-47	29.7	410.6	15.0	377
48-59	28.7	347.4	13.6	327
Sex				
Male	26.0	886.7	11.4	825
Female	21.9	908.5	9.6	857
Mother's interview status				
Interviewed	23.6	1638.8	10.5	1539
Not interviewed, but in household	25.6	150.3	9.1	136
Not interviewed, and not in household[1]	55.0	6.0	28.5	6
Residence				
Urban	5.8	241.2	3.5	225
Rural	26.7	1554.0	11.5	1456
Region				
Northern Region	15.3	186.0	6.5	181
Central Region	27.9	745.0	11.7	708
Southern Region	22.3	863.0	10.2	793
Education[2]				
No education	37.5	192.6	14.6	182
Primary	25.8	1072.0	12.2	1002
Secondary	10.4	354.0	3.8	337
More than secondary	8.4	20.2	0.0	19
Wealth quintile				
Lowest	33.5	597.3	15.3	553
Second	28.0	529.4	10.5	496
Middle	15.7	315.7	9.7	295
Fourth	11.1	216.9	2.7	208
Highest	5.5	135.8	3.5	129
Total	23.9	1,795	10.5	1,682

RDT = Rapid Diagnostic Test

[1] Includes children whose mothers are deceased

[2] 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 4.7 Malaria species from microscopy

Among children age 6-59 months who were positive for malaria parasite by the microscopy, percentage with specific species of plasmodium, Malawi MIS 2021

Background characteristic	*Plasmodium faciparum*	*Plasmodium malariae*	*Plasmodium ovale*	Mixed infections	Number of children with malaria parasite
Sex					
Male	8.7	0.1	0.2	1.6	887
Female	8.2	0.4	0.0	0.4	908
Residence					
Urban	3.2	0.0	0.0	0.0	241
Rural	9.3	0.3	0.1	1.2	1554
Region					
Northern Region	5.5	0.2	0.0	0.4	0.2
Central Region	9.7	0.3	2.0	1.0	0.0
Southern Region	8.0	0.2	0.0	1.1	0.0
Total	8.5	0.2	0.1	1.0	0.0

MALARIA KNOWLEDGE AND MESSAGING 5

Key Findings

- ***Women's knowledge of malaria prevention method:*** 92% of women age 15-49 reported that sleeping under a mosquito net can protect against malaria.
- ***Exposure to malaria messages***17% of women age 15-49 have seen or heard a malaria message in the past 6 months. Among those women, 51% saw or heard the message at a government clinic or hospital.
- ***Mosquito net misuse****:* Five percent of women age 15-49 reported nets being used for reasons other than sleeping

This chapter assesses the extent to which women age 15-49 are exposed to malaria messages and the channels through which they receive such messages. The chapter also provides data on women's basic knowledge of the causes, symptoms, and prevention of malaria. Net misuse is perceived to be a significant barrier to malaria prevention in Malawi and the 2021 MMIS asked direct questions on this topic. Information on the percentage of women who reported nets being used for purposes other than sleeping is included at the end of this chapter.

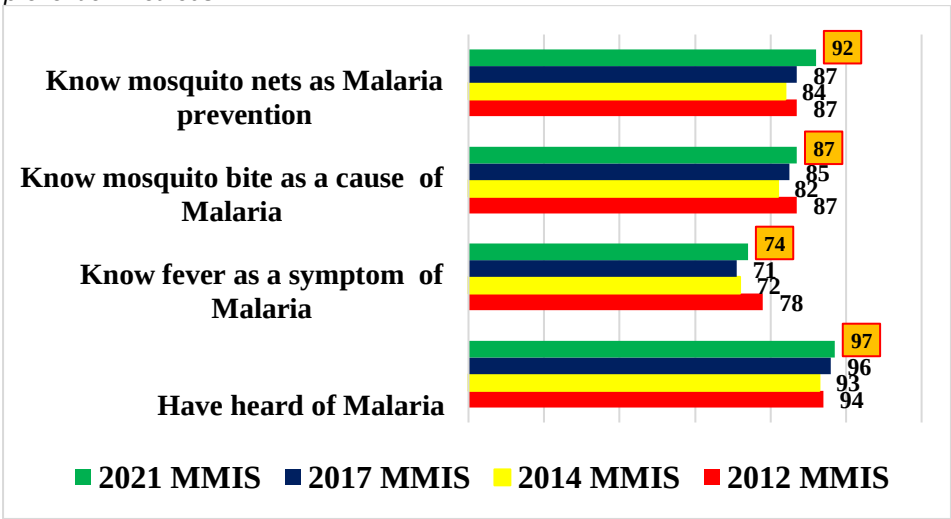
5.1 WOMEN'S KNOWLEDGE OF CAUSES, SYMPTOMS, AND PREVENTION

Perceptions, beliefs and attitudes about the causes of malaria, how to identify symptoms, and ways of preventing the illness are often overlooked in malaria control efforts. Yet such understanding is Have heard of malaria necessary to identify and target vulnerable populations and ensure the success of malaria control.

The majority of women age 15-49 in Malawi have heard of malaria (97%), recognize fever as a cause of malaria symptom (74%), report mosquito bites as a cause (87%), and say mosquito nets are a prevention malaria prevention method (92%) (**Table 5.1**).

Figure 5.1 Trends in malaria knowledge

Percentage of women age 15-49 who have heard of malaria and know malaria symptoms, causes, and prevention methods



Trends: In general, women's knowledge about malaria, including causes, symptoms, and prevention, has not changed over the last 5 years. (**Figure 5.1**)

Patterns by background characteristics

- The percentage of women who report mosquito nets as a malaria prevention method ranges from 87% in the lowest wealth quintile to 96% in the highest wealth quintile **(Table 5.1)**.
- Urban women (98%) are more likely to have heard of malaria than rural women (96%).

5.2 Exposure to Malaria Messages

Exposure to communication messages

Percentage of women age 15-49 who recall seeing or hearing a message about malaria through various sources in the past 6 months

Sample: Women age 15-49 who have seen or heard messages or information about malaria in the past 6 months

The effectiveness of social and behavioural change communications is notoriously difficult to measure. Because of this, the success of these initiatives is often measured by the percentage of the target population who recall hearing or seeing messages. Exposure is the critical first step in increasing knowledge of malaria prevention methods, as well as attitudes and practices about malaria. The target population's ability to recall messages about malaria is an indicator of how widely communications have penetrated the target audience.

Overall, almost one-fifth of women age 15-49 in Malawi (17%) heard or saw a message on malaria in the 6 months prior to the survey (**Table 5.2**). The most common place to be exposed to these messages was at government clinics/hospitals; 5 in 10 women who saw or heard a message on malaria in the 6 months prior to the survey did so at a government clinic or hospital (51%). Radio is the second most common form of media for exposure to malaria messages (26%), while TV and newspapers/magazines account for just 3% and 1%, respectively (**Table 5.3**).

At most 10% of women age 15-49 who were exposed to malaria messages heard/saw messages related to "malaria is dangerous" and/or "sleeping under a mosquito net is important" (10% and 9%) (**Table 5.4**).

Trends: The percentage of women age 15-49 who have seen or heard malaria messages in the past 6 months increased from 22% in the 2014 MMIS to 31% in the 2017 MMIS, but declined to 17% in the 2021 MMIS. However, the average number of months ago that the messages were seen or heard also increased from 1.5 months in the 2017 MMIS to 1.8 months in the 2021 MMIS (**Table 5.2**).

Patterns by background characteristics

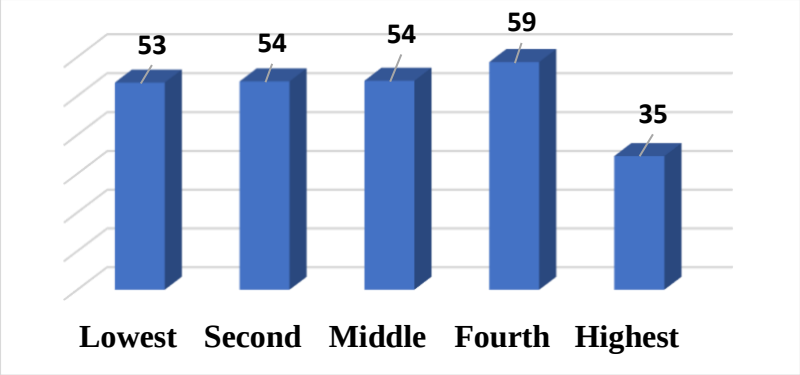
- Exposure to malaria messages at government clinics/hospitals decreases as wealth quintile increases; from 53% in the lowest quintile to 35% in the highest quintile (**Figure 5.2**).

- Women living in urban areas (2%) were more likely to have heard or seen information about seeking treatment for fever than rural women (1%) (**Table 5.4**).

- Among women age 15-49 who saw or heard a message on malaria in the past 6 months, women from the Northern region (12%) were more likely than women in the Central (8%) and Southern (9%) regions to have heard or seen a message that "sleeping under a mosquito net is important" (**Table 5.4**).

Figure 5.2 Exposure to messages on malaria at government clinics/hospitals

Percentage of women age 15-49 who heard or saw a message on malaria at government clinics/hospitals by wealth



5.3 Mosquito Net Misuse

Use of an insecticide-treated net (ITN) is the primary strategy for vector control implemented by the NMCP in Malawi, and net misuse is considered a threat to Malawi's Malaria Strategic Plan. However, only 5% of women age 15-49 reported using nets for reasons other than sleeping. Among women who reported mosquito nets in the house being used for reasons other than sleeping, almost four in ten women reported using nets for cover or protection (36%) (**Table 5.5**). Examples of using a net for cover or protection include use as fencing for vegetable gardens and/or chicken coops. One in twenty-five women reported their nets were also used for fishing (4%).

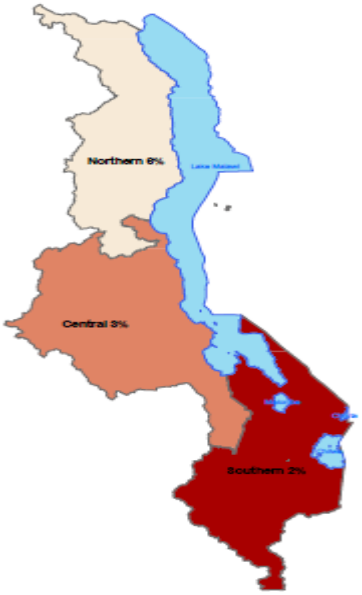
Patterns by background characteristics

- Women in rural areas (25%) were more likely to report nets being used as window screens than women in urban areas (16%).

- A higher percentage of women in the Northern (6%) region reported using a mosquito net for fishing than women in the Central and Southern region (4% and 2%, respectively) (**Figure 5.3**)

Figure 5.3 **Map of women age 15-49 who reported using nets for fishing by region**

Among women who reported mosquito nets in the house being used for reasons other than sleeping, the percentage of women age 15-49 who reported mosquito nets being used for fishing by region



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- **Table 5.1 Women's knowledge of malaria causes and symptoms**
- **Table 5.2 Messages about malaria**
- **Table 5.3 Exposure to messages on malaria by source**
- **Table 5.4 Exposure to specific messages and information on malaria**
- **Table 5.5 Use of mosquito nets for reasons other than sleeping**

Table 5.1 Women's knowledge of malaria causes, symptoms and prevention

Percentage of women age 15-49 who reported having heard of malaria, percentage who can recognize fever as a sign or symptom of malaria, percentage who reported mosquito bites as a cause of malaria, and percentage who reported that sleeping under a mosquito net can protect against malaria, according to background characteristics,
Malawi MIS, 2021

Background characteristic		Percentage who have heard of malaria	Percentage who recognized fever as a symptom of malaria	Percentage who reported mosquito bites as a cause of malaria	Percentage who reported mosquito nets as a malaria prevention method	Number of women
Age	15-19	96.6	64.6	85.1	89.1	830
	20-24	97.1	77.2	86.9	92.8	781
	25-29	97.0	77.3	86.9	92.9	629
	30-34	97.6	78.5	87.5	93.7	458
	35-39	96.3	76.8	89.6	93.9	455
	40-44	97.0	74.7	89.6	91.4	324
	45-49	97.5	64.8	80.8	89.2	231
Residence	Urban	98.2	76.4	92.0	94.2	705
	Rural	96.7	72.8	85.5	91.3	3,004
Region	Northern Region	97.3	72.8	85.9	88.7	442
	Central Region	96.0	75.8	86.2	89.4	1,565
	Southern Region	97.8	71.7	87.5	95.0	1,702
Education	No education	90.8	66.3	72.8	83.4	355
	Primary	96.6	72.1	84.8	90.7	2,245
	Secondary	99.6	78.4	95.0	96.8	1,011
	Higher	100.0	82.9	98.7	99.5	99
Wealth quintile	Lowest	94.0	72.2	79.3	87.3	1,049
	Second	96.6	72.0	85.6	91.1	929
	Middle	98.8	72.8	89.3	94.3	756
	Fourth	99.2	78.5	94.2	95.3	527
	Highest	98.8	75.0	93.7	96.2	448
	Total	**97.0**	**73.5**	**86.8**	**91.9**	**3,709**

Table 5.2 Messages about malaria
Percentage of women age 15-49 who have seen or heard messages or information about malaria in the last 6 months, and among women who have heard or seen malaria messages in the last 6 months, percentage who have seen or heard malaria messages within the past 1 month, and average number of months ago the malaria message was seen or heard, according to background characteristics, Malawi MIS, 2021

Background characteristic		Percentage who have seen or heard malaria messages in the past 6 months	Number of women	Percentage who have seen or heard malaria messages in the past 6 months		
				Percentage who have seen or heard malaria messages in the past 1 month	Average months ago the messages were seen or heard	Number of women
Age	15-19	10.6	830	50.5	2.1	88
	20-24	16.8	781	53.0	1.8	131
	25-29	20.1	629	68.6	1.5	126
	30-34	20.0	458	48.0	2.2	92
	35-39	19.1	455	65.1	1.5	87
	40-44	25.5	324	51.3	1.8	83
	45-49	15.6	231	47.3	2.0	36
residence	Urban	19.0	705	56.0	1.9	134
	Rural	16.9	3,004	56.1	1.8	508
region	Northern Region	24.8	442	55.4	1.9	110
	Central Region	16.4	1,565	66.7	1.5	256
	Southern Region	16.3	1,702	46.6	2.0	277
Education	No education	12.6	355	51.0	2.0	45
	Primary	14.6	2,245	57.8	1.7	328
	Secondary	22.3	1,011	52.7	2.0	226
	Higher	44.8	99	66.2	1.5	44
Wealth quintile	Lowest	15.4	1,049	63.1	1.6	162
	Second	15.4	929	51.8	1.8	143
	Middle	15.8	756	54.8	2.0	120
	Fourth	20.1	527	50.2	2.0	106
	Highest	24.9	448	58.6	1.7	112
	Total	17.3	3,709	56.1	1.8	643

Table 5.3 Exposure to messages on malaria by source
Among women age 15-49 who saw or heard a message on malaria in past 6 months, percentage who saw or heard messages through various sources, according to background characteristics, Malawi MIS, 2021

Background characteristic		Exposure to malaria messages											
		Government clinic/hospital	Community health worker	Friends/ family	Work place	Drama groups	Peer educators	Poster/ billboard	Television	Radio	Newspaper/ magazine	Other	Number of women
Age	15-19	41.2	12.9	12.6	0.0	0.1	10.2	0.6	0.9	16.6	1.2	13.3	88
	20-24	43.8	18.6	9.4	0.2	1.9	0.9	0.8	2.3	21.6	3.8	5.7	131
	25-29	57.0	12.7	2.5	0.7	0.4	1.4	1.8	3.7	24.8	0.0	6.5	126
	30-34	58.7	15.2	4.8	2.5	0.4	0.0	0.7	6.1	25.1	0.9	4.6	92
	35-39	62.8	6.5	7.8	0.2	0.0	0.1	0.8	4.2	33.4	0.5	3.2	87
	40-44	47.8	7.6	13.5	0.0	2.1	1.4	0.9	2.2	34.5	0.0	3.0	83
	45-49	42.5	31.5	13.5	0.0	0.0	2.5	0.0	3.3	36.4	0.0	0.0	36
Residence	Urban	37.0	7.0	8.8	1.2	0.4	3.7	3.8	15.0	37.5	3.0	9.4	134
	Rural	54.9	15.7	8.2	0.4	0.9	1.8	0.2	0.1	23.1	0.7	4.8	508
Region	Northern Region	52.9	15.8	7.6	0.5	0.6	5.4	1.6	3.8	21.5	0.0	5.5	110
	Central Region	42.1	9.7	9.0	0.3	0.7	1.9	1.2	5.6	35.3	0.9	6.0	256
	Southern Region	58.9	16.9	8.0	0.8	1.0	1.2	0.4	0.7	19.6	1.8	5.6	277
Education	No education	50.1	15.6	16.8	0.0	0.0	1.1	0.4	0.0	23.4	0.0	1.8	45
	Primary	52.1	18.0	8.6	0.0	0.2	1.7	0.3	0.4	21.8	0.4	6.4	328
	Secondary	53.6	9.7	6.1	0.1	1.9	2.5	0.9	4.3	29.2	2.2	5.4	226
	Higher	32.9	2.8	9.9	7.6	0.9	5.6	5.9	21.3	46.0	2.2	6.9	44
Wealth quintile	Lowest	53.4	27.3	8.7	0.0	0.3	0.6	0.0	0.0	13.0	0.0	5.0	162
	Second	53.7	10.0	8.5	0.0	1.7	0.6	0.0	0.0	25.6	0.3	4.5	143
	Middle	53.9	12.7	7.6	0.0	0.0	4.0	0.9	0.0	20.5	3.3	5.9	120
	Fourth	58.7	6.3	10.1	1.8	1.7	2.3	1.8	0.9	33.4	0.5	7.2	106
	Highest	34.5	7.8	6.9	1.5	0.4	4.5	2.7	17.6	45.1	2.1	6.9	112
	Total	51.2	13.8	8.4	0.5	0.8	2.2	0.9	3.2	26.1	1.1	5.8	643

Table 5.4 Exposure to specific messages and information on malaria
Among women age 15-49 who saw or heard a message on malaria in the past 6 months, the percentage of women who heard or saw a specific message or information on malaria, according to background characteristics, Malawi MIS, 2021

Background characteristic		Exposure to malaria messages												
		Malaria is dangerous	Malaria can kill	Mosquito spread malaria	Sleeping under a mosquito net is important	Who should sleep under a mosquito net	Seek treatment for fever	Seek treatment for fever promptly(within 24 hours)	Importance of house spraying	Not plastering walls after spraying	Environmental sanitation activities	Other	Don`t know	Number of women
Age	15-19	5.2	2.6	0.7	4.2	1.1	0.7	0.6	0.3	0.0	2.4	0.8	0.1	830
	20-24	7.7	3.0	1.8	9.9	0.3	0.8	1.4	0.4	0.5	3.3	1.5	0.7	781
	25-29	11.9	4.0	2.5	11.8	1.3	2.3	1.1	0.1	0.1	2.7	2.7	0.4	629
	30-34	10.3	5.1	1.2	12.7	2.5	0.8	4.6	0.0	0.0	2.8	0.9	0.2	458
	35-39	13.3	6.1	1.4	6.4	2.3	0.8	1.7	0.2	0.4	2.1	1.6	0.0	455
	40-44	14.9	6.9	3.5	13.9	2.0	4.3	3.6	0.2	0.8	3.4	0.6	0.4	324
	45-49	8.6	2.5	1.3	6.5	1.5	1.7	2.5	0.8	0.2	3.6	2.2	0.0	231
residence	Urban	10.4	5.2	2.4	11.1	2.1	1.9	2.3	0.5	0.2	2.7	2.1	0.1	705
	Rural	9.4	3.8	1.5	8.5	1.3	1.3	1.8	0.2	0.3	2.9	1.3	0.4	3,004
region	Northern Region	13.0	7.2	3.4	11.9	2.4	2.0	2.1	0.3	0.0	3.9	1.8	0.7	442
	Central Region	7.8	2.9	1.5	8.4	0.9	1.8	1.8	0.3	0.1	2.4	1.9	0.2	1,565
	Southern Region	10.3	4.3	1.4	8.7	1.6	0.8	1.9	0.3	0.5	3.0	0.9	0.3	1,702
Education	No education	7.0	3.6	0.7	4.5	0.0	1.0	0.5	0.0	1.2	0.1	0.7	0.7	355
	Primary	7.6	2.9	1.3	6.8	1.1	1.1	1.6	0.2	0.2	2.6	1.1	0.2	2,245
	Secondary	13.3	5.9	2.2	13.5	1.7	2.0	2.9	0.4	0.1	4.1	2.0	0.5	1,011
	Higher	25.1	13.0	8.3	29.2	9.1	3.7	3.6	1.5	0.5	5.0	5.9	0.0	99
Wealth quintile	Lowest	8.2	2.8	1.3	7.7	0.3	0.9	1.5	0.2	0.5	1.9	1.6	0.4	1,049
	Second	7.5	3.4	1.3	6.8	0.7	2.1	2.1	0.3	0.3	3.0	1.2	0.5	929
	Middle	9.4	3.6	0.8	8.9	1.9	0.9	1.2	0.0	0.0	2.3	1.1	0.1	756
	Fourth	12.8	4.9	2.7	10.8	2.5	1.0	1.9	0.4	0.1	5.0	1.1	0.2	527
	Highest	13.4	8.0	3.6	14.6	3.4	2.6	3.3	0.7	0.1	3.0	2.6	0.1	448
	Total	9.6	4.0	1.7	9.0	1.4	1.4	1.9	0.3	0.3	2.8	1.4	0.3	3,709

Table 5.5 Use of mosquito nets for reasons other than sleeping
Percentage of women age 15-49 who reported mosquito nets in the house being used for reasons other than sleeping, and what they were used for, by background characteristics, Malawi MIS, 2021

Background characteristic		Percentage who reported mosquito nets in the house being used for reasons other than sleeping	Number of women	Among those who reported mosquito nets in the house being used for reasons other than sleeping						
				Fishing	Cover/ protection	Window screen	Clothing/ wedding veil	Other	Don't know	Number of women who reported use of mosquito nets other than sleeping
Age	15-19	5.8	830	5.3	37.6	24.5	0.0	40.8	0.0	48
	20-24	3.2	781	7.0	31.9	29.9	0.0	31.1	0.0	25
	25-29	4.1	629	1.6	46.7	7.5	0.0	47.7	0.0	26
	30-34	3.5	458	0.0	33.9	50.7	0.0	23.1	0.0	16
	35-39	5.9	455	0.0	29.0	27.0	9.1	36.3	0.0	27
	40-44	3.1	324	12.8	23.0	9.1	1.3	59.9	0.0	10
	45-49	7.0	231	0.0	46.1	14.5	0.0	43.7	0.0	16
Residence	Urban	2.7	705	5.7	39.2	16.2	0.7	39.7	0.0	19
	Rural	5.0	3,004	3.3	36.0	24.6	1.6	39.5	0.0	149
Region	Northern Region	6.8	442	6.4	33.2	55.6	0.5	24.3	0.0	30
	Central Region	5.5	1,565	3.5	41.1	23.5	2.8	31.2	0.0	86
	Southern Region	3.0	1,702	2.1	30.3	5.3	0.0	62.3	0.0	52
Education	No education	5.2	355	9.2	9.5	11.8	0.0	71.7	0.0	19
	Primary	4.2	2,245	3.0	43.9	27.7	1.4	30.2	0.0	94
	Secondary	5.0	1,011	3.0	30.4	22.8	2.4	44.5	0.0	51
	Higher	4.8	99	0.0	57.6	0.0	0.0	42.4	0.0	5
Wealth quintile	Lowest	3.6	1,049	4.6	22.4	18.9	6.5	49.8	0.0	38
	Second	5.9	929	2.0	45.6	25.3	0.0	32.3	0.0	55
	Middle	3.7	756	6.1	33.0	28.4	0.0	39.4	0.0	28
	Fourth	4.8	527	4.3	37.4	31.9	0.5	30.8	0.0	25
	Highest	5.0	448	1.9	40.4	12.5	0.0	49.7	0.0	22
	Total	4.5	3,709	3.6	36.4	23.7	1.5	39.5	0.0	168

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SAMPLE DESIGNS APPENDIX A

A.1 INTRODUCTION

The 2021 Malawi Malaria Indicator Survey (MMIS) is a country-wide survey with a nationally representative sample of approximately 3,750 households. The survey provides information on key malaria control indictors, such as the proportion of households having at least one insecticide-treated net (ITN). Among children, it looks at the proportion under age 5 who slept under a bed net the previous night and whether the net was an ITN. In addition, the survey assessed the prevalence of malaria among children age 6-59 months. Among pregnant women, the survey tallied the proportion of pregnant women who slept under a bed net the previous night and who received intermittent preventive treatment (IPTp) for malaria during their last pregnancy.

In Malawi, there are three regions divided into 28 districts. In addition to reporting estimates for the country as a whole and for urban and rural areas separately, the survey reports estimates for each of the three geographical regions. The 28 districts are distributed over the three regions as follows:

- ***Northern Region:*** Chitipa, Karonga, Likoma, Mzimba, Nkhata Bay, and Rumphi
- ***Central Region***: Dedza, Dowa, Kasungu, Lilongwe, Mchinji, Nkhotakota, Ntcheu, Ntchisi, and Salima
- ***Southern Region:*** Balaka, Blantyre, Chikhwawa, Chiradzulu, Machinga, Mangochi, Mulanje, Mwanza, Neno, Nsanje, Phalombe, Thyolo, and Zomba

A.2 SAMPLE FRAME

The sampling frame used for the 2021 MMIS is the frame of the Malawi Population and Housing Census (MPHC) conducted in Malawi in 2018, provided by the Malawi National Statistical Office (NSO). The census frame is a complete list of all census enumeration areas (EA) created for the 2018 MPHC. An EA is a geographic area covering on average 235 households. The sampling frame contains information about the EA location, type of residence (urban or rural), and the estimated number of residential households. A sketch map that delineates the EA geographic boundaries is available for each EA.

Table A.1 indicates the percentage distribution of households by region and by type of residence. The region size varies from 11.8 percent (Northern, the smallest) to 45.2 percent (Southern, the largest). In Malawi, 16 percent of the households are in urban areas. The percentage of urban areas is almost similar across the three regions.

Distribution of number of residential households in the sampling frame by region and according to residence: percent distribution of households by region and percent of households that are in urban areas in Malawi, 2021 MMIS

	Number of households in the frame			Percentage of households in the frame	Percentage of households that are in urban
Region	**Urban**	**Rural**	**Total**		
Northern	80,637	387,087	467,724	11.8	17.2
Central	286,603	1,427,882	1,714,485	43.1	16.7
Southern	271,238	1,525,847	1,797,085	45.2	15.1
Malawi	**638,478**	**3,340,816**	**3,979,294**	**100.0**	**16.0**

Source: 2018 MPHC provided by the NSO

Table A.2 indicates the distribution of EAs and their average size in the number of households by region and by type of residence. There are a total of 18, 463 EAs excluding the insitutional EAs; among them 2,726 are in urban and 15, 737 are in rural areas. The average EA size is 216 households, the urban EAs are large with an average of 243 households per EA. The rural EAs are smaller, with an average of 212 households per EA.

Distribution of enumeration areas (EAs) in the sampling frame and average number of residential households per EA by region according to residence in Malawi, 2021 MMIS

	Number of enumeration areas in the frame			Average number of residential households in enumeration area		
Region	**Urban**	**Rural**	**Total**	**Urban**	**Rural**	**Total**
Northern	345	2,755	3,100	234	141	374
Central	1,204	6,385	7,589	238	224	462
Southern	1,177	6,597	7,774	230	231	462
Malawi	**2,726**	**15,737**	**18,463**	**234**	**212**	**216**

Source: 2018 MPHC provided by the NSO

A.3 SAMPLE DESIGN AND IMPLEMENTATION

The sample for the 2021 MMIS is a stratified sample selected in two stages. In the first stage, 150 EAs were selected from the sampling frame; they had a stratified probability proportional to size (PPS). The EA size is the number of residential households residing in the EA as recorded in the census. Stratification was achieved by separating every region into urban and rural areas. Therefore, the 2021 MMIS contains 6 sampling strata, including six urban strata and six rural strata. Samples were selected independently in every stratum, with a predetermined number of EAs to be selected, as shown in **Table A.3**.

A household listing operation was carried out in all of the selected EAs before the main survey. It consisted of visiting each of the 150 selected EAs, drawing a location map and a detailed sketch map, and recording on the household listing forms all residential households found in the EA with the address and the name of the head of the household. The resulting list of households served as the sampling frame for the selection of households in the second stage.

At the second stage, for each selected EA, a fixed number of 25 households was selected from the list created during the household listing. Only the pre-selected households were interviewed. To prevent bias, no replacements and no changes of the pre-selected households were allowed in the implementing stages. All women age 15-49 in the selected households were eligible for an interview.

Table A.3 shows the sample allocation of enumeration areas (clusters) by region and by urban-rural residence. Because of the desire to produce results by region, as well as budgetary and implementing constraints, the sample allocation is an equal size allocation at the regional level, with 50 clusters in each region. The 50 clusters in each region were then allocated to urban/rural areas. Among the 150 clusters selected, 60 clusters are in urban areas and 90 clusters are in rural areas. **Table A.3** shows the number of households selected by region and by type of residence. The total number of households selected in the 2021 MMIS is 3,750, with 1,500 in urban areas and 2,250 in rural areas.

Sample allocation of clusters and selected households by region, according to residence in Malawi, MMIS 2021

	Number of clusters allocated			Number of households allocated		
Region	**Urban**	**Rural**	**Total**	**Urban**	**Rural**	**Total**
Northern	20	30	50	500	750	1,250
Central	20	30	50	500	750	1,250
Southern	20	30	50	500	750	1,250
Malawi	**60**	**90**	**150**	**1,500**	**2,250**	**3,750**

Table A.4 shows the expected number of women aged 15 – 49 in the sampled households and the expected number of completed interviews with women by region and type of residence. The total expected number of interviewed women in the 2021 MMIS was 3709, with 1654 in urban areas and 2074 in rural areas.

A.4 Sample allocation of completed interviews with woman

Sample allocation of expected number of women aged 15 - 49 in interviewed households and sample allocation of expected number of women aged 15 -49 with completed interviews by region, according to residence in Malawi, MMIS 2021

	Expected number of women 15 - 49 in the interviewed households			Expected number of women 15 - 49 with completed interviews		
Region	**Urban**	**Rural**	**Total**	**Urban**	**Rural**	**Total**
Northern	566	723	1,289	558	706	1,264
Central	548	684	1,232	545	675	1,220
Southern	540	704	1,244	532	693	1,225
Malawi	**1,654**	**2,111**	**3,765**	**1,635**	**2,074**	**3,709**

Table A.5 shows the expected number of children aged 6 – 59 months tested for malaria. These calculations were based on the results obtained from 2021 MMIS, using the following

assumptions: (1) the household completion rate was 99.5% in urban areas and 99.7% in rural areas; (2) the response rate for women is 98.9% in urban and 98.2% in rural areas; (3) in urban and rural areas, there is less than one woman per household; and (4) in urban and rural areas there is less than one child aged 6 – 59 months tested for malaria.

A.5 Sample allocation of completed rapid diagnostic tests for malaria in children

Sample allocation of expected number of children aged 6 - 59 months tested with RDT for malaria by region, according to residence in Malawi, 2021 MMIS

	Expected number of children aged 6 - 59 months tested for malaria (RDT)		
Region	**Urban**	**Rural**	**Total**
Northern	207	347	554
Central	193	369	562
Southern	185	381	566
Malawi	585	1,097	1,682

A.4 SAMPLE PROBABILITIES AND SAMPLING WEIGHTS

The sampling for the 2021 Malawi Malaria Indicator Survey (MIS) followed the recommended guidelines developed by the DHS programme [ICF International, 2011; 2012]. The country was stratified into urban and rural clusters to facilitate comparison between these strata. Since Malawi has three administrative regions, we had urban and rural clusters for each of the three regions. We used probability sampling methods to select the sampling units and used a two-stage cluster sampling methodology. At the first stage, we selected clusters, while households were selected at the second stage. We took the following detailed steps.

Sampling frame

The first stage was the identification of the sampling frame. A sampling frame is a complete list of all sampling units covering the whole population. The presence of a sampling frame allows for the use of probability sampling methods since the probability of selecting any sampling unit can be determined. We used the official enumeration areas (EAs) from the 2018 Malawi housing and population census obtained from the National Statistical Office (NSO)[1]. An EA code in the database uniquely identified all the EAs. Other variables in the database included some of the following: the size of EA, district code, region code (North, Central or South), residence (urban or rural), population size and the number of households, which made stratification and selection of EAs (i.e., clusters) using probability sampling methods possible.

[1] http://www.nsomalawi.mw/

Stratification

Stratification is the process of subdividing the survey population into homogenous groups. These groups are known as strata using a particular criterion. In the 2021 MMIS, we stratified the country into two strata (urban and rural). Stratification is beneficial in that it improves the representativeness of the selected sample. Thus stratification has the effect of reducing the sampling error. Stratification was only done at the first stage of sampling. We applied systematic sampling at the second stage

We sampled 150 clusters, 90 from the rural stratum and 60 from the urban stratum. Since Malawi has three regions, this was further broken as follows: 30 clusters from each region in the rural stratum and 20 clusters per region in the urban stratum.

Household listing

After selecting the clusters at the first stage, we conducted household listing on all the selected clusters. This exercise provided the sampling frame for the second stage of the MMIS.

Sampling details

Sampling probabilities were calculated for both stages.

First stage

Let $h = \{1,2\}$ denote the strata where 1=rural and 2=urban and $k = \{1,2,3\}$ represent the regions of Malawi where 1=Northern, 2=Central and 3=Southern. The first stage sampling probability for the i-th cluster in stratum h and region k is then given by P_{1hki}. Let a_{hk} be the number of clusters selected in stratum h in region k and M_{hki} the number of households according to the sampling frame in the i-th cluster belonging to region k. The total number of households in stratum h within region k is simply the sum of all the households in the clusters i given by the expression $\sum M_{hki}$. The probability of selecting the i-th cluster in stratum h under region k is given by

$$P_{1hki} = \frac{a_{hk} M_{hki}}{\sum M_{hki}}$$

To obtain 90 clusters in the rural stratum ($h = 1$), we sampled 30 clusters per region k. For example, in the Northern region ($k = 1$), $a_{hk} = 30$. For the urban stratum ($h = 2$), we selected 20 clusters per region k to get the total of 60 clusters for the urban stratum. For the urban, $a_{hk} = 20$

We applied these probabilities during the sampling process. Figure A1 shows an example of selected clusters in one of the districts in Malawi.

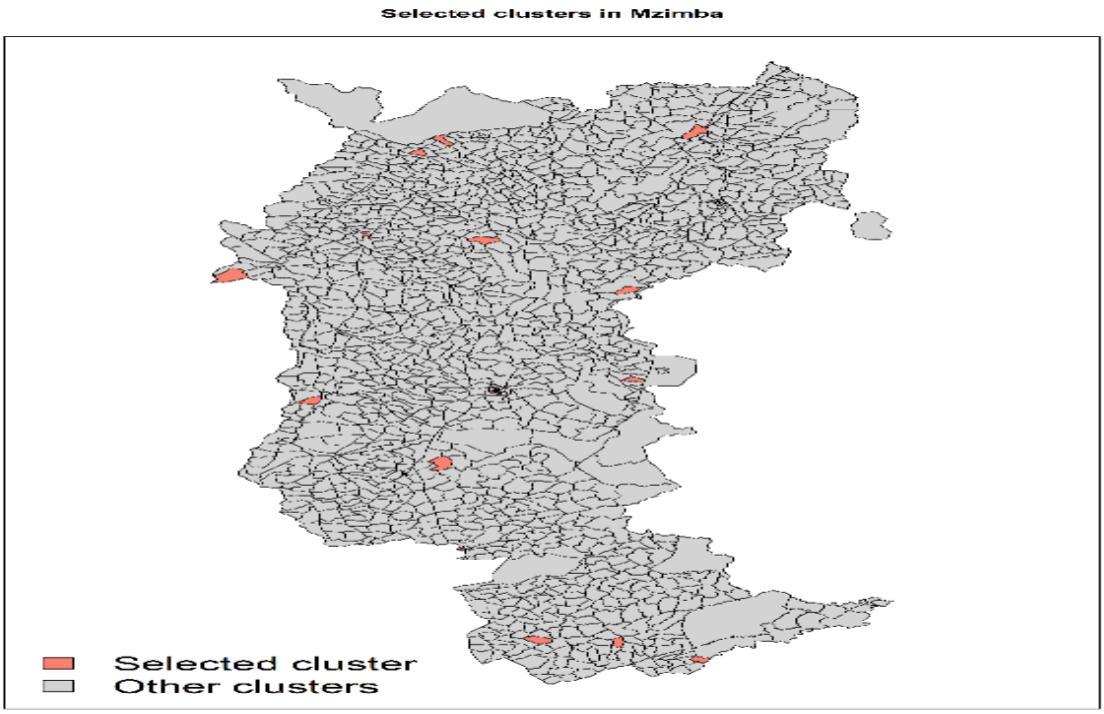

Figure A1: Selected clusters in Mzimba district in Northern Malawi

Second stage

Let the selection probability of a household during the second stage within the i-th cluster in stratum h, and region k be P_{2hki}. Let g_{hki} be the number of households to be selected in the i-th cluster of stratum h in region k. For the 2021 MMIS, $g_{hki} = 25$. The selection probability for each household at the second is given by

$$P_{2hki} = \frac{g_{hki}}{M_{hki}}$$

The overall probability of selecting each household in cluster i of stratum h within region k is given by the product of the selection probabilities

$$P_{hki} = P_{1hki} \times P_{2hki} = \frac{a_{hk} g_{hki}}{\sum M_{hki}}$$

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

A.5 SURVEY IMPLEMENTATION

An examination of response rates for the 2021 MMIS indicates that the survey was successfully implemented. **Table A.6** present interview completion rates for household and individual women in the 2021 MMIS by urban and rural areas, and region. The rates of completed household and women interviews are generally higher than expected.

Table A.6 Sample Implementation: Women

	Residence		Region			
Result	**Urban**	**Rural**	**North**	**Central**	**South**	**Total**
Selected households						
Completed (c)	98.7	99.1	99.1	97.8	99.9	99.0
Household present but not completed and respondent at home (P)	0.1	0.0	0.1	0.1	0.0	0.1
Refused (R)	0.3	0.0	0.0	0.2	0.1	0.1
Dwelling not found (DNF)	0.0	0.0	0.0	0.0	0.0	0.0
Household absent (HA)	0.2	0.3	0.2	0.6	0.0	0.2
Dwelling vacant/address not a dwelling (DV)	0.7	0.4	0.5	1.1	0.0	0.5
Dwelling destroyed (DD)	0.1	0.1	0.2	0.2	0.0	0.1
Total						
Number of sampled households	1,500	2,250	1,250	1,250	1,250	3,750
Household response rate (HRR)	99.7	100.0	99.9	99.7	99.9	99.8
Eligible women						
Completed (EWC)	98.9	98.3	98.1	99.0	98.5	98.5
Incapacitated (EWI)	0.2	0.2	0.2	0.1	0.3	0.2
Total						
Number of women	1654	2111	1289	1232	1244	3765
Eligible women response rate (EWRR)	98.9	98.3	98.1	99.0	98.5	98.5
Overall women response rate (ORR)	**98.5**	**98.2**	**98.0**	**98.7**	**98.4**	**98.4**

Using the number of households failing into specific response category, the household response rate (HRR) is calculated as:

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

The eligible women response rate (EWRR) is equivalent to the percentage of interviews completed (EWC)

The overall women response rate (OWRR) is calculated as:

$$OWRR = HRR * \frac{EWRR}{100}$$

ESTIMATES OF SAMPLING ERRORS APPENDIX B

The estimates from a sample survey are affected by two types of errors: non-sampling errors and sampling errors. Non-sampling errors are the results of mistakes made in implementing data collection and data processing, such as failure to locate and interview the correct household, misunderstanding of the questions on the part of either the interviewer or the respondent, and data entry errors. Although numerous efforts were made during the implementation of the 2021 Malawi Malaria Indicator Survey (2021MMIS) to minimize this type of error, non-sampling errors are impossible to avoid and difficult to evaluate statistically.

Sampling errors, on the other hand, can be evaluated statistically. The sample of respondents selected in the 2021MMIS is only one of many samples that could have been selected from the same population, using the same design and expected size. Each of these samples would yield results that differ somewhat from the results of the actual sample selected. Sampling errors are a measure of the variability between all possible samples. Although the degree of variability is not known exactly, it can be estimated from the survey results.

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

If the sample of respondents had been selected as a simple random sample, it would have been possible to use straightforward formulas for calculating sampling errors. However, the 2021 MMIS sample is the result of a multi-stage stratified design, and, consequently, it was necessary to use more complex formulae. Sampling errors are computed using CSPlan in SPSS. These programs use the Taylor linearization method of variance estimation for survey estimates that are means, proportions or ratios.

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

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

In which

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

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

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

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

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

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

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

Sampling errors for the 2021MMIS are calculated for selected variables considered to be of primary interest. The results are presented in this appendix for the country as a whole, for urban and rural areas and for each of the country regions. For each variable, the type of statistic (mean, proportion, or rate) and the base population are given in Table B.1. Tables B.2 through B.7 present the value of the statistic (R), its standard error (SE), the number of un-weighted (N) and weighted (WN) cases, the design effect (DEFT), the relative standard error (SE/R), and the 95 percent confidence limits (R±2SE), for each variable. The DEFT is considered undefined when the standard error considering a simple random sample is zero (when the estimate is close to 0 or 1).

The confidence interval (e.g., as calculated for child has fever in last two weeks can be interpreted as follows: the overall average from the national sample is 0.371, and its standard error is 0.017. Therefore, to obtain the 95 percent confidence limits, one adds and subtracts twice the standard error to the sample estimate, i.e., 0.371 ± 2×0.017. There is a high probability (95 percent) that the true proportion of children have fever in last two weeks is between 0.337 and 0.405.

For the total sample, the value of the DEFT, averaged over all variables, is 2.62. This means that, due to multi-stage clustering of the sample, the average standard error is increased by a factor of 2.62 over that in an equivalent simple random sample.

Table B.1: List of indicators for sampling errors, Malawi MIS, 2021

Variable	Type of Estimate	Base Population
HOUSEHOLDS		
Ownership of at least one ITN	Proportion	All households interviewed
Ownership of at least one ITN for two people	Proportion	All households interviewed and have at least one ITN
CHILDREN		
Slept under an ITN last night	Proportion	All children under age 5
Slept under an ITN last night in household with at least one ITN	Proportion	All children under age 5 in household having at least one ITN
Had fever in the last2 weeks	Proportion	All children under age 5
For whom advice was or treatment was sought	Proportion	Children under age 5 had fever in the last 2 weeks
Had received ACT treatment to fever	Proportion	Children under age 5 had fever in the last 2 weeks who had received any antimalarial drugs
Prevalence of anaemia (haemoglobin level <8.0g/dl)	Proportion	Children aged 6 - 59 months who were tested
Prevalence of malaria (RDT)	Proportion	Children aged 6 - 59 months who were tested
Prevalence of malaria (Microscopy)	Proportion	Children aged 6 - 59 months who were tested
ALL WOEMN 15 -49		
Urban residence	Proportion	All women aged 15 - 59 months
Literacy	Proportion	All women aged 15 - 59 months
No Education	Proportion	All women aged 15 - 59 months
At least some secondary education	Proportion	All women aged 15 - 59 months
PREGNANT WOMEN		
Slept under an ITN last night	Proportion	Pregnant women aged 15 - 59 years
Slept under an ITN last night in households with at l	Proportion	Pregnant women aged 15 - 59 years in households having at least one ITN
Received two or more doses od SP/Fansidar during the pregnancy of the most recent live birth	Proportion	Women aged 15 - 59 years with live birth in the 2 years
Received three or more doses of SP/Fansidar during the pregnancy of the most recent live birth	Proportion	Women aged 15 - 59 years with live birth in the 2 years

Table B.1: Sampling Errors: Total Sample, Malawi MIS, 2021

Total Sample (National)			**Number of cases**				**Confidence Interval**	
Variable	**Value (R)**	**Standard Error (SE)**	**Un-weighted (N)**	**Weighted (WN)**	**Design Effects (DEFF)**	**Relative Error (SE/R)**	**Lower (R-2SE)**	**Upper (R+SE)**
Urban residence	0.1892	0.0104	3,765	3,765	2.6510	0.0549	0.1687	0.2098
Literacy	0.7611	0.0134	3,709	3,709	3.6330	0.0175	0.7347	0.7875
No education	0.0956	0.0082	3,709	3,709	2.8690	0.0856	0.0794	0.1118
At least some secondary education	0.2992	0.0146	3,709	3,709	3.7620	0.0487	0.2704	0.3280
Ownership of at least one ITN	0.2075	0.0089	3,698	3,698	1.7820	0.0429	0.1899	0.2251
Ownership of at least one ITN for two people	0.5517	0.0146	3,711	3,711	3.2060	0.0265	0.5228	0.5806
Child slept under an ITN last night	0.5300	0.0201	1,974	1,974	3.1910	0.0379	0.4903	0.5697
Child slept under an ITN last night in household with at least one ITN	0.8105	0.0166	1,277	1,277	2.2750	0.0204	0.7778	0.8432
Pregnant woman slept under an ITN last night	0.0487	0.0485	252	249	2.3670	0.9967	0.3909	0.5832
Pregnant woman slept under an ITN last night in household with at least one ITN	0.7707	0.0448	161	157	1.8180	0.0582	0.6817	0.8596
Received two or more doses of SP/Fansidar during the pregnancy of the most recent live birth	0.8394	0.0175	769	872	1.7340	0.0208	0.8049	0.8739
Received three or more doses of SP/Fansidar during the pregnancy of the most recent live birth	0.5599	0.0297	769	872	2.7420	0.0530	0.5013	0.6186
Child had fever in the last 2 weeks	0.3706	0.0172	1,828	2,047	2.3230	0.0465	0.3366	0.4046
Child for whom advice was or treatment was sought	0.9291	0.0158	608	7,588	2.3010	0.0170	0.8978	0.9603
Child had received ACT treatment to fever	0.8918	0.0154	507	623	1.2440	0.0173	0.8613	0.9223
Child had anaemia (haemoglobin level <8.0g/dl)	0.0113	0.0031	1,773	1,783	1.5230	0.2743	0.0052	0.0175
Child had malaria (RDT)	0.2397	0.0212	1,773	1,783	4.3520	0.0883	0.1979	0.2815
Child had malaria (based on microscopy test)	0.1048	0.0136	1,676	1,677	3.3220	0.1302	0.0779	0.1318

Table B.3: Sampling Errors Urban Sample, Malawi MIS, 2021

Urban Sample			Number of cases				Confidence Interval	
Variable	Value (R)	Standard Error (SE)	Un-weighted (N)	Weighted (WN)	Design Effects (DEFF)	Relative Error (SE/R)	Lower (R-2SE)	Upper (R+SE)
Urban residence	1	0.0000	1,654	712	0	0.0000	1	0
Literacy	0.9066	0.0120	1,635	705	2.756	0.0132	0.8827	0.9306
No education	0.0388	0.0070	1,635	705	2.135	0.1802	0.0249	0.0528
At least some secondary education	0.5881	0.0258	1,635	705	4.499	0.0439	0.5364	0.6399
Ownership of at least one ITN	0.2873	0.0172	1,477	605	2.137	0.0599	0.2528	0.3218
Ownership of at least one ITN for two people	0.5594	0.0180	1,481	607	1.947	0.0322	0.5233	0.5954
Child slept under an ITN last night	0.5477	0.0301	697	283	2.541	0.0549	0.4875	0.6079
Child slept under an ITN last night in household with at least one ITN	0.852	0.0224	464	182	1.841	0.0263	0.8071	0.8968
Pregnant woman slept under an ITN last night	0.4557	0.0565	98	38	1.246	0.1239	0.3421	0.5692
Pregnant woman slept under an ITN last night in household with at least one ITN	0.7136	0.0611	63	25	1.113	0.0856	0.5896	0.8377
Received two or more doses of SP/Fansidar during the pregnancy of the most recent live birth	0.8286	0.0211	265	117	0.824	0.0254	0.7864	0.8708
Received three or more doses of SP/Fansidar during the pregnancy of the most recent live birth	0.5603	0.0341	265	117	1.243	0.0608	0.492	0.6285
Child had fever in the last 2 weeks	0.2554	0.0263	662	287	2.405	0.1030	0.2027	0.3081
Child for whom advice was or treatment was sought	0.9117	0.0266	155	73	1.358	0.0292	0.8582	0.9652
Child had received ACT treatment to fever	0.7029	0.0493	137	64	1.584	0.0702	0.6037	0.8022
Child had anaemia (haemoglobin level <8.0g/dl)	0.0029	0.0024	621	241	1.235	0.8345	-0.0019	0.0078
Child had malaria (RDT)	0.0578	0.0211	621	241	5.055	0.3645	0.0156	0.1000
Child had malaria (based on microscopy test)	0.0346	0.0153	582	225	4.051	0.4413	0.0041	0.0652

Table B.4: Sampling Errors Rural, Sample, Malawi MIS, 2021

Rural Sample			Number of cases				Confidence Interval	
Variable	Value (R)	Standard Error (SE)	Un-weighted (N)	Weighted (WN)	Design Effects (DEFF)	Relative Error (SE/R)	Lower (R-2SE)	Upper (R+SE)
Urban residence	0	0.0000	2,111	3,052	0.0000	0.0000	0	0
Literacy	0.7269	0.0164	2,074	3,004	2.8130	0.0226	0.6943	0.7595
No education	0.1089	0.0099	2,074	3,004	2.1010	0.0909	0.0892	0.1287
At least some secondary education	0.2313	0.0165	2,074	3,004	3.1900	0.0713	0.1984	0.2642
Ownership of at least one ITN	0.1919	0.0099	2,221	3,094	1.4130	0.0516	0.1721	0.2116
Ownership of at least one ITN for two people	0.5502	0.0171	2,230	3,104	2.6360	0.0311	0.5162	0.5842
Child slept under an ITN last night	0.5272	0.0227	1,277	1,792	2.6460	0.0431	0.482	0.5724
Child slept under an ITN last night in household with at least one ITN	0.8041	0.0187	813	1,175	1.8000	0.0233	0.7669	0.8412
Pregnant woman slept under an ITN last night	0.4928	0.0566	154	210	1.4000	0.1148	0.38	0.6056
Pregnant woman slept under an ITN last night in household with at least one ITN	0.7812	0.0517	98	133	1.2310	0.0661	0.6778	0.8845
Received two or more doses of SP/Fansidar during the pregnancy of the most recent live birth	0.8411	0.0199	504	755	1.4860	0.0237	0.8016	0.8806
Received three or more doses of SP/Fansidar during the pregnancy of the most recent live birth	0.5599	0.0338	504	755	2.3370	0.0604	0.4926	0.6217
Child had fever in the last2 weeks	0.3894	0.0197	1,166	1,760	1.8930	0.0505	0.3503	0.4284
Child for whom advice was or treatment was sought	0.9309	0.0172	453	685	2.0880	0.0185	0.8967	0.9652
Child had received ACT treatment to fever	0.9136	0.0156	370	558	1.1380	0.0171	0.8826	0.9446
Child had anaemia (haemoglobin level <8.0g/dl)	0.0126	0.0036	1,152	1,543	1.1780	0.2857	0.0055	0.0198
Child had malaria (RDT)	0.2681	0.0241	1,152	1,543	3.4190	0.0900	0.2201	0.3161
Child had malaria (based on microscopy test)	0.1157	0.0016	1,094	1,452	2.6130	0.0135	0.0846	0.1468

Table B.5: Sampling Errors Northern Region Sample, Malawi MIS, 2021

Northern Sample			Number of cases				Confidence Interval	
At least A69:I82some secondary education	Value (R)	Standard Error (SE)	Un-weighted (N)	Weighted (WN)	Design Effects (DEFF)	Relative Error (SE/R)	Lower (R-2SE)	Upper (R+SE)
Urban residence	0.2191	0.0187	1,289	451	2.643	0.0855	0.1814	0.2568
Literacy	0.8711	0.0159	1,264	442	2.854	0.0183	0.8391	0.9031
No education	0.0271	0.0055	1,264	442	1.435	0.2022	0.0161	0.0381
At least some secondary education	0.3977	0.0237	1,264	442	2.953	0.0595	0.3501	0.4452
Ownership of at least one ITN	0.2501	0.0219	1,235	418	3.161	0.0876	0.2061	0.2942
Ownership of at least one ITN for two people	0.5773	0.0299	1,239	420	4.528	0.0518	0.5172	0.6374
Child slept under an ITN last night	0.4935	0.0287	634	217	2.082	0.0581	0.4359	0.5512
Child slept under an ITN last night in household with at least one ITN	0.7718	0.0261	425	137	1.641	0.0338	0.7193	0.8243
Pregnant woman slept under an ITN last night	0.5575	0.0818	87	285	2.332	0.1467	0.3921	0.723
Pregnant woman slept under an ITN last night in household with at least one ITN	0.8621	0.0493	58	185	1.165	0.0572	0.7517	0.9625
Received two or more doses of SP/Fansidar during the pregnancy of the most recent live birth	0.8333	0.0279	226	86	1263	0.0335	0.7771	0.8895
Received three or more doses of SP/Fansidar during the pregnancy of the most recent live birth	0.5933	0.0335	226	86	1.047	0.0565	0.5259	0.6607
Child had fever in the last2 weeks	0.3429	0.0276	546	199	1.84	0.0804	0.2875	0.3984
Child for whom advice was or treatment was sought	0.9309	0.0270	162	68	1.82	0.0290	0.8766	0.9852
Child had received ACT treatment to fever	0.8441	0.0372	133	56	1.391	0.0441	0.9193	0.9193
Child had anaemia (haemoglobin level <8.0g/dl)	0.0128	0.0050	569	185	1.126	0.3914	0.0027	0.0229
Child had malaria (RDT)	0.1545	0.0353	553	185	5.412	0.2283	0.0836	0.22544
Child had malaria (based on microscopy test)	0.065	0.0147	553	181	1.948	0.2254	0.0356	0.0945

Table B.6: Sampling Errors Central Region Sample, Malawi MIS, 2021

Central Sample			Number of cases				Confidence Interval	
Variable	Value (R)	Standard Error (SE)	Un-weighted (N)	Weighted (WN)	Design Effects (DEFF)	Relative Error (SE/R)	Lower (R-2SE)	Upper (R+SE)
Urban residence	0.2008	0.0124	1,232	1,584	1.186	0.0619	0.1758	0.2258
Literacy	0.7301	0.0215	1,220	1,565	2.869	0.0295	0.6868	0.7734
No education	0.1016	0.0107	1,220	1,565	1.528	0.1053	0.0801	0.1231
At least some secondary education	0.2907	0.0200	1,220	1,565	2.358	0.0687	0.2506	0.3309
Ownership of at least one ITN	0.1358	0.0111	1,219	1,601	1.285	0.0820	0.1135	0.1582
Ownership of at least one ITN for two people	0.4238	0.0203	1,223	1,604	2.061	0.0479	0.3830	0.4646
Child slept under an ITN last night	0.4163	0.0307	659	878	2.553	0.0738	0.3546	0.4780
Child slept under an ITN last night in household with at least one ITN	0.8031	0.0347	343	455	2.598	0.0431	0.7335	0.8728
Pregnant woman slept under an ITN last night	0.3086	0.0592	78	104	1.263	0.1917	0.1887	0.4285
Pregnant woman slept under an ITN last night in household with at least one ITN	0.6790	0.0948	36	47	1.443	0.1396	0.4842	0.8739
Received two or more doses of SP/Fansidar during the pregnancy of the most recent live birth	0.8920	0.0262	258	367	1.829	0.0293	0.8393	0.9447
Received three or more doses of SP/Fansidar during the pregnancy of the most recent live birth	0.6377	0.0443	258	367	2.180	0.0694	0.5487	0.7268
Child had fever in the last2 weeks	0.3756	0.0279	626	860	2.072	0.0742	0.3196	0.4317
Child for whom advice was or treatment was sought	0.9122	0.0298	220	323	2.420	0.0326	0.8523	0.9720
Child had received ACT treatment to fever	0.8538	0.0314	182	254	1.432	0.0368	0.7905	0.9170
Child had anaemia (haemoglobin level <8.0g/dl)	0.0150	0.0059	588	742	1.392	0.3947	0.0031	0.0269
Child had malaria (RDT)	0.2808	0.0358	588	742	3.724	0.1275	0.2088	0.3528
Child had malaria (based on microscopy test)	0.1177	0.0218	559	706	2.545	0.1849	0.0739	0.1614

Table B.7: Sampling Errors Southern Region Sample, Malawi MIS, 2021

Southern Sample			Number of cases				Confidence Interval	
Variable	Value (R)	Standard Error (SE)	Un-weighted (N)	Weighted (WN)	Design Effects (DEFF)	Relative Error (SE/R)	Lower (R-2SE)	Upper (R+SE)
Urban residence	0.1709	0.0181	1,244	1,729	3.186	0.1057	0.1325	0.2092
Literacy	0.7610	0.0208	1,225	1,701	2.904	0.0273	0.7192	0.8027
No education	0.1079	0.0149	1,225	1,701	2.805	0.1376	0.0781	0.1378
At least some secondary education	0.2814	0.0250	1,225	1,701	3.785	0.0888	0.2311	0.3317
Ownership of at least one ITN	0.2651	0.0147	1,244	1,680	1.369	0.0553	0.2357	0.2946
Ownership of at least one ITN for two people	0.6670	0.0206	1,249	1,687	2.377	0.0308	0.6257	0.7084
Child slept under an ITN last night	0.6399	0.0278	681	980	2.285	0.0435	0.5839	0.6958
Child slept under an ITN last night in household with at least one ITN	0.8219	0.0203	509	763	1.436	0.0247	0.7810	0.8628
Pregnant woman slept under an ITN last night	0.6289	0.0778	87	116	2.230	0.1237	0.4720	0.7858
Pregnant woman slept under an ITN last night in household with at least one ITN	0.7994	0.0551	67	916	1.250	0.0689	0.6878	0.9111
Received two or more doses of SP/Fansidar during the pregnancy of the most recent live birth	0.7947	0.0261	285	419	1.187	0.0329	0.7422	0.8472
Received three or more doses of SP/Fansidar during the pregnancy of the most recent live birth	0.4850	0.0440	285	419	2.199	0.0907	0.0440	0.5735
Child had fever in the last2 weeks	0.3718	0.0256	656	988	1.837	0.0688	0.3203	0.4232
Child for whom advice was or treatment was sought	0.9436	0.0189	226	367	1.509	0.0200	0.9056	0.9816
Child had received ACT treatment to fever	0.9314	0.0156	192	312	0.729	0.0167	0.8999	0.9629
Child had anaemia (haemoglobin level <8.0g/dl)	0.0078	0.0038	616	856	1.145	0.4872	0.0002	0.0155
Child had malaria (RDT)	0.2226	0.0307	616	856	3.348	0.1379	0.1609	0.2843
Child had malaria (based on microscopy test)	0.1025	0.0214	564	790	2.800	0.2088	0.0595	0.1455

DATA QUALITY TABLES APPENDIX C

Table C.1: Household Age Distribution, Malawi MIS, 2021

Single-year age distribution of the de facto household population by sex (weighted), Malawi, 2021 MMIS

	Female		Male			Female		Male	
Age	Number	Percent	Number	Percent	Age	Number	Percent	Number	Percent
0	188	2.3	167	2.1	36	92	1.1	78	1.0
1	216	2.6	197	2.5	37	70	0.9	61	0.8
2	211	2.6	206	2.6	38	107	1.3	83	1.0
3	207	2.5	217	2.7	39	66	0.8	82	1.0
4	171	2.1	194	2.5	40	78	1.0	113	1.4
5	204	2.5	193	2.4	41	60	0.7	54	0.7
6	204	2.5	194	2.5	42	88	1.1	73	0.9
7	256	3.1	288	3.6	43	54	0.7	45	0.6
8	233	2.8	216	2.7	44	40	0.5	36	0.5
9	270	3.3	221	2.8	45	68	0.8	94	1.2
10	260	3.2	247	3.1	46	55	0.7	62	0.8
11	240	2.9	232	2.9	47	34	0.4	54	0.7
12	261	3.2	247	3.1	48	45	0.6	57	0.7
13	274	3.4	208	2.6	49	31	0.4	45	0.6
14	305	3.7	200	2.5	50	98	1.2	51	0.6
15	145	1.8	222	2.8	51	47	0.6	33	0.4
16	170	2.1	216	2.7	52	66	0.8	48	0.6
17	135	1.7	181	2.3	53	43	0.5	37	0.5
18	179	2.2	223	2.8	54	36	0.4	27	0.3
19	145	1.8	122	1.5	55	45	0.6	46	0.6
20	233	2.8	195	2.5	56	33	0.4	36	0.5
21	182	2.2	203	2.6	57	26	0.3	38	0.5
22	150	1.8	148	1.9	58	35	0.4	23	0.3
23	136	1.7	146	1.8	59	23	0.3	19	0.2
24	133	1.6	122	1.5	60	43	0.5	48	0.6
25	178	2.2	153	1.9	61	30	0.4	15	0.2
26	134	1.6	152	1.9	62	33	0.4	21	0.3
27	126	1.5	109	1.4	63	24	0.3	16	0.2
28	128	1.6	111	1.4	64	19	0.2	23	0.3
29	103	1.3	100	1.3	65	32	0.4	28	0.4
30	107	1.3	125	1.6	66	16	0.2	9	0.1
31	79	1.0	76	1.0	67	12	0.1	20	0.3
32	112	1.4	114	1.4	68	30	0.4	19	0.2
33	92	1.1	79	1.0	69	20	0.2	17	0.2
34	94	1.1	68	0.9	70+	201	2.5	158	2.0
35	116	1.4	127	1.6	Don't know/missing	0.0	0.0	0.0	0.0
					Total	**8,177**	**22**	**7,888**	**21**

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

Table C.2: Age Distribution of Eligible and Interviewed Women, Malawi MIS, 2021

De Facto household population of women aged 10 – 54; number and percent distribution of interviewed - women aged 15 – 49, and percent of eligible women who were interviewed (weighted) by 5-year age groups, Malawi MIS 2021

Age-group	Household population of women aged 10-54	Interviewed women aged 15 - 49		Percentage of eligible women interviewed
		Number	Percent	
10 - 14	1,340	0.0	na	na
15 - 19	795	782.0	21.1	98.4
20 - 24	824	811.0	21.9	98.4
25 - 29	650	642.0	17.3	98.8
30 - 34	484	475.0	12.8	98.1
35 - 39	453	444.0	12.0	98.0
40 - 44	332	330.0	8.9	99.4
45 - 49	227	225.0	6.1	99.1
50 - 54	290	0.0	0.0	0.0
15 - 49	3,765	3709.0	98.5	98.5

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

Table C.3: Completeness of Reporting, Malawi MIS, 2021

Percentage of observations with missing information for selected demographic and health questions (weighted) in Malawi, 2021 MMIS

Subject	Reference group	Percentage with missing information	Number of cases
Birth date	Birth in the 5 year preceding the survey		
Date only		0	1872
Month only		0	1872
Month and year		0	1872
Respondent's education	All women aged 15 - 49	0	3709
Anaemia	Living children aged 6 -59 months from the biomarker questionnaire	14.8	1974

Table C.3: Completeness of Reporting, Malawi MIS, 2021

Number of births, percentage with complete date and sex ratio at birth and calendar year according to living (L), dead (D) and total (T) children (weighted) in Malawi, 2021 MMIS

Calendar year	Number of births			Percentage with complete birth date			Sex ratio at birth			Calendar year ratio		
	L	D	T	L	D	T	L	D	T	L	D	T
2021	153	6	159	96.2	3.8	100.0	82.1	200.0	84.9	na	na	na
2020	373	7	380	98.2	1.8	100.0	93.3	250.0	15.5	133.9	100	133.1
2019	404	8	412	98.1	1.9	100.0	100.0	700.0	103.0	110.2	114.3	110.3
2018	360	7	367	98.1	1.9	100.0	103.4	75.0	102.8	91,3	66.7	90.6
2017	385	13	398	96.7	3.3	100.0	115.1	225.0	117.5	150.1	260	152.2
2016	153	3	156	98.1	1.9	100.0	106.8	0.0	102.6	na	na	na
2017 - 2021	1675	38	1713	97.8	2.2	100.0	103.0	171.4	104.2	na	na	na
All	1828	44	1872	97.6	2.4	100.0	101.1	175.0	102.4	na	na	na

na = Not applicable

Both year and month of birth given

(Bm/Bf)*100 where Bm and Bf are the number of male and female births respectively

[2Bx/Bx-1+Bx+1]*100 where Bx is the number of births in the calendar year x

PERSONS INVOLVED IN 2021 MMIS APPENDIX D

SURVEY MANAGEMENT TEAM

NAME	ROLE
Dr Michael Kayange	Programme Manager
Dr Sosten Lankhulani	Deputy Programme Manager
Gracious Hamuza	Project Manager
Austin Gumbo	Project Manager
Kingsley Manda	Mapping/Listing Trainer
John Kapalamula	Mapping/Listing Trainer
Pachalo Chizala	Data Manager
Grevazio Kapaswiche	Data Manager
Chisomo Singano	Data Manager
Atusaye Mwambyale	Data Manager
James Chirombo	Statistician
Esnart Katuya	Programme Secretary
Amos Maenje	Lab Supervisor
James Kaphiyo	Lab Supervisor
Milliam Miluka	Programme Assistant
James Msumba	Driver
Jeremia Chikuse	Driver
Lorent Chirwa	Driver

Listing Team

Oscar Nsutu	Team Leader
Harry Milala	Team Leader
Maurice Nyamuka	Team Leader
Oscar Banda	Team Leader
Moses Gausi	Team Leader
Michael Phiri	Lister/Mapper
Jessy Jambo	Lister/Mapper
Tembani Mkandawire	Lister/Mapper
Webster Mgalason	Lister/Mapper
Yamikani Chilipo	Lister/Mapper
Noel Dickson	Lister/Mapper
Wilson Edward	Lister/Mapper
Jaston Chataika	Lister/Mapper
John Salapa	Lister/Mapper
Nancy Kalima	Lister/Mapper
Ken Mkandawire	Lister/Mapper

Gift Osman	Lister/Mapper
Charity Hamuza	Lister/Mapper
Donack Sabola	Lister/Mapper
Dickson Matiki	Lister/Mapper
Mbwana Richard	Lister/Mapper
Mwakwawa Keneth	Lister/Mapper
Tung'ande Humphreys	Lister/Mapper
Madengele Veronica	Lister/Mapper
Henry Sabudu	Lister/Mapper
Gracian Chimangeni	Driver
Alphony Lutere	Driver

Microscopists

Harry Mpwatika
Gift Kasiyafumbi
Mlotha Mbughi
Lawrence Lubeni
Mwayi Luka
Dorothy Moyo
Christina Kaliwo
Limbani Banda
Wesley Katundu

Fieldwork Team 1

Sarah Msowoya	Team Supervisor
Alberta Lwesha	Interviewer 1
Frankwell Lusayo Sikwese	Interviewer 2
Alice Msukwa	Interviewer 3
Carolyn Chipeta	Interviewer 4
Clever Njakale	Biomarker 1
Beatrice Mphande	Biomarker 2
Grecian Chimangeno	Driver
Kenneth Manda	Driver

Fieldwork Team 2

Sophie Gumbo	Team Supervisor
Excevious Gondwe	Interviewer 1
Bertha Mbichila	Interviewer 2
MacMillani Mwamatope	Interviewer 3
Loyce Banda	Interviewer 4
Dalph Nyirongo	Biomarker 1
Esther Kananji	Biomarker 2
Fransis Nsandula	Driver
Jeremia Chikuse	Driver

Fieldwork Team 3

Grena Jumbe	Team Supervisor
Alice Nkhoma	Interviewer 1
Thokozani Ngomba	Interviewer 2
Edith Mahwayo	Interviewer 3
Danvan Kapalamula	Interviewer 4
Kandakuone Makamo	Biomarker 1
Patrick Kalengo	Biomarker 2
Ireen Chirwa	Driver
Bryce Kachule	Driver

Fieldwork Team 4

Agnes Mapala Banda	Team Supervisor
Florence Kamba Sande	Interviewer 1
Patricia Sambo	Interviewer 2
Chrissy Maulidi	Interviewer 3
Paliwin Malikebu	Interviewer 4
Margaret Gremu	Biomarker 1
Chiyembekezo Kachala	Biomarker 2
Redson Kandiuze	Driver
Noel Milanzi	Driver

Fieldwork Team 5

Sarah Nyirongo	Team Supervisor
Chifundo Zaina	Interviewer 1
Beatrice Kamanga	Interviewer 2
Victoria Nyirenda	Interviewer 3
Lucy Karonda	Interviewer 4
Francis Mkandawire	Biomarker 1
Mwayi Luka	Biomarker 2
Ignasio Kamwendo	Driver
Wilson Chatuluka	Driver

Fieldwork Team 6

Shyreen Chithambo	Supervisor
Doris Namanja	Interviewer 1
Charity Chiunda	Interviewer 2
Sarah Mwenyekulu	Interviewer 3
Tamala Nyasulu Mbewe	Interviewer 4
Beatrice Mwinjiro	Biomarker 1
Getson Uladi	Biomarker 2
White Chiboda	Driver
James Mwatiha	Driver

Fieldwork Team 7

Prisca Thumpwa Nyalungwe	Supervisor
Carol Tembo	Interviewer 1
Naomi Khulungira	Interviewer 2
Deliah Gomiwa	Interviewer 3
Edgar Muonja	Interviewer 4
Masauko Chiwaya	Biomarker 1
Robert Jumbe	Biomarker 2
Daveson Kandielo	Driver
Yamikani Chiponde	Driver

Fieldwork Team 8

Mirriam Maseko	Team Supervisor
Austrida Mbepula	Interviewer 1
Charles Phiri	Interviewer 2
Esther Nagoli	Interviewer 3
Elizabeth Nankhumwa	Interviewer 4
Friedah Bandawe	Biomarker 1
Eric Chirwa	Biomarker 2
Billion Mwale	Driver
John Manda	Driver

Fieldwork Team 9

Rose Jimusole	Supervisor
Chikondi Maonga	Interviewer 1
Annie Chaura Zoya	Interviewer 2
Beatrice Kamwendo	Interviewer 3
George Seda	Biomarker 1
Symon Utila	Biomarker 2
Davie Simkoko	Biomarker 3
Macleen Kabutsa	Driver
Robert Mussa	Driver

Fieldwork Team 10

Kupatsa Chigona	Supervisor
Regina Juwa	Interviewer 1
Gettrude Namuthuwa	Interviewer 2
Losta Moyo	Interviewer 3
Wisdom Mkali	Interviewer 4
Divason Banda	Biomarker 1
Steve Kunyenga	Biomarker 2
Tionge Banda	Driver
Frank Malunga	Driver

Report Writing Team

Dr Michael Kayange	NMCP
Dr Sosten Lankhulani	NMCP
Austin Gumbo	NMCP
Gracious Hamuza	NMCP
Godfrey Silungwe	NMCP
Shadreck Mulenga	NMCP
Agnes Mapala Banda	Mzimba South DHO
Kingsley Manda	NSO
Atusaye Mwambyale	NSO
Chisomo Singano	NSO
John Kapalamula	NSO
James Chirombo	Welcome Trust
Collins Kwizombe	PMI
Amos Maenje	PHIM
Charles Bwetule	NSO
Alfred Kangunda	OPC
James Njaliwa	MoH
Jeremia Chikuse	NMCP
Kenneth Manda	NMCP
Laurent Chirwa	NMCP

QUESTIONNAIRES

APPENDIX E

FORMATTING DATE: 13 Jan 2021
ENGLISH LANGUAGE: 13 Jan 2021

2021 MALARIA INDICATOR SURVEY

MODEL HOUSEHOLD QUESTIONNAIRE

MALAWI

MINISTRY OF HEALT **NATIONAL MALARIA CONTROL PROGRAM**

IDENTIFICATION (1)

PLACE NAME _____

NAME OF HOUSEHOLD HEAD _____

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

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

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	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 INTERVIEW**	NATIVE LANGUAGE OF RESPONDENT**	TRANSLATOR USED (YES = 1, NO = 2)
0 1	[ ][ ]	[ ][ ]	[ ]

LANGUAGE OF QUESTIONNAIRE** **ENGLISH**

**LANGUAGE CODES:

01 ENGLISH	03 TUMBUKA
02 CHICHEWA	04 OTHERS _____ (SPECIFY)

TEAM	TEAM SUPERVISOR		CAPI SUPERVISOR (2)	
[ ][ ]	_____	[ ][ ][ ][ ]	_____	[ ][ ][ ][ ]
NUMBER	NAME	NUMBER	NAME	NUMBER

INTRODUCTION AND CONSENT

(3)

Hello. My name is _____. I am working with the Ministry of Health. We are conducting a survey about health all over Malawi. The information we collect will help the government to plan health services. Your household was selected for the survey. I would like to ask you some questions about your household. The questions usually take about 15 to 20 minutes. All of the answers you give will be confidential and will not be shared with anyone other than members of our survey team. You don't have to be in the survey, but we hope you will agree to answer the questions since your views are important. If I ask you any question you don't want to answer, just let me know and I will go on to the next question or you can stop the interview at any time. In case you need more information about the survey, you may contact the person listed on this card.

GIVE CARD WITH CONTACT INFORMATION

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 ASKING QUESTIONS 2-7 FOR EACH PERSON ASK QUESTIONS 2A-2C TO BE SURE THAT THE LISTING IS COMPLETE.	What is the relationship of (NAME) to the head of the household? SEE CODES BELOW.	Is (NAME) male or female? M F	Does (NAME) usually live here? Y N	Did (NAME) stay here last night? Y N	How old is (NAME)? IF 95 OR MORE, RECORD '95'. IN YEARS	CIRCLE LINE NUMBER OF ALL WOMEN AGE 15-49	CIRCLE LINE NUMBER OF ALL CHILDREN AGE 0-5
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	07 = PARENT-IN-LAW
02 = WIFE OR HUSBAND	08 = BROTHER OR SISTER
03 = SON OR DAUGHTER	09 = OTHER RELATIVE
04 = SON-IN-LAW OR DAUGHTER-IN-LAW	10 = ADOPTED/FOSTER/ STEPCHILD
05 = GRANDCHILD	11 = NOT RELATED
06 = PARENT	98 = DON'T KNOW

HOUSEHOLD CHARACTERISTICS

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES		SKIP
101	What is the main source of drinking water for members of your household?	**PIPED WATER**		
		PIPED INTO DWELLING	11	
		PIPED TO YARD/PLOT	12	→ 105
		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	→ 103
		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 _____ (SPECIFY)	96	→ 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	→ 105
		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 _____ (SPECIFY)	96	
103	Where is that water source located?	IN OWN DWELLING	1	→ 105
		IN OWN YARD/PLOT	2	
		ELSEWHERE	3	
104	How long does it take to go there, get water, and come back?	MINUTES	___	
		DON'T KNOW	998	
105	What kind of toilet facility do members of your household usually use?	**FLUSH OR POUR FLUSH TOILET**		
		FLUSH TO PIPED SEWER SYSTEM	11	
		FLUSH TO SEPTIC TANK	12	
		FLUSH TO PIT LATRINE	13	
		FLUSH TO SOMEWHERE ELSE	14	
	IF NOT POSSIBLE TO DETERMINE, ASK PERMISSION TO OBSERVE THE FACILITY.	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	→ 108
		OTHER _____ (SPECIFY)	96	

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 (LIQUIFIED PET . . . . . 02 NATURAL GAS . . . . . 03 PIOGAS . . . . . 04 KEROSENE . . . . . 05 COAL, LIGNITE . . . . . 06 CHARCOL . . . . 07 WOOD . . . . . 08 STRW/SHRUBS/GRASS . . . . . 09 AGRICULTURAL CROP RESIDUE . . . . . 10 ANIMAL DUNG . . . . . 11 NO FOOD COOKED IN HOUSEHOLD . . . . . 95 OTHER _____ 96 (SPECIFY)	
109	How many rooms in the household are used for sleeping?	ROOMS	
109A	How many separate rooms are in this household?	ROOMS	
109B	How many separate sleeping spaces are there in your household?	ROOMS	
110	Does the household own any livestock, herds, other farm animals, or poultry?	YES . . . . . 1 NO . . . . . 2 → 112	
111	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	
112	Does any member of this household own any agricultural land?	YES . . . . . 1 NO . . . . . 2 → 114	
113	How many hectares of agricultural land do members of this household own?	HECTARES . . . . . 1 .	
	1 ACRE = 0.4 HECTARE	FOOTBALL PITCH . . . . . 2 .	
	1 FOOTBALL PITCH = 2.5 ACRE		
	IF 95 OR MORE HECTARES, CIRCLE '950'.	ACRES . . . . . 3 .	
	IF 95 OR MORE FOOTBALL PITCH, CIRCLE '950'.	95 OR MORE HECTARES 950	
	IF 95 OR MORE ACRES, RECORD IN HECTARES.	DON'T KNOW 998	

114	Does your household have:			YES	NO	
	a) Electricity?	a) ELECTRICITY	1	2		
	b) A radio?	b) RADIO	1	2		
	c) A television?	c) TELEVISION	1	2		
	d) A non-mobile telephone?	d) NON-MOBILE TELEPHONE . .	1	2		
	e) A computer/Tablet computer?	e) COMPUTER	1	2		
	f) A refrigerator?	f) REFRIGERATOR	1	2		
	g) A koloboyi?	g) KOLOBOYI	1	2		
	h) A paraffin lamp?	h) PARAFFIN LAMP	1	2		
	i) A bed with a matress?	i) BED WITH MATRESS	1	2		
	j) A torch?	j) TORCH	1	2		
	k) A sofa set?	k) SOFA SET	1	2		
115	Does any member of this household own:			YES	NO	
	a) A watch?	a) WATCH	1	2		
	b) A mobile phone?	b) MOBILE PHONE	1	2		
	c) A bicycle?	c) BICYCLE	1	2		
	d) A motorcycle or motor scooter?	d) MOTORCYCLE/SCOOTER . .	1	2		
	e) An animal-drawn cart?	e) ANIMAL-DRAWN CART	1	2		
	f) A car or truck?	f) CAR/TRUCK	1	2		
	g) A boat with a motor?	g) BOAT WITH MOTOR	1	2		
116	Does any member of this household have an account in a bank or other financial institution such as airtel, mpamba?	YES		1		
		NO		2		
117	At any time in the past 12 months, has anyone come into your dwelling to spray the interior walls against mosquitoes?	YES		1		
		NO		2	→	119
		Don't know		98	→	119
118	Who sprayed the dwelling?	GOVERNMENT WORKER/PROGRAM		A		
		PRIVATE COMPANY		B		
		NONGOVERNMENTAL ORGANIZATION (NGO)		C		
		OTHER _____ (SPECIFY)		X		
		DON'T KNOW		Z		
119	Does your household have any mosquito nets?	YES		1		
		NO		2	→	121
120	How many mosquito nets does your household have? IF 7 OR MORE NETS, RECORD '7'.	NUMBER OF NETS				

	MOSQUITO NETS	NET #1	NET #2	NET #3
121	ASK THE RESPONDENT TO SHOW YOU ALL THE NETS IN THE HOUSEHOLD IF MORE THAN 3 NETS, USE ADDITIONAL QUESTIONNAIRE(S).	OBSERVED HANGING ... 1 OBSERVED NOT HANGING/ PACKAGED ... 2 NOT OBSERVED ... 3	OBSERVED HANGING ... 1 OBSERVED NOT HANGING/ PACKAGED ... 2 NOT OBSERVED ... 3	OBSERVED HANGING ... 1 OBSERVED NOT HANGING/ PACKAGED ... 2 NOT OBSERVED ... 3
121A	OBSERVE (OR ASK ABOUT) THE CONDITION OF THE MOSQUITO NET: DOES THE NET HAVE HOLES IN IT (HOLES THE SIZE OF THE TIP OF YOUR THUMB OR LARGER)?	YES ... 1 NO ... 2	YES ... 1 NO ... 2	YES ... 1 NO ... 2
121B	OBSERVE (OR ASK) THE COLOR OF THE MOSQUITO NET.	GREEN ... 01 DARK BLUE ... 02 LIGHT BLUE ... 03 RED ... 04 BLACK ... 05 WHITE ... 06 OTHER ... 96	GREEN ... 01 DARK BLUE ... 02 LIGHT BLUE ... 03 RED ... 04 BLACK ... 05 WHITE ... 06 OTHER ... 96	GREEN ... 01 DARK BLUE ... 02 LIGHT BLUE ... 03 RED ... 04 BLACK ... 05 WHITE ... 06 OTHER ... 96
121C	OBSERVE (OR ASK) THE SHAPE OF THE MOSQUITO NET.	CONICAL ... 1 RECTANGLE ... 2 (SKIP TO 122) OTHER ... 6	CONICAL ... 1 RECTANGLE ... 2 (SKIP TO 122) OTHER ... 6	CONICAL ... 1 RECTANGLE ... 2 (SKIP TO 122) OTHER ... 6
121D	Was this net altered to become a conical?	YES ... 1 NO ... 2 (SKIP TO 122) NOT SURE ... 6	YES ... 1 NO ... 2 (SKIP TO 122) NOT SURE ... 6	YES ... 1 NO ... 2 (SKIP TO 122) NOT SURE ... 6
121E	How many nets were used to make the mosquito net conical?	ONE NET ... 1 TWO NETS ... 2 THREE OR MORE ... 3	ONE NET ... 1 TWO NETS ... 2 THREE OR MORE ... 3	ONE NET ... 1 TWO NETS ... 2 THREE OR MORE ... 3
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)** DAWAPLUS ... 11 DURANET ... 12 INTERCEPTOR ... 13 LIFENET ... 14 MAGNET ... 15 OLYSET ... 16 OLYSET PLUS ... 17 PERMANET 2.0 ... 18 PERMANET 3.0 ... 19 ROYAL SENTRY ... 20 YORKOOL ... 21 OTHER/DON'T KNOW BRAND ... 26 **OTHER TYPE** ... 96 DON'T KNOW TYPE ... 98	**LONG-LASTING INSECTICIDE-TREATED NET (LLIN)** DAWAPLUS ... 11 DURANET ... 12 INTERCEPTOR ... 13 LIFENET ... 14 MAGNET ... 15 OLYSET ... 16 OLYSET PLUS ... 17 PERMANET 2.0 ... 18 PERMANET 3.0 ... 19 ROYAL SENTRY ... 20 YORKOOL ... 21 OTHER/DON'T KNOW BRAND ... 26 **OTHER TYPE** ... 96 DON'T KNOW TYPE ... 98	**LONG-LASTING INSECTICIDE-TREATED NET (LLIN)** DAWAPLUS ... 11 DURANET ... 12 INTERCEPTOR ... 13 LIFENET ... 14 MAGNET ... 15 OLYSET ... 16 OLYSET PLUS ... 17 PERMANET 2.0 ... 18 PERMANET 3.0 ... 19 ROYAL SENTRY ... 20 YORKOOL ... 21 OTHER/DON'T KNOW BRAND ... 26 **OTHER TYPE** ... 96 DON'T KNOW TYPE ... 98

		NET #1	NET #2	NET #3
124	Did you get the net throughthe 2018 mass distribution campaign, during an antenatal care visit, at birth, or first immunization visit	YES, 2018 MASS CAMPAIGN 1 YES, ANC 2 YES, AT BIRTH .... 3 YES IMMUNIZATION VISIT 4 (SKIP TO 126) NO 5	YES, 2018 MASS CAMPAIGN 1 YES, ANC 2 YES, AT BIRTH .... 3 YES IMMUNIZATION VISIT 4 (SKIP TO 126) NO 5	YES, 2018 MASS CAMPAIGN 1 YES, ANC 2 YES, AT BIRTH .... 3 YES IMMUNIZATION VISIT 4 (SKIP TO 126) NO 5
125	Where did you get the net?	GOVERNMENT HOSPITAL 01 GOVERNMENT HEALTH CENTER 02 GOVERNMENT HEALTH POST/OUTREACH 03 CHAM/MISSION 04 PRIVATE HEALTH FACILITY 05 PHARMACY .... 06 SHOPMARKET .... 07 WORKPLACE .... 08 OTHER ______ 96 (SPECIFY) DON'T KNOW 98	GOVERNMENT HOSPITAL 01 GOVERNMENT HEALTH CENTER 02 GOVERNMENT HEALTH POST/OUTREACH 03 CHAM/MISSION 04 PRIVATE HEALTH FACILITY 05 PHARMACY ..... 06 SHOPMARKET ..... 07 WORKPLACE ..... 08 OTHER ______ 96 (SPECIFY) DON'T KNOW 98	GOVERNMENT HOSPITAL 01 GOVERNMENT HEALTH CENTER 02 GOVERNMENT HEALTH POST/OUTREACH 03 CHAM/MISSION 04 PRIVATE HEALTH FACILITY 05 PHARMACY .... 06 SHOPMARKET .... 07 WORKPLACE .... 08 OTHER ______ 96 (SPECIFY) DON'T KNOW 98
126	Did anyone sleep under this mosquito net last night?	YES .... 1 NO .... 2 (SKIP TO 128A) NOT SURE 8	YES .... 1 NO .... 2 (SKIP TO 128A) NOT SURE 8	YES .... 1 NO .... 2 (SKIP TO 128A) NOT SURE 8
127	Who slept under this mosquito net last last night? RECORD THE PERSON'S NAME AND LINE NUMBER FROM THE HOUSEHOLD SCHEDULE.	NAME______ LINE NO. .... [ ][ ] NAME______ LINE NO. .... [ ][ ] NAME______ LINE NO. .... [ ][ ] NAME______ LINE NO. .... [ ][ ]	NAME______ LINE NO. .... [ ][ ] NAME______ LINE NO. .... [ ][ ] NAME______ LINE NO. .... [ ][ ] NAME______ LINE NO. .... [ ][ ]	NAME______ LINE NO. .... [ ][ ] NAME______ LINE NO. .... [ ][ ] NAME______ LINE NO. .... [ ][ ] NAME______ LINE NO. .... [ ][ ]

128A	ANY CHILDREN UNDER AGE 5 OR OLDER WHO DID NOT SLEEP UNDER A MOSQUITO NET YES [ ] NO [ ] → 129 NAME OF CHILD(REN): ______ ______ NAME OF OLDER: ______ ______	129
128B	Why did (NAME OF CHILD) (and (NAME OF OLDER)) not sleep under a mosquito net last night? Any other reason? RECORD ALL MENTIONED.	TOO HOT .... A TOO COLD .... B CHILD CRIES .... C CHILD AFRAID .... D NOT ENOUGH NET .... E NET NOT HUNG UP .... F USED BY ADULTS .... G NET NOT USED WHEN TRAVELING .... H NET NOT IN GOOD CONDITION .... I NET BAD FOR CHILDREN'S HEALTH .... J BEDBUGS .... K OTHER ______ X (SPECIFY)

		NET #1	NET #2	NET #3
129		NEXT NET; OR, IF NO MORE NETS, GO TO 130.	NEXT NET; OR, IF NO MORE NETS, GO TO 130.	COLUMN OF A NEW QUESTIONNAIRE; OR, IF NO MORE NETS, GO TO 130.

ADDITIONAL HOUSEHOLD CHARACTERISTICS

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
130 (5)	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)	
131 (5)	OBSERVE MAIN MATERIAL OF THE ROOF OF THE DWELLING. RECORD OBSERVATION.	**NATURAL ROOFING** NO ROOF . . . . . 11 THATCH/PALM LEAF . . . . . 12 SOD . . . . . 13 **RUDIMENTARY ROOFING** RUSTIC MAT . . . . . 21 PALM/BAMBOO . . . . . 22 WOOD PLANKS . . . . . 23 CARDBOARD . . . . . 24 **FINISHED ROOFING** METAL . . . . . 31 WOOD . . . . . 32 CALAMINE/CEMENT FIBER . . . . . 33 CERAMIC TILES . . . . . 34 CEMENT . . . . . 35 ROOFING SHINGLES . . . . . 36 OTHER _____ 96 (SPECIFY)	
132 (5)	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)	

ADDITIONAL MOSQUITO NETS RELATED QUESTIONS

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES		SKIP
133	Has anyone in your household ever sold or given away a mosquito net?	YES	1	
		NO	2	
		DON'T KNOW	8	
134	If you have a choice , what color of mosquito net do you prefer?	BLUE	1	
		GREEN	2	
		RED	3	
		WHITE	4	
		BLACK	5	
		OTHER _____ (SPECIFY)	6	
		DON'T KNOW/NO PREFERENCE	8	
135	If you have a choice , what shap of mosquito net do you prefer?	CONICAL	1	
		RECTANGULAR	2	→ 137
		DON'T KNOW/NO PREFERENCE	8	→ 138
136	What are the reasons why you prefer a conical-shaped net over a rectangular-shaped net?	EASIER TO HANG	A	
		EASIER TO STORE WHEN NOT HANGED	B	
		EASIER TO TRAVEL WITH OUTSIDE THE HOUSEHOLD	C	
		BETTER FIT AROUND SLEEPING PLACE	D	
		TALLER	E	→ 138
		MORE PEOPLE CAN SLEEP UNDER NET (WIDER)	F	
		LOOKS NICER	G	
		STRONGER	H	
		OTHER _____ (SPECIFY)	X	
137	What are the reasons why you prefer a rectangular-shaped net over a conical-shaped net?	EASIER TO HANG	A	
		EASIER TO STORE WHEN NOT HANGED	B	
		EASIER TO TRAVEL WITH OUTSIDE THE HOUSEHOLD	C	
		BETTER FIT AROUND SLEEPING PLACE	D	
		TALLER	E	
		MORE PEOPLE CAN SLEEP UNDER NET (WIDER)	F	
		LOOKS NICER	G	
		STRONGER	H	
		OTHER _____ (SPECIFY)	X	
138	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

FORMATTING DATE: 19-Jan-21
ENGLISH LANGUAGE: 19 Jan 2021

MALARIA INDICATOR SURVEY

MODEL BIOMARKER QUESTIONNAIRE

MALAWI

MINISTRY OF HEALTH — NATIONAL MALARIA CONTROL PROGRAM

IDENTIFICATION

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

LANGUAGE OF QUESTIONNAIRE** **ENGLISH**

**LANGUAGE CODES:

01 ENGLISH
02 CHICHEWA
03 TUMBUKA
04 OTHER _____ (SPECIFY)

TEAM NUMBER [ ][ ]

TEAM SUPERVISOR NAME _____ NUMBER [ ][ ][ ][ ]

HEMOGLOBIN MEASUREMENT AND MALARIA TESTING FOR CHILDREN AGE 0-5

101 CHECK COLUMN 9 IN HOUSEHOLD SCHEDULE. RECORD THE LINE NUMBER AND NAME FOR ALL ELIGIBLE CHILDREN 0-5 YEARS IN QUESTION 102. IF MORE THAN SIX CHILDREN, USE ADDITIONAL QUESTIONNAIRE(S).

		CHILD 1	CHILD 2	CHILD 3
102	CHECK HOUSEHOLD QUESTIONNAIRE LINE NUMBER 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 birth date?	DAY ..... ☐☐ MONTH ..... ☐☐ YEAR ☐☐☐☐	DAY ..... ☐☐ MONTH ..... ☐☐ YEAR ☐☐☐☐	DAY ..... ☐☐ MONTH ..... ☐☐ YEAR ☐☐☐☐
104	CHECK 103: CHILD BORN IN 2015-2020	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	NAME OF PARENT/OTHER ADULT RESPONSIBLE FOR THE CHILD	NAME _____	NAME _____	NAME _____
107	ASK CONSENT FOR ANEMIA TEST FROM PARENT/OTHER ADULT IDENTIFIED IN 106 AS RESPONSIBLE FOR CHILD.	As part of this survey, we are asking children all over the country to take an **anemia** test. Anemia is a serious health problem that usually results from poor nutrition, infection, or chronic disease. This survey will assist the government to develop programs to prevent and treat anemia. We ask that all children born in 2015 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 to the test, or you can say no. It is up to you to decide. Will you allow (NAME OF CHILD) to participate in the anemia test?		
108	CIRCLE THE APPROPRIATE 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 CHILDREN AGE 0-5

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

109	ASK CONSENT FOR MALARIA TEST FROM PARENT/OTHER ADULT IDENTIFIED IN 106 AS RESPONSIBLE FOR CHILD.	As part of this survey, we are asking that children all over the country take a test to see if they have **malaria**. Malaria is a serious illness caused by a parasite transmitted by a mosquito bite. This survey will help the government to develop programs to prevent malaria. We ask that all children born in 2015 or later take part in malaria 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. (We will use blood from the same finger prick made for the anemia test). One blood drop will be tested for malaria immediately, and the result will be told to you right away. A few blood drops will be collected on a slide and taken to a laboratory for testing. You will not be told the results of the laboratory testing. All results will be kept strictly confidential and will not be shared with anyone other than members of our survey team. Do you have any questions? You can say yes to the test, or you can say no. It is up to you to decide. Will you allow (NAME OF CHILD) to participate in the malaria testing?		
110	CIRCLE THE APPROPRIATE CODE AND SIGN YOUR NAME.	GRANTED .... 1 (SIGN AND ENTER YOUR FIELDWORKER NUMBER) REFUSED .... 2 NOT PRESENT OTHER 3	GRANTED .... 1 (SIGN AND ENTER YOUR FIELDWORKER NUMBER) REFUSED .... 2 NOT PRESENT OTHER 3	GRANTED .... 1 (SIGN AND ENTER YOUR FIELDWORKER NUMBER) REFUSED .... 2 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	PLACE BAR CODE LABEL FOR MALARIA LAB TEST	PUT THE 1ST BAR CODE LABEL HERE. NOT PRESENT 99994 REFUSED .... 99995 OTHER .... 99996 PUT THE 2ND BAR CODE ON THE RDT. THE 3RD ON THE THICK SMEARSLIDE. THE 4TH ON THETHIN SMEAR SLIDE AND THE 5TH ON THE TRANSMITTAL FORM.	PUT THE 1ST BAR CODE LABEL HERE. NOT PRESENT 99994 REFUSED ..... 99995 OTHER .... 99996 PUT THE 2ND BAR CODE ON THE RDT. THE 3RD ON THE THICK SMEARSLIDE. THE 4TH ON THETHIN SMEAR SLIDE AND THE 5TH ON THE TRANSMITTAL FORM.	PUT THE 1ST BAR CODE LABEL HERE. NOT PRESENT 99994 REFUSED .... 99995 OTHER .... 99996 PUT THE 2ND BAR CODE ON THE RDT. THE 3RD ON THE THICK SMEARSLIDE. THE 4TH ON THETHIN SMEAR SLIDE AND THE 5TH 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	RECORD RESULT CODE OF 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 PAMPHLET.	POSITIVE Pf .... 1 POSITIVE PAN ..... 2 POSITIVE Pf and PAN 3 (SKIP TO 118) NEGATIVE .... 4 OTHER 6	POSITIVE Pf .... 1 POSITIVE PAN .... 2 POSITIVE Pf and PAN 3 (SKIP TO 118) NEGATIVE .... 4 OTHER 6	POSITIVE Pf .... 1 POSITIVE PAN .... 2 POSITIVE Pf and PAN 3 (SKIP TO 118) NEGATIVE .... 4 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 8.0 G/DL, SEVERE ANEMIA 1 8.0 G/DL OR ABOVE 2 NOT PRESENT . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)	BELOW 8.0 G/DL, SEVERE ANEMIA 1 8.0 G/DL OR ABOVE 2 NOT PRESENT . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)	BELOW 8.0 G/DL, SEVERE ANEMIA 1 8.0 G/DL OR ABOVE 2 NOT PRESENT . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)
117	**SEVERE ANEMIA REFERRAL** STATEMENT 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	Does (NAME) suffer from any of following illnesses or symptoms:	YES NO	YES NO	YES NO
	a) Extreme weakness (Prostration)?	a) EXTREME WEAKNESS 1 2	a) EXTREME WEAKNESS 1	a) EXTREME WEAKNESS 1 2
	b) Heart problems?	b) HEART PROBLEMS 1 2	b) HEART PROBLEMS 1	b) HEART PROBLEMS 1 2
	c) Loss of consciousness?	c) LOSS OF CONSCIOUSNESS 1 2	c) LOSS OF CONSCIOUSNESS 1	c) LOSS OF CONSCIOUSNESS 1 2
	d) Rapid or difficult breathing?	d) RAPID BREATHING 1 2	d) RAPID BREATHING 1	d) RAPID BREATHING 1 2
	e) Seizures?	e) SEIZURES 1 2	e) SEIZURES 1	e) SEIZURES 1 2
	f) Abnormal bleeding?	f) BLEEDING 1 2	f) BLEEDING 1	f) BLEEDING 1 2
	g) Jaundice (Yellow Skin)?	g) JAUNDICE 1 2	g) JAUNDICE 1	g) JAUNDICE 1 2
	h) Dark urine (brown)?	h) DARK URINE 1 2	h) DARK URINE 1	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 8.0 G/DL, SEVERE ANEMIA 1 (SKIP TO 122) 8.0 G/DL OR ABOVE 2 NOT PRESENT . . . . 4 REFUSED . . . . 5 OTHER 6	BELOW 8.0 G/DL, SEVERE ANEMIA 1 (SKIP TO 122) 8.0 G/DL OR ABOVE 2 NOT PRESENT . . . . 4 REFUSED . . . . 5 OTHER 6	BELOW 8.0 G/DL, SEVERE ANEMIA 1 (SKIP TO 122) 8.0 G/DL OR ABOVE 2 NOT PRESENT . . . . 4 REFUSED . . . . 5 OTHER 6
121	In the past two weeks has (NAME) taken or is taking LA given by a doctor or health center (Not Needed) 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)

No.	Question	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 taken to a health facility right away. SKIP TO 128		
223	**ALREADY TAKING LA REFERRAL** STATEMENT	You have told me that (NAME OF CHILD) has already received medication for malaria. Therefore, I cannot give you additional medication. However, the test shows that he/she is positive for malaria. If your child has a fever for two days after the last dose of medication, you should take the child to the nearest health facility for further examination. SKIP TO 130		
124	READ INFORMATION FOR MALARIA TREATMENT AND CONSENT STATEMENT TO PARENT OR OTHER ADULT RESPONSIBLE FOR THE CHILD	The malaria test shows that your child has malaria. We can give you free medicine. The medicine is called Arthemether-Lumefantrine or LA. LA is very effective and in a few days it should get rid of the fever and other symptoms. You 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 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 MEDICATION 1 REFUSED . . . . 2 SKIP TO 130 OTHER 6	ACCEPTED MEDICATION 1 REFUSED . . . . 2 SKIP TO 130 OTHER 6	ACCEPTED MEDICATION 1 REFUSED . . . . 2 SKIP TO 130 OTHER 6
127	READ INFORMATION FOR MALARIA TREATMENT AND CONSENT STATEMENT TO PARENT/OTHER ALDULT RESPONSIBLE FOR THE CHILD	**TREATMENT WITH ARTEMETHER-LUMEFANTRINE - (A-20MG TABLET/L-120MG TABLET)** **Weight (in kg) - Approximate age** / **Dosage** ≤14.9kg (under 3 years) — 1 tablet LA in AM - 1 tablet in PM daily for 3 days 15kg - <24.9kg (age 3-5 years) — 2 tablets LA in AM - 2 tablets LA in PM daily for 3 days Give the child one or two tablets twice a day for three consucutive days. Take the medicine with fatty food or drink like milk. The smaller children, put the 4tablet in a little water and dissolve/mix well, and give to the child. If your child vomits within an hour of taking ALSO TELL THE PARENT/OTHER ADULT RESPONSIBLE FOR THE CHILD If (NAME OF CHILD) has any of the following symptoms, you bshould take him/her to a health professional for further assessment and treatment right away: - A high temperature of fever - Fast or difficulty breathing - Not able to drink of bereastfeed - Gets sicker or does not get better in two days SKIP TO 130		
128	CHECK 113 HEMOGLOBIN RESULT	BELOW 8.0 G/DL, SEVERE ANEMIA 1 8.0 G/DL OR ABOVE 2 NOT PRESENT . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)	BELOW 8.0 G/DL, SEVERE ANEMIA 1 8.0 G/DL OR ABOVE 2 NOT PRESENT . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)	BELOW 8.0 G/DL, SEVERE ANEMIA 1 8.0 G/DL OR ABOVE 2 NOT PRESENT . . . . 3 REFUSED . . . . 4 OTHER . . . . 6 (SKIP TO 130)
129	**SEVERE ANEMIA REFERRAL** RECORD THE RESULT OF THE ANEMIA TEST ON THE REFERRAL FORM	The anemia test shows that (NAME OF CHILD) has severe anemia. Your child also has symptoms of severe malaria. 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

FORMATTING DATE: 17 Jan 2021
ENGLISH LANGUAGE: 17 Jan 2021

2021 MALARIA INDICATOR SURVEY

MODEL WOMAN'S QUESTIONNAIRE

MALAWI

MINISTRY OF HEALTH — NATIONAL MALARIA CONTROL PROGRAM

IDENTIFICATION (1)

PLACE NAME _____

NAME OF HOUSEHOLD HEAD _____

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

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

NAME AND LINE NUMBER OF WOMAN _____ [ ][ ]

INTERVIEWER VISITS

	1	2	3	FINAL VISIT
DATE				DAY [ ][ ]
				MONTH [ ][ ]
				YEAR 2021
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** 01 — LANGUAGE OF INTERVIEW** [ ][ ] — NATIVE LANGUAGE OF RESPONDENT** [ ][ ] — TRANSLATOR USED (YES = 1, NO = 2) [ ]

LANGUAGE OF QUESTIONNAIRE** ENGLISH

**LANGUAGE CODES:
01 ENGLISH; 02 CHICHEWA; 03 CHITUMBUKA; 04 OTHERS _____ (SPECIFY)

TEAM NUMBER [ ][ ]

TEAM SUPERVISOR NAME _____ NUMBER [ ][ ][ ][ ]

SECTION 1: RESPONDENT BACKGROUND

INTRODUCTION AND CONSENT

INFORMED CONSENT

Hello. My name is _____. I am working with the Minsitry of Health. We are conducting a survey about health all over Malawi. The information we collect will help the government to plan health services. Your household was selected for the survey. The questions usually take about 10-20 minutes. All of the answers you give will be confidential and will not be shared with anyone other than members of our survey team. You don't have to be in the survey, but we hope you will agree to answer the questions since your views are important. If I ask you any question you don't want to answer, just let me know and I will go on to the next question or you can stop the interview at any time.

In case you need more information about the survey, you may contact the person listed on 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	
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 _____ (SPECIFY LANGUAGE) 4 BLIND/VISUALLY IMPAIRED 5	
109	What is your religion?	CATHOLIC . . . . . 01 CCAP . . . . . 02 ANGLICAN . . . . . 03 SEVENTH DAY ADVENT/BAPTIST . . . . . 04 OTHER CHRISTIAN . . . . . 05 MUSLIM 06	

SECTION 2. REPRODUCTION

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
201	Now I would like to ask about all the births you have had during your life. Have you ever given birth?	YES . . . . . 1 NO 2	→ 206
202	Do you have any sons or daughters to whom you have given birth who are now living with you?	YES . . . . . 1 NO 2	→ 204
203	a) How many sons live with you? b) And how many daughters live with you? IF NONE, RECORD '00'.	a) SONS AT HOME . . . . . [ ][ ] b) DAUGHTERS AT HOME . . . . . [ ][ ]	
204	Do you have any sons or daughters to whom you have given birth who are alive but do not live with you?	YES . . . . . 1 NO 2	→ 206
205	a) How many sons are alive but do not live with you? b) And how many daughters are alive but do not live with you? IF NONE, RECORD '00'.	a) SONS ELSEWHERE . . . . . [ ][ ] b) DAUGHTERS ELSEWHERE . . . . . [ ][ ]	
206	Have you ever given birth to a boy or girl who was born alive but later died? IF NO, PROBE: Any baby who cried, who made any movement, sound, or effort to breathe, or who showed any other signs of life even if for a very short time?	YES . . . . . 1 NO 2	→ 208
207	a) How many boys have died? b) And how many girls have died? IF NONE, RECORD '00'.	a) BOYS DEAD . . . . . [ ][ ] b) GIRLS DEAD . . . . . [ ][ ]	
208	SUM ANSWERS TO 203, 205, AND 207, AND ENTER TOTAL. IF NONE, RECORD '00'.	TOTAL LIVE 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 2015-2020? RECORD NUMBER OF LIVE BIRTHS IN 2016-2021.	TOTAL IN 2016-2021 . . . . . [ ][ ] NONE 00	→ 225

SECTION 2. REPRODUCTION

212 Now I would like to record the names of all your births in 2016-2021, whether still alive or not, starting with the most recent one you had.
RECORD IN 213 THE NAMES OF ALL THE BIRTHS BORN IN 2016-2021. RECORD TWINS AND TRIPLETS ON SEPARATE ROWS. IF THERE ARE MORE THAN 5 BIRTHS, USE AN ADDITIONAL QUESTIONNAIRE STARTING WITH THE SECOND ROW.

213	214	215	216	217	218	219	220	221
What name was given to your (most recent/ previous) baby? RECORD NAME. BIRTH HISTORY NUMBER.	Is (NAME) a boy or a girl?	Was that a single or multiple pregnancy?	On what day, month, and year was (NAME) born?	Is (NAME) still alive?	IF ALIVE: How old was (NAME) at (NAME)'s last birthday? RECORD AGE IN COMP-LETED YEARS.	IF ALIVE: Is (NAME) living with you?	IF ALIVE: RECORD HOUSEHOLD LINE NUMBER OF CHILD. RECORD '00' IF CHILD NOT LISTED IN HOUSEHOLD.	Were there any other live births between (NAME) and (NAME OF PREVIOUS BIRTH), including any children who died after birth?
01	BOY 1 GIRL 2	SING 1 MULT 2	DAY MONTH YEAR	YES 1 NO 2 → (NEXT BIRTH)	AGE IN YEARS	YES 1 NO 2	HOUSEHOLD LINE NUMBER → (NEXT BIRTH)	
02	BOY 1 GIRL 2	SING 1 MULT 2	DAY MONTH YEAR	YES 1 NO 2 → (SKIP TO 221)	AGE IN YEARS	YES 1 NO 2	HOUSEHOLD LINE NUMBER	YES 1 (ADD BIRTH) NO 2 (NEXT BIRTH)
03	BOY 1 GIRL 2	SING 1 MULT 2	DAY MONTH YEAR	YES 1 NO 2 → (SKIP TO 221)	AGE IN YEARS	YES 1 NO 2	HOUSEHOLD LINE NUMBER	YES 1 (ADD BIRTH) NO 2 (NEXT BIRTH)
04	BOY 1 GIRL 2	SING 1 MULT 2	DAY MONTH YEAR	YES 1 NO 2 → (SKIP TO 221)	AGE IN YEARS	YES 1 NO 2	HOUSEHOLD LINE NUMBER	YES 1 (ADD BIRTH) NO . . . . . 2 (NEXT BIRTH)
05	BOY 1 GIRL 2	SING 1 MULT 2	DAY MONTH YEAR	YES 1 NO 2 → (SKIP TO 221)	AGE IN YEARS	YES 1 NO 2	HOUSEHOLD LINE NUMBER	YES 1 (ADD BIRTH) NO . . . . . 2 (NEXT BIRTH)

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 THE SAME NUMBERS ARE DIFFERENT (PROBE AND RECONCILE)	
224	CHECK 218 ENTER THE NUMBER OF BIRTHS IN 2016-2021	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	CHECK 224 ONE OR MORE BIRTHS IN 2016-2021 (GO TO 301)	NO BIRTHS IN 2016-2021 Q 224 IS BLANK	→ 501 → 501

SECTION 3. PREGNANCY AND INTERMITTENT PREVENTIVE TREA+A1:AQ66TMENT

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. While you were pregnant with (NAME), did you see anyone for antenatal care for this pregnancy?	YES . . . . . 1 NO 2	→ 304
303	Whom did you see? Anyone else? PROBE TO IDENTIFY EACH TYPE OF PERSON AND RECORD ALL MENTIONED.	**HEALTH PERSONNEL** DOCTOR/OFFICER/MEDICAL ASSISTANT . . . . . A NURSE/MIDWIFE . . . . . B PATIENT ATTENDANT . . . . . C H.A.S. . . . . D **OTHER PERSON** TRADITIONAL BIRTH ATTENDANT . . . . . E OTHER _____ X (SPECIFY)	

SECTION 3. PREGNANCY AND INTERMITTENT PREVENTIVE TREA+A1:AQ66TMENT

304	During this pregnancy, did you take SP/Fansidar OR NOVIDA SP to keep you from getting malaria?	YES . . . . . 1 NO . . . . . 2 DON'T KNOW 8	→ 306D
305	How many times did you take SP/Fansidar OR NOVIDA SP during this pregnancy?	TIMES . . . . . ☐☐	
306	Did you get the SP/Fansidar OR NOVIDA SP 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	→ 306D
306A	How many times did you take SP/Fansidar OR NOVIDA SP during an antenatal care visit?	TIMES . . . . . ☐☐	
306B	Did you take the SP/Fansidar OR NOVIDAR SP under direct observation by the health personnel each time?	YES . . . . . 1 NO 2	→ 306D
306C	How many times did you take the SP/Fansidar OR NOVIDAR SP under direct observation by the health personnel?	TIMES . . . . . ☐☐	

SECTION 3. PREGNANCY AND INTERMITTENT PREVENTIVE TREATMENT

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
306D	Did you take CPT (cotrimoxazole preventive therapy) during the last pregnancy?	YES . . . . . 1 NO . . . . . 2 DON'T KNOW 8	306F
306E	How long did you take cotrimoxazole during the last pregnancy? IF LESS THAN 1 WEEK, RECORD DAYS; IF LESS THAN 1 MONTH, RECORD DAYS.	DAYS . . . . . 1 WEEKS . . . . . 2 MONTHS 3	
306F	CHECK 302 ANC RECEIVED	ANC RECEIVED NO ANC (SKIP TO 307)	
306G	Do you have an ANC card for the time you were pregnant with [NAME]?	YES, SEEN . . . . . 1 YES, NOT SEEN . . . . . 2 (SKIP TO 307) NO CARD 3	
306H	CHECK ANC CARD AND RECORD NUMBER OF SP/FANSIDAR GIVEN	DOSES . . . . . . NONE 0	
307	CHECK 216 AND 217 ONE OR MORE LIVING CHILDREN BORN IN 2015-2020 (SKIP TO 401	ONE OR MORE LIVING CHILDREN BORN IN 2015-2020	501

SECTION 4. FEVER IN CHILDREN

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
401	CHECK 213, RECORD THE BIRTH HISTRY NUMBER IN 402 AND THE NAME AND SURVIVAL STATUS IN 403 FOR EACH BIRTH IN 2015-2020. ASK THE QUESTIONS ABOUT ALL OF THESE BIRTHS WITH THE MOST RECENT BIRTH. IF THERE ARE MORE THAN 2 BIRTHS, USE ADDITIONAL QUESTIONNAIRE(S) Now I would like to ask some questions about the health of your children born since January 2015. (We will talk about each separately, starting with the youngest.)		
402	BIRTH HISTORY NUMBER FROM 213 IN BIRTH HISTORY	MOST RECENT BIRTH BIRTH HISTORY NUMBER ..... [ ][ ] NEXT MOST RECENT BIRTH BIRTH HISTORY NUMBER ..... [ ][ ]	
403	FROM 213 AND 217	MOST RECENT BIRTH NAME _____ LIVING [ ] DEAD [ ] (SKIP TO 426) NEXT MOST RECENT BIRTH NAME _____ LIVING [ ] DEAD [ ] (SKIP TO 426)	
404	Has (NAME) been ill with a fever at any time in the last 2 weeks?	MOST RECENT BIRTH YES . . 1 NO . . 2 (SKIP TO 426) DON'T KNOW 8 NEXT MOST RECENT BIRTH YES . . . 1 NO . . . 2 (SKIP TO 426) DON'T KNOW 8	
404A	How many days ago did the fever start? IF LESS THAN ONE DAY, RECORD '00'	MOST RECENT BIRTH DAYS ..... [ ][ ] NEXT MOST RECENT BIRTH DAYS ..... [ ][ ]	
405	At any time during the illness, did (NAME) have blood taken from (NAME)'s finger or heel for testing?	MOST RECENT BIRTH YES . . 1 NO . . 2 DON'T KNOW 8 NEXT MOST RECENT BIRTH YES . . . 1 NO . . . 2 DON'T KNOW 8	
406	Did you seek advice or treatment for the illness from any source?	MOST RECENT BIRTH YES 1 NO 2 (SKIP TO 411) NEXT MOST RECENT BIRTH YES 1 NO 2 SKIP TO 411	

SECTION 4. FEVER IN CHILDREN

NO.	QUESTIONS AND FILTERS	MOST RECENT BIRTH NAME _____	MOST RECENT BIRTH NAME _____
409	Where did you first seek advice or treatment? USE LETTER CODE FROM 407.	FIRST PLACE ..... [ ]	FIRST PLACE ..... [ ]
409A	How far is your house from the (FIRST PLACE IN 409)	LESS THAN 15KM ..... 1 15KM OR MORE 2	LESS THAN 15KM ..... 1 15KM OR MORE 2
409B	How much did you spend on transport to and from the (FIRST PLACE IN 409)?	COST IN KWACHA [ ][ ][ ][ ][ ] FREE ..... 9995 DON'T KNOW 9998	COST IN KWACHA [ ][ ][ ][ ][ ] FREE ..... 9995 DON'T KNOW 9998
409C	Did you take any days off work to care for your child's illness	YES 1 NO 2 (SKIP TO 410)	YES 1 NO 2 (SKIP TO 410)
409D	How many days did you take off work to care for your child's illness?	DAYS ..... [ ][ ]	DAYS ..... [ ][ ]
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 medicine for the illness?	YES ..... 1 NO ..... 2 (SKIP TO 426) DON'T KNOW 8	YES ..... 1 NO ..... 2 (SKIP TO 426) DON'T KNOW 8
412	What medicine did (NAME) take? Any other medicine? RECORD ALL MENTIONED. IF MEDICINE NOT KNOWN, ASK TO SEE THE PACKAGE OR PRESCRIPTION.	**ANTIMALARIAL MEDICINE** LA A ASAQ (COMBINED AMODIAQUINE AND ARTERSUNATE) B SP/FANSIDAR /NOVIDAR SP C QUININE TABLETS..... D INJECTION/IV ..... E ARTESUNATE RECTAL ..... F INJECTION/IV .. G OTHER ANTIMALARIAL _____ H (SPECIFY) **ANTIBIOTIC MEDICINE** PILL/SYRUP ..... I INJECTION/IV J **OTHER MEDICINE** ASPIRIN/CAFENOL ..... K ACETAMINOPHEN/PANADOL /PARACETAMOL L IBUPROFEN M OTHER _____ X (SPECIFY) DON'T KNOW ..... Z	**ANTIMALARIAL MEDICINE** LA A ASAQ (COMBINED AMODIAQUINE AND ARTERSUNATE) B SP/FANSIDAR /NOVIDAR SP C QUININE TABLETS..... D INJECTION/IV ..... E ARTESUNATE RECTAL ..... F INJECTION/IV ... G OTHER ANTIMALARIAL _____ H (SPECIFY) **ANTIBIOTIC MEDICINE** PILL/SYRUP ..... I INJECTION/IV J **OTHER MEDICINE** ASPIRIN/CAFENOL ..... K ACETAMINOPHEN/PANADOL/PA RACETAMOL L IBUPROFEN M OTHER _____ X (SPECIFY) DON'T KNOW ..... Z

SECTION 4. FEVER IN CHILDREN

NO.	QUESTIONS AND FILTERS	MOST RECENT BIRTH NAME	MOST RECENT BIRTH NAME
413	CHECK 412. ANY CODE A-H CIRCLED?	YES → NO (SKIP TO 426)	YES → NO (SKIP TO 426)
414	CHECK 412. LA (A) GIVEN	CODE 'A' CIRCLED → NOT CODE 'A' CIRCLED (SKIP TO 416)	CODE 'A' CIRCLED → NOT CODE 'A' 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
415A	For how many days did (NAME) take LA?	DAYS	DAYS .....
415B	Did you have LA at home or did you get it from somew here else? IF SOMEWHERE ELSE PROBE FOR SOURCE IF MORE THAN ONE SOURCE ASK WHERE DID YOU GET THE LA FIRST?	HOME..... 01 GOVERNMENT HEALTH FACILITY/WORKER 02 CHAM/MISSION FACILITY/WORKER 03 PRIVATE FACILITY/WORKER 04 BLM HEALTH FACILITY/WORKER 05 MACRO HEALTH FACILITY/WORKER 06 YOUTH DROP IN CENTRE..... 07 SHOP..... 08 OTHERS (SPECIFY)	HOME..... 01 GOVERNMENT HEALTH FACILITY/WORKER 02 CHAM/MISSION FACILITY/WORKER 03 PRIVATE FACILITY/WORKER 04 BLM HEALTH FACILITY/WORKER 05 MACRO HEALTH FACILITY/WORKER 06 YOUTH DROP IN CENTRE..... 07 SHOP..... 08 OTHERS (SPECIFY)
415C	Did you purchase the LA?	YES 1 NO 2 (SKIP TO 416)	YES 1 NO 2 (SKIP TO 416)
415D	How much did you pay for the LA?	COST IN KWACHA DON'T KNOW 9998	COST IN KWACHA DON'T KNOW 9998
416	CHECK 412. ASAQ (COMBINED AMODIAQUINE AND ARTESUNATE) (B) GIVEN	CODE 'B' CIRCLED → NOT CODE 'B' CIRCLED (SKIP TO 418)	CODE 'B' CIRCLED → NOT CODE 'B' CIRCLED (SKIP TO 418.)
417	How long after the fever started did (NAME) first take ASAQ?	SAME DAY ..... 0 NEXT DAY ..... 1 TWO DAYS AFTER FEVER ..... 2 THREE DAYS OR MORE AFTER FEVER 3 DON'T KNOW 4	SAME DAY ..... 0 NEXT DAY ..... 1 TWO DAYS AFTER FEVER ..... 2 THREE DAYS OR MORE AFTER FEVER 3 DON'T KNOW 4

SECTION 4. FEVER IN CHILDREN

NO.	QUESTIONS AND FILTERS	MOST RECENT BIRTH NAME	MOST RECENT BIRTH NAME
418	CHECK 412 SP/FANSIDAR/NOVIDAR SP (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 SP/FANSIDAR/NOVIDAR SP?	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: QUININE (D OR E) GIVEN	CODE 'D OR E' CIRCLED ☐ → CODE 'D OR E' NOT CIRCLED ☐ (SKIP TO 422)	CODE 'D OR E' CIRCLED ☐ → CODE 'D OR E' NOT CIRCLED ☐ (SKIP TO 422)
421	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
422	CHECK 412: ARTESUNATE ('F' OR 'G') GIVEN	CODE 'F' OR 'G' CIRCLED ☐ → CODE 'F' OR 'G' NOT CIRCLED ☐ (SKIP TO 424)	CODE 'F' OR 'G' CIRCLED ☐ → CODE 'F' OR 'G' NOT CIRCLED ☐ (SKIP TO 424)
423	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
424	CHECK 412: OTHER ANTIMALARIAL ('H') GIVEN	CODE 'H' CIRCLED ☐ → CODE 'H' NOT CIRCLED ☐ (SKIP TO 426)	CODE 'H' CIRCLED ☐ → CODE 'H' NOT CIRCLED ☐ (SKIP TO 426)
425	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
426		GO BACK TO 403 IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 501.	GO BACK TO 403 IN FIRST COLUMN OF NEW QUESTIONNAIRE OR IF NO MORE BIRTHS GO TO 501

SECTION 5. KNOWLEDGE OF MALARIA

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES		SKIP
501	Have you ever heard of an illness called malaria?	YES	1	
		NO	2	→ 516
502	What do you think is the cause of malaria?	MOSQUITO BITES	A	
		EATING IMMATURE SUGARCANE	B	
		EATING COLD SIMA	C	
	Anything else?	EATING DIRTY FOOD	D	
		DRINKING DIRTY WATER	E	
		GETTING SOAKED IN RAIN	F	
	RECORD ALL MENTIONED.	COLD OR CHANGING WEATHER	G	
		WITCHCRAFT	H	
		OTHER _____ (SPECIFY)	X	
		DON'T KNOW	Z	
503	What signs or symptoms would lead you to think that a person has malaria?	FEVER	A	
		FEELING COLD	B	
		HEADACHE	C	
		NAUSEA/VOMITING	D	
	Anything else?	DIARRHEA	E	
		DIZZINESS	F	
		LOSS OF APPETITE	G	
	RECORD ALL MENTIONED.	BODY ACHE OR JOINT PAIN	H	
		PALE EYES	I	
		SALTY-TASTING PALMS	J	
		FEELING WEAK	K	
		REFUSE TO EAT OR DRINK	L	
		OTHER _____ (SPECIFY)	X	
		DON'T KNOW	Z	
504	How can someone protect themselves against malaria?	SLEEP UNDER A MOSQUITO NET	A	
		SLEEP UNDER AN INSECTICIDE-TREATED MOSQUITO NET	B	
	Anything else?	USE MOSQUITO REPELLANT	C	
		TAKE PREVENTIVE MEDICATION	D	
	RECORD ALL MENTIONED.	SPRAY THE HOUSE/ROOMS WITH INSECTICIDE	E	
		CLEAR WEEDS AROUND THE HOUSE	F	
		USE MOSQUITO COILS	G	
		CUT GRASS AROUND THE HOUSE	H	
		FILL IN STAGNANT WATERS (PUDDLES)	I	
		KEEP SURROUNDINGS CLEAN	J	
		BURN LEAVES	K	
		AVOID DRINKING DIRTY WATER	L	
		AVOID EATING BAD FOOD	M	
		PUT SCREENS ON WINDOWS	N	
		AVOID GETTING SOAKED IN RAIN	O	
		OTHER _____ (SPECIFY)	X	
		DON'T KNOW	Z	
505	What are the danger signs of malaria?	SEIZURE/CONVULSIONS	A	
		FAINTING	B	
	Anything else?	ANY FEVER	C	
		HIGH FEVER	D	
	RECORD ALL MENTIONED.	STIFF NECK	E	
		FEELING WEAK	F	
		NOT ACTIVE	G	
		CHILLS/SHIVERING	H	
		UNABLE TO EAT	I	
		VOMITING	J	
		CRYING ALL THE TIME	K	
		RESTLESS	L	
		DIARRHEA	M	
		OTHER _____ (SPECIFY)	X	
		DON'T KNOW	Z	

SECTION 5. KNOWLEDGE OF MALARIA

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES			SKIP
506	In the last six months, have you listened or seen any messages or information about malaria?	YES	1		
		NO	2	→	510
507	Where did you hear or see these messages or information?		YES	NO	
	a) At a Government clinic/hospital?	GOVT. CLINIC/HOSPITAL	1	2	
	b) From a community health worker?	COMMUNITY HEALTH WORKER	1	2	
	c) From a friend/relative?	FRIENDS/FAMILY	1	2	
	d) At workplace?	WORKPLACE	1	2	
	e) In drama groups?	DRAMA GROUPS	1	2	
	f) From peer education?	PEER EDUCATORS	1	2	
	g) On a poster or billboard?	POSTER/BILLBOARDS	1	2	
	h) On the television?	TELEVISION	1	2	
	i) On the radio?	RADIO	1	2	
	j) In a newspaper?	NEWSPAPER	1	2	
	k) Anywhere else?	ANYWHERE ELSE	1	2	
508	How many months ago was the last time you heard or saw the message?	MONTHS AGO	☐		
509	What type of messages about malaria did you hear or saw?	MALARIA IS DANGEROUS	A		
		MALARIA CAN KILL	B		
	Anything else?	MOSQUITO SPREAD MALARIA	C		
		SLEEPING UNDER A MOSQUITO NET IS IMPORTANT	D		
	RECORD ALL MENTIONED.	WHO SHOULD SLEEP UNDER A MOSQUITO NET	E		
		SEEK TREATMENT FOR FEVER	F		
		SEEK TREATMENT FOR FEVER PROMPTLY (WITHIN 24 HOURS)	G		
		IMPORTANCE OF HOUSE SPRAYING	H		
		NOT PLASTERING WALLS AFTER SPRAYING	I		
		ENVIRONMENTAL SANITATION ACTIVITIES	J		
		OTHER _____ (SPECIFY)	X		
		DON'T KNOW	Z		
510	Has anyone ever provided you with information on malaria at your home?	YES	1		
		NO	2	→	514
511	Who gave you the information at your home?	HEALTH CARE WORKER	A		
		COMMUNITY HEALTH WORKER	B		
	Anybody else?	FRIENDS/FAMILY	C		
		EMPLOYER	D		
	RECORD ALL MENTIONED.	PEER EDUCATORS	E		
		OTHER _____ (SPECIFY)	X		
		DON'T KNOW	Z		
512	How long ago did someone visit your house to provide you with information about malaria?	MONTHS AGO	☐☐		
513	What type of messages about malaria did you hear or see?	MALARIA IS DANGEROUS	A		
		MALARIA CAN KILL	B		
	Anything else?	MOSQUITO SPREAD MALARIA	C		
		SLEEPING UNDER A MOSQUITO NET IS IMPORTANT	D		
	RECORD ALL MENTIONED.	WHO SHOULD SLEEP UNDER A MOSQUITO NET	E		
		SEEK TREATMENT FOR FEVER	F		
		SEEK TREATMENT FOR FEVER PROMPTLY (WITHIN 24 HOURS)	G		
		IMPORTANCE OF HOUSE SPRAYING	H		
		NOT PLASTERING WALLS AFTER SPRAYING	I		
		ENVIRONMENTAL SANITATION ACTIVITIES	J		
		OTHER _____ (SPECIFY)	X		
		DON'T KNOW	Z		

514	Has any mosquito net in this house been used for any reason other than sleeping?	YES . . . . . 1 NO 2	→ 516
515	What was it used for? Anything else? RECORD ALL MENTIONED.	FISHING . . . . . A COVER/PROTECTION . . . . . B WINDOW SCREEN . . . . . C CLOTHING/WEDDING VEIL . . . . . D OTHER _____ X (SPECIFY) DON'T KNOW . . . . . Z	
516	RECORD THE TIME.	HOUR	
		MINUTES	

INTERVIEWER'S OBSERVATIONS

TO BE FILLED IN AFTER COMPLETING INTERVIEW

COMMENTS ABOUT INTERVIEW:

COMMENTS ON SPECIFIC QUESTIONS:

ANY OTHER COMMENTS:

SUPERVISOR'S OBSERVATIONS