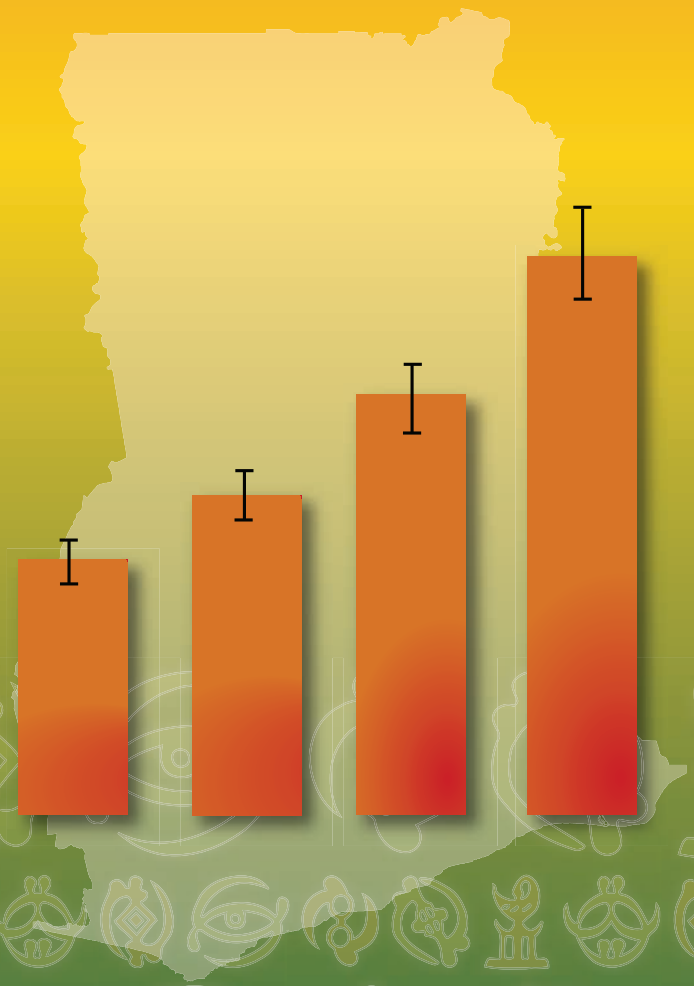
Ghana Malaria Indicator Trends:

Outputs from a DHS Program Workshop



Ghana Malaria Indicator Trends: Outputs from a DHS Program Workshop

December 2018

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Introduction

This report is the product of the Ghana Malaria Indicator Trends Workshop held in Mankessim, Ghana from September 17-21, 2018. The purpose of this 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 workshop included training on understanding key malaria indicators, linking the DHS/MIS questionnaire to indicators, examining confidence intervals for the interpretation of trends, and other topics.

Twenty-nine participants worked in teams of 4-5 individuals from different regions (please see the participant list on page vi) to produce the findings presented in this report. During the workshop, the facilitators provided participants with estimates of sampling errors from the core malaria indicators found in the 2008 and 2014 Ghana DHS and 2016 Ghana MIS surveys. The teams graphed indicator estimates with confidence intervals, examined variation in indicators across national level, urban/rural residence and regions. Each team produced the figures and bulleted indicator summaries, a product of guided discussions, included in this report. At the end of the workshop the teams also presented their key findings to the group, describing and interpreting results for their indicators.

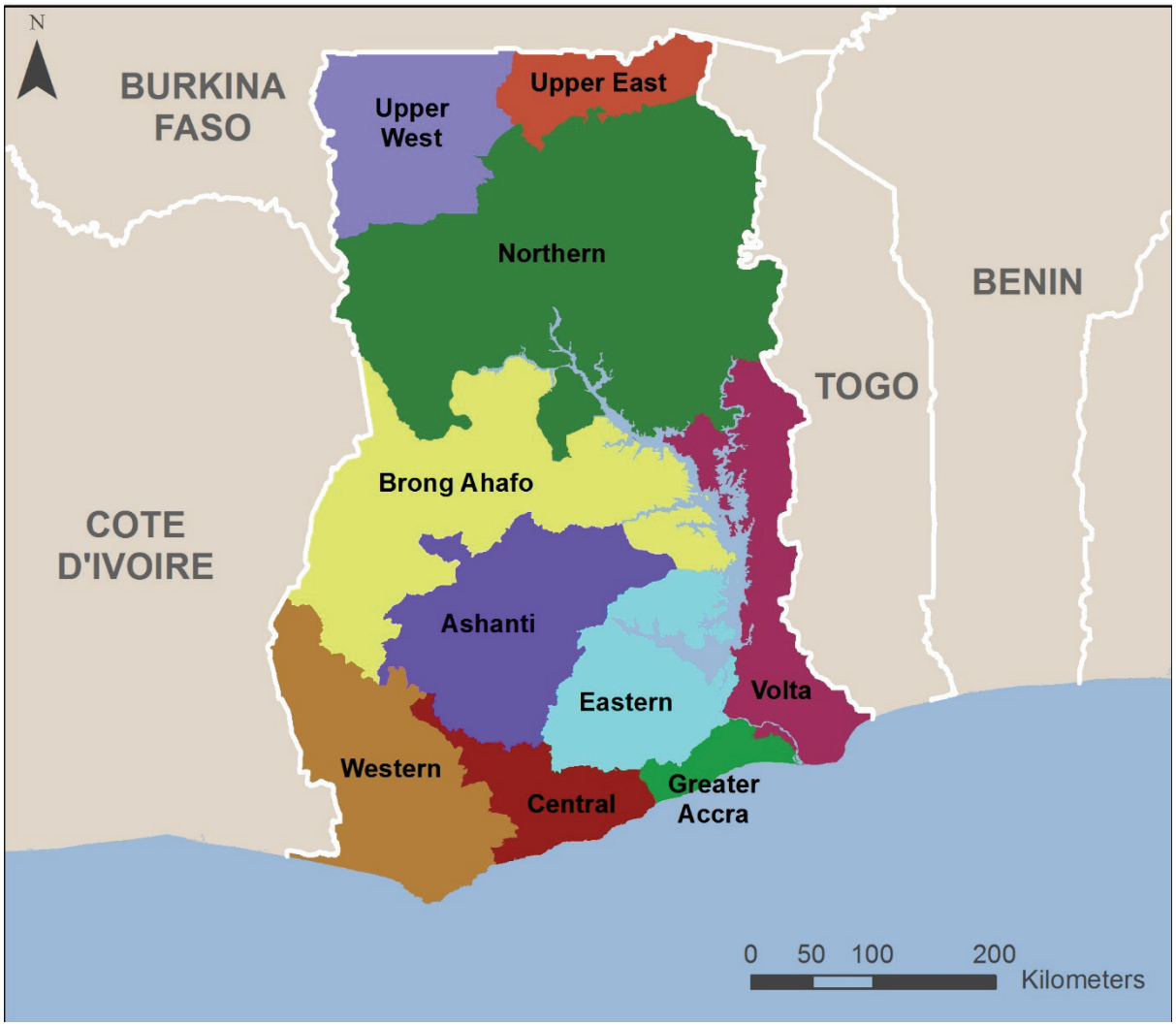
A NOTE ON INTERPRETATION

Every estimate from a sample survey such as the 2008 GDHS, 2014 GDHS and 2016 GMIS is subject to a certain degree of uncertainty. The values shown in 2008 GDHS, 2014 GDHS, and 2016 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 2016, 73% of households had at least one insecticide treated net (ITN). This estimate is surrounded by a confidence interval that ranges from 70.1% to 75.2%. This is a 95% confidence interval, meaning that, if the 2016 GMIS were conducted 100 times with a different sample each time, for 95 out of 100 samples, the result would fall between 70.1% and 75.2%.

Participant Name	Region of Work
Stephen Opoku Asabere	Ashanti
Theodore Borbi	Ashanti
Akwasi Appiah Donkor	Brong Ahafo
Bernard Opoku Dwomo	Brong Ahafo
Isaac Mensah Addai	Brong Ahafo
Alexander Akwasi Kissi	Central
Cynthia Sekubia Asamoah	Central
Oware Mengyah	Central
Dominic Afriyie-Kusi	Eastern
Joseph Abankwa	Eastern
Mary Achiaa	Eastern
Bendicta Owusu Appiah	Greater Accra
Oscar Vetsi	Greater Accra
Abraham Kofi Boateng	Northern
Abu Issahaku	Northern
Adjei Sarfo Kwabena	Northern
Ataaba Robert Asoko	Upper East
Ernest Owusu Afriyie	Upper East
Aleungurah Douglas	Upper West
Saaka Karim Sanda	Upper West
Titus Nii Teiko Tagoe	Upper West
Ebenezer Tetteh	Volta
Edwin Daklu	Volta
Faustina Dosoogla	Volta
James Mba	Western
Mercy Nkrumah	Western
William Apanya	Western
Duvor Fergusson	National Malaria Control Programme
Ihsan Abubakar	National Malaria Control Programme

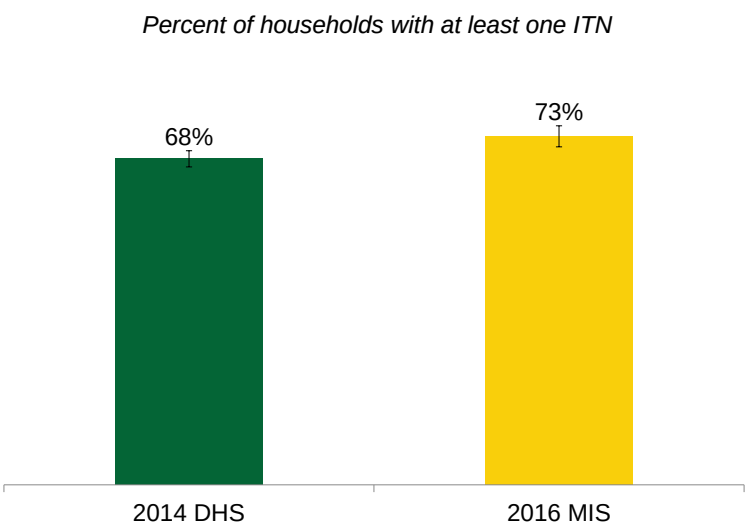
Facilitators	
Annē Linn	The DHS Program
Cameron Taylor	The DHS Program
Samuel Oppong	National Malaria Control Programme

GHANA


N
BURKINA FASO
Upper West
Upper East
Northern
BENIN
TOGO
Brong Ahafo
COTE D'IVOIRE
Ashanti
Eastern
Volta
Western
Central
Greater Accra
0 50 100 200
Kilometers

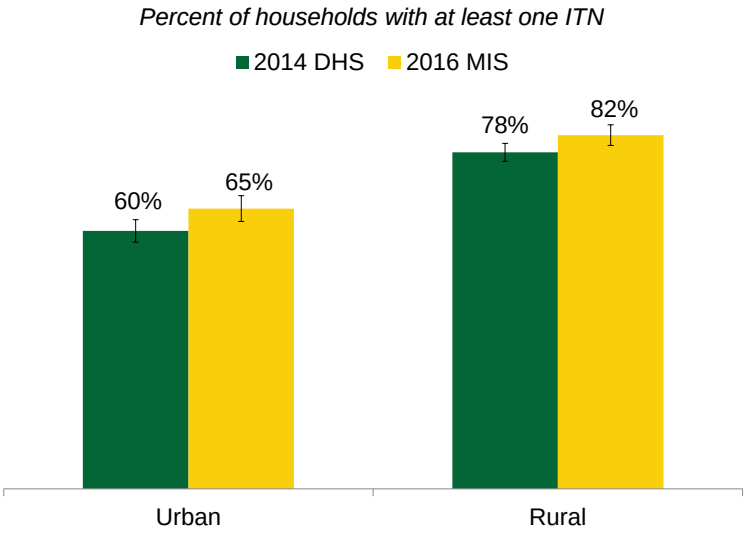
Household Ownership of Insecticide Treated Nets (ITNs)

National Level Trends in ITN* Ownership



- Household ownership of at least one ITN increased significantly between the two surveys, from 68% in 2014 to 73% in 2016.
- Ghana is doing well in terms of household ownership of at least one ITN. The country achieved 73% household ownership as against the national target of 77% for 2016 (National Malaria Strategic Plan (NMSP) 2014-2020).

ITN Ownership Trends by Residence

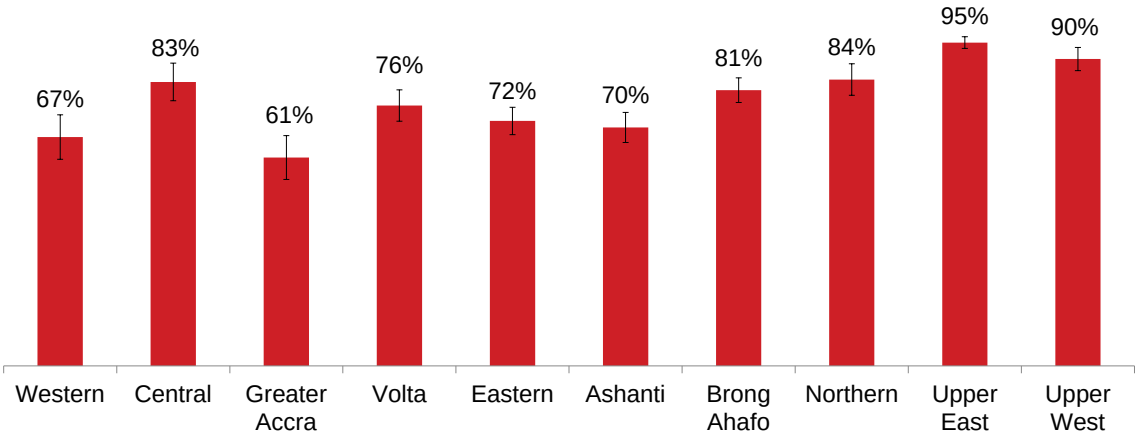


- Household ownership of at least one ITN is significantly higher in rural areas than in the urban areas for both surveys. In 2016, this indicator wass 17 percentage points higher in rural settings compared to urban settings.
- There was an increase of 8% in urban household ownership of ITNs, from 60% in 2014 to 65% in 2016.
- Rural household ownership increased by 5%, from 78% in 2014 to 82% in 2016.

*An insecticide-treated net (ITN) is a factory-treated net that does not require any further treatment. In the final reports for the 2008 Ghana DHS, 2014 Ghana DHS, and 2016 Ghana MIS, this was known as a long-lasting insecticidal net (LLIN). However, the definition of an ITN in the 2008 and 2014 DHS included nets that had been soaked with insecticides within the past 12 months.

ITN Ownership by Region (2016)

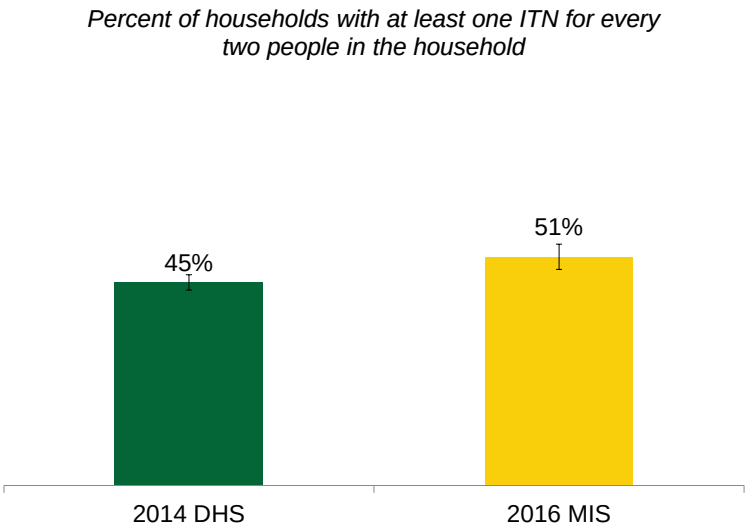
Percent of households with at least one ITN



- Household ownership of at least one ITN across regions in Ghana ranges between 61% in Greater Accra and 95% in Upper East region. This represents a statistically significant difference of 34 percentage points.
- It is noteworthy that Northern, Upper East, and Upper West regions had mass LLIN distribution campaigns in 2016 prior to the fieldwork for the 2016 MIS.

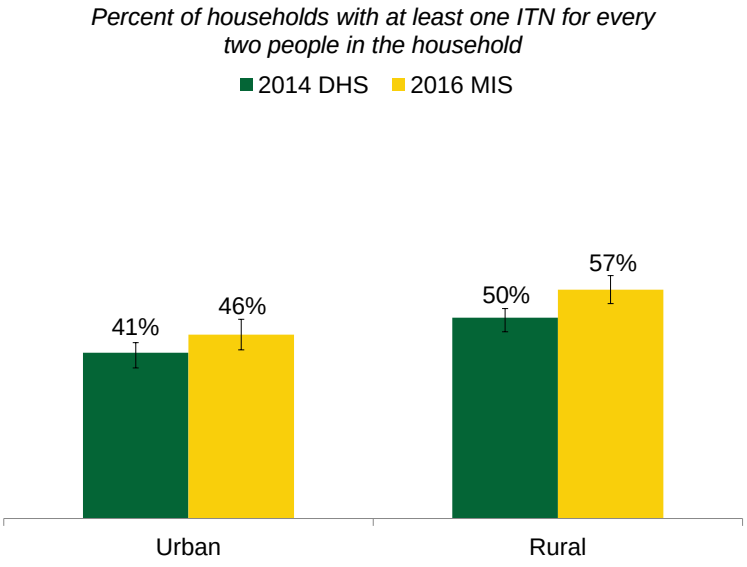
Household Ownership of ITNs (2)

National Level Trends in Full Household ITN Coverage



- Household ownership of at least one ITN for two people in the household increased significantly between the two surveys, from 45% in 2014 to 51% in 2016.

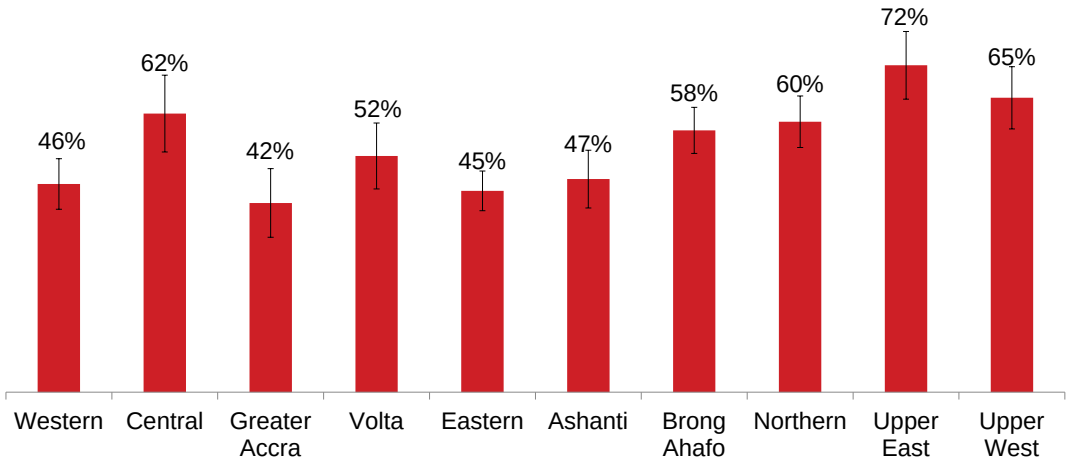
Full Household ITN Coverage Trends by Residence



- Household ownership of at least one ITN for every two people is signficantly higher in rural areas than in the urban areas for both surveys. This indicator is 11 percentage points higher in rural settings compared to urban settings in 2016.
- Full household coverage among urban households increased from 41% in 2014 to 46% in 2016, representing a 12% increase.
- Rural household ownership of at least one ITN for every two people showed a 14%, statistically significant, increase from 50% in 2014 to 57% in 2016.

Full Household ITN Coverage by Region (2016)

Percent of households with at least one ITN for every two people

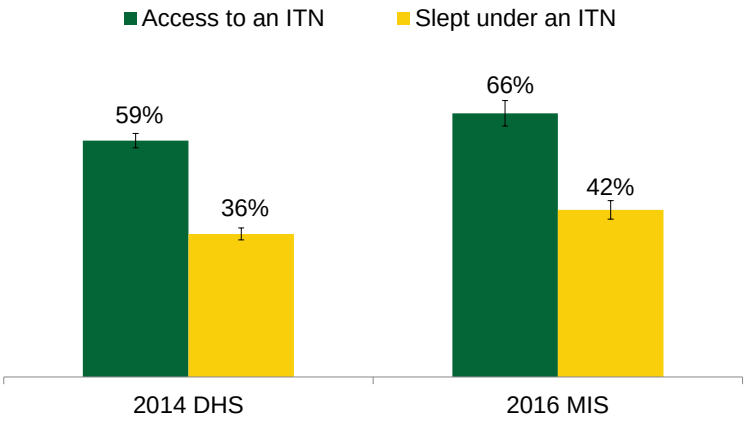


- Household ownership of at least one ITN for every two people across all regions in Ghana ranges between 42% in Greater Accra and 72% in Upper East Region.
- This represents a significant difference of 30 percentage points.

ITN Access and Use

National Level Trends in ITN Access and Use

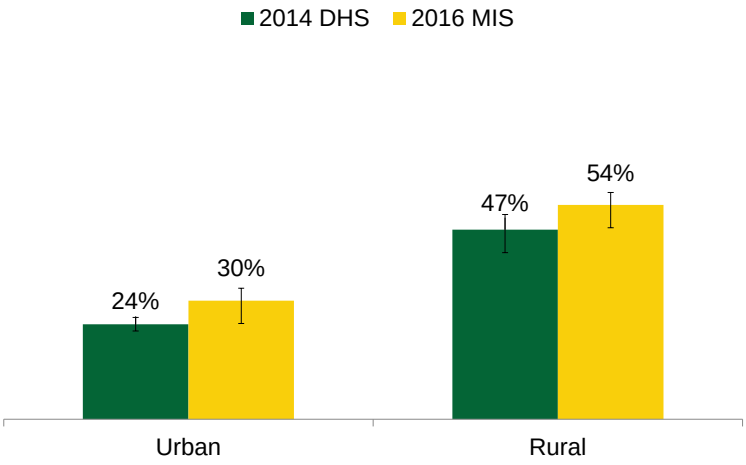
Percent of household population with access to an ITN and who slept under an ITN the night before the survey



- The 2016 MIS showed that, while 66% of the population has access to an ITN, only 42% of the population slept under an ITN the night before the survey.
- There is a significant difference between ITN access and ITN use in both the 2014 and 2016 surveys
- Both ITN access and use have increased slightly since 2014.

Trends in ITN Use by Residence

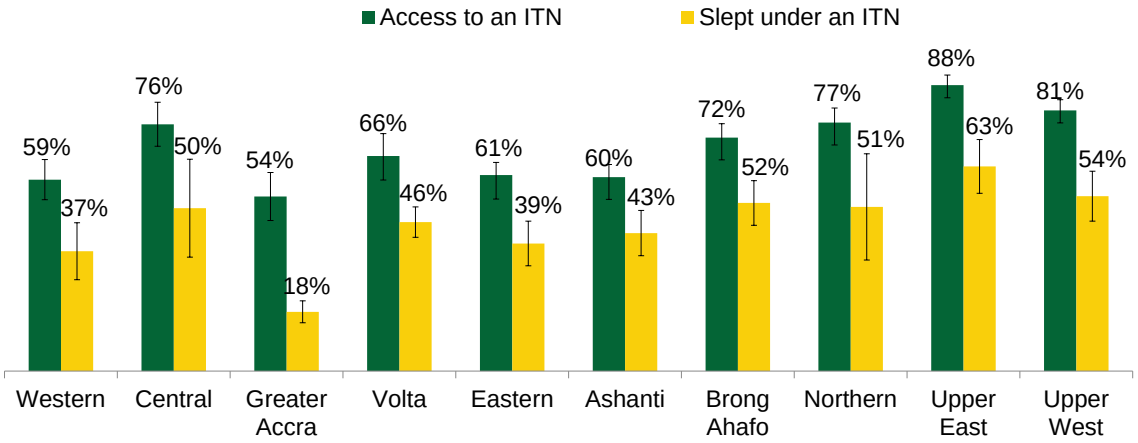
Percent of the houshold population that slept under an ITN the previous night



- ITN use among the rural household population is higher than that of urban household population in both the 2014 DHS and 2016 MIS.
- There was an increase in ITN use among both the urban and rural household populations between the 2014 DHS and 2016 MIS.
- ITN use among the urban household population increased by 25% between the 2014 DHS to 2016 MIS. This is a statistically significant change
- Among the rural household population, ITN use increased by 15% between the 2014 DHS and 2016 MIS.

ITN Access and Use by Region (2016)

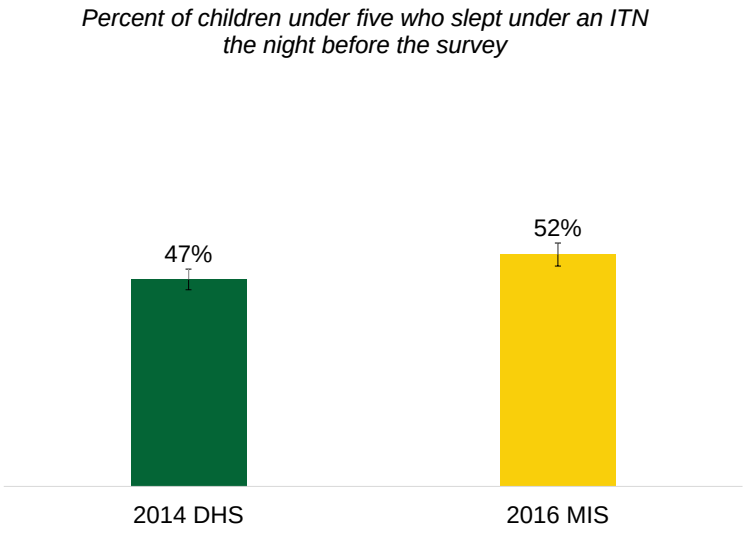
Percent of household population with access to an ITN and who slept under an ITN the night before the survey



- Upper East region has the highest ITN access (88%), compared to Greater Accra with the lowest (54%). This represents a 34 percentage point difference between the highest and the lowest region.
- Upper East region also has the highest percentage of the household population who slept under an ITN the night before this survey (63%). In Greater Accra, only 18% of the household population slept under an ITN the night before the survey.

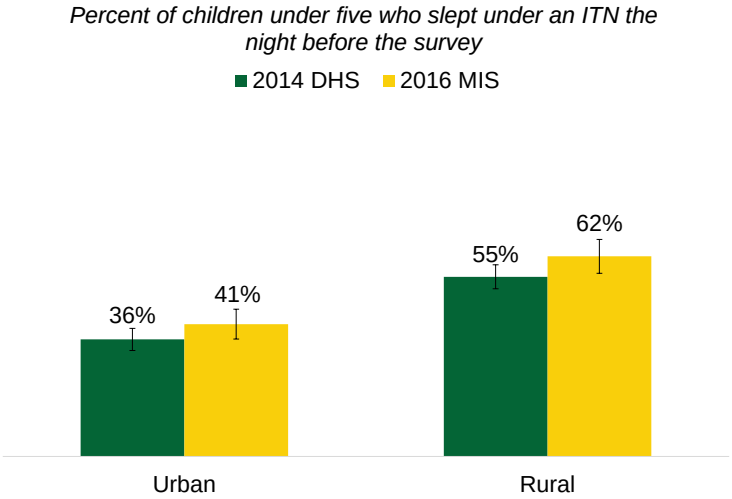
Children's Use of ITNs

National Level Trends in Children's Use of ITNs



- The percentage of children under five who slept under an ITN the night before the survey increased from 47% in 2014 to 52% in 2016.
- This is an increase of five percentage points. It is noteworthy that, during this time period, there was a continuous ITN distribution targeting children age 18 months due for Measles 2 immunization.
- The current level of 52% use of ITNs by children under five is a 10 percentage point deficit compared to the annual target of 62% for the year 2016.
- Limiting the indicator only to households with at least one ITN reveals a higher percentage of children who slept under an ITN the night before the survey. This indicator increased from 59% in 2014 to 62% in 2016. (These data are not pictured but are presented in the tables in Appendix B.)

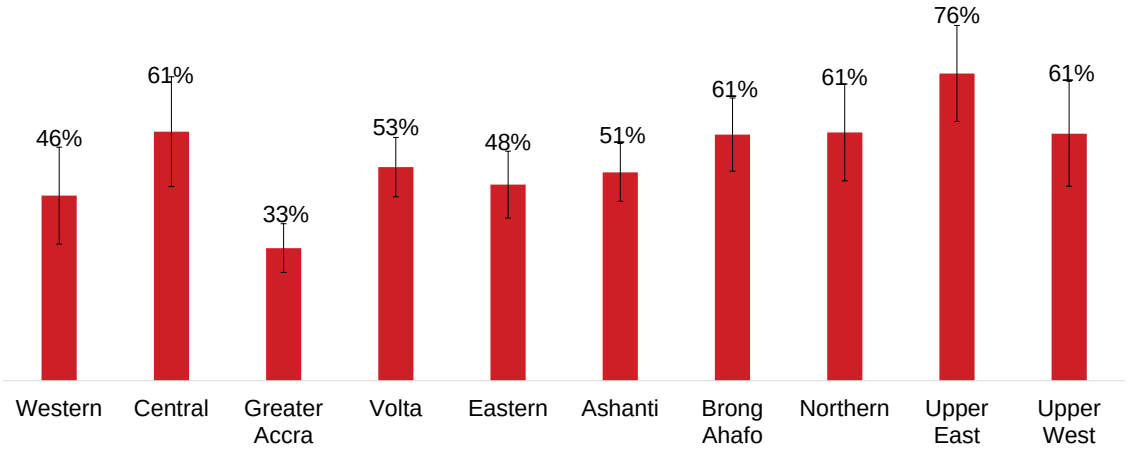
Trends in Children's Use of ITNs by Residence



- A significantly higher percentage of children in rural areas (62%) than urban areas (41%) slept under an ITN the night before the 2016 MIS, a difference of 21 percentage points.
- Children in rural areas who slept under an ITN the night before the survey increased from 55% in 2014 to 62% in 2016.
- Children in urban areas who slept under an ITN the night before the survey increased from 36% in 2014 to 41% in 2016.

Children's Use of ITNs by Region (2016)

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

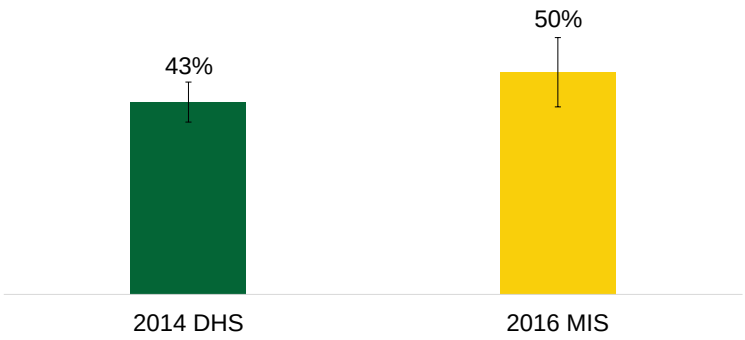


- The use of ITNs among children under five is highest in Upper East region (76%) and lowest Greater Accra (33%).
- There is a significant difference in ITN use among children under five between Upper East and Greater Accra, with a 43 percentage point range.

Use of ITNs by Pregnant Women

National Level Trends in Pregnant Women's Use of ITNs

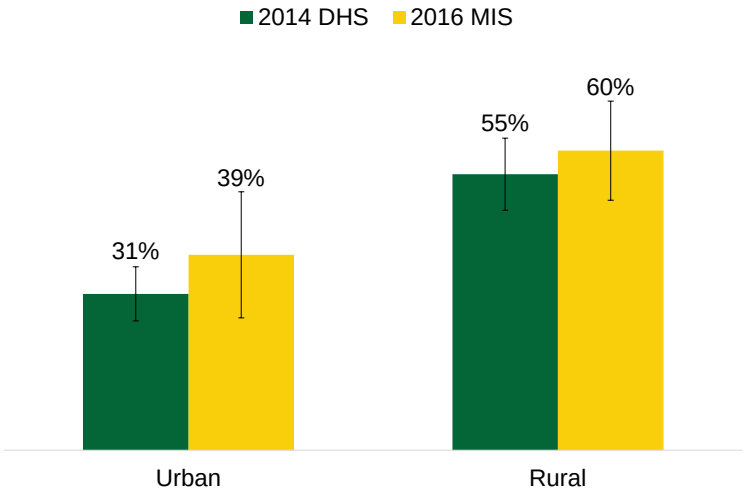
Percent of pregnant women age 15-49 who slept under an ITN the night before the survey



- Pregnant women who slept under an ITN the night before the survey increased from 43% in 2014 to 50% in 2016. This is an increase of 16%. The increase is not significant.
- Pregnant women in households with at least one ITN who slept under an ITN the previous night increased from 54% in 2014 to 59% in 2016 (these data are not pictured, but are presented in the tables in Appendix B). This is an increase of 9%. The increase is not statistically significant.
- There were mass campaigns for ITN distribution in 2010 and 2014, along with continuous distribution of ITNs to pregnant women at ANC since 2010.
- The 2016 national target for pregnant women's use of ITNs was 77%, but the achievement was 50%.

Trends in Pregnant Women's Use of ITNs by Residence

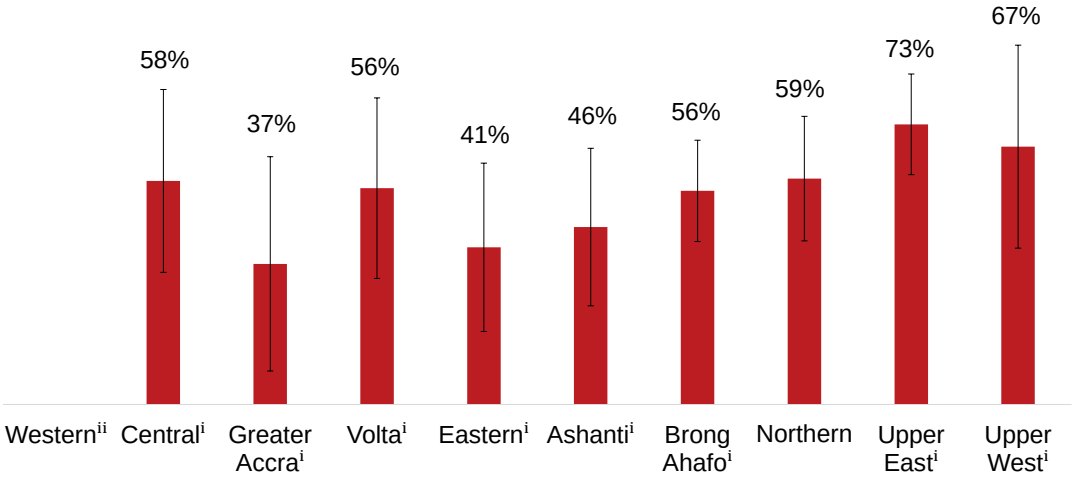
Percent of pregnant women age 15-49 who slept under an ITN the night before the survey



- The 2016 MIS showed that 60% of pregnant women slept under an ITN the previous night in rural areas, versus 39% in urban areas.
- Pregnant women who slept under an ITN increased from 31% in 2014 to 39% in 2016 in urban areas and from 55% in 2014 to 60% in 2016 in the rural areas.
- The magnitude of change was greater in urban areas compared to that of rural areas: the percentage increase in urban areas from 2014 to 2016 is 26% and that of rural areas is 9%.
- Neither of these increases is statistically significant.

Pregnant Women's Use of ITNs by Region (2016)

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



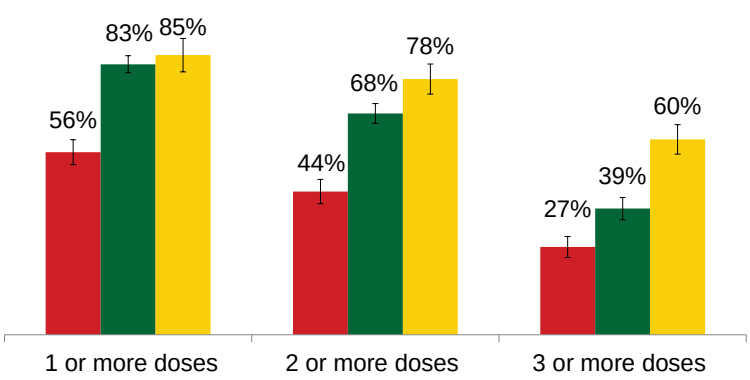
[i] Estimate is based on 25-49 unweighted cases and should be interpreted with caution
[ii] Estimate not shown due to insufficient sample size (<25 unweighted cases)

- Among the ten regions, Upper East recorded the highest percentage (73%) of pregnant women who slept under an ITN the previous night, whilst Western Region recorded the lowest (24%).
- There is a significant difference in the use of ITNs by pregnant women between Upper East and Western regions.

Intermittent Preventive Treatment in Pregnancy (IPTp)

National Level Trends

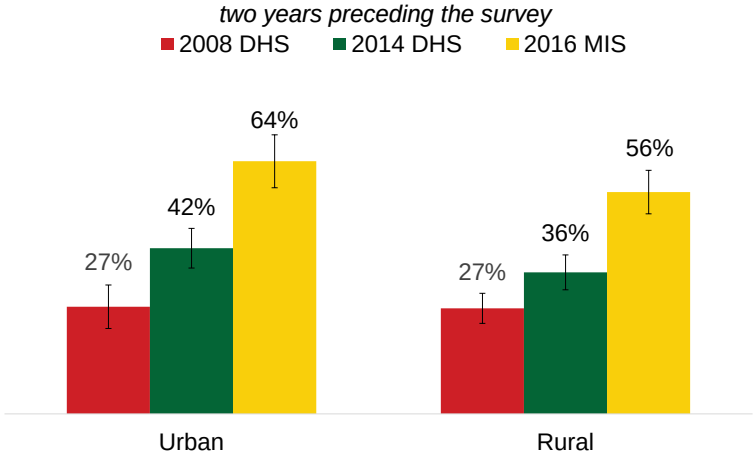
Percent of pregnant women age 15-49 receiving SP/Fansidar, with at least one dose during an ANC visit, during their most recent pregnancy in the two years preceding the survey



- In 2016, significantly fewer women (60%) reported receiving three or more doses of SP (IPTp3+), with at least one during an antenatal care (ANC) visit than one or more doses (IPTp1+, 85%) during their last pregnancy.
- There was a significant increase in the uptake of one or more doses of SP (IPTp1+) between 2008 (56%) and 2014 (83%) but not for 2014 to 2016 (85%).
- Results from the 2016 GMIS showed that 60% of women had received IPTp3+ with statistically significant increases of 122% over 2008 (27%) and 54% over 2014 (39%).
- The national target for 2016 for IPTp3+ was 65%. Results from the 2016 GMIS showed that Ghana had reached 60% of pregnant women with IPTp3+, which is 92% of the target.

IPTp 3+ Trends by Residence

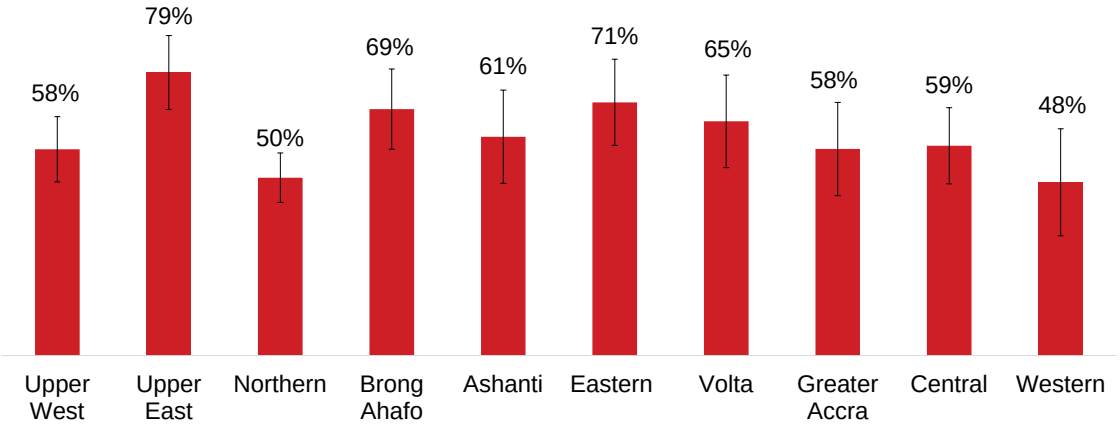
Percent of pregnant women age 15-49 receiving three or more doses of SP/Fansidar, with at least one dose during an ANC visit, during their most recent pregnancy in the two years preceding the survey



- There was a significant increase in uptake of IPTp3+ in both urban and rural settings between the 2014 and 2016 surveys.
- Within the rural setting, there was an increase of 52% between 2014 and 2016; whereas the increase within the urban setting was 56%.

IPTp 3+ by Region (2016)

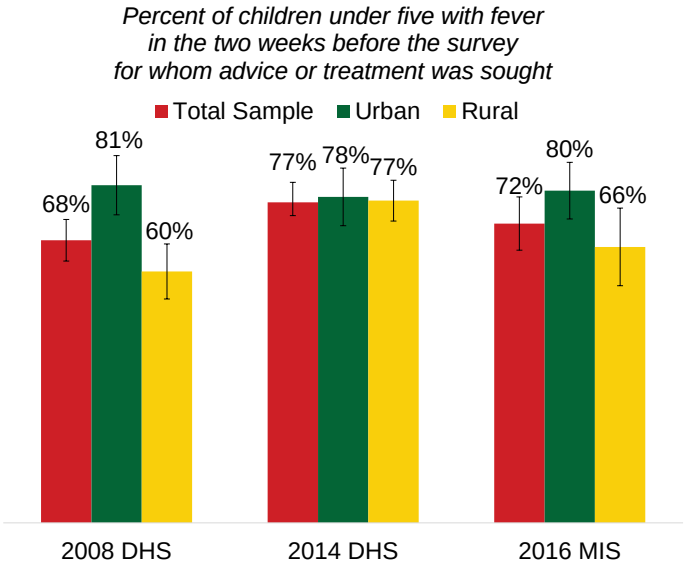
Percent of pregnant women age 15-49 receiving three or more doses of SP/Fansidar, with at least one dose during an ANC visit, during their most recent pregnancy in the two years preceding the survey



- The 2016 MIS results show that Northern region presents the lowest percentage of women having received IPTp1+ or IPTp2+ during their last pregnancy (see tables in Appendix B for full details). However, for IPTp3+, it is Western region that has the lowest percentage (48%).
- This is significantly lower than Upper East region, which has the highest uptake of IPTp3+ (79%).

Case Management

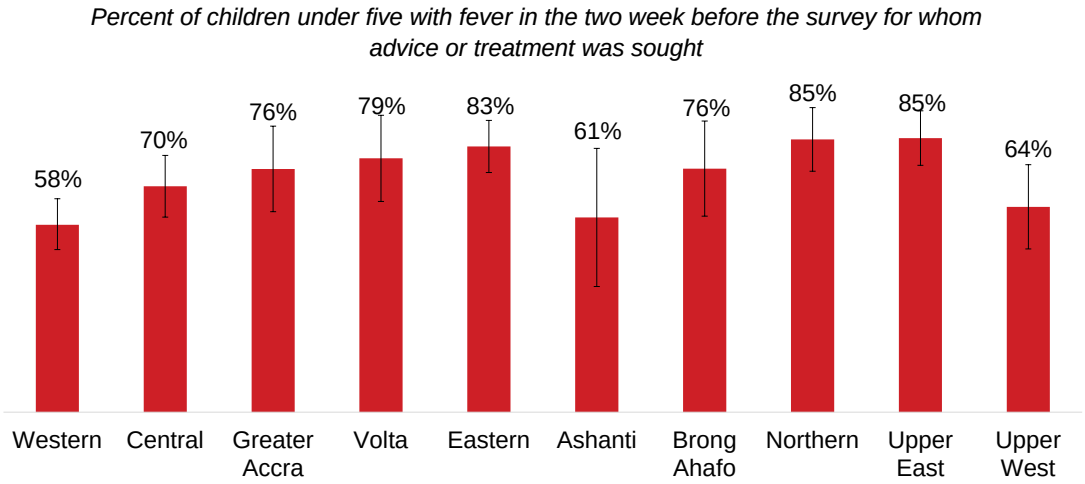
Trends in Care-Seeking Behaviour



- The percentage of children under five with fever in the two weeks before the survey whom advice or treatment was sought from health provider, health facility, or a pharmacy increased from 68% in 2008 to a high of 77% in 2014, a significant change. It subsequently fell by 6% to 72% in 2016.
- It is notable that the mass ITN campaign conducted in 2014 which included SBCC on malaria could have influenced this trend.

- The percentage of the children under five with fever in the two weeks before the survey whom advice or treatment was sought is higher in the urban areas than the rural areas in the three surveys.
- While there was only a marginal difference observed between urban and rural areas in 2014, treatment seeking for children with fever in rural areas decreased by 14% between 2014 and 2016 and remained stable in urban areas.

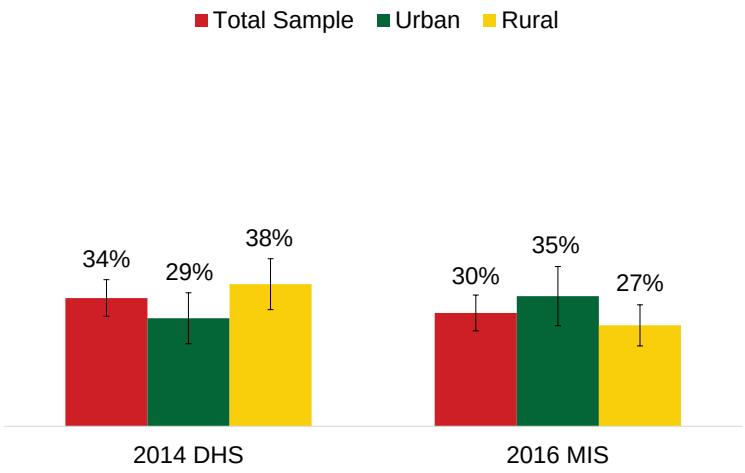
Care-Seeking Behaviour by Region (2016)



- The percent of febrile children for whom care or treatment was sought varies between 58% in Western and 85% in Upper East and Northern regions, which represents a statistically significant difference.

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

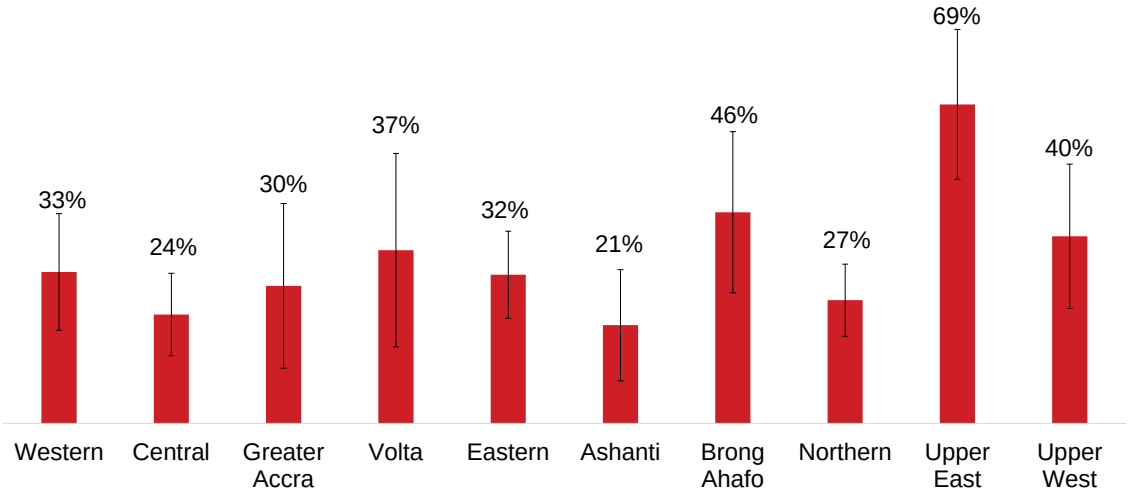


- The percentage of children under five with fever in the two weeks before the survey who had blood taken from a finger/heel for testing was 34% in the 2014 DHS with a slight, non-significant decrease to 30% in the 2016 MIS.
- This represents a decrease of 12% in 2016 MIS over the 2014 DHS.
- The NMCP introduced the policy of 3Ts (test, treat and track) in 2014.

- The overall decrease in diagnostic testing between the surveys was driven by a decrease in rural areas.
- The percentage of children under five with fever in the two weeks before the survey who had blood taken from a finger/heel for testing decreased by 29% between the two surveys for the rural areas, from 38% in 2014 to 27% in 2016.
- In urban areas, however, diagnostic testing of children with fever increased from 29% in 2014 to 35% in 2016.

Diagnostic Testing by Region (2016)

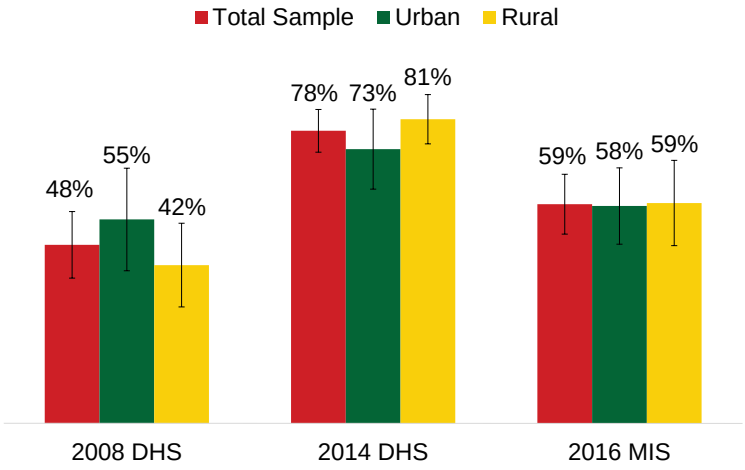
Percent of children under five with fever in the two weeks before the survey from whom blood was taken from their finger/heel for testing



- Upper East region reports the highest percentage of children receiving a finger/heel stick (69%), which is significantly higher than the poorest performing region (Ashanti, 21%).

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

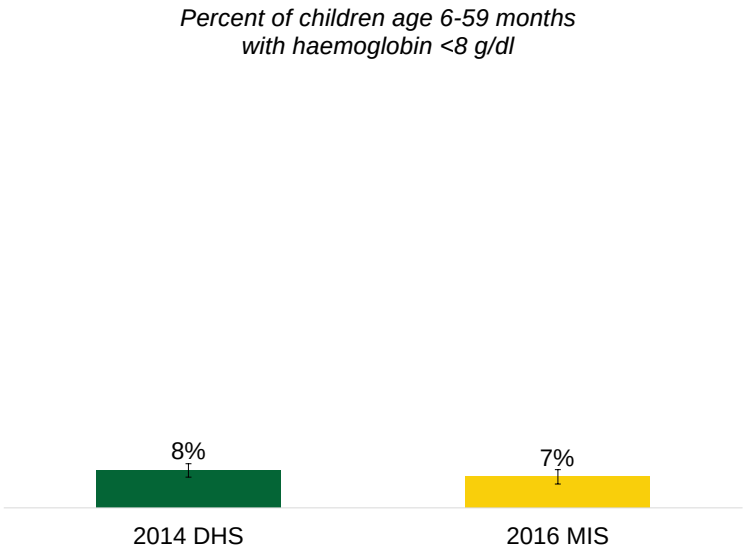


- The lowest percentage of children under five with fever who took artemisinin-based combination therapy (ACT), Ghana's recommended first-line antimalarial, in the two weeks before the survey among those who took any antimalarial drugs was recorded in the 2008 GDHS (48%).
- There was a dramatic, statistically significant 63% increase between 2008 (48%) and 2014 (78%), followed by a 24% decrease to only 59% in 2016. This decrease was also statistically significant.
- NMCP introduced ACTs to the private sector in 2014.

- For both urban and rural areas, appropriate antimalarial treatment peaked in 2014 (73% in urban areas and 81% in rural areas).
- While in 2008, appropriate treatment with ACTs was higher in urban areas, for both 2014 and 2016, rural areas had higher percentages of children receiving antimalarial treatment in accordance with national protocols.

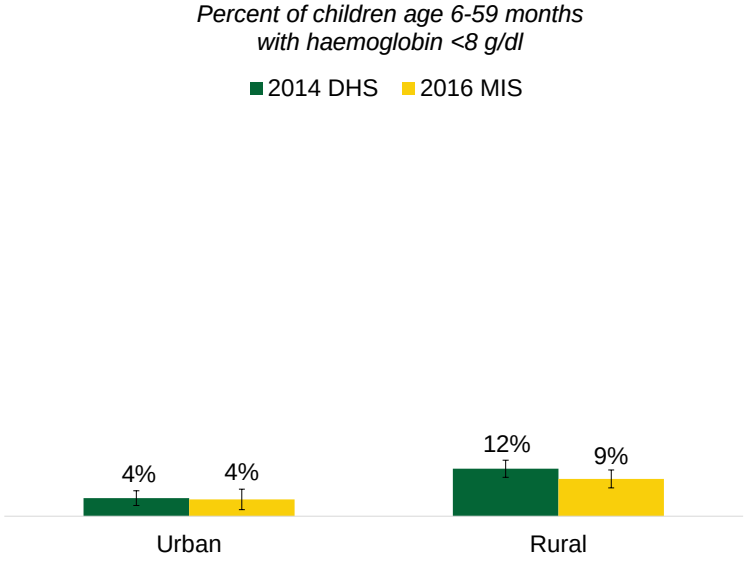
Morbidity

National Level Trends in Moderate-to-Severe Anaemia



- Moderate-to-severe anaemia among children decreased from 8% in 2014 to 7% in 2016. This is a decrease of 13% but is not statistically significant.

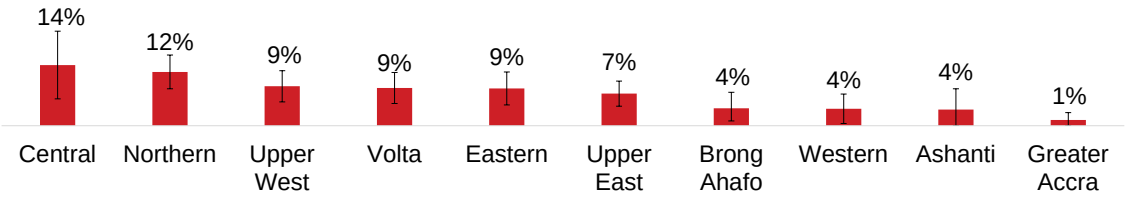
Trends in Moderate-to-Severe Anaemia by Residence



- The 2016 MIS showed that moderate-to-severe anaemia is significantly lower among urban children than among rural children, with a difference of 5 percentage points.
- Between 2014 and 2016, moderate-to-severe anaemia decreased slightly in rural areas but remained unchanged in urban areas.

Moderate-to-Severe Anaemia by Region (2016)

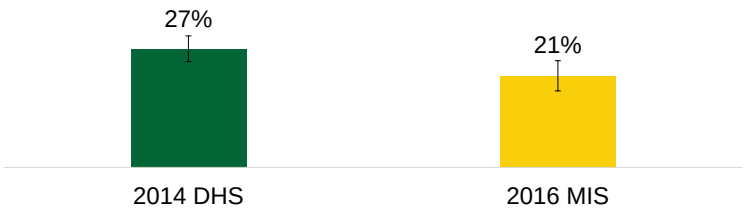
Percent of children age 6-59 months with haemoglobin <8 g/dl



- There is a statistically significant difference between the prevalence of moderate-to-severe anaemia among children in Greater Accra and those in Central, Volta, Eastern, Northern, Upper East and Upper West regions.
- Moderate-to-severe anaemia prevalence ranges between 1% in Greater Accra and 14% in Central region.

National Level Trends in Malaria Prevalence

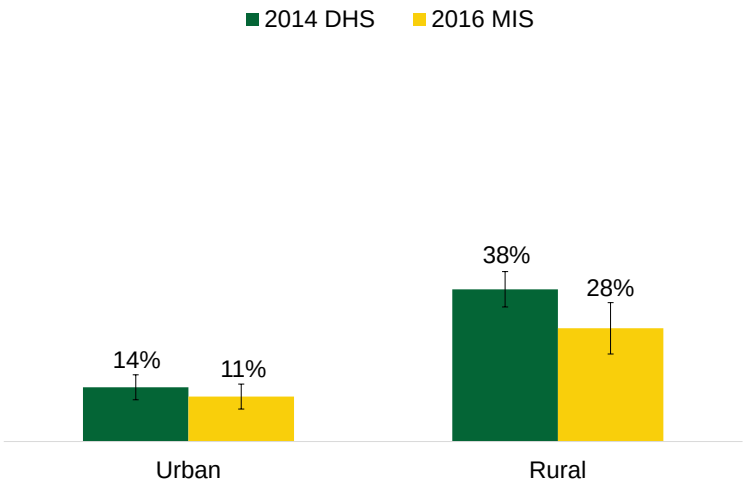
Percent of children age 6-59 months who tested positive for malaria by microscopy



- These two 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 DHS to 21% in 2016 MIS. This is a decrease of 22%. While the confidence intervals do overlap slightly, statistical testing reveals that this was in fact a significant decrease.

Trends in Malaria Prevalence by Residence

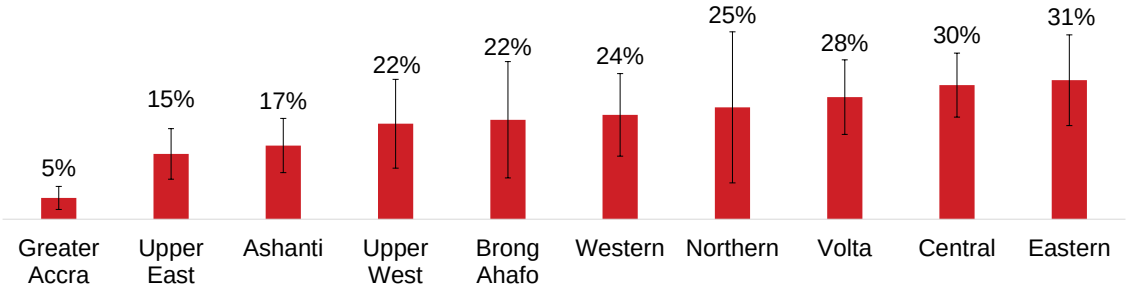
Percent of children age 6-59 months who tested positive for malaria by microscopy



- Malaria prevalence decreased between 2014 and 2016 in both urban and rural areas.
- In 2016, malaria prevalence by microscopy was more than twice as high in rural areas (28%) than in urban areas (11%). There is a statistically significant difference in malaria prevalence between urban and rural areas.

Malaria Prevalence by Region (2016)

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



- There is a statistically significant difference between malaria prevalence (by microscopy) in Greater Accra Region and the rest of the regions.
- The range of malaria prevalence is between 5% in Greater Accra and 31% in Eastern region.

AUTHORS BY REPORT TOPIC

Appendix A

Topic	Names
Household Ownership of Insecticide Treated Nets (ITNs)	William Apanya Abu Issahaku Bernard Opoku Dwomo Ihsan Abubakar
ITN Access and Use	Alexander Akwasi Kissi Saaka Karim Sanda Faustina Dosoogla James Mba
Children's Use of ITNs	Theodore Borbi Edwin Daklu Mercy Nkrumah Adjei Sarfo Kwabena
Use of ITNs by Pregnant Women	Joseph Abankwa Abraham Kofi Boateng Oware Mengyah Ebenezer Tetteh
Intermittent preventive treatment in pregnancy (IPTp)	Mary Achiaa Duvor Fergusson Stephen Opoku Asabere Bendicta Owusu Appiah Aleungurah Douglas
Case Management	Dominic Afriyie-Kusi Ernest Owusu Afriyie Titus Nii Teiko Tagoe Akwasi Appiah Donkor
Morbidity	Isaac Mensah Addai Cynthia Sekubia Asamoah Ataaba Robert Asoko Oscar Vetsi

ESTIMATES OF SAMPLING ERRORS *Appendix* B

The following pages provide information on the sampling errors from the 2008 GDHS, 2014 GDHS, and 2016 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, and 2016 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, and 2016 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, and 2016 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)

Table B List of indicators for sampling errors, 2008 Ghana DHS, 2014 Ghana DHS, and 2016 Ghana MIS 2016

Variable	Type of Estimate	Base Population
HOUSEHOLDS		
Ownership of at least one mosquito net of any type	Proportion	All households
Number of any mosquito nets	Mean	All households
Ownership of at least one ITN	Proportion	All households
Number of ITNs	Mean	All households
Ownership of at least one ITN for two persons	Proportion	Households with at least one ITN
CHILDREN		
Slept under any mosquito net last night	Proportion	All children under age 5
Slept under an ITN last night	Proportion	All children under age 5
Slept under an ITN last night in household with at least one ITN	Proportion	Children under age 5 in households with at least one ITN
Had fever in last 2 weeks	Proportion	All children under age 5
Had a haemoglobin level less than 8 g/dl	Proportion	Children under age 5 who were tested
Has malaria (based on rapid test)	Proportion	Children under age 5 who were tested
Has malaria (based on microscopy test)	Proportion	Children under age 5 who were tested
PREGNANT WOMEN		
Slept under any mosquito net last night	Proportion	Pregnant women age 15-49
Slept under an ITN last night	Proportion	Pregnant women age 15-49
Slept under an ITN last night in household with at least one ITN	Proportion	Pregnant women age 15-49 in households with at least one ITN
Received one or more doses of SP/Fansidar during pregnancy of the most recent live birth	Proportion	Women age 15-49 with a live birth in the 2 years preceding the survey with at least one dose received during an ANC visit
Received 2 or more doses of SP/Fansidar during pregnancy of the most recent live birth	Proportion	Women age 15-49 with a live birth in the 2 years preceding the survey with at least one dose received during an ANC visit

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

	Value	Standard error	Number of cases: Un-weighted	Number of cases: Weighted	Design effect	Relative error	Confidence limits: Lower	Confidence limits: Upper
	(R)	(SE)	(N)	(WN)	(DEFT)	(SE/R)	(R-2SE)	(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 ITNs	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
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

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

	Value (R)	Standard error (SE)	Number of cases: Un-weighted (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 ITNs	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
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

	Value (R)	Standard error (SE)	Number of cases: Un-weighted (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 ITNs	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
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

	Value	Standard error	Number of cases: Un-weighted	Number of cases: Weighted	Design effect	Relative error	Confidence limits: Lower	Confidence limits: Upper
	(R)	(SE)	(N)	(WN)	(DEFT)	(SE/R)	(R-2SE)	(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 ITNs	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 Ghana DHS 2014

	Value (R)	Standard error (SE)	Number of cases: Un-weighted (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 Ghana DHS 2014

	Value (R)	Standard error (SE)	Number of cases: Un-weighted (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 ITNs	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

	Value	Standard error	Number of cases: Un-weighted	Number of cases: Weighted	Design effect	Relative error	Confidence limits: Lower	Confidence limits: Upper
	(R)	(SE)	(N)	(WN)	(DEFT)	(SE/R)	(R-2SE)	(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 ITNs	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 Ghana MIS 2016

	Value (R)	Standard error (SE)	Number of cases: Un-weighted (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 ITNs	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 Ghana MIS 2016

	Value (R)	Standard error (SE)	Number of cases: Un-weighted (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	3026	2646	1.683	0.014	0.811	0.857
Number of any mosquito nets	1.985	0.062	3026	2646	2.224	0.031	1.861	2.109
Ownership of at least one ITN	0.824	0.012	3026	2646	1.753	0.015	0.8	0.848
Number of ITNs	1.947	0.061	3026	2646	2.192	0.031	1.825	2.069
Ownership of at least one ITN for two persons	0.57	0.018	3002	2619	1.941	0.031	0.535	0.605
Household population that slept under an ITN last night	0.535	0.028	13088	10460	6.536	0.053	0.478	0.592
Proportion of de facto population with access to an ITN	0.721	0.013	13088	10460	4.349	0.019	0.694	0.748
CHILDREN								
Slept under any mosquito net last night	0.623	0.026	2120	1768	2.49	0.042	0.571	0.675
Slept under an ITN last night	0.617	0.026	2120	1768	2.47	0.042	0.565	0.669
Slept under an ITN last night in household with at least one ITN	0.694	0.025	1931	1572	2.364	0.036	0.644	0.744
Had fever in last 2 weeks	0.324	0.02	1936	1703	1.904	0.062	0.284	0.364
Advice or treatment for fever sought	0.662	0.046	583	551	2.361	0.07	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	0.27	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	1902	1598	1.629	0.118	0.069	0.113
Has malaria (based on rapid test)	0.399	0.039	1902	1598	3.466	0.098	0.321	0.477
Has malaria (based on microscopy test)	0.282	0.032	1902	1598	3.116	0.114	0.218	0.346
PREGNANT WOMEN								
Slept under any mosquito net last night	0.598	0.049	208	186	1.45	0.083	0.499	0.697
Slept under an ITN last night	0.598	0.049	208	186	1.45	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	0.05	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	2.17	0.045	0.676	0.81
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 Ghana MIS 2016

	Value (R)	Standard error (SE)	Number of cases: Un-weighted (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 ITNs	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 Ghana MIS 2016

	Value (R)	Standard error (SE)	Number of cases: Un-weighted (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 ITNs	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 Ghana MIS 2016

	Value (R)	Standard error (SE)	Number of cases: Un-weighted (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 ITNs	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 Ghana MIS 2016

	Value (R)	Standard error (SE)	Number of cases: Un-weighted (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 ITNs	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 Ghana MIS 2016

	Value (R)	Standard error (SE)	Number of cases: Un-weighted (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 ITNs	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 Ghana MIS 2016

	Value (R)	Standard error (SE)	Number of cases: Un-weighted (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 ITNs	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 Ghana MIS 2016

	Value (R)	Standard error (SE)	Number of cases Un-weighted (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 ITNs	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 Ghana MIS 2016

	Value (R)	Standard error (SE)	Number of cases: Un-weighted (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 ITNs	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 Ghana MIS 2016

	Value (R)	Standard error (SE)	Number of cases: Un-weighted (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 ITNs	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 Ghana MIS 2016

	Value (R)	Standard error (SE)	Number of cases: Un-weighted (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 ITNs	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