Reading and Understanding Tables from the 2015 Nigeria Malaria Indicator Survey (NMIS)

Example 1: Indoor Residual Spraying (IRS)

Table 5.3 Indoor residual spraying against mosquitoes **1**

Percentage of households in which someone has come into the dwelling to spray the interior walls against mosquitoes (IRS) in the past 12 months, the percentage of households with at least one ITN and/or IRS in the past 12 months, and the percentage of households with at least one ITN for every two persons and/or IRS in the past 12 months, by background characteristics, Nigeria 2015

3 Background characteristic	**2** Percentage of households with IRS[1] in the past 12 months	Percentage of households with at least one ITN[2] and/or IRS in the past 12 months	Percentage of households with at least one ITN[2] for every two persons and/or IRS in the past 12 months	Number of households
Residence				
Urban	2.0	63.2	30.8	3,083
Rural	0.8	72.9	38.6	4,662
Zone				
North Central	0.8	55.5	25.3	1,311
North East	2.5	80.1	38.4	843
North West	0.8	90.7	45.2	1,993
South East	2.6	64.1	37.2	876
South South	1.0	64.2	40.5	1,154
South West	0.9	53.2	25.4	1,567
Wealth quintile				
Lowest	0.6	86.2	42.7	1,237
Second	0.5	73.7	36.7	1,423
Middle	1.3	68.8	37.5	1,616
Fourth	1.8	64.4	35.2	1,684
Highest	1.8	58.0	27.8	1,784
Total	**4** 1.3	69.0	35.5	7,745

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Note: Estimates for North East Zone do not include the rural areas of Borno State.
[1] Indoor residual spraying (IRS) is limited to spraying conducted by a government, private or non-governmental organisation
[2] An insecticide-treated net (ITN) is (1) a factory-treated net that does not require any further treatment (LLIN) or (2) a net that has been soaked with insecticide within the past 12 months

Step 1: Read the title and subtitle. They tell you the topic and the specific population group being described. In this case, the table is about coverage of indoor residual spraying (IRS) and/or insecticide-treated nets (ITNs) among households.

Step 2: Scan the column headings—highlighted in green in the table above. They describe how the information is categorized. In this table, there are four columns. The first column presents the percent of households that have had IRS in the 12 months before the survey. The second column presents the percent of households with at least one ITN and/or IRS in the year before the survey. The third column presents the percent of households with at least one ITN for every two persons and/or IRS in the 12 months before the survey. The last column lists the denominators, or the number of households in each category.

Step 3: Scan the row headings—the first vertical column highlighted in blue in the table above. These show the different ways the data are divided into categories based on background characteristics. In this case, the table presents IRS and ITN coverage by urban-rural residence, zone, and wealth quintile. Most of the tables in the NMIS report will be divided into these same categories.

Step 4: Look at the row at the bottom of the table highlighted in red. This percent represents the total of all households that have IRS and/or ITN coverage. In this case, only 1.3% of households had IRS in the 12 months before the survey, while 69% had at least one ITN and/or IRS in the 12 months before the survey.

Step 5: To find out what percent of households in South East Zone had IRS in the year before the survey, draw two imaginary lines, as shown on the table. This shows that 0.9% of households in South West Zone were sprayed in the year before the survey.

Practice: Use the table above to answer the following questions (answers are upside down, below):

a) Is IRS more common in urban or rural areas?

b) In which zone is IRS the most common?

c) Which wealth quintiles have the highest percent of households with IRS?

a) Urban households—2.0% of urban households have had IRS in the 12 months before the survey compared to 0.8% of rural households.
b) South East zone—2.6%.
c) Households in the fourth and highest wealth quintiles - 1.8% each.

Example 2: Prevalence of Malaria in Children
Comparing and Understanding Patterns

Step 1: Read the title and subtitle. In this case, the table presents prevalence of malaria in children age 6-59 months.

Step 2: Identify the information presented in the table—highlighted in green in the table above. This table presents malaria prevalence according to the results of two tests used in the NMIS—rapid diagnostic tests (RDTs) and microscopy. The number of children who were tested was slightly different for each test, so the "number of children," or denominator column, is presented twice.

Step 3: Look at the row headings to identify the background characteristics. In this table, malaria prevalence in children is presented by age in months, sex, mother's interview status, urban-rural residence, zone, mother's educational level, and wealth quintile.

Step 4: Look at the row in the bottom of the table to determine the total percent of children age 6-59 months who tested positive for malaria by microscopy. This shows that 27.4% of children age 6-59 months in Nigeria tested positive for malaria by microscopy.

Step 5: In Nigeria, 27.4% of children tested positive for malaria by microscopy, but a closer look at the table shows how malaria prevalence varies throughout Nigeria. To gain a better understanding of the variability of malaria according to microscopy, consider the following questions:

Table 6.3.1 Prevalence of malaria in children: National 1

Percentage of eligible children 6-59 months classified in two tests as having malaria, by background characteristics, Nigeria 2015

Background characteristic 3	Malaria prevalence according to RDT 2		Malaria prevalence according to microscopy	
	RDT positive	Number of children	Microscopy positive	Number of children
Age in months				
6-11	31.3	605	16.7	578
6-8	29.6	331	14.9	315
9-11	33.4	273	18.8	263
12-17	37.0	699	20.6	674
18-23	38.3	607	22.5	582
24-35	44.4	1,281	26.6	1,227
36-47	49.4	1,434	31.0	1,339
48-59	54.0	1,425	34.9	1,333
Sex				
Male	46.2	3,071	27.9	2,899
Female	43.9	2,979	26.9	2,834
Mother's interview status				
Interviewed	44.6	5,343	26.9	5,068
Not interviewed[1]	48.6	707	31.3	665
Residence				
Urban	24.2	2,029	11.5	1,933
Rural	55.7	4,021	35.6	3,800
Zone				
North Central	50.7	1,134	32.0	1,074
North East	42.8	824	25.9	789
North West	58.3	1,951	37.1	1,854
South East	31.7	516	13.7	499
South South	28.6	668	19.3	630
South West	32.1	957	16.6	888
Mother's education[2]				
No education	59.7	2,421	37.7	2,308
Primary	44.3	946	26.2	889
Secondary	29.9	1,566	16.7	1,482
More than secondary	12.5	410	3.6	389
Wealth quintile				
Lowest	64.1	1,242	42.9	1,199
Second	62.6	1,406	41.0	1,299
Middle	49.1	1,170	27.4	1,093
Fourth	30.1	1,111	16.8	1,062
Highest	12.6	1,121	4.4	1,080
Total	45.1	6,050	27.4 4	5,733

Note: Estimates for North East Zone do not include the rural areas of Borno State.
RDT = Rapid Diagnostic Test
[1] Includes children whose mothers are deceased.
[2] Excludes children whose mothers were not interviewed.

- Is malaria prevalence higher in urban or rural areas? Malaria prevalence (by microscopy) is more than three times as high in rural areas as in urban areas (35.6% compared with 11.5%).
- What are the lowest and the highest percentages (range) of malaria prevalence by zone? Malaria prevalence in children (by microscopy) ranges from a low of 13.7% in South East zone to a high of 37.1% in North West zone.
- Look for patterns: Does malaria prevalence vary by background characteristics? For example, is there a clear pattern in malaria prevalence by age? By mother's education? By wealth quintile?
  Answers:
  - Malaria prevalence increases steadily with age. Malaria prevalence is lowest among children age <6 months (16.7%), while malaria prevalence is highest among children age 48-59 months (34.9%).
  - Malaria prevalence decreases with mother's education. Only 3.6% of children whose mothers have more than secondary education tested positive for malaria by microscopy, compared to 37.7% of children whose mothers have no education.
  - Malaria prevalence decreases as household wealth increases. Malaria prevalence by microscopy in children is almost 10 times higher among those living in the poorest households than those living in the wealthiest households (42.9% versus 4.4%).
- By looking at patterns by background characteristics, we can see which groups are more in need of interventions to decrease malaria prevalence. Resources are often limited; looking for patterns can help programme planners and policy makers determine how to most effectively use resources.

Example 3: Malaria Test Positivity among Children with Fever by State
Minimum Number of Cases Required for Reliable Results

Step 1: Read the title and subtitle. This table is about malaria test positivity among children age 6-59 who had a fever in the two weeks before the survey by state.

Step 2: Identify the indicators and denominators presented in the columns. The first column shows malaria test positivity by RDT. The second column shows the denominator: the number of children with fever in the two weeks before the survey who were tested by RDT. The third column shows malaria test positivity by microscopy. The last column tells us how many children had fever in the last two weeks and were tested for malaria by microscopy.

Step 3: Look at the row headings to identify the background characteristics. This table presents malaria test positivity by state. There are 37 states in Nigeria.

Step 4: Find the denominators for each indicator in the table. How many children with fever in the two weeks before the survey were tested with RDTs? There are 2,373 children in this group. How many children with fever in the last two weeks were tested by microscopy? 2,226. While these are relatively large numbers, when divided up into 37 states there may be too few cases for the data to be reliable. For example:

- What percent of children with fever tested positive for malaria by RDT in FCT-Abuja? 48.2%. This percent is in parentheses because there are only 25-49 children (unweighted) in this category. Readers should use this number with caution—it may not be accurate. (For more information on weighted and unweighted numbers, see Example 4.)
- What percent of children with fever tested positive for malaria by RDT in Ekiti? There is no number in this cell—only an asterisk. This is because fewer than 25 children are in this category. Results for this group are not reported. The subgroup is too small, and therefore the data are not reliable.

Table 6.4.2 Malaria test positivity among children reporting having a fever within the last 2 weeks: States 1

Percentage of eligible children 6-59 months classified in two tests as having malaria, by state, Nigeria 2015

3 State	2	Malaria test positivity according to RDT		Malaria test positivity according to microscopy	
		RDT positive	Number of children with fever in the last 2 weeks	Microscopy positive	Number of children with fever in the last 2 weeks
North Central					
FCT-Abuja		(48.2) 4	7	(31.0)	7
Benue		(80.8)	41	(48.2)	38
Kogi		(54.1)	25	*	20
Kwara		(67.7)	41	(26.1)	36
Nasarawa		61.7	63	38.9	55
Niger		51.0	78	29.9	77
Plateau		67.4	68	37.4	65
North East					
Adamawa		65.4	66	42.9	64
Bauchi		55.6	109	27.6	102
Borno - Urban		*	2	*	3
Gombe		57.2	47	32.4	48
Taraba		62.2	65	46.1	61
Yobe		35.3	103	17.8	93
North West					
Jigawa		63.4	99	30.0	91
Kaduna		61.3	96	40.5	89
Kano		70.8	212	35.3	209
Katsina		64.9	259	31.6	249
Kebbi		48.5	63	71.2	58
Sokoto		70.6	110	54.1	113
Zamfara		75.0	124	61.4	111
South East					
Abia		(36.4)	22	(11.1)	20
Anambra		(25.5)	55	(16.2)	54
Ebonyi		50.5	53	21.7	49
Enugu		(43.1)	30	(14.3)	28
Imo		(30.2)	41	(5.1)	35
South South					
Akwa Ibom		34.1	67	27.9	58
Bayelsa		43.2	47	35.9	43
Cross River		40.5	43	20.8	38
Delta		(42.2)	37	(28.1)	34
Edo		*	15	*	14
Rivers		(24.4)	65	(7.2)	63
South West					
Ekiti		*	13	*	13
Lagos		(5.4)	40	(0.0)	36
Ogun		(56.6)	33	(13.9)	30
Ondo		(53.3)	35	(23.0)	32
Osun		(56.2)	36	*	33
Oyo		(59.2)	60	(31.2)	54
Total		56.1	2,373	32.9	2,226

Notes: Estimates for North East Zone do not include the rural areas of Borno State. Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.
RDT = Rapid Diagnostic Test

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

Example 4: Understanding Sampling Weights in NMIS Tables

A sample is a group of people who have been selected for a survey. In MIS surveys, the sample is designed to represent the national population age 15-49. In addition to national data, most countries want to collect and report data on smaller geographical or administrative areas. However, doing so requires a minimum sample size per area. For the 2015 NMIS, the survey sample is representative of Nigeria as a whole, for urban and rural areas, for 6 zones, and for 37 states.

To generate statistics that are representative of the country as a whole and each of the 37 states, the number of women surveyed in each state should contribute to the size of the total (national) sample in proportion to size of the state. However, if some states have small populations, then a sample allocated in proportion to each state's population may not include sufficient women from each state for analysis. To solve this problem, states with small populations are oversampled. For example, let's say that you have enough money to interview about 8,000 women and want to produce results that are representative of Nigeria as a whole and each of its states (as in Table 3.1.2). However, the total population of Nigeria is not evenly distributed among the states: some, such as Kano and Katsina are heavily populated while others, such as FCT-Abuja are not. Thus, FCT-Abuja must be oversampled.

A sampling statistician determines how many women should be interviewed in each state in order to get reliable statistics. The blue column (1) in the table at the right shows the actual number of women interviewed in each state. Within the states, the number of women interviewed ranges from 88 in Borno-Urban to 313 in Adamawa. This number of interviews is sufficient to get reliable results in each state.

With this distribution of interviews, some states are overrepresented and some zones are underrepresented. For example, the real population of FCT-Abuja is only about half a percent (0.6%) of the population of Nigeria, while the population of Benue is more than 3% of the population of Nigeria. But as the blue column shows, the NMIS interviewed almost the exact same number of women in these two states. The number of women interviewed in FCT-Abuja and in Benue accounts for 2% each of the total sample of women interviewed (178/8,034). This unweighted distribution of Nigerian women does not accurately represent the population.

In order to get statistics that are representative of Nigeria, the distribution of the women in the sample needs to be weighted (or mathematically adjusted) such that it resembles the true distribution in the country. Women from a small state, like FCT-Abuja should only contribute a small amount to the national total. Women from a more populated state, like Benue, should contribute much more. Therefore, DHS statisticians mathematically calculate a "weight" which is used to adjust the number of women from each state so that each state's contribution to the total is proportional to the actual population of the state. The numbers in the purple column (2) represent the "weighted" values. The weighted values can be smaller or larger than the unweighted values at the state level. The total national sample size of 8,034 women has not changed after weighting, but the distribution of the women in the states has been changed to represent their contribution to the total population size.

How do statisticians weight each category? They take into account the probability that a woman was selected in the sample. If you were to compare the red column (3) to the actual population distribution of Nigeria, you would see that women in each state are contributing to the total sample with the same weight that they contribute to the population of Nigeria. The weighted number of women in the survey now accurately represents the proportion of women who live in FCT-Abuja and the proportion of women who live in Benue.

Table 3.1.2 Distribution of respondents: States

Percent distribution of women age 15-49 by state, Nigeria 2015

State	Weighted percent (3)	Weighted number (2)	Unweighted number (1)
North Central			
FCT-Abuja	0.6	46	178
Benue	3.3	267	179
Kogi	2.3	188	220
Kwara	2.4	195	183
Nasarawa	1.6	131	262
Niger	3.6	285	205
Plateau	3.0	244	245
North East			
Adamawa	2.6	209	313
Bauchi	3.5	284	274
Borno - Urban	0.7	58	88
Gombe	1.9	155	287
Taraba	2.0	163	289
Yobe	2.6	207	290
North West			
Jigawa	4.6	371	281
Kaduna	3.8	305	244
Kano	6.1	491	252
Katsina	6.5	519	279
Kebbi	2.5	198	221
Sokoto	2.2	178	251
Zamfara	3.7	297	286
South East			
Abia	1.5	123	207
Anambra	2.2	177	116
Ebonyi	2.0	159	213
Enugu	2.0	162	214
Imo	2.4	189	177
South South			
Akwa Ibom	2.3	187	197
Bayelsa	1.6	126	234
Cross River	1.9	151	194
Delta	1.8	144	164
Edo	1.4	112	152
Rivers	4.5	361	231
South West			
Ekiti	1.2	99	157
Lagos	4.5	358	261
Ogun	1.9	151	188
Ondo	1.8	145	129
Osun	2.9	235	170
Oyo	4.5	362	203
Total 15-49	100.0	8,034	8,034

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

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