Ghana Malaria Indicator Trends: 2014-2019

July 2021

Outputs from a DHS Program Workshop on Data Use

The 2019 Ghana Malaria Indicator Survey (2019 GMIS) was implemented by the Ghana Statistical Service (GSS) in close collaboration with the Ghana National Malaria Control Programme (NMCP) and the National Public Health and Reference Laboratory (NPHRL) of the Ghana Health Service (GHS). Financial support for the survey was provided by the United States Agency for International Development (USAID); The Global Fund to Fight AIDS, Tuberculosis and Malaria; and the Government of Ghana. ICF provided technical assistance through The DHS Program, a USAID-funded project offering support and technical assistance in the implementation of population and health surveys in countries worldwide.

Additional information about the 2019 GMIS may be obtained from the Ghana Statistical Service, Head Office, P.O. Box GP 1098, Accra, Ghana; e-mail: info@statsghana.gov.gh.

Information about The DHS Program may be obtained from ICF, 530 Gaither Road, Suite 500, Rockville, MD 20850, USA; telephone: +1-301-407-6500; fax: +1-301-407-6501; e-mail: info@DHSprogram.com; Internet: www.DHSprogram.com.

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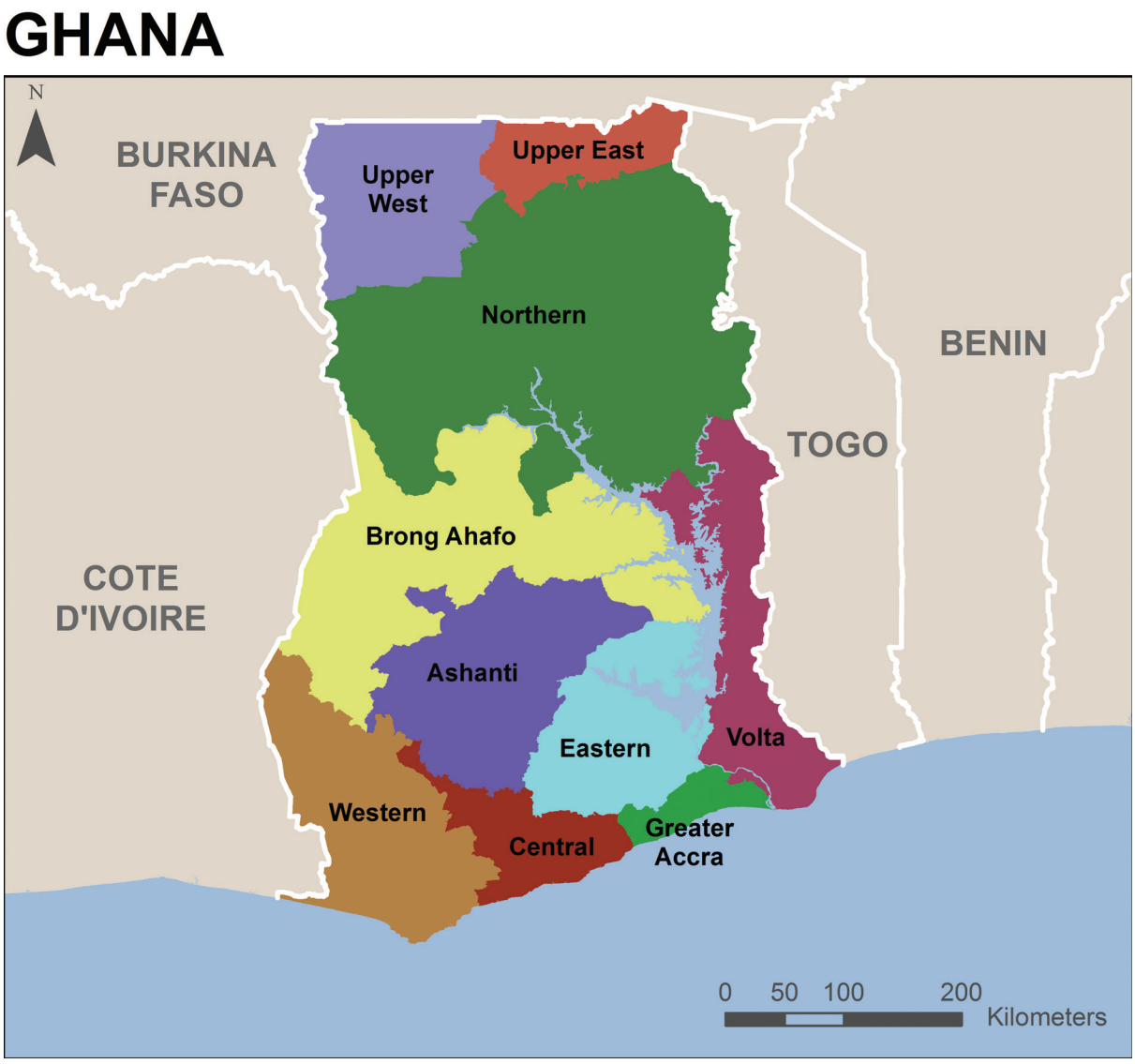
2019 Ghana Malaria Indicator Survey

The 2019 Ghana Malaria Indicator Survey (GMIS) is designed to provide current estimates of key malaria indicators in Ghana. The 2019 GMIS is the second Malaria Indicator Survey conducted in Ghana; the first was conducted in 2016. The 2019 GMIS provides population-based estimates of malaria indicators to complement routine administrative data that are used to inform strategic planning and evaluation of the Ghana Malaria Control Programme. Data were collected on ownership and use of mosquito bed nets, coverage of intermittent preventive treatment to protect pregnant women against malaria, practices and specific medications used to treat malaria, and malaria knowledge and communication messages. Blood samples for anaemia and malaria testing were collected via finger or heel pricks from children age 6-59 months whose parents or guardians consented to the specified test.

A nationally representative sample of 5,799 households and 5,181 women age 15-49 were successfully interviewed. The sample design for the 2019 Ghana MIS provides estimates for the country as a whole, for urban and rural areas separately, and for each of the 10 administrative regions (Western, Central, Greater Accra, Volta, Eastern, Ashanti, Brong Ahafo, Northern, Upper East, and Upper West) as defined in the Ghana 2010 Population and Housing Census (PHC).



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Report Background

This report is the product of a Ghana Malaria Indicator Trends Virtual Meeting held on June 10, 2021 as a follow-up to the Ghana Malaria Indicator Trends Workshop held in Mankessim, Ghana from September 17-21, 2018. The purpose of the 2018 workshop was to increase the capacity of participants to understand and interpret trends in population-based household survey malaria indicators to answer key malaria programmatic questions. The workshop included a critical assessment of the malaria data from the 2008 Ghana Demographic and Health Survey (2008 GDHS), 2014 Ghana Demographic and Health Survey (2014 GDHS), and the 2016 Ghana Malaria Indicator Survey (2016 GMIS). The purpose of the 2021 virtual meeting was to critically assess malaria indicator trends in Ghana with the inclusion of data from the 2019 Ghana Malaria Indicator Survey (2019 GMIS). Data collection for the 2019 Ghana MIS was conducted from September 25 to November 24, 2019. Dissemination of the 2019 GMIS results virtually occurred on July 28, 2020 due to the COVID-19 pandemic.

On June 10, 2021, thirty-six participants from different regions across Ghana and eight facilitators convened on Zoom for a presentation of the malaria indicator trends updated with 2019 GMIS data. Participants then joined one of four breakout rooms to discuss and produce key findings for different malaria topics: Insecticide-Treated Nets (ITN), Intermittent Preventive Treatment for Pregnant Women (IPTp), case management, and morbidity among children). Breakout group discussions allowed for more in-depth examination of indicators and trends, as well as factors that might be impacting the data, including malaria programmatic milestones like net distribution campaigns. Each team produced bulleted indicator summaries, a product of guided discussions, included in this report. At the end of the virtual meeting participants presented their key findings to the group, describing and interpreting results for their indicators which have been compiled in this document.

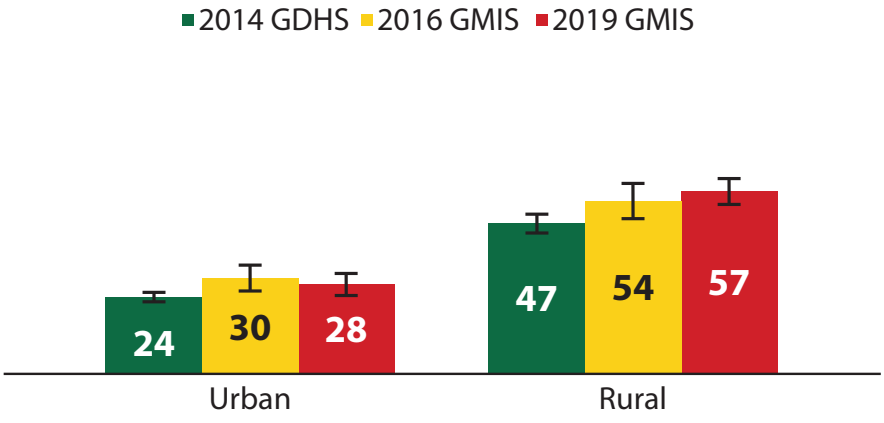
A Note on Interpretation of Malaria Indicator Trends

Every estimate from a sample survey such as the 2008 GDHS, 2014 GDHS, 2016 GMIS, and 2019 GMIS is subject to a certain degree of uncertainty. The values shown in 2008 GDHS, 2014 GDHS 2016 GMIS, and 2019 GMIS tables and figures are the middle of a range of possible values. This range of possible values is called the confidence interval. Researchers are confident that the "truth," or the value one would get if every single person in the population were surveyed, (rather than using a sample), lies within this range. All figures in this report include confidence interval bars showing the lower and upper limit of the 95% confidence interval for the estimate. For example, in 2019, 73.7% of households had at least one insecticide treated net (ITN). This estimate is surrounded by a confidence interval that ranges from 72.0% to 75.5%. This is a 95% confidence interval, meaning that, if the 2019 GMIS were conducted 100 times with a different sample each time, for 95 out of 100 samples, the result would fall between 72.0% and 75.5%.

How to Read and Understand Trend Graphs

The use of a standard methodology and questionnaires by the Demographic and Health Surveys allows comparisons between estimates of the same indicator over time. The sample design of a Demographic and Health Survey or a Malaria Indicator Survey allows assessment of trends in indicators over time at the national level and at the residential level (urban and rural). The trend graphs in this document (both national-level and residential-level) use a uniform colour scheme to facilitate reading and understanding. Data from the **2008 GMIS** are always presented in **orange**, data from the **2014 GDHS** are always presented in **green**, data from the **2016 GMIS** in **yellow** and data from the **2019 GMIS** are always in **red**. Each histogram includes the 95% confidence intervals in black at the top of each column. If the 95% confidence intervals for two estimates do not overlap, the difference between the estimates is considered significant. If the 95% confidence intervals do overlap, additional statistical tests were conducted to determine whether the change over the years is statistically significant. The text immediately following each graph describes the indicator's key findings, including whether or not the changes are significant. In addition, the graphs that present data according to place of residence all use the same orientation (such as the graph below). In all residential-level graphs, data are presented separately for urban and rural areas. This layout makes it easier for the reader to see whether an indicator has changed over time in urban or rural areas. In the example below, we see that ITN use among the rural household population has increased from 47% in 2014 to 57% in 2019. Looking at the 95% confidence intervals of these rural estimates, it is clear that they overlap. The increase observed in rural areas between 2014 and 2019 is significant, while the increase between 2016 and 2019 is not. While ITN use among the urban household population decreased from 30% in 2016 to 28% in 2019, the confidence intervals overlap so we cannot say this is a significant change.

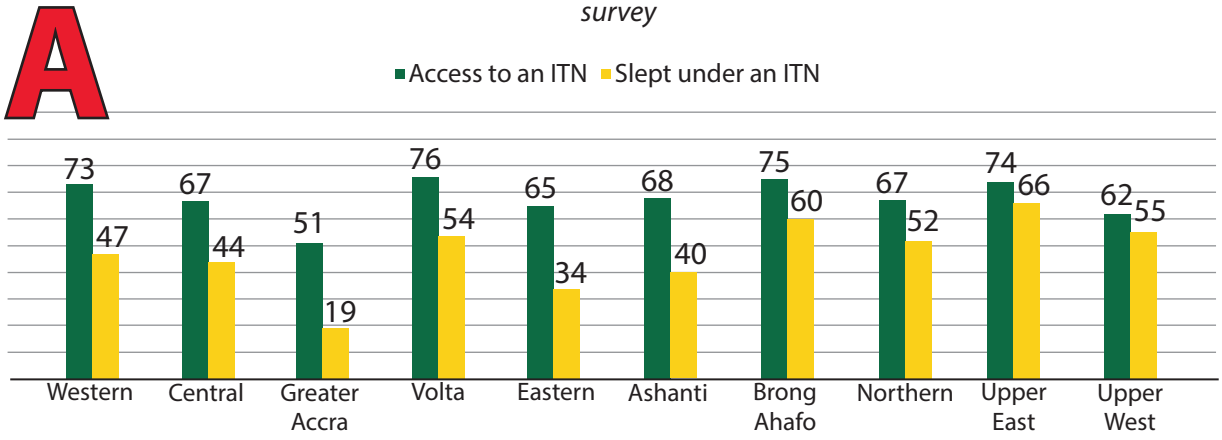
Percent of household population who slept under an ITN the night before the survey



How to Read and Understand Regional Charts

Using the 2019 GMIS, it is possible to compare estimates of the same indicator across regions. This report presents two different charts to illustrate whether indicators vary between regions in Ghana in a statistically significant way. The first graph (A, below) presents the data for the indicator by region. In this report, the regions are always presented in the same order. Note that for some indicators, such as access to an ITN, a high value represents a "good" result, but for other indicators, such as malaria prevalence by microscopy, a low value is synonymous with a "good" result.

Percent of household population with access to an ITN and who slept under an ITN the night before the survey



How to Read and Understand Regional Staircase Charts

The second visualization (B, below), is designed to allow users to quickly visualize whether differences between regional indicator estimates are statistically significant. Each brick in the staircase graph shows whether the difference between the two regions is significant or not.

 These bricks represent significant differences.

 These bricks represent differences that are not significant.

Each tip for readers in this list has a corresponding number in the graphic below.

1. Staircase charts are ordered in ascending order from left to right.

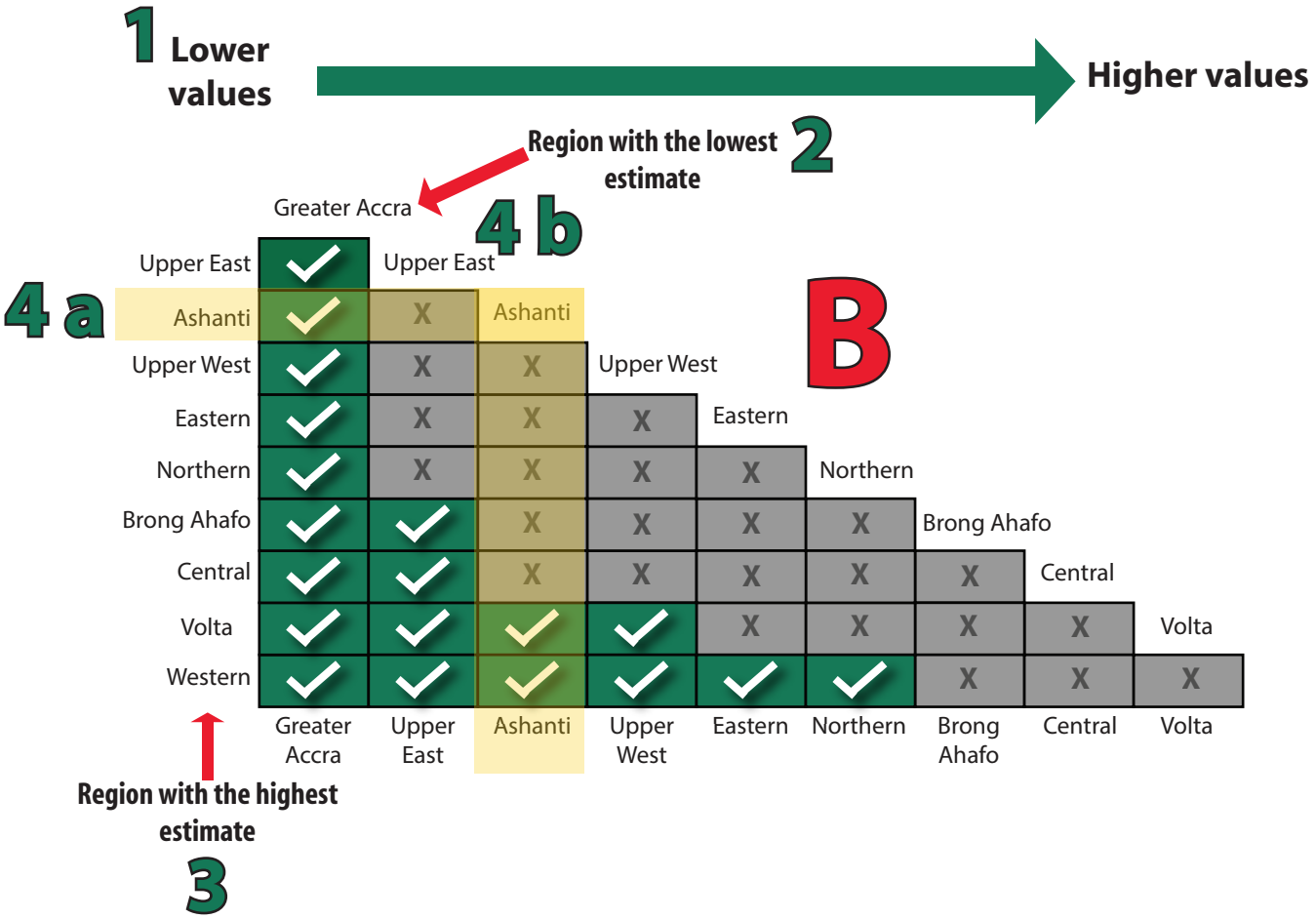
2. The region with the lowest indicator estimate is always the first column on the left; in this example it is Greater Accra.

3. The region with the highest indicator estimate is always the last row at the bottom of the stairs; in this example it is Western.

4. Look for the name of your region of interest in the staircase. Let's use Ashanti as an example (highlighted in yellow below).

a. Start with the row that represents Ashanti. Proceeding from left to right you can see that prevalence of malaria among children under five in Ashanti is significantly higher than in Greater Accra. **A region's row compares it to regions with lower estimates for that indicator**.

b. Now, look at the column that represents Ashanti. Proceeding from top to bottom you can see that prevalence of malaria among children under five in Ashanti is not significantly different from the estimates of this indicator for Upper East, Upper West, Eastern, Northern, Brong Ahafo, and Central regions. However, malaria prevalence among children under five in Ashanti is significantly lower than in Volta and Western regions. **A region's column compares it to regions with higher estimates for that indicator**.



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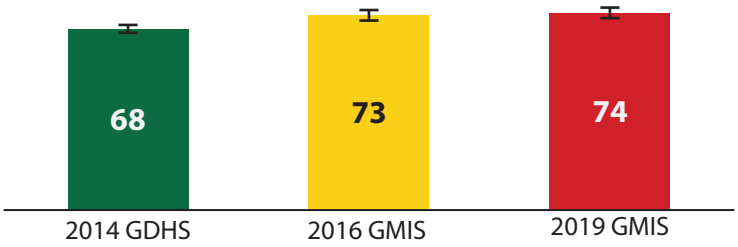
Household Ownership of Insecticide Treated Nets (ITNs)

National-Level Trends in ITN* Ownership

Percent of households with at least one ITN



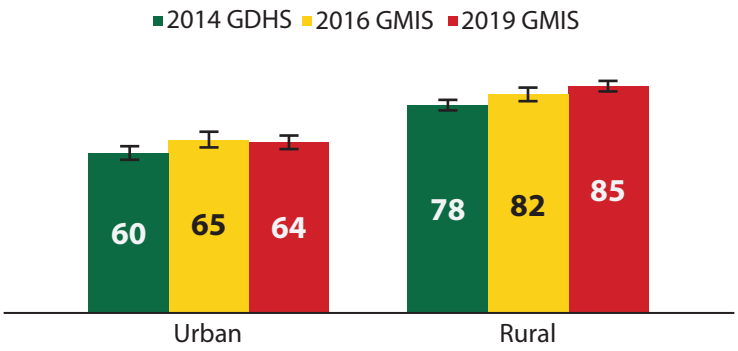
• While household ownership of at least one ITN increased significantly from 68% in 2014 to 73% in 2016, household ownership of at least one ITN remained unchanged from 2016 to 2019.

• An increase in ITN ownership was expected between 2016 and 2019, given that fieldwork for the 2019 MIS was conducted from 25 September to 24 November 2019, following the 2018 mass net distribution campaign covering all of Ghana.

• Ghana is doing well in terms of household ownership of at least one ITN. The country achieved 74% household ownership compared to the national target of 80% by 2025 (Ghana Malaria National Strategic Plan 2021-2025).

ITN Ownership Trends by Residence

Percent of households with at least one ITN



• Household ownership of at least one ITN is significantly higher in rural areas than in the urban areas for all three surveys. In 2019, this indicator was 21 percentage points higher in rural areas than in urban areas.

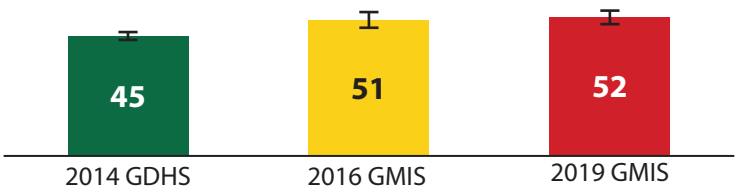
• In both urban and rural areas, household ownership of at least one ITN remained unchanged between 2016 and 2019.

• Anecdotal reports from the 2018 mass distribution campaign noted that urban households were harder to access than rural households and that people in urban areas sometimes refused the nets.

**An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment. However, the definition of an ITN in surveys conducted prior to the 2016 GMIS included nets that had been soaked with insecticides within the past 12 months.*

National-Level Trends in Full Household ITN Coverage

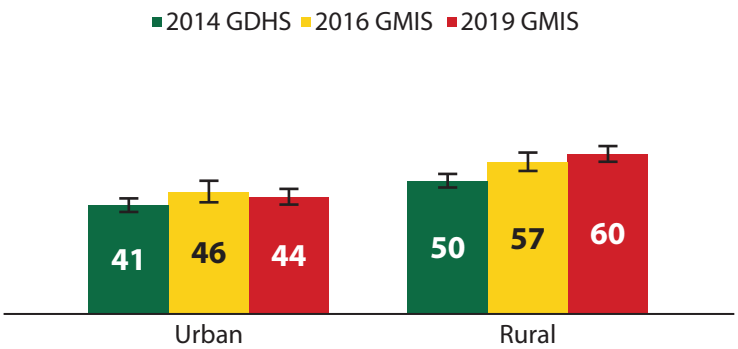
Percent of households that own at least one ITN for every two people who spent the night before the survey in the household



• Household ownership of at least one ITN for every two people in the household, also known as full household ITN coverage, increased significantly from 45% in 2014 to 51% in 2016, but remained unchanged between 2016 and 2019.

Full Household ITN Coverage Trends by Residence

Percent of households that own at least one ITN for every two people who spent the night before the survey in the household



• Household ownership of at least one ITN for every two people is significantly higher in rural areas than in urban areas for all surveys. In 2019, full household coverage is 16 percentage points higher in rural households (60%) compared to urban households (44%).

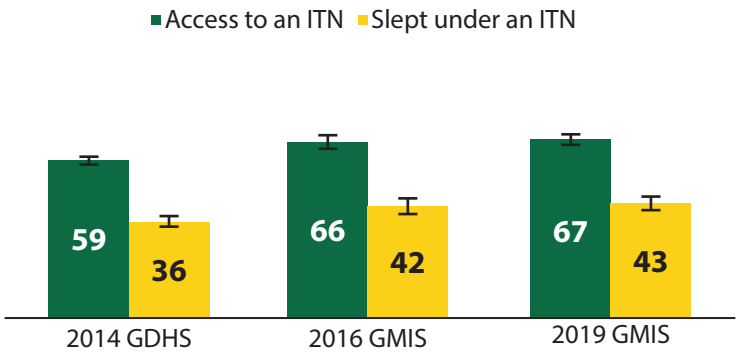
• Full household coverage among urban households has remained unchanged since 2014.

• In contrast, full household coverage among rural households increased significantly from 50% in 2014 to 60% in 2019.

ITN Access and Use

National-Level Trends in ITN Access and Use

Percent of household population with access to an ITN and who slept under an ITN the night before the survey



• The 2019 GMIS shows that while 67% of the population has access to an ITN, only 43% of the population slept under an ITN the night before the survey.

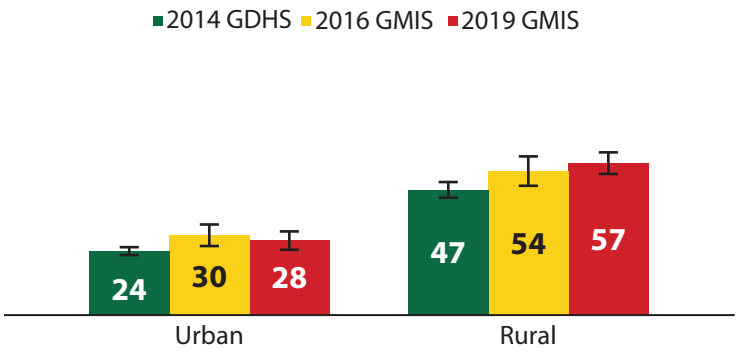
• There is a significant difference between ITN access and ITN use in all surveys.

• While both ITN access and use increased slightly between 2014 and 2016, they remained unchanged between 2016 and 2019.

• It is thought that the type of nets distributed impacts use. Anecdotal reports from the 2018 mass distribution campaign detail that many people rejected the 'hard' nets that were distributed. It is reported that some who collected nets used them for other purposes, such as fishing. According to the 2019 GMIS, 50% of all mosquito nets were not used the night before the survey. The most common reasons given for non-use were that the net was extra/being saved for later (39%), it was too hot (25%), and prefer other method (coils, spray, fans) (13%).

Trends in ITN Use by Residence

Percent of household population who slept under an ITN the night before the survey



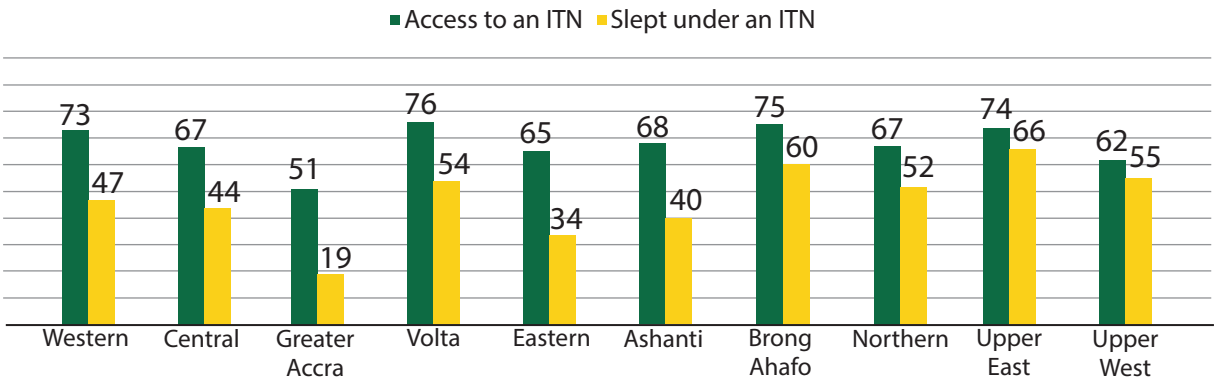
• ITN use among the rural household population is significantly higher than that of the urban household population in all surveys. In 2019, ITN use is 29 percentage points higher in rural households (57%) than in urban households (28%).

• ITN use among the rural household population increased significantly by 10 percentage points from 2014 to 2019.

• Conversely, ITN use among the urban household population has remained unchanged from 2014 to 2019.

ITN Access and Use by Region (2019)

Percent of household population with access to an ITN and who slept under an ITN the night before the survey



• ITN access ranges from a high of 76% in Volta region to a low of 51% in Greater Accra. This represents a statistically significant 25 percentage point difference.

• Use of ITNs is more than three times higher in Upper East region than in Greater Accra; 66% of the household population in Upper East slept under an ITN the night before the survey, compared to 19% in Greater Accra.

• Across all regions of Ghana ITN access is higher than ITN use, but this gap is largest in Greater Accra and Eastern region. In Greater Accra, only 19% of the population slept under an ITN the night before the survey, while 51% has access to an ITN, a difference of 32 percentage points. In Eastern region, 65% of the population has access to an ITN, but only 34% slept under an ITN, a difference of 31 percentage points.

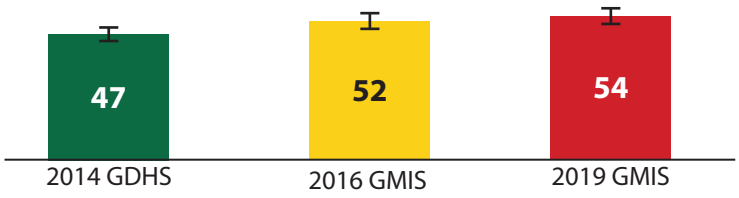
• The regions with the smallest gaps between ITN access and use are Upper East and Upper West, with gaps of 8 percentage points and 7 percentage points respectively.

• Since 2016, NMCP has engaged with an increased number of NGOs and District Officers across Ghana to propagate the use of nets and IPTp for pregnant women. ITN use is higher in rural regions than it is in Greater Accra and other urban regions.

ITN Use by Vulnerable Groups

National-Level Trends in Children's Use of ITNs

Percent of children under five who slept under an ITN the night before the survey

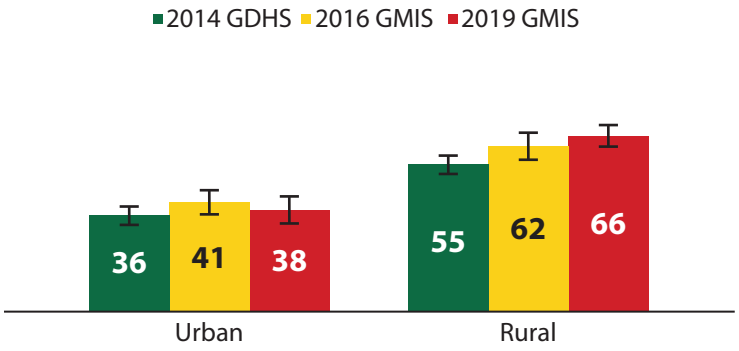


• Use of ITNs by children under five increased significantly from 47% in 2014 to 52% in 2016. Between 2016 and 2019, use of ITNs by children under five remained unchanged.

• Looking at only households with at least one ITN reveals a higher percentage of children who slept under an ITN the night before the survey. In 2019, 63% of children under five in households with at least one ITN slept under an ITN. This indicator has remained unchanged since 2014. (Data are not shown here, see Appendix B.)

Trends in Children's Use of ITNs by Residence

Percent of children under five who slept under an ITN the night before the survey



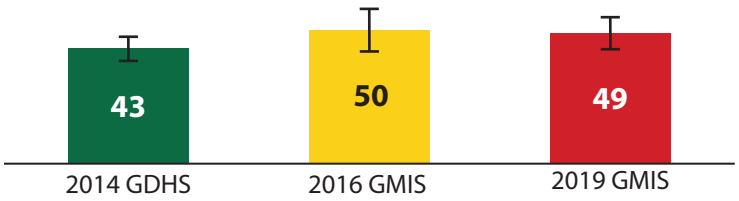
• In 2019, children's use of ITNs is higher in rural areas (66%) than urban areas (38%), a statistically significant difference of 28 percentage points.

• ITN use by children in rural areas increased significantly from 55% in 2014 to 66% in 2019.

• ITN use by children in urban areas has remained unchanged since 2014.

National-Level Trends in Pregnant Women's Use of ITNs

Percent of pregnant women age 15-49 who slept under an ITN the night before the survey



• Pregnant women's use of ITNs remained unchanged since 2014.

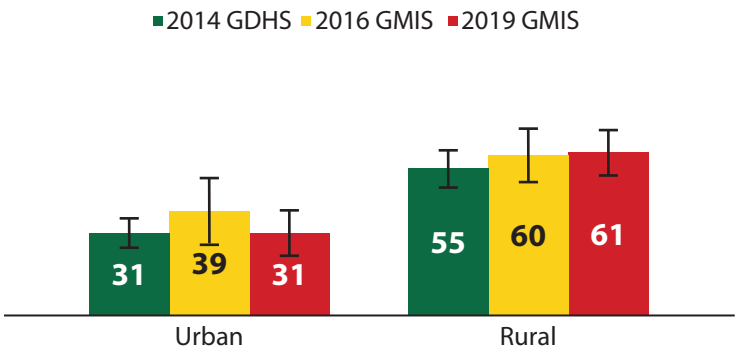
• Looking only at households with at least one ITN reveals a higher percentage of pregnant women who slept under an ITN the night before the survey. In 2019, 58% of pregnant women in households with at least one ITN slept under an ITN the previous night. This indicator has remained unchanged since 2014 (data not shown here, see Appendix B).

• Mass ITN distribution campaigns occurred in 2010, 2014, and 2018, along with continuous distribution of ITNs to pregnant women at ANC since 2010.

• One objective of the Ghana Malaria National Strategic Plan 2021-2025 is to protect 80% of eligible pregnant women with a package of interventions, including the use of ITNs.

Trends in Pregnant Women's Use of ITNs by Residence

Percent of pregnant women age 15-49 who slept under an ITN the night before the survey



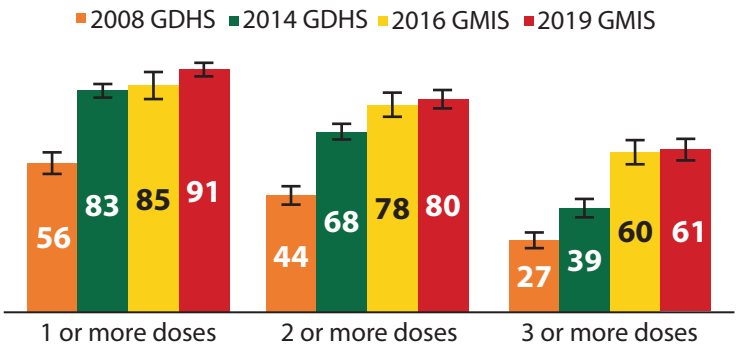
• ITN use by pregnant women in rural areas (61%) is nearly twice as high as in rural areas (31%). This 30-percentage point difference is statistically significant.

• In both rural and urban areas, pregnant women's use of ITNs has remained unchanged since 2014.

Intermittent Preventive Treatment in Pregnancy (IPTp)

National-Level Trends in IPTp

Percent of women age 15-49 with a live birth in the past two years who, during their last pregnancy, received at least 1 dose of SP/Fansidar during an antenatal care visit



• Intermittent preventive treatment during pregnancy using sulfadoxine and pyrimethamine (IPTp-SP) has been in place in Ghana since 2003. Based on WHO recommendations, the policy was revised in 2013 and 2017, from up to three doses of IPTp-SP recommended for pregnant women to three or more doses (IPTp3+).

• One objective of the Ghana Malaria National Strategic Plan 2021-2025 is to protect 80% of eligible pregnant women with a package of interventions, including IPTp3+. In 2019, 61% of women received three or more doses of SP (IPTp3+) during their last pregnancy.

• In 2019, 80% of women received two or more doses of SP (IPTp2+) and 91% of women received one or more doses of SP (IPTp1+) during their last pregnancy.

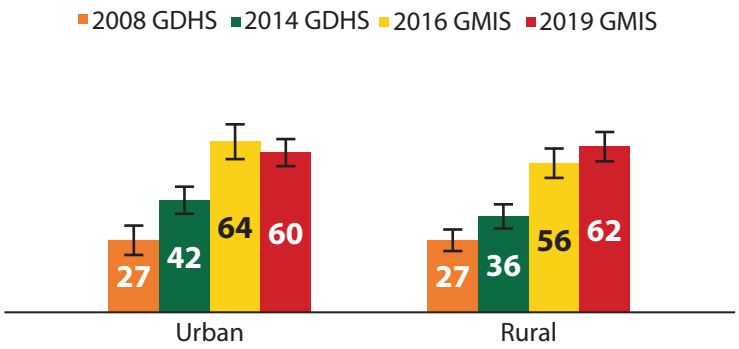
• There are sometimes discrepancies between survey data and routine data collected from health facilities. One objective of the Ghana Malaria National Strategic Plan 2021-2025 is to strengthen malaria surveillance and M&E systems to ensure timely availability of high quality, consistent and relevant malaria data at all levels.

• Women who received IPTp3+ increased significantly between 2014 and 2019 but remained unchanged between 2016 and 2019.

• Anecdotal evidence suggests that some women do not report to health facilities for antenatal care early enough, so they do not have time in their pregnancy to receive at least three doses of SP.

IPTp 3+ Trends by Residence

Percent of women age 15-49 with a live birth in the past two years who, during their last pregnancy, received at least 3 doses of SP/Fansidar



• In 2019, pregnant women's uptake of IPTp3+ was not significantly different between urban and rural areas (60% and 62%, respectively).

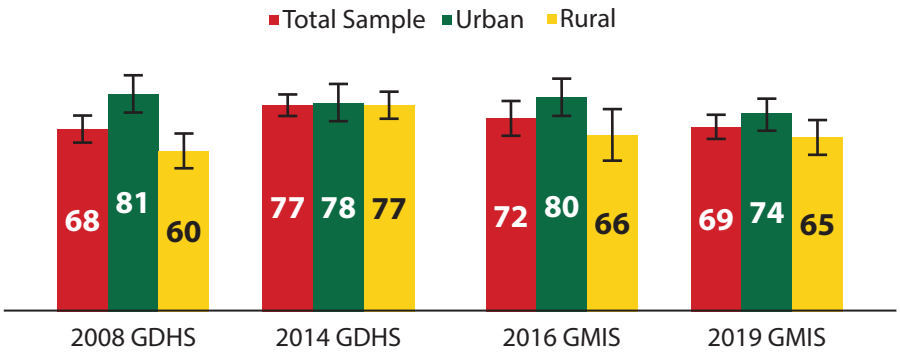
• There was a significant increase in uptake of IPTp3+ in both urban and rural settings between the 2014 and 2016 surveys. Between 2016 and 2019, uptake of IPTp3+ remained unchanged in both urban and rural settings.

• Continuous placement of midwives within the Community Health Planning Service (CHPS) zones, so midwives can easily do home visits of pregnant women in their area, may have contributed to the increase in coverage of IPTp3+ in rural areas.

Malaria Case Management in Children

Trends in Care-Seeking Behaviour

Percent of children under five with fever in the two weeks before the survey for whom advice or treatment was sought



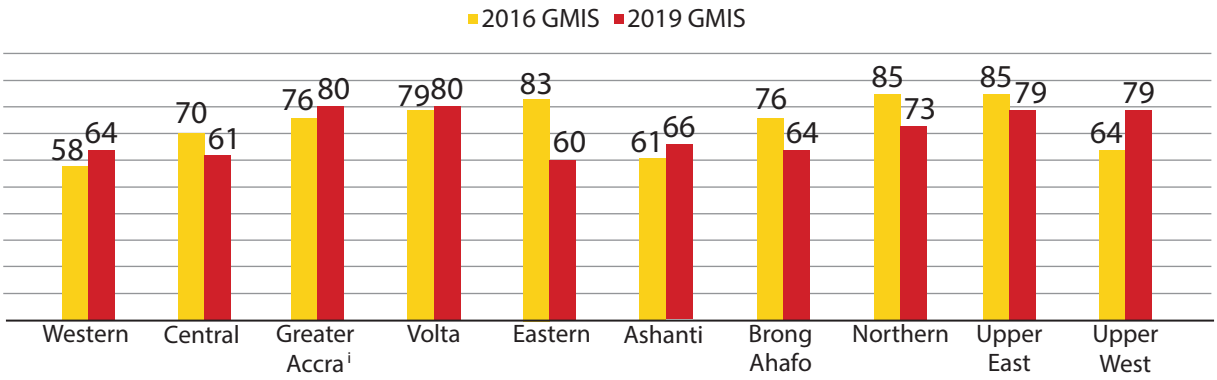
• In 2019, advice or treatment was sought from a health provider, health facility, or a pharmacy for 69% of children under five with fever in the two weeks before the survey. This is unchanged since 2008.

• In 2019, advice or treatment was sought for 74% of children under five with fever in urban areas, compared to 65% of children with fever in rural areas, though this difference is not significant.

• Treatment seeking for children with fever remained stable in both urban and rural areas between 2016 and 2019.

Care-Seeking Behaviour by Region (2016 and 2019)

Among children under five with fever in the two weeks before the survey, percent who had advice or treatment sought



[i] Estimate for 2019 is based on 25-49 unweighted cases and should be interpreted with caution.

• Care-seeking for children with fever varies by region, from 60% in Eastern to 80% in Greater Accra and Volta regions, which represents a statistically significant difference.

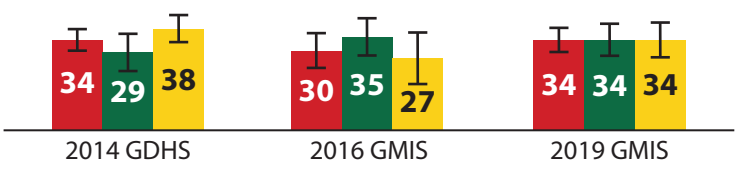
• Between 2016 and 2019, there were no major changes to policy or interventions related to care-seeking. However, behaviour change communication (BCC) efforts continue, especially the "Test, Treat and Track"campaign, in order to educate people to seek care for children with fever.

• From 2016-2018 there was an intervention conducted in the Northern region to improve referrals, when it was noted that 60% of deaths in the country due to malaria were occurring in that region due to delays in seeking care.

Malaria Case Management in Children

Trends in Diagnostic Testing

Percent of children under five with fever in the two weeks before the survey from whom blood was taken from their finger/heel for testing



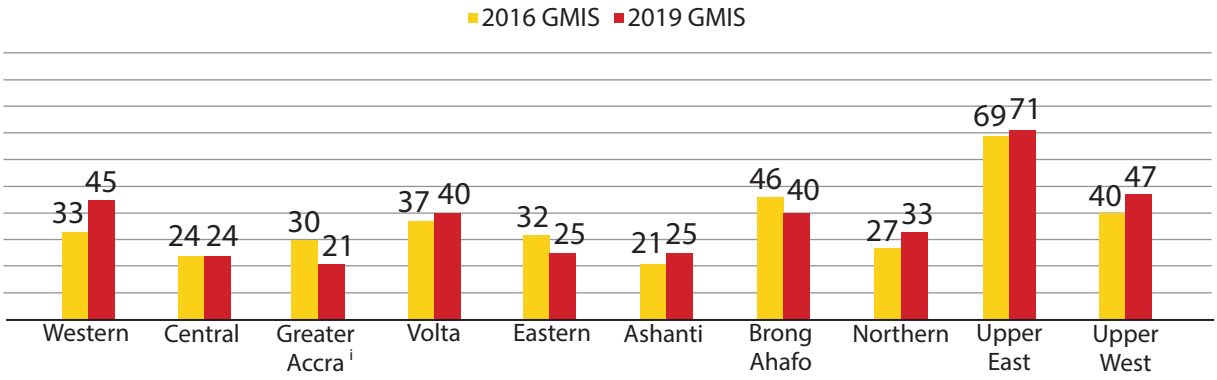
• Testing of children under five with fever has remained unchanged since 2014 in both urban and rural settings.

• The NMCP introduced the policy of 3Ts ("test, treat and track") in 2014, which continues to be promoted throughout Ghana.

• The policy continues to be to test 100% of suspected malaria cases to provide appropriate diagnosis and prompt and effective treatment to confirmed malaria cases. According to routine health data, testing improvements have been made that are not reflected in MIS data.

Diagnostic Testing by Region (2016 and 2019)

Among children under five with fever in the two weeks before the survey, percent who had blood taken from a finger or heel for testing



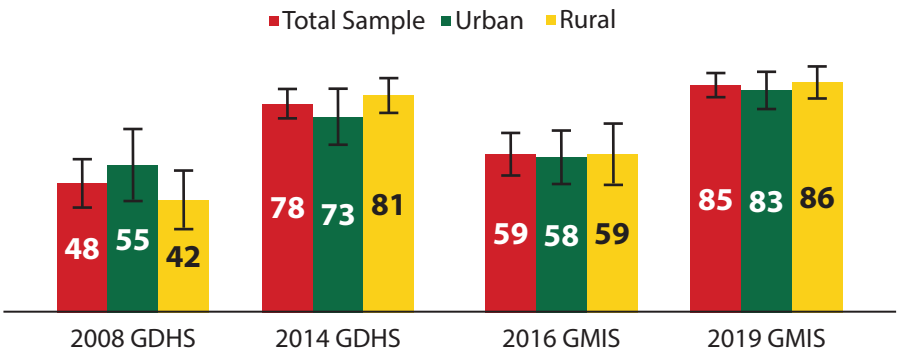
[i] Estimate for 2019 is based on 25-49 unweighted cases and should be interpreted with caution.

• Diagnostic testing for children with fever is more than three times higher in Upper East than in Greater Accra; 71% of children with fever in Upper East had a finger or heel stick, compared to just 21% of febrile children in Greater Accra.

• Stockouts of RDTs may contribute to low rates of diagnostic testing. In Upper East region, they work to ensure that all health facilities have rapid diagnostic tests (RDTs) at the chief's level.

Trends in Appropriate Antimalarial Treatment

Among children under five with fever in the two weeks before the survey who received any antimalarial, percent who received ACT



• According to the 2019 GMIS, 85% of children under five with fever in the two weeks before the survey who took any antimalarial drugs took ACT (the recommended antimalarial treatment in Ghana). This represents a statistically significant increase from 59% in 2016.

• In 2019, 83% of children under five with fever in the two weeks before the survey who took any antimalarial drugs took ACT in urban areas, compared to 86% of children in rural areas, though this difference is not statistically significant. According to significance checks performed, this indicator has never varied significantly by urban-rural residence.

• NMCP introduced ACTs to the private sector in 2014.

• While in 2008, appropriate treatment with ACTs was higher in urban areas, for 2014, 2016, and 2019 rural areas had higher percentages of children receiving antimalarial treatment in accordance with national protocols.

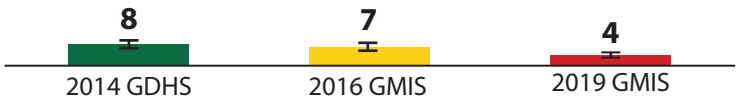
• New BCC advertisements emphasizing "Test, Treat and Track" and proper treatment of malaria with ACTs featuring popular musical artists were released in Ghana in 2019, several months before the MIS was conducted, which may have influenced the trends.

• Question: is it possible to disaggregate this data by the source? Promotions across board expected to improve dispensing of ACTs at pharmacies in particular.

Prevalence of Anaemia

National-Level Trends in Moderate-to-Severe Anaemia (Haemoglobin Level <8.0 g/dl)

Percent of children age 6-59 months who had a haemoglobin measurement of less than 8 grams per deciliter (g/dl)

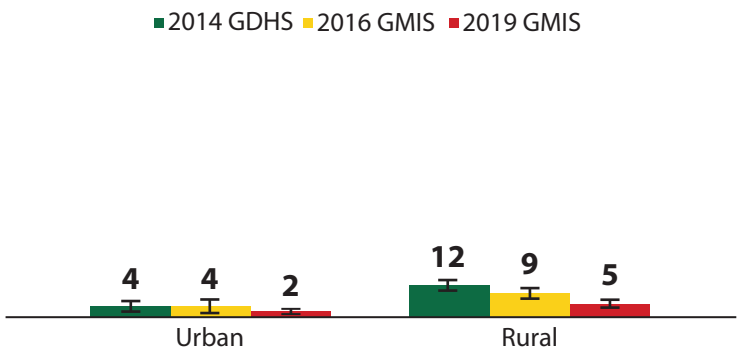


• Moderate-to-severe anaemia among children decreased from 8% in 2014 to 7% in 2016 to 4% in 2019. The decrease from 2014 to 2016 of 13% was not statistically significant. The decrease from 2016 to 2019 is a statistically significant decrease of 43%.

• There has been continuous distribution of ITNs for children under age 18 months who go for their measles II vaccines, and pregnant women are given ITNs when they go for antenatal care.

Trends in Moderate-to-Severe Anaemia by Residence

Percent of children age 6-59 months who had a haemoglobin measurement of less than 8 grams per deciliter (g/dl)



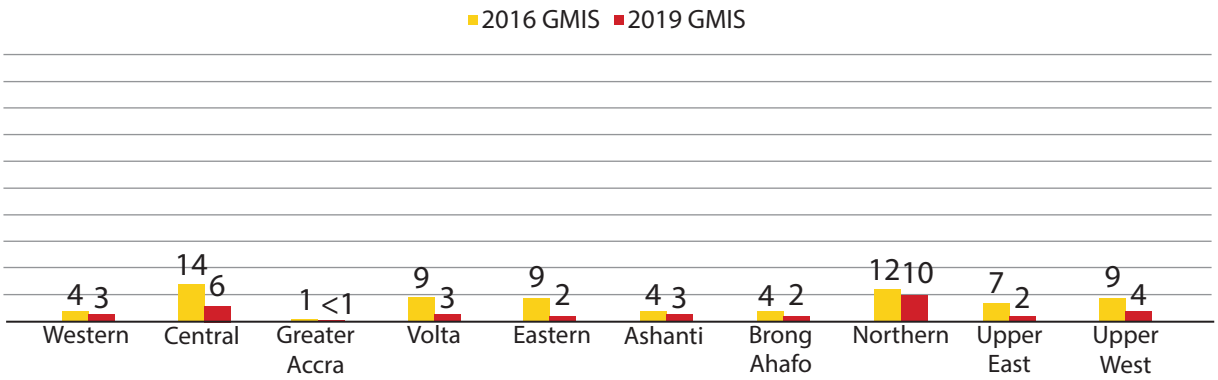
• In 2019, moderate-to-severe anaemia is significantly lower among urban children (2%) than among rural children (5%).

• Between 2016 and 2019, moderate-to-severe anaemia decreased significantly in rural areas from 9% to 5%. This represents a decrease of 44% from 2016 to 2019.

• From 2016 to 2019, moderate-to-severe anaemia in urban areas decreased from 4% to 2%, though the change was not significant.

Moderate-to-Severe Anaemia by Region (2016 and 2019)

Percent of children age 6-59 months who had a haemoglobin measurement of less than 8 grams per deciliter (g/dl)



• Moderate-to-severe anaemia prevalence ranges between <1% in Greater Accra and 10% in Northern region.

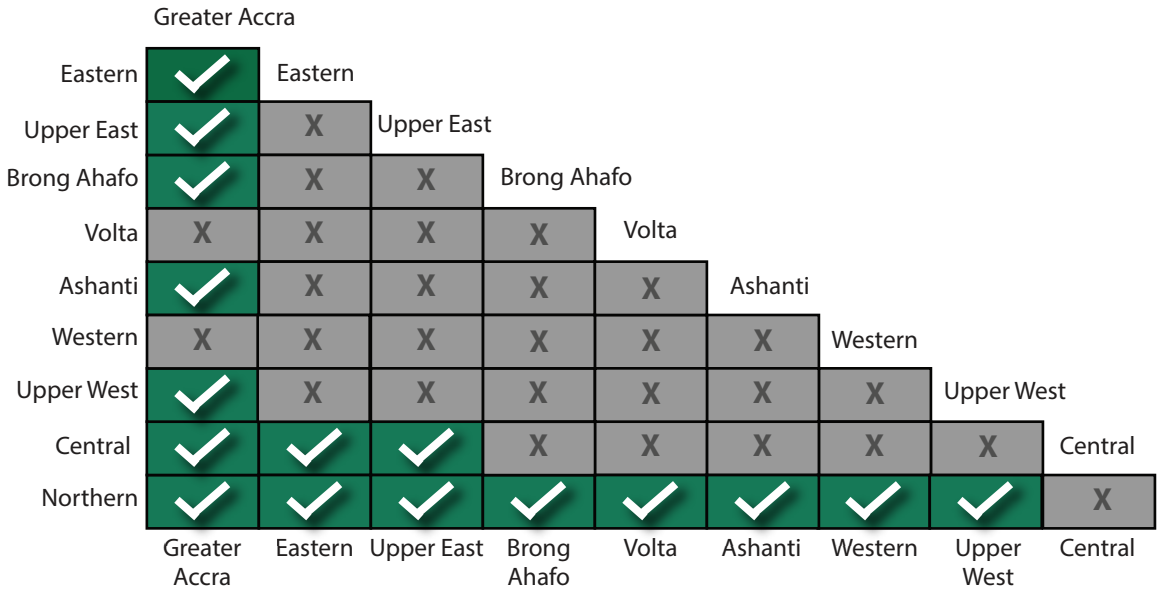
• The prevalence of moderate-to-severe anaemia among children in Northern (10%) is significantly higher than among children in all other regions except Central (see staircase chart below).

• Between 2016 and 2019, moderate-to-severe anaemia significantly decreased in Central, Volta, Eastern, Upper East, and Upper West regions.

• In 2015/2016 there was an indoor residual spraying (IRS) campaign that cut across the Upper East region.

• Pregnant women in Greater Accra who had not taken IPTp2+ were visited at home by Community Health Officers (CHOs). If the CHOs found malnourished children, they were referred to the nearest health facility.

Moderate-to-Severe Anaemia by Region (2019)



Prevalence of Malaria

National-Level Trends in Malaria Prevalence

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

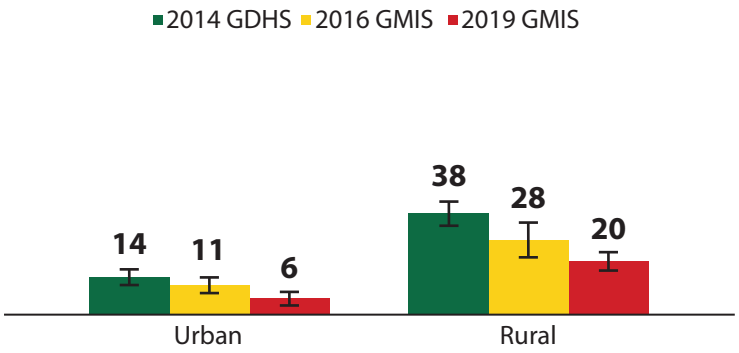
• The 2014 DHS, 2016 MIS and 2019 MIS surveys were fielded during similar periods of the year and estimates of malaria parasitaemia are thus directly comparable.

• Malaria among children decreased from 27% in 2014 to 21% in 2016 to 14% in 2019. From 2016 to 2019, malaria among children significantly decreased from 21% to 14%. This represents a decrease of 33%.

• Social and behaviour change communication (SBCC) activities have been implemented across health facilities and within communities and remain an important strategy in the Ghana Malaria National Strategic Plan 2021-2025 to achieve the objective of ensuring that 95% of the population will use at least one malaria preventive measure.

Trends in Malaria Prevalence by Residence

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

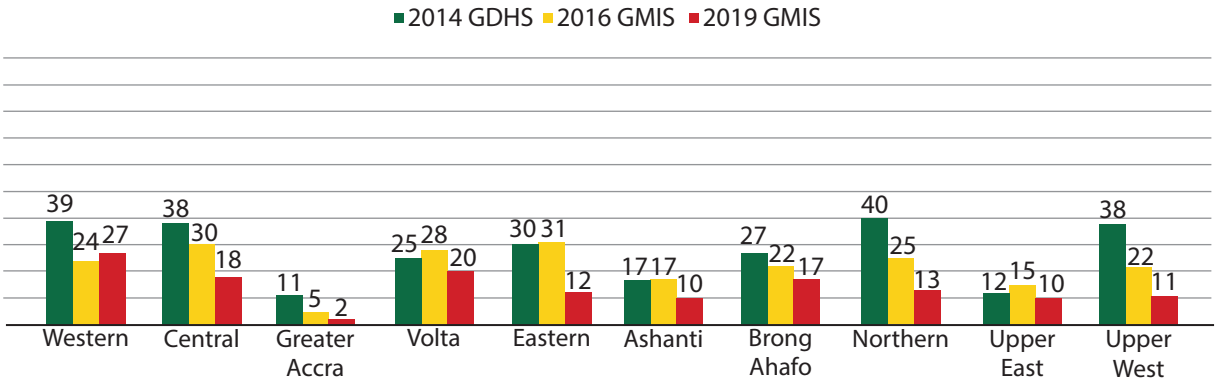


• Malaria prevalence decreased significantly between 2016 and 2019 in both urban and rural areas.

• In 2019, malaria prevalence by microscopy was more than three times as high in rural areas (20%) than in urban areas (6%). There is a statistically significant difference in malaria prevalence between urban and rural areas.

Malaria Prevalence by Region (2014, 2016, and 2019)

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

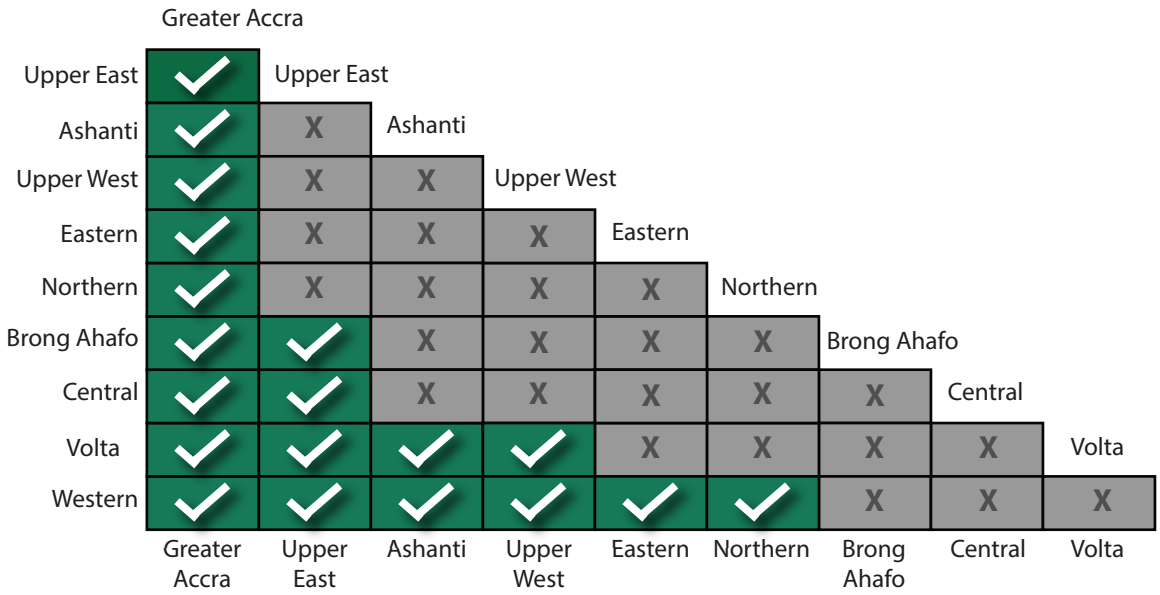


• Malaria prevalence among children is significantly lower in Greater Accra (2%) than in all other regions (see staircase chart below).

• The range of malaria prevalence by microscopy is between 2% in Greater Accra and 27% in Western region.

• Between 2016 and 2019, malaria prevalence among children significantly decreased in Central, Eastern, and Upper West regions.

Malaria Prevalence by Region (2019)



Appendix A
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**For three participants who accessed the virtual meeting, their names in the Zoom platform were unable to be matched to names and email addresses on the invitation list.*

Appendix B
Estimates of Sampling Errors

The following pages provide information on the sampling errors from the 2008 GDHS, 2014 GDHS, 2016 GMIS, and 2019 GMIS surveys. This is the data used to produce the graphs and confidence intervals displayed throughout the document. Please reference the following tables for more information about the sampling errors for these surveys.

The estimates from a sample survey are affected by two types of errors: (1) nonsampling errors and (2) sampling errors. Nonsampling errors result from mistakes made in implementing data collection and data processing, such as the failure to locate and interview the selected households, misunderstanding of the questions by interviewers or respondents, and data entry errors. Although numerous efforts are made during the implementation surveys to minimize nonsampling errors, they are impossible to avoid and difficult to evaluate statistically.

Sampling errors, on the other hand, can be evaluated statistically. The sample of respondents selected for each survey is one of many samples that could have been selected from the same population, with the same design and identical size for each of these surveys. Each of these samples would yield results that differ somewhat from the results of the actual sample. Sampling error is a measure of the variability between all possible samples. The exact degree of variability is unknown, but can be estimated from the survey results.

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

If the sample were selected as a simple random sample, it would have been possible to use straightforward formulas for calculating sampling errors. However, the samples for the 2008 GDHS, 2014 GDHS, 2016 GMIS, and 2019 GMIS surveys are the result of a multi-stage, stratified design. Consequently, it was necessary to use more complex formulas. The computer software used to calculate sampling errors for the 2008 GDHS, 2014 GDHS, 2016 GMIS, and 2019 GMIS surveys is a SAS program that used the Taylor linearization method for variance estimation for survey estimates that are means or proportions.

In addition to the standard error, the program computes the design effect (DEFT) for each estimate, which is defined as the ratio between the standard error that uses 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. A value greater than 1.0 indicates that the increase in the sampling error is due to the use of a more complex, less statistically efficient design, such as multistage and cluster selection. The program also computes the relative standard error and the confidence limits for the estimates.

Sampling errors for the 2008 GDHS, 2014 GDHS, 2016 GMIS, and 2019 GMIS surveys are calculated for selected variables of primary interest for households, children under age 5, and pregnant women, respectively. For each variable, the type of statistic (mean, proportion, or rate) and the base population are provided in Table B. The subsequent tables present the value of the statistic (R), its standard error (SE), the number of unweighted (N-UNWE) and weighted (N-WEIG) cases, the design effect (DEFT), the relative standard error (SE/R), and the 95% confidence limits (R±2SE) for each variable. The DEFT is considered undefined when the standard error for the simple random sample is zero (when the estimate is close to 0 or 1).

The confidence interval (as calculated for households with at least one insecticide treated net (ITN) in the 2016 Ghana MIS survey) can be interpreted as the overall average from the total sample at 73%, with its standard error at 0.011. Therefore, to obtain the 95% confidence limits, twice the standard error is added or subtracted to the sample estimate, i.e., 0.73±2×0.011. There is a high probability (95%) that the true average number of mosquito nets per household falls between 0.708 and 0.752.

The following Appendix tables present the sampling errors by background characteristics.

2008 Ghana DHS

Total, Urban, and Rural (Table B.1-Table B.3)

2014 Ghana DHS

Total, Urban, and Rural (Table B.4-Table B.6)

2016 Ghana MIS

Total, Urban, Rural, and 10 regions (Table B.7-Table B.19)

2019 Ghana MIS

Total, Urban, Rural, and 10 regions (Table B.20- Table B.32)

Table B List of selected variables for sampling errors, 2008 Ghana DHS, 2014 Ghana DHS, 2016 Ghana MIS, 2019 Ghana MIS

Variable	Estimate	Base population
	HOUSEHOLDS	
Ownership of at least one mosquito net	Proportion	Households
Average number of mosquito nets per household	Mean	Households
Ownership of at least one ITN	Proportion	Households
Average number of ITNs per household	Mean	Households
Ownership of at least one ITN for two persons	Proportion	Households
	CHILDREN	
Slept under any mosquito net last night	Proportion	Children under 5
Slept under an ITN last night	Proportion	Children under 5
Slept under an ITN last night in households with at least one ITN	Proportion	Children under 5 in households with at least one ITN
Had fever in last 2 weeks	Proportion	Child under 5 in women's birth history
Sought care/treatment from a health facility	Proportion	Child under 5 with fever in last 2 weeks
Took ACT	Proportion	Child under 5 with fever in last 2 weeks who received any antimalarial drugs
Has anaemia (haemoglobin <8.0 g/dl)	Proportion	Child 6-59 tested for anaemia
Has malaria (based on rapid test)	Proportion	Children 6-59 tested (rapid test) for malaria
Has malaria (based on microscopy test)	Proportion	Children 6-59 tested (on microscopy) for malaria
	PREGNANT WOMEN	
Slept under any mosquito net last night	Proportion	All pregnant women 15-49
Slept under an ITN last night	Proportion	All pregnant women 15-49
Slept under an ITN last night in households with at least one ITN	Proportion	Pregnant women 15-49 in households with at least one ITN
Received 1+ doses of SP/Fansidar	Proportion	Last birth of women 15-49 with live births in last 2 years
Received 2+ doses of SP/Fansidar	Proportion	Last birth of women 15-49 with live births in last 2 years
Received 3+ doses of SP/Fansidar	Proportion	Last birth of women 15-49 with live births in last 2 years

Table B.1 Sampling errors: Total sample, Ghana DHS 2008

Variable	Value (R)	Standard error (SE)	Number of cases Unweighted (N)	Number of cases Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits Lower (R-2SE)	Confidence limits Upper (R+2SE)
HOUSEHOLD/POPULATION								
Ownership of at least one mosquito net of any type	0.454	0.009	11,778	11,777	1.944	0.020	0.436	0.472
Number of any mosquito nets	0.705	0.018	11,778	11,777	2.082	0.025	0.669	0.741
Ownership of at least one ITN	0.417	0.008	11,778	11,777	1.773	0.019	0.401	0.433
Number of ITN	0.628	0.015	11,778	11,777	1.849	0.024	0.598	0.658
Ownership of at least one ITN for two persons	0.170	0.006	11,722	11,716	1.653	0.034	0.159	0.181
Household population that slept under an ITN last night	0.209	0.006	45,297	43,280	2.897	0.026	0.198	0.220
Proportion of de facto population with access to an ITN	0.301	0.006	45,297	43,280	3.821	0.021	0.288	0.314
CHILDREN								
Slept under any mosquito net last night	0.411	0.010	6,134	5,790	1.629	0.025	0.391	0.431
Slept under an ITN last night	0.387	0.010	6,134	5,790	1.582	0.025	0.367	0.407
Slept under an ITN last night in household with at least one ITN	0.579	0.012	4,181	3,875	1.544	0.020	0.555	0.603
Had fever in last 2 weeks	0.199	0.010	2,794	2,731	1.277	0.048	0.180	0.218
Advice or treatment for fever sought	0.678	0.025	551	544	1.251	0.037	0.628	0.728
Received ACT treatment for fever	0.477	0.044	225	234	1.330	0.093	0.388	0.566
Received a finger/heel stick								
Had a haemoglobin level less than 8 g/dl								
Has malaria (based on rapid test)								
Has malaria (based on microscopy test)								
PREGNANT WOMEN								
Slept under any mosquito net last night	0.315	0.027	368	353	1.112	0.086	0.261	0.369
Slept under an ITN last night	0.274	0.025	368	353	1.083	0.092	0.224	0.324
Slept under an ITN last night in household with at least one ITN	0.521	0.000	208	186	0.000	0.000	0.521	0.521
Received one or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.557	0.019	1,225	1,178	1.334	0.034	0.519	0.595
Received 2 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.437	0.018	1,225	1,178	1.293	0.042	0.400	0.474
Received 3 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.268	0.016	1,225	1,178	1.253	0.059	0.236	0.300

Tables B.2 Sampling errors: Urban sample, Ghana DHS 2008

Variable	Value (R)	Standard error (SE)	Number of cases Unweighted (N)	Number of cases Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits Lower (R-2SE)	Confidence limits Upper (R+2SE)
HOUSEHOLD/POPULATION								
Ownership of at least one mosquito net of any type	0.372	0.011	5,175	5,627	1.694	0.031	0.349	0.395
Number of any mosquito nets	0.539	0.021	5,175	5,627	1.848	0.039	0.497	0.581
Ownership of at least one ITN	0.347	0.010	5,175	5,627	1.567	0.030	0.326	0.368
Number of ITN	0.493	0.018	5,175	5,627	1.668	0.037	0.457	0.529
Ownership of at least one ITN for two persons	0.148	0.007	5,145	5,596	1.509	0.051	0.133	0.163
Household population that slept under an ITN last night	0.145	0.006	17,697	18,850	2.320	0.042	0.133	0.157
Proportion of de facto population with access to an ITN	0.257	0.008	17,697	18,850	3.168	0.033	0.240	0.274
CHILDREN								
Slept under any mosquito net last night	0.342	0.014	2,084	2,229	1.366	0.042	0.314	0.370
Slept under an ITN last night	0.326	0.014	2,084	2,229	1.407	0.044	0.297	0.355
Slept under an ITN last night in household with at least one ITN	0.533	0.019	1,276	1,362	1.336	0.035	0.496	0.570
Had fever in last 2 weeks	0.190	0.015	933	1,039	1.138	0.077	0.161	0.219
Advice or treatment for fever sought	0.810	0.035	181	197	1.210	0.044	0.739	0.881
Received ACT treatment for fever	0.545	0.068	91	104	1.301	0.125	0.408	0.682
Received a finger/heel stick								
Had a haemoglobin level less than 8 g/dl								
Has malaria (based on rapid test)								
Has malaria (based on microscopy test)								
PREGNANT WOMEN								
Slept under any mosquito net last night	0.184	0.036	139	145	1.099	0.197	0.112	0.256
Slept under an ITN last night	0.180	0.036	139	145	1.097	0.199	0.108	0.252
Slept under an ITN last night in household with at least one ITN	0.416	0.000	64	63	0.000	0.000	0.416	0.416
Received one or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.607	0.029	422	455	1.205	0.047	0.550	0.664
Received 2 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.463	0.030	422	455	1.221	0.064	0.404	0.522
Received 3 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.271	0.027	422	455	1.267	0.101	0.216	0.326

Table B.3 Sampling errors: Rural sample, Ghana DHS 2008

Variable	Value (R)	Standard error (SE)	Number of cases: Unweighted (N)	Number of cases: Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits: Lower (R-2SE)	Confidence limits: Upper (R+2SE)
HOUSEHOLD/POPULATION								
Ownership of at least one mosquito net of any type	0.530	0.014	6,603	6,150	2.208	0.026	0.503	0.557
Number of any mosquito nets	0.857	0.028	6,603	6,150	2.293	0.033	0.801	0.913
Ownership of at least one ITN	0.481	0.012	6,603	6,150	1.983	0.025	0.457	0.505
Number of ITN	0.751	0.023	6,603	6,150	2.019	0.031	0.704	0.798
Ownership of at least one ITN for two persons	0.189	0.009	6,577	6,120	1.777	0.045	0.172	0.206
Household population that slept under an ITN last night	0.258	0.009	27,600	24,430	3.252	0.033	0.241	0.275
Proportion of de facto population with access to an ITN	0.335	0.010	27,600	24,430	4.379	0.028	0.316	0.354
CHILDREN								
Slept under any mosquito net last night	0.454	0.014	4,050	3,561	1.806	0.031	0.426	0.482
Slept under an ITN last night	0.426	0.013	4,050	3,561	1.719	0.031	0.399	0.453
Slept under an ITN last night in household with at least one ITN	0.604	0.015	2,905	2,513	1.686	0.025	0.573	0.635
Had fever in last 2 weeks	0.205	0.013	1,861	1,692	1.360	0.062	0.180	0.230
Advice or treatment for fever sought	0.603	0.033	370	347	1.289	0.054	0.537	0.669
Received ACT treatment for fever	0.423	0.056	134	130	1.303	0.132	0.311	0.535
Received a finger/heel stick								
Had a haemoglobin level less than 8 g/dl								
Has malaria (based on rapid test)								
Has malaria (based on microscopy test)								
PREGNANT WOMEN								
Slept under any mosquito net last night	0.406	0.037	229	208	1.141	0.091	0.332	0.480
Slept under an ITN last night	0.339	0.034	229	208	1.090	0.101	0.271	0.407
Slept under an ITN last night in household with at least one ITN	0.574	0.045	144	123	1.099	0.079	0.483	0.665
Received one or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.526	0.025	803	723	1.414	0.047	0.476	0.576
Received 2 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.421	0.023	803	723	1.332	0.055	0.375	0.467
Received 3 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.267	0.019	803	723	1.232	0.072	0.229	0.305

Table B.4 Sampling errors: Total sample, Ghana DHS 2014

Variable	Value (R)	Standard error (SE)	Number of cases Unweighted (N)	Number of cases Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits Lower (R-2SE)	Confidence limits Upper (R+2SE)
HOUSEHOLD/POPULATION								
Ownership of at least one mosquito net of any type	0.696	0.008	11,835	11,835	1.979	0.012	0.679	0.713
Number of any mosquito nets	1.366	0.023	11,835	11,835	1.993	0.017	1.320	1.412
Ownership of at least one ITN	0.683	0.008	11,835	11,835	1.982	0.012	0.666	0.700
Number of ITN	1.333	0.023	11,835	11,835	1.972	0.017	1.287	1.379
Ownership of at least one ITN for two persons	0.452	0.008	11,747	11,743	1.836	0.019	0.435	0.469
Household population that slept under an ITN last night	0.357	0.009	42,292	40,337	3.797	0.025	0.339	0.375
Proportion of de facto population with access to an ITN	0.590	0.007	42,292	40,337	3.788	0.013	0.575	0.605
CHILDREN								
Slept under any mosquito net last night	0.478	0.013	6,075	5,801	1.992	0.027	0.452	0.504
Slept under an ITN last night	0.466	0.013	6,075	5,801	1.963	0.027	0.441	0.491
Slept under an ITN last night in household with at least one ITN	0.588	0.013	4,908	4,602	1.798	0.021	0.563	0.613
Had fever in last 2 weeks	0.138	0.008	5,595	5,431	1.724	0.058	0.122	0.154
Advice or treatment for fever sought	0.769	0.020	824	752	1.373	0.026	0.729	0.809
Received ACT treatment for fever	0.782	0.029	423	365	1.423	0.037	0.725	0.839
Received a finger/heel stick	0.343	0.025	824	752	1.491	0.072	0.294	0.392
Had a haemoglobin level less than 8 g/dl	0.083	0.007	2,697	2,568	1.375	0.088	0.068	0.098
Has malaria (based on rapid test)	0.364	0.017	2,683	2,555	1.801	0.046	0.331	0.397
Has malaria (based on microscopy test)	0.267	0.015	2,688	2,558	1.712	0.055	0.238	0.296
PREGNANT WOMEN								
Slept under any mosquito net last night	0.448	0.021	680	654	1.108	0.047	0.406	0.490
Slept under an ITN last night	0.433	0.023	680	654	1.187	0.052	0.388	0.478
Slept under an ITN last night in household with at least one ITN	0.543	0.024	549	521	1.115	0.044	0.496	0.590
Received one or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.825	0.013	2,329	2,264	1.639	0.016	0.799	0.851
Received 2 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.675	0.015	2,329	2,264	1.522	0.022	0.645	0.705
Received 3 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.385	0.017	2,329	2,264	1.672	0.044	0.351	0.419

Table B.5 Sampling errors: Urban sample, Ghana MIS 2014

Variable	Value (R)	Standard error (SE)	Number of cases: Unweighted (N)	Number of cases: Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits: Lower (R-2SE)	Confidence limits: Upper (R+2SE)
HOUSEHOLD/POPULATION								
Ownership of at least one mosquito net of any type	0.612	0.013	5,939	6,503	2.032	0.021	0.586	0.638
Number of any mosquito nets	1.140	0.030	5,939	6,503	1.948	0.026	1.080	1.200
Ownership of at least one ITN	0.601	0.013	5,939	6,503	2.072	0.022	0.575	0.627
Number of ITN	1.112	0.030	5,939	6,503	1.939	0.027	1.053	1.171
Ownership of at least one ITN for two persons	0.413	0.012	5,888	6,444	1.923	0.030	0.388	0.438
Household population that slept under an ITN last night	0.237	0.009	18,684	19,905	2.745	0.036	0.220	0.254
Proportion of de facto population with access to an ITN	0.536	0.011	18,684	19,905	3.614	0.021	0.513	0.559
CHILDREN								
Slept under any mosquito net last night	0.372	0.018	2,462	2,639	1.800	0.047	0.337	0.407
Slept under an ITN last night	0.361	0.017	2,462	2,639	1.770	0.047	0.327	0.395
Slept under an ITN last night in household with at least one ITN	0.492	0.019	1,833	1,938	1.633	0.039	0.454	0.530
Had fever in last 2 weeks	0.124	0.012	2,230	2,450	1.742	0.098	0.100	0.148
Advice or treatment for fever sought	0.776	0.035	302	304	1.444	0.045	0.707	0.845
Received ACT treatment for fever	0.733	0.054	156	144	1.507	0.073	0.626	0.840
Received a finger/heel stick	0.289	0.034	302	304	1.306	0.118	0.221	0.357
Had a haemoglobin level less than 8 g/dl	0.044	0.009	1,095	1,180	1.455	0.206	0.026	0.062
Has malaria (based on rapid test)	0.169	0.018	1,086	1,171	1.568	0.106	0.133	0.205
Has malaria (based on microscopy test)	0.135	0.015	1,092	1,175	1.486	0.114	0.104	0.166
PREGNANT WOMEN								
Slept under any mosquito net last night	0.317	0.027	308	323	1.035	0.087	0.262	0.372
Slept under an ITN last night	0.312	0.027	308	323	1.016	0.086	0.258	0.366
Slept under an ITN last night in household with at least one ITN	0.412	0.033	232	244	1.014	0.080	0.346	0.478
Received one or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.827	0.018	932	1,009	1.417	0.021	0.792	0.862
Received 2 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.682	0.024	932	1,009	1.552	0.035	0.635	0.729
Received 3 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.419	0.025	932	1,009	1.547	0.060	0.369	0.469

Table B.6 Sampling errors: Rural sample, Ghana MIS 2014

Variable	Value (R)	Standard error (SE)	Number of cases Unweighted (N)	Number of cases Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits Lower (R-2SE)	Confidence limits Upper (R+2SE)
HOUSEHOLD/POPULATION								
Ownership of at least one mosquito net of any type	0.798	0.010	5,896	5,332	2.004	0.013	0.777	0.819
Number of any mosquito nets	1.643	0.037	5,896	5,332	2.156	0.022	1.570	1.716
Ownership of at least one ITN	0.784	0.011	5,896	5,332	1.978	0.014	0.763	0.805
Number of ITN	1.601	0.036	5,896	5,332	2.120	0.022	1.529	1.673
Ownership of at least one ITN for two persons	0.500	0.012	5,859	5,299	1.766	0.023	0.477	0.523
Household population that slept under an ITN last night	0.473	0.015	23,608	20,432	4.719	0.032	0.442	0.504
Proportion of de facto population with access to an ITN	0.643	0.010	23,608	20,432	4.131	0.016	0.623	0.663
CHILDREN								
Slept under any mosquito net last night	0.566	0.018	3,613	3,163	2.237	0.033	0.529	0.603
Slept under an ITN last night	0.554	0.018	3,613	3,163	2.224	0.033	0.517	0.591
Slept under an ITN last night in household with at least one ITN	0.657	0.017	3,075	2,664	1.965	0.026	0.623	0.691
Had fever in last 2 weeks	0.150	0.011	3,365	2,981	1.713	0.070	0.129	0.171
Advice or treatment for fever sought	0.765	0.024	522	448	1.312	0.032	0.716	0.814
Received ACT treatment for fever	0.813	0.033	267	221	1.384	0.041	0.747	0.879
Received a finger/heel stick	0.380	0.034	522	448	1.601	0.090	0.312	0.448
Had a haemoglobin level less than 8 g/dl	0.116	0.011	1,602	1,388	1.327	0.092	0.095	0.137
Has malaria (based on rapid test)	0.529	0.022	1,597	1,384	1.799	0.043	0.484	0.574
Has malaria (based on microscopy test)	0.379	0.022	1,596	1,384	1.811	0.058	0.335	0.423
PREGNANT WOMEN								
Slept under any mosquito net last night	0.576	0.030	372	331	1.157	0.052	0.517	0.635
Slept under an ITN last night	0.551	0.036	372	331	1.394	0.065	0.479	0.623
Slept under an ITN last night in household with at least one ITN	0.658	0.032	317	277	1.188	0.048	0.595	0.721
Received one or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.823	0.019	1,397	1,255	1.817	0.023	0.786	0.860
Received 2 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.669	0.019	1,397	1,255	1.482	0.028	0.632	0.706
Received 3 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.358	0.022	1,397	1,255	1.709	0.061	0.314	0.402

Table B.7 Sampling errors: Total sample, Ghana MIS 2016

Variable	Value (R)	Standard error (SE)	Number of cases Unweighted (N)	Number of cases Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits Lower (R-2SE)	Confidence limits Upper (R+2SE)
HOUSEHOLD/POPULATION								
Ownership of at least one mosquito net of any type	0.739	0.010	5,841	5,841	1.760	0.014	0.719	0.759
Number of any mosquito nets	1.660	0.040	5,841	5,841	1.992	0.024	1.581	1.739
Ownership of at least one ITN	0.730	0.011	5,841	5,841	1.886	0.015	0.708	0.752
Number of ITN	1.629	0.040	5,841	5,841	2.010	0.024	1.550	1.708
Ownership of at least one ITN for two persons	0.509	0.014	5,774	5,770	2.116	0.027	0.481	0.537
Household population that slept under an ITN last night	0.417	0.016	22,332	20,708	4.910	0.039	0.385	0.449
Proportion of de facto population with access to an ITN	0.658	0.012	22,332	20,708	4.413	0.018	0.635	0.681
CHILDREN								
Slept under any mosquito net last night	0.528	0.016	3,429	3,234	1.904	0.031	0.496	0.560
Slept under an ITN last night	0.522	0.016	3,429	3,234	1.897	0.031	0.490	0.554
Slept under an ITN last night in household with at least one ITN	0.620	0.017	2,958	2,724	1.885	0.027	0.586	0.654
Had fever in last 2 weeks	0.302	0.013	3,145	3,121	1.576	0.043	0.276	0.328
Advice or treatment for fever sought	0.718	0.032	894	942	2.124	0.045	0.654	0.782
Received ACT treatment for fever	0.586	0.040	455	474	1.738	0.069	0.506	0.666
Received a finger/heel stick	0.303	0.024	894	942	1.552	0.079	0.255	0.351
Had a haemoglobin level less than 8 g/dl	0.069	0.008	3,047	2,874	1.713	0.114	0.053	0.085
Has malaria (based on rapid test)	0.279	0.021	3,047	2,874	2.568	0.075	0.237	0.321
Has malaria (based on microscopy test)	0.206	0.017	3,047	2,874	2.351	0.084	0.172	0.240
PREGNANT WOMEN								
Slept under any mosquito net last night	0.502	0.039	351	353	1.458	0.078	0.424	0.580
Slept under an ITN last night	0.500	0.039	351	353	1.457	0.078	0.422	0.578
Slept under an ITN last night in household with at least one ITN	0.593	0.040	304	297	1.403	0.067	0.514	0.672
Received one or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.853	0.026	1,291	1,285	2.603	0.030	0.802	0.904
Received 2 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.780	0.023	1,291	1,285	1.992	0.029	0.734	0.826
Received 3 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.596	0.022	1,291	1,285	1.645	0.038	0.551	0.641

Table B.8 Sampling errors: Urban sample, Ghana MIS 2016

Variable	Value (R)	Standard error (SE)	Number of cases: Unweighted (N)	Number of cases: Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits: Lower (R-2SE)	Confidence limits: Upper (R+2SE)
HOUSEHOLD/POPULATION								
Ownership of at least one mosquito net of any type	0.661	0.014	2,815	3,195	1.540	0.021	0.634	0.688
Number of any mosquito nets	1.391	0.045	2,815	3,195	1.657	0.033	1.300	1.482
Ownership of at least one ITN	0.653	0.015	2,815	3,195	1.695	0.023	0.623	0.683
Number of ITN	1.366	0.046	2,815	3,195	1.697	0.034	1.274	1.458
Ownership of at least one ITN for two persons	0.458	0.019	2,772	3,151	2.027	0.042	0.420	0.496
Household population that slept under an ITN last night	0.296	0.019	9,244	10,249	3.977	0.064	0.258	0.334
Proportion of de facto population with access to an ITN	0.594	0.018	9,244	10,249	4.024	0.030	0.559	0.629
CHILDREN								
Slept under any mosquito net last night	0.413	0.023	1,309	1,466	1.668	0.055	0.368	0.458
Slept under an ITN last night	0.408	0.023	1,309	1,466	1.674	0.056	0.362	0.454
Slept under an ITN last night in household with at least one ITN	0.519	0.025	1,027	1,151	1.609	0.048	0.469	0.569
Had fever in last 2 weeks	0.276	0.016	1,209	1,418	1.231	0.057	0.244	0.308
Advice or treatment for fever sought	0.797	0.034	311	391	1.482	0.042	0.729	0.865
Received ACT treatment for fever	0.581	0.051	157	184	1.292	0.088	0.479	0.683
Received a finger/heel stick	0.348	0.039	311	391	1.457	0.113	0.269	0.427
Had a haemoglobin level less than 8 g/dl	0.041	0.013	1,145	1,276	2.150	0.307	0.016	0.066
Has malaria (based on rapid test)	0.128	0.019	1,145	1,276	1.897	0.147	0.090	0.166
Has malaria (based on microscopy test)	0.112	0.016	1,145	1,276	1.680	0.140	0.081	0.143
PREGNANT WOMEN								
Slept under any mosquito net last night	0.395	0.063	143	167	1.530	0.159	0.270	0.520
Slept under an ITN last night	0.390	0.063	143	167	1.534	0.161	0.264	0.516
Slept under an ITN last night in household with at least one ITN	0.489	0.069	112	133	1.459	0.142	0.351	0.627
Received one or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.899	0.019	492	577	1.415	0.021	0.861	0.937
Received 2 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.826	0.023	492	577	1.359	0.028	0.779	0.873
Received 3 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.639	0.034	492	577	1.551	0.053	0.572	0.706

Table B.9 Sampling errors: Rural sample, Ghana MIS 2016

Variable	Value (R)	Standard error (SE)	Number of cases: Unweighted (N)	Number of cases: Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits: Lower (R-2SE)	Confidence limits: Upper (R+2SE)
HOUSEHOLD/POPULATION								
Ownership of at least one mosquito net of any type	0.834	0.011	3,026	2,646	1.683	0.014	0.811	0.857
Number of any mosquito nets	1.985	0.062	3,026	2,646	2.224	0.031	1.861	2.109
Ownership of at least one ITN	0.824	0.012	3,026	2,646	1.753	0.015	0.800	0.848
Number of ITN	1.947	0.061	3,026	2,646	2.192	0.031	1.825	2.069
Ownership of at least one ITN for two persons	0.570	0.018	3,002	2,619	1.941	0.031	0.535	0.605
Household population that slept under an ITN last night	0.535	0.028	13,088	10,460	6.536	0.053	0.478	0.592
Proportion of de facto population with access to an ITN	0.721	0.013	13,088	10,460	4.349	0.019	0.694	0.748
CHILDREN								
Slept under any mosquito net last night	0.623	0.026	2,120	1,768	2.490	0.042	0.571	0.675
Slept under an ITN last night	0.617	0.026	2,120	1,768	2.470	0.042	0.565	0.669
Slept under an ITN last night in household with at least one ITN	0.694	0.025	1,931	1,572	2.364	0.036	0.644	0.744
Had fever in last 2 weeks	0.324	0.020	1,936	1,703	1.904	0.062	0.284	0.364
Advice or treatment for fever sought	0.662	0.046	583	551	2.361	0.070	0.569	0.755
Received ACT treatment for fever	0.589	0.057	298	290	1.998	0.097	0.475	0.703
Received a finger/heel stick	0.270	0.027	583	551	1.489	0.102	0.215	0.325
Had a haemoglobin level less than 8 g/dl	0.091	0.011	1,902	1,598	1.629	0.118	0.069	0.113
Has malaria (based on rapid test)	0.399	0.039	1,902	1,598	3.466	0.098	0.321	0.477
Has malaria (based on microscopy test)	0.282	0.032	1,902	1,598	3.116	0.114	0.218	0.346
PREGNANT WOMEN								
Slept under any mosquito net last night	0.598	0.049	208	186	1.450	0.083	0.499	0.697
Slept under an ITN last night	0.598	0.049	208	186	1.450	0.083	0.499	0.697
Slept under an ITN last night in household with at least one ITN	0.676	0.044	192	164	1.304	0.065	0.588	0.764
Received one or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.815	0.041	799	708	2.946	0.050	0.734	0.896
Received 2 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.743	0.034	799	708	2.170	0.045	0.676	0.810
Received 3 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.561	0.028	799	708	1.579	0.049	0.506	0.616

Table B.10 Sampling errors: Western sample, Ghana MIS 2016

Variable	Value (R)	Standard error (SE)	Number of cases Unweighted (N)	Number of cases Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits Lower (R-2SE)	Confidence limits Upper (R+2SE)
HOUSEHOLD/POPULATION								
Ownership of at least one mosquito net of any type	0.691	0.032	572	482	1.639	0.046	0.628	0.754
Number of any mosquito nets	1.496	0.092	572	482	1.442	0.061	1.312	1.680
Ownership of at least one ITN	0.669	0.033	572	482	1.652	0.049	0.604	0.734
Number of ITN	1.460	0.088	572	482	1.382	0.061	1.283	1.637
Ownership of at least one ITN for two persons	0.461	0.028	561	472	1.322	0.060	0.405	0.517
Household population that slept under an ITN last night	0.370	0.044	1,901	1,667	3.956	0.118	0.282	0.458
Proportion of de facto population with access to an ITN	0.591	0.031	1,901	1,667	3.248	0.053	0.529	0.653
CHILDREN								
Slept under any mosquito net last night	0.455	0.059	274	241	1.971	0.131	0.336	0.574
Slept under an ITN last night	0.455	0.059	274	241	1.971	0.131	0.336	0.574
Slept under an ITN last night in household with at least one ITN	0.582	0.060	214	189	1.775	0.103	0.462	0.702
Had fever in last 2 weeks	0.359	0.026	252	237	0.847	0.071	0.308	0.410
Advice or treatment for fever sought	0.583	0.041	88	85	0.770	0.070	0.502	0.664
Received ACT treatment for fever	0.822	0.081	36	35	1.247	0.098	0.661	0.983
Received a finger/heel stick	0.327	0.063	88	85	1.254	0.193	0.201	0.453
Had a haemoglobin level less than 8 g/dl	0.039	0.017	246	213	1.363	0.434	0.005	0.073
Has malaria (based on rapid test)	0.381	0.050	246	213	1.619	0.132	0.281	0.481
Has malaria (based on microscopy test)	0.235	0.047	246	213	1.719	0.198	0.142	0.328
PREGNANT WOMEN								
Slept under any mosquito net last night	0.242	0.089	21	23	0.931	0.369	0.064	0.420
Slept under an ITN last night	0.242	0.089	21	23	0.931	0.369	0.064	0.420
Slept under an ITN last night in household with at least one ITN	0.399	0.117	13	14	0.831	0.294	0.164	0.634
Received one or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.882	0.023	104	101	0.714	0.026	0.837	0.927
Received 2 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.773	0.042	104	101	1.018	0.054	0.689	0.857
Received 3 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.483	0.074	104	101	1.509	0.154	0.334	0.632

Table B.11 Sampling errors: Central sample, Ghana MIS 2016

Variable	Value (R)	Standard error (SE)	Number of cases Unweighted (N)	Number of cases Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits Lower (R-2SE)	Confidence limits Upper (R+2SE)
HOUSEHOLD/POPULATION								
Ownership of at least one mosquito net of any type	0.843	0.025	593	646	1.641	0.029	0.794	0.892
Number of any mosquito nets	2.001	0.146	593	646	2.288	0.073	1.709	2.293
Ownership of at least one ITN	0.830	0.028	593	646	1.782	0.033	0.775	0.885
Number of ITN	1.957	0.150	593	646	2.328	0.076	1.658	2.256
Ownership of at least one ITN for two persons	0.617	0.042	589	643	2.115	0.069	0.532	0.702
Household population that slept under an ITN last night	0.503	0.075	2,083	2,264	6.868	0.150	0.352	0.654
Proportion of de facto population with access to an ITN	0.762	0.034	2,083	2,264	4.657	0.045	0.694	0.830
CHILDREN								
Slept under any mosquito net last night	0.619	0.066	286	310	2.287	0.106	0.487	0.751
Slept under an ITN last night	0.612	0.068	286	310	2.345	0.111	0.477	0.747
Slept under an ITN last night in household with at least one ITN	0.666	0.062	255	285	2.105	0.094	0.541	0.791
Had fever in last 2 weeks	0.439	0.034	259	294	1.104	0.078	0.371	0.507
Advice or treatment for fever sought	0.703	0.048	107	129	1.083	0.068	0.607	0.799
Received ACT treatment for fever	0.623	0.060	54	76	0.902	0.096	0.503	0.743
Received a finger/heel stick	0.235	0.044	107	129	1.075	0.188	0.146	0.324
Had a haemoglobin level less than 8 g/dl	0.140	0.039	258	281	1.802	0.279	0.062	0.218
Has malaria (based on rapid test)	0.446	0.044	258	281	1.411	0.098	0.358	0.534
Has malaria (based on microscopy test)	0.302	0.036	258	281	1.253	0.119	0.230	0.374
PREGNANT WOMEN								
Slept under any mosquito net last night	0.582	0.119	35	43	1.404	0.204	0.344	0.820
Slept under an ITN last night	0.582	0.119	35	43	1.404	0.204	0.344	0.820
Slept under an ITN last night in household with at least one ITN	0.666	0.110	29	37	1.240	0.166	0.445	0.887
Received one or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.930	0.023	113	131	0.969	0.025	0.883	0.977
Received 2 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.845	0.029	113	131	0.852	0.034	0.787	0.903
Received 3 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.585	0.053	113	131	1.135	0.090	0.479	0.691

Table B.12 Sampling errors: Greater Accra sample, Ghana MIS 2016

Variable	Value (R)	Standard error (SE)	Number of cases Unweighted (N)	Number of cases Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits Lower (R-2SE)	Confidence limits Upper (R+2SE)
HOUSEHOLD/POPULATION								
Ownership of at least one mosquito net of any type	0.617	0.027	690	1,177	1.484	0.045	0.562	0.672
Number of any mosquito nets	1.216	0.075	690	1,177	1.485	0.062	1.066	1.366
Ownership of at least one ITN	0.609	0.032	690	1,177	1.721	0.053	0.545	0.673
Number of ITN	1.199	0.081	690	1,177	1.600	0.067	1.037	1.361
Ownership of at least one ITN for two persons	0.419	0.038	674	1,151	1.990	0.090	0.343	0.495
Household population that slept under an ITN last night	0.183	0.017	2,138	3,563	2.043	0.093	0.149	0.217
Proportion of de facto population with access to an ITN	0.539	0.037	2,138	3,563	3.974	0.069	0.465	0.613
CHILDREN								
Slept under any mosquito net last night	0.326	0.030	290	490	1.086	0.092	0.266	0.386
Slept under an ITN last night	0.326	0.030	290	490	1.086	0.092	0.266	0.386
Slept under an ITN last night in household with at least one ITN	0.418	0.040	227	383	1.233	0.097	0.337	0.499
Had fever in last 2 weeks	0.238	0.025	279	506	0.980	0.105	0.188	0.288
Advice or treatment for fever sought	0.757	0.067	65	120	1.244	0.088	0.624	0.890
Received ACT treatment for fever	0.573	0.104	32	55	1.165	0.181	0.366	0.780
Received a finger/heel stick	0.297	0.089	65	120	1.557	0.299	0.119	0.475
Had a haemoglobin level less than 8 g/dl	0.013	0.008	244	406	1.161	0.643	0.000	0.030
Has malaria (based on rapid test)	0.046	0.022	244	406	1.628	0.475	0.002	0.090
Has malaria (based on microscopy test)	0.048	0.013	244	406	0.933	0.267	0.022	0.074
PREGNANT WOMEN								
Slept under any mosquito net last night	0.366	0.139	27	49	1.476	0.381	0.087	0.645
Slept under an ITN last night	0.366	0.139	27	49	1.476	0.381	0.087	0.645
Slept under an ITN last night in household with at least one ITN	0.419	0.153	22	43	1.421	0.365	0.113	0.725
Received one or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.874	0.044	116	207	1.424	0.050	0.786	0.962
Received 2 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.787	0.045	116	207	1.179	0.057	0.697	0.877
Received 3 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.576	0.065	116	207	1.410	0.113	0.446	0.706

Table B.13 Sampling errors: Volta sample, Ghana MIS 2016

Variable	Value (R)	Standard error (SE)	Number of cases: Unweighted (N)	Number of cases: Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits: Lower (R-2SE)	Confidence limits: Upper (R+2SE)
HOUSEHOLD/POPULATION								
Ownership of at least one mosquito net of any type	0.778	0.024	591	423	1.424	0.031	0.729	0.827
Number of any mosquito nets	1.892	0.102	591	423	1.529	0.054	1.689	2.095
Ownership of at least one ITN	0.761	0.023	591	423	1.309	0.030	0.715	0.807
Number of ITN	1.812	0.098	591	423	1.489	0.054	1.616	2.008
Ownership of at least one ITN for two persons	0.523	0.036	585	418	1.764	0.070	0.450	0.596
Household population that slept under an ITN last night	0.460	0.023	2,414	1,666	2.307	0.051	0.413	0.507
Proportion of de facto population with access to an ITN	0.664	0.034	2,414	1,666	4.327	0.052	0.595	0.733
CHILDREN								
Slept under any mosquito net last night	0.548	0.037	377	252	1.446	0.068	0.474	0.622
Slept under an ITN last night	0.525	0.036	377	252	1.413	0.069	0.452	0.598
Slept under an ITN last night in household with at least one ITN	0.658	0.031	298	201	1.121	0.047	0.596	0.720
Had fever in last 2 weeks	0.210	0.035	351	246	1.603	0.166	0.140	0.280
Advice or treatment for fever sought	0.790	0.067	67	52	1.340	0.085	0.656	0.924
Received ACT treatment for fever	0.683	0.140	43	34	1.948	0.205	0.403	0.963
Received a finger/heel stick	0.374	0.105	67	52	1.755	0.280	0.165	0.583
Had a haemoglobin level less than 8 g/dl	0.087	0.018	330	217	1.156	0.207	0.051	0.123
Has malaria (based on rapid test)	0.373	0.085	330	217	3.192	0.228	0.203	0.543
Has malaria (based on microscopy test)	0.275	0.042	330	217	1.709	0.153	0.191	0.359
PREGNANT WOMEN								
Slept under any mosquito net last night	0.563	0.118	27	19	1.208	0.209	0.328	0.798
Slept under an ITN last night	0.563	0.118	27	19	1.208	0.209	0.328	0.798
Slept under an ITN last night in household with at least one ITN	0.627	0.121	24	17	1.200	0.193	0.385	0.869
Received one or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.836	0.058	159	110	1.952	0.069	0.721	0.951
Received 2 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.751	0.059	159	110	1.715	0.079	0.633	0.869
Received 3 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.653	0.064	159	110	1.701	0.099	0.524	0.782

Table B.14 Sampling errors: Eastern sample, Ghana MIS 2016

Variable	Value (R)	Standard error (SE)	Number of cases: Unweighted (N)	Number of cases: Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits: Lower (R-2SE)	Confidence limits: Upper (R+2SE)
HOUSEHOLD/POPULATION								
Ownership of at least one mosquito net of any type	0.727	0.020	603	574	1.108	0.028	0.687	0.767
Number of any mosquito nets	1.440	0.064	603	574	1.156	0.044	1.313	1.567
Ownership of at least one ITN	0.716	0.020	603	574	1.091	0.028	0.676	0.756
Number of ITN	1.412	0.061	603	574	1.110	0.043	1.290	1.534
Ownership of at least one ITN for two persons	0.446	0.022	599	571	1.085	0.049	0.402	0.490
Household population that slept under an ITN last night	0.394	0.034	2,056	1,938	3.183	0.087	0.325	0.463
Proportion of de facto population with access to an ITN	0.605	0.019	2,056	1,938	2.219	0.032	0.566	0.644
CHILDREN								
Slept under any mosquito net last night	0.496	0.041	278	264	1.362	0.083	0.414	0.578
Slept under an ITN last night	0.482	0.041	278	264	1.363	0.085	0.400	0.564
Slept under an ITN last night in household with at least one ITN	0.594	0.048	231	214	1.484	0.081	0.498	0.690
Had fever in last 2 weeks	0.318	0.051	256	259	1.737	0.159	0.217	0.419
Advice or treatment for fever sought	0.827	0.040	79	82	0.942	0.049	0.746	0.908
Received ACT treatment for fever	0.468	0.105	49	52	1.461	0.225	0.257	0.679
Received a finger/heel stick	0.321	0.047	79	82	0.890	0.146	0.227	0.415
Had a haemoglobin level less than 8 g/dl	0.086	0.019	236	224	1.037	0.220	0.048	0.124
Has malaria (based on rapid test)	0.346	0.049	236	224	1.586	0.142	0.248	0.444
Has malaria (based on microscopy test)	0.313	0.051	236	224	1.689	0.163	0.211	0.415
PREGNANT WOMEN								
Slept under any mosquito net last night	0.409	0.109	25	24	1.091	0.268	0.190	0.628
Slept under an ITN last night	0.409	0.109	25	24	1.091	0.268	0.190	0.628
Slept under an ITN last night in household with at least one ITN	0.513	0.122	21	19	1.095	0.239	0.268	0.758
Received one or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.934	0.027	99	100	1.092	0.029	0.879	0.989
Received 2 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.892	0.033	99	100	1.056	0.037	0.826	0.958
Received 3 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.706	0.060	99	100	1.299	0.085	0.586	0.826

Table B.15 Sampling errors: Ashanti sample, Ghana MIS 2016

Variable	Value (R)	Standard error (SE)	Number of cases: Unweighted (N)	Number of cases: Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits: Lower (R-2SE)	Confidence limits: Upper (R+2SE)
HOUSEHOLD/POPULATION								
Ownership of at least one mosquito net of any type	0.702	0.021	742	1,278	1.231	0.029	0.661	0.743
Number of any mosquito nets	1.439	0.061	742	1,278	1.224	0.042	1.318	1.560
Ownership of at least one ITN	0.697	0.022	742	1,278	1.289	0.031	0.653	0.741
Number of ITN	1.415	0.060	742	1,278	1.234	0.043	1.294	1.536
Ownership of at least one ITN for two persons	0.472	0.032	738	1,267	1.753	0.068	0.408	0.536
Household population that slept under an ITN last night	0.426	0.035	2,388	4,120	3.474	0.083	0.356	0.496
Proportion of de facto population with access to an ITN	0.599	0.019	2,388	4,120	2.321	0.032	0.560	0.638
CHILDREN								
Slept under any mosquito net last night	0.517	0.035	389	705	1.393	0.068	0.446	0.588
Slept under an ITN last night	0.512	0.035	389	705	1.398	0.069	0.441	0.583
Slept under an ITN last night in household with at least one ITN	0.637	0.036	300	566	1.312	0.057	0.564	0.710
Had fever in last 2 weeks	0.347	0.031	342	647	1.203	0.089	0.285	0.409
Advice or treatment for fever sought	0.606	0.108	107	224	2.269	0.178	0.391	0.821
Received ACT treatment for fever	0.739	0.092	42	85	1.335	0.124	0.556	0.922
Received a finger/heel stick	0.212	0.060	107	224	1.514	0.284	0.092	0.332
Had a haemoglobin level less than 8 g/dl	0.037	0.024	356	656	2.395	0.651	0.000	0.085
Has malaria (based on rapid test)	0.179	0.042	356	656	2.077	0.236	0.094	0.264
Has malaria (based on microscopy test)	0.166	0.030	356	656	1.539	0.183	0.105	0.227
PREGNANT WOMEN								
Slept under any mosquito net last night	0.462	0.103	37	77	1.236	0.222	0.257	0.667
Slept under an ITN last night	0.462	0.103	37	77	1.236	0.222	0.257	0.667
Slept under an ITN last night in household with at least one ITN	0.565	0.101	30	63	1.096	0.179	0.363	0.767
Received one or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.854	0.037	125	238	1.151	0.043	0.781	0.927
Received 2 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.796	0.044	125	238	1.210	0.055	0.708	0.884
Received 3 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.610	0.065	125	238	1.483	0.107	0.480	0.740

Table B.16 Sampling errors: Brong Ahafo sample, Ghana MIS 2016

Variable	Value (R)	Standard error (SE)	Number of cases: Unweighted (N)	Number of cases: Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits: Lower (R-2SE)	Confidence limits: Upper (R+2SE)
HOUSEHOLD/POPULATION								
Ownership of at least one mosquito net of any type	0.812	0.018	587	490	1.126	0.022	0.776	0.848
Number of any mosquito nets	1.708	0.082	587	490	1.416	0.048	1.544	1.872
Ownership of at least one ITN	0.806	0.018	587	490	1.108	0.022	0.770	0.842
Number of ITN	1.676	0.076	587	490	1.331	0.045	1.524	1.828
Ownership of at least one ITN for two persons	0.580	0.025	577	482	1.228	0.044	0.529	0.631
Household population that slept under an ITN last night	0.519	0.034	2,003	1,668	3.085	0.066	0.450	0.588
Proportion of de facto population with access to an ITN	0.721	0.022	2,003	1,668	2.676	0.030	0.678	0.764
CHILDREN								
Slept under any mosquito net last night	0.620	0.047	307	261	1.697	0.076	0.526	0.714
Slept under an ITN last night	0.605	0.045	307	261	1.603	0.074	0.515	0.695
Slept under an ITN last night in household with at least one ITN	0.678	0.041	273	233	1.436	0.060	0.597	0.759
Had fever in last 2 weeks	0.326	0.046	292	259	1.668	0.141	0.234	0.418
Advice or treatment for fever sought	0.758	0.074	91	84	1.636	0.098	0.610	0.906
Received ACT treatment for fever	0.673	0.063	48	44	0.915	0.093	0.548	0.798
Received a finger/heel stick	0.456	0.087	91	84	1.659	0.191	0.282	0.630
Had a haemoglobin level less than 8 g/dl	0.044	0.017	276	233	1.347	0.377	0.011	0.077
Has malaria (based on rapid test)	0.299	0.065	276	233	2.358	0.218	0.169	0.429
Has malaria (based on microscopy test)	0.224	0.065	276	233	2.605	0.292	0.093	0.355
PREGNANT WOMEN								
Slept under any mosquito net last night	0.577	0.068	39	34	0.844	0.117	0.442	0.712
Slept under an ITN last night	0.556	0.066	39	34	0.819	0.119	0.424	0.688
Slept under an ITN last night in household with at least one ITN	0.643	0.083	34	30	0.995	0.129	0.477	0.809
Received one or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.919	0.030	125	111	1.242	0.033	0.858	0.980
Received 2 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.850	0.033	125	111	1.036	0.039	0.784	0.916
Received 3 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.687	0.056	125	111	1.341	0.081	0.575	0.799

Table B.17 Sampling errors: Northern sample, Ghana MIS 2016

Variable	Value (R)	Standard error (SE)	Number of cases: Unweighted (N)	Number of cases: Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits: Lower (R-2SE)	Confidence limits: Upper (R+2SE)
HOUSEHOLD/POPULATION								
Ownership of at least one mosquito net of any type	0.838	0.023	535	464	1.445	0.027	0.792	0.884
Number of any mosquito nets	2.445	0.192	535	464	2.510	0.079	2.060	2.830
Ownership of at least one ITN	0.837	0.023	535	464	1.429	0.027	0.791	0.883
Number of ITN	2.428	0.187	535	464	2.457	0.077	2.054	2.802
Ownership of at least one ITN for two persons	0.599	0.028	530	461	1.331	0.047	0.542	0.656
Household population that slept under an ITN last night	0.507	0.082	2,803	2,364	8.656	0.161	0.343	0.671
Proportion of de facto population with access to an ITN	0.767	0.023	2,803	2,364	3.560	0.029	0.722	0.812
CHILDREN								
Slept under any mosquito net last night	0.612	0.060	582	511	2.969	0.098	0.492	0.732
Slept under an ITN last night	0.610	0.060	582	511	2.950	0.098	0.491	0.729
Slept under an ITN last night in household with at least one ITN	0.681	0.056	529	458	2.756	0.082	0.569	0.793
Had fever in last 2 weeks	0.241	0.023	532	482	1.265	0.097	0.194	0.288
Advice or treatment for fever sought	0.849	0.050	142	116	1.649	0.058	0.750	0.948
Received ACT treatment for fever	0.204	0.076	86	71	1.727	0.370	0.053	0.355
Received a finger/heel stick	0.266	0.039	142	116	1.044	0.146	0.188	0.344
Had a haemoglobin level less than 8 g/dl	0.124	0.020	515	464	1.344	0.158	0.085	0.163
Has malaria (based on rapid test)	0.393	0.110	515	464	5.096	0.279	0.173	0.613
Has malaria (based on microscopy test)	0.252	0.085	515	464	4.446	0.338	0.082	0.422
PREGNANT WOMEN								
Slept under any mosquito net last night	0.588	0.081	59	54	1.251	0.137	0.426	0.750
Slept under an ITN last night	0.588	0.081	59	54	1.251	0.137	0.426	0.750
Slept under an ITN last night in household with at least one ITN	0.699	0.071	52	45	1.099	0.101	0.558	0.840
Received one or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.674	0.084	219	211	2.647	0.125	0.506	0.842
Received 2 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.610	0.063	219	211	1.908	0.103	0.484	0.736
Received 3 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.496	0.035	219	211	1.019	0.070	0.427	0.565

Table B.18 Sampling errors: Upper East sample, Ghana MIS 2016

Variable	Value (R)	Standard error (SE)	Number of cases: Unweighted (N)	Number of cases: Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits: Lower (R-2SE)	Confidence limits: Upper (R+2SE)
HOUSEHOLD/POPULATION								
Ownership of at least one mosquito net of any type	0.952	0.007	478	180	0.694	0.007	0.938	0.966
Number of any mosquito nets	3.047	0.128	478	180	1.703	0.042	2.791	3.303
Ownership of at least one ITN	0.945	0.008	478	180	0.797	0.009	0.928	0.962
Number of ITN	2.988	0.121	478	180	1.616	0.041	2.746	3.230
Ownership of at least one ITN for two persons	0.724	0.038	474	179	1.828	0.052	0.649	0.799
Household population that slept under an ITN last night	0.632	0.042	2,583	916	4.378	0.066	0.549	0.715
Proportion of de facto population with access to an ITN	0.883	0.016	2,583	916	3.854	0.018	0.852	0.914
CHILDREN								
Slept under any mosquito net last night	0.755	0.059	354	118	2.585	0.078	0.637	0.873
Slept under an ITN last night	0.755	0.059	354	118	2.585	0.078	0.637	0.873
Slept under an ITN last night in household with at least one ITN	0.766	0.059	350	116	2.603	0.077	0.648	0.884
Had fever in last 2 weeks	0.265	0.028	329	116	1.158	0.106	0.209	0.321
Advice or treatment for fever sought	0.853	0.043	88	31	1.124	0.050	0.768	0.938
Received ACT treatment for fever	0.695	0.125	40	13	1.692	0.180	0.445	0.945
Received a finger/heel stick	0.689	0.081	88	31	1.633	0.118	0.527	0.851
Had a haemoglobin level less than 8 g/dl	0.074	0.014	319	105	0.987	0.196	0.045	0.103
Has malaria (based on rapid test)	0.258	0.035	319	105	1.423	0.135	0.188	0.328
Has malaria (based on microscopy test)	0.147	0.029	319	105	1.444	0.195	0.090	0.204
PREGNANT WOMEN								
Slept under any mosquito net last night	0.729	0.066	49	19	1.024	0.090	0.598	0.860
Slept under an ITN last night	0.729	0.066	49	19	1.024	0.090	0.598	0.860
Slept under an ITN last night in household with at least one ITN	0.729	0.066	49	19	1.024	0.090	0.598	0.860
Received one or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.965	0.011	130	45	0.691	0.012	0.943	0.987
Received 2 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.908	0.029	130	45	1.122	0.031	0.851	0.965
Received 3 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.789	0.052	130	45	1.434	0.065	0.686	0.892

Table B.19 Sampling errors: Upper West sample, Ghana MIS 2016

Variable	Value (R)	Standard error (SE)	Number of cases: Unweighted (N)	Number of cases: Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits: Lower (R-2SE)	Confidence limits: Upper (R+2SE)
HOUSEHOLD/POPULATION								
Ownership of at least one mosquito net of any type	0.897	0.017	450	126	1.194	0.019	0.863	0.931
Number of any mosquito nets	2.098	0.073	450	126	1.221	0.035	1.951	2.245
Ownership of at least one ITN	0.897	0.017	450	126	1.194	0.019	0.863	0.931
Number of ITN	2.093	0.072	450	126	1.194	0.034	1.949	2.237
Ownership of at least one ITN for two persons	0.652	0.034	447	125	1.525	0.053	0.583	0.721
Household population that slept under an ITN last night	0.540	0.038	1,963	541	3.419	0.071	0.463	0.617
Proportion of de facto population with access to an ITN	0.805	0.016	1,963	541	2.407	0.020	0.772	0.838
CHILDREN								
Slept under any mosquito net last night	0.607	0.065	292	83	2.253	0.106	0.478	0.736
Slept under an ITN last night	0.607	0.065	292	83	2.253	0.106	0.478	0.736
Slept under an ITN last night in household with at least one ITN	0.633	0.066	281	79	2.287	0.104	0.501	0.765
Had fever in last 2 weeks	0.236	0.033	253	76	1.240	0.141	0.170	0.302
Advice or treatment for fever sought	0.639	0.065	60	18	1.044	0.102	0.508	0.770
Received ACT treatment for fever	0.747	0.122	25	8	1.372	0.163	0.503	0.991
Received a finger/heel stick	0.404	0.078	60	18	1.218	0.193	0.248	0.560
Had a haemoglobin level less than 8 g/dl	0.091	0.018	267	75	1.009	0.195	0.055	0.127
Has malaria (based on rapid test)	0.278	0.059	267	75	2.134	0.211	0.161	0.395
Has malaria (based on microscopy test)	0.215	0.050	267	75	1.991	0.233	0.115	0.315
PREGNANT WOMEN								
Slept under any mosquito net last night	0.671	0.132	32	11	1.562	0.196	0.407	0.935
Slept under an ITN last night	0.671	0.132	32	11	1.562	0.196	0.407	0.935
Slept under an ITN last night in household with at least one ITN	0.710	0.156	30	10	1.853	0.220	0.398	1.022
Received one or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.894	0.029	101	30	0.949	0.033	0.836	0.952
Received 2 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.822	0.029	101	30	0.748	0.035	0.765	0.879
Received 3 or more doses of SP/Fansidar during pregnancy of the most recent live birth	0.575	0.045	101	30	0.919	0.079	0.484	0.666

Table B.20 Sampling errors: Total sample, Ghana MIS 2019

Variable	Value (R)	Standard error (SE)	Number of cases Unweighted (N)	Number of cases Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits Lower (R-2SE)	Confidence limits Upper (R+2SE)
HOUSEHOLDS								
Ownership of at least one mosquito net	0.740	0.009	5,799	5,799	1.535	0.012	0.722	0.757
Average number of mosquito nets per household	1.787	0.038	5,799	5,799	1.756	0.021	1.711	1.862
Ownership of at least one ITN	0.737	0.009	5,799	5,799	1.515	0.012	0.720	0.755
Average number of ITNs per household	1.778	0.037	5,799	5,799	1.743	0.021	1.703	1.852
Ownership of at least one ITN for two persons	0.518	0.012	5,749	5,756	1.772	0.023	0.494	0.541
Household population that slept under an ITN last night	0.432	0.014	23,000	21,843	4.179	0.032	0.405	0.459
Proportion of de facto population with access to an ITN	0.667	0.010	23,000	21,843	4.033	0.016	0.646	0.688
WOMEN								
No education	0.167	0.011	5,181	5,181	2.075	0.064	0.145	0.188
Secondary education or higher	0.647	0.015	5,181	5,181	2.199	0.023	0.618	0.677
Literacy	0.585	0.015	5,181	5,181	2.192	0.026	0.555	0.615
CHILDREN								
Slept under any mosquito net last night	0.542	0.016	3,252	3,008	1.495	0.030	0.510	0.574
Slept under an ITN last night	0.541	0.016	3,252	3,008	1.495	0.030	0.509	0.573
Slept under an ITN last night in households with at least one ITN	0.633	0.017	2,805	2,572	1.544	0.027	0.599	0.666
Had fever in last 2 weeks	0.296	0.015	2,928	2,809	1.619	0.050	0.267	0.326
Sought care/treatment from a health facility	0.690	0.023	929	832	1.344	0.033	0.645	0.735
Took ACT	0.845	0.022	435	382	1.127	0.026	0.801	0.890
Received a finger/heel stick	0.341	0.022	929	832	1.386	0.063	0.298	0.384
Has anaemia (haemoglobin <8.0 g/dl)	0.036	0.005	2,849	2,621	1.365	0.144	0.026	0.047
Has malaria (based on rapid test)	0.230	0.017	2,843	2,612	1.857	0.073	0.196	0.263
Has malaria (based on microscopy test)	0.141	0.012	2,846	2,619	1.599	0.085	0.117	0.165
PREGNANT WOMEN								
Slept under any mosquito net last night	0.491	0.031	364	345	1.147	0.063	0.429	0.553
Slept under an ITN last night	0.487	0.031	364	345	1.147	0.064	0.425	0.549
Slept under an ITN last night in households with at least one ITN	0.584	0.035	310	288	1.223	0.061	0.513	0.655
Received 1+ doses of SP/Fansidar	0.914	0.013	1,215	1,151	1.521	0.014	0.888	0.939
Received 2+ doses of SP/Fansidar	0.802	0.016	1,215	1,151	1.393	0.020	0.769	0.835
Received 3+ doses of SP/Fansidar	0.610	0.019	1,215	1,151	1.354	0.032	0.571	0.649

Table B.21 Sampling errors: Urban sample, Ghana MIS 2019

Variable	Value (R)	Standard error (SE)	Number of cases: Unweighted (N)	Number of cases: Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits: Lower (R-2SE)	Confidence limits: Upper (R+2SE)
HOUSEHOLDS								
Ownership of at least one mosquito net	0.639	0.012	2,801	2,984	1.290	0.018	0.616	0.663
Average number of mosquito nets per household	1.421	0.049	2,801	2,984	1.697	0.035	1.322	1.520
Ownership of at least one ITN	0.635	0.011	2,801	2,984	1.261	0.018	0.613	0.658
Average number of ITNs per household	1.409	0.049	2,801	2,984	1.671	0.034	1.312	1.506
Ownership of at least one ITN for two persons	0.443	0.014	2,781	2,970	1.484	0.032	0.415	0.471
Household population that slept under an ITN last night	0.276	0.017	9,670	10,085	3.645	0.060	0.243	0.309
Proportion of de facto population with access to an ITN	0.585	0.013	9,670	10,085	3.104	0.023	0.558	0.612
WOMEN								
No education	0.096	0.011	2,440	2,657	1.815	0.113	0.074	0.117
Secondary education or higher	0.749	0.017	2,440	2,657	1.915	0.022	0.716	0.783
Literacy	0.706	0.019	2,440	2,657	2.019	0.026	0.669	0.744
CHILDREN								
Slept under any mosquito net last night	0.379	0.025	1,232	1,246	1.454	0.065	0.330	0.429
Slept under an ITN last night	0.378	0.025	1,232	1,246	1.452	0.065	0.329	0.427
Slept under an ITN last night in households with at least one ITN	0.484	0.030	978	972	1.567	0.062	0.424	0.544
Had fever in last 2 weeks	0.296	0.016	1,140	1,194	1.088	0.053	0.265	0.328
Sought care/treatment from a health facility	0.743	0.030	352	354	1.248	0.041	0.683	0.803
Took ACT	0.832	0.035	159	154	1.030	0.042	0.762	0.901
Received a finger/heel stick	0.340	0.030	352	354	1.184	0.088	0.280	0.400
Has anaemia (haemoglobin <8.0 g/dl)	0.023	0.006	1,053	1,064	1.095	0.251	0.012	0.035
Has malaria (based on rapid test)	0.098	0.013	1,049	1,057	1.224	0.129	0.073	0.123
Has malaria (based on microscopy test)	0.061	0.012	1,051	1,062	1.428	0.190	0.038	0.084
PREGNANT WOMEN								
Slept under any mosquito net last night	0.325	0.042	136	143	1.019	0.129	0.241	0.409
Slept under an ITN last night	0.314	0.042	136	143	1.021	0.132	0.231	0.397
Slept under an ITN last night in households with at least one ITN	0.442	0.056	102	102	1.098	0.128	0.329	0.555
Received 1+ doses of SP/Fansidar	0.910	0.020	478	500	1.491	0.022	0.870	0.950
Received 2+ doses of SP/Fansidar	0.789	0.022	478	500	1.163	0.028	0.745	0.833
Received 3+ doses of SP/Fansidar	0.595	0.026	478	500	1.143	0.044	0.543	0.647

Table B.22 Sampling errors: Rural sample, Ghana MIS 2019

Variable	Value (R)	Standard error (SE)	Number of cases		Design effect (DEFT)	Relative error (SE/R)	Confidence limits	
			Unweighted (N)	Weighted (WN)			Lower (R-2SE)	Upper (R+2SE)
HOUSEHOLDS								
Ownership of at least one mosquito net	0.846	0.011	2,998	2,815	1.684	0.013	0.824	0.868
Average number of mosquito nets per household	2.174	0.046	2,998	2,815	1.539	0.021	2.082	2.267
Ownership of at least one ITN	0.845	0.011	2,998	2,815	1.670	0.013	0.823	0.867
Average number of ITNs per household	2.168	0.046	2,998	2,815	1.537	0.021	2.076	2.261
Ownership of at least one ITN for two persons	0.597	0.016	2,968	2,786	1.762	0.027	0.565	0.629
Household population that slept under an ITN last night	0.566	0.021	13,330	11,758	4.887	0.037	0.524	0.608
Proportion of de facto population with access to an ITN	0.738	0.014	13,330	11,758	4.863	0.020	0.709	0.767
WOMEN								
No education	0.242	0.018	2,741	2,524	2.202	0.075	0.206	0.278
Secondary education or higher	0.540	0.022	2,741	2,524	2.360	0.042	0.495	0.585
Literacy	0.458	0.020	2,741	2,524	2.151	0.045	0.417	0.499
CHILDREN								
Slept under any mosquito net last night	0.657	0.020	2,020	1,762	1.527	0.031	0.617	0.698
Slept under an ITN last night	0.657	0.020	2,020	1,762	1.531	0.031	0.616	0.697
Slept under an ITN last night in households with at least one ITN	0.723	0.018	1,827	1,600	1.475	0.025	0.686	0.760
Had fever in last 2 weeks	0.296	0.023	1,788	1,615	1.974	0.077	0.251	0.342
Sought care/treatment from a health facility	0.651	0.032	577	479	1.413	0.049	0.588	0.714
Took ACT	0.855	0.029	276	228	1.213	0.034	0.796	0.913
Received a finger/heel stick	0.342	0.030	577	479	1.533	0.089	0.281	0.403
Has anaemia (haemoglobin <8.0 g/dl)	0.045	0.008	1,796	1,557	1.478	0.169	0.030	0.061
Has malaria (based on rapid test)	0.319	0.026	1,794	1,556	2.090	0.081	0.267	0.371
Has malaria (based on microscopy test)	0.196	0.018	1,795	1,556	1.652	0.090	0.161	0.231
PREGNANT WOMEN								
Slept under any mosquito net last night	0.610	0.042	228	202	1.267	0.069	0.525	0.694
Slept under an ITN last night	0.610	0.042	228	202	1.267	0.069	0.525	0.694
Slept under an ITN last night in households with at least one ITN	0.662	0.045	208	186	1.356	0.068	0.572	0.752
Received 1+ doses of SP/Fansidar	0.916	0.016	737	651	1.550	0.018	0.884	0.949
Received 2+ doses of SP/Fansidar	0.812	0.023	737	651	1.574	0.029	0.766	0.858
Received 3+ doses of SP/Fansidar	0.622	0.028	737	651	1.517	0.044	0.567	0.678

Table B.23 Sampling errors: Western region sample, Ghana MIS 2019

Variable	Value (R)	Standard error (SE)	Number of cases Unweighted (N)	Number of cases Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits Lower (R-2SE)	Confidence limits Upper (R+2SE)
HOUSEHOLDS								
Ownership of at least one mosquito net	0.788	0.028	589	573	1.689	0.036	0.731	0.845
Average number of mosquito nets per household	1.984	0.121	589	573	1.773	0.061	1.743	2.225
Ownership of at least one ITN	0.788	0.028	589	573	1.689	0.036	0.731	0.845
Average number of ITNs per household	1.984	0.121	589	573	1.773	0.061	1.743	2.225
Ownership of at least one ITN for two persons	0.590	0.026	581	567	1.286	0.045	0.537	0.642
Household population that slept under an ITN last night	0.470	0.051	2,136	2,076	4.704	0.108	0.368	0.572
Proportion of de facto population with access to an ITN	0.725	0.027	2,136	2,076	3.327	0.037	0.671	0.779
WOMEN								
No education	0.131	0.019	505	501	1.234	0.141	0.094	0.168
Secondary education or higher	0.717	0.030	505	501	1.493	0.042	0.657	0.777
Literacy	0.617	0.039	505	501	1.784	0.063	0.540	0.695
CHILDREN								
Slept under any mosquito net last night	0.585	0.060	314	310	1.726	0.103	0.464	0.705
Slept under an ITN last night	0.585	0.060	314	310	1.726	0.103	0.464	0.705
Slept under an ITN last night in households with at least one ITN	0.679	0.046	271	267	1.339	0.067	0.587	0.770
Had fever in last 2 weeks	0.404	0.031	288	289	0.992	0.076	0.343	0.465
Sought care/treatment from a health facility	0.641	0.043	115	117	0.927	0.067	0.556	0.726
Took ACT	0.642	0.062	73	75	1.014	0.096	0.518	0.765
Received a finger/heel stick	0.446	0.065	115	117	1.390	0.145	0.317	0.575
Has anaemia (haemoglobin <8.0 g/dl)	0.033	0.017	286	283	1.634	0.509	0.000	0.066
Has malaria (based on rapid test)	0.312	0.042	286	283	1.379	0.134	0.228	0.396
Has malaria (based on microscopy test)	0.270	0.039	286	283	1.364	0.143	0.193	0.348
PREGNANT WOMEN								
Slept under any mosquito net last night	0.639	0.083	36	33	1.052	0.129	0.474	0.805
Slept under an ITN last night	0.639	0.083	36	33	1.052	0.129	0.474	0.805
Slept under an ITN last night in households with at least one ITN	0.712	0.086	32	30	1.110	0.121	0.540	0.885
Received 1+ doses of SP/Fansidar	0.902	0.024	115	114	0.874	0.027	0.853	0.950
Received 2+ doses of SP/Fansidar	0.844	0.029	115	114	0.849	0.034	0.786	0.901
Received 3+ doses of SP/Fansidar	0.675	0.038	115	114	0.876	0.057	0.599	0.752

Table B.24 Sampling errors: Central region sample, Ghana MIS 2019

Variable	Value (R)	Standard error (SE)	Number of cases Unweighted (N)	Number of cases Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits Lower (R-2SE)	Confidence limits Upper (R+2SE)
HOUSEHOLDS								
Ownership of at least one mosquito net	0.777	0.026	610	463	1.534	0.033	0.725	0.829
Average number of mosquito nets per household	1.680	0.094	610	463	1.587	0.056	1.491	1.868
Ownership of at least one ITN	0.777	0.026	610	463	1.534	0.033	0.725	0.829
Average number of ITNs per household	1.680	0.094	610	463	1.587	0.056	1.491	1.868
Ownership of at least one ITN for two persons	0.546	0.030	602	456	1.473	0.055	0.486	0.606
Household population that slept under an ITN last night	0.436	0.036	2,114	1,590	3.318	0.082	0.364	0.508
Proportion of de facto population with access to an ITN	0.672	0.028	2,114	1,590	3.355	0.042	0.616	0.728
WOMEN								
No education	0.098	0.016	465	368	1.192	0.168	0.065	0.130
Secondary education or higher	0.691	0.030	465	368	1.417	0.044	0.630	0.751
Literacy	0.549	0.027	465	368	1.161	0.049	0.495	0.602
CHILDREN								
Slept under any mosquito net last night	0.564	0.043	295	223	1.249	0.076	0.478	0.649
Slept under an ITN last night	0.564	0.043	295	223	1.249	0.076	0.478	0.649
Slept under an ITN last night in households with at least one ITN	0.652	0.037	258	193	1.051	0.057	0.578	0.726
Had fever in last 2 weeks	0.363	0.043	266	206	1.379	0.118	0.278	0.448
Sought care/treatment from a health facility	0.612	0.060	101	75	1.122	0.098	0.492	0.732
Took ACT	0.877	0.053	41	30	1.022	0.061	0.770	0.984
Received a finger/heel stick	0.240	0.051	101	75	1.189	0.212	0.138	0.342
Has anaemia (haemoglobin <8.0 g/dl)	0.057	0.015	251	187	0.978	0.268	0.027	0.088
Has malaria (based on rapid test)	0.299	0.035	251	187	1.087	0.118	0.229	0.370
Has malaria (based on microscopy test)	0.176	0.029	250	186	1.038	0.162	0.119	0.234
PREGNANT WOMEN								
Slept under any mosquito net last night	0.509	0.065	35	26	0.749	0.127	0.380	0.638
Slept under an ITN last night	0.509	0.065	35	26	0.749	0.127	0.380	0.638
Slept under an ITN last night in households with at least one ITN	0.611	0.076	29	21	0.829	0.125	0.458	0.764
Received 1+ doses of SP/Fansidar	0.916	0.028	125	98	1.138	0.031	0.860	0.973
Received 2+ doses of SP/Fansidar	0.776	0.035	125	98	0.945	0.046	0.705	0.847
Received 3+ doses of SP/Fansidar	0.624	0.043	125	98	0.985	0.069	0.539	0.710

Table B.25 Sampling errors: Greater Accra region sample, Ghana MIS 2019

Variable	Value (R)	Standard error (SE)	Number of cases Unweighted (N)	Number of cases Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits Lower (R-2SE)	Confidence limits Upper (R+2SE)
HOUSEHOLDS								
Ownership of at least one mosquito net	0.562	0.017	697	1,103	0.910	0.030	0.528	0.596
Average number of mosquito nets per household	1.194	0.067	697	1,103	1.189	0.056	1.060	1.327
Ownership of at least one ITN	0.561	0.017	697	1,103	0.899	0.030	0.527	0.595
Average number of ITNs per household	1.188	0.067	697	1,103	1.192	0.056	1.054	1.322
Ownership of at least one ITN for two persons	0.394	0.022	696	1,102	1.183	0.056	0.350	0.438
Household population that slept under an ITN last night	0.190	0.017	2,178	3,470	2.025	0.090	0.156	0.224
Proportion of de facto population with access to an ITN	0.514	0.020	2,178	3,470	2.059	0.038	0.475	0.553
WOMEN								
No education	0.050	0.015	586	938	1.663	0.301	0.020	0.080
Secondary education or higher	0.780	0.023	586	938	1.348	0.030	0.734	0.826
Literacy	0.808	0.029	586	938	1.777	0.036	0.750	0.866
CHILDREN								
Slept under any mosquito net last night	0.247	0.033	234	376	1.045	0.134	0.181	0.313
Slept under an ITN last night	0.247	0.033	234	376	1.045	0.134	0.181	0.313
Slept under an ITN last night in households with at least one ITN	0.349	0.045	164	266	1.094	0.128	0.260	0.438
Had fever in last 2 weeks	0.193	0.020	231	379	0.766	0.101	0.154	0.232
Sought care/treatment from a health facility	0.798	0.081	44	73	1.387	0.102	0.635	0.960
Took ACT	1.000	0.000	18	30	na	0.000	1.000	1.000
Received a finger/heel stick	0.206	0.084	44	73	1.365	0.408	0.038	0.374
Has anaemia (haemoglobin <8.0 g/dl)	0.000	0.000	187	307	na	na	0.000	0.000
Has malaria (based on rapid test)	0.010	0.008	186	304	1.052	0.765	0.000	0.025
Has malaria (based on microscopy test)	0.024	0.013	187	307	1.155	0.537	0.000	0.049
PREGNANT WOMEN								
Slept under any mosquito net last night	0.208	0.079	29	43	1.012	0.379	0.050	0.366
Slept under an ITN last night	0.208	0.079	29	43	1.012	0.379	0.050	0.366
Slept under an ITN last night in households with at least one ITN	0.317	0.108	21	28	0.978	0.340	0.101	0.533
Received 1+ doses of SP/Fansidar	0.918	0.026	103	174	0.987	0.028	0.867	0.970
Received 2+ doses of SP/Fansidar	0.751	0.043	103	174	1.032	0.057	0.666	0.837
Received 3+ doses of SP/Fansidar	0.570	0.045	103	174	0.940	0.078	0.481	0.659

na = Not applicable

Table B.26 Sampling errors: Volta region sample, Ghana MIS 2019

Variable	Value (R)	Standard error (SE)	Number of cases Unweighted (N)	Number of cases Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits Lower (R-2SE)	Confidence limits Upper (R+2SE)
HOUSEHOLDS								
Ownership of at least one mosquito net	0.849	0.017	563	644	1.119	0.020	0.815	0.883
Average number of mosquito nets per household	2.148	0.103	563	644	1.482	0.048	1.942	2.354
Ownership of at least one ITN	0.845	0.016	563	644	1.018	0.018	0.814	0.876
Average number of ITNs per household	2.135	0.101	563	644	1.458	0.047	1.932	2.337
Ownership of at least one ITN for two persons	0.611	0.039	559	640	1.892	0.064	0.532	0.689
Household population that slept under an ITN last night	0.543	0.031	2,140	2,576	2.837	0.056	0.482	0.604
Proportion of de facto population with access to an ITN	0.755	0.036	2,140	2,576	4.874	0.047	0.683	0.827
WOMEN								
No education	0.162	0.043	468	561	2.535	0.268	0.075	0.249
Secondary education or higher	0.581	0.061	468	561	2.650	0.105	0.459	0.702
Literacy	0.536	0.058	468	561	2.495	0.108	0.420	0.652
CHILDREN								
Slept under any mosquito net last night	0.676	0.028	280	340	0.889	0.042	0.619	0.732
Slept under an ITN last night	0.676	0.028	280	340	0.889	0.042	0.619	0.732
Slept under an ITN last night in households with at least one ITN	0.724	0.036	259	317	1.219	0.050	0.652	0.797
Had fever in last 2 weeks	0.247	0.084	245	309	3.015	0.339	0.079	0.414
Sought care/treatment from a health facility	0.804	0.046	73	76	0.905	0.057	0.713	0.895
Took ACT	0.922	0.042	32	32	0.807	0.046	0.838	1.007
Received a finger/heel stick	0.395	0.050	73	76	0.861	0.126	0.296	0.494
Has anaemia (haemoglobin <8.0 g/dl)	0.028	0.015	251	302	1.329	0.530	0.000	0.058
Has malaria (based on rapid test)	0.333	0.082	250	301	2.499	0.246	0.169	0.496
Has malaria (based on microscopy test)	0.204	0.038	249	301	1.398	0.187	0.128	0.281
PREGNANT WOMEN								
Slept under any mosquito net last night	0.348	0.091	27	32	1.012	0.261	0.166	0.530
Slept under an ITN last night	0.330	0.089	27	32	0.998	0.268	0.153	0.508
Slept under an ITN last night in households with at least one ITN	0.389	0.110	22	27	1.102	0.283	0.169	0.610
Received 1+ doses of SP/Fansidar	0.946	0.021	104	121	0.943	0.022	0.903	0.988
Received 2+ doses of SP/Fansidar	0.818	0.063	104	121	1.644	0.078	0.691	0.944
Received 3+ doses of SP/Fansidar	0.532	0.096	104	121	1.919	0.180	0.340	0.723

Table B.27 Sampling errors: Eastern region sample, Ghana MIS 2019

Variable	Value (R)	Standard error (SE)	Number of cases: Unweighted (N)	Number of cases: Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits: Lower (R-2SE)	Confidence limits: Upper (R+2SE)
HOUSEHOLDS								
Ownership of at least one mosquito net	0.719	0.027	611	739	1.479	0.038	0.665	0.773
Average number of mosquito nets per household	1.559	0.069	611	739	1.099	0.044	1.420	1.697
Ownership of at least one ITN	0.713	0.026	611	739	1.426	0.037	0.660	0.765
Average number of ITNs per household	1.535	0.061	611	739	0.975	0.040	1.413	1.657
Ownership of at least one ITN for two persons	0.483	0.035	600	728	1.689	0.072	0.414	0.552
Household population that slept under an ITN last night	0.335	0.043	1,974	2,405	4.078	0.129	0.248	0.422
Proportion of de facto population with access to an ITN	0.650	0.025	1,974	2,405	2.823	0.038	0.600	0.700
WOMEN								
No education	0.093	0.021	493	642	1.568	0.222	0.051	0.134
Secondary education or higher	0.754	0.028	493	642	1.423	0.037	0.699	0.809
Literacy	0.660	0.037	493	642	1.715	0.056	0.587	0.734
CHILDREN								
Slept under any mosquito net last night	0.435	0.070	263	315	1.930	0.161	0.295	0.575
Slept under an ITN last night	0.435	0.070	263	315	1.930	0.161	0.295	0.575
Slept under an ITN last night in households with at least one ITN	0.504	0.083	228	272	2.146	0.166	0.337	0.671
Had fever in last 2 weeks	0.283	0.029	246	297	0.913	0.102	0.225	0.341
Sought care/treatment from a health facility	0.603	0.077	76	84	1.166	0.128	0.448	0.758
Took ACT	0.795	0.102	29	37	1.336	0.128	0.591	0.998
Received a finger/heel stick	0.249	0.058	76	84	1.162	0.233	0.133	0.365
Has anaemia (haemoglobin <8.0 g/dl)	0.016	0.008	224	270	0.916	0.489	0.000	0.031
Has malaria (based on rapid test)	0.264	0.051	222	267	1.604	0.193	0.162	0.366
Has malaria (based on microscopy test)	0.123	0.041	224	270	1.707	0.335	0.041	0.206
PREGNANT WOMEN								
Slept under any mosquito net last night	0.437	0.058	34	46	0.745	0.134	0.320	0.553
Slept under an ITN last night	0.437	0.058	34	46	0.745	0.134	0.320	0.553
Slept under an ITN last night in households with at least one ITN	0.567	0.089	28	35	1.001	0.156	0.390	0.745
Received 1+ doses of SP/Fansidar	0.822	0.063	91	111	1.527	0.077	0.695	0.948
Received 2+ doses of SP/Fansidar	0.684	0.053	91	111	1.055	0.078	0.578	0.790
Received 3+ doses of SP/Fansidar	0.422	0.054	91	111	1.009	0.128	0.314	0.530

Table B.28 Sampling errors: Ashanti region sample, Ghana MIS 2019

Variable	Value (R)	Standard error (SE)	Number of cases: Unweighted (N)	Number of cases: Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits: Lower (R-2SE)	Confidence limits: Upper (R+2SE)
HOUSEHOLDS								
Ownership of at least one mosquito net	0.728	0.024	729	1,057	1.453	0.033	0.680	0.776
Average number of mosquito nets per household	1.813	0.094	729	1,057	1.534	0.052	1.626	2.001
Ownership of at least one ITN	0.725	0.024	729	1,057	1.449	0.033	0.677	0.773
Average number of ITNs per household	1.805	0.094	729	1,057	1.541	0.052	1.616	1.993
Ownership of at least one ITN for two persons	0.540	0.029	727	1,053	1.573	0.054	0.482	0.598
Household population that slept under an ITN last night	0.403	0.043	2,643	3,836	4.478	0.106	0.318	0.488
Proportion of de facto population with access to an ITN	0.677	0.028	2,643	3,836	3.531	0.041	0.622	0.732
WOMEN								
No education	0.104	0.019	648	950	1.563	0.181	0.066	0.141
Secondary education or higher	0.708	0.037	648	950	2.088	0.053	0.634	0.783
Literacy	0.600	0.035	648	950	1.801	0.058	0.531	0.670
CHILDREN								
Slept under any mosquito net last night	0.525	0.041	318	472	1.281	0.079	0.442	0.607
Slept under an ITN last night	0.523	0.041	318	472	1.274	0.079	0.440	0.605
Slept under an ITN last night in households with at least one ITN	0.624	0.045	260	395	1.362	0.073	0.534	0.715
Had fever in last 2 weeks	0.321	0.029	303	465	1.088	0.092	0.262	0.379
Sought care/treatment from a health facility	0.661	0.066	99	149	1.384	0.100	0.529	0.793
Took ACT	0.899	0.074	31	45	1.356	0.083	0.750	1.047
Received a finger/heel stick	0.252	0.051	99	149	1.168	0.203	0.150	0.354
Has anaemia (haemoglobin <8.0 g/dl)	0.028	0.012	280	413	1.105	0.418	0.005	0.052
Has malaria (based on rapid test)	0.158	0.042	280	413	1.766	0.265	0.074	0.241
Has malaria (based on microscopy test)	0.104	0.029	280	413	1.572	0.279	0.046	0.162
PREGNANT WOMEN								
Slept under any mosquito net last night	0.484	0.092	40	64	1.222	0.190	0.300	0.668
Slept under an ITN last night	0.484	0.092	40	64	1.222	0.190	0.300	0.668
Slept under an ITN last night in households with at least one ITN	0.571	0.109	32	54	1.349	0.191	0.353	0.790
Received 1+ doses of SP/Fansidar	0.939	0.025	117	184	1.190	0.027	0.888	0.990
Received 2+ doses of SP/Fansidar	0.848	0.033	117	184	1.023	0.039	0.782	0.914
Received 3+ doses of SP/Fansidar	0.642	0.036	117	184	0.846	0.056	0.570	0.715

Table B.29 Sampling errors: Brong Ahafo region sample, Ghana MIS 2019

Variable	Value (R)	Standard error (SE)	Number of cases Unweighted (N)	Number of cases Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits Lower (R-2SE)	Confidence limits Upper (R+2SE)
HOUSEHOLDS								
Ownership of at least one mosquito net	0.800	0.018	569	499	1.050	0.022	0.765	0.835
Average number of mosquito nets per household	1.958	0.090	569	499	1.324	0.046	1.779	2.138
Ownership of at least one ITN	0.796	0.017	569	499	1.025	0.022	0.762	0.831
Average number of ITNs per household	1.940	0.089	569	499	1.317	0.046	1.762	2.119
Ownership of at least one ITN for two persons	0.609	0.019	563	495	0.924	0.031	0.571	0.647
Household population that slept under an ITN last night	0.603	0.031	2,030	1,769	2.839	0.051	0.541	0.665
Proportion of de facto population with access to an ITN	0.751	0.017	2,030	1,769	2.171	0.023	0.717	0.785
WOMEN								
No education	0.122	0.025	416	378	1.578	0.208	0.071	0.173
Secondary education or higher	0.656	0.044	416	378	1.884	0.067	0.568	0.744
Literacy	0.520	0.040	416	378	1.628	0.077	0.440	0.600
CHILDREN								
Slept under any mosquito net last night	0.702	0.036	298	259	1.255	0.051	0.630	0.774
Slept under an ITN last night	0.693	0.038	298	259	1.321	0.055	0.617	0.769
Slept under an ITN last night in households with at least one ITN	0.764	0.041	271	235	1.511	0.053	0.682	0.845
Had fever in last 2 weeks	0.337	0.042	278	246	1.366	0.124	0.254	0.420
Sought care/treatment from a health facility	0.644	0.066	98	83	1.221	0.103	0.512	0.777
Took ACT	0.763	0.084	38	33	1.088	0.109	0.596	0.930
Received a finger/heel stick	0.401	0.081	98	83	1.636	0.203	0.238	0.564
Has anaemia (haemoglobin <8.0 g/dl)	0.023	0.009	263	230	0.982	0.394	0.005	0.041
Has malaria (based on rapid test)	0.354	0.053	261	228	1.726	0.149	0.248	0.460
Has malaria (based on microscopy test)	0.173	0.032	263	230	1.342	0.183	0.109	0.236
PREGNANT WOMEN								
Slept under any mosquito net last night	0.611	0.102	34	31	1.166	0.166	0.408	0.815
Slept under an ITN last night	0.578	0.105	34	31	1.180	0.181	0.369	0.788
Slept under an ITN last night in households with at least one ITN	0.616	0.103	32	29	1.145	0.167	0.410	0.822
Received 1+ doses of SP/Fansidar	0.938	0.027	110	95	1.152	0.029	0.883	0.992
Received 2+ doses of SP/Fansidar	0.873	0.041	110	95	1.261	0.047	0.790	0.955
Received 3+ doses of SP/Fansidar	0.632	0.058	110	95	1.234	0.092	0.515	0.749

Table B.30 Sampling errors: Northern region sample, Ghana MIS 2019

Variable	Value (R)	Standard error (SE)	Number of cases Unweighted (N)	Number of cases Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits Lower (R-2SE)	Confidence limits Upper (R+2SE)
HOUSEHOLDS								
Ownership of at least one mosquito net	0.854	0.016	520	405	1.032	0.019	0.822	0.886
Average number of mosquito nets per household	2.470	0.103	520	405	1.309	0.042	2.265	2.676
Ownership of at least one ITN	0.854	0.016	520	405	1.032	0.019	0.822	0.886
Average number of ITNs per household	2.468	0.104	520	405	1.322	0.042	2.261	2.676
Ownership of at least one ITN for two persons	0.477	0.037	517	402	1.700	0.079	0.402	0.552
Household population that slept under an ITN last night	0.516	0.029	3,075	2,476	3.261	0.057	0.457	0.575
Proportion of de facto population with access to an ITN	0.667	0.028	3,075	2,476	4.459	0.041	0.612	0.722
WOMEN								
No education	0.570	0.031	581	481	1.511	0.055	0.508	0.632
Secondary education or higher	0.276	0.037	581	481	1.996	0.134	0.202	0.351
Literacy	0.264	0.038	581	481	2.052	0.143	0.189	0.340
CHILDREN								
Slept under any mosquito net last night	0.575	0.025	565	473	1.029	0.044	0.524	0.625
Slept under an ITN last night	0.575	0.025	565	473	1.029	0.044	0.524	0.625
Slept under an ITN last night in households with at least one ITN	0.647	0.025	505	421	1.024	0.038	0.597	0.696
Had fever in last 2 weeks	0.263	0.039	472	409	1.748	0.150	0.184	0.341
Sought care/treatment from a health facility	0.725	0.070	132	107	1.662	0.096	0.586	0.865
Took ACT	0.959	0.020	83	67	0.931	0.021	0.919	1.000
Received a finger/heel stick	0.328	0.063	132	107	1.524	0.191	0.203	0.453
Has anaemia (haemoglobin <8.0 g/dl)	0.096	0.020	509	421	1.595	0.211	0.055	0.136
Has malaria (based on rapid test)	0.187	0.033	509	421	1.840	0.177	0.121	0.253
Has malaria (based on microscopy test)	0.130	0.038	509	421	2.180	0.289	0.055	0.206
PREGNANT WOMEN								
Slept under any mosquito net last night	0.614	0.079	60	45	1.223	0.128	0.457	0.771
Slept under an ITN last night	0.614	0.079	60	45	1.223	0.128	0.457	0.771
Slept under an ITN last night in households with at least one ITN	0.695	0.062	53	40	0.986	0.089	0.572	0.819
Received 1+ doses of SP/Fansidar	0.884	0.050	186	161	2.182	0.057	0.784	0.985
Received 2+ doses of SP/Fansidar	0.770	0.061	186	161	2.006	0.079	0.648	0.891
Received 3+ doses of SP/Fansidar	0.645	0.061	186	161	1.781	0.095	0.522	0.767

Table B.31 Sampling errors: Upper East region sample, Ghana MIS 2019

Variable	Value (R)	Standard error (SE)	Number of cases: Unweighted (N)	Number of cases: Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits: Lower (R-2SE)	Confidence limits: Upper (R+2SE)
HOUSEHOLDS								
Ownership of at least one mosquito net	0.878	0.027	472	193	1.768	0.030	0.824	0.931
Average number of mosquito nets per household	2.423	0.142	472	193	2.055	0.059	2.138	2.708
Ownership of at least one ITN	0.878	0.027	472	193	1.768	0.030	0.824	0.931
Average number of ITNs per household	2.421	0.142	472	193	2.054	0.059	2.137	2.706
Ownership of at least one ITN for two persons	0.555	0.046	466	191	1.984	0.083	0.463	0.647
Household population that slept under an ITN last night	0.658	0.036	2,368	996	3.652	0.054	0.587	0.729
Proportion of de facto population with access to an ITN	0.740	0.032	2,368	996	4.770	0.044	0.675	0.805
WOMEN								
No education	0.374	0.036	509	215	1.670	0.096	0.303	0.446
Secondary education or higher	0.418	0.042	509	215	1.908	0.100	0.334	0.502
Literacy	0.419	0.035	509	215	1.616	0.085	0.348	0.490
CHILDREN								
Slept under any mosquito net last night	0.672	0.061	342	144	1.990	0.090	0.551	0.793
Slept under an ITN last night	0.672	0.061	342	144	1.990	0.090	0.551	0.793
Slept under an ITN last night in households with at least one ITN	0.749	0.045	308	129	1.559	0.060	0.659	0.839
Had fever in last 2 weeks	0.351	0.035	285	122	1.202	0.100	0.281	0.421
Sought care/treatment from a health facility	0.787	0.053	99	43	1.263	0.067	0.681	0.893
Took ACT	0.910	0.028	50	23	0.710	0.030	0.855	0.966
Received a finger/heel stick	0.705	0.055	99	43	1.193	0.078	0.595	0.815
Has anaemia (haemoglobin <8.0 g/dl)	0.019	0.009	297	124	1.054	0.487	0.000	0.037
Has malaria (based on rapid test)	0.306	0.041	297	124	1.438	0.134	0.224	0.388
Has malaria (based on microscopy test)	0.098	0.018	297	124	1.027	0.187	0.061	0.135
PREGNANT WOMEN								
Slept under any mosquito net last night	0.682	0.112	36	16	1.377	0.164	0.458	0.906
Slept under an ITN last night	0.682	0.112	36	16	1.377	0.164	0.458	0.906
Slept under an ITN last night in households with at least one ITN	0.759	0.097	32	15	1.244	0.128	0.565	0.953
Received 1+ doses of SP/Fansidar	0.968	0.014	131	55	0.939	0.015	0.939	0.997
Received 2+ doses of SP/Fansidar	0.894	0.031	131	55	1.154	0.035	0.832	0.956
Received 3+ doses of SP/Fansidar	0.774	0.050	131	55	1.350	0.064	0.675	0.873

Table B.32 Sampling errors: Upper West region sample, Ghana MIS 2019

Variable	Value (R)	Standard error (SE)	Number of cases Unweighted (N)	Number of cases Weighted (WN)	Design effect (DEFT)	Relative error (SE/R)	Confidence limits Lower (R-2SE)	Confidence limits Upper (R+2SE)
HOUSEHOLDS								
Ownership of at least one mosquito net	0.779	0.038	439	123	1.908	0.049	0.703	0.855
Average number of mosquito nets per household	1.882	0.133	439	123	1.854	0.071	1.616	2.149
Ownership of at least one ITN	0.779	0.038	439	123	1.908	0.049	0.703	0.855
Average number of ITNs per household	1.882	0.133	439	123	1.854	0.071	1.616	2.149
Ownership of at least one ITN for two persons	0.426	0.035	438	123	1.492	0.083	0.355	0.496
Household population that slept under an ITN last night	0.553	0.044	2,342	650	4.284	0.080	0.465	0.641
Proportion of de facto population with access to an ITN	0.615	0.039	2,342	650	4.843	0.063	0.537	0.693
WOMEN								
No education	0.455	0.037	510	146	1.669	0.081	0.382	0.529
Secondary education or higher	0.376	0.040	510	146	1.866	0.107	0.296	0.456
Literacy	0.366	0.037	510	146	1.738	0.102	0.291	0.440
CHILDREN								
Slept under any mosquito net last night	0.693	0.038	343	95	1.216	0.055	0.617	0.770
Slept under an ITN last night	0.693	0.038	343	95	1.216	0.055	0.617	0.770
Slept under an ITN last night in households with at least one ITN	0.855	0.025	281	77	1.064	0.030	0.805	0.906
Had fever in last 2 weeks	0.292	0.049	314	88	1.773	0.167	0.194	0.389
Sought care/treatment from a health facility	0.792	0.076	92	26	1.750	0.096	0.640	0.944
Took ACT	0.882	0.060	40	11	1.140	0.068	0.762	1.001
Received a finger/heel stick	0.471	0.047	92	26	0.897	0.100	0.377	0.565
Has anaemia (haemoglobin <8.0 g/dl)	0.036	0.009	301	83	0.799	0.240	0.019	0.054
Has malaria (based on rapid test)	0.226	0.037	301	83	1.463	0.163	0.152	0.300
Has malaria (based on microscopy test)	0.105	0.023	301	83	1.265	0.221	0.059	0.152
PREGNANT WOMEN								
Slept under any mosquito net last night	0.725	0.062	33	9	0.773	0.086	0.601	0.850
Slept under an ITN last night	0.725	0.062	33	9	0.773	0.086	0.601	0.850
Slept under an ITN last night in households with at least one ITN	0.821	0.076	29	8	1.033	0.093	0.669	0.973
Received 1+ doses of SP/Fansidar	0.949	0.029	133	37	1.509	0.031	0.891	1.007
Received 2+ doses of SP/Fansidar	0.877	0.039	133	37	1.340	0.044	0.800	0.954
Received 3+ doses of SP/Fansidar	0.778	0.054	133	37	1.494	0.070	0.670	0.887