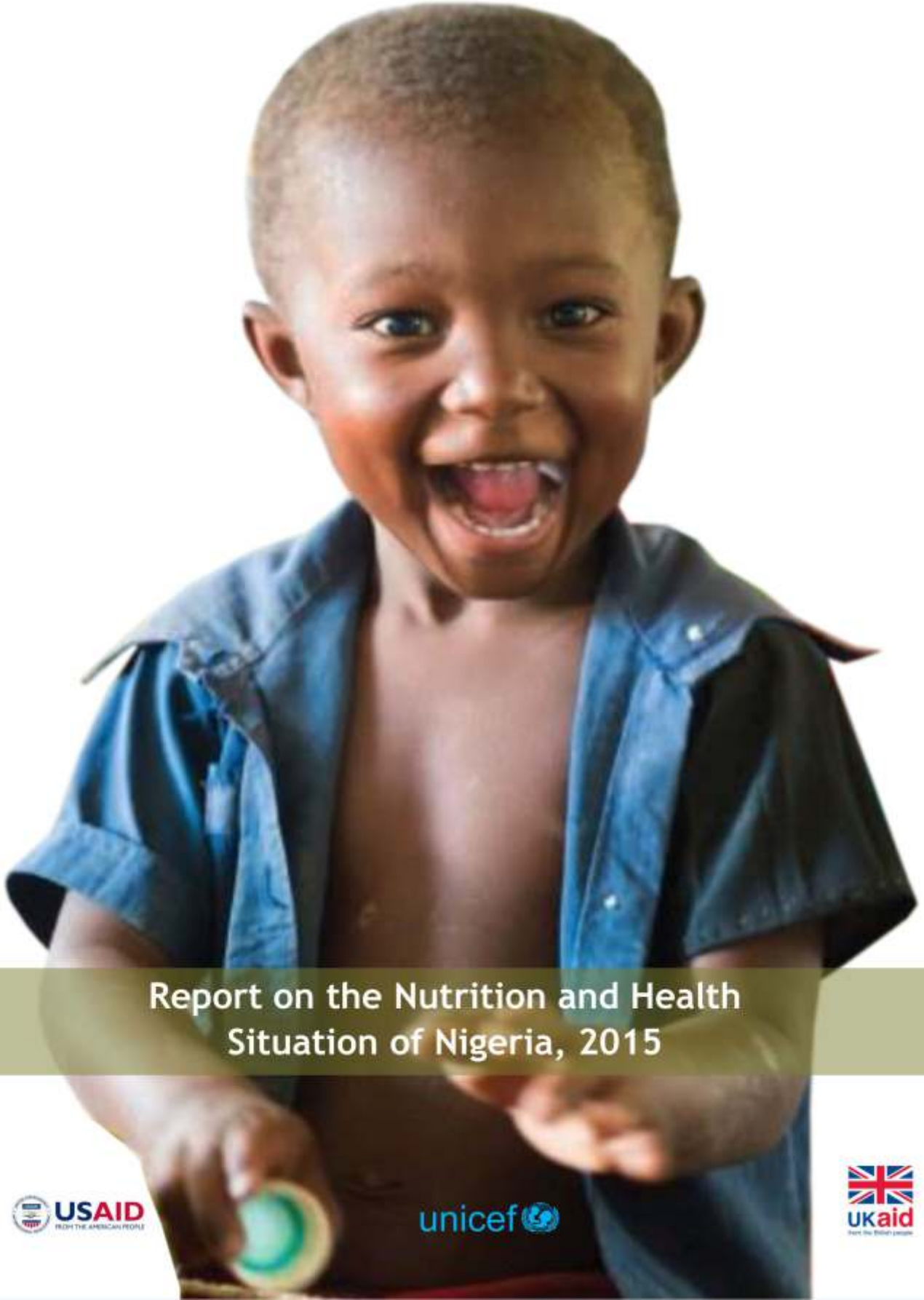
National Nutrition and Health Survey (NNHS)



Report on the Nutrition and Health Situation of Nigeria, 2015

USAID FROM THE AMERICAN PEOPLE

unicef

UKaid from the British people

Foreword

The National Nutrition and Health Survey (NNHS) was carried out in 2015 by the National Bureau of Statistics (NBS). Financial support was provided by; the Government of Nigeria, United Nations Children's Fund (UNICEF), United States Agency for International Development (USAID) and Department for International Development (DFID). Technical Support was provided by UNICEF and the Government of Nigeria through NBS.

NNHS is a household survey conducted using Standardized Monitoring and Assessment of Relief and Transition (SMART) methods. NNHS is conducted annually and this is the second national level survey. NNHS provides up-to-date information on the situation of nutrition and health and measures key indicators that support the country to monitor progress towards national and internal goals.

National Bureau of Statistic (2015)
Main Report, Abuja Nigeria

The report was written by Lorenza Rossi (the Survey Analyst) in close coordination with the UNICEF Nigeria Country Office.

Table of Contents

List of Acronyms

ACT	Artemisinin-based Combination Therapy
ANC	Antenatal Care
ARI	Acute Respiratory Infection
CI	Confidence Interval
CMAM	Community-based Management of Acute Malnutrition
DFID	Department for International Development
DHS	Demographic and Health Survey
DPT	Diphtheria, Pertussis and Tetanus
EA	Enumeration Areas
EFB	Exclusive Breastfeeding
ENA	Emergency Nutrition Assessment
EPI	Expanded Programme on Immunisation
FCT	Federal Capital Territory
FGON	Federal Government of Nigeria
FMOH	Federal Ministry of Health
GAM	Global Acute Malnutrition
HAZ	Height for Age Z-score
HH	Household
IPTp	Intermittent Preventive Treatment in Pregnancy
ITN	Insecticide Treated Net
IYCFP	Infant and Young Child Feeding Practice
KAP	Knowledge Attitudes and Practice
LGA	Local Governmental Area
MAM	Moderate Acute Malnutrition
MDG	Millennium Development Goals
MNCHW	Maternal Newborn and Child Health Week
MICS	Multiple Cluster Indicator Survey
MMR	Maternal Mortality Rate
MTCT	Mother to Child Transmission
MUAC	Mid-Upper Arm Circumference
NBS	National Bureau of Statistics
NCHS	National Center for Health Statistics
NDHS	Nigeria Demographic and Health Survey
NIS	Nutrition Information System
NMCSP	National Malaria Control Strategic Plan
NNHS	National Nutrition and Health Survey
NPopC	National Population Commission

NSHDP	National Strategic Health Development Plan
NSPAN	National Strategic Plan of Action for Nutrition
ORIE	Operational Research and Impact Evaluation
ORS	Oral Rehydration Salts
ORT	Oral Rehydration Therapy
PBF	Predominant Breastfeeding
PENTA	Pentavalent vaccine
PHC	Primary Health Care
PPS	Probability Proportional to Size
PSU	Primary Sampling Unit
RDT	Rapid Diagnostic Testing
SAM	Severe Acute Malnutrition
SD	Standard Deviation
SMART	Standardized Monitoring and Assessment of Relief and Transition
SOML	Saving One Million Lives
SP	Sulphadoxine Pyrimethamine
UCI	Universal Child Immunization
UNHCR	United Nation High Commission for Refugees
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VAD	Vitamin A Deficiency
WASH	Water Sanitation and Hygiene
WAZ	Weight for Age Z-score
WB	World Bank
WHZ	Weight for Height Z-score
WINNN	Working to Improve Nutrition in Northern Nigeria
WFP	World Food Program
WHO	World Health Organization

Executive Summary

The Global Nutrition Report (GNR) 2015 places Nigeria among the countries displaying commitment to reduce hunger and improve nutrition in children and women. Although it still is one of the five large low-middle income countries where more than half of children under age 5 are either stunted or wasted, the trends in meeting the global World Health Assembly Resolution (WHAR) targets are positive and Nigeria is obtaining "some progress".[1]

Survey results seem consistent with the GNR 2015 positive findings, as the overall NNHS 2015 global acute malnutrition (GAM) and severe acute malnutrition (SAM) prevalence for under-five children is reported at 7.2 and 1.8 percent respectively, whereas the same indicators were reported at 8.7 and 2.2 percent in National Nutrition and Health Survey (NNHS) 2014. In addition, none of the states surveyed this year reported GAM and SAM above critical WHO cut off points,[2] and there has also been a slight reduction in the underweight indicator (19.4 percent compared to 21 percent in 2014). Stunting, however, is still the largest burden, thus indicating a long-term nutritional problem in the country. The indicator is quite stable (33 percent), confirming an overall prevalence positively below Sub-Saharan regional level (37 percent).[3]

The downward trend in child malnutrition is good news, but the battle is far from won. Children growing up healthy are still a minority in the North West and North East: GAM is above warning threshold in five states and SAM in six states. Underweight is critical in Katsina, Kebbi, Sokoto, Yobe and particularly in Jigawa, where it exceeds 40 percent. Jigawa also has the highest prevalence of severe underweight (13 percent) among all states surveyed. Furthermore in 9 states, more than half of the under 5 children are stunted.

The situation is even worse when assessing the nutritional and health status of women. Global acute malnutrition and severe acute malnutrition prevalence[4] in the North West and the North East are above 12 and 7 percent respectively. Compared to last year, acute malnutrition has dramatically risen in Katsina, Zamfara, Sokoto, Kebbi and Yobe, an increase ranging from 5 to 12 percentage points. In these two zones, almost one in four women was found pregnant, but more than 60 percent

---

[1]The other four countries are Bangladesh, Democratic Republic of the Congo, Ethiopia, and Pakistan. 2015 Global Nutrition Report, International Food Policy Research Institute, 2015.
[2]The WHO classification of Malnutrition Prevalence considers GAM acceptable if < than 5%, precarious if comprised between 5 and 10%, serious if comprised between 10 and 15% and critical if above 15%. As for Chronic Malnutrition, acceptable prevalence should be < 20%, precarious comprised between 20 and 30%, serious between 30 and 40%, and critical above 40%. Underweight threshold are respectively set at 10% (acceptable), 20% (precarious), 30% (serious) and above 30% (critical). SAM prevalence is considered critical if above 2%.
[3]The State of the World's Children 2015, Reimagine the future, UNICEF 2015.
[4]In this survey, women with MUAC < 221 mm were classified as acutely malnourished, while women whose MUAC was between 214 and 221 mm were classified as moderately malnourished and women whose MUAC fell below 214 mm were classified as severely malnourished.

of all pregnant women did not receive skilled care during childbirth, only 13 percent used any contraceptive method, 36 percent did not attend Antenatal Care (ANC) and only 15 percent were HIV tested.

This situation has profound implications for health and human development, and presents a major obstacle to the attainment of the Saving One Million Lives (SOML) initiative in the country. Launched in 2012 as a comprehensive programme to complement the achievement of the MDGs, the SOML has recently been extended by the Federal Government of Nigeria (FGON) for another five years. Building on the growing international momentum behind child and maternal survival, the FGON has contextually agreed a 500 million USD credit with World Bank (WB) for a Program for Results (PforR) which will disburse funds to states according to key linked indicators.[5]

To assess the progress towards the set target, generation of data on key indicators on regular basis has become imperative. In the last thirteen years, National Bureau of Statistics (NBS) and National Population Commission (NPopC) have conducted regular national nutritional status surveys, such as Multiple Indicator Cluster Survey (MICS) and Demographic Health Surveys (DHS). But the frequency of these surveys – which take place every 4 to 5 years – is not helping to regularly track progress made. Therefore a cross-sectional annual household survey was proposed

This survey report presents the results of the National Nutrition and Health Survey conducted in all the 36 States of Nigeria and Federal Capital Territory (FCT) in July and September 2015. It is the second national survey to assess the nutritional and health status of children under 5 years of age and of women in the reproductive age group (15-49 years), the first being conducted from February to May 2014. In order to provide reliable data for planning and monitoring of key activities, new key indicators have been added: Malaria Intermittent Preventive Treatment in pregnancy for women in the reproductive age group, antenatal care coverage and HIV testing during ANC.

For clarity, indicators have been divided into six macro-areas:

- Nutritional status of children under 5 years of age [Acute Malnutrition, Underweight, Stunting and Overweight];
- Health status of children under 5 years of age [DPT/Penta3 and measles immunisation coverage, diarrhoea and ORS therapy and zinc supplementation, Acute Respiratory Infection (ARI), fever prevalence and antibiotic treatment];
- Malaria [household availability, net usage, fever prevalence, diagnosis and treatment of

[5]Indicators identified as key to strengthen the overall health system in the country include: DPT[3]/Penta[3] coverage, Vitamin A coverage, HIV testing during ANC, skilled birth attendant, modern contraceptive prevalence rate and use of mosquito nets.

malaria in children under 5 years of age, and Malaria Intermittent Preventive Treatment in pregnancy for women in reproductive age group];

- Nutritional status of women in the reproductive age group (15 – 49 years) [Acute malnutrition];
- Health status of women in the reproductive age group (15 – 49 years) [skilled attendance at delivery, contraceptive prevalence rate, antenatal care coverage, and HIV testing during ANC];
- MNCHW [coverage, Vitamin A supplementation and deworming coverage].

A cross-sectional study design with two stage cluster sampling was used.

Data were collected from 25,210 households, 20,060 children under-five years of age and 23,688 women of reproductive age (15-49 years). The 36 states and Federal Capital Territory (FCT) of Nigeria constitute the domains of the survey. The domains used by MICS and DHS are similar, which allows comparison of results. The 37 Nigerian states have been grouped into six geo-political zones:[6] However, some local government areas were excluded from sampling in Borno state for security reasons and hence the data from Borno state does not represent the whole state and it needs to be interpreted with caution.

Table 1: Nigerian states by geo-political zone

Geo-political zone	State
South East	Anambra, Enugu, Ebonyi, Imo and Abia
South South	Edo, Delta, Rivers, Bayelsa, Cross-River and Akwa-Ibom
South West	Lagos, Ogun, Oyo, Osun, Ondo and Ekiti
North Central	Kwara, Kogi, Plateau, Nassarawa, Benue, Niger and F.C.T
North East	Taraba, Adamawa, Borno, Yobe, Bauchi and Gombe
North West	Sokoto, Zamfara, Kebbi, Kaduna, Katsina, Kano and Jigawa

[6]Nigeria has six geopolitical regions that reflect major ethnic, cultural, geographic, and political blocks. The six zonal structure was adopted in [1995] during the regime of president Babangida, following former vice-president, Alex Ekwueme's proposal. Nigerian economic, political and educational resources are often shared across the zones. For a detailed map of these zones see Annex [1].

Data Quality Summary

A representative sample of 25,210 households across 37 strata/domains was selected for the survey. Target groups were children below 5 years of age and women in the reproductive age group (15-49 years). Overall 23,688 women and 20,060 children were interviewed. There was an average of 0.8 children per household and 0.9 women per household.

Only 37 percent of children were found to have exact age calculated, which is slightly lower than 2014 findings of 40 per cent. Exact age calculation shows a significant variation among survey domains and teams, ranging from 3 percent in Yobe to 84 percent in Kogi and from 5 percent of team 11 to 90 percent of team 26. Age heaping is also present, producing a marked deficit especially around year one and two, which suggests that surveyors are still not estimating ages well with local events of calendar. The tendency of reporting ages at adjacent numbers such as 35/37 and 47/49 months was also noted and might indicate an effort to "distribute" age heaping around year 3 and 4.However, the overall age distribution is acceptable. The overall ratio of boys to girls of under-five years of age ranged from 0.8 to 1.3 for the 37 states surveyed. The ratio varied among states – lowest ratio was found in Cross River and Niger at 0.83 and highest in Osun (1.31). Another three states had boy/girl ratio above 1.2 – Bayelsa (1.25), Imo (1.22) and Yobe (1.3) – which might indicate a sex bias related to these domains. Nevertheless the overall ratio of boys to girls was 1.01, which indicates that both sexes are equally distributed in survey domain.

Complete data for calculating z-scores were available for 19,646 children (98 percent of all children interviewed). The analysis of anthropometric data shows that there was no significant digit preference for weight, height and MUAC in the overall dataset, and the score was good. Level of missing data varied between survey domains, but the highest percentage was reported in Anambra, Imo and especially Abia 8.6 percent for Weight-for-Height Z-score (WHZ), 9.6 percent for Height for Age Z-score (HAZ) and Weight for Age Z-score (WAZ) while the lowest was reported in Kaduna and Sokoto states at 0.5 and 0.6 percent for WHZ respectively, 0.8 and 0.7 percent for WAZ respectively and 0.7 percent both for HAZ. Standardized Monitoring and Assessment in Relief and Transition (SMART) flags were used to exclude extreme values. The overall standard deviation of anthropometric z-scores for WHZ and WAZ were 1.05 and 1.11 respectively, and all domain values were below 1.10, indicating a high reliability of data. As for HAZ, the overall standard deviation of anthropometric z-scores was 1.31, thus indicating a problem with the quality of age data. Nevertheless the upper limit for most domains was slightly above 1.2, therefore the prevalence of stunting based on HAZ results can be considered reliable.

Survey distribution of anthropometric z-scores after applying SMART Flags shows that WAZ and WHZ distribution follow normal bell shaped curve, while HAZ curve is flatter than normal, probably because of poor age estimation for children. Digit preference is even more significant in the case of

women and their age distribution by single years is distorted by a notable age heaping at age 20, 25, 30, 35, 40 and 45. Age heaping is also present, although less pronounced, for even numbers. Therefore, women results based on age category should be interpreted with caution and more effort is needed in future surveys to correct this tendency. Detailed data quality report is included in the annex of the report in order to identify and avoid mistakes in the future and to consistently improve the quality of nutrition surveys.

Justification for the Survey

The National Strategic Plan of Action for Nutrition (NSPAN) 2014-2019, highlighted the need to strengthen the Nutrition Information System (NIS) in the country. Among others, conducting surveys on regular basis is one of the plans to achieve this objective. National Bureau of Statistics (NBS) and National Population Commission (NPopC) have been conducting surveys – including Multiple Indicator Cluster Survey (MICS) and Demographic Health Surveys (DHS) – every 4 to 5 years at national level. Though these surveys are useful, the frequency of these surveys does not helping to monitor the programs on regular/annual basis. Additionally, the Federal Government of Nigeria (FGON) extended the Saving One Million Lives (SOML) initiative for five years, as part of the National Strategic Health Development Plan (NSHDP) 2016-2020. The FGON agreed a 500 million USD credit with World Bank (WB) for a Program for Results (PforR) to support the "Saving One Million Lives (SOML)" initiative. The objective of the PforR is to increase the utilization of high impact reproductive health, child health, and nutrition interventions in the country. The PforR will disburse funds to states based on results, not inputs, using set disbursement linked indicators (DLIs). The grant will use six indicators identified as key to strengthen the overall health system in the country. The indicators include; DPT3/Penta3 coverage, Vitamin A coverage, HIV testing during ANC, skilled birth attendant, modern contraceptive prevalence rate and use of mosquito nets. Hence, a sound data collection system that can generate reliable information on annual basis has a vital importance. For this reason, a cross-sectional National Nutrition and Health Survey (NNHS) was proposed to be conducted on annual basis.

This is the second annual survey aimed to provide reliable information for planning and monitoring of key indicators at national level. The gathered information will be used to triangulate with other information such as program data for improved program management in the country. Additionally, the results from this survey can be used to monitor the progress towards national goals and global commitments at state, region and national level.

Objectives of the Survey

The objectives of the survey are:

- Determine the prevalence of acute malnutrition among children 6 to 59 months of age using WHZ, Mid Upper Arm Circumference (MUAC) and bilateral oedema;

- Determine the prevalence of chronic malnutrition and underweight among children 0 to 59 months of age;
- Determine the prevalence of acute malnutrition among women 15 to 49 years of age using MUAC;
- Assess the prevalence of diarrhoea and use of ORS and zinc among children under-five years two weeks preceding the survey;
- Estimate coverage of vitamin A supplementation and deworming among children 6 to 59 and 12 to 59 months of age respectively within the last six months;
- Determine the coverage of DPT3/Penta3 and measles immunization among children 12-23 months of age;
- Determine the proportion of under five children with Acute Respiratory Infection (ARI) symptoms and proportion of children with fever received treatment;
- Determine the ownership and universal access of mosquito nets, and utilization of mosquito nets by children 0-59 months;
- Assess the practice of skilled birth attendants, contraceptive prevalence rate and antenatal care coverage among women 15 to 49 years; and
- Determine the proportion of women 15 – 49 years received HIV testing and intermittent preventive treatment during antenatal care.

Key Findings

Child Nutrition

This survey includes an anthropometric module in which all children from 0-59 months of age were weighed and measured. Overall 25,210 households across 37 strata/domains were interviewed and 20,060 children sampled, of which 10,062 boys and 9,998 girls.

Four child malnutrition indicators are presented: Acute Malnutrition[7], Underweight, Stunting and Overweight[8]. All the anthropometric measurements of children in the survey population have been compared with the World Health Organization Child Growth Standards (WHO, 2006).

[7]Acute malnutrition refers to Global Acute Malnutrition (GAM) i.e. Moderate Acute Malnutrition (MAM) plus Severe Acute Malnutrition (SAM). In this survey Acute Malnutrition has been calculated, for children 6 to 59 months, using either Weight-for-height (WHZ) and/or bilateral edema presence either mid upper arm circumference (MUAC) and/or bilateral edema presence.
[8]The estimates for Underweight, Stunting, and Overweight were instead calculated for children 0 to 59 months.

The overall global acute malnutrition (GAM) prevalence for children 6 to 59 months based on WHZ was 7.2 percent, while the prevalence of severe acute malnutrition (SAM) was 1.8 percent, presenting an improvement since 2014 – when GAM was reported at 8.7 percent and SAM at 2.2 percent. In 2014, GAM and SAM were above emergency cut off points (15 percent for GAM and 2 percent for SAM[9]) in three states, namely Jigawa, Bauchi, and Yobe. None of the states surveyed in 2015 surpassed the critical cut-off and ten states showed prevalence of GAM below the WHO not critical threshold of 5 percent. However five states (Borno, Jigawa, Katsina, Sokoto and Yobe) were above warning threshold for GAM (10< GAM <15) and six states (Borno, Delta, Katsina, Kebbi, Sokoto and Yobe) were above the WHO SAM crisis threshold of 2 percent. Finally, 51 cases of bilateral oedema were found.

Although MUAC and WHZ identify a population of children that only partially overlap, findings from both indicators substantially converge and in general, malnutrition prevalence is higher in the North West than in the South East, and the difference is considerable for both GAM and SAM.

According to survey results, there has been a slight reduction in the underweight indicator, and 19.4 percent of children under age 5 were reported being underweight in 2015. The North East states have undergone the greatest improvement, a drop of 6 percentage points compared to 2014, while North West states are still above the 30 percent WHO critical threshold. However, the result from North East should interpreted with caution as the result from Borno is not representative. Underweight is critical in Katsina, Kebbi, Sokoto, Yobe and particularly in Jigawa, where it exceeds 40 percent. Jigawa has also the highest rate among all states surveyed in terms of severe underweight (13 percent).

Stunting prevalence is quite stable since last year and national stunting prevalence is below regional level at 33 percent. Nevertheless the situation is still critical – above 40 percent – in the North West and North East states, where 56 percent and 44 of the under 5 children are still stunted, respectively. The situation is particularly critical in Bauchi, Jigawa, Kaduna, Kano, Katsina, Kebbi, Sokoto, Yobe and Zamfara, where more than half of under 5 children are stunted. Conversely, the prevalence of stunting is lowest in the South East (12 percent), where about one in ten children is stunted. Overall, 12 percent of children are severely stunted (below -3 SD) and severe stunting by zone and state follows the same trend of stunting. Nigeria has also an overweight prevalence of 1.6 percent.

---

[9]The WHO classification of Malnutrition Prevalence considers GAM acceptable if < than 5%, precarious if comprised between 5 and 10%, serious if comprised between 10 and 15% and critical if above 15%. As for Chronic Malnutrition, acceptable prevalence should be < 20%, precarious comprised between 20 and 30%, serious between 30 and 40%, and critical above 40%. Underweight threshold are respectively set at 10% (acceptable), 20% (precarious), 30% (serious) and above 30% (critical). SAM prevalence is considered critical if above 2%.

[10]While WHZ is a more comprehensive measure of nutritional status, MUAC is mainly a measure of muscle mass. *Test characteristics of MUAC*, University of Gent, 2012.

These results are particularly encouraging considering that 2014 survey was conducted between February and May – before the expected hunger gap – while 2015 survey has been conducted at the peak of hunger season – which usually occurs between June and August. Although Nigeria is still one of the five large low-middle income countries where more than half of children under age 5 are either stunted or wasted – the others being Bangladesh, Democratic Republic of the Congo, Ethiopia, and Pakistan – the trends in meeting global WHAR targets are positive. The Global Nutrition Report 2015 ranked Nigeria between countries displaying commitment to reduce hunger and improve children and women nutrition[11]

Child Health

Data for children under-five years were collected on DTP/Penta and measles vaccination coverage; diarrhoea, Oral Rehydration Salt (ORS) and zinc supplementation; and acute respiratory infections (ARI) and treatment. Overall, 49 percent of children aged 12-23 months have received the third dose of DPT/Penta at the time of the survey, which is still far from the target of 90 percent Result from last year survey shows that 52 percent of children had received DTP/Penta. However, the dropout rate has improved from 22 to 14 percent from 2014 to 2015. South-West and South-East have consistently higher coverage, between 75 and 80 percent, while the North-West and North-East have been persistently least performing – 17 and 26 percent respectively. Coverage was particularly low in Kebbi, Sokoto, Yobe and Zamfara, where less than one in ten children was immunized.

The measles immunisation pattern is similar to the observed DPT3/Penta3 pattern. Overall coverage has dropped since 2014 from 64 to 51 percent, which indicates that nearly half of eligible children still receive no vaccine at all. In general, North East and North West states have poorest rates of immunisation as compared to South East and South West states. Only four states reached the target of 80 percent: Edo, Ekiti, FCT and Lagos. Nineteen states had coverage between 50 and 80 percent and fourteen states had coverage less than 50 percent. Coverage was again particularly low in Kebbi, Sokoto, Yobe and Zamfara. It should also be noted that nearly 20 percent of children age 12-23 months had received no vaccine at all which is alarming

As for diarrhoea, survey results show that 15 percent of children under age of 5 years were reported to have had diarrhoea in the two weeks period preceding the survey. The highest prevalence was reported among children between 6 and 24 months (45 percent), thus indicating that complementary feeding introduction is a very delicate transition period and continued breastfeeding until age 2 is highly recommended. Nearly three in four children who have had

[9]2015 Global Nutrition Report, International Food Policy Research Institute, 2015.

diarrhoea received no treatment at all. In case of treatment, three times as many children received ORS instead of zinc tablets (21 versus 6 percent), which is probably due to the fact that mothers – and/or caregivers – are much more familiar with ORS than zinc supplementation or zinc is not routinely available in health facilities. Finally, a positive association between the prevalence of diarrhoea and the prevalence of GAM in children age 6-59 months was observed. This is an expected pattern.

Overall, 2 percent of children under 5 years were reported to have had symptoms of acute respiratory infections (ARI), cough with short rapid breaths or difficulty breathing in the two weeks preceding the survey, of which nearly half were given antibiotics. Treatment with antibiotics was more prevalent among older children and children were more likely to be treated in South West and South East, where more than one in two children was treated, as compared to South South, where less than one in three received antibiotics. Finally, no sex bias was reported in terms of treatment, as boys and girls are likely to receive the same medical attention when they are ill with diarrhoea or have symptoms of acute respiratory illness.

Malaria

Although Nigeria is still far from achieving the universal mosquito net coverage advised by the National Malaria Control Strategic Plan (NMCSP), survey results indicate a great improvement. According to 2015 findings, 60 percent of households in the survey domain possess at least one mosquito net, compared to 53 percent of NNHS 2014 and 45 percent of MICS 2011. Region variability ranges between the North West, where four households in five possess at least one mosquito net, and the South South, where the ratio is two to five. The state with the highest coverage is Jigawa (92 percent), followed shortly by Katsina (90 percent). Conversely FCT has the lowest possession of mosquito nets (25 percent).

The custom of protecting children by making them sleep under a mosquito nets is also below NMCSP target and extremely variable in the country. Overall only 40 percent of children slept under a net in the night preceding the survey. The highest percentage was reported in North West (almost 57 percent), while children living in South East and South West zone were less likely to sleep under a net (22 and 27 percent respectively). A very odd finding is from Katsina, where 90 percent of net possession was reported, but only 24 percent of children slept under them, also considering that the peak malaria transmission season in Northern states is usually between June and September. Although it should be interpreted with caution, this finding raises the issue of ownership of nets which does not always translate to usage. Post distribution educational campaign should therefore be incorporated into future distribution campaigns to help increase net utilisation.

Fever is another important indicator to track malaria infection. WHO new guidelines recommend that children with severe malaria symptoms, such as fever, should be taken to a health facility and subjected to diagnostic testing, and treatment on the basis of clinical suspicion should be given only when a parasitological diagnosis is not accessible. However Nigeria is far from having adopted WHO recommendation: nearly one fourth of children aged 0 to 59 months had fever in the two weeks preceding the survey, but less than one tenth of them had their blood tested. The situation is particularly critical in the North West, where 22 percent of children had fever in the two weeks preceding the survey, but only 3 percent were tested. At national level, 35 percent of all children with fever were given an anti-malarial treatment – but only 14 percent received Artemisinin Combination Therapy (ACTs), which should be the first line treatment for malaria – and 18 percent received antibiotics. In conclusion, the proportion of children receiving treatment is severely below the NMCSP national target of at least 80 percent coverage.

As for women, national guidelines recommend an early case management protocol of malaria in pregnancy, with three doses of sulphadoxine-pyrimethamine (SP)/Fansidar. However, the survey indicates that Intermittent Preventive Treatment of Malaria in pregnancy (IPTp) is still not routinely administered and only 6 percent of women aged 15-49 years who had a live birth during the two years preceding the survey took SP/Fansidar at least three times during pregnancy, less than one in twelve women who received Antenatal Care (ANC) by a skilled provider. Older women were more likely to receive Malaria IPTp than teenagers (6 versus 4 percent). Reasons for such a low coverage could be related to systems-based challenges (stock outs; lack of provider knowledge of IPTp protocols) coupled with individual women's beliefs and lack of understanding of the IPT contribute. Educational campaign should therefore be strengthened and delivered with widespread coverage.

Women Nutrition

Nutritional status of women in the reproductive age group was assessed using the Mid Upper Arm Circumference (MUAC)[12]. Accordingly, 7.4 percent of Nigerian women of reproductive age were reported as malnourished and 3.7 percent as severely malnourished. In addition, it represents a worsening since NNHS 2014 prevalence were 5.5 and 2.5 percent respectively.

The situation was found critical in the North West and the North East, where global acute malnutrition prevalence were at 13 and 12 percent, respectively and severe acute malnutrition prevalence at 7 percent in both regions, while in the other four zones global acute malnutrition prevalence were all below 5 percent, and severe acute malnutrition below 2 percent. At

[12]In this survey, women with MUAC < 221 mm were classified as acutely malnourished, while women whose MUAC was between 214 and 221 mm were classified as moderately malnourished and women whose MUAC fell below 214 mm were classified as severely malnourished.

disaggregated level, ten states – compared to five in last year NNHS – had acute malnutrition indicators over 10 percent: Bauchi, Borno, Gombe, Jigawa, Kano, Katsina, Kebbi, Sokoto, Yobe and Zamfara. This is partly explained by the seasonality of acute malnutrition, however, further investigation is therefore needed to understand the reason for such elevated prevalence of low MUAC in these states, also considering that compared to previous NNHS, most figures have risen by more than 3 percentage points.

Results also identified teenagers (15 to 19 years) as more at risk than older women. They are more malnourished (20 percent compared to 5 percent of older women) and the discrepancy has risen since last year's findings, when the relation was three times higher. A positive association between women and child nutritional status was also noted. Thus, intervention should be addressed in the key area of maternal nutritional, targeting in particular teenage mothers, in order to prevent the vicious cycle of intergenerational growth failure and benefit the whole community in the long run.

Reproductive Health

According to survey results, Nigeria has made some progress toward MDG5, albeit too slow: the coverage of use of skilled birth attendants in Nigeria is extremely variable and overall only 47 percent of pregnant women received skilled care during childbirth. The percentage is highest in the South East states at 91 percent, where nine deliveries in ten were assisted by a skilled birth attendant, and lowest in the North West states at 20 percent, where only one in five deliveries was assisted. Almost half of births of older women were delivered by skilled personnel, while only 36 percent of teenagers received birth assistance. Reasons for the North-South divergence may be explained by different factors, but in some Northern states traditional birth attendants and relatives still account for a significant portion of deliveries. According to DHS 2013, traditional birth attendants assist 22 percent of all deliveries, while 23 percent of births are assisted by a relative.

In comparison with NNHS 2014, the estimated current prevalence rate for contraceptive use in Nigeria has risen from 23 to more than 30 percent. Twenty percent of women are using a modern method compared to 15 percent in 2014, while 10 percent compared to 8 percent in 2014 still rely on traditional methods. The use of contraceptive methods has increased especially among younger women, and in 2015, 14 percent of teenagers have reported current use of contraception (compared to 4 percent in 2014). The South zones have better rates of use of modern methods than the North (South West rate is 38 percent as compared to North East rate at 11 percent). On the other hand, women in the North rarely rely on traditional methods (less than 5 percent in all three zones).

Antenatal care coverage for women in the reproductive age group has also been assessed. It is the first year that this indicator has been estimated in NNHS. In Nigeria, the antenatal care policy follows the latest WHO approach, recommending at least four ANC visits for women without

complications. Coverage of antenatal care (by a doctor, nurse, midwife, or auxiliary nurse or midwife) was 71 percent of women receiving ANC at least once during the pregnancy. Nevertheless, still one in three women made no antenatal care visits during pregnancy, and 45 percent do not have the recommended number of visits. The likelihood of ANC attendance is lower among younger women – 62 percent compared to 72 percent of older women and among women living in North West (56 percent for 1 visit, 36 percent for four visits).

The ANC period has potential as an entry point for HIV prevention and care – in particular for the prevention of HIV transmission from mother to child. Therefore this year, the indicator antenatal care coverage for women in the reproductive age group has been determined. Overall, 52 percent of women were offered HIV testing during ANC, 49 percent accepted to be tested and 40 percent received results. The offering of HIV testing – and the effective testing – was lower in the case of younger women (aged 15-19) as compared to older women – around 40 versus 52 percent – and for North Western States, where only one in three women was offered a test and accepted testing.

Reproductive health findings are consistent with women and child malnutrition patterns reported in the country: Southern states have better rates as compared to Northern states and teenage women appear to be the more disadvantaged group compared to older women. The high maternal and children malnutrition prevalence in the North West and North East zones correspond with the lowest prevalence of antenatal care coverage, indicating that antenatal coverage needs to be improved considerably in order to reduce maternal mortality. While some states have achieved antenatal coverage of more than 90 percent, others – namely Sokoto, Yobe and Zamfara – are trailing at less than 40 percent.

Maternal New-born and Child Health Week (MNCHW)

To complement the weak routine services of the Primary Health Care (PHC) system, the MNCHWs are biannual campaigns which have been regularly implemented in Nigeria since 2010, with the aim to provide maternal, newborn and child health service to communities in the country.

Among the MNCHW services delivered, vitamin A and deworming coverage were estimated. According to UNICEF standard a coverage threshold of 70 percent is the minimal coverage at which countries can expect to observe reductions in child mortality[13]. In the 37 strata/domain surveyed, only five were above the prescribed threshold, and the situation was found particularly critical in Gombe, Sokoto, Taraba, Yobe and Zamfara, where less than one child in ten has received vitamin A supplement. Overall, still three in five Nigerian children do not receive adequate levels of

[13] *Tracking progress on child and maternal nutrition: A survival and development priority, UNICEF 2009*

supplementation and may be growing up with vitamin A deficiency (VAD). This finding – which represents a deterioration of 7 percentage points compared to NNHS 2014 – is consistent with NHS 2013 findings. However, it should be noted that information on vitamin A supplementation is prevalently based on caregivers recall (since immunisation cards are rarely available), therefore findings should be interpreted with caution.

As for deworming, overall 27 percent of children aged 6-59 months had received deworming medication, the coverage of which at zone level ranges from 8 (North East) to 48 percent (South West). Deworming coverage over 50 percent was reported in only six states; these results substantially differ from NNHS 2014 and should be interpreted with caution since they are based on caregivers recall.

Methodology

Design

The National Nutrition and Health Survey using SMART methods is designed as a cross-sectional household survey using a two stage cluster sampling to provide results representative at the state level.

Fieldwork was conducted for 8 weeks between July and September 2015. All the 36 states and FCT constitute the domains of the survey. The domains used by MICs and DHS are similar, which allows comparison of results.

Data were collected from a total of 25,210 households, 20,060 children under-five years of age and 23,688 women of reproductive age.

Sampling

The sample for the 2015 NNHS is nationally representative and covers the entire population residing in non-institutional dwelling units in the country. The survey uses the national sample frame, which is a list of Enumeration Areas (EAs) prepared for the 2006 Population Census. Administratively Nigeria is divided into states, Local Government Areas (LGAs), and localities. In addition to these administrative units, during the 2006 population census, each locality was subdivided into census Enumeration Areas (EAs). The primary sampling unit (PSU), referred to as a cluster in this survey, is defined on the basis of EAs from the 2006 EA census frame.

The 2015 NNHS sample has been selected using a two-stage cluster design as described below.
First stage sampling procedure: cluster selection

The PSU (clusters) for each state were randomly selected from the national master sample frame according to the probability proportional to size (PPS) method with the support from National Population Commission.

Second stage sampling procedure: household selection

The second stage of sampling consisted of selecting households within each cluster by using systematic random selection. The team leader was responsible for the determination of the total number of households in the cluster by conducting a household listing through detailed enumeration of the selected cluster with a support from the community leader. This served as the sampling frame for the selection of households. The team leader then entered the total number of households onto the tablet and sampling interval was automatically calculated and displayed on the tablet. The sampling interval is calculated by dividing the total number of households in the cluster by the number of households to be interviewed. A random number table was used to randomly select a start number, between 1 and the sampling interval, to identify the first household. The sampling interval was used to identify all subsequent households to be included in the survey.

Sample size determination

The formula for calculating the sample size is given by

$$n = \frac{[\, t^2\ (p)\ (1\text{-}p)\ (deff\,)\ (1.05)]}{[\ (d)^2\ (pc)\ (hz)\ ]}$$

Where;

n = required sample size, expressed as number of households, for the KEY indicator,
t = is a factor to achieve 95% confidence interval
p = is the estimated value of the indicator /expected prevalence
1.05 = factor necessary to raise the sample size by 5 % for non-response
deff = design effect d= relative desired precision
pc= proportion of children under five years, and
hz= average household size (that is, average number of persons per household).

In order to be able to estimate most of the indicators with reasonable precision, the sample size has been calculated using a prevalence of Global Acute Malnutrition (GAM), based on children age 6-59 months. Indicators with narrow age range; 0-23, 6-23 and 12-23 months have been estimated with reasonable precision for each state. However, indicators with narrower age group such as 0-5, 12-15, 20-23 months and very low prevalence, such as treatment of children with ARI and Malaria, have been estimated at zonal level, by pooling the data from the survey domain within each zone.

Table 2: parameters and source used for sample size calculation

Parameters	Estimation and Source
Estimated prevalence of Global Acute Malnutrition (GAM)	10%[14] (NNHS 2014)
Precision	3.5%
Design effect for WHZ	1.6 (NNHS 2014)
Number of children to be included	492
Average number of persons per household	4.2 (NNHS 2014)
Percent of under five children in total population	20% (NNHS 2014)
Percent of non-response households	5%
Number of Households to be included	684

Accounting for the workload for data collection, it was determined that one team could complete 22 households in one cluster per day. To achieve the planned number of households per domain, 32 clusters were assigned for each state. Accordingly, a total of 1,184 clusters were selected for the survey with the target to interview 26,048 households across the country. The set target was not reached and overall 25,210 households were interviewed (97 percent).

[14]The prevalence of GAM was reported at 8.7% in NNHS 2014. Given the period that this survey will be conducted, hunger period, unlike the survey conducted in post-harvest in 2014 the prevalence of GAM is expected to increase.

Table 3: Planned number of clusters and households per state

S.N	Survey Domain	Number of cluster	Household per Cluster	Number of Households
1	Abia	32	22	704
2	Adamawa	32	22	704
3	Akwa Ibom	32	22	704
4	Anambra	32	22	704
5	Bauchi	32	22	704
6	Bayelsa	32	22	704
7	Benue	32	22	704
8	Borno	32	22	704
9	Cross River	32	22	704
10	Delta	32	22	704
11	Ebonyi	32	22	704
12	Edo	32	22	704
13	Ekiti	32	22	704
14	Enugu	32	22	704
15	FCT	32	22	704
16	Gombe	32	22	704
17	Imo	32	22	704
18	Jigawa	32	22	704
19	Kaduna	32	22	704
20	Kano	32	22	704
21	Katsina	32	22	704
22	Kebbi	32	22	704
23	Kogi	32	22	704
24	Kwara	32	22	704
25	Lagos	32	22	704
26	Nasarawa	32	22	704
27	Niger	32	22	704
28	Ogun	32	22	704
29	Ondo	32	22	704
30	Osun	32	22	704
31	Oyo	32	22	704
32	Plateau	32	22	704
33	Rivers	32	22	704
34	Sokoto	32	22	704
35	Taraba	32	22	704
36	Yobe	32	22	704
37	Zamfara	32	22	704
	Total	**1,184**		**26,048**

Training

The survey training was conducted by the Survey Technical Team, the National Bureau of Statistics, National Population Council, and the Federal Ministry of Health with support from eHealth Africa.

The trainings started on the 22nd of June 2015 and conducted in three rounds of 5 days each. Each training had a maximum number of 36 participants. It has been found that limiting the number of participants greatly increases quality of trainings in Nigeria. The same trainers were used at each training to ensure consistency. The trainings were given in three separate locations for ease of transport of interviewers and to facilitate distribution of enumerators based on knowledge of local language. The major local dialects for the regions are Yoruba, Hausa, Igbo and Pidgin.

The training included the following:

- An overview of the survey and its objectives, as well as an introduction to SMART methods
- Interviewing and general communication skills
- Segmentation and systematic random selection of households
- Consent forms and identification of individuals to measure or interview
- How to complete the questionnaires
- Estimation of age in months and validation using the calendar of local events
- How to make anthropometric measurements always in a two persons team
- The standardization of anthropometric measures: Each measurer had to measure 10 children less than five years of age twice (height, weight and MUAC) to assess the accuracy and precision of measurement by enumerators. The results of the standardization test by interviewer produced immediately and used to determine whether additional training and standardization is needed.
- The identification of severe acute malnutrition and bilateral oedema and how to refer children with SAM to the nearest health facility for treatment
- The data entry using tablets

The specific training on tablets included testing for basic literacy and numeracy, testing capacity to enter data in the tablet, how to handle system crashes of the tablet and when the data entry form closes accidentally. The training on use of tablet for data collection was led by UNICEF.

Recruitment of Interviewers and Team Organization

The National Bureau of Statistics (NBS), the National Population Commission (NPopC), Federal Ministry of Health (FMOH) and UNICEF selected 121 persons to be involved in the survey. Of the 121 individuals, 112 constituted the survey teams and 9 individuals were assigned as standby to replace

any interviewers who dropped out during the data collection period. Of the 112 individuals, 90 of them were assigned to 30 survey teams (3 individuals per team, of which 1 team leader and 2 measurers), 10 supervisors, 1 national coordinator, 1 assistant national coordinator, 3 training coordinators, 2 technical coordinators and 5 regional coordinators. Please refer to figure 1 for details of the structure of the survey team.

Team candidates were selected based on their experience in surveys and language skills to facilitate interviews with the respondents in their native language as much as possible. English language fluency was also a requirement for all team members. A minimum of 2 enumerators per team had to be females and all survey staff were required to wear culturally appropriate clothes. In some parts of the country, it was decided that all the 3 survey team members were to be females in order not be refused access to households, especially in areas where men are not allowed to enter households to measure children and women. Survey teams were assigned to areas taking into account their local languages skills and other requirements.

Supervisors were in charge of a group of 2 to 4 teams and responsible for the daily organisation and supervision of teams' work. The regional coordinators provided support to supervisors based on need, this included daily activities support based on feedback received from survey coordinators. The teams comprised of experienced and senior staffs from National Bureau of Statistics, National Population Commission and Federal Ministry of Health. UNICEF also has provided technical support and supportive supervision to the teams.

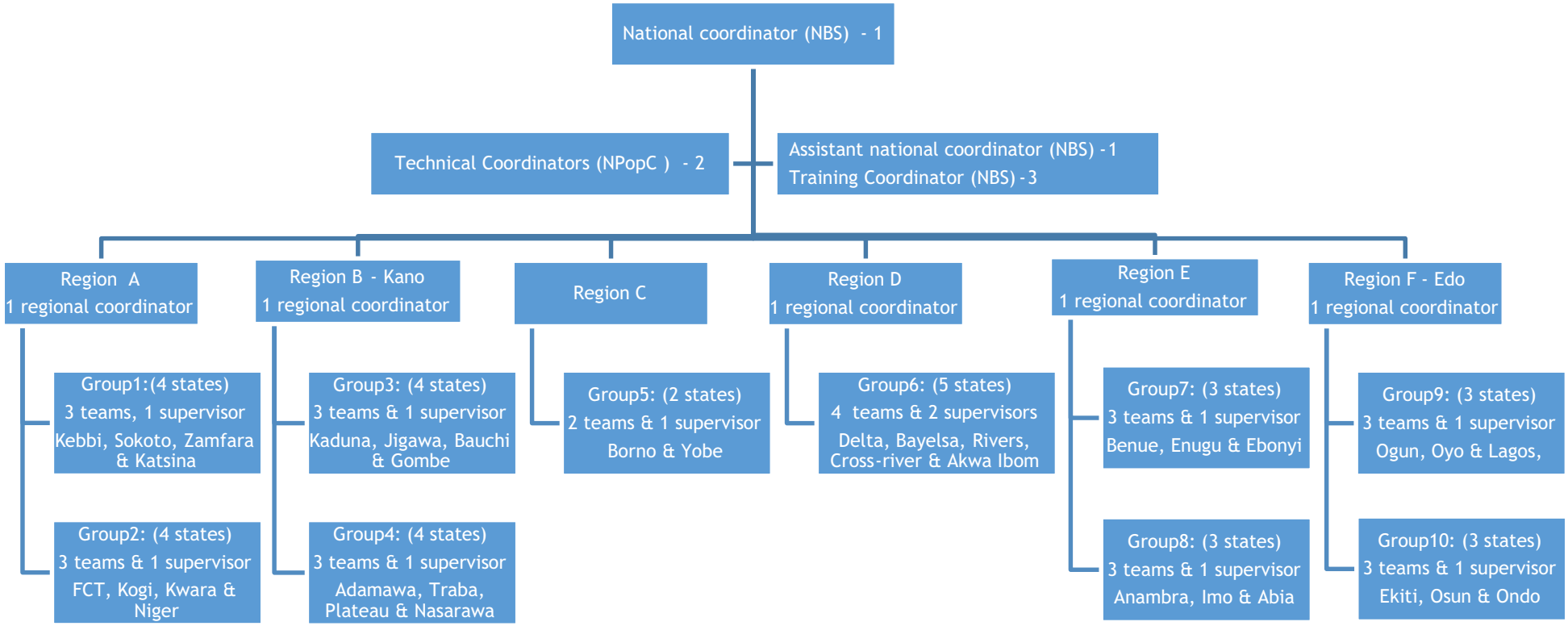


Figure 1: Structure of the survey team

Fieldwork was conducted for 8 weeks between July and September 2015, following extensive training.
A pilot test was conducted before the commencement of data collection, in order to assess the tools and evaluate the actual data collection process before deployment of the teams.

Data collection was conducted for 8 weeks, from July to September 2015. The enumerators for the survey were assessed during the training and continually throughout the data collection period. Only those teams consistently producing high quality data were retained.

Fieldwork was undertaken with a minimum of 3 teams, except in Borno and Yobe, where only 2 teams were deployed[15]. A detailed state level fieldwork plan was designed, in order to visit the most remote selected enumeration areas first and avoid the missing of selected clusters due to inaccessibility from rain or impassable roads.

Data Collection and Supervision

Galaxy tab 4 7.0" were used to collect data in the field. Collected data were automatically sent to a central server using 3G internet connection using FormHub (Open Data Kit) and immediately analysed for key quality checks. Results displayed on a purpose built dashboard and analysis with STATA served as the basis for communication between the coordinator and the rest of the survey teams during entire data collection period.

Prior to the start of the data collection phase, the selected local government area (LGA) authorities were informed about the survey in order to facilitate the informing of community members about data collection and gain support from the officials and the community. Each team had its own vehicle and was accompanied by a driver. To minimise travel times, teams were advised to stay in the nearest LGA.

Survey teams started fieldwork in the same location where training was conducted in order to make supervision of all teams by senior survey staff possible.

Data Quality Control and Data Entry

Data Quality Control

To ensure the quality of data, supportive supervision was provided for the teams at different level. The first level of supervision was provided by the team supervisors who were responsible for closely

[15]The small number of teams per supervisor allowed the supervision teams to provide effective support by reviewing the skills and implementation of all data collection process during entire period.

monitoring the work of the teams to ensure that all sampled households were visited and eligible children and women included. An important element of these supervisors was to facilitate logistics, organize the team movement within the state, reviewing listing of households, systematic selectin of households and supporting in measurement and age estimation The main aim of such support was needed to uncover any deliberate distortion of household listing and selection of households, age estimation or omission of household members by interviewers so as to reduce their workload. Supervisors also observed the interview to ensure that the survey team were conducting the interviews as per the interview manual.

The second level of supervision consisted of regional coordinators and state level government officers visit to the field and regularly check teams on their work. Strengths and weaknesses were discussed in review session with the teams.

A dashboard was created to summarize the quality report on daily basis during fieldwork to check the data that were sent using smart phone (tablets). The results in the dashboard focused on issues such as response rates, the age distribution of children, women and household members, the level of missing values for key indicators, time of data collection and quality of anthropometry measurements. Any problems that appeared from review of the dashboard were discussed with the appropriate teams in order to prevent data quality problems from affecting the survey results.

Data Entry

Data were collected using tablets. Therefore, data collection and data entry were completed at the same time in the field. This has facilitated quick review with the objective to improve the quality of data and real time reporting of the results. In addition to saving the time of data entry, this method saved money that would have been spent on second data entry and validation process.

Data Analysis

All data were analysed with STATA version 14.0. ENA for SMART application was used to assess the quality of anthropometric measurements. As per SMART methods, SMART flags were used in the analysis of child anthropometric data and extreme values that resulted likely from incorrect measurements at state level were excluded. SMART flags exclude anthropometric indices with -3 to 3 for WHZ, -3 to 3 for HAZ, -3 to 3 for WAZ, from observed mean. This is different from WHO flags which uses reference population and excludes -5 to 5 for WHZ, -6 to 6 for HAZ, -6 to 5 for WAZ. However, the regional and national level estimates were calculated using WHO exclusion criteria. This allows comparison to MICS and DHS survey results. Estimates on child malnutrition were calculated with the WHO 2006 growth reference standard.

Survey weights were calculated based on populations provided from the master sample frame and number of valid cases. The strata level results were self-weighted as per the sample design. The

national results were weighted by the survey weights. Three sets of survey weights were used for household, woman level, and child level results, respectively. The data quality report is included in the annexes.

Limitations and Potential Biases

Reliability of the sampling frame

The master sampling frame used for the random selection of Primary Sampling Units (Enumeration Areas) was developed in 2005. As the projections at EA levels are technically difficult to obtain, the choice is made to use the original population estimates for the cluster selection when applying the PPS method.

Reliability of the EA maps

The mapping of the enumeration areas dated from 2006 census and some boundaries changed since that time. Effort were made to locate the correct location using staff from National Population Commission and the supervisors.

Sample size

The sample size for the survey is calculated using a prevalence of Global Acute Malnutrition (GAM) based on children age 6-59 months. This sample size was validated for estimates of most of the indicators based on the 0-59 or 6-59 month age range. Indicators with narrow age range were also validated to produce estimates with reasonable precision for each survey domain. The indicators with very narrow age group and very low prevalence were estimated at zonal level by pooling the data from the survey domain within the particular zone. It was not possible to provide precise estimates for these types of indicators at state level.

Review of Data Quality

Overall 20,060 children under five were interviewed, 37 percent of which had age calculated from exact day, month and year, a result which is slightly lower than 2014 findings (40 per cent). Survey missing data were 0.9 percent. Abia, Anambra and Imo reported the highest percentage of missing data, all around 6 percent. As shown in Table 4, exact age calculation still shows a significant variation among survey domains, ranging from 3.3 percent in Yobe to 84 percent in Kogi. Team members also showed significant dissimilarities, team 11 reported only 5 percent of exact age calculation, while teams 25 and 28 scored above 70 percent and team 26 nearly reached 90 percent. This is mainly due to the fact that different team members were working in different geographic locations.

Table 4: Percent distribution of children with complete date of birth, age reported in months or missing by domain and team

Background Characteristics	N(#)	Complete date of birth (%)	Age reported in months (%)	Missing (%)
National	**20,060**	**37.1**	**60.6**	**0.9**
Survey Domain				
Abia	303	46.5	47.2	6.3
Adamawa	487	37.8	62.0	0.2
Akwa-Ibom	329	47.7	52.0	0.3
Anambra	291	45.0	49.1	5.8
Bauchi	902	17.0	82.9	0.1
Bayelsa	353	31.2	68.6	0.3
Benue	495	34.1	65.3	0.6
Borno	704	11.8	87.2	1.0
Cross River	415	55.7	43.9	0.5
Delta	323	36.8	63.2	0.0
Ebonyi	501	61.5	37.9	0.6
Edo	468	70.5	28.9	0.6
Ekiti	337	66.2	33.2	0.6
Enugu	426	66.2	32.6	1.2
FCT	509	67.0	29.7	3.3
Gombe	771	33.2	66.4	0.4
Imo	350	53.7	40.3	6.0
Jigawa	891	11.3	88.6	0.1
Kaduna	735	31.6	68.3	0.1
Kano	741	13.9	84.8	1.4
Katsina	834	21.1	77.7	1.2
Kebbi	848	15.9	84.0	0.1
Kogi	448	83.9	15.6	0.5
Kwara	479	77.2	22.6	0.2
Lagos	603	77.1	22.4	0.5
Nasarawa	511	33.5	65.4	1.2
Niger	721	30.0	69.5	0.6
Ogun	484	74.6	24.8	0.6
Ondo	382	50.5	48.7	0.8
Osun	277	62.8	37.2	0.0
Oyo	423	65.5	33.6	1.0
Plateau	491	44.2	55.4	0.4
Rivers	303	39.9	59.7	0.3
Sokoto	822	10.5	89.5	0.0
Taraba	523	26.8	73.0	0.2
Yobe	778	3.3	95.5	1.2
Zamfara	802	11.5	87.8	0.8
Team number				
1	335	56.1	43.9	0.0
2	497	48.1	51.9	0.0
3	437	31.1	68.4	0.5
4	454	38.6	60.8	0.7
5	1156	20.1	79.2	0.7

Table 4 continued

Background Characteristics	N(#)	Complete date of birth (%)	Age reported in months (%)	Missing (%)
6	536	54.5	41.8	3.7
7	1066	11.7	87.4	0.8
8	1084	12.2	87.8	0.0
9	761	54.8	45.2	0.0
10	860	69.1	30.5	0.5
11	812	4.9	94.1	1.0
12	877	9.5	88.9	1.6
13	818	36.2	62.7	1.1
14	915	34.0	65.7	0.3
15	566	28.6	71.2	0.2
16	1,178	16.0	83.5	0.5
17	1,297	29.8	70.2	0.1
18	1,071	18.7	81.3	0.0
19	247	24.7	74.9	0.4
20	350	67.1	32.3	0.6
21	347	47.3	37.2	15.6
22	443	47.6	52.4	0.0
23	375	44.5	52.5	2.9
24	604	63.1	36.9	0.0
25	681	75.6	24.4	0.0
26	542	89.3	9.0	1.7
27	563	51.7	47.6	0.7
28	406	79.1	20.0	1.0
29	399	50.4	49.4	0.3
30	383	55.1	44.9	0.0

Reporting age estimated to the closest month using local events of calendar was found in more than 61 percent of cases. Poor age estimation has a negative effect on data quality. The children's age distribution reported in Figure 2 demonstrates that age heaping is consistent, producing peaks and troughs in the distribution throughout the five years. This suggests insufficient probing by the surveyors with the “local events” calendar. The tendency of reporting ages at adjacent numbers such as 35/37 and 47/49 months could indicate an effort to “distribute” age heaping around year 3 and 4, in order to avoid checking for digit preference[16] or to seasonal variation in reproduction.[17] It must be noted that although age heaping does not affect the quality of the weight-for-height outcomes, however it can affect height-for-age and weight-for-age outcomes, as highlighted in the below discussion about WHZ, WAZ, and HAZ standard deviations. Overall, the distribution is acceptable though there is a need for improvement.

[16]UNHCR Standardized Expanded Nutrition Survey Guidelines for Refugee Populations, UNHCR 2013.
[17]A time to be born: Birth seasonality in Sub-Saharan Africa, Audrey Dorélien, Population Studies Centre 2013.

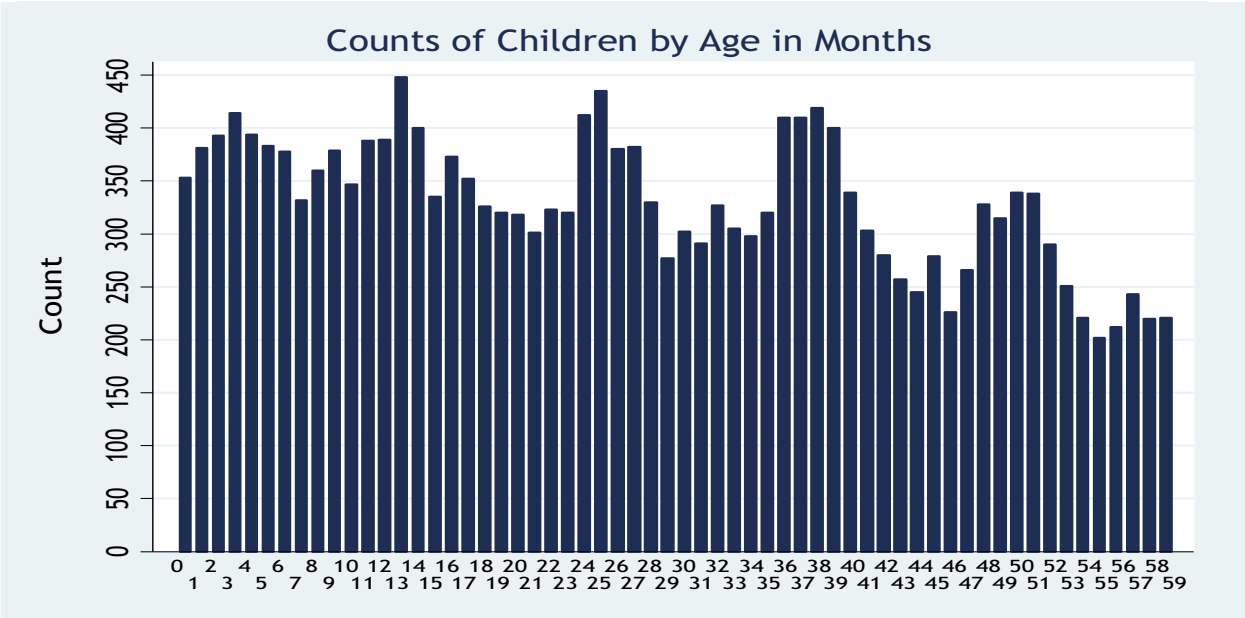


Figure 2: Distribution of children by age in months

Digit preference is even more significant in the age distribution of women. There is notable age heaping at age 20, 25, 30, 35, 40 and 45 (see Figure 3). The below figure shows spikes also for even numbers. This result is quite typical in African countries, where women age reporting tend to fall in the "approximate" category, a possible explanation being the lack of literacy and education.[18] Since the problem remains considerable, more effort is needed in future surveys to correct this tendency. It is for this reason that women results based on age category should be interpreted with caution.

[18] *An Assessment of the Age Reporting in the IPUMS-Microdata*, Minnesota Population Center, Minnesota University 2014.

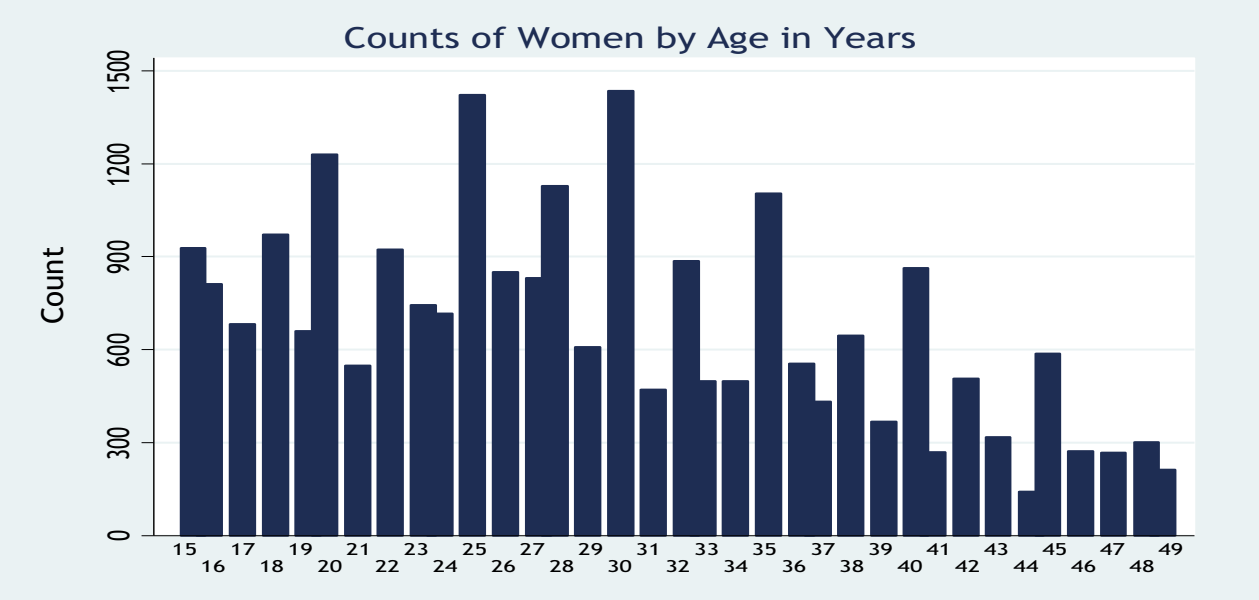


Figure 3: Distribution of women per years of age

According to WHO guidelines, survey teams were trained to measure children in recumbent position if the child was less than 87cm and standing position if the child was 87cm or more.[19] Overall 98 percent of children were measured, of which almost 97 percent were correctly measured. Teams were extremely good in Cross River, Nasarawa and Rivers states, reaching 99 percent of children correctly measured, and only in Enugu was the level of measurement recorded as less than 90 percent. Teams 1, 5, 15 and 29 were the most accurate (all above 99 percent) and teams 24 and 30 the less accurate (both at 92 percent). The corrections of the calculation of z-scores by measure of either recumbent length or standing height were made automatically in the ENA software following the WHO 2006 growth standards methods.

[19]The WHO guidelines for anthropometrics measurements prescribe that for all standards involving length or height measurements, recumbent length should be used for children younger than 2 years and standing height for older children. The decision to use the 87cm cut-off – the child expected height at 2 years according to WHO growth reference charts – instead of the age cut-off was made because accurate age determination is very difficult in the survey area.

Table 5: Children measured correctly (standing height or recumbent length according to child's height) by background characteristics

Background Characteristics	Child height or length measured				Children not measured	
	N	correctly (%)	incorrectly (%)	unknown (%)	N	%
National	19,646	96.8	3.2	0.1	414	2.1
Survey Domain						
Abia	278	96.4	3.6	0.0	25	8.3
Adamawa	479	98.8	1.3	0.0	8	1.6
Akwa-Ibom	322	97.5	2.5	0.0	7	2.1
Anambra	274	96.7	3.3	0.0	17	5.8
Bauchi	884	96.4	3.4	0.2	18	2.0
Bayelsa	349	96.6	3.4	0.0	4	1.1
Benue	485	93.8	6.2	0.0	10	2.0
Borno	695	98.9	1.2	0.0	9	1.3
Cross River	411	99.3	0.7	0.0	4	1.0
Delta	321	98.4	1.6	0.0	2	0.6
Ebonyi	497	94.6	5.4	0.0	4	0.8
Edo	447	96.4	3.6	0.0	21	4.5
Ekiti	330	96.4	3.3	0.3	7	2.1
Enugu	416	89.2	10.8	0.0	10	2.4
FCT	482	93.4	6.4	0.2	27	5.3
Gombe	754	97.0	2.7	0.4	17	2.2
Imo	328	97.9	2.1	0.0	22	6.3
Jigawa	881	97.8	2.2	0.0	10	1.1
Kaduna	733	98.2	1.8	0.0	2	0.3
Kano	711	95.8	4.2	0.0	30	4.1
Katsina	816	96.5	3.6	0.0	18	2.2
Kebbi	843	97.9	2.1	0.0	5	0.6
Kogi	436	97.5	2.5	0.0	12	2.7
Kwara	470	95.7	4.3	0.0	9	1.9
Lagos	588	98.6	1.4	0.0	15	2.5
Nasarawa	499	99.0	0.8	0.2	12	2.4
Niger	713	93.4	6.6	0.0	8	1.1
Ogun	473	97.5	2.5	0.0	11	2.3
Ondo	371	94.9	4.9	0.3	11	2.9
Osun	272	93.8	5.9	0.4	5	1.8
Oyo	415	96.4	3.6	0.0	8	1.9
Plateau	485	96.5	3.5	0.0	6	1.2
Rivers	302	99.0	1.0	0.0	1	0.3
Sokoto	817	97.6	2.3	0.1	5	0.6
Taraba	516	97.9	2.1	0.0	7	1.3
Yobe	763	98.4	1.4	0.1	15	1.9
Zamfara	790	97.0	2.9	0.1	12	1.5
Team number						
1	637	99.4	0.6	0.0	1	0.3
2	799	97.6	2.4	0.0	0	0.0
3	815	98.1	1.9	0.0	13	3.0

Table 5 continued

Background Characteristics	Child height or length measured				Children not measured	
	N	correctly	incorrectly	unknown	N	%
4	1,236	98.0	2.0	0.0	4	0.9
5	956	99.0	1.0	0.1	11	1.0
6	1,077	96.0	3.8	0.2	31	5.8
7	749	96.4	3.5	0.1	22	2.1
8	621	96.2	3.8	0.0	7	0.7
9	627	95.9	4.1	0.0	12	1.6
10	1,168	93.0	7.0	0.0	13	1.5
11	931	98.0	2.0	0.0	14	1.7
12	1,075	98.8	1.1	0.1	18	2.1
13	647	96.9	3.0	0.1	24	2.9
14	712	97.2	2.8	0.0	22	2.4
15	552	99.1	0.9	0.0	2	0.4
16	583	95.3	4.5	0.3	31	2.6
17	548	98.1	2.0	0.0	15	1.2
18	492	98.5	1.3	0.2	8	0.8
19	691	96.3	3.8	0.0	7	2.8
20	632	97.1	2.9	0.0	3	0.9
21	488	97.6	2.4	0.0	54	15.6
22	564	91.8	8.2	0.0	5	1.1
23	714	94.7	5.3	0.0	19	5.1
24	854	92.2	7.8	0.0	0	0.0
25	943	99.1	0.9	0.0	2	0.3
26	719	95.8	4.2	0.0	20	3.7
27	742	97.6	2.4	0.0	28	5.0
28	854	93.4	6.3	0.3	25	6.2
29	943	99.0	0.5	0.5	0	0.0
30	719	92.4	7.6	0.0	3	0.8

The analysis of anthropometric data shows that there was no significant digit preference for weight, height and MUAC in the overall dataset, and the score was good (see Annex 2 for details).

Complete data for calculating z-scores were available for 19,646 children (98 percent of all children interviewed)[20]. The level of missing data varied between survey domains, but the highest percentage was reported in Anambra, Imo and especially in Abia (8.6 percent for WHZ, 9.6 percent for HAZ and WAZ) while the lowest level was reported in Kaduna and Sokoto states (0.5 and 0.6 percent for WHZ respectively, 0.8 and 0.7 percent for WAZ respectively and 0.7 percent both for HAZ). Among children with anthropometric Z-score calculated, percentage of values flagged with SMART flags are reported as 2.0, 1.6 and 3.5 percent for WHZ, WAZ and HAZ respectively. As shown in

[20]Age in months, sex, weight and height are needed to calculate z-score. It has been possible to calculate WHZ for 19,605 children, WAZ for 19,572 and HAZ for 19,534.

Table 6, there is variation at domain level; WHZ highest value was found in Katsina (3.8 percent), WAZ highest percentage in Osun (2.9 percent), while HAZ highest value in Akawa Ibom (5.9 percent). SMART flags were used to exclude extreme values. The overall standard deviation of anthropometric z-scores for WHZ and WAZ were 1.05 and 1.11 respectively, thus indicating reliability of data. The overall standard deviation of HAZ was 1.31, indicating a problem with the quality of age data. Overall, the HAZ results can be considered reliable.

Table 6: Mean z-scores, design effect and excluded subjects using SMART Flags by domains for children 0-59 months.

Survey Domain	Missing data(% of surveyed children)			Z-scores						Z-scores out of range					
	WHZ	WAZ	HAZ	WHZ		WAZ		HAZ		WHZ		WAZ		HAZ	
	%	%	%	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*N*	*%*	*N*	*%*	*N*	*%*
Abia	8.6	9.6	9.6	-0.47	1.02	-0.83	1.05	1.24	-0.86	2	0.7	4	1.5	6	2.2
Adamawa	1.9	1.6	1.6	-0.30	1.09	-1.07	1.05	1.22	-1.50	8	1.7	8	1.7	9	1.9
Akwa-Ibom	2.4	1.2	2.1	-0.64	0.94	-1.17	1.05	1.16	-1.18	3	0.9	4	0.9	19	5.9
Anambra	5.8	7.2	7.2	-0.23	0.96	-0.39	1.00	1.13	-0.43	2	0.7	2	0.7	8	3.0
Bauchi	2.4	2.2	3.2	-0.45	1.09	-1.48	1.06	1.21	-2.11	17	1.9	19	2.0	32	3.7
Bayelsa	1.1	1.4	1.4	-0.15	1.01	-0.55	1.03	1.17	-0.77	6	1.7	8	2.0	14	4.0
Benue	2.4	4.4	4.2	-0.03	0.93	-0.60	1.01	1.22	-1.00	12	2.5	8	1.1	20	4.2
Borno	1.3	2.0	2.1	-0.66	1.04	-1.41	1.01	1.11	-1.67	8	1.2	8	0.9	11	1.6
Cross River	1.5	1.7	1.9	-0.50	1.04	-0.85	1.02	1.19	-0.89	9	2.2	5	1.2	18	4.4
Delta	0.9	1.6	1.6	-0.28	0.97	-0.66	1.03	1.25	-0.85	2	0.6	3	0.9	11	3.5
Ebonyi	0.8	2.0	2.0	-0.36	1.02	-0.86	0.98	1.19	-0.99	15	3.0	5	0.4	20	4.1
Edo	4.5	4.9	5.1	-0.34	1.02	-0.67	1.07	1.16	-0.78	3	0.7	4	0.5	15	3.4
Ekiti	2.1	2.7	2.7	-0.29	0.95	-0.75	0.97	1.03	-0.91	4	1.2	7	2.1	13	4.0
Enugu	2.6	2.6	2.8	-0.15	1.00	-0.38	1.01	1.16	-0.39	8	1.9	4	1.7	16	3.9
FCT	5.5	5.3	5.7	-0.24	1.02	-0.73	1.04	1.21	-0.92	9	1.9	8	1.7	17	3.5
Gombe	2.9	2.5	2.9	-0.40	1.02	-1.29	1.06	1.21	-1.84	22	2.9	16	2.0	36	4.8
Imo	6.3	8.0	8.0	-0.36	1.03	-0.65	1.10	1.14	-0.70	5	1.5	5	0.9	9	2.8
Jigawa	1.6	1.6	2.1	-0.56	1.11	-1.76	1.07	1.18	-2.40	22	2.5	16	1.7	33	3.8
Kaduna	0.5	0.8	0.7	-0.35	1.13	-1.44	1.06	1.20	-2.03	21	2.9	12	1.7	27	3.7
Kano	4.2	4.2	4.9	-0.45	1.07	-1.45	1.06	1.20	-1.99	18	2.5	17	2.4	26	3.7
Katsina	2.4	2.3	2.4	-0.46	1.09	-1.59	1.08	1.21	-2.22	31	3.8	22	2.1	39	4.8
Kebbi	0.7	0.6	0.6	-0.49	1.09	-1.60	1.03	1.17	-2.21	28	3.3	20	2.3	26	3.1
Kogi	2.7	2.7	2.9	-0.18	0.96	-0.83	0.98	1.12	-1.22	1	0.2	4	1.4	5	1.2

Table 6 continued

	Missing data(% of surveyed children)			Z-scores						Z-scores out of range					
	WHZ	WAZ	HAZ	WHZ		WAZ		HAZ		WHZ		WAZ		HAZ	
	%	%	%	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*N*	*%*	*N*	*%*	*N*	*%*
Kwara	1.9	1.9	2.3	-0.33	1.03	-1.07	0.98	1.11	-1.49	6	1.3	9	1.5	22	4.7
Lagos	2.5	2.8	2.8	-0.41	0.99	-0.61	1.03	1.18	-0.59	9	1.5	10	1.5	11	1.9
Nasarawa	2.4	2.4	2.4	-0.13	1.06	-0.91	1.07	1.15	-1.40	7	1.4	9	1.8	19	3.8
Niger	1.7	1.0	1.3	-0.35	1.00	-1.13	1.01	1.21	-1.64	13	1.8	11	1.4	29	4.1
Ogun	2.3	2.5	2.5	-0.45	1.03	-0.89	1.04	1.18	-1.01	2	0.4	7	1.1	9	1.9
Ondo	3.4	3.4	4.2	-0.37	0.94	-0.98	0.99	1.16	-1.25	12	3.3	8	2.4	16	4.4
Osun	1.8	1. 8	1.8	-0.39	0.98	-0.92	0.96	1.11	-1.11	5	1.8	8	2.9	10	3.7
Oyo	2.1	2.4	2.1	-0.38	1.09	-0.82	1.02	1.14	-1.01	4	1.0	4	1.0	10	2.4
Plateau	1.4	1.6	1.6	-0.16	0.97	-1.10	1.04	1.25	-1.73	10	2.1	7	1.4	23	4.7
Rivers	1.0	0.7	0.3	-0.25	0.95	-0.69	0.94	1.17	-0.92	4	1.3	4	1.3	11	3.6
Sokoto	0.6	0.7	0.7	-0.55	1.11	-1.62	1.09	1.16	-2.20	23	2.8	13	1.6	28	3.4
Taraba	1.3	1.3	1.3	-0.08	1.08	-0.99	1.07	1.15	-1.65	10	1.9	6	1.2	19	3.7
Yobe	2.2	2.2	2.4	-0.66	1.05	-1.61	1.07	1.15	-2.07	15	2.0	13	1.7	27	3.6
Zamfara	1.5	1.8	1.8	-0.22	1.13	-1.44	1.05	1.14	-2.21	22	2.8	18	1.8	24	3.1
National	**2.3**	**2.4**	**2.6**	**-0.37**	**1.05**	**-1.14**	**1.11**	**1.31**	**-1.53**	**398**	**2.0**	**309**	**1.6**	**688**	**3.5**

Results

Sample Description

A representative sample of 25,210 households across 37 strata/domains was selected for the survey. Target groups were children below 5 years of age and women in the reproductive age group (15-49 years). Overall 23,688 women were interviewed and caregivers of 20,060 children included in the survey were interviewed. There was an average of 0.8 children per household and 0.9 women per household.

Table 7: Number of households interviewed, children in completed sample and average number of children per household by survey domain

Survey Domain	Number of HH surveyed	Total number of children <5 years	Average number of children per HH	Total number of women (15-49)	Average number of women per HH
Abia	680	303	0.45	541	0.80
Adamawa	627	487	0.78	633	1.01
Akwa-Ibom	697	329	0.47	513	0.74
Anambra	681	291	0.43	547	0.80
Bauchi	701	902	1.29	762	1.09
Bayelsa	662	353	0.53	497	0.75
Benue	696	495	0.71	664	0.95
Borno	653	704	1.08	725	1.11
Cross River	662	415	0.63	558	0.84
Delta	686	323	0.47	481	0.70
Ebonyi	697	501	0.72	673	0.97
Edo	689	468	0.68	571	0.83
Ekiti	700	337	0.48	512	0.73
Enugu	696	426	0.61	672	0.97
FCT	700	509	0.73	691	0.99
Gombe	701	771	1.10	702	1.00
Imo	702	350	0.50	534	0.76
Jigawa	699	891	1.27	738	1.06
Kaduna	678	735	1.08	738	1.09
Kano	695	741	1.07	760	1.09
Katsina	695	834	1.20	761	1.09
Kebbi	699	848	1.21	842	1.20
Kogi	680	448	0.66	637	0.94
Kwara	699	479	0.69	641	0.92
Lagos	700	603	0.86	703	1.00
Nasarawa	701	511	0.73	714	1.02
Niger	699	721	1.03	763	1.09
Ogun	656	484	0.74	578	0.88
Ondo	694	382	0.55	543	0.78
Osun	677	277	0.41	458	0.68
Oyo	675	423	0.63	532	0.79
Plateau	636	491	0.77	628	0.99
Rivers	639	303	0.47	489	0.77
Sokoto	695	822	1.18	750	1.08
Taraba	639	523	0.82	660	1.03
Yobe	670	778	1.16	721	1.08
Zamfara	654	802	1.23	756	1.16
Total	**25,210**	**20,060**	**0.80**	**23,688**	**0.94**

The overall ratio of boys to girls of under-five years of age ranged from 0.8 to 1.3 for the 37 domains surveyed. The lowest ratio was reported in Cross River and Niger at 0.83 and the highest in Osun at 1.31. Another three states had boys/girls ratio above 1.2: Bayelsa 1.25, Imo 1.22 and Yobe 1.3. However Bayelsa and Imo findings are not statistically significant (p value = 0.062 and 0.099 respectively). In the case of Yobe, the p value is 0.003, which might indicate that boys are over-represented in the sample.

Table 8: Distribution of children 0-59 months by sex and survey domain

Survey Domain	Boys	Girls	Total N	Ratio: boys/girls
Abia	154	149	303	1.03
Adamawa	245	242	487	1.01
Akwa-Ibom	162	167	329	0.97
Anambra	152	139	291	1.09
Bauchi	426	476	902	0.89
Bayelsa	196	157	353	1.25
Benue	255	240	495	1.06
Borno	353	351	704	1.01
Cross River	188	227	415	0.83
Delta	172	151	323	1.14
Ebonyi	259	242	501	1.07
Edo	231	237	468	0.97
Ekiti	169	168	337	1.01
Enugu	224	202	426	1.11
FCT	276	233	509	1.18
Gombe	385	386	771	1.00
Imo	192	158	350	1.22
Jigawa	407	484	891	0.84
Kaduna	343	392	735	0.88
Kano	375	366	741	1.02
Katsina	416	418	834	1.00
Kebbi	416	432	848	0.96
Kogi	221	227	448	0.97
Kwara	235	244	479	0.96
Lagos	300	303	603	0.99
Nasarawa	272	239	511	1.14
Niger	327	394	721	0.83
Ogun	249	235	484	1.06
Ondo	195	187	382	1.04
Osun	157	120	277	1.31
Oyo	209	214	423	0.98
Plateau	239	252	491	0.95
Rivers	152	151	303	1.01
Sokoto	418	404	822	1.03
Taraba	265	258	523	1.03
Yobe	440	338	778	1.30
Zamfara	387	415	802	0.93
Total	10,062	9,998	20,060	1.01

Anthropometry Results

The anthropometric measurements of children in the survey were converted into z-scores using the World Health Organization Child Growth Standards (WHO, 2006)[21]. The use of the WHO Child Growth Standards is based on the finding that well-nourished children of all population groups for which data exist follow similar growth patterns before puberty. Therefore, the international standard population serves as a point of comparison, facilitating the examination of differences in the anthropometric status of subgroups in a population and of changes in nutritional status over time. The anthropometric indices are expressed as Z-scores derived from reference population and calculated with ENA software.

Four child malnutrition indicators are presented: Acute Malnutrition; Underweight; Stunting; and Overweight. Acute Malnutrition has been calculated using either Weight-for-height and/or bilateral oedema presence or mid upper arm circumference (MUAC) and/or bilateral oedema presence. The estimates for Underweight, Stunting, and Overweight were calculated for children 0 to 59 month; while the estimates for Acute Malnutrition are based on children aged 6 to 59 months.

SMART flags were used for state estimates to exclude implausible values that were resulted likely from incorrect measurements. SMART flags exclude anthropometric indices with <-3 to >3 from the observed mean for WHZ, HAZ and WAZ. WHO flags were used for national and regional estimates. These are based on the distribution of values in the reference population using the reference mean of zero and excludes <-5 to >5 for WHZ, <-6 to >6 for HAZ, <-6 to >5 for WAZ.

Acute Malnutrition

Although there is no gold standard measure for acute malnutrition, Weight for Height (WHZ) or middle upper arm circumference (MUAC), in addition to bilateral pitting oedema presence are defined as measures of acute malnutrition by WHO/UNICEF Statement 2009. While the WHZ based index is largely used as a nutritional or anthropometric index, the MUAC based index has a closer relation to infant and child mortality. Furthermore, children with oedema should always be classified as suffering from severe acute malnutrition (SAM), regardless of their MUAC and WHZ values. Acute malnutrition in children 6 to 59 months can be either moderate or severe. SAM is a

[21]The indicators of the nutritional status of children are calculated using the growth standards published by the World Health Organization in 2006, which were generated through the data collected in the WHO Multicentre Growth Reference Study (WHO, 2006). That study, which sampled 8,440 children in six countries (Brazil, Ghana, India, Norway, Oman, and the United States), illustrated how children should grow under optimal conditions. Therefore, the WHO child growth standards can be used to assess children all over the world, regardless of ethnicity, social and economic influences, or feeding practices. The WHO growth standards replaced the previously used NCHS/CDC/WHO (U.S. National Center for Health Statistics/U.S. Centers for Disease Control and Prevention/World Health Organization) reference standards.

very important indicator because it is the most dangerous form of malnutrition and it is closely linked to mortality risk. According to WHO and UNICEF Joint Statement[22], a child with severe acute malnutrition (WHZ <-3; and/or MUAC<115mm and/or bilateral oedema) has 9-fold increased risk of death compared to a child with no acute malnutrition.

Acute Malnutrition (WHZ /or Bilateral Oedema)

Acute malnutrition is diagnosed by WHZ and/or presence of bilateral oedema. A child who is minus three standard deviations (-3 SD) below the reference median and/or has bilateral pitting oedema is considered severely malnourished. Children whose WHZ is below - 2SD from reference median but above - 3 SD are considered moderately malnourished. It should also be noted that, since WHZ has seasonal peaks, estimates based on WHZ and/or oedema presence in annual surveys may find much lower prevalence of acute malnutrition, if the data are not collected during the hunger season.[23]

Figure 4 shows that the distribution of WHZ in the survey sample (red color) follows a normal bell shaped curve, similar to the WHZ distribution of the reference population WHO 2006 (in darker green color). WHZ distribution of the sample is slightly skewed to the left, the standard deviation is 1.02 and the mean is – 0.47.

[22]WHO Child growth standards and the identification of severe acute malnutrition in infants and children, A Joint Statement, WHO and UNICEF, 2009.

[23]According to northern Nigeria monitoring of Famine Early Warning Systems Network (FEWSNET), the main harvest is underway across the country, increasing food availability, access, and diversity for most households. Livestock terms of trade for pastoral and agro pastoral households are also improving. Food availability and access will remain good through at least March 2016, therefore most of the country will experience Minimal (IPC Phase 1) food insecurity. The situation is more critical in the northeast, due to Boko Haram conflict: new harvest stocks is improving food availability, but production is well below average. Much of Borno, Yobe, and Adamawa, as well as informal settlements in greater Maiduguri, will be in Crisis (IPC Phase 3) through March 2016. IDPs and households less directly impacted by the conflict in Borno, Yobe, and Adamawa will also experience restrictions to their normal livelihoods and will remain Stressed (IPC Phase 2) through March 2016. FEWSNET, Nigeria, October 2015-March 2016.

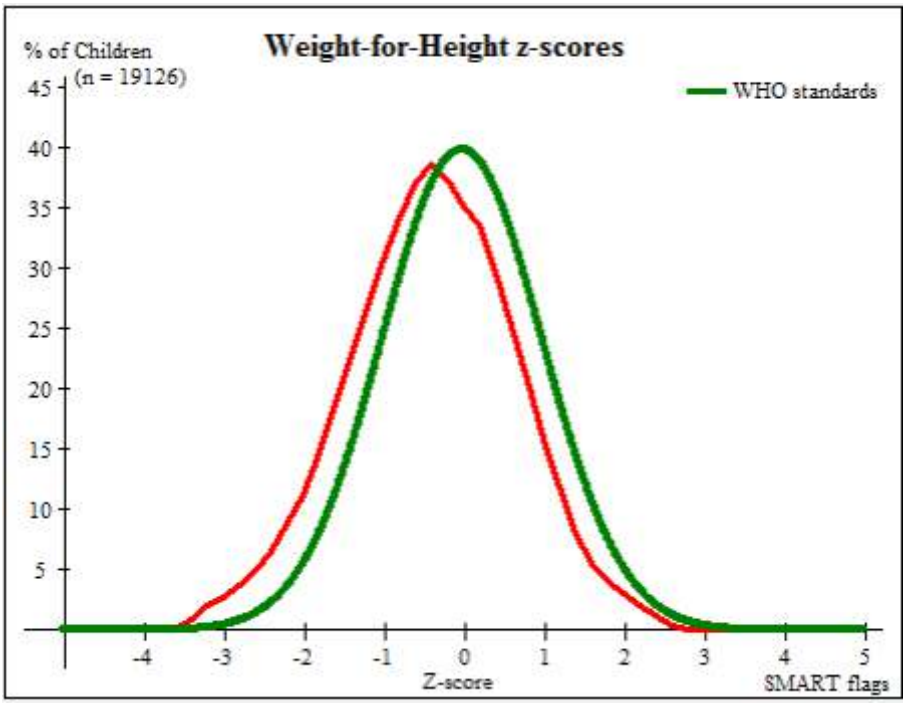


Figure 4: Distributions of Weight for Height z-score (WHO 2006, extreme values excluded using SMART Flags)

In 2012, the World Health Assembly Resolution (WHAR) endorsed a comprehensive plan on maternal, child and infant nutrition, which specified six global nutrition targets by 2025, the sixth target being reducing and maintaining Global Acute Malnutrition (GAM) lower than 5 percent.

The prevalence of Global Acute Malnutrition (GAM) and of Severe Acute Malnutrition (SAM) expressed in z-scores, according to WHO 2006 growth standards is shown in Table 9. The overall GAM prevalence for children under-five based WHZ is 7.2 percent, while the prevalence of SAM was 1.8 percent, showing an improvement since 2014 – when GAM was reported at 8.7 percent and SAM at 2.2 percent. Disaggregation by geopolitical zones confirms last year findings: acute malnutrition is highest in the North West (10.2 percent) and North East (9.5 percent) and low in the South states and particularly in the North Central states, where is less than half at 4.5 percent. Hence, the prevalence of acute malnutrition at state level exhibits the same level of variability, ranging from 1.4 percent in Benue to 12 percent in Jigawa.

In 2014, GAM and SAM were reported above critical cut off points (15 percent for GAM and 2 percent for SAM[24]) in three states, namely Jigawa, Bauchi, and Yobe. None of the states surveyed in 2015, reported such critical prevalence. However five states (Borno, Jigawa, Katsina, Sokoto and Yobe) were above the warning threshold for GAM (10< GAM <15) and six states (Borno, Delta, Katsina, Kebbi, Sokoto and Yobe) were above the WHO SAM crisis threshold of 2 percent. Only 10 states had GAM prevalence below the WHO acceptable threshold of 5 percent (Bayelsa, Benue, Ekiti, Enugu, FCT, Kogi, Nasarawa, Plateau and Rivers), however another 7 states had GAM below 5.5 percent. Finally, 51 cases of bilateral oedema were found: 6 in Kano, 5 in Kaduna and Zamfara, 4 in Jigawa and Bauchi, 3 in Adamawa, Gombe, Katsina and Kebbi, 2 in Delta, Nasarawa and Sokoto, 1 in Bayelsa, Borno, Imo, Kogi, Niger, Ondo, Plateau, Taraba and Yobe.

These results are particularly encouraging, also considering that the 2014 survey was conducted between February and May – hence before the expected hunger gap – while the 2015 survey has been conducted during the hunger season. This progress is confirmed by the Global Nutrition Report 2015 which placed Nigeria among the countries displaying commitment to reduce hunger and improve children and women nutrition.

Disaggregation by child's age shows that the prevalence of global and severe acute malnutrition is highest in younger children – 14 and 4 percent among children 6 to 11 months and 13 and 4 percent among children 12 to 23 months respectively. Boys (8 percent) are more likely to be malnourished than girls (7 percent), which is less pronounced compared to 2014 findings.

[24]The WHO classification of Malnutrition Prevalence considers GAM acceptable if < than 5%, precarious if comprised between 5 and 10%, serious if comprised between 10 and 15% and critical if above 15%. As for Chronic Malnutrition, acceptable prevalence should be < 20%, precarious comprised between 20 and 30%, serious between 30 and 40%, and critical above 40%. Underweight threshold are respectively set at 10% (acceptable), 20% (precarious), 30% (serious) and above 30% (critical). SAM prevalence is considered critical if above 2%.

Table 9: Prevalence of global, moderate and severe acute malnutrition in children 6 to 59 months of age by background characteristics (WHO 2006)

Background Characteristics	Total N	Global Acute Malnutrition (WHZ <-2 and/or oedema)	Moderate Acute Malnutrition (WHZ <-2 >= -3, no oedema)	Severe Acute Malnutrition (WHZ<-3 and/or oedema)
National	17,201	7.2	5.4	1.8
		[6.8,7.7]	[5.0,5.8]	[1.6,2.1]
Sex				
Males	8,655	7.6	5.5	2.1
		[7.0,8.2]	[5.0,6.1]	[1.8,2.4]
Females	8,546	6.8	5.3	1.5
		[6.2,7.5]	[4.7,5.9]	[1.3,1.8]
Age (in months)				
6-11	2,156	13.9	10.3	3.6
		[12.4,15.5]	[9.0,11.7]	[2.9,4.6]
12-23	4,149	12.9	9.2	3.7
		[11.7,14.1]	[8.3,10.2]	[3.1,4.4]
24-35	3,991	4.7	3.4	1.2
		[4.0,5.4]	[2.9,4.1]	[0.9,1.7]
36-47	3,777	3.5	2.9	0.6
		[2.9,4.3]	[2.3,3.6]	[0.4,1.0]
48-59	3,128	2.9	2.6	0.3
		[2.3,3.5]	[2.1,3.2]	[0.2,0.5]
Zone				
North Central	3,136	4.5	3.5	1
		[3.8,5.5]	[2.9,4.3]	[0.7,1.5]
North East	3,609	9.5	6.9	2.6
		[8.5,10.7]	[6.1,7.9]	[2.1,3.3]
North West	4,882	10.2	7.1	3.1
		[9.2,11.3]	[6.3,8.1]	[2.6,3.7]
South East	1,557	5.3	4.2	1.1
		[4.2,6.6]	[3.2,5.4]	[0.7,1.9]
South South	1,881	5.3	4.3	1
		[4.3,6.6]	[3.4,5.4]	[0.6,1.7]
South West	2,136	6.2	5	1.2
		[5.2,7.5]	[4.1,6.2]	[0.8,1.8]
State				
Abia	237	5.9	5.1	0.8
		[3.8,9.1]	[3.2,8.0]	[0.2,3.2]
Adamawa	435	7.1	6.4	0.7
		[5.0,10.1]	[4.5,9.1]	[0.2,2.0]
Akwa-Ibom	282	5.3	5	0.4
		[3.4,8.2]	[3.1,7.8]	[0.0,2.5]
Anambra	234	3.8	3	0.9
		[2.3,6.4]	[1.6,5.5]	[0.2,3.3]
Bauchi	755	8.5	6.9	1.6
		[6.9,10.3]	[5.7,8.4]	[0.9,2.9]

Table 9 continued

Background Characteristics	Total N	Global Acute Malnutrition (WHZ <-2 and/or oedema)	Moderate Acute Malnutrition (WHZ <-2 >= -3, no oedema)	Severe Acute Malnutrition (WHZ<-3 and/or oedema)
Bayelsa	308	3.6	3.2	0.3
		[1.9,6.5]	[1.8,5.7]	[0.0,2.3]
Benue	416	1.4	1.4	0
		[0.7,3.1]	[0.7,3.1]	
Borno	617	11.5	8.9	2.6
		[8.8,14.9]	[6.4,12.4]	[1.7,3.9]
Cross River	355	7	5.9	1.1
		[4.5,10.8]	[3.9,9.0]	[0.4,3.5]
Delta	280	7.1	5	2.1
		[4.7,10.7]	[3.1,7.9]	[0.9,5.0]
Ebonyi	426	5.6	5.4	0.2
		[3.8,8.2]	[3.7,7.7]	[0.0,1.6]
Edo	387	5.2	4.9	0.3
		[3.3,8.0]	[3.1,7.6]	[0.0,1.8]
Ekiti	289	3.8	3.5	0.3
		[1.9,7.3]	[1.8,6.7]	[0.0,2.4]
Enugu	362	3.3	3.3	0
		[1.8,5.9]	[1.8,5.9]	
FCT	411	3.4	3.4	0
		[2.2,5.2]	[2.2,5.2]	
Gombe	650	7.1	5.2	1.8
		[4.9,10.0]	[3.4,7.9]	[1.1,3.2]
Imo	283	5.3	4.9	0.4
		[2.9,9.4]	[2.6,9.2]	[0.0,2.5]
Jigawa	745	11.9	10.2	1.7
		[9.5,14.9]	[8.3,12.5]	[0.9,3.4]
Kaduna	629	8.1	6.2	1.9
		[5.8,11.2]	[4.4,8.6]	[1.1,3.3]
Kano	601	8.3	6.5	1.8
		[6.2,11.1]	[4.5,9.3]	[1.0,3.2]
Katsina	709	10.3	8.2	2.1
		[8.0,13.1]	[6.1,10.9]	[1.4,3.3]
Kebbi	731	9.3	6.4	2.9
		[6.8,12.7]	[4.4,9.2]	[1.9,4.4]
Kogi	375	3.5	3.2	0.3
		[1.9,6.2]	[1.9,5.4]	[0.0,1.9]
Kwara	408	5.9	5.1	0.7
		[3.8,9.0]	[3.2,8.3]	[0.2,2.2]
Lagos	507	5.1	4.3	0.8
		[3.5,7.5]	[2.8,6.6]	[0.3,2.0]
Nasarawa	435	3.9	3.2	0.7
		[2.2,6.9]	[1.8,5.8]	[0.2,3.0]
Niger	625	6.1	5.6	0.5
		[4.1,8.9]	[4.0,7.9]	[0.1,2.1]

Table 9 continued

Background Characteristics	Total N	Global Acute Malnutrition (WHZ <-2 and/or oedema)	Moderate Acute Malnutrition (WHZ <-2 >= -3, no oedema)	Severe Acute Malnutrition (WHZ<-3 and/or oedema)
Ogun	401	6.5	6.2	0.2
		[4.3,9.6]	[4.2,9.3]	[0.0,1.8]
Ondo	316	5.1	4.4	0.6
		[3.1,8.1]	[2.7,7.3]	[0.2,2.4]
Osun	244	5.3	4.9	0.4
		[3.2,8.8]	[2.8,8.5]	[0.1,2.9]
Oyo	358	7.3	6.7	0.6
		[4.6,11.3]	[4.3,10.3]	[0.1,2.2]
Plateau	431	3.9	3.2	0.7
		[2.6,6.0]	[1.9,5.4]	[0.2,2.0]
Rivers	257	2.7	2.3	0.4
		[1.1,6.4]	[0.9,6.2]	[0.1,2.7]
Sokoto	697	10.5	8	2.4
		[8.5,12.8]	[6.3,10.3]	[1.5,3.9]
Taraba	452	5.1	4.4	0.7
		[3.3,7.7]	[2.8,6.9]	[0.2,1.9]
Yobe	651	10.9	8.9	2
		[8.6,13.7]	[7.0,11.3]	[1.1,3.5]
Zamfara	680	7.1	6.2	0.9
		[5.0,9.9]	[4.5,8.4]	[0.3,2.3]

WHO Flags were used for National and Regional Estimates
SMART Flags were used for State Estimates
Note: results in brackets are 95% confidence interval

Acute Malnutrition (MUAC /or Bilateral Oedema)

Low middle-upper arm circumference (in combination with bilateral oedema presence) is increasingly used to define severe acute malnutrition in management of SAM programming. MUAC is preferred to WHZ for its simplicity. MUAC strips are easier to carry than scales and easier to use for measuring children. Some limitations with MUAC measures in surveys are the following. There is no standard tension applied on the MUAC strip during measurement. Even with well-trained anthropometrists, there can be up to 1cm of variation in the measure of MUAC on the same child. Also MUAC measures for children are not standardised for age or sex, thus ignoring sex and age related changes. Boys and girls have a different growth, and at any time, and girls on average will have slightly lower MUAC than boys, even if well nourished[25]. For this reason, MUAC tends to diagnose more girls and younger children as acutely malnourished[26].

[25]Arm Circumference for Age, WHO Child Growth Standards, WHO 2007.
[26]Test characteristics of MUAC, University of Gent, 2012.

According to WHO and UNHCR standards, a MUAC measure of less than 115 mm and/or presence of oedema is defined as severe acute malnutrition in children from 6 to 59 months.

The prevalence of MUAC-based Acute Malnutrition is shown in table 10. Overall GAM prevalence for children 6-59 months was 5 percent, while the prevalence of SAM was 1 percent. The highest prevalence of global acute malnutrition was reported in Sokoto (14 percent), followed shortly by Kebbi and Jigawa (13 percent respectively); the lowest in Benue and Rivers (0.5 and 1.5 percent). As for SAM, a greater variability was observed compared to 2014. Nine states registered a zero prevalence – compared to one in 2014 – but seven were above 2 percent – compared to one in 2014 – namely Jigawa, Kaduna, Kano, Katsina, Kebbi, Sokoto and Zamfara.

Disaggregation by age and sex confirms what was previously highlighted: the prevalence of acute malnutrition is highest in younger children – children less than 24 months – and girls are more likely to be malnourished than boys (6.3 versus 4.3 percent).

Although MUAC and WHZ identify a population of children that only partially overlap[27], findings from both indicators substantially converge and in general, malnutrition prevalence in the North West and North East is higher than in the South and North Central zones, and the difference is considerable for both GAM and SAM.

[27]While WHZ is a more comprehensive measure of nutritional status, MUAC is mainly a measure of muscle mass. Test characteristics of MUAC, University of Gent, 2012.

Table 10: Prevalence of acute malnutrition according to MUAC in children 6 to 59 months by background characteristics (WHO 2006)

Background Characteristics	Total N	Global Acute Malnutrition (MUAC <125 and/or oedema)	Moderate Acute Malnutrition (MUAC <125 >=115, no oedema)	Severe Acute Malnutrition (MUAC <115 and/or oedema)
National	17,278	5.3	4.3	1
		[4.9,5.7]	[3.9,4.7]	[0.9,1.2]
Sex				
Males	8,697	4.3	3.3	0,9
		[3.8,4.8]	[2.9,3.8]	[0.7,1.2]
Females	8,581	6.3	5.3	1,1
		[5.7,7.0]	[4.7,5.8]	[0.9,1.3]
Age				
6-11	2,165	14.6	12.6	2.0
		[13.0,16.4]	[11.0,14.3]	[1.5,2.8]
12-23	4,172	10.3	8	2,3
		[9.2,11.5]	[7.0,9.1]	[1.9,2.9]
24-35	4,012	3.1	2.5	0,7
		[2.6,3.7]	[2.1,3.0]	[0.4,1.0]
36-47	3,787	1	0.9	0,1
		[0.7,1.5]	[0.6,1.3]	[0.1,0.3]
48-59	3,142	0.3	0.2	0,1
		[0.1,0.5]	[0.1,0.4]	[0.0,0.2]
Zone				
North Central	3,145	3.8	3.3	0,5
		[3.1,4.7]	[2.7,4.0]	[0.3,0.9]
North East	3,631	5.9	4.4	1,4
		[5.0,6.9]	[3.7,5.3]	[1.1,1.9]
North West	4,916	10.3	7.9	2,4
		[9.2,11.6]	[6.9,9.1]	[1.9,3.0]
South East	1,561	2.3	2.2	0,1
		[1.6,3.4]	[1.5,3.2]	[0.0,0.6]
South South	1,885	3.2	2.9	0,3
		[2.4,4.2]	[2.1,3.9]	[0.1,0.7]
South West	2,140	2.8	2.5	0,3
		[2.2,3.5]	[1.9,3.2]	[0.1,0.6]
State				
Abia	237	3	3	0
		[1.5,5.6]	[1.5,5.6]	
Adamawa	439	3.4	2.1	1,4
		[2.1,5.5]	[1.0,4.1]	[0.7,2.8]
Akwa-Ibom	284	7.4	7	0,4
		[4.7,11.4]	[4.5,10.9]	[0.1,2.4]
Anambra	236	2.5	2.5	0
		[1.1,5.9]	[1.1,5.9]	
Bauchi	778	6.9	5.1	1,8
		[5.0,9.6]	[3.6,7.3]	[1.0,3.1]

Table 10 continued

Background Characteristics	Total N	Global Acute Malnutrition (MUAC <125 and/or oedema)	Moderate Acute Malnutrition (MUAC <125 >=115, no oedema)	Severe Acute Malnutrition (MUAC <115 and/or oedema)
Bayelsa	312	2.9	2.6	0.3
		[1.6,5.1]	[1.4,4.7]	[0.0,2.3]
Benue	427	0.5	0.5	0
		[0.1,1.9]	[0.1,1.9]	
Borno	625	6.4	5.3	1.1
		[4.3,9.5]	[3.5,8.0]	[0.6,2.1]
Cross River	360	2.8	2.8	0
		[1.5,5.2]	[1.5,5.2]	
Delta	280	2.9	1.8	1.1
		[1.4,5.7]	[0.8,4.1]	[0.4,3.1]
Ebonyi	434	1.8	1.8	0
		[0.9,3.6]	[0.9,3.6]	
Edo	388	1.3	1.3	0
		[0.6,3.0]	[0.6,3.0]	
Ekiti	291	2.4	2.1	0.3
		[1.3,4.4]	[1.0,4.1]	[0.1,2.3]
Enugu	369	2.2	1.9	0.3
		[1.2,4.0]	[1.0,3.7]	[0.0,1.9]
FCT	416	4.3	3.8	0.5
		[2.8,6.7]	[2.4,6.1]	[0.1,1.8]
Gombe	669	6	4.8	1.2
		[4.3,8.2]	[3.4,6.6]	[0.7,2.1]
Imo	285	2.1	1.8	0.4
		[0.8,5.4]	[0.7,4.5]	[0.0,2.5]
Jigawa	766	12.5	10.3	2.2
		[9.4,16.6]	[7.4,14.1]	[1.3,3.7]
Kaduna	646	9.8	7.4	2.3
		[6.8,13.8]	[4.9,11.2]	[1.3,4.0]
Kano	618	8.4	6.1	2.3
		[6.0,11.6]	[4.0,9.3]	[1.2,4.1]
Katsina	731	8.1	5.6	2.5
		[5.8,11.2]	[3.9,8.0]	[1.5,4.1]
Kebbi	751	12.8	10	2.8
		[10.0,16.2	[7.8,12.8]	[1.8,4.4]
Kogi	377	3.2	2.9	0.3
		[1.4,6.9]	[1.4,6.0]	[0.0,1.9]
Kwara	414	6.8	6.3	0.5
		[4.8,9.4]	[4.4,8.8]	[0.1,1.8]
Lagos	509	2.2	2.2	0
		[1.3,3.7]	[1.3,3.7]	
Nasarawa	438	3.2	2.3	0.9
		[1.8,5.7]	[1.2,4.4]	[0.2,3.6]
Niger	638	5.3	4.4	0.9
		[3.6,7.9]	[3.1,6.2]	[0.3,2.8]

Table 10 continued

Background Characteristics	Total N	Global Acute Malnutrition (MUAC <125 and/or oedema)	Moderate Acute Malnutrition (MUAC <125 >=115, no oedema)	Severe Acute Malnutrition (MUAC <115 and/or oedema)
Ogun	403	4.7	4	0.7
		[2.9,7.5]	[2.3,6.7]	[0.2,2.2]
Ondo	328	3	2.1	0.9
		[1.8,5.0]	[1.1,4.2]	[0.3,2.6]
Osun	247	3.6	3.2	0.4
		[1.8,7.1]	[1.5,6.7]	[0.1,2.9]
Oyo	362	1.9	1.9	0
		[1.0,3.8]	[1.0,3.8]	
Plateau	435	4.8	3.9	0.9
		[3.1,7.5]	[2.3,6.5]	[0.4,2.3]
Rivers	261	1.5	1.5	0
		[0.5,4.6]	[0.5,4.6]	
Sokoto	710	14.2	11.5	2.7
		[11.5,17.4	[9.1,14.6]	[1.6,4.3]
Taraba	457	4.6	3.3	1.3
		[2.8,7.4]	[1.9,5.6]	[0.5,3.4]
Yobe	663	7.2	5.6	1.7
		[4.8,10.7]	[3.7,8.3]	[0.8,3.3]
Zamfara	694	11.2	8.9	2.3
		[8.5,14.6]	[6.5,12.1]	[1.3,4.0]

Note: results in brackets are 95% confidence intervals

Underweight

Underweight refers to low weight-for-age, as to say when a child is too thin for his/her age. It is defined in terms of standard deviation from median weight-for-age of the reference WHO population. Children whose weight-for-age is below minus two standard deviations (-2 SD) from the reference population median are classified as underweight, while children whose weight-for-age is below minus three standard deviations (-3 SD) from the reference median are considered severely underweight. Growth charts based on Weight for Age Z scores (WAZ) reference curves are used for growth monitoring in Mother and Child Health programmes and for attainment of the Millennium Development Goals.

The figure below shows that the distribution of WAZ in the sample (in lighter red color), applying SMART Flags, follows closely a normal distribution (in darker green colour).

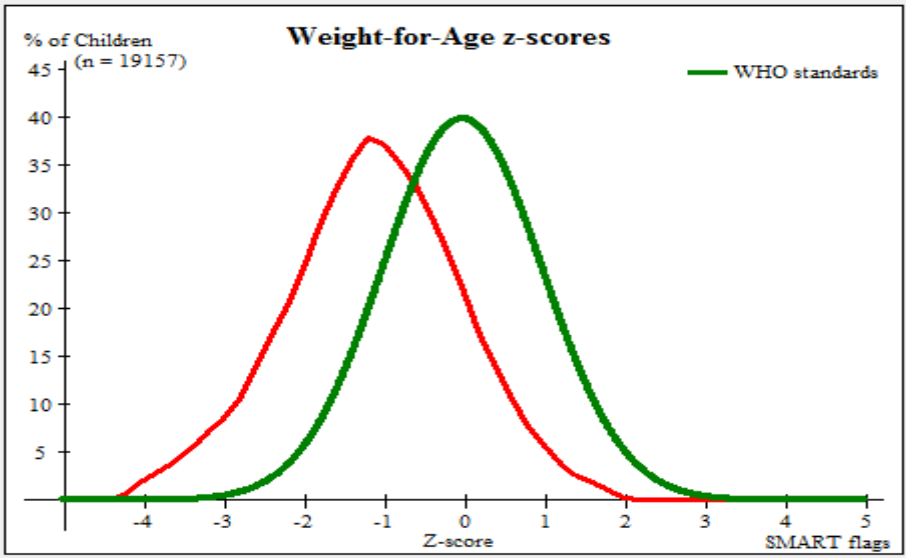


Figure 5: Distributions of Weight for Age z-score (WHO 2006, extreme values excluded using SMART Flags)

In 2012, 22 percent of children under-five were estimated to be underweight in West and Central Africa, a rate higher than the global estimate of 15 percent[28]. The 2014 NNHS estimate for Nigeria was close to that of the region with about 21 percent of children under age 5 being underweight. According to this survey results, there has been a slight reduction in the indicator, since 19.4 percent of children under age 5 were reported being underweight in 2015. Disaggregation by geo-political zones shows that underweight is lowest in the South East at 9 percent and highest in North East (25 percent) and North West (32 percent). A drop of 6 percentage points compared to 2014 was noted in the North East states, while most of North West states are still above the 30 percent WHO critical threshold. The drop in North East states could be due to the fact that the result from Borno state is not representative of the state and could affect the overall estimate for the region, hence the result needs to be interpreted with caution. Underweight is critical in Katsina, Kebbi, Sokoto, Yobe and particularly in Jigawa, where it exceeds 40 percent. Jigawa has also the highest rate among all states surveyed in terms of severe underweight (13 percent). The prevalence in eleven states – Bauchi, Borno, Gombe, Jigawa, Kaduna, Kano, Katsina, Kebbi, Sokoto, Yobe and Zamfara – is significantly greater than the national estimate of 19 percent, a result that corresponds with 2014 findings. As shown in Table 11, the proportion of underweight children is highest among those aged 12-23 months (26 percent), and similar in boys and girls at 20 versus 19 percent respectively.

[28]United Nations Children's Fund, World Health Organization. The World Bank, UNICEF-WHO-World Bank Joint Child Malnutrition Estimates, 2013.

Table 11: Prevalence of overall, moderate and severe underweight status (Weight-for-Age Z-score) in children 0 to 59 months of age by background characteristics (WHO 2006)

Background Characteristics	Total N	Prevalence of Underweight (WAZ <-2SD)	Prevalence of Moderate Underweight (WAZ <-2 and >=-3SD)	Prevalence of Severe Underweight (WAZ <-3SD)
National	19,525	19.4	14	5.6
		[18.6,20.2]	[13.4,14.6]	[5.1,6.0]
Sex				
Males	9,791	20.4	14.5	6
		[19.4,21.4]	[13.7,15.3]	[5.5,6.6]
Females	9,734	18.5	13.5	5.1
		[17.5,19.5]	[12.7,14.3]	[4.6,5.6]
Age in months				
0-5	2,244	14.5	9.7	4.8
		[12.9,16.4]	[8.5,11.2]	[3.8,5.9]
6-11	2,162	22.7	15.7	7.4
		[20.9,24.8]	[14.1,17.5]	[6.2,8.7]
12-23	4,167	25.7	17.3	8.6
		[24.1,27.3]	[16.0,18.6]	[7.6,9.6]
24-35	4,013	20.8	14.7	6.4
		[19.4,22.3]	[13.5,15.9]	[5.6,7.2]
36-47	3,785	15.9	12.6	3.4
		[14.6,17.3]	[11.5,13.8]	[2.8,4.2]
48-59	3,147	14.7	12.4	2.3
		[13.3,16.1]	[11.2,13.7]	[1.8,2.9]
Zone				
North Central	3,505	13.6	10.6	3
		[12.1,15.3]	[9.4,12.0]	[2.3,3.8]
North East	4,002	25.3	18.5	6.7
		[23.3,27.3]	[17.1,20.1]	[5.8,7.7]
North West	5,439	31.6	22.3	9.3
		[29.8,33.4	[21.0,23.7]	[8.3,10.4]
South East	1,753	9.5	7.7	1.7
		[7.7,11.5]	[6.3,9.5]	[1.2,2.5]
South South	2,118	12.3	10.2	2.2
		[10.6,14.3]	[8.7,11.8]	[1.5,3.1]
South West	2,397	12.2	10.1	2.1
		[10.8,13.9]	[8.9,11.5]	[1.6,2.9]
State				
Abia	270	13	9.3	3.7
		[9.1,18.1]	[6.4,13.3]	[1.9,7.2]
Adamawa	469	19.6	14.9	4.7
		[16.5,23.2]	[12.1,18.3]	[3.1,7.0]
Akwa-Ibom	322	21.4	15.5	5.9
		[15.8,28.3]	[11.6,20.4]	[3.3,10.2]
Anambra	268	7.1	6.7	0.4
		[4.7,10.5]	[4.4,10.2]	[0.1,2.5]

Table 11 continued

Background Characteristics	Total N	Prevalence of Underweight (WAZ <-2SD)	Prevalence of Moderate Underweight (WAZ <-2 and >=-3SD)	Prevalence of Severe Underweight (WAZ <-3SD)
Bauchi	859	29	20.1	8.8
		[24.5,33.9]	[17.1,23.6]	[6.7,11.6]
Bayelsa	340	8.8	7.6	1.2
		[6.1,12.6]	[4.9,11.7]	[0.5,2.9]
Benue	468	7.7	5.8	1.9
		[4.5,12.8]	[3.4,9.6]	[0.8,4.5]
Borno	683	26.6	20.8	5.9
		[21.7,32.2	[17.1,25.0]	[4.0,8.4]
Cross River	403	12.7	10.4	2.2
		[9.2,17.1]	[7.6,14.1]	[1.2,4.1]
Delta	313	9.9	8.6	1.3
		[6.6,14.6]	[5.6,13.0]	[0.5,3.2]
Ebonyi	489	11.5	9	2.5
		[8.2,15.7]	[6.5,12.3]	[1.3,4.4]
Edo	443	11.3	9.3	2
		[8.2,15.3]	[6.7,12.7]	[1.1,3.8]
Ekiti	321	10	7.5	2.5
		[7.1,13.8]	[5.0,11.0]	[1.0,6.0]
Enugu	408	4.7	3.4	1.2
		[3.0,7.2]	[2.1,5.6]	[0.5,2.8]
FCT	475	9.3	7.4	1.9
		[6.5,13.0]	[5.2,10.4]	[1.0,3.7]
Gombe	735	23.5	17.8	5.7
		[19.5,28.2	[14.7,21.4]	[4.2,7.8]
Imo	318	12.6	10.7	1.9
		[8.0,19.2]	[6.8,16.4]	[1.0,3.6]
Jigawa	857	40.6	27.3	13.3
		[35.9,45.5]	[23.7,31.2]	[11.1,15.9]
Kaduna	711	28.6	20.3	8.3
		[23.6,34.1]	[16.3,24.8]	[5.7,11.9]
Kano	688	26.9	18.9	8
		[23.1,31.1]	[16.1,22.0]	[5.8,10.9]
Katsina	796	33.9	23.5	10.4
		[30.2,37.9]	[20.7,26.5]	[8.4,12.9]
Kebbi	820	33.5	23.9	9.6
		[28.9,38.5]	[21.2,26.8]	[7.0,13.1]
Kogi	429	11.9	10.3	1.6
		[8.9,15.7]	[7.7,13.6]	[0.7,3.6]
Kwara	464	17.2	13.8	3.4
		[13.2,22.3]	[10.1,18.5]	[2.1,5.6]
Lagos	577	9.7	7.8	1.9
		[7.1,13.2]	[5.6,10.7]	[1.0,3.4]
Nasarawa	487	14.2	11.1	3.1
		[11.2,17.7]	[8.2,14.8]	[1.8,5.2]

Table 11 continued

Background Characteristics	Total N	Prevalence of Underweight (WAZ <-2SD)	Prevalence of Moderate Underweight (WAZ <-2 and >=-3SD)	Prevalence of Severe Underweight (WAZ <-3SD)
Niger	704	17.3	12.8	4.5
		[14.0,21.2]	[10.4,15.6]	[3.0,6.8]
Ogun	466	13.9	11.4	2.6
		[10.8,17.8]	[9.1,14.1]	[1.4,4.5]
Ondo	360	15.3	12.2	3.1
		[11.3,20.3]	[9.1,16.3]	[1.7,5.3]
Osun	264	14	12.5	1.5
		[10.6,18.3]	[9.4,16.5]	[0.6,3.7]
Oyo	409	13.2	11.2	2
		[10.0,17.3]	[8.4,14.9]	[0.9,4.2]
Plateau	478	18.4	14.4	4
		[14.3,23.3]	[10.7,19.2]	[2.3,6.9]
Rivers	297	8.8	8.4	0.3
		[5.9,12.9]	[5.7,12.2]	[0.1,2.2]
Sokoto	799	35.7	25.9	9.8
		[31.1,40.5]	[22.6,29.5]	[7.3,13.0]
Taraba	509	16.3	12.2	4.1
		[12.8,20.6]	[9.2,15.9]	[2.7,6.2]
Yobe	747	32.8	22.6	10.2
		[28.4,37.5]	[19.1,26.6]	[8.1,12.7]
Zamfara	768	28	21.4	6.6
		[24.6,31.6]	[18.8,24.2]	[5.0,8.8]

WHO Flags were used for National and Regional Estimates

SMART Flags were used for State

Note: results in brackets are 95% confidence intervals

Stunting

Stunting is an indicator of linear growth retardation and cumulative growth deficits in children. It reflects the failure to grow in stature, which occurs as a result of inadequate nutrition over a longer period. For this reason, stunting – and especially stunting of children under five years of age – is a stronger indicator of hunger and endemic poverty than underweight[29].

Children whose height-for-age Z-score (HAZ) is below minus two standard deviations (-2 SD) from the median of the WHO reference population are considered stunted or chronically malnourished. Children who are below minus three standard deviations (-3 SD) from the reference median are considered severely stunted.

[29]The Nutrition Challenge in Sub-Saharan Africa, Regional Bureau for Africa, UNDP 2012.

It must be reminded that these results should be interpreted with caution because of the age-quality data issues previously reported. The figure below confirms poor age estimation for children showing that the survey distribution of HAZ (red colour) is flatter than normal (green colour).

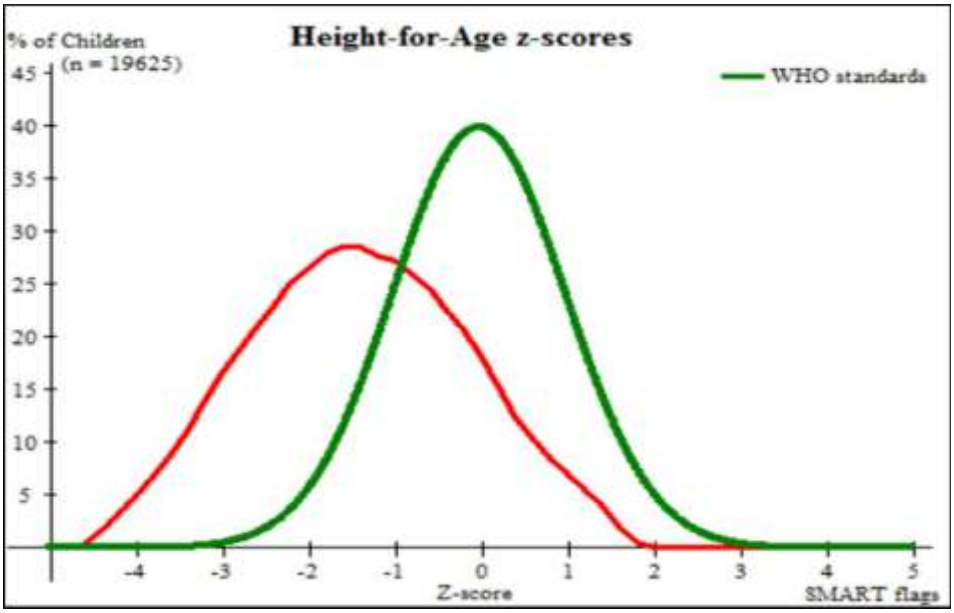


Figure 6: Distributions of Height for Age z-score (WHO 2006, extreme values excluded using SMART Flags)

Although wasting and underweight are serious, the largest burden for Sub-Saharan Africa is in fact stunting[30]: About 37 percent of children are stunted in sub-Saharan Africa compared to a global prevalence of 25 percent[31]. The WHO classification of malnutrition prevalence considers stunting serious if comprised between 30 and 40 percent, and critical if above 40 percent. Moreover in 2012 the WHAR introduced a specific stunting target in order to complement MDGs underweight goal: a relative reduction of 40 percent in the number of stunted children to be achieved globally by the year 2025[32].

This year, the Global Nutrition Report 2015 has placed Nigeria within the "off-course" countries that are achieving "some progress" in terms of stunting[33]. In fact, according to DHS, MICs and NNHS

[30]The Nutrition Challenge in Sub-Saharan Africa, Regional Bureau for Africa, UNDP 2012.
[31]The State of the World's Children 2015, UNICEF, based on MICS, DHS and other national surveys, 2009-2013.
[32]Proposed Global Targets for Maternal, Infants and Young Children Nutrition, WHO, 2012.
[33]To be classified as "on course", countries should have stunting rates under 5 percent and an actual average annual rate of reduction (AARR) greater than their country-specific AARR required to meet the global goal. Countries with stunting rates greater than or equal to 5 percent were classified in the "off-course" category. Off-course countries have been subsequently disaggregated into "no progress" and "some progress", to recognize countries that are making progress but not at the rate required to meet the 2025 WHA target. Global Nutrition Report 2015. International Food Policy Research Institute, Washington 2015.

surveys, the nutritional status of Nigerian children has gradually improved over the last decade, the stunting prevalence dropping from 41 percent in 2008 (DHS) to 36 percent in 2011 (MICS) to 32 percent in 2014 (NNHS). According to NNHS 2015 the situation is quite stable, as the slight difference (33 percent) is not statistically significant as confidence intervals are overlapping.

National stunting prevalence is below Sub-Saharan regional level of 37 percent. Nevertheless the situation is critical – above 40 percent – in the North West and North East states, where 56 percent and 44 of the under 5 children are still stunted. The situation is particularly serious in Bauchi, Jigawa, Kaduna, Kano, Katsina, Kebbi, Sokoto, Yobe and Zamfara, where more than half of under 5 children are stunted. Conversely, the prevalence of stunting is lowest in the South East (12 percent), where less than one in ten children is stunted. Overall, 12.5 percent of children are severely stunted (below -3 SD) and severe stunting by zone and state follow the same trend of stunting.

In developing countries, stunting follows an age pattern: prevalence rise quickly after about six months, peaks often about 24 months and slowly decreases after 36 months of age Therefore, the age of the child modifies the interpretation of the findings: for children in the age group below 2-3 years, low height-for-age probably reflects a continuing process of "failing to grow" or "stunting", while for older children, it reflects a state of "having failed to grow" or "being stunted"[34]. Stunting, therefore, reflects failure to receive adequate nutrition over a long period of time and it is affected by recurrent and chronic illness. It represents the long-term effects of malnutrition in a population and is not sensitive to recent, short-term changes in dietary intake. Since the effects of stunting are not completely reversible and stunted children will grow up becoming small adults, chronic malnutrition has a lifelong impact on the individual, the community and the nation.

As shown in Table 13, analysis by age groups confirms that stunting increases with age, peaking at 43 percent among children age 24-35 months. Severe stunting shows a similar pattern, with the highest proportion of severe stunting in children age 24-35 months (19 percent). Percentage of stunted children over 2 years of age is significantly high, exhibiting the consequences of stunting in early age and of long-term malnutrition. Finally, boys (35 percent) are more likely to be stunted than girls (30 percent). Since underweight, wasting (WHZ based) and stunting indicators all report the same sex difference, this finding might reflect a yet not well understood greater vulnerability of boys at this stage, which may have higher nutritional requirements than girls[35]. This findings also contradicts the theory that the low priority of girls in many cultures would bias food consumption toward boys[36].

---

[34]WHO, Global Database on Child Growth and Malnutrition at
http://www.who.int/nutgrowthdb/about/introduction/en/index2.html
[35]*Are determinants of Rural and Urban Food Security and Nutritional Status Different? Some Insights from Mozambique*. World Development, 1999
[36]*The determinants of child health and nutrition-A meta-analysis*. Washington, D.C.: World Bank 2005

Table 12: Prevalence of overall, moderate and severe stunting status (Height-for-Age) in children 0 to 59 months of age by background characteristics (WHO 2006)

Background Characteristics	Total N	Prevalence of Stunting (HAZ <-2SD)	Prevalence of Moderate Stunting (HAZ <-2 and >=-3SD)	Prevalence of Severe Stunting (HAZ <-3SD)
National	19,416	32.9	20.4	12.5
		[31.9,34.0]	[19.7,21.1]	[11.8,13.2]
Sex				
Males	9,729	35.4	21.3	14.1
		[34.1,36.7]	[20.4,22.3]	[13.2,15.0]
Females	9,687	30.4	19.5	10.9
		[29.1,31.6]	[18.6,20.4]	[10.1,11.7]
Age				
0-5	2,226	14.8	9.8	5
		[13.2,16.5]	[8.5,11.2]	[4.1,6.1]
6-11	2,151	21.6	14.5	7.1
		[19.6,23.7]	[12.9,16.1]	[6.0,8.4]
12-23	4,150	35.4	22	13.5
		[33.6,37.2]	[20.6,23.4]	[12.3,14.7]
24-35	3,984	43.2	24.5	18.7
		[41.3,45.1]	[23.0,25.9]	[17.3,20.2]
36-47	3,768	36.8	22.4	14.4
		[34.9,38.7]	[20.9,24.0]	[13.1,15.8]
48-59	3,132	32.4	22.4	10
		[30.4,34.5]	[20.8,24.1]	[8.8,11.4]
Zone				
North Central	3,421	30.6	21.6	9
		[28.2,33.1]	[19.9,23.4]	[7.7,10.4]
North East	3,929	43.5	26.5	17
		[41.1,45.9]	[25.0,28.1]	[15.3,18.8]
North West	5,359	55.9	31.4	24.5
		[53.9,57.9]	[30.1,32.7]	[22.7,26.4]
South East	1,712	12.3	9.8	2.4
		[10.6,14.2]	[8.5,11.4]	[1.7,3.5]
South South	2,054	20	15.8	4.2
		[17.5,22.6]	[13.8,18.1]	[3.2,5.4]
South West	2,369	17.5	13.6	3.8
		[15.5,19.7]	[12.1,15.3]	[3.0,4.8]
State				
Abia	268	17.9	12.7	5.2
		[12.5,25.0]	[9.2,17.2]	[2.5,10.6]
Adamawa	470	33.2	20.6	12.6
		[27.6,39.3]	[16.7,25.2]	[10.0,15.6]
Akwa-Ibom	303	24.1	18.5	5.6
		[18.2,31.2]	[13.6,24.6]	[3.2,9.6]
Anambra	262	7.6	6.5	1.1
		[4.9,11.8]	[3.9,10.6]	[0.4,3.4]
Bauchi	840	54.2	30	24.2
		[49.3,59.0]	[27.2,33.0]	[19.9,29.0]

Table 12 continued

Background Characteristics	Total N	Prevalence of Stunting (HAZ <-2SD)	Prevalence of Moderate Stunting (HAZ <-2 and >=-3SD)	Prevalence of Severe Stunting (HAZ <-3SD)
Bayelsa	334	14.1	10.5	3.6
		[10.8,18.1]	[7.9,13.8]	[2.2,5.8]
Benue	454	23.8	19.4	4.4
		[18.5,30.0]	[15.2,24.4]	[2.5,7.7]
Borno	678	36.7	25.1	11.7
		[30.8,43.1]	[21.4,29.2]	[8.1,16.5]
Cross River	389	18.5	14.1	4.4
		[14.7,23.1]	[11.1,17.8]	[2.7,6.9]
Delta	307	19.9	14	5.9
		[14.5,26.6]	[10.2,18.9]	[3.3,10.3]
Ebonyi	471	20.6	16.8	3.8
		[16.8,25.0]	[13.8,20.2]	[2.4,6.0]
Edo	430	15.1	11.9	3.3
		[11.6,19.5]	[8.9,15.7]	[1.8,5.8]
Ekiti	315	13.3	10.8	2.5
		[9.6,18.2]	[7.8,14.8]	[1.3,4.9]
Enugu	398	8	7.3	0.8
		[5.7,11.3]	[5.2,10.2]	[0.3,2.2]
FCT	464	19.2	15.1	4.1
		[14.4,25.1]	[11.1,20.2]	[2.5,6.6]
Gombe	712	44.1	26.8	17.3
		[39.0,49.4]	[23.6,30.3]	[13.6,21.7]
Imo	313	12.1	9.6	2.6
		[9.1,16.1]	[7.0,13.0]	[1.2,5.2]
Jigawa	838	63.4	31.4	32
		[58.0,68.4]	[28.4,34.5]	[26.8,37.7]
Kaduna	702	52.1	30.5	21.7
		[46.4,57.8]	[27.2,33.9]	[17.5,26.5]
Kano	680	51.9	31	20.9
		[46.9,56.9]	[27.8,34.4]	[16.9,25.6]
Katsina	775	58.2	31.9	26.3
		[53.6,62.6]	[29.4,34.4]	[22.4,30.7]
Kebbi	816	58.3	33.2	25.1
		[54.3,62.2]	[30.0,36.6]	[21.6,29.1]
Kogi	430	24.7	19.3	5.3
		[20.4,29.4]	[15.5,23.8]	[3.2,8.7]
Kwara	447	31.8	22.6	9.2
		[25.9,38.2]	[18.3,27.5]	[6.7,12.4]
Lagos	575	11.1	9.6	1.6
		[8.1,15.1]	[7.1,12.8]	[0.7,3.3]
Nasarawa	480	30.6	23.1	7.5
		[26.9,34.7]	[19.4,27.3]	[5.6,9.9]
Niger	684	38	24.1	13.9
		[32.4,44.0]	[20.5,28.1]	[10.9,17.5]
Ogun	462	21.4	16.5	5
		[16.3,27.6]	[13.0,20.7]	[3.2,7.7]

Table 12 continued

Background Characteristics	Total N	Prevalence of Stunting (HAZ <-2SD)	Prevalence of Moderate Stunting (HAZ <-2 and >=-3SD)	Prevalence of Severe Stunting (HAZ <-3SD)
Ondo	351	23.6	14.5	9.1
		[18.6,29.6]	[11.2,18.7]	[6.0,13.6]
Osun	262	21.8	17.9	3.8
		[17.1,27.3]	[14.1,22.5]	[2.1,6.8]
Oyo	404	20.5	16.3	4.2
		[15.4,26.9]	[12.5,21.1]	[2.4,7.3]
Plateau	462	43.7	26.8	16.9
		[36.5,51.2]	[22.5,31.7]	[12.3,22.7]
Rivers	291	22.3	19.9	2.4
		[16.7,29.3]	[14.9,26.2]	[1.1,5.3]
Sokoto	786	56.5	30.4	26.1
		[51.8,61.1]	[27.3,33.7]	[21.5,31.3]
Taraba	497	38.8	25.8	13.1
		[33.1,44.8]	[21.3,30.7]	[10.1,16.7]
Yobe	732	52	30.5	21.6
		[47.6,56.5]	[27.8,33.2]	[18.7,24.8]
Zamfara	762	57.5	32.5	24.9
		[52.8,62.1]	[28.8,36.5]	[20.9,29.5]

WHO Flags were used for National and Regional Estimates
SMART Flags were used for State estimates
Note: results in brackets are 95% confidence intervals

Trends of Acute Malnutrition

Much of a child's future is determined by the quality of nutrition in the early stages of his life and specifically during the first 1,000 days. This period – which spreads from the beginning of pregnancy to the child's second birthday – is in fact a critical window, since the brain and body grow rapidly and good nutrition is essential to lay the foundation for a healthy cognitive and physical development. If children do not get the right nutrients during this period, the damage is often irreversible[37].

In the below graph, trends of malnutrition have been compared to determine which age are more critical. We can see that stunting increases progressively until it reaches a peak between 27 and 37 months of age. Underweight increases less and reaches its peak earlier in age (between 17 and 25 months). Prevalence of global acute malnutrition based on WHZ and MUAC shows corresponding decreasing trend from eighteen months on, but while the MUAC indicator is declining from six months on, the WHZ slightly increases from 6 to 18 months. The MUAC based indicator offers a lower GAM variation than the WHZ based indicator, especially in the 6-18 months window.

[37]Nutrition in the first 1,000 days, State of the World's Mothers 2012, Save the Children, 2012

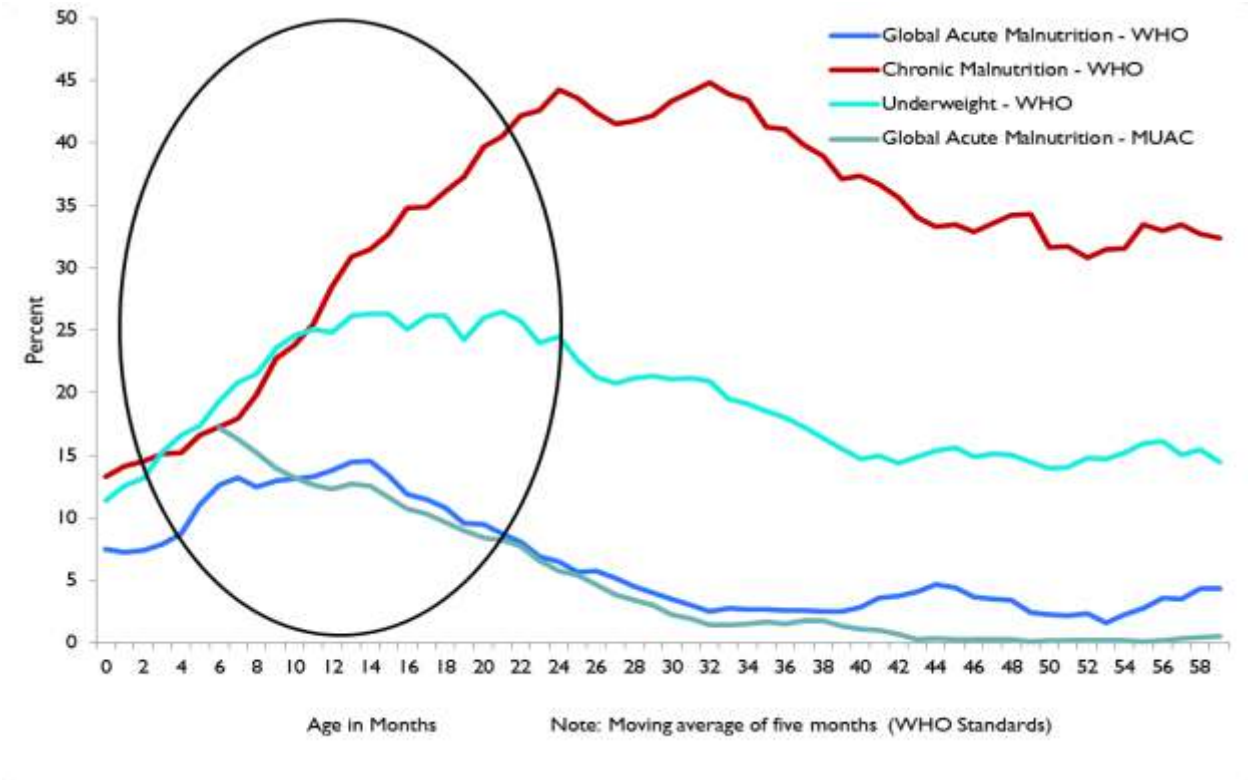


Figure 7: Trends of GAM, Stunting, Underweight and MUAC<125mm by age in months (plotted values are smoothed by a moving average of 5 months)

Dual Malnutrition Deficits

The burden of child malnutrition is generally reported separately for wasting, stunting, underweight, and micronutrient deficiencies and many studies report associations between stunting, wasting, and underweight and mortality of under 5 children. However, estimates of the effects of individual anthropometric indicators overlook the fact that multiple deficits may occur simultaneously, especially because all deficits are associated with poverty, disease history, and poor dietary intake. A study conducted recently in 10 countries has estimated that a child with comorbidities of stunting, wasting and underweight has a 12 fold elevated risk of mortality than a child with no nutritional deficit[38].

Recent evidence compiled in WHO's Global Nutrition Policy Review highlights that existing national nutrition policies tend not to adequately integrate all forms of malnutrition and data on the share of children who are neither stunted, wasted or underweight should be reported more frequently to provide an additional rationale for investing in nutrition, especially in fragile contexts where

[38]The effect of multiple anthropometric deficits on child mortality: meta-analysis of individual data in 10 prospective studies from developing countries, McDonald et al. AJCN 2013.

multiple types of child growth impairments are likely to be observed. The same line of reasoning is echoed by the latest Global Nutrition Report. The extent of these concurrent deficits, and the implications for mortality and programming, are quite serious, because often this population is significant in size and is missed by programs targeting single nutrition deficits alone. The development and implementation of comprehensive, multilevel approaches that cover all forms of malnutrition should be fostered.

The table below synthesizes the comorbid burden of stunting and wasting in children in Nigeria. Children growing up healthy are 63 percent, thus implying that one in three children is experiencing a nutrition deficit. Children experiencing the co-occurrence of stunting and wasting are 3 percent, 0.4 of which are experiencing severe stunting and severe wasting together, which likely suggests an early environment characterized by harsh deprivation. Therefore it is highly advised that multiple malnutrition indicators are introduced in screening, referral, treatment, and discharge procedures in both community-and facility-based programs.

Table 13: Extent of wasting and stunting in the same children

	No stunting	Moderate stunting	Severe stunting	Total
No wasting	62.9	18.9	10.9	92.7
	[61.8,63.9]	[18.2,19.6]	[10.3,11.6]	[92.2,93.1]
	11,434	3,960	2,456	17,850
Moderate wasting	3.4	1.1	1.1	5.6
	[3.1,3.7]	[1.0,1.3]	[0.9,1.2]	[5.2,6.0]
	620	250	249	1,119
Severe wasting	0.9	0.4	0.4	1.7
	[0.7,1.0]	[0.3,0.5]	[0.4,0.6]	[1.5,2.0]
	168	87	106	361
Total	67.1	20.4	12.4	100
	[66.1,68.2]	[19.7,21.1]	[11.8,13.2]	
	12,222	4,297	2,811	19,330

Overweight

The weight-for-height index also provides data on overweight. Children that are above two standard deviations (+2 SD) from the reference median are considered overweight. Although globally the majority of overweight children is in high-income countries, some low-income countries are starting to have a growing problem with overweight. In 2013, UNICEF, WHO, and World Bank estimated an increase of the global prevalence of childhood overweight from 5 to 7 percent in a 12-years period from 2000 to 2012. Childhood overweight results in immediate issues, such as metabolic abnormalities including raised cholesterol, triglycerides and glucose, type 2 diabetes, and high blood pressure. Childhood overweight is also a strong risk factor for adult obesity and its

consequences, which in turn has vast implications for the overall development of a nation. For these reason, in 2012, the WHAR resolution has included overweight among its nutrition indicators.

According to the Global Nutrition Report 2015, Nigeria is currently "on course" of achieving "good progress" in terms of overweight[39]. National overweight prevalence has not changed since last year (1.6 percent). Nigeria has also an overweight prevalence below the 7 percent threshold in all states surveyed. Highest prevalence was reported in Bayelsa (3 percent), followed by Zamfara, Nasarawa and Taraba, all between 2 and 3 percent. Overweight prevalence by state is presented in Figure 8.

[39]To be catalogued as "on course" for overweight indicators, countries had to have a current under 5 overweight rate below 7 percent. In addition, countries were disaggregated into the narrower categories of "good progress" (threshold is decreasing), "some progress" (threshold is stable) and "no progress" (threshold is increasing). Global Nutrition Report 2015. International Food Policy Research Institute, Washington 2015.

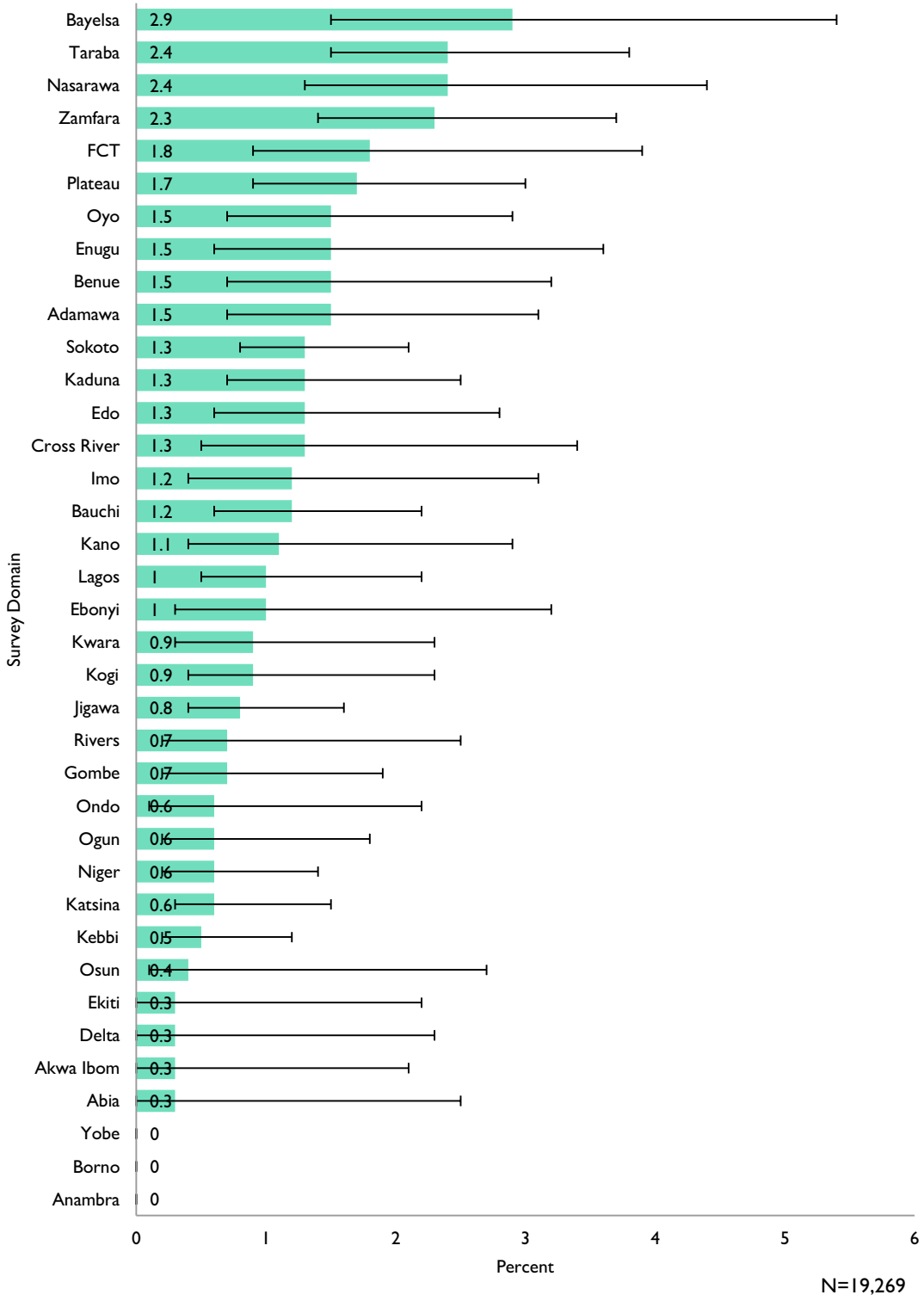


Figure 8: Overweight prevalence by state (WHO 2006, extreme values excluded using SMART Flags)

Child Health

Vaccination Coverage

Immunisation is one of the most cost effective ways of preventing many under-five deaths. Therefore immunisation coverage[40] is one of the indicators used to monitor progress toward the reduction of child morbidity and mortality. The Nigerian Expanded Programme on Immunization (EPI) was initiated in 1979. Significant progress was made in the 1980's with the Universal Child Immunization (UCI) when 80 percent coverage for all antigens was recorded. Since then, performance of EPI has stagnated with interludes of declines and improvements – routine immunisation coverage in the last decade ranging from 27 to 114 percent[41].

For these reasons, in the last five years, Nigeria has introduced several child survival initiatives and expanded existing ones, with a particular focus on strengthening routine immunisation. In May 2012, for instance, Nigeria began the replacement of the diphtheria, pertussis, and tetanus (DPT) vaccine with the pentavalent vaccine, which contains more antigens – Haemophilus influenzae type B, and hepatitis B. The actual target is to ensure full immunisation of children less than one year at 90 percent nationally, with at least 80 percent coverage in each state.

In this survey, mothers were asked to provide vaccination card and interviewers copied vaccination information from the cards onto the questionnaire. If the child had no vaccination card, the respondent was asked to recall the vaccine given to the child. If the mother indicated that the child had received DTP/Penta, she was asked the number of dose(s) the child had received.

Overall, only 49 percent of children aged 12-23 months had received the third dose at the time of the survey, which represents a further reduction compared to last year findings – where 52 percent of children had received DTP/Penta 3. Figure 9 compares 2014 and 2015 DTP/Penta 3 immunisation findings by zone. Great variability was again observed, with South-West and South-East having consistently higher coverage, between 75 and 80 percent, while the North-West and North-East have been persistently least performing – 17 and 26 percent respectively. The South West has also reported the greatest drop in immunisation coverage, as compared to 2014 (- 8.7 percentage points).

---

[40]According to WHO, a child is considered fully vaccinated if she or he has received vaccination against tuberculosis; three doses of vaccine to prevent diphtheria, pertussis, and tetanus; at least three doses of polio vaccine; and one dose of measles vaccine; during the first year of life. That is the reason why vaccination coverage information generally focuses on the 12- to 23-month age group (i.e., the typical age by which children should have received all basic vaccinations).

[41]Findings from several reviews and studies refer to a wide range of issues hampering the proper implementation of the immunisation programme in Nigeria including weak governance, inadequate funding, vaccine stock-out, lack outs of vaccine bundling, distribution challenges, non-maintenance of Cold Chain Equipment (CCE), and poor staff performance at state and local government levels. Nigerian National Routine Immunisation Strategic Plan (2013-15), National Primary Health Care Development Agency, Nigeria 2012.

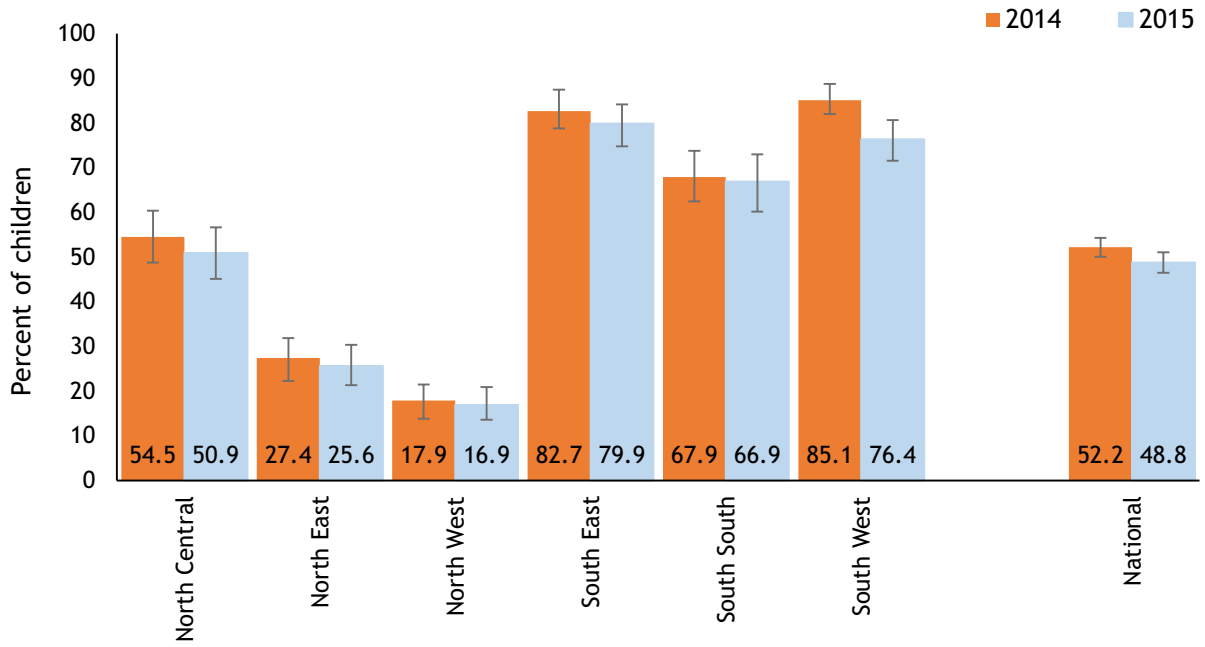


Figure 9: DTP/Penta 3 immunisation coverage by zone (2014, 2015)

At state level (see table 14 below), DTP/Penta 3 immunization coverage ranges from 4 percent in Sokoto to 91 percent in Imo state. In 2014, only 11 states out of 37 achieved the targeted 80 percent coverage, while coverage was below 25 percent in 9 states. In 2015, only five states – Edo, Ekiti, Enugu, Imo and Lagos – achieved the targeted 80 percent DPT/Penta 3 coverage, and coverage was less than 25 percent in nine states. Coverage was particularly low in Kebbi, Sokoto, Yobe and Zamfara, where less than one in ten children was immunized[42]. On the other hand, the overall dropout rate (from DTP/Penta 1 to DTP/Penta 3) has improved from 22 to 14 percent from 2014 to 2015.

[42]A baseline assessment in 7 LGAs in 6 northern states showed that DPT3 coverage at the LGA level for outreach settlements (those >5 km from a health facility) is as low as 3%. The Nigerian Vaccine Wastage Study Report – November 2011, WHO-UNICEF-CDC.

Table 14: Percentage of children 12-23 months vaccinated against preventable childhood diseases at any time before the survey by domain and zone.

Background Characteristics	Any Vaccination	DTP1 / Penta1	DTP2 / Penta2	DTP3 / Penta3	Measles	Percentage with vaccination card seen	Number of children age 12-23 months
National	81.6	63.5	57.7	48.8	50.6	34.4	4,205
	[79.4,83.6]	[61.2,65.6]	[55.4,60.0]	[46.5,51.1]	[48.3,52.9]	[32.4,36.5]	
Zone							
North Central	80.6	70.1	61.8	50.9	55.3	38.1	777
	[75.4,84.9]	[64.5,75.2]	[56.0,67.3]	[45.1,56.7]	[49.7,60.8]	[33.1,43.3]	
North East	72.8	43.8	36.5	25.6	33.3	15.8	849
	[67.1,77.9]	[38.4,49.3]	[31.5,41.8]	[21.3,30.4]	[28.7,38.3]	[12.5,19.7]	
North West	68.4	30.9	23.5	16.9	21.5	11.4	1,267
	[62.3,74.0]	[26.7,35.4]	[19.5,28.0]	[13.6,20.9]	[17.8,25.6]	[8.6,15.0]	
South East	96.2	91.2	86.7	79.9	73.9	58.3	361
	[93.6,97.8]	[86.8,94.2]	[81.8,90.4]	[74.8,84.2]	[68.8,78.5]	[51.6,64.7]	
South South	87.3	81.7	78.4	66.9	65.2	46.8	449
	[82.3,91.1]	[76.0,86.3]	[72.6,83.3]	[60.2,73.0]	[58.6,71.4]	[41.5,52.1]	
South West	94.1	87.8	84.9	76.4	75.1	53.7	502
	[91.5,96.0]	[84.0,90.8]	[80.7,88.2]	[71.6,80.7]	[69.9,79.6]	[48.4,58.9]	
State							
Abia	95.3	89.1	84.4	70.3	67.2	50	64
	[86.3,98.5]	[78.3,94.8]	[72.6,91.7]	[58.9,79.7]	[53.8,78.3]	[39.5,60.5]	
Adamawa	88.9	74.1	65.7	45.4	61.1	30.8	108
	[78.1,94.7]	[61.2,83.8]	[53.2,76.4]	[32.5,58.9]	[50.5,70.8]	[19.6,44.9]	
Akwa-Ibom	89.3	84	81.3	64	70.7	46.7	75
	[78.8,95.0]	[72.0,91.5]	[69.2,89.4]	[52.7,73.9]	[56.4,81.8]	[35.2,58.5]	
Anambra	98.1	90.4	82.7	73.1	76.9	46.2	52
	[86.6,99.8]	[76.8,96.4]	[69.5,90.9]	[59.9,83.2]	[64.3,86.1]	[29.9,63.2]	
Bauchi	73.5	32	23.8	14.9	23.8	15	181
	[56.6,85.5]	[22.3,43.7]	[15.8,34.2]	[9.0,23.7]	[14.6,36.3]	[8.5,25.1]	
Bayelsa	89.5	75	59.2	43.4	43.4	42.1	76
	[80.4,94.6]	[61.9,84.7]	[47.1,70.3]	[32.4,55.1]	[33.0,54.5]	[29.2,56.2]	
Benue	78.2	72.3	68.3	57.4	62.4	31.3	101
	[62.7,88.5]	[55.9,84.3]	[51.1,81.7]	[40.3,72.9]	[44.5,77.4]	[20.1,45.3]	
Borno	55.8	38.8	36.7	32	27.9	6.1	147
	[42.5,68.3]	[26.2,53.1]	[24.4,51.0]	[21.3,45.0]	[18.3,40.0]	[3.2,11.4]	
Cross River	93.3	91.1	84.4	74.4	73.3	43.3	90
	[84.8,97.2]	[82.7,95.7]	[73.7,91.3]	[64.4,82.4]	[62.1,82.2]	[32.9,54.4]	
Delta	75.4	68.9	67.2	63.9	55.7	44.3	61
	[58.7,86.9]	[52.8,81.4]	[51.1,80.1]	[46.4,78.4]	[40.7,69.8]	[32.8,56.4]	
Ebonyi	88.8	86.5	83.1	73	66.3	69.7	89
	[76.2,95.1]	[73.6,93.7]	[70.3,91.1]	[58.4,83.9]	[51.8,78.3]	[57.3,79.7]	
Edo	92.9	91.8	90.6	81.2	82.4	54.2	85
	[83.0,97.3]	[81.8,96.5]	[79.3,96.0]	[67.4,90.0]	[72.4,89.3]	[43.6,64.5]	
Ekiti	95.6	95.6	91.2	82.4	83.8	45.6	68
	[87.7,98.5]	[87.7,98.5]	[81.8,96.0]	[67.3,91.4]	[68.3,92.6]	[35.7,55.9]	

Table 14 continued

Background Characteristics	Any Vaccination	DTP1 / Penta1	DTP2 / Penta2	DTP3 / Penta3	Measles	Percentage with vaccination card seen	Number of children age 12-23 months
Enugu	96.6	89.8	89.8	86.4	76.1	73.6	88
	[90.2,98.9]	[76.1,96.0]	[76.1,96.0]	[73.9,93.4]	[66.3,83.8]	[59.9,83.9]	
FCT	96	88.1	80.2	63.4	84.2	60.4	101
	[90.5,98.4]	[76.5,94.4]	[65.3,89.7]	[48.7,75.9]	[74.4,90.7]	[50.9,69.2]	
Gombe	96.9	47.9	35.6	23.9	34.4	17.2	163
	[92.0,98.9]	[35.3,60.7]	[24.5,48.5]	[15.4,35.2]	[23.5,47.1]	[10.4,26.9]	
Imo	98.5	97.1	91.2	91.2	77.9	57.4	68
	[90.3,99.8]	[89.0,99.3]	[80.1,96.4]	[80.1,96.4]	[66.9,86.1]	[42.8,70.7]	
Jigawa	80.2	37.6	27.2	17.3	29.7	7	202
	[66.8,89.1]	[27.2,49.4]	[18.0,39.0]	[9.9,28.6]	[20.0,41.6]	[3.8,12.6]	
Kaduna	78.5	49.3	39.6	32.6	36.8	20.1	144
	[60.2,89.8]	[34.1,64.6]	[25.5,55.6]	[20.6,47.5]	[23.9,52.0]	[11.5,32.9]	
Kano	59.3	34.6	25.3	19.1	24.7	13.6	162
	[45.5,71.7]	[25.4,45.1]	[16.5,36.8]	[12.1,28.9]	[16.7,34.9]	[6.9,24.9]	
Katsina	68.9	35.3	28.7	19.8	21	12	167
	[54.0,80.6]	[24.8,47.5]	[19.4,40.3]	[11.7,31.5]	[13.2,31.7]	[6.2,21.8]	
Kebbi	66.7	21.1	15.2	7.8	14.7	9.8	204
	[47.6,81.5]	[12.9,32.5]	[9.1,24.2]	[3.6,16.1]	[7.8,25.9]	[4.8,18.9]	
Kogi	90.8	85.7	78.6	71.4	62.2	50	98
	[80.1,96.1]	[74.4,92.5]	[67.0,86.9]	[59.7,80.8]	[51.4,72.0]	[36.5,63.5]	
Kwara	81.6	81.6	75.5	61.2	60.2	52	98
	[68.8,90.0]	[68.8,90.0]	[58.7,87.0]	[43.9,76.1]	[43.8,74.6]	[36.8,66.9]	
Lagos	98.5	94	93.3	85.8	84.3	68.7	134
	[94.3,99.6]	[88.1,97.1]	[87.6,96.5]	[78.3,91.0]	[75.8,90.2]	[58.7,77.2]	
Nasarawa	82.8	71.7	54.5	38.4	56.6	37.4	99
	[71.6,90.2]	[57.2,82.8]	[41.5,67.0]	[26.0,52.5]	[42.7,69.5]	[23.9,53.2]	
Niger	67.9	46.5	35.3	27.8	28.3	19.9	187
	[52.5,80.2]	[32.6,61.0]	[23.2,49.6]	[17.2,41.6]	[18.0,41.6]	[12.3,30.6]	
Ogun	87.1	78.5	75.3	64.5	63.4	48.4	93
	[76.2,93.4]	[66.0,87.3]	[62.6,84.7]	[51.0,76.0]	[50.1,75.0]	[37.1,59.8]	
Ondo	87.7	84.9	80.8	75.3	72.6	42.5	73
	[76.3,94.0]	[72.9,92.2]	[67.4,89.6]	[57.3,87.5]	[54.8,85.3]	[28.3,57.9]	
Osun	93.2	88.1	84.7	72.9	69.5	35.6	59
	[80.3,97.9]	[75.5,94.7]	[70.4,92.9]	[58.4,83.7]	[52.9,82.2]	[23.4,49.9]	
Oyo	94.7	80	74.7	66.7	66.7	52	75
	[87.5,97.8]	[67.0,88.7]	[59.7,85.5]	[51.3,79.2]	[52.7,78.2]	[40.8,63.0]	
Plateau	79.6	65.6	58.1	47.3	57	36.6	93
	[67.4,88.0]	[50.3,78.2]	[41.8,72.8]	[31.8,63.4]	[43.2,69.8]	[23.4,52.1]	
Rivers	87.1	80.6	80.6	67.7	61.3	48.4	62
	[71.3,94.8]	[62.6,91.2]	[62.6,91.2]	[47.4,83.0]	[42.2,77.5]	[35.4,61.6]	
Sokoto	66.5	10.3	6.9	4.4	3.9	5.9	203
	[47.9,81.1]	[5.8,17.8]	[3.3,13.7]	[1.7,11.1]	[1.5,10.1]	[2.9,11.5]	
Taraba	89.6	60.4	45.8	26	50	25.3	96
	[80.7,94.6]	[48.6,71.1]	[34.8,57.3]	[17.5,36.8]	[39.2,60.8]	[16.6,36.5]	

Table 14 continued

Background Characteristics	Any Vaccination	DTP1 / Penta1	DTP2 / Penta2	DTP3 / Penta3	Measles	Percentage with vaccination card seen	Number of children age 12-23 months
Yobe	40.3	14.3	12.3	7.8	7.1	3.9	154
	[27.0,55.1]	[7.9,24.5]	[6.7,21.7]	[3.7,15.6]	[3.5,14.1]	[1.5,10.0]	
Zamfara	66.5	11.4	9.2	5.9	7	4.9	185
	[47.5,81.3]	[5.9,20.7]	[4.6,17.7]	[2.4,13.9]	[2.9,15.9]	[1.7,13.2]	

Note: results in brackets are 95% confidence interval

Measles

Measles is a highly contagious viral respiratory tract infection caused by a Morbillivirus. It only affects humans and rapidly spreads among individuals who have not been vaccinated. Symptoms include high fever, coughing and skin rashes and it can be fatal if not treated quickly. About 1 to 5 percent of children with measles die from complications of the disease[43]. Immunisation from measles is effective, and has resulted in significant reductions in case burden in many parts of the world. A child is considered adequately immunised against measles after receiving only one dose of vaccine. Unfortunately, a large percentage of children never receive their first measles vaccine dose in time for immunity to take hold. Failure to vaccinate children against measles puts them at risk of severe health complications such as pneumonia, diarrhoea, encephalitis, and blindness[44].

In the 37 states surveyed, measles immunisation pattern is similar to the observed DTP3/Penta3 pattern. Overall coverage has dropped since 2014 and the decline is even more significant (from 64 to 51 percent) thus indicating that nearly half percent of eligible children received no measles vaccine at all. This finding could be related to the measles campaign delivered in late 2013, which was still displaying its positive effect in 2014. It must also be reminded that immunisation data are prevalently based on mothers' (caregivers) recall, therefore such poor measles immunisation coverage could be due to the different timing of measles campaign, if conducted, and survey data collection. In general, North East and West have poorest rates of immunisation as compared to South East and West, and the decline from last year has been more significant in the Northern zones[45], and particularly in the North West (from 42.5 to 21.5 percent).

[43]Measles, Fact sheet N°286 - Reviewed February 2015, WHO.
[44]Measles pre-elimination Programme Fact sheet, Regional Office for Africa, WHO, 2014
[45]Low coverage in Northern states is often explained by the frequent lack of vaccines in these areas. Northern Nigeria MNCH Programme: Selected Analyses from Population-Based Baseline Survey. Columbia University 2012.

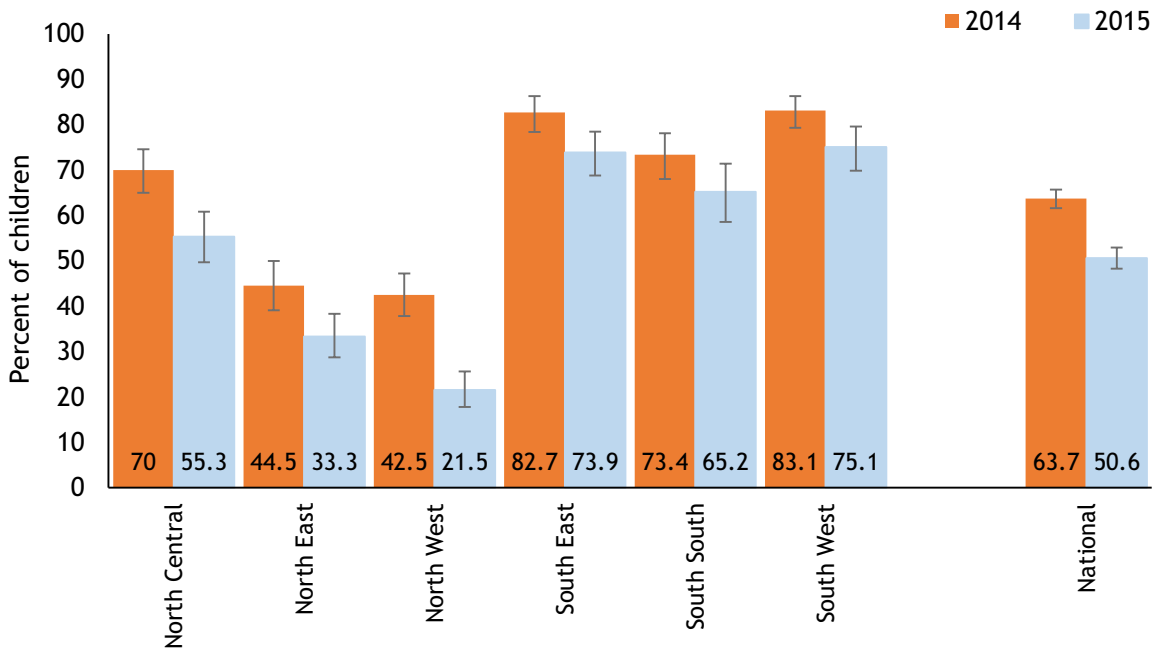


Figure 10: Measles immunisation coverage by zone (2014, 2015)

Only four states reached the target of 80 percent: Edo, Ekiti, FCT and Lagos. Nineteen states had coverage between 50 and 80 percent and fourteen states had coverage less than 50 percent. Coverage was again particularly low in Kebbi, Sokoto, Yobe and Zamfara[46]. Overall, nearly 20 percent of children aged 12-23 months received no vaccine at all. These results, which are consistent with DHS and MICS findings, call for the need to strengthen routine immunisation programmes, especially in the highlighted areas, in order to reduce infant and child mortality rates.

[46]In Zamfara, for instance, although mother's attitude towards immunization is generally positive, many believed that it could cause infertility in children. Determinants of routine immunization coverage in Bungudu, Zamfara State, Northern Nigeria, May 2010, Pan African Medical Journal 2014.

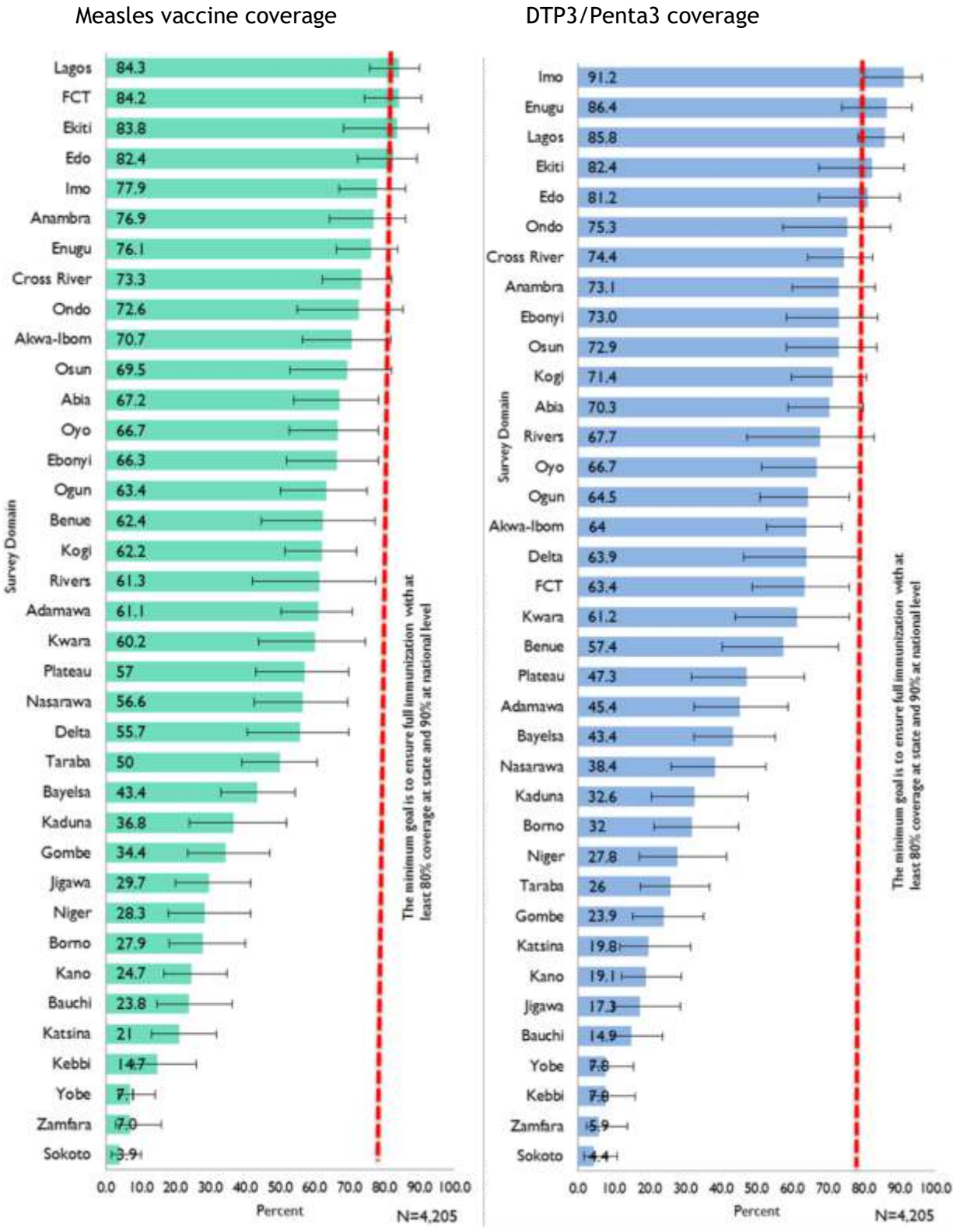


Figure 11: Percent of children 12 to 23 months who received DTP3/Penta3 and measles vaccines, 95% confidence interval by survey domain

Diarrhoea, Oral Rehydration Therapy and Zinc Supplementation Coverage

Worldwide, diarrhoea is the second leading cause of death in children, after pneumonia, and is a leading cause of malnutrition and mortality in children aged less than five years, in Nigeria and in most developing countries[47]. It is frequently related to the consumption of contaminated water and to unhygienic practices in food preparation and disposal of stools. Most of these deaths are due to dehydration from loss of substantial quantities of water and electrolytes in loose stools and could be easily treated with low-osmolarity oral rehydration salt (ORS)[48]. On average, under-five children experience 2.9 episodes of diarrhoea per year in developing countries49.

Zinc deficiency is also prevalent among young children that have a poor diet and high exposure to gastrointestinal parasites[50]. It is associated with immune system dysfunctions, growth retardation, and a high risk of morbidities, such as diarrhoea and Acute Respiratory Infection (ARI) and, subsequently, is responsible for 14 percent of all diarrhoeal deaths among children between 6 months and 5 years of age in developing countries[51]. Studies show that supplemental zinc, when combined oral rehydration solutions (ORS), provides therapeutic benefits, reducing the duration and the severity of the diarrhoea episodes, as well as the need for advanced medical care[52]. In Nigeria, there is a high prevalence of zinc deficiency: national prevalence is estimated at 20 percent, slightly higher in rural than urban areas – 26 versus 17 percent[53]. Based on this evidence, WHO and UNICEF recommend zinc with ORS in the treatment for diarrhoea[54]. Although international guidelines exist and most developing countries have added zinc treatment to their national policy on the treatment for diarrhoea, most countries, including Nigeria, need to increase the implementation of effective programmes for managing diarrhoea[55]. Although some progress to incorporate zinc in the treatment for diarrhoea, using the primary healthcare (PHC) workers as the delivery channel, has been made, some studies report that there still exists a gap in the knowledge,

---

Childhood Malnutrition and Infection Network. Multi-country analysis of the effects of diarrhoea on childhood stunting. Int Journal of Epidemiology 2008.

With ORT it is intended a therapy with oral rehydration salts (ORS and/or recommended home fluid (RHF), such as salt/sugar solution, coconut/rice water and other recommended home fluids.

Diarrhoea incidence in low- and middle income countries in 1990 and 2010: a systematic review. BMC Public Health 2012.

Assessment of the risk of zinc deficiency in populations and options for its control. International Zinc Nutrition Consultative Group (IZiNCG) technical document #1. Food Nutrition Bulletin 2004.

Global and regional child mortality and burden of disease attributable to zinc deficiency. European Journal of Clinical Nutrition 2009.

Therapeutic effects of oral zinc in acute and persistent diarrhea in children in developing countries: pooled analysis of randomized controlled trials. American Journal of Clinical Nutrition 2000.

Nigeria food consumption and nutrition survey 2001-2003: summary. International Institute of Tropical Agriculture, 2004.

A daily supplementation of 20 mg zinc for 10-14 days for children with acute diarrhoea and 10 mg per day for infants below six months of age.

[55]Promotion of Zinc Tablets with ORS through Child Health Weeks Improves Caregiver Knowledge, Attitudes, and Practice on Treatment of Diarrhoea in Nigeria, International Center for Diarrhoeal Disease Research, Health and Population Nutrition Journal, 2015.

attitudes, and practice (KAP) in relation to appropriate treatment practices for diarrhoea among caregivers in Nigeria[56].

In this survey, mothers were asked whether any of their children under age 5 had diarrhoea at any time during the preceding two weeks. If yes, the mother (or the caretaker) was asked if the child was given ORS and/or Zinc. The validity of this indicator is affected by the mother's perception of diarrhoea as an illness and her capacity to recall the events. It should be noted that the prevalence of diarrhoea also varies seasonally[57], hence the conditions of diarrhoea and its treatment not be interpreted as constant throughout the year.

Table 15 shows the percentage of children under age 5 with diarrhoea in the two weeks before the survey who received ORS and/or Zinc or both. Overall 15 percent of children under 5 years were reported to have had diarrhoea in the two weeks preceding the survey. The prevalence of diarrhoea varied from 4 to 37 percent – highest prevalence was reported among children living in Kebbi and the lowest among children living in Ekiti. Nearly three out of four children who have had diarrhoea received no treatment at all; and children living in the South West and in North Central states were most likely to receive treatment compared to children living in South East and North East. In case of treatment, children prevalently received ORS (21 percent) instead of zinc tablets (6 percent), and this is probably due to the fact that mothers – and/or caregivers – are much more familiar with ORS than zinc supplementation. Nearly 45 percent of children with diarrhoea were aged 6-23 months, while only 7 percent of children aged less than 6 months reported diarrhoea in the two weeks preceding the survey, thus implying that complementary feeding introduction – and food hygiene – is a very delicate transition period and continued breastfeeding until age 2 is highly recommended.

[56]Knowledge, attitude and practice of home management of childhood diarrhoea among caregivers of under-5 children with diarrhoeal disease in northwestern Nigeria. Journal of Tropical Pediatrics 2012.
[57]Distinct seasonal patterns of diarrhoea occur in many geographical areas. In temperate climates, bacterial diarrhoea occur more frequently during the warm season, whereas viral diarrhoea, particularly diarrhoea caused by rotavirus peak during the winter. In tropical area, rotavirus diarrhoea occurs throughout the year, increasing in frequency during the drier, cool months, whereas bacterial diarrhoeas peak during the warmer, rainy season. The incidence of persistent diarrhoea follows the same seasonal patterns as that of acute watery diarrhoea. WHO Readings on diarrhoea, student Manual 1992.

Table 15: Percent of children under age 5 years with diarrhoea in the previous 2 weeks who received ORS or Zinc by survey domain and zone.

Background Characteristics	Had diarrhoea in the last two weeks	Number of children age 0-59 months	Children with diarrhoea who received:		Number of children age 0-59 months with diarrhoea in the last two weeks
			Oral rehydration salts (ORS)	Zinc	
National	15.3	20,060	20.9	5.9	3,356
	[14.4,16.2]		[19.1,22.8]	[4.8,7.1]	
Sex					
Male	15.7	10,062	20.7	5.8	1,723
	[14.7,16.8]		[18.3,23.2]	[4.5,7.5]	
Female	14.8	9,998	21.1	5.9	1,633
	[13.9,15.8]		[18.7,23.7]	[4.6,7.6]	
Age in months					
0-5	7.1	2,318	17.8	3.5	181
	[6.0,8.4]		[12.1,25.4]	[1.5,8.1]	
6-11	20.7	2,184	23.8	6.5	484
	[18.7,22.8]		[19.7,28.5]	[4.4,9.4]	
12-23	23.2	4,205	25.9	6.7	1,041
	[21.6,24.8]		[22.7,29.5]	[4.8,9.3]	
24-35	16.9	4,059	20.1	5.3	764
	[15.5,18.4]		[16.7,24.0]	[3.7,7.6]	
36-47	12.4	3,834	12.3	5.6	530
	[11.2,13.7]		[9.6,15.8]	[3.8,8.2]	
48-59	9.4	3,180	18.6	5.6	336
	[8.3,10.6]		[14.3,23.8]	[3.0,10.2]	
Zone					
North Central	14.7	3,654	25.6	6.7	534
	[12.8,16.8]		[21.0,30.7]	[4.6,9.8]	
North East	14.5	4,165	15.8	4.5	638
	[12.7,16.5]		[12.4,19.8]	[2.8,7.1]	
North West	24.3	5,673	22.4	4.9	1,480
	[22.2,26.5]		[19.4,25.6]	[3.5,6.9]	
South East	13.5	1,871	13.3	8.3	254
	[11.4,16.0]		[9.1,19.0]	[5.0,13.5]	
South South	13.8	2,191	18.9	8.0	274
	[11.5,16.5]		[14.3,24.5]	[5.0,12.5]	
South West	6.8	2,506	25.8	5.0	176
	[5.6,8.3]		[18.9,34.1]	[1.6,14.3]	
State					
Abia	13.5	303	(29.3)	(19.5)	41
	[9.6,18.8]		[15.0,49.2]	[7.5,41.8]	
Adamawa	13.8	487	7.5	3.0	67
	[9.5,19.5]		[3.2,16.4]	[0.7,12.0]	
Akwa-Ibom	14.3	329	(10.6)*	4.3	47
	[9.9,20.2]		[4.5,23.0]	[1.0,15.9]	
Anambra	13.4	291	5.1	2.6	39
	[9.1,19.3]		[1.2,19.2]	[0.4,16.3]	

Table 15 continued

Background Characteristics	Had diarrhoea in the last two weeks	Number of children age 0-59 months	Children with diarrhoea who received: Oral rehydration salts (ORS)	Children with diarrhoea who received: Zinc	Number of children age 0-59 months with diarrhoea in the last two weeks
Bauchi	18.7	902	17.8	5.9	169
	[14.8,23.4]		[11.5,26.3]	[2.6,12.9]	
Bayelsa	7.1	353	*	*	25
	[4.4,11.1]				
Benue	15.4	495	14.5	2.6	76
	[12.0,19.4]		[6.8,28.3]	[0.6,10.3]	
Borno	5	704	(17.1)	(5.9)	35
	[2.9,8.5]		[5.4,42.9]	[0.7,35.7]	
Cross River	15.2	415	33.9	19	63
	[10.3,21.9]		[24.5,44.7]	[10.9,31.2]	
Delta	13.9	323	(26.7)	(11.1)	45
	[8.7,21.7]		[17.0,39.3]	[4.3,25.8]	
Ebonyi	13.6	501	19.1	11.8	68
	[10.6,17.2]		[11.1,30.9]	[4.6,26.7]	
Edo	8.5	468	(15.0)	(0.0)	40
	[5.7,12.7]		[4.9,37.7]		
Ekiti	4.2	337	*	*	14
	[2.1,8.1]				
Enugu	14.1	426	16.7	8.3	60
	[9.8,19.8]		[7.9,31.9]	[3.2,20.1]	
FCT	14.9	509	30.3	9.2	76
	[9.8,22.1]		[20.2,42.6]	[3.8,20.8]	
Gombe	18.2	771	20	3.6	140
	[13.9,23.4]		[12.6,30.3]	[1.6,7.9]	
Imo	13.1	350	(4.3)	(4.3)	46
	[8.3,20.1]		[1.1,15.6]	[1.1,15.6]	
Jigawa	24.1	891	38.8	5.6	215
	[18.6,30.7]		[29.7,48.7]	[2.7,11.4]	
Kaduna	21	735	29.2	0.0	154
	[15.2,28.1]		[20.9,39.2]		
Kano	20.1	741	38.9	12.8	149
	[15.5,25.6]		[30.2,48.4]	[7.6,20.5]	
Katsina	22.2	834	15.1	3.8	185
	[18.8,26.0]		[10.0,22.3]	[1.5,9.1]	
Kebbi	36.7	848	9.7	4.5	311
	[32.1,41.6]		[6.0,15.3]	[1.8,11.1]	
Kogi	12.3	448	34.5	12.7	55
	[8.6,17.2]		[23.2,48.0]	[5.6,26.3]	
Kwara	8.8	479	(28.6)	(4.8)	42
	[6.1,12.4]		[15.6,46.5]	[0.6,28.8]	
Lagos	5.5	603	(42.4)	(12.1)	33
	[3.7,8.1]		[23.7,63.7]	[2.6,41.2]	
Nasarawa	14.5	511	31.1	9.5	74
	[11.1,18.7]		[21.3,43.0]	[5.1,16.9]	

Table 15 continued

Background Characteristics	Had diarrhoea in the last two weeks	Number of children age 0-59 months	Children with diarrhoea who received: Oral rehydration salts (ORS)	Zinc	Number of children age 0-59 months with diarrhoea in the last two weeks
Niger	19.1	721	23.2	2.2	138
	[13.3,26.7]		[13.2,37.5]	[0.5,8.5]	
Ogun	10.3	484	22.0	2.0	50
	[7.1,14.7]		[14.1,32.6]	[0.3,13.1]	
Ondo	8.1	382	(3.2)	(0.0)	31
	[5.2,12.5]		[0.5,19.5]		
Osun	5.1	277	*	*	14
	[2.5,9.8]				
Oyo	8	423	(20.6)	(5.9)	34
	[4.9,12.8]		[7.8,44.4]	[0.8,31.4]	
Plateau	14.9	491	29.2	12.3	73
	[10.6,20.4]		[19.0,41.9]	[5.3,26.0]	
Rivers	17.8	303	14.8	5.6	54
	[12.0,25.7]		[7.3,27.9]	[1.8,16.0]	
Sokoto	32.6	822	4.1	0.4	268
	[27.5,38.2]		[2.4,6.9]	[0.1,2.7]	
Taraba	18.2	523	23.2	7.4	95
	[13.6,23.8]		[15.2,33.6]	[4.1,13.1]	
Yobe	17	778	7.6	0.0	132
	[11.0,25.2]		[3.6,15.2]		
Zamfara	24.7	802	8.6	2.0	198
	[20.0,30.1]		[4.6,15.3]	[0.6,6.3]	

Note: results in brackets are 95% confidence interval

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.

Acute Respiratory Infection (ARI) and Treatment

Acute respiratory infections (ARI) are a heterogeneous and complex group of diseases that constitute the major causes of mortality and morbidity among under-five children in Nigeria, and globally. Most of these deaths are caused by pneumonia and bronchiolitis. According to a study[58] conducted in Nigeria, the overall incidence of ARI is 6-8 episodes during the first 5 years of life. Timely diagnosis and treatment with antibiotics can prevent a considerable proportion of mortality.

In the survey, the prevalence of ARI has been estimated by asking mothers (or caretakers) whether the child had had cough accompanied by short, rapid breathing in the two weeks prior to the survey.

[58] *Incidence of acute lower respiratory infections in a low socioeconomic community*, Nigerian Journal of Pediatrics 1991

The estimate is based on mothers' perception and not on a diagnosis by a health professional, therefore this finding needs to be interpreted with caution. Also the prevalence of ARI, as diarrhoea, varies seasonally[59]. The survey estimates are similar to the ones found in NNHS 2014, MICS 2011 and DHS 2013.

Overall, only 2 percent of children under 5 years were reported to have had symptoms of ARI during the two weeks preceding the survey. Nearly half of these children were given antibiotics, but the percentage of children receiving treatment varied greatly among surveyed states. Children were more likely to be treated in South East, South West and North East, where more than one in two children was treated, as compared to South South, where less than one in three received antibiotics. Antibiotics treatment was most prevalent among children age 36 to 47 months (56 percent) and least prevalent among younger children aged 0-11 (45 percent) months and 24-35 months (44 percent). Girls and boys with ARI symptoms had an equal likelihood of being treated with antibiotics (48 percent compared to 49 percent), thus implying that boys and girls are likely to receive the same medical attention have symptoms of acute respiratory illness – as when they are ill with diarrhoea.

[59]In a study conducted in Kwara State, a correlation between ARI episodes and seasonality was found. On average a child would have three episodes of mild, moderate and severe ARI per year. The peak of infection corresponded to the rainy season (July-November), and a smaller peak to the dry season (February-April). Acute respiratory infections in Nigerian children: prospective cohort study of incidence and case management, Journal of Tropical Pediatrics, 1994

Table 16: Percent of children under age 5 years with Acute Respiratory Infection (ARI) in the last two weeks who were given antibiotics by sex, age and zone.

Background Characteristics	Had symptoms of ARI	Number of children age 0-59 months	Children with symptoms of ARI in the last two weeks who were given antibiotics	Number of children age 0-59 months with symptoms of ARI
National	2.3	20,060	48.8	386
	[2.0,2.6]		[42.3,55.3]	
Sex				
Male	2.4	10,062	49.4	201
	[2.1,2.9]		[41.3,57.6]	
Female	2.1	9,998	48.1	185
	[1.7,2.5]		[39.4,56.9]	
Age in months				
0-5	2	2,318	45.7	38
	[1.4,2.9]		[30.4,61.9]	
6-11	2.8	2,184	45.0	49
	[2.0,3.7]		[31.1,59.7]	
12-23	3.4	4,205	52.3	121
	[2.8,4.2]		[42.2,62.3]	
24-35	2	4,059	44.0	71
	[1.6,2.6]		[31.1,57.7]	
36-47	1.6	3,834	55.8	57
	[1.2,2.2]		[41.0,69.7]	
48-59	1.7	3,180	49.7	47
	[1.2,2.3]		[34.1,65.3]	
Zone				
North Central	2,8	3,654	36,3	95
	[2.2,3.5]		[24.6,50.0]	
North East	1.1	4,165	55.7	38
	[0.7,1.5]		[36.3,73.4]	
North West	0.9	5,673	39.6	45
	[0.5,1.5]		[22.9,59.2]	
South East	7.1	1,871	61.7	118
	[5.4,9.2]		[50.5,71.7]	
South South	2.5	2,191	29.1	54
	[1.9,3.4]		[18.5,42.7]	
South West	1.5	2,506	60.0	36
	[1.0,2.1]		[41.5,76.0]	

Note: results in brackets are 95% confidence interval

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.

Malaria

Malaria is endemic in Nigeria, with year round transmission. Plasmodium falciparum is the predominant parasite species. Pregnant women and children are most at risk of malaria transmission and its effects. Malaria in pregnant women is a major risk factor of child death in the first month of life, it causes about 15 percent of maternal anaemia and about 35 percent of preventable low birthweight, which is a leading cause of neonatal mortality[60]. Malaria also contributes to anaemia in children. In Nigeria, the hardest-hit country in Africa, it accounts for 11 percent of maternal mortality and 12-30 percent of mortality in children below 5 years[61]. According to Nigeria Malaria Indicator Survey 2010, four in ten Nigerian children were infected with malaria, and almost half of children aged 6-59 months had moderate to severe anaemia[62].

Among preventive measures, many studies have reported the high reduction effect on mortality due to the use of mosquito nets and particularly insecticide-treated bed nets (ITNs). In order to achieve universal coverage in 2009, Nigeria started the National Malaria Control Strategic Plan (NMCSP)[63] and started afresh a coordinated strategy to deliver 2 nets to every household across the country through a series of stand-alone campaigns to achieve universal coverage. In 2010, the World Bank Booster supported seven states (Kano, Jigawa, Bauchi, Gombe, Anambra, Akwa Ibom, and Rivers) conducted net campaigns, and health workers distributed free nets to households. The aim was to promote net-use in households, especially among pregnant women and children below five years of age. Finally, in 2014 a new 2014-2020 national strategic plan for malaria control has been developed.

During the survey, respondents were asked whether they possess any type of mosquito net in their household and, if so, how many. The results indicate that 60 percent of households in the survey domain possess at least one mosquito net, a great improvement compared to NNHS 2014 and MICS 2011, where 53 and 45 percent were reported respectively. As shown in below figures, the possession of mosquito nets varies noticeably by domain, from North West, where four households out of five possess at least one mosquito net, to South South, where only two households out of five possess at least one mosquito net. The state with the highest coverage is Jigawa (92 percent), followed shortly by Katsina (90 percent). Conversely FCT has the lowest possession of mosquito nets (25 percent).

---

[60]Malaria continues to threaten pregnant women and children. Washington, DC: Population Reference Bureau; 2001.
[61]*Nigeria. Federal Ministry of Health, National Malaria Control Programme. Strategic Plan 2009-2013: "A Road Map for Malaria Control in Nigeria",* abridged version. Abuja: Yaliam Press; 2009
[62]Nigeria Malaria Indicator Survey, Nigeria 2010.
[63]NMCSP targets are basically three: at least 80 percent coverage for effective case management for Children under five years; at least 80 percent coverage of population at risk sleeping under an Insecticide treated net (ITN); and 90 percent coverage for Intermittent Preventive treatment for pregnant women.

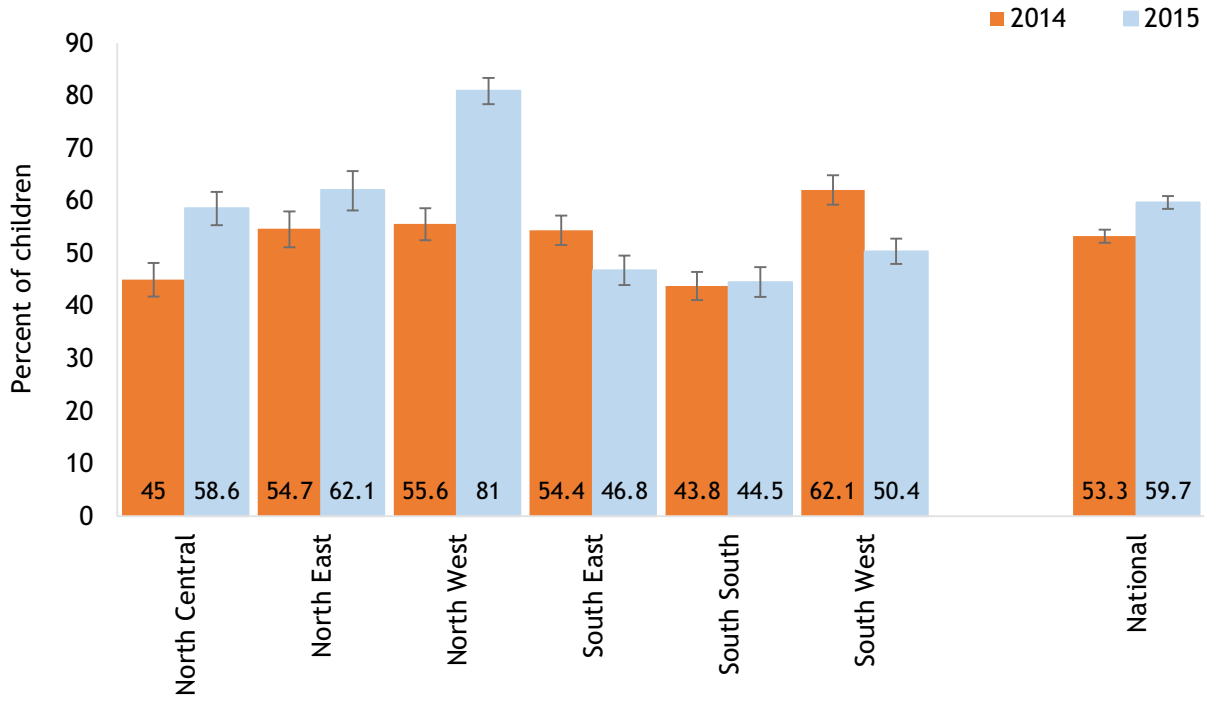


Figure 12: Percent of households with at least one mosquito net by zone (2014, 2015)

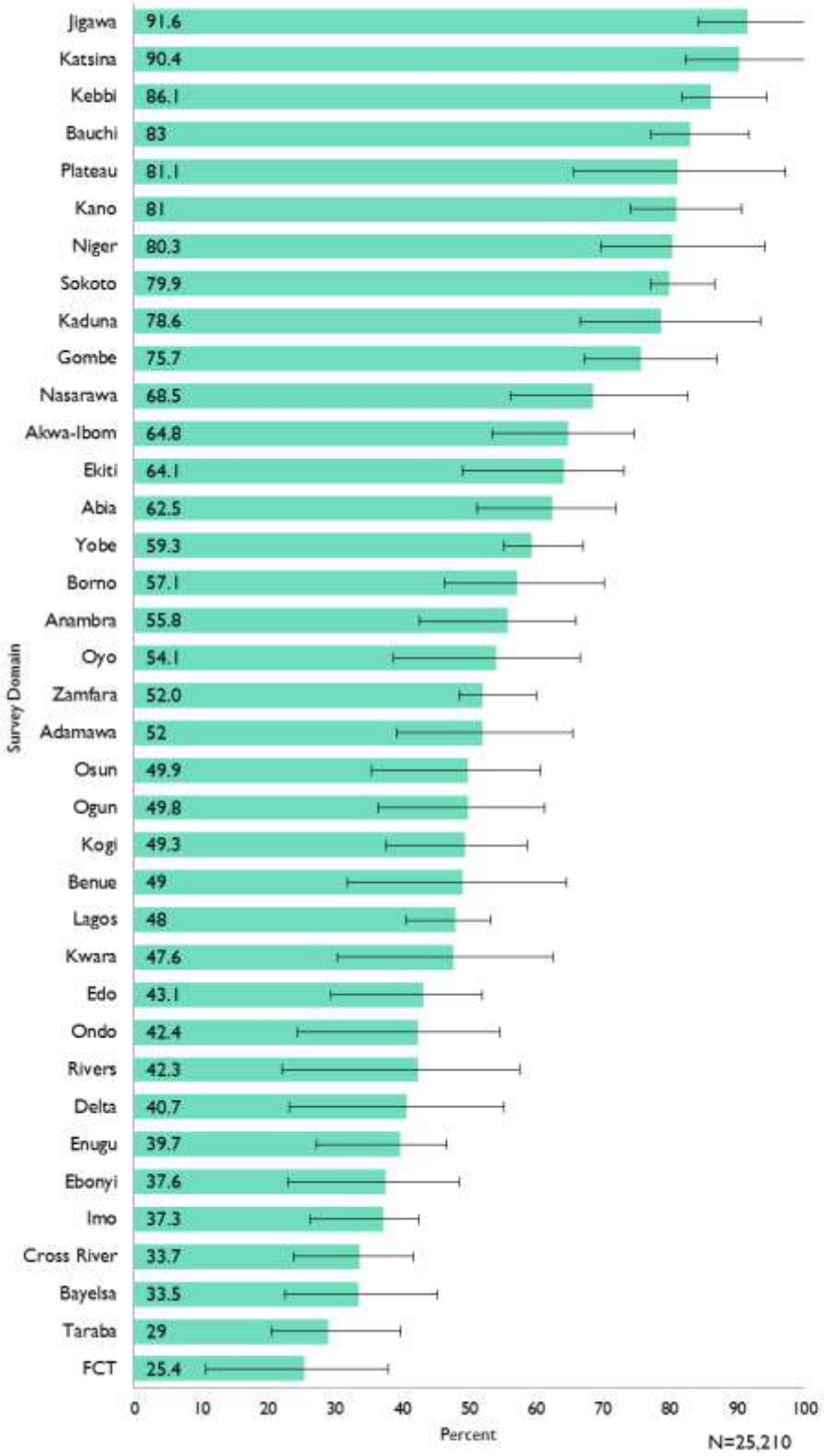


Figure 13: Percent of households with at least one mosquito net and 95% confidence interval by survey domain

The custom of protecting children, by having them sleep under a mosquito nets, is still low (nearly 60 percent of surveyed households possess a mosquito net, but only 40 percent of children slept under them), but in general it has undergone a great improvement. Figure 14 compares the extent of which children under age 5 slept under any net on the night before the interview in 2015 and in 2014. Last year only one in four children was sleeping under a mosquito net, while this year there were two in five children. At regional level, greatest achievements were reported in the Northern zones, where rates where all above 40 percent. The highest percentage was reported in North West (almost 57 percent), while children living in South East and South West zone were less likely to sleep under a net (22 and 27 percent respectively). This could be due to seasonal variation in use of mosquito net; this round survey was conducted due to rainy season compared to last year survey (NNHS 2014).

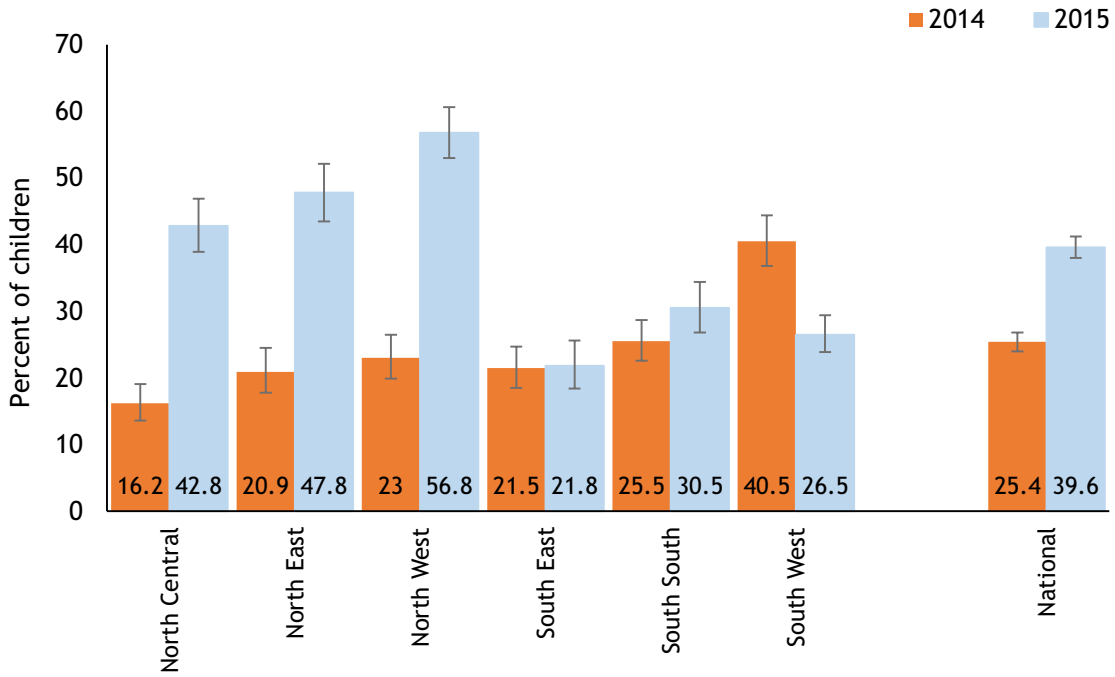


Figure 14: Percent of under 5 children that slept under a mosquito net the night before the survey by zone (2014, 2105)

At state level (see Table 17), the highest and lowest percentages were found in Jigawa and Osun (86 and 15.5 percent respectively). A very odd data is that of Katsina, where 90 percent of net was reported, but only 24 percent of children slept under them. Considering that the use of mosquito nets is seasonal and that the peak malaria transmission season in Northern states is usually between June and September, this finding raises the issue of ownership of nets, which does not always translate to usage. One reason for this discrepancy, as postulated by several studies, could be the

lack of educational campaigns accompanying nets distributions[64]. These strategies provide knowledge on the importance of nets and help to demonstrate the proper use of nets immediately following mass distribution. The involvement of communities in malaria control is very important since it helps dealing with several complex questions about the perceptions of the disease, its causes, prevention, and control[65]. Post distribution educational campaign should therefore be incorporated into future distribution campaigns to help increase net utilization.

[64]Ownership and utilisation of long lasting insecticide treated nets following free distribution campaign in South West Nigeria, Pan African Medical Journal, 2014.
[65]Sleeping under Insecticide-treated Nets to Prevent Malaria in Nigeria: What Do We Know? Health and Population Nutrition Journal, 2013.

Table 17: Percent of households with at least one mosquito net and children age 0-59 months who slept under a mosquito net the night before the survey, by background characteristics

Background Characteristics	Percentage of households with at least one mosquito net	Number of households	Percentage of children who slept under mosquito net last night	Number of children age 0-59 months
National	59.7	25,210	39.6	20,060
	[58.5,60.9]		[38.0,41.2]	
Zone				
North Central	58.6	4,811	42.8	3,654
	[55.4,61.7]		[38.9,46.9]	
North East	62.1	3,991	47.8	4,165
	[58.2,65.7]		[43.5,52.1]	
North West	81	4,815	56.8	5,673
	[78.4,83.4]		[53.0,60.6]	
South East	46.8	3,456	21.8	1,871
	[44.0,49.6]		[18.4,25.6]	
South South	44.5	4,035	30.5	2,191
	[41.7,47.4]		[26.8,34.4]	
South West	50.4	4,102	26.5	2,506
	[48.0,52.8]		[23.9,29.4]	
State				
Abia	62.5	680	25.1	303
	[56.4,68.3]		[17.6,34.3]	
Adamawa	52	627	45.4	487
	[44.3,59.6]		[37.7,53.3]	
Akwa-Ibom	64.8	697	49.2	329
	[58.6,70.7]		[38.8,59.8]	
Anambra	55.8	681	28.9	291
	[48.9,62.5]		[19.8,39.9]	
Bauchi	83	701	71.1	902
	[74.6,89.0]		[60.0,80.1]	
Bayelsa	33.5	662	28.9	353
	[28.2,39.3]		[22.2,36.7]	
Benue	49	696	34.1	495
	[41.2,56.9]		[25.0,44.6]	
Borno	57.1	653	32.5	704
	[46.7,66.9]		[23.8,42.7]	
Cross River	33.7	662	20.5	415
	[27.2,40.9]		[14.6,28.0]	
Delta	40.7	686	29.4	323
	[33.9,47.8]		[22.6,37.2]	
Ebonyi	37.6	697	27.1	501
	[30.4,45.4]		[18.8,37.5]	
Edo	43.1	689	20.1	468
	[37.6,48.8]		[14.8,26.7]	
Ekiti	64.1	700	20.2	337
	[58.1,69.8]		[14.1,28.0]	
Enugu	39,7	696	18,8	426
	[33.6,46.1]		[13.4,25.6]	

Table 17 continued

Background Characteristics	Percentage of households with at least one mosquito net	Number of households	Percentage of children who slept under mosquito net last night	Number of children age 0-59 months
FCT	25.4	700	16.5	509
	[19.3,32.7]		[11.8,22.6]	
Gombe	75.7	701	64.2	771
	[65.9,83.5]		[52.2,74.7]	
Imo	37.3	702	11.7	350
	[32.8,42.1]		[7.7,17.4]	
Jigawa	91.6	699	86.3	891
	[87.7,94.3]		[80.9,90.4]	
Kaduna	78.6	678	73.7	735
	[69.3,85.7]		[62.2,82.8]	
Kano	81	695	50.5	741
	[73.9,86.5]		[40.2,60.7]	
Katsina	90.4	695	23.9	834
	[85.0,93.9]		[18.4,30.3]	
Kebbi	86.1	699	83.3	848
	[79.2,91.0]		[75.3,89.0]	
Kogi	49.3	680	29.5	448
	[41.0,57.6]		[21.4,39.1]	
Kwara	47.6	699	36.5	479
	[38.0,57.5]		[25.8,48.7]	
Lagos	48	700	26.2	603
	[44.0,52.0]		[21.4,31.6]	
Nasarawa	68.5	701	53.8	511
	[58.6,76.9]		[43.4,63.9]	
Niger	80.3	699	56.2	721
	[71.8,86.7]		[45.6,66.2]	
Ogun	49.8	656	29.5	484
	[43.8,55.9]		[22.4,37.8]	
Ondo	42.4	694	16	382
	[36.4,48.6]		[11.4,21.9]	
Osun	49.9	677	15.5	277
	[43.0,56.9]		[10.3,22.7]	
Oyo	54.1	675	40.7	423
	[47.4,60.6]		[34.3,47.4]	
Plateau	81.1	636	69.9	491
	[72.3,87.6]		[58.8,79.0]	
Rivers	42.3	639	29	303
	[35.2,49.6]		[20.3,39.6]	
Sokoto	79.9	695	63.4	822
	[73.6,84.9]		[52.7,72.9]	
Taraba	29	639	22.9	523
	[20.4,39.3]		[14.7,33.9]	
Yobe	59.3	670	38.4	778
	[48.8,69.0]		[28.0,50.0]	
Zamfara	52	654	30.3	802
	[45.0,58.9]		[23.9,37.5]	

Note: results in brackets are 95% confidence interval

Antimalarial Treatment for Children

Fever is a major manifestation of many acute infections in children, of which malaria is among. Since malaria is endemic in Nigeria, the presence of fever should always be regarded with attention, especially after the end of the rainy season, when malaria is most prevalent[66]. In 2010 the World Health Organization started recommending universal use of diagnostic testing to confirm malaria infection and apply appropriate treatment based on the results. According to the new guidelines, treatment solely on the basis of clinical suspicion should only be considered when a parasitological diagnosis is not accessible. Children with severe malaria symptoms, such as fever or convulsions, should be taken to a health facility and subjected to diagnostic testing.

In the context of the survey, mothers (or caregivers) were asked whether their children under age 5 had fever in the two weeks before the survey. If fever was reported, mothers (or caregivers) were asked if a blood sample was taken, and if positive, whether the child had been given any antimalarial drugs, in particular Artemisinin-based Combination Therapy (ACT) (or other first line treatment according to the national policy).

Overall, 4,630 under five children (23 percent of all children) were reported to have had fever in the two weeks before the survey. Fever prevalence was highest in the South South and South East zones (34 and 32 percent respectively) – where malaria is known to be most predominant – and lowest in North Central and North East (18 percent). Fever prevalence also peaked in the 12-23 age group (28 percent), while it was less common in children below six months of age (9 percent).

Despite the consistent number of children affected by fever – nearly one in four – and despite WHO recommendations – only 9 percent of them were reported to have been tested from a finger or a heel with Rapid Diagnostic Testing (RDT). The majority of children tested were found in North Central zone (18 percent) while only 3 percent were tested in North West. At state level, more than half of children with fever were tested in Kwara, while in Anambra, Kebbi and Sokoto only a child out of a hundred had a RDT.

Prompt treatment of fever is another indicator used to measure the quality of case management. The results of the survey indicate that of all the children under age 5 who had a fever during the two weeks preceding the interview, 35 percent were given an anti-malarial treatment – but only 14 percent received artemisinin combination therapies (ACTs), which should be the first line treatment for malaria. On the other hand almost one child in five was given antibiotics.

[66]While fever can occur year round, malaria is more prevalent after the end of the rainy season. For this reason, temporal factors must be taken into account when interpreting fever as an indicator of malaria prevalence.

Antimalarial treatment was more prevalent in the South West zone – where 53 percent of children were treated for malaria, 22 percent of which with ACT – and less prevalent in the North West, where only 24 percent of children with fever received an antimalarial treatment. In addition, ACT treatment is practically not in use in three states: Borno, Kwara and Yobe. This finding is particularly worrying since malaria is prevalent in all the three states.

Generally, the use of antimalarial treatment (included ACT) tends to increase as the child gets older, from 18 percent for children with less than 6 months to over 40 percent for children above 4 years of age, while antibiotic treatment is quite stable, around 20 percent for all ages. No significant difference was noted between boys and girls receiving appropriate antimalarial drugs.

In conclusion, despite national malaria prevention programs having an impact and some progress being achieved, the proportion of children who received first line treatment is still severely below the national target – at least 80 percent by 2010, as specified in the National Malaria Strategic Plan.

Table 18: Children with fever in the last two weeks that had blood finger testing, and/or were given an anti-malarial drug, ACT or antibiotics by background characteristics

Background Characteristics	Had fever in the last two weeks		Children with a fever in the last two weeks who:			
	%	N	Had blood taken from a finger or heel for testing	Were given anti-malarial	Were given ACT	Were given antibiotics
National	23.4	4,630	8.9	35.4	14.4	18.1
	[22.3,24.5]		[7.9,10.1]	[33.3,37.5]	[13.0,16.0]	[16.5,19.7]
Sex						
Male	24.0	2,399	9.3	35.9	14.7	18.9
	[22.7,25.4]		[7.9,10.9]	[33.3,38.6]	[13.0,16.7]	[16.9,21.0]
Female	22.8	2,231	8.5	34.8	14	17.2
	[21.6,24.0]		[7.2,10.0]	[32.3,37.4]	[12.2,16.0]	[15.4,19.2]
Age in months						
0-5	9.1	206	2.4	17.8	3.8	18.5
	[7.8,10.6]		[0.8,6.9]	[12.2,25.1]	[1.9,7.6]	[12.8,26.1]
6-11	23.6	509	7.6	29.4	8.6	20.8
	[21.5,25.8]		[5.3,10.8]	[24.9,34.3]	[6.3,11.7]	[17.3,24.9]
12-23	28.3	1,185	10.6	33.8	13.2	19.9
	[26.6,30.1]		[8.7,12.9]	[30.6,37.0]	[11.0,15.7]	[17.3,22.6]
24-35	26.7	1,057	8.2	38.4	15.6	17.9
	[24.9,28.5]		[6.5,10.2]	[34.8,42.1]	[13.3,18.3]	[15.2,20.9]
36-47	23.9	910	8.2	36.5	16.9	14.9
	[22.2,25.6]		[6.3,10.6]	[32.7,40.4]	[14.2,20.0]	[12.3,18.0]
48-59	23.9	736	11.2	41.2	18.4	17.5
	[22.0,26.0]		[8.9,14.2]	[36.9,45.6]	[15.4,21.9]	[14.5,20.9]
Zone						
North Central	17.9	641	17.8	40.3	16.2	25
	[15.8,20.2]		[14.1,22.1]	[35.3,45.6]	[12.9,20.3]	[20.5,30.0]
North East	17.8	737	7	41.7	18.1	15.6
	[15.7,20.2]		[5.2,9.6]	[36.5,47.1]	[13.7,23.4]	[12.5,19.2]
North West	22.3	1,396	2.9	24.1	7.6	18.7
	[20.5,24.3]		[1.9,4.3]	[20.3,28.4]	[5.7,10.0]	[15.7,22.1]
South East	32	629	8.3	36.5	12.3	21.6
	[29.2,34.9]		[5.8,11.6]	[30.5,42.9]	[9.1,16.3]	[17.5,26.2]
South South	34.1	702	11.2	27.8	15.1	8.9
	[29.9,38.5]		[8.6,14.4]	[23.5,32.6]	[11.6,19.4]	[6.5,12.0]
South West	19.7	525	10.4	53.2	21.8	22.6
	[17.4,22.3]		[7.6,13.9]	[47.2,59.0]	[17.8,26.4]	[18.1,27.8]
State						
Abia	36.3	110	8.2	40.9	9.1	22.7
	[29.6,43.6]		[3.3,18.6]	[29.1,53.8]	[3.8,20.1]	[14.5,33.8]
Adamawa	24	117	7.7	47.9	29.1	22.2
	[17.2,32.5]		[3.8,14.8]	[35.7,60.2]	[19.3,41.2]	[14.5,32.5]
Akwa-Ibom	41.6	137	10.9	17.5	10.2	1.5
	[32.5,51.4]		[6.4,18.0]	[11.4,26.0]	[5.6,17.8]	[0.4,5.4]
Anambra	24.1	70	1.4	24.3	8.6	30
	[18.8,30.3]		[0.2,10.0]	[14.1,38.5]	[3.0,21.9]	[18.9,44.1]

Table 18 continued

Background Characteristics	Had fever in the last two week s		Children with a fever in the last two weeks who:			
	%	N	Had blood taken from a finger or heel for testing	Were given anti-malarial	Were given ACT	Were given antibiotics
Bauchi	16.6	150	3.3	44	26.7	16.7
	[13.3,20.7]		[1.4,7.6]	[33.7,54.8]	[16.0,41.0]	[10.1,26.2]
Bayelsa	21	74	5.4	27	4.1	9.5
	[14.6,29.2]		[1.9,14.3]	[13.7,46.4]	[1.4,11.4]	[4.6,18.4]
Benue	22.6	112	8	33	22.3	6.3
	[17.3,29.0]		[4.0,15.4]	[23.9,43.7]	[14.1,33.5]	[2.7,13.8]
Borno	12.4	87	4.6	52.9	0	9.2
	[8.4,17.8]		[1.5,13.2]	[38.7,66.6]		[4.5,17.8]
Cross River	39	162	19.8	29.6	24.1	11.1
	[31.1,47.6]		[13.2,28.6]	[20.3,41.1]	[14.9,36.4]	[6.1,19.4]
Delta	28.5	92	15.2	29.3	13	9.8
	[21.7,36.5]		[8.4,26.0]	[18.3,43.5]	[6.0,26.0]	[4.3,20.8]
Ebonyi	39.5	198	14.1	42.9	22.7	6.6
	[34.3,45.0]		[7.1,26.2]	[33.8,52.6]	[14.5,33.7]	[3.9,10.7]
Edo	25.2	118	5.9	63.6	33.9	23.7
	[20.6,30.4]		[3.0,11.5]	[53.8,72.3]	[24.3,45.0]	[15.4,34.7]
Ekiti	24	81	7.4	45.7	32.1	21
	[17.8,31.7]		[3.4,15.6]	[30.5,61.7]	[20.1,47.0]	[11.7,34.8]
Enugu	31.2	133	9.8	37.6	18.8	26.3
	[24.8,38.4]		[6.0,15.5]	[25.4,51.6]	[11.3,29.6]	[17.3,37.9]
FCT	19.4	99	15.2	36.4	22.2	34.3
	[13.7,26.8]		[9.6,23.1]	[22.7,52.7]	[13.4,34.6]	[22.4,48.7]
Gombe	16.5	127	7.9	29.1	22	17.3
	[13.5,20.0]		[4.0,14.9]	[17.7,44.0]	[12.2,36.6]	[10.9,26.4]
Imo	33.7	118	8.5	37.3	5.9	20.3
	[27.9,40.0]		[4.2,16.4]	[22.9,54.3]	[2.2,14.8]	[13.0,30.4]
Jigawa	19.3	172	3.5	51.2	24.4	19.8
	[14.8,24.8]		[1.7,7.1]	[40.9,61.3]	[15.2,36.7]	[13.7,27.7]
Kaduna	14	103	7.8	40.8	8.7	12.6
	[10.8,18.0]		[3.8,15.1]	[29.3,53.3]	[4.6,15.9]	[6.8,22.2]
Kano	19.2	142	3.5	27.5	5.6	21.8
	[14.6,24.7]		[1.2,9.6]	[16.4,42.2]	[1.9,15.9]	[14.0,32.5]
Katsina	20.4	170	2.4	18.8	8.2	12.9
	[16.8,24.5]		[0.9,5.7]	[11.3,29.6]	[4.5,14.6]	[6.5,24.2]
Kebbi	37.6	319	1.3	15.4	3.8	24.5
	[31.9,43.7]		[0.4,4.2]	[9.3,24.3]	[1.8,7.7]	[18.6,31.5]
Kogi	13.6	61	26.2	49.2	14.8	36.1
	[10.4,17.6]		[18.8,35.3]	[39.5,59.0]	[7.5,27.0]	[26.5,46.9]
Kwara	14.8	71	52.1	53.5	0.0	28.2
	[9.6,22.3]		[26.9,76.2]	[39.2,67.3]		[20.3,37.6]
Lagos	10.4	63	14.3	54	12.7	22.2
	[7.7,14.0]		[8.3,23.5]	[40.0,67.4]	[7.7,20.2]	[13.8,33.8]
Nasarawa	14.9	76	17.1	42.1	15.8	18.4
	[11.9,18.4]		[9.4,29.1]	[31.6,53.3]	[9.6,24.8]	[12.1,27.0]

Table 18 continued

Background Characteristics	Had fever in the last two week s		Children with a fever in the last two weeks who:			
	%	N	Had blood taken from a finger or heel for testing	Were given anti-malarial	Were given ACT	Were given antibiotics
Niger	18	130	16.2	32.3	18.5	39.2
	[12.4,25.5]		[10.4,24.2]	[23.6,42.4]	[12.1,27.2]	[27.6,52.2]
Ogun	18.8	91	15.4	62.6	16.5	46.2
	[13.9,25.0]		[8.1,27.4]	[52.1,72.1]	[9.0,28.4]	[33.6,59.2]
Ondo	32.2	123	4.9	56.9	35.8	13.8
	[25.9,39.2]		[2.1,11.1]	[48.0,65.4]	[26.8,45.9]	[8.6,21.5]
Osun	32.9	91	2.2	35.2	8.8	4.4
	[23.8,43.4]		[0.5,8.8]	[24.6,47.4]	[4.5,16.5]	[1.7,11.0]
Oyo	18	76	19.7	65.8	27.6	36.8
	[12.5,25.1]		[11.4,32.0]	[46.6,80.9]	[15.4,44.5]	[21.6,55.3]
Plateau	18.7	92	10.9	50	9.8	22.8
	[13.8,24.9]		[5.2,21.5]	[32.4,67.6]	[3.9,22.4]	[11.7,39.9]
Rivers	39.3	119	7.6	21.0	10.1	7.6
	[27.3,52.7]		[3.7,15.0]	[12.7,32.6]	[4.4,21.3]	[3.4,16.0]
Sokoto	30.4	250	1.6	12.8	4.8	19.6
	[26.3,34.8]		[0.6,4.2]	[7.3,21.6]	[2.5,9.1]	[14.9,25.4]
Taraba	27.3	143	14.7	35.0	16.8	18.2
	[19.9,36.3]		[9.3,22.5]	[25.1,46.3]	[8.1,31.5]	[11.5,27.6]
Yobe	14.5	113	3.5	32.7	0.0	1.8
	[9.7,21.2]		[1.5,8.0]	[20.7,47.6]		[0.5,6.4]
Zamfara	29.9	240	1.3	10.8	3.3	15.8
	[25.9,34.3]		[0.3,4.8]	[6.5,17.5]	[1.6,6.9]	[9.9,24.3]

Note: results in brackets are 95% confidence interval

Intermittent Preventive Treatment for Malaria in pregnant women

Current estimates of malaria parasitaemia in Nigerian pregnant women vary greatly among geographic regions. Hospital-based prevalence percentages range from 5 percent in the north-western region, 17 percent in the south-western region, to 95 percent in the south-eastern region where Nigeria borders the Gulf of Guinea[67].

Intermittent preventive treatment with an antimalarial drug during pregnancy such as sulphadoxine-pyrimethamine (SP)/Fansidar is a cost-effective means of preventing malaria in pregnancy. Several studies have demonstrated its efficacy in causing a decline in placental infection, anaemia, and low birth weight babies[68]. In 2001, the Federal Ministry of Health in Nigeria

[67]Population based prevalence of malaria among pregnant women in Enugu State, Nigeria: the Healthy Beginning Initiative. Malaria Journal 2015.
[68]World Health Organisation. Roll Back Malaria Factsheet No.94. Geneva, 2001.

in its National Strategic Plan for the control of malaria recommended early case management against the adverse consequences of malaria in pregnancy: two doses of SP during the second trimester and early in the third trimester of pregnancy. A third dose was recommended for pregnant women who were HIV positive[69]. In accordance with current national guidelines, SP is given free of charge to pregnant women attending antenatal care clinics services in public health facilities and nongovernmental organizations. However, a decade after the policy recommendation, studies in many parts of Nigeria still indicate low coverage of intermittent preventive treatment of malaria in pregnancy (IPTp) use during pregnancy[70]. The 2010 Nigeria Malaria Indicator Survey reported that only 15 per cent of women who had given birth in the two years preceding the survey had received even one dose of SP during their ANC visits, less than a third of the number who attended ANC with a skilled provider.

Intermittent preventive treatment for malaria in pregnant women who gave birth in the two years preceding the survey is presented in Table 19. Overall, only 6 percent of women aged 15-49 years who had a live birth during the two years preceding the survey took SP/Fansidar three or more times during ANC. The coverage of this intervention was highest in the North East (9 percent) and lowest in the South West (2 percent). At state level, the highest percentage was reported in Jigawa, where 18 percent of pregnant women received SP/Fansidar three or more times during ANC. Conversely, the lowest percentage was reported in Ogun, where only one pregnant woman in twenty received recommended preventive treatment[71].

[69]Strategic Plan for Rolling Back Malaria in Nigeria 2001-2005. Abuja, Nigeria: Federal Ministry of Health; 2001. Federal Ministry of Health

[70]Knowledge and utilization of intermittent preventive treatment for malaria among pregnant women attending antenatal clinics in primary health care centers in rural southwest, Nigeria: a cross-sectional study. BMC Pregnancy Childbirth, 2009.

[71]Reasons for such a low coverage could be related to systems-based challenges (stockouts; lack of provider knowledge of IPTp protocols) coupled with individual women's beliefs and lack of understanding of the IPT contribute. Many pregnant women are still reluctant to seek care for an illness they do not have. In addition, those with malaria often prefer to self-medicate through drug shops or herbs, though those who seek clinic-based treatment trust their providers and willingly accept medicine prescribed. Perceptions of intermittent preventive treatment of malaria in pregnancy (IPTp) and barriers to adherence in Nasarawa and Cross River States in Nigeria, Malaria Journal 2013.

Table 19: Intermittent preventive treatment for malaria in pregnant women (15-49) whoreceived 3 or more doses of SP/Fansidar at least once during an ANC visit

Background Characteristics	Percentage of women with live birth in the last two years who took medicines during an ANC visit to prevent malaria				Percentage of women with live birth in the last two years who received 3 or more doses of SP/Fansidar during ANC	Number of women age 15-49 years with live birth in the last two years
	SP/Fansidar	Chloroquine	Other medicine	At least one medicine		
National	32.9	0.6	12.8	51.6	6	8,639
	[31.1,34.8]	[0.4,0.9]	[11.8,13.9]	[49.6,53.6]	[5.4,6.8]	
Age Group						
15-19	28.7	0.4	7.8	41.1	3.5	508
	[24.5,33.3]	[0.1,2.9]	[5.6,10.9]	[36.3,46.1]	[2.2,5.6]	
20-49	33.1	0.6	13.1	52.3	6.2	8,131
	[31.3,35.1]	[0.5,0.9]	[12.1,14.2]	[50.2,54.3]	[5.5,6.9]	
Zone						
North Central	31.2	1.2	10.1	43.3	4.1	1,468
	[27.1,35.6]	[0.7,1.9]	[7.9,13.0]	[39.0,47.6]	[3.2,5.3]	
North East	49.4	0	0.8	50.2	8.7	1,690
	[44.3,54.4]	[0.0,0.3]	[0.4,1.3]	[45.1,55.3]	[7.0,10.9]	
North West	32.7	0.1	1.7	35.9	7.6	2,696
	[28.9,36.7]	[0.0,1.0]	[1.1,2.7]	[31.9,40.0]	[6.2,9.3]	
South East	30.7	2.2	29.1	69.9	8.1	714
	[26.6,35.2]	[1.2,3.9]	[24.7,34.0]	[65.4,74.0]	[6.1,10.6]	
South South	32.5	0.9	27.8	64.8	5.1	996
	[28.3,37.0]	[0.5,1.9]	[24.1,31.7]	[60.5,68.9]	[3.9,6.7]	
South West	21.5	0.7	28.6	71.7	1.9	1,075
	[18.5,24.8]	[0.3,1.6]	[25.4,32.1]	[67.8,75.2]	[1.2,3.1]	
State						
Abia	20.5	3.8	43.9	83.3	8.3	132
	[14.5,28.1]	[1.7,8.1]	[34.8,53.6]	[76.7,88.4]	[3.9,17.0]	
Adamawa	46.2	0	5.6	52.4	3.5	143
	[35.4,57.2]		[2.8,10.7]	[40.4,64.3]	[1.6,7.5]	
Akwa-Ibom	34.2	0.6	22.4	59	4.3	161
	[24.3,45.6]	[0.1,4.4]	[14.6,32.7]	[49.4,68.0]	[2.2,8.4]	
Anambra	18.3	1.8	41.3	68.8	8.3	109
	[11.2,28.6]	[0.5,7.1]	[29.4,54.3]	[57.9,78.0]	[4.2,15.6]	
Bauchi	65	0	0	65	13.3	420
	[52.5,75.7]			[52.5,75.7]	[9.7,18.1]	
Bayelsa	24.8	0.6	21.8	47.9	6.1	165
	[16.2,36.1]	[0.1,4.2]	[14.8,31.0]	[37.4,58.5]	[2.9,12.4]	
Benue	24.6	1.4	5.8	32.4	2.4	207
	[16.7,34.8]	[0.5,4.3]	[3.2,10.3]	[23.8,42.4]	[1.0,5.5]	
Borno	40.7	0	0	40.7	9.8	307
	[31.7,50.4]			[31.7,50.4]	[5.8,15.9]	
Cross River	50.5	0	17.9	72.4	11.2	196
	[41.8,59.2]		[12.4,25.0]	[64.7,79.1]	[8.0,15.5]	

Table 19 continued

Background Characteristics	Percentage of women with live birth in the last two years who took medicines during an ANC visit to prevent malaria				Percentage of women with live birth in the last two years who received 3 or more doses of SP/Fansidar during ANC	Number of women age 15-49 years with live birth in the last two years
	SP/Fansidar	Chloroquine	Other medicine	At least one medicine		
Delta	27.3	0.7	34	62.7	4.7	150
	[20.7,35.1]	[0.1,4.6]	[25.2,44.0]	[51.1,72.9]	[2.1,9.9]	
Ebonyi	55.2	1.1	3.8	62.3	8.7	183
	[42.3,67.4]	[0.3,4.3]	[1.2,11.3]	[50.2,73.1]	[5.1,14.5]	
Edo	24.4	1.2	25.6	64	4.1	172
	[16.8,34.1]	[0.3,4.4]	[17.9,35.1]	[54.6,72.4]	[1.4,11.2]	
Ekiti	28.9	0	18.3	56.3	1.4	142
	[22.2,36.6]		[11.7,27.5]	[44.5,67.5]	[0.4,5.3]	
Enugu	41.7	1.9	6.4	52.6	10.9	156
	[31.3,52.9]	[0.5,7.6]	[3.0,13.3]	[42.8,62.1]	[6.8,17.0]	
FCT	34.8	0.5	10.1	50.7	6.8	207
	[27.0,43.5]	[0.1,3.2]	[5.3,18.6]	[41.6,59.8]	[3.6,12.3]	
Gombe	56.1	0	0	56.1	5.6	337
	[45.2,66.4]			[45.2,66.4]	[3.2,9.6]	
Imo	25.4	2.2	41	79.1	5.2	134
	[17.9,34.7]	[0.5,8.9]	[30.6,52.3]	[69.9,86.1]	[2.5,10.8]	
Jigawa	60.1	0	0	60.6	17.9	436
	[50.6,68.9]			[51.0,69.4]	[12.6,24.7]	
Kaduna	51.5	0	0	51.5	10.8	334
	[39.5,63.3]			[39.5,63.3]	[6.9,16.4]	
Kano	37.2	0.6	2.2	41.2	7.4	325
	[27.2,48.5]	[0.1,4.2]	[0.7,6.3]	[30.8,52.5]	[4.6,11.7]	
Katsina	12	0	2.7	18.1	2.7	375
	[6.7,20.6]		[1.2,6.0]	[11.0,28.4]	[1.1,6.5]	
Kebbi	18.9	0	4.1	23.7	4.3	417
	[12.0,28.6]		[1.8,8.9]	[15.5,34.5]	[2.1,8.7]	
Kogi	29.2	0.5	26.3	56	5.7	209
	[18.6,42.6]	[0.1,3.4]	[16.8,38.7]	[44.6,66.8]	[3.3,9.7]	
Kwara	43.3	0.9	14.3	59	6.9	217
	[29.6,58.2]	[0.2,3.6]	[6.9,27.3]	[45.4,71.4]	[3.9,12.0]	
Lagos	21.2	0.8	30.8	77.7	1.5	260
	[15.6,28.0]	[0.2,3.0]	[24.9,37.3]	[71.2,83.0]	[0.5,4.9]	
Nasarawa	54.1	1.9	1.3	57.2	4.4	159
	[41.5,66.2]	[0.5,7.3]	[0.3,4.7]	[44.8,68.8]	[2.0,9.5]	
Niger	20.4	0.6	5.4	26.4	0.9	333
	[13.1,30.4]	[0.2,2.3]	[3.3,8.8]	[18.4,36.4]	[0.3,2.7]	
Ogun	15.3	0	43.5	80.6	0.5	216
	[10.8,21.2]		[35.0,52.4]	[72.2,86.8]	[0.1,3.1]	
Ondo	18.4	0	19	48.7	1.3	158
	[13.7,24.1]		[13.3,26.3]	[37.0,60.7]	[0.3,5.0]	
Osun	32.5	0.8	19.8	54.8	5.6	126
	[24.0,42.4]	[0.1,5.8]	[12.7,29.7]	[42.6,66.4]	[2.5,11.9]	

Table 19 continued

Background Characteristics	Percentage of women with live birth in the last two years who took medicines during an ANC visit to prevent malaria				Percentage of women with live birth in the last two years who received 3 or more doses of SP/Fansidar during ANC	Number of women age 15-49 years with live birth in the last two years
	SP/Fansidar	Chloroquine	Other medicine	At least one medicine		
Oyo	20.2	1.7	26.6	80.3	2.3	173
	[13.1,29.9]	[0.6,5.3]	[19.7,34.8]	[69.3,88.1]	[1.0,5.4]	
Plateau	43.4	3.7	5.9	53.7	7.4	136
	[33.6,53.7]	[1.4,9.4]	[2.3,14.3]	[43.0,64.0]	[4.5,11.8]	
Rivers	31.6	2	36.2	72.4	2.6	152
	[20.8,44.8]	[0.6,5.9]	[27.5,45.9]	[61.5,81.1]	[1.1,6.3]	
Sokoto	17	0	2.7	20.7	1.9	411
	[10.3,26.8]		[1.1,6.3]	[12.8,31.6]	[0.9,4.2]	
Taraba	48	0.7	4	52.7	6	150
	[40.3,55.8]	[0.1,4.6]	[2.0,7.7]	[43.6,61.5]	[2.9,12.1]	
Yobe	21.9	0	0	21.9	3.9	333
	[14.9,31.0]			[14.9,31.0]	[2.0,7.3]	
Zamfara	17.3	0	1	20.4	5.8	398
	[9.7,29.1]		[0.2,4.7]	[12.2,31.9]	[2.4,13.1]	

Note: results in brackets are 95% confidence interval

Women Nutrition

Adequate nutrition, a fundamental cornerstone for any individual, is especially critical in the case of women because malnutrition has important implications for their health as well as their children's health. Women malnutrition results in increased susceptibility to infections, slow recovery from illness, and a heightened risk of adverse pregnancy outcomes – pre-term, birth and intra-uterine growth retardation, obstructed labour, low birth weight, low quality breast milk, postpartum haemorrhage, and increased morbidity for both herself and her baby. On the other hand, children of malnourished women are more likely to face cognitive impairments, short stature, lower resistance to infections, and a higher risk of disease and death[72].

In this survey, the nutritional status of women was assessed using MUAC[73]. Commonly used as an indicator of child malnutrition and wasting, the MUAC can be used as an indicator of maternal

[72]Ransom Elder, Nutrition of Women and Adolescent Girls: Why It Matters, Population Reference Bureau, 2003

[73]Currently there is neither consensus on which anthropometric measurement should be used to identify acute malnutrition during pregnancy nor which cut-off value should be used. Some programs use the normal body mass index (BMI) cut-off value of 18.5 kg/m2 for adult women. Mid-upper arm circumference (MUAC) is often used too, but no universal cut-off points have been identified. The guidelines state that cut-off points for risk vary by country and range from 18 cm to 23 cm. *Which Anthropometric Indicators Identify a Pregnant Woman as Acutely Malnourished and Predict Adverse Birth Outcomes in the Humanitarian Context?* PLoS Currents, June 2013

nutritional status because of its high correlation with maternal weight and body mass index. Increases of MUAC during pregnancy are generally less than 0.5 cm, therefore it can be used to define under nutrition also in pregnant women. In this survey, women with MUAC < 221 mm were classified as acutely malnourished, while women whose MUAC was between 214 and 221 mm were classified as moderately malnourished and women whose MUAC fell below 214 mm were classified as severely malnourished.

Overall, 23,688 women in reproductive age group (15-49 years) were surveyed in the 37 domains, 14 percent of which were found pregnant. This percentage is most likely to be underestimated as often women do not know or do not want to report that their status until the pregnancy is visibly obvious. In the below figure, it can be seen that the majority of pregnant women was found in the North, and particularly in the North East and North West, where almost one in four women was pregnant. In addition, 9 percent of pregnant women were found to be teenagers (15-19 years). It must be noted that child bearing early in life carries significant risks for young people, particularly in rural areas where women do not complete their growth until around the age of 20 years.

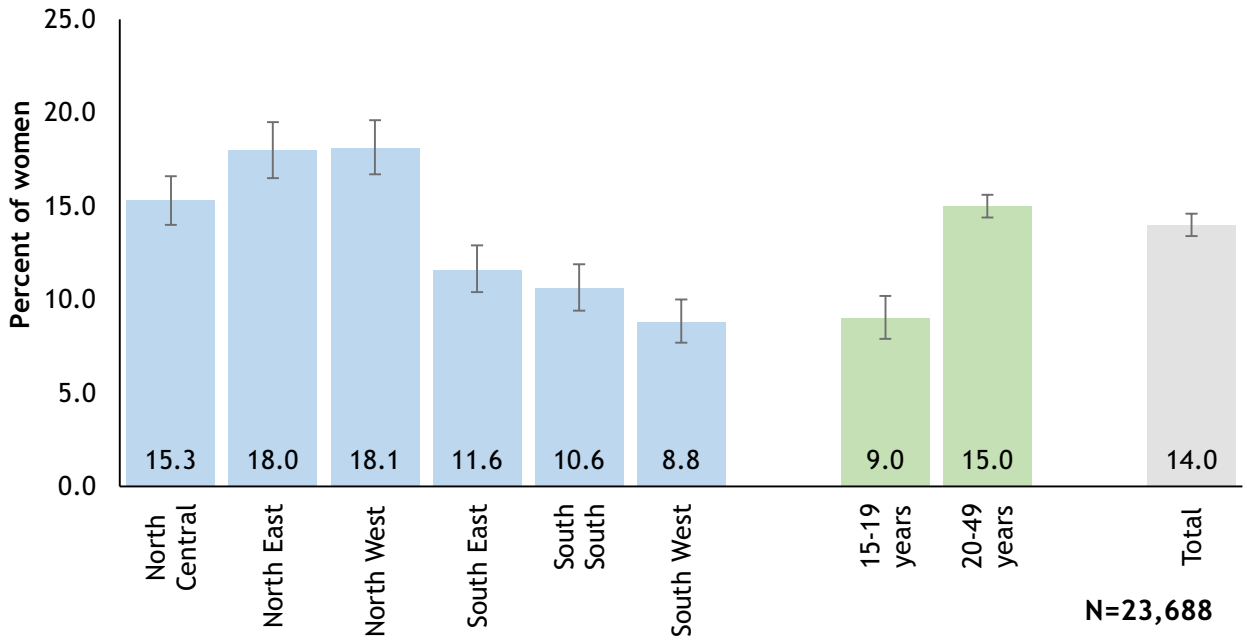


Figure 15: Percent of pregnant women and 95% confidence interval by geopolitical zone and age in years

Although the geographical distribution of women in acute malnutrition is consistent with previous nutrition surveys conducted since 2010, the situation appears to be deteriorating. Overall, 7 percent of Nigerian women of reproductive age were reported as malnourished (MUAC < 221mm) and 4 percent as severely malnourished (MUAC <214 mm).

The situation was found critical in the North West and the North East, where acute malnutrition in women prevalence were at 14 and 12 percent respectively and severe acute malnutrition prevalence at 7 percent in both regions, while in the other four zones acute malnutrition prevalence were not critical (all within the limit of 5 percent The South East states reported the lowest prevalence in terms of acute malnutrition and severe acute malnutrition in women at 3 and 1 percent respectively.

At more disaggregated level, ten states – compared to five in last year NNHS – had acute malnutrition indicators over 10 percent: Bauchi, Borno, Gombe, Jigawa, Kano, Katsina, Kebbi, Sokoto, Yobe and Zamfara. In addition, most figures have risen by more than 3 percentage points compared to previous findings. The increase is particularly critical in Katsina (plus 12 percent), Zamfara (plus 8 percent) Sokoto (plus 7 percent), Kebbi (plus 6 percent) and Yobe (plus 5 percent).

Further investigation is therefore needed to understand the reasons for such an increase of malnutrition indicators among women of reproductive age in these domains, also considering that the situation of women has acutely deteriorated as compared to that of children.

In addition, the prevalence of acute malnutrition was reported more than four times higher for teenagers (15 to 19 years) than adult women (20 to 49 years), 20 percent compared to 5 percent. This finding highlights the urgency of developing effective interventions to improve the nutrition of adolescent girls for birth outcomes and subsequent nutrition throughout the lifecycle. Improving nutrition in adolescent girls is critical to improving the nutrition status of the entire population.

Table 20: Acute Malnutrition among women of reproductive age (15-49 years) by background characteristics

Background Characteristics	MUAC in millimeter		Number of women age 15-49 years
	≤ 221 mm	< 214 mm	
National	7.4	3.7	23,688
	[7.0,7.9]	[3.4,4.1]	
Age Group			
15-19	20.3	11.2	4,054
	[18.9,21.8]	[10.1,12.4]	
20-49	4.9	2.2	19,634
	[4.5,5.2]	[2.0,2.5]	
Zone			
North Central	4.9	2.5	4,738
	[4.1,5.8]	[2.0,3.2]	
North East	12.4	6.9	4,203
	[11.2,13.9]	[6.0,7.9]	
North West	13.5	7.3	5,345
	[12.4,14.7]	[6.4,8.3]	
South East	2.6	1.1	2,967
	[2.1,3.4]	[0.8,1.5]	
South South	4.1	1.6	3,109
	[3.3,5.1]	[1.1,2.2]	
South West	3.5	1.1	3,326
	[2.8,4.3]	[0.7,1.6]	
State			
Abia	2.8	1.1	541
	[1.5,5.1]	[0.5,2.3]	
Adamawa	5.8	3.5	633
	[4.0,8.5]	[2.1,5.7]	
Akwa-Ibom	5.3	1.9	513
	[3.5,7.8]	[1.0,3.6]	
Anambra	1.8	0.5	547
	[1.0,3.2]	[0.2,1.6]	
Bauchi	14	8.3	762
	[11.2,17.5]	[6.2,10.9]	
Bayelsa	3.6	2.6	497
	[2.1,6.0]	[1.5,4.6]	
Benue	2	1.2	664
	[1.1,3.3]	[0.6,2.4]	
Borno	15.2	7.9	725
	[12.5,18.3]	[6.1,10.1]	
Cross River	4.7	1.1	558
	[3.3,6.5]	[0.5,2.5]	
Delta	2.9	0.8	481
	[1.7,5.0]	[0.2,3.8]	
Ebonyi	4.2	2.4	673
	[2.6,6.5]	[1.3,4.4]	

Table 20 continued

Background Characteristics	MUAC in millimeter		Number of women age 15-49 years
	≤ 221 mm	< 214 mm	
Edo	4.7	2.5	571
	[3.1,7.1]	[1.4,4.3]	
Ekiti	2.7	2	512
	[1.5,5.0]	[0.9,4.0]	
Enugu	1.9	0.6	672
	[1.1,3.3]	[0.2,1.5]	
FCT	3.5	1.7	691
	[2.3,5.3]	[1.0,2.9]	
Gombe	10.7	6	702
	[7.6,14.8]	[4.1,8.7]	
Imo	3.2	1.3	534
	[2.0,5.1]	[0.7,2.5]	
Jigawa	13.3	7	738
	[10.8,16.2]	[5.2,9.6]	
Kaduna	8.3	4.3	738
	[6.1,11.1]	[2.9,6.5]	
Kano	13.2	7.8	760
	[10.7,16.1]	[5.6,10.7]	
Katsina	16.8	7.5	761
	[14.1,19.9]	[5.9,9.4]	
Kebbi	13.7	7.6	842
	[10.9,17.0]	[5.6,10.2]	
Kogi	5.8	3	637
	[4.0,8.4]	[1.7,5.3]	
Kwara	6.6	3.1	641
	[4.5,9.5]	[1.8,5.3]	
Lagos	3	0.9	703
	[1.8,5.1]	[0.3,2.5]	
Nasarawa	3.9	1.7	714
	[2.4,6.3]	[0.8,3.3]	
Niger	6.9	3.5	763
	[4.8,10.0]	[2.5,5.0]	
Ogun	4	1.2	578
	[2.4,6.4]	[0.5,2.9]	
Ondo	2.4	0.9	543
	[1.4,4.0]	[0.3,2.5]	
Osun	2.8	1.1	458
	[1.7,4.8]	[0.5,2.5]	
Oyo	5.3	0.9	532
	[3.8,7.3]	[0.4,2.5]	
Plateau	5.6	3.2	628
	[3.3,9.3]	[1.4,7.2]	
Rivers	3.7	1.2	489
	[2.0,6.8]	[0.4,3.6]	

Table 20 continued			
Background Characteristics	MUAC in millimeter		Number of women age 15-49 years
	≤ 221 mm	< 214 mm	
Sokoto	15.5	8.4	750
	[12.8,18.6]	[6.3,11.1]	
Taraba	7.3	4.4	660
	[5.1,10.3]	[2.8,7.0]	
Yobe	19.6	10.4	721
	[15.1,24.9]	[7.5,14.3]	
Zamfara	16.1	9.5	756
	[12.7,20.3]	[7.2,12.5]	

Note: results in brackets are 95% confidence interval

Reproductive Health

Skilled Birth Attendant

Nigeria has one of the highest levels of maternal mortality in the world, accounting for 10 percent of maternal deaths worldwide[74]. Three quarters of all maternal deaths occur during delivery and the immediate post-partum period[75]. The single most critical intervention for safe motherhood is to ensure a competent birth attendant with midwifery skills – namely a doctor, nurse or midwife – is present at every birth, and transport is available to a referral facility for obstetric care in case of emergency. The skills and performance of the person providing assistance determine whether complications are properly managed and hygienic practices observed.

A World Fit for Children goal is to ensure that women have ready and affordable access to skilled attendance at delivery. Skilled attendance at delivery is also one of the indicators used to track progress toward the Millennium Development Goal (MDG5) target of reducing the maternal mortality ratio (MMR) by three quarters between 1990 and 2015, and achieving universal access to reproductive health by 2015. According to WHO, UNICEF, UNFPA and the World Bank estimates, Nigeria has made some progress toward MDG5, albeit too slow: in 2010, maternal mortality rate in Nigeria was estimated to be approximately 576 deaths/100,000 live births[76].

According to the survey the coverage of use of skilled birth attendants in Nigeria is extremely variable and overall only 47 percent of pregnant women received skilled care during childbirth.

[74]Progress for Children: a Report Card on Maternal Mortality, UNICEF 2008
[75]MICS Nigeria, 2011.
[76]National Population Commission (NPC) [Nigeria]. Nigeria Demographic and Health Survey 2013. Calverton, Maryland, USA: National Population Commission and ICF Macro.

Figure 16 shows the proportion of live births in the 2 years prior to the survey assisted by a skilled provider by region. The percentage is highest in the South East states (91 percent), where nine deliveries in ten were assisted by a skilled birth attendants, and lowest in the North West states (20 percent), where only one in five deliveries is assisted. Almost half of births occurring from older women were delivered by skilled personnel, while only 36 percent of teenagers received birth assistance.

Skilled birth attendance is disaggregated by state in Figure 17. More than 90 percent of all women who had live birth in the two years preceding the survey in Anambra, Imo, Enugu and Lagos received skilled care during childbirth. On the other hand, the situation is particularly serious in Jigawa, Yobe, Katsina, Zamfara, Kebbi and Sokoto, where more than 80 percent of all deliveries were not assisted by a skilled birth attendant. Reasons for such a low percentage may be explained by different factors[77], but in some Northern states traditional birth attendants and relatives still account for a significant portion of deliveries. According to DHS 2013, traditional birth attendants assist 22 percent of all deliveries, while 23 percent of births are assisted by a relative. According to MICS 2011, 15 percent of all birth are still delivered by traditional birth attendants.

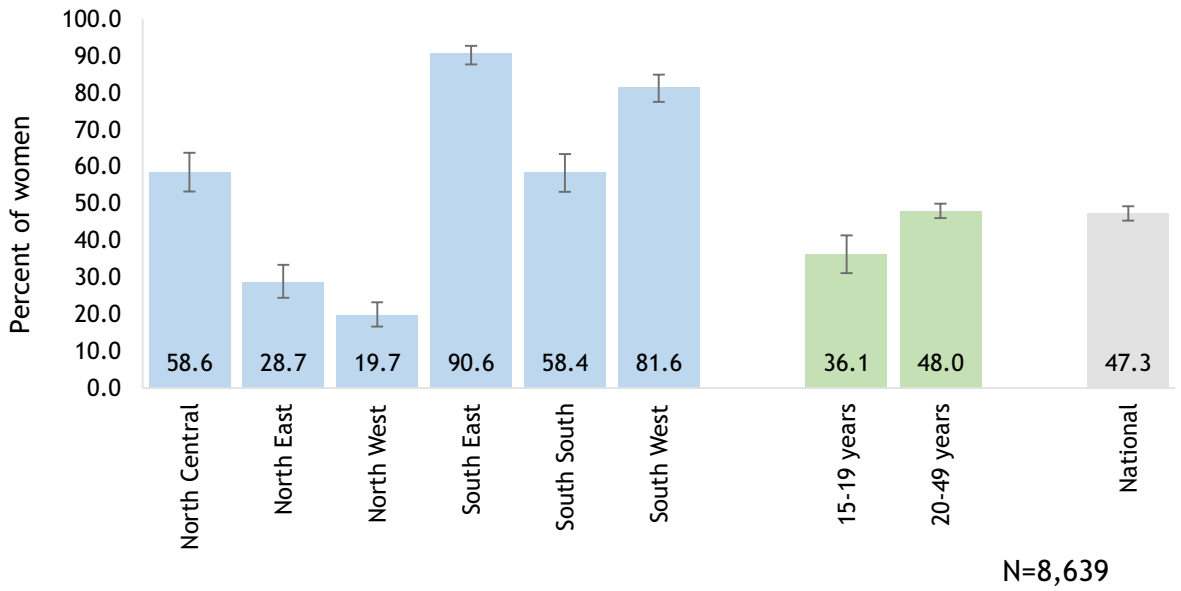


Figure 16: Skilled birth attendant for women of reproductive age by zone and age

[77]According to a recent study, published in the journal Midwifery, and based on a survey conducted in Katsina, women were more likely to use skilled birth attendants if there was staff available, they had their husband's approval, and the service was affordable. Efforts should therefore be made to strengthen the health system, remove fees for maternal health services and encourage men to be more involved.

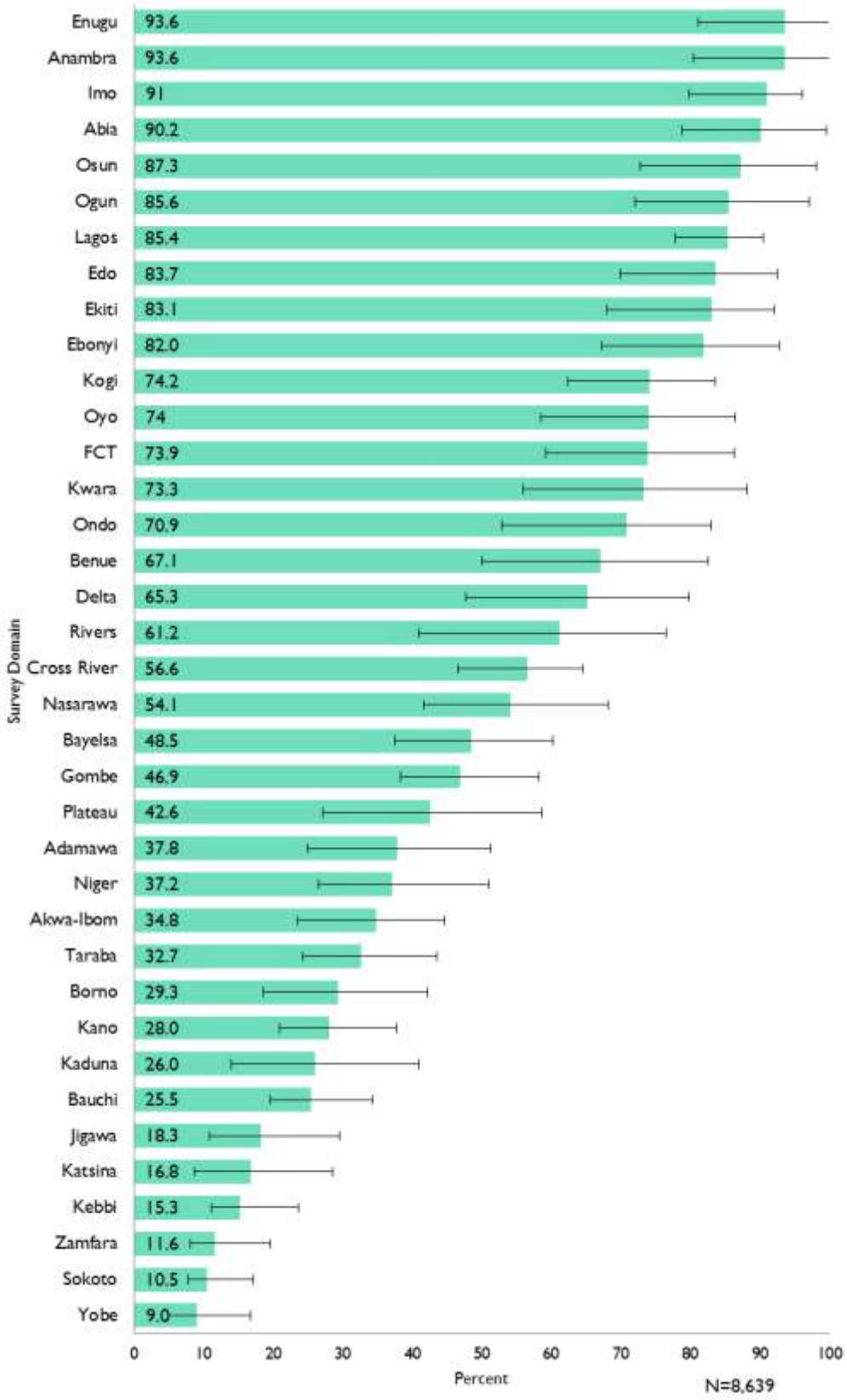


Figure 17: Skilled birth attendance for women of reproductive age by state

Contraceptive Prevalence Rate

The contraceptive prevalence rate is usually defined as the percentage of married women or in a union who are currently using a method of contraception[78]. Thus being a measure of the actual contraceptive practices, this indicator is also an indicator of the success of family planning programmes. Furthermore, contraceptive prevalence rates have a strong correlation with maternal mortality[79] and can be used to estimate reductions in total fertility rates. In comparison with NNHS 2014, the estimated current prevalence rate for contraceptive use in Nigeria has risen from 23 to more than 30 percent. Twenty percent of women are using a modern method (compared to 15 percent in 2014), while 10 percent (compared to 8 percent in 2014) still rely on traditional methods. The use of contraceptive methods has increased especially among younger women: last year only 4 percent of adolescents (15 to 19 years) reported current use of contraception compared to 25 percent in the adult women group (20 to 49 years). This year, although still consistent, the gap is less pronounced and 14 percent of teenagers have reported current use of contraception compared to 31 percent of older women[80].

Table 21 shows the proportion of women currently using a family planning method according to age, zone and state. Contraceptive prevalence is highest in the South West (56 percent) and also high in the South East and South South at 50 percent and 43 percent respectively. The South has also the highest proportion of women currently using traditional methods (30 percent in the South East, 19 and 18 percent in the South South and South West respectively). Only 19 percent of women in the North Central and 17 percent in North West use a method of contraception. Contraceptive use in the North East is even rare: only 13 percent of married (and in a union) women reported using any method. On the other hand, women in the North rarely rely on traditional methods (less than 5 percent in all three zones).

---

[78]Contraceptive methods are classified as modern or traditional methods. Modern methods include female sterilisation, male sterilisation, the pill, the intrauterine device (IUD), injectable, implants, male condoms, female condoms, the diaphragm, foam/jelly, the lactational amenorrhoea method (LAM), and emergency contraception. Traditional methods include the rhythm (periodic abstinence), withdrawal and also folk methods such as herbs.

[79]In Nigeria, unprotected intercourse is the primary cause of unwanted pregnancies, which in many cases leads to abortion. Since abortion is illegal in Nigeria (unless medically recommended to save a mother's life) many abortions are carried out in an unsafe environment. Abortions account for 20%–40% of maternal deaths in Nigeria. Contraceptive practices in Nigeria: Literature review and recommendation for future policy decisions, Journal of Contraception, May 2010.

[80]One reason might be that younger women (age 15-19), more so if living in rural areas, are least likely to know of a contraceptive method. Another reason might be the direct relation between women's use of family planning methods and the number of children they have. In general, women do not begin to use contraception until they have had at least one child and contraceptive use is highest among women with three or four living children, which might be the case for women in older age groups.

Table 21: Use of contraception for women in reproductive age group by background characteristics

Background Characteristics	Modern method	Traditional method	Any Method	Number of women age 15-49 years
National	20.2	10.2	30.5	13,893
	[19.0,21.6]	[9.5,11.0]	[29.0,32.0]	
Age Group				
15-19	11	2.8	13.8	759
	[8.5,14.2]	[1.6,4.7]	[11.0,17.1]	
20-49	20.7	10.6	31.4	13,134
	[19.5,22.1]	[9.9,11.4]	[29.9,32.9]	
Zone				
North Central	15.4	3.5	18.9	2,777
	[13.1,18.1]	[2.5,4.9]	[16.2,22.1]	
North East	11.4	1.2	12.6	2,650
	[9.2,14.0]	[0.7,2.0]	[10.3,15.4]	
North West	13.6	3.2	16.8	3,647
	[11.1,16.7]	[2.3,4.3]	[13.8,20.3]	
South East	19.1	30.4	49.6	1,311
	[16.9,21.6]	[27.2,33.9]	[45.3,53.8]	
South South	24.1	19	43.2	1,547
	[21.4,27.1]	[16.7,21.6]	[39.4,47.0]	
South West	37.8	18	55.8	1,961
	[34.5,41.3]	[15.9,20.2]	[52.3,59.3]	
State				
Abia	34	35.2	69.1	256
	[29.0,39.3]	[30.3,40.4]	[63.9,73.9]	
Adamawa	22.8	4.8	27.6	355
	[14.8,33.5]	[2.1,10.4]	[18.3,39.3]	
Akwa-Ibom	26.4	19.1	45.5	246
	[20.2,33.7]	[14.6,24.6]	[36.4,55.0]	
Anambra	19.4	40.7	60.2	216
	[15.3,24.4]	[34.6,47.1]	[52.3,67.5]	
Bauchi	13.1	1.2	14.3	512
	[8.2,20.3]	[0.6,2.4]	[9.2,21.5]	
Bayelsa	9.5	22.8	32.4	241
	[6.7,13.4]	[16.8,30.2]	[25.7,39.8]	
Benue	11.4	11.4	22.9	341
	[7.4,17.4]	[6.5,19.3]	[14.8,33.6]	
Borno	0.7	0	0.7	446
	[0.2,2.0]		[0.2,2.0]	
Cross River	29.5	17.8	47.3	292
	[23.0,36.9]	[12.4,24.9]	[37.3,57.5]	
Delta	19.7	17.5	37.2	234
	[14.6,25.9]	[11.1,26.5]	[28.3,47.0]	

Table 21 continued

Background Characteristics	Modern method	Traditional method	Any method	Number of women age 15-49 years
Ebonyi	7.7	17.1	24.8	298
	[3.6,15.9]	[10.6,26.4]	[15.9,36.6]	
Edo	34.9	22.1	57	307
	[27.6,42.9]	[18.1,26.8]	[49.7,64.0]	
Ekiti	30.2	14.4	44.6	285
	[23.0,38.4]	[9.5,21.2]	[36.4,53.1]	
Enugu	17.9	16.8	34.7	291
	[13.5,23.3]	[10.9,25.1]	[25.7,45.0]	
FCT	24.3	5.6	29.9	375
	[19.1,30.3]	[3.2,9.7]	[23.9,36.6]	
Gombe	14.7	0.8	15.5	489
	[10.5,20.2]	[0.3,2.1]	[11.1,21.3]	
Imo	15.2	35.2	50.4	250
	[10.6,21.3]	[28.2,42.9]	[41.2,59.6]	
Jigawa	10,9	7,4	18,3	503
	[6.7,17.5]	[3.9,13.3]	[11.7,27.4]	
Kaduna	24	5.5	29.6	487
	[15.1,36.0]	[2.7,10.9]	[19.0,42.9]	
Kano	10	1.8	11.7	512
	[5.7,16.9]	[0.7,4.4]	[6.9,19.2]	
Katsina	13.5	2.4	16	495
	[8.5,21.0]	[1.3,4.4]	[9.9,24.6]	
Kebbi	11.9	2	13.9	553
	[6.8,20.1]	[1.0,4.1]	[8.1,22.9]	
Kogi	9.9	1.3	11.3	373
	[6.4,15.0]	[0.5,3.6]	[7.6,16.3]	
Kwara	21.8	2.2	24	367
	[15.9,29.2]	[0.6,7.6]	[17.8,31.4]	
Lagos	39	21.7	60.7	438
	[32.4,46.1]	[18.0,25.9]	[54.0,67.1]	
Nasarawa	21.4	0.5	21.9	434
	[14.3,30.9]	[0.1,1.8]	[14.6,31.5]	
Niger	6.9	1.2	8.1	506
	[3.6,12.8]	[0.4,3.5]	[4.5,14.1]	
Ogun	39.5	18.8	58.3	362
	[32.0,47.5]	[13.8,25.0]	[50.1,66.0]	
Ondo	30	19.1	49.1	293
	[24.2,36.6]	[12.9,27.3]	[42.4,55.9]	
Osun	30.8	14.6	45.4	260
	[24.7,37.6]	[10.3,20.4]	[38.3,52.7]	
Oyo	45.8	13.9	59.8	323
	[37.4,54.5]	[10.0,19.1]	[50.4,68.5]	
Plateau	23.6	1.3	24.9	381
	[14.6,35.9]	[0.6,2.9]	[15.5,37.6]	

Table 21 continued

Background Characteristics	Modern method	Traditional method	Any method	Number of women age 15-49 years
Rivers	20.3	17.6	37.9	227
	[14.1,28.3]	[13.4,22.8]	[29.9,46.6]	
Sokoto	15.4	1.5	16.8	546
	[8.8,25.4]	[0.6,3.4]	[9.6,27.8]	
Taraba	21.6	0.8	22.4	375
	[14.2,31.5]	[0.2,3.2]	[14.7,32.6]	
Yobe	1.3	0.2	1.5	473
	[0.3,5.3]	[0.0,1.4]	[0.4,5.1]	
Zamfara	9.3	2	11.3	551
	[4.7,17.3]	[0.9,4.5]	[5.9,20.3]	

Note: results in brackets are 95% confidence interval

Antenatal Care

Antenatal care (ANC) is one of the components of safe motherhood[81]. The purpose of this specialised form of care is to assure that every pregnancy ends in the birth of a healthy baby with no impairment in the mother's health. Therefore antenatal care should provide timely interventions and information to mothers and families about the danger signs and symptoms during pregnancy, the risks of labour and delivery without the assistance of a skilled health care provider, the importance of birth spacing, tetanus immunisation, syphilis screening and treatment, prevention and treatment of malaria and management of anaemia. More recently, the potential of the antenatal period as an entry point for HIV prevention and care – in particular for the prevention of HIV transmission from mother to child – has led to renewed interest in access to and use of antenatal services.

The World Health Organization recommends a minimum of four antenatal care visits during pregnancy to ensure the well-being of mothers and new-borns. At these visits, women should receive at least a basic care package, including nutritional advice. They should also be alerted to warning signs indicating possible problems during their pregnancy and get support in planning a safe delivery.

[81]Late antenatal care booking and its predictors among women in south western Nigeria. Online Journal of Health Allied Science 2008.

As of 2014, on average only 52 percent of pregnant women in the developing regions received the recommended number of antenatal care visits during pregnancy. Progress has been particularly slow in sub-Saharan Africa, where coverage levels have stagnated over the past two decades, with a small increase to 49 per cent of pregnant women receiving the recommended care[82]. In Nigeria, the antenatal care policy follows the latest WHO approach to promote safe pregnancies, recommending at least four ANC visits for women without complications. Coverage (of at least one visit) with a skilled health attendant has slowly increased from 61 percent in 2004 to 68 percent in 2012. Similarly antenatal coverage – of at least four visits – rose to 58 percent in 2012 compared to 47 percent in 2004[83].

Antenatal care coverage for women in the reproductive age group is presented in table 22. A skilled provider was defined as a Doctor /Nurse /Midwife or Auxiliary Midwife. Coverage of antenatal care (by a doctor, nurse, midwife, or auxiliary midwife) is moderate in Nigeria with 71 percent of women receiving antenatal care at least once during the pregnancy and 55 percent receiving at least four ANC visits. Nevertheless, overall, still one in three women who had live birth in two years prior to the survey made no antenatal care visits, and half do not receive the recommended number of ANC visits.

The likelihood of ANC attendance was lower among younger women – 62 percent of women aged 15-19 attended at least one visit and 40 percent at least four, compared to 72 percent and 56 percent of older women. Younger women were also less likely to be visited by a skilled provider than older women older than 20 years (60 versus 70 percent). The lowest level of antenatal care was found in North West (56 percent for 1 visit, 36 percent for four visits), while the highest level was reported in the South East and South West regions (95 and 93 percent respectively for 1 visit, and 84 and 87 percent respectively for 4 visits). Variability at state level ranged from 99 percent in Imo to 30 percent in Zamfara for at least one visit, and from 94 percent in Lagos and Ogun to 18 percent in Sokoto for at least four visits. ANC was delivered by a skilled provider in 70 percent of cases and women were more likely to be visited by a skilled provider in the South East States, where rates were estimated at 94 percent, than in the North West, where rates were estimated at 55 percent.

[82]The Millennium Development Goals Report 2015, United Nations 2015.
[83]Gestational age at booking for antenatal care in a tertiary health facility in north-central, Nigeria. Nigeria Medical Journal December 2012.

Table 22: Antenatal care coverage for women in the reproductive age group by background characteristics

Background Characteristics	Percentage of women with live birth in the last two years who received ANC			Number of women age 15-49 years with live birth in the last two years
	At least one visit	At least 4 visits	By skilled provider[84]	
National	71.3	55.1	69.4	8,639
	[69.2,73.3]	[53.1,57.0]	[67.3,71.5]	
Age Group				
15-19	61.8	40.2	59.8	508
	[56.4,66.9]	[35.4,45.3]	[54.4,64.9]	
20-49	71.9	56	70	8,131
	[69.8,73.8]	[54.0,57.9]	[67.9,72.0]	
Zone				
North Central	68.9	52.9	68.5	1,468
	[63.6,73.8]	[48.0,57.8]	[63.1,73.4]	
North East	64.3	40.4	62.8	1,690
	[58.5,69.7]	[36.0,44.9]	[57.1,68.2]	
North West	55.7	35.8	54.7	2,696
	[51.2,60.1]	[32.1,39.7]	[50.1,59.2]	
South East	94.7	83.9	94	714
	[92.1,96.5]	[79.9,87.2]	[91.4,95.9]	
South South	79.7	65	76.5	996
	[75.9,83.0]	[60.2,69.5]	[72.3,80.2]	
South West	92.8	86.7	88.5	1,075
	[90.0,94.9]	[83.5,89.3]	[85.5,91.0]	
State				
Abia	93.9	75.8	93.2	132
	[88.6,96.9]	[64.9,84.1]	[86.9,96.6]	
Adamawa	79.7	57.3	78.3	143
	[67.9,87.9]	[46.8,67.3]	[66.2,86.9]	
Akwa-Ibom	70.8	51.6	68.3	161
	[61.9,78.3]	[40.7,62.3]	[58.5,76.8]	
Anambra	91.7	82.6	91.7	109
	[79.4,97.0]	[70.2,90.5]	[79.4,97.0]	
Bauchi	71.4	43.1	68.6	420
	[57.7,82.1]	[34.3,52.4]	[55.4,79.3]	
Bayelsa	58.2	47.9	53.9	165
	[47.2,68.4]	[37.2,58.7]	[43.2,64.4]	
Benue	69.1	45.4	69.1	207
	[53.2,81.5]	[32.9,58.6]	[53.2,81.5]	
Borno	53.7	34.2	53.4	307
	[41.3,65.8]	[24.8,45.0]	[41.0,65.4]	

[84]At least one visit.

Table 22 continued

Background Characteristics	Percentage of women with live birth in the last two years who received ANC			Number of women age 15-49 years with live birth in the last two years
	At least one visit	At least 4 visits	By skilled provider[85]	
Cross River	84.2	58.7	81.6	196
	[76.2,89.9]	[49.4,67.4]	[73.4,87.8]	
Delta	80.7	70.7	76.7	150
	[68.9,88.7]	[59.2,80.0]	[64.4,85.6]	
Ebonyi	90.7	82	90.7	183
	[84.3,94.7]	[72.1,88.9]	[84.3,94.7]	
Edo	87.8	82.6	86	172
	[76.9,94.0]	[71.1,90.1]	[74.9,92.7]	
Ekiti	92.3	85.2	88	142
	[85.9,95.9]	[77.9,90.4]	[80.7,92.8]	
Enugu	95.5	92.3	94.9	156
	[90.9,97.8]	[85.7,96.0]	[90.3,97.3]	
FCT	86	73.9	85.5	207
	[75.2,92.5]	[61.7,83.3]	[74.8,92.1]	
Gombe	76.3	51.3	75.1	337
	[65.0,84.7]	[41.5,61.1]	[63.9,83.7]	
Imo	99.3	85.1	97.8	134
	[95.0,99.9]	[76.8,90.7]	[93.6,99.2]	
Jigawa	70.6	47.7	69	436
	[59.4,79.8]	[39.3,56.2]	[57.6,78.5]	
Kaduna	72.2	50.9	71.3	334
	[60.2,81.6]	[40.6,61.1]	[59.5,80.7]	
Kano	64.3	40	61.8	325
	[51.4,75.4]	[30.0,50.9]	[48.6,73.6]	
Katsina	48.3	33.6	48.3	375
	[36.8,59.9]	[24.9,43.6]	[36.8,59.9]	
Kebbi	47.7	24.7	47.7	417
	[38.1,57.6]	[17.3,34.0]	[38.1,57.6]	
Kogi	89.5	71.3	89.5	209
	[83.3,93.5]	[60.9,79.8]	[83.3,93.5]	
Kwara	74.2	67.7	74.2	217
	[59.2,85.1]	[54.1,78.9]	[59.2,85.1]	
Lagos	95.4	93.5	91.9	260
	[91.8,97.4]	[89.8,95.9]	[87.9,94.7]	
Nasarawa	78.6	57.2	76.7	159
	[67.1,86.9]	[45.7,68.1]	[65.7,85.0]	
Niger	43.2	30.6	42.9	333
	[31.5,55.8]	[21.3,41.8]	[31.2,55.6]	
Ogun	95.8	93.5	89.4	216
	[87.1,98.7]	[86.6,97.0]	[80.1,94.6]	

[85]At least one visit.

Table 22 continued

Background Characteristics	Percentage of women with live birth in the last two years who received ANC			Number of women age 15-49 years with live birth in the last two years
	At least one visit	At least 4 visits	By skilled provider[86]	
Ondo	86.7	67.7	79.1	158
	[76.9,92.8]	[54.5,78.6]	[66.0,88.1]	
Osun	96.8	80.2	94.4	126
	[90.6,99.0]	[70.1,87.5]	[87.9,97.6]	
Oyo	87.3	83.2	83.8	173
	[75.5,93.9]	[71.1,90.9]	[73.3,90.7]	
Plateau	73.5	54.4	71.3	136
	[60.4,83.5]	[42.7,65.7]	[57.7,81.9]	
Rivers	85.5	70.4	81.6	152
	[77.0,91.3]	[57.5,80.7]	[71.3,88.8]	
Sokoto	35.8	18	35.5	411
	[26.3,46.4]	[12.2,25.7]	[26.1,46.2]	
Taraba	75.3	45.3	74.7	150
	[63.0,84.6]	[32.3,59.1]	[62.2,84.1]	
Yobe	37.2	19.8	36.6	333
	[26.6,49.2]	[13.4,28.3]	[26.1,48.6]	
Zamfara	30.2	19.3	29.6	398
	[20.3,42.2]	[12.6,28.6]	[20.0,41.6]	

Note: results in brackets are 95% confidence interval

HIV Testing

In 2010, it was estimated that 230,000 pregnant women and 360,000 children were living with HIV in Nigeria, and more than 90 percent of children new infections occurred through mother to child transmission (MTCT)[87]. According to UNICEF and WHO, MTCT programme coverage was still very limited: only 5 percent of ANC facilities in Nigeria offered MTCT services, while HIV testing among pregnant women was as low as 14 percent[88].

The same year, Nigeria developed a national scale up plan towards the elimination of mother to child transmission of HIV (2010-2015) and adopted WHO 2010 Guidelines for prophylaxis[89]. However, in 2013 new HIV infections among children had declined by only 19 percent since 2009, and Nigeria

[86]At least one visit.
[87]UNAIDS report on the global AIDS epidemic. 2010. Joint United Nations program on HIV/AIDS.
[88]World Health Organization, Joint United Nations Programme on HIV/AIDS, United Nations Children's Fund, Towards Universal Access: Scaling up Priority HIV/AIDS Interventions in the Health Sector. Progress report, 2011
[89]Targets were achieving a 50 percent reduction of the transmission of the HIV virus through MTCT by the year 2010 and eliminating pediatric HIV by 2015. Government of Nigeria, Federal Ministry of Health, National Strategic Plan for HIV/AIDS 2010-2015.

still accounted for one quarter of all new HIV infections (nearly 51,000 cases) among children in the 21 priority countries in sub-Saharan Africa: the largest absolute number of any country[90].

Meeting the 2015 targets requires a massive effort. The government has taken a bold step to focus on the states with the highest burden of HIV. In addition, it scaled up service delivery to stop new HIV infections among children and embarked on an intensive state-focused data-driven decentralization initiative. Considerable efforts have also been made to strengthen MTCT interventions and particularly the detection of HIV maternal infection early in pregnancy[91]. Many studies shows that, in the absence of interventions, rates of MTCT generally range from 25 to 40 percent, but with effective interventions, rates have been successfully reduced to below 2 percent[92].

Antenatal care coverage for women of reproductive age group is presented in Table 23. Overall, 52 percent of women were offered HIV testing during ANC, 49 percent accepted to be tested and 40 percent received results. The offering of HIV testing was lower in the case of younger women (aged 15-19) as compared to older women – 40 versus 52 percent – and the same discrepancy was estimated for testing – 37 versus 50 percent. The offering of HIV testing displayed a great variability at zone level, ranging from 80 percent in the South East states to 33 percent in the North West. The acceptance of HIV testing varied accordingly, from 77 percent in the South East to 31 percent in the North West. At state level, HIV testing was offered to more than three fourth of women in Anambra, Cross River, Ebonyi, Enugu, Imo and Lagos, where it also registered level of acceptance above 70 percent. The lowest rates of testing at state level were obtained in Katsina, Kebbi, Sokoto and Zamfara, where HIV testing was offered in less than 17 percent of cases – and effective testing rates were below 15 percent. A recent study conducted in Nigeria showed that among main reasons for declining, were: fear of the test itself, fear of the consequences of a positive test result, knowledge that antiretroviral therapy was not available, and the need to consult her partner before testing. In this study, it was identified that some women were prevented from having the HIV test by their spouse's refusal[93].

---

[90]UNAIDS. 2014 Progress Report on the global plan towards the elimination of new HIV infections among children by 2015 and keeping their mothers alive. 2014.
[91]In Nigeria, HIV testing is generally offered as an “opt-in” approach, i.e. it is offered during ANC with women choosing whether to be tested or not. The alternative “opt-out” approach, which is prevalent in the U.S.A., provides routine antenatal care testing policy, but it is very rare in Sub-Saharan Africa.
[92]An end to perinatal HIV: Success in the US requires ongoing and innovative efforts that should expand globally. Journal of Public Health Policy 2007
[93]Provider Initiated HIV Testing During Antenatal Care and Labour – Knowledge and Acceptability of Patients in a Nigeria Teaching Hospital, European Journal of Preventive Medicine, July 2015.

Table 23: HIV testing during Antenatal care for women in the reproductive age group by background characteristics

Background Characteristics	Percentage of women with live birth in the last two years who			Number of women age 15-49 years with live birth in the last two years
	were offered a test for HIV during ANC	were tested for HIV during ANC	received HIV test result	
National	51.7	49.3	39.5	
	[49.5,53.9]	[47.1,51.5]	[37.4,41.7]	8,639
Age Group				
15-19	39.8	37.2	26.9	
	[34.8,44.9]	[32.4,42.2]	[22.7,31.6]	508
20-49	52.4	50	40.3	
	[50.2,54.6]	[47.8,52.2]	[38.1,42.5]	8,131
Zone				
North Central	54.4	52.5	26.7	
	[49.1,59.6]	[47.3,57.7]	[22.8,30.9]	1,468
North East	50.4	48.9	41.1	
	[44.6,56.2]	[42.9,55.0]	[35.0,47.4]	1,690
North West	33.4	31.3	27.4	
	[29.1,38.0]	[27.1,35.9]	[23.5,31.7]	2,696
South East	79.6	77.4	68.7	
	[75.2,83.5]	[73.0,81.4]	[63.5,73.4]	714
South South	55.7	55	46.1	
	[50.7,60.5]	[50.0,59.9]	[41.2,51.2]	996
South West	70.9	65.6	53.8	
	[66.5,75.0]	[61.1,69.7]	[48.7,58.9]	1,075
State				
Abia	74.2	68.9	63.6	
	[66.7,80.6]	[61.3,75.7]	[55.1,71.4]	132
Adamawa	61.5	60.1	25.2	
	[47.7,73.7]	[45.9,72.8]	[14.2,40.7]	143
Akwa-Ibom	50.9	50.3	44.1	
	[40.2,61.6]	[39.7,60.9]	[33.9,54.8]	161
Anambra	78	75.2	67	
	[65.5,86.9]	[62.6,84.6]	[53.2,78.4]	109
Bauchi	54	51.2	49.8	
	[41.0,66.6]	[37.5,64.7]	[36.0,63.6]	420
Bayelsa	40.6	40.6	36.4	
	[30.2,52.0]	[30.2,52.0]	[26.6,47.4]	165
Benue	59.4	58.5	54.1	
	[45.3,72.1]	[44.8,70.9]	[40.6,67.1]	207
Borno	46.3	45.3	41.7	
	[35.2,57.7]	[34.2,56.9]	[30.4,54.0]	307
Cross River	75	75	61.7	
	[66.4,82.0]	[66.4,82.0]	[50.1,72.1]	196
Delta	54	54	42.7	
	[41.8,65.8]	[41.8,65.8]	[31.7,54.4]	150
Ebonyi	79.8	78.7	64.5	
	[68.8,87.6]	[67.9,86.6]	[54.2,73.6]	183
Edo	53.5	49.4	34.9	
	[43.8,62.9]	[38.9,60.0]	[25.4,45.8]	172

Table 23 continued

Background Characteristics	Percentage of women with live birth in the last two years who			Number of women age 15-49 years with live birth in the last two years
	were offered a test for HIV during ANC	**were tested for HIV during ANC**	**received HIV test result**	
Ekiti	73.9	69.7	60.6	
	[62.5,82.9]	[58.7,78.9]	[48.5,71.5]	142
Enugu	85.9	85.3	78.2	
	[77.4,91.6]	[77.0,90.9]	[69.5,85.0]	156
FCT	67.1	64.3	36.7	
	[52.8,78.9]	[49.2,77.0]	[26.3,48.6]	207
Gombe	59.3	58.5	55.8	
	[45.1,72.1]	[43.9,71.7]	[41.8,68.9]	337
Imo	79.9	78.4	68.7	
	[68.4,87.9]	[67.2,86.5]	[55.3,79.5]	134
Jigawa	56.7	55.7	55.5	
	[44.3,68.2]	[43.2,67.6]	[42.9,67.5]	436
Kaduna	60.2	59.6	58.1	
	[46.1,72.8]	[45.6,72.2]	[44.2,70.8]	334
Kano	40	33.5	28.6	
	[28.6,52.5]	[22.7,46.5]	[18.8,41.0]	325
Katsina	17.1	15.7	7.5	
	[10.4,26.7]	[9.4,25.2]	[3.7,14.3]	375
Kebbi	16.3	15.6	10.8	
	[8.8,28.3]	[8.1,27.8]	[5.3,20.6]	417
Kogi	73.7	71.8	20.6	
	[62.1,82.7]	[60.3,81.0]	[12.4,32.2]	209
Kwara	66.4	62.2	10.6	
	[52.5,77.9]	[48.5,74.2]	[6.4,17.1]	217
Lagos	76.2	72.7	61.5	
	[68.6,82.4]	[64.6,79.5]	[52.0,70.2]	260
Nasarawa	65.4	65.4	28.9	
	[51.4,77.2]	[51.4,77.2]	[18.2,42.7]	159
Niger	26.7	24.9	8.4	
	[17.3,38.9]	[15.6,37.4]	[4.2,16.0]	333
Ogun	62	56.5	50	
	[52.5,70.7]	[47.9,64.7]	[41.0,59.0]	216
Ondo	70.9	65.8	51.9	
	[56.7,81.9]	[51.9,77.5]	[37.4,66.1]	158
Osun	69	57.9	41.3	
	[56.4,79.4]	[45.3,69.6]	[28.5,55.3]	126
Oyo	68.2	61.8	48	
	[55.0,79.0]	[50.3,72.2]	[35.1,61.2]	173
Plateau	52.2	51.5	38.2	
	[39.3,64.8]	[38.6,64.1]	[26.5,51.6]	136
Rivers	55.3	55.3	50.7	
	[42.2,67.7]	[42.2,67.7]	[38.1,63.1]	152
Sokoto	9.7	9.2	6.3	
	[4.4,20.0]	[4.1,19.6]	[2.2,16.8]	411
Taraba	61.3	60.7	24	
	[50.2,71.4]	[49.8,70.6]	[14.5,37.0]	150
Yobe	27.3	27	22.2	
	[18.4,38.6]	[18.1,38.3]	[14.0,33.4]	333
Zamfara	12.1	11.8	7.8	
	[5.4,24.8]	[5.2,24.6]	[3.1,18.3]	398

Note: results in brackets are 95% confidence interval

Reproductive health findings are consistent with women (and child) malnutrition pattern reported in the country: Southern states have better rates as compared to Northern states and teenage women appear to be the more disadvantaged group compared to older women. The high maternal mortality rates in the North West and North East zones correspond with the low rates of antenatal care coverage, thus indicating that ANC coverage and services need to be considerably enhanced in order to reduce maternal mortality. While some states have achieved ANC coverage of more than 90 percent, others are still trailing at less than 40 percent (Sokoto, Yobe and Zamfara)[94].

Maternal Newborn and Child Health Week (MNCHW)

The Maternal Newborn and Child Health Week (MNCHW) Programme was launched in Nigeria in 2009 as part of the strategy of the Federal Ministry of Health (FMOH) of Nigeria to accelerate the achievement of the health Millennium Development Goals. Conceived to complement the weak routine services of the PHC system, the MNCHW has been regularly implemented in Nigeria since 2010 as a bi-annual campaign-style programme. During the week, primary healthcare services are offered in health facilities, from house to house, and at community stations. The maternal and child health services offered include routine and emergency antenatal, intrapartum and postnatal care; routine and emergency obstetric and newborn care; infant and young child nutrition and supplementation; routine immunizations, malaria prevention and distribution of mosquito nets, PMTCT programmes and care of HIV exposed or infected children, health and Water, Sanitation and Hygiene (WASH) education and effective primary health care service and management of common childhood illnesses[95].

MNCHW coverage by zone and state is presented in Table 24. Overall, only 29 percent of households surveyed lived in an area where an MNCHW campaign was implemented, and less than half (14 percent) received some MNCHW services. Campaigns were prevalently delivered in proximity of households located in the South South (51 percent) and North Central states where the percentage of households who received some service was 25 and 18 percent respectively – whereas households located in the North East and South East had less chance of benefitting of an MNCHW campaign (only 4 percent of households received some service).

At state level, services were prevalently delivered in Cross River, where 45 percent of households benefitted of some campaign services, and Akwa-Ibon, Bayelsa, Delta, FCT, Kebbi and Oyo, where one fourth to one third of households benefitted of some service. On the other hand, the lowest percentages were found in Gombe, Imo and Yobe – where only one household in ten profited of some

[94]Nigeria Millennium Development Goals. 2013 Report.
[95]National Guidelines for the Development of Primary Health Care System in Nigeria. NPHCDA 2012.

MNCHW campaign service. Percentages were also very low in Abia, Anambra, Bauchi, Borno, Kano, Nasarawa, Osun and Taraba (less than 5 percent).

At national level, services were prevalently received at families' own house (53 percent)[96] or in a health facility (32 percent), but these percentages varied greatly across zones. Families living in Northern zones received services prevalently in a health facility (percentages vary from 60 percent in North Central to 43 percent in North West), while families living in the South East preferred to receive 44 percent of services preferably in other sites (44 percent) and at home (31 percent). Those families living in the South South and the South West received services mostly at home (69 and 76 percent respectively) and in a health facility (15 percent both).

[96]This high percentage might as well indicate a certain confusion in the response, as MNCHW services could have not been delivered at home for more than 50% of the population.

Table 24: MNCHW coverage by zone and state

Background Characteristics	Percentage of households who lived in an area where there was a MNCHW campaign	Percentage of households who received some service during a MNCHW campaign	Number of households	Households who received some services during a MNCHW campaign			
				In a health Facility	In other site	At their own house	Number of HH
National	**29.4**	**14.1**	**25,210**	**31.9**	**15**	**53.2**	**3,569**
	[27.6,31.3]	[13.1,15.2]		[28.4,35.7]	[12.3,17.6]	[49.2,57.2]	
Zone							
North Central	40.6	18	4,811	59.7	14	26.7	910
	[36.1,45.2]	[15.8,21.4]		[51.3,67.5]	[8.8,20.5]	[19.9,34.8]	
North East	10.7	4	3,991	49.8	15	35	151
	[7.7,14.6]	[2.6,6.6]		[32.9,66.8]	[6.6,31.3]	[17.9,57.1]	
North West	22.6	13	4,815	42.9	18	39.1	712
	[18.9,26.8]	[10.3,15.2]		[33.4,53.0]	[11.1,27.2]	[29.7,49.5]	
South East	15	4	3,456	25.3	44	31.1	139
	[11.6,19.2]	[2.6,5.1]		[15.2,39.1]	[29.3,59.0]	[17.7,48.6]	
South South	50.9	25	4,035	15.6	16	68.7	1,029
	[46.5,55.4]	[22.2,26.9]		[11.9,20.3]	[12.4,19.4]	[63.3,73.7]	
South West	34.5	18	4,102	15.3	9	76	628
	[29.4,40.0]	[15.2,21.3]		[12.0,19.3]	[5.8,12.8]	[71.0,80.4]	
State							
Abia	18.5	3.4	680	52.2	34.8	13	23
	[11.6,28.3]	[1.9,5.9]		[32.6,71.1]	[20.2,52.9]	[4.7,31.3]	
Adamawa	25.8	9.4	627	40.7	16.9	42.4	59
	[15.5,39.8]	[5.7,15.1]		[18.9,66.9]	[5.0,44.3]	[20.7,67.4]	
Akwa-Ibom	63.4	25.3	697	9.7	20.5	69.9	176
	[53.1,72.6]	[21.1,29.9]		[5.3,16.9]	[12.0,32.8]	[57.4,80.0]	
Anambra	4	2.3	681	50	43.8	6.3	16
	[1.8,8.3]	[0.9,6.0]		[22.2,77.8]	[19.0,72.0]	[0.7,38.3]	
Bauchi	11.6	3.9	701	63	33.3	3.7	27
	[5.3,23.3]	[1.1,12.8]		[36.5,83.4]	[15.5,57.6]	[1.4,9.4]	
Bayelsa	47.7	25.8	662	10.5	10.5	78.9	171
	[37.2,58.5]	[20.7,31.7]		[5.1,20.6]	[4.6,22.2]	[65.3,88.2]	
Benue	30.2	9.1	696	65.1	7.9	27	63
	[21.0,41.2]	[5.4,14.7]		[37.0,85.5]	[2.7,21.1]	[9.1,57.8]	
Borno	5.2	4.7	653	38.7	0	61.3	31
	[1.5,16.4]	[1.3,15.4]		[8.5,81.1]		[18.9,91.5]	
Cross River	70.7	45.2	662	12.4	12.7	74.6	299
	[60.5,79.2]	[38.8,51.7]		[7.9,18.9]	[7.6,20.5]	[64.8,82.4]	
Delta	58.6	23.5	686	9.3	18.6	72	161
	[47.4,69.0]	[18.6,29.2]		[3.5,22.5]	[12.2,27.3]	[60.2,81.5]	
Ebonyi	25.1	6	697	19	35.7	45.2	42
	[15.0,39.0]	[3.3,10.7]		[7.0,42.3]	[11.3,70.8]	[20.2,72.9]	
Edo	23.4	14.7	689	56.4	8.9	34.7	101
	[16.2,32.5]	[10.2,20.7]		[35.2,75.5]	[3.8,19.3]	[19.8,53.2]	

Table 24 continued

Background Characteristics	Percentage of households who lived in an area where there was a MNCHW campaign	Percentage of households who received some service during a MNCHW campaign	Number of HH	Households who received some services during a MNCHW campaign			
				In a health Facility	In other site	At their own house	Number of HH
Ekiti	16.7	7.6	700	64.2	1.9	34	53
	[10.8,25.0]	[4.4,12.7]		[37.1,84.4]	[0.3,11.1]	[13.8,62.2]	
Enugu	34.9	7.6	696	9.4	49.1	41.5	53
	[21.6,51.1]	[4.2,13.4]		[3.2,24.8]	[22.8,75.9]	[17.3,70.7]	
FCT	43.9	29.3	700	63.4	2.4	34.1	205
	[34.8,53.4]	[22.7,36.9]		[46.3,77.7]	[0.7,8.0]	[20.4,51.2]	
Gombe	7.1	1	701	28.6	42.9	28.6	7
	[3.7,13.4]	[0.4,2.6]		[7.5,66.4]	[11.9,80.7]	[3.9,79.8]	
Imo	2.3	0.7	702	20	60	20	5
	[1.2,4.2]	[0.3,1.9]		[2.4,71.5]	[27.2,85.8]	[4.4,57.8]	
Jigawa	19.7	14.4	699	39.6	9.9	50.5	101
	[10.9,33.2]	[7.9,25.0]		[14.4,71.8]	[1.3,47.1]	[21.0,79.6]	
Kaduna	10.8	6.3	678	48.8	25.6	25.6	43
	[5.3,20.8]	[3.0,13.0]		[16.0,82.7]	[3.9,74.6]	[6.0,64.9]	
Kano	12.1	4.2	695	10.3	31	58.6	29
	[6.8,20.5]	[2.0,8.4]		[2.8,31.3]	[14.6,54.2]	[35.1,78.8]	
Katsina	32.1	19.3	695	32.8	17.9	48.5	134
	[20.5,46.4]	[12.1,29.3]		[18.3,51.7]	[6.2,41.8]	[29.6,67.9]	
Kebbi	44.1	30.5	699	48.4	15	36.6	213
	[30.4,58.7]	[20.6,42.6]		[28.5,68.7]	[5.1,36.8]	[19.1,58.6]	
Kogi	55	21.8	680	75	14.9	10.1	148
	[41.5,67.8]	[16.1,28.8]		[60.2,85.6]	[6.3,31.0]	[5.4,18.4]	
Kwara	51.2	31	699	49.8	14.3	35.9	217
	[38.0,64.2]	[21.6,42.4]		[30.1,69.5]	[4.7,36.0]	[17.9,59.0]	
Lagos	41.7	22.4	700	14	3.8	82.2	157
	[29.9,54.6]	[16.2,30.2]		[9.5,20.2]	[1.2,11.2]	[74.2,88.1]	
Nasarawa	13.3	4.7	701	97	0	3	33
	[6.8,24.3]	[2.2,9.9]		[79.0,99.6]		[0.4,21.0]	
Niger	44.5	17.9	699	38.4	36.8	24.8	125
	[33.0,56.6]	[10.8,28.1]		[23.4,56.0]	[19.8,57.9]	[15.2,37.7]	
Ogun	43.9	23	656	11.3	2.6	86.1	151
	[30.5,58.2]	[15.6,32.6]		[6.5,18.7]	[0.9,7.5]	[77.3,91.8]	
Ondo	17.6	9.1	694	38.1	11.1	49.2	63
	[11.7,25.6]	[5.8,13.9]		[16.2,66.3]	[5.2,22.2]	[27.6,71.2]	
Osun	10.5	4.4	677	26.7	26.7	46.7	30
	[5.7,18.5]	[2.1,9.1]		[12.5,48.0]	[11.0,51.6]	[37.5,56.0]	
Oyo	48.7	25.8	675	7.5	17.2	75.3	174
	[37.4,60.2]	[19.1,33.8]		[4.6,11.9]	[10.7,26.6]	[67.0,82.1]	
Plateau	39.9	18.7	636	66.4	1.7	31.9	119
	[28.5,52.5]	[12.0,28.1]		[38.4,86.2]	[0.5,5.7]	[12.5,60.7]	

Table 24 continued

Background Characteristics	Percentage of households who lived in an area where there was a MNCHW campaign	Percentage of households who received some service during a MNCHW campaign	Number of HH	Households who received some services during a MNCHW campaign			
				In a health Facility	In other site	At their own house	Number of HH
Rivers	42.1	18.9	639	15.7	16.5	67.8	121
	[31.4,53.6]	[13.9,25.3]		[7.6,29.6]	[9.9,26.3]	[52.6,79.9]	
Sokoto	39.3	18	695	64.8	24	11.2	125
	[27.2,52.9]	[12.2,25.7]		[41.4,82.7]	[9.2,49.6]	[3.9,27.9]	
Taraba	11.7	3	639	94.7	0	5.3	19
	[6.1,21.3]	[1.4,6.3]		[67.7,99.4]		[0.6,32.3]	
Yobe	1.5	1.2	670	50	0	50	8
	[0.3,8.4]	[0.2,8.1]		[50.0,50.0]		[50.0,50.0]	
Zamfara	22.5	10.2	654	55.2	3	41.8	67
	[12.6,36.8]	[5.7,17.7]		[32.2,76.2]	[0.4,19.8]	[21.4,65.5]	

Note: results in brackets are 95% confidence interval

Vitamin A

Vitamin A is an essential micronutrient for child development. At younger ages, inadequate intake can result in vitamin A deficiency (VAD) causing xerophthalmia, a serious eye disorder that can lead blindness. Vitamin A deficient children are also more vulnerable to infection and have reduced immunity to fight common childhood diseases, such as measles, diarrhoea and acute respiratory infections (ARI). It is estimated that increasing vitamin A intake can decrease childhood mortality from such illnesses by 23 percent, or nearly a quarter of childhood deaths[97].

Children can receive Vitamin A from foods, fortified foods and supplementation. A healthy varied diet should be composed of foods rich in vitamin A and with an adequate fat content, because fatty acids facilitate the absorption of fat-soluble vitamins, such as food as breast milk, dairies, liver, eggs, meat, fish, butter, mangoes, papayas, carrots, pumpkins, and dark green leafy vegetables. Infant formula and other infant foods are also fortified with Vitamin A. Other large-scale fortification efforts have produced fortified sugar, oil, milk, margarine, cereal grains, various types of flour and condiments. Although food-based approaches, such consumption of foods rich in vitamin A and of fortified foods, are becoming increasingly feasible, in most affected areas they

[97] *Tracking progress on child and maternal nutrition: A survival and development priority,* UNICEF 2009

have not yet ensured coverage levels similar to supplementation and delivery of high-dose supplements remains the principal strategy for controlling vitamin A deficiency[98].

In Africa, Vitamin A deficiency alone is responsible for almost 6 percent of child deaths under the age of 5 years[99]. Therefore, alongside with appropriate Infant and Young Children Feeding Practices, interventions for adequate micronutrients intake for children 6 to 59 months of age should include vitamin A supplementation. Vitamin A is a fat-soluble vitamin and can be stored in the body for about six months; it is for this reason that two annual doses of high-potency supplements are adequate for addressing the adverse effects associated with vitamin A deficiency. In Nigeria, campaigns are in place for semi-annual mass supplementation of vitamin A capsules. They are usually held in in May and November, during the Maternal Newborn and Child Health Weeks.

According to survey results, nearly 42 percent of the children aged between 6 to 59 months received vitamin A supplement in the 6 months prior to the survey, which means that still three in five Nigerian children do not receive adequate levels of supplementation and are at risk for vitamin A deficiency. This finding – which represents a deterioration of 7 percentage points compared to NNHS 2014 – is consistent with NHS 2013 findings (41 percent). However, it should be noted that information on vitamin A are prevalently based on mother's recall (since immunisation card are rarely available), therefore findings should be interpreted with caution.

At zone level, the lowest levels of supplementation were reported in the North East and North West (both at 15 percent), while the highest percentages were found in the South West (70 percent). According to UNICEF standard a coverage threshold of 70 percent is the minimal coverage at which countries can expect to observe reductions in child mortality[100]. In the 37 domains surveyed, only five were above the prescribed threshold, namely Cross River, Ekiti, Kwara, Lagos, and Ondo – last year there were seven states. The situation is particularly critical in Gombe, Sokoto, Taraba, Yobe and Zamfara, where less than one child in ten reported to have received vitamin A supplement. Table 16 shows that the proportion of children consuming vitamin A is slightly higher for older children: 42-43 percent of children aged 1 year and older received vitamin A supplement compared to 37 percent of younger children aged 6 to 11 months. Since younger children seem to be at greater risk of VAD, it is vital to continue monitoring the supplementation programme progresses.

---

[98] *Vitamin A Supplementation: A decade of progress,* The United Nations Children's Fund (UNICEF), 2007
[99] *Guideline: Vitamin A supplementation in infants and children 6-59 months of age,* World Health Organization, Geneva 2011
[100] *Tracking progress on child and maternal nutrition: A survival and development priority,* UNICEF 2009

Deworming

Helminths are a group of parasites commonly referred to as worms and include schistosomiases and soil-transmitted helminths. Schistosome and soil-transmitted helminth infections are among the most common infections in developing countries. They can impair nutritional status by causing internal bleeding which can lead to loss of iron and anemia; malabsorption of nutrients; diarrhoea and loss of appetite which can lead to a reduction in energy intake; and infections that can cause cognitive impairment as well as tissue damage.

The nutritional impairment caused by schistosome and soil-transmitted helminth infections during childhood has been shown to have a significant impact on growth and development of children. Periodic deworming of children can reduce the transmission of schistosome and soil-transmitted helminth infections. However, drug therapy alone is only a short-term measure of reducing worm infection and re-infection is frequent. Thus, control measures with improvement of water and sanitation, and health education are needed to prevent infection and re-infection[101].

Overall 27 percent of children age 6-59 months have received deworming medication, the coverage of which at zone level ranges from 8 (North East) to 48 percent (South West). Variability is even more pronounced at state level, ranging from less than 1 percent in Yobe and Zamfara to 64 percent in Lagos. Deworming coverage over 50 percent was reported only in six states – Abia, Anambra, Edo, Imo, Lagos, and Ogun – but these results substantially differ from NNHS 2014 findings and should be taken with caution since they are based on mother's recall. In any case, since Sub-Saharan Africa has the highest prevalence of helminths parasites worldwide[102], domains should all be supported to improve coverage of deworming.

[101]Deworming to combat the health and nutritional impact of helminth infections, WHO, 2014
[102]Soil transmitted helminth infection: Fact sheet No 366, WHO, 2013

Table 25: Percentage of children 6-59 months of age given who received vitamin A tables 6 months prior to the survey and percent of children age 12-59 months given an anthelminthic drug in the past 6 months by background characteristics

Background Characteristics	Children age 6-59 months who received vitamin A tables		Children age 12-59 months given an anthelminthic drug	
	%	N	%	N
National	41.9	17,414	27.0	15,227
	[40.1,43.8]		[25.5,28.5]	
Sex				
Males	42.1	8,760	26.8	7,678
	[40.1,44.2]		[25.0,28.6]	
Females	41.8	8,654	27.2	7,549
	[39.7,43.9]		[25.6,29.0]	
Age in Months				
6-11	37	2,179		
	[34.2,39.9]			
12-23	43.1	4,190	21.4	4,189
	[40.8,45.4]		[19.5,23.3]	
24-35	43.1	4,045	28.5	4,042
	[40.7,45.5]		[26.5,30.5]	
36-47	41.6	3,826	29.1	3,825
	[39.2,44.1]		[27.0,31.4]	
48-59	42.7	3,174	29.9	3,171
	[40.0,45.4]		[27.7,32.2]	
Zone				
North Central	51.3	3,170	16.4	2,759
	[45.5,57.1]		[13.5,19.9]	
North East	15.0	3,651	7.6	3,176
	[11.6,19.0]		[5.4,10.6]	
North West	15.5	4,932	9.2	4,283
	[12.5,19.1]		[6.9,12.1]	
South East	41.5	1,578	45.4	1,425
	[36.8,46.4]		[41.0,50.0]	
South South	64.7	1,903	43.5	1,686
	[58.9,70.1]		[38.3,48.9]	
South West	70.4	2,180	47.6	1,898
	[66.4,74.1]		[44.4,50.9]	
State				
Abia	48	244	62.1	214
	[38.1,58.0]		[51.6,71.7]	
Adamawa	33.2	440	19.8	389
	[23.2,44.9]		[12.4,30.0]	
Akwa-Ibom	68.6	287	35.4	260
	[53.4,80.7]		[26.5,45.4]	
Anambra	39.9	238	57.1	217
	[29.9,50.9]		[48.0,65.8]	

Table 25 continued

Background Characteristics	Children age 6-59 months who Received vitamin A tables		Children age 12-59 months given an anthelminthic drug	
	%	N	%	N
Bauchi	13.6	784	5.5	670
	[7.6,23.3]		[2.2,13.2]	
Bayelsa	63.3	313	47.8	276
	[49.9,74.9]		[34.3,61.7]	
Benue	43.4	429	9.2	370
	[29.1,58.8]		[4.9,16.5]	
Borno	13.8	623	5.5	532
	[6.5,26.9]		[1.9,14.6]	
Cross River	80.9	361	48.1	310
	[67.1,89.8]		[37.3,59.0]	
Delta	65.8	281	41.8	251
	[51.9,77.5]		[29.8,55.0]	
Ebonyi	32	435	15.1	391
	[20.3,46.4]		[9.1,23.9]	
Edo	61	400	55.2	362
	[50.3,70.7]		[45.9,64.2]	
Ekiti	75.8	297	37.5	251
	[62.2,85.6]		[29.1,46.6]	
Enugu	31.6	373	19.4	341
	[21.4,44.1]		[11.6,30.4]	
FCT	66.3	424	27.6	377
	[53.5,77.0]		[17.6,40.5]	
Gombe	8.8	681	5.9	589
	[3.9,18.6]		[1.9,17.2]	
Imo	52.8	288	62.2	262
	[43.8,61.6]		[52.9,70.7]	
Jigawa	16.3	769	16.5	662
	[9.2,27.1]		[8.1,30.6]	
Kaduna	14	648	9.1	560
	[7.3,25.2]		[4.0,19.3]	
Kano	19.5	627	9.6	541
	[13.1,27.9]		[5.6,16.0]	
Katsina	19	731	8.6	628
	[11.0,30.9]		[4.4,16.0]	
Kebbi	20.2	754	12.2	658
	[12.2,31.4]		[6.7,21.0]	
Kogi	61.4	383	8	326
	[44.0,76.3]		[4.4,14.1]	
Kwara	79.4	417	40.1	359
	[68.1,87.4]		[26.6,55.3]	
Lagos	79.7	522	64.4	463
	[73.6,84.7]		[59.4,69.1]	
Nasarawa	22.7	440	8.8	386
	[12.0,38.9]		[5.6,13.5]	
Niger	51.7	638	9.5	557
	[36.2,66.9]		[5.5,15.9]	

Table 25 continued

Background Characteristics	Children age 6-59 months who Received vitamin A tables		Children age 12-59 months given an anthelminthic drug	
	%	N	%	N
Ogun	62.5	408	55.4	352
	[52.5,71.6]		[46.5,64.0]	
Ondo	70.9	337	30.6	294
	[60.5,79.5]		[22.8,39.8]	
Osun	63.2	250	25.8	217
	[48.9,75.5]		[17.8,35.8]	
Oyo	62.6	366	43.9	321
	[52.1,72.0]		[35.5,52.7]	
Plateau	36	439	22.1	384
	[23.0,51.4]		[13.4,34.2]	
Rivers	54.8	261	40.5	227
	[40.6,68.2]		[27.1,55.5]	
Sokoto	9.9	710	5.5	632
	[4.9,18.8]		[2.1,14.1]	
Taraba	8.1	459	7.5	416
	[3.9,15.9]		[3.1,16.8]	
Yobe	7.7	664	0.9	580
	[3.5,16.2]		[0.1,5.9]	
Zamfara	1.4	693	0.8	602
	[0.5,4.1]		[0.3,2.3]	

Note: results in brackets are 95% confidence interval

Conclusion and Recommendations

The Global Nutrition Report (GNR) 2015 places Nigeria among the countries displaying commitment to reduce hunger and improve children and women nutrition. Although it still is one of the five large low-middle income countries where more than half of children under age 5 are either stunted or wasted, the trends in meeting the global WHAR targets are positive and Nigeria is obtaining "some progress"[103].

Survey results seem consistent with the GNR 2015 findings, as the overall GAM (and SAM) prevalence for under-five children is reported at 7.2 (and 1.8) percent, whereas the same indicators were reported at 8.7 (and 2.2) percent in 2014. In addition, none of the states surveyed this year reported GAM and SAM above critical WHO cut off points[104], and there has also been a slight reduction in the underweight indicator (19.4 percent compared to 21 percent in 2014). Stunting is still the largest burden, thus indicating a long term nutritional problem in the country, and the indicator is quite stable (33 percent), confirming an overall prevalence positively below Sub-Saharan regional level (37 percent). In terms of overweight, national prevalence has not changed since last year (1.6 percent) and the prevalence is below the 7 percent threshold in all the 37 domains. The prevalence of under 5 children who are not stunted or wasted is 63 percent.

These results are particularly encouraging, also considering that the 2014 survey was conducted between February and May – hence before the expected hunger gap – while the 2015 survey has been conducted during the lean season – July and September – which corresponds with the rainy season and greatest hunger needs, especially in the Northern area of the country.

The reduction in child malnutrition is good news, but the battle is far from won. Children growing up healthy are still a minority in the North West and North East of Nigeria: global acute malnutrition is above warning threshold in five states (Borno, Jigawa, Katsina, Sokoto and Yobe), severe acute malnutrition in six (Borno, Delta, Katsina, Kebbi, Sokoto and Yobe). Underweight is critical in Katsina, Kebbi, Sokoto, Yobe and particularly in Jigawa, where it exceeds 40 percent. Jigawa has also the highest rate among all states surveyed in terms of severe underweight (13 percent). In 9 states of the13 states of the two Northern regions, more than half of the under 5 children are stunted.

---

[103]The other four countries are Bangladesh, Democratic Republic of the Congo, Ethiopia, and Pakistan. 2015 Global Nutrition Report, International Food Policy Research Institute, 2015.

[104]The WHO classification of Malnutrition Prevalence considers GAM acceptable if < than 5%, precarious if comprised between 5 and 10%, serious if comprised between 10 and 15% and critical if above 15%. As for Chronic Malnutrition, acceptable prevalence should be < 20%, precarious comprised between 20 and 30%, serious between 30 and 40%, and critical above 40%. Underweight threshold are respectively set at 10% (acceptable), 20% (precarious), 30% (serious) and above 30% (critical). SAM prevalence is considered critical if above 2%.

Beside Northern children, categories more at risk appear to be boys (as compared to girls) and younger children (less than 2 years old). Interventions in the critical window of first 1,000 days of life and a greater focus on boys in nutrition assessment, programming, and policy is highly advised.

The situation changes dramatically when assessing the nutritional status of women. Although the geographical distribution of women acute malnutrition is consistent with previous nutrition surveys, the situation has deteriorated since 2014. Overall, 7 percent of Nigerian women of reproductive age were reported as malnourished (MUAC < 221 mm) and 4 percent as severely malnourished (MUAC < 214 mm), whereas last year the prevalence of global acute malnutrition and severe acute malnutrition were at 5 and 2 percent respectively (NNHS 2014). The situation was found particularly serious in the North West and the North East, where global acute malnutrition prevalence was at 14 and 12 percent respectively and severe acute malnutrition prevalence at 7 percent in both regions. Ten states – compared to five in last year NNHS survey – had acute malnutrition indicators over 10 percent. The increase has been acutely critical in Katsina (plus 12 percent), Zamfara (plus 8 percent) Sokoto (plus 7 percent), Kebbi (plus 6 percent) and Yobe (plus 5 percent). Further investigation is therefore needed to understand the reasons for such an increase of malnutrition indicators among women of reproductive age in these domains, also considering that the situation of women has greatly deteriorated as compared to that of children.

According to survey results, younger mothers appear more disadvantaged nutritionally. Emerging research shows the importance of the nutrition of adolescent girls for birth outcomes and subsequent nutrition throughout the lifecycle[105], making it very urgent to develop effective interventions for the adolescent preconception period.

Reproductive health findings are consistent with women malnutrition pattern reported in the country: Southern states (and older women) have better rates in terms of skilled attendance at delivery, use of contraceptive methods, antenatal care (ANC) coverage and HIV testing during ANC. Specific family planning programs to diffuse awareness of skilled birth attendants and ANC, HIV testing and contraceptive benefits are highly advised, especially in the North East and North West, where almost one in four women was found pregnant, but more than 60 percent of all pregnant women did not receive skilled care during childbirth, only 14 percent used any contraceptive method, 36 percent attended the prescribed ANC and only 15 percent was HIV tested.

[105]Mother's nutritional status at the time of conception can influence her child's epigenome, with likely lifelong implications. Maternal nutrition at conception modulates DNA methylation of human metastable epialleles, Dominguez-Salas et al., Nature, 2014.

In terms of children's health, DTP/Penta 3, and especially measles, immunisation coverage were found still far below the 90 percent coverage target. Compared to 2014, DTP/Penta 3 coverage has dropped from 52 to 49 percent, while measles coverage from 64 to 51 percent, thus indicating that nearly half percent of eligible children received no vaccine at all. Great variability was again observed, with South-West and South-East having consistently higher coverage, and the North-West and North-East being persistently least performing. The North West has also reported the greatest drop in immunisation coverage, as compared to 2014 (- 8.7 percentage points for DTP/Penta 3 and -21 percentage points for measles). In the case of measles, this finding could be related to the measles campaign delivered in late 2013, which was still displaying its positive effect in 2014. It must also be reminded that immunisation data are prevalently based on mothers' (caregivers) recall, therefore such poor immunisation coverage could also be explained by the difference in timing of data collection, which took place more than 6 weeks from the May round of the MNCHW. It is therefore urgent to improve immunisation coverage and particularly in the North East and North West of Nigeria, where polio campaigns are conducted frequently and missing such percent of children shows the need to improve immunisation program.

According to survey results, nearly 42 percent of the children aged between 6 to 59 months received vitamin A supplement in the 6 months prior to the survey, which means that still three in five Nigerian children do not receive adequate levels of supplementation and may be growing up with Vitamin A deficiency. This finding – which represents a deterioration of 7 percentage points compared to NNHS 2014 – is consistent with NHS 2013 findings (41 percent). According to UNICEF standard a coverage threshold of 70 percent is the minimal coverage at which countries can expect to observe reductions in child mortality[106]. In the 37 domains surveyed, only five were above the prescribed threshold, and the situation is particularly critical in Gombe, Sokoto, Taraba, Yobe and Zamfara, where less than one child in ten has received vitamin A supplement.

Overall 27 percent of children age 6-59 months have received deworming medication, the coverage of which at zone level ranges from 8 (North East) to 48 percent (South West). Variability is even more pronounced at state level, ranging from less than 1 percent in Yobe and Zamfara to 64 percent in Lagos. Deworming coverage was over 50 percent in only six states, but these results substantially differ from NNHS 2014 findings and should be taken with caution since they are based on mother's recall. In any case, since Sub-Saharan Africa has the highest prevalence of helminths parasites worldwide[107], all domains should be supported to improve coverage of deworming.

[106]Tracking progress on child and maternal nutrition: A survival and development priority, UNICEF 2009
[107]Soil transmitted helminth infection: Fact sheet No 366, WHO, 2013

Overall 15 percent of children under 5 years were reported to have had diarrhoea in the two weeks preceding the survey. Nearly three in four children who had diarrhoea received no treatment at all. In case of treatment, children prevalently received ORS (21 percent) and only 6 percent recieved zinc tablets. Although some progress to incorporate zinc in the treatment for diarrhoea has been made, there still exists a gap in the knowledge, attitudes, and practice (KAP) in relation to appropriate treatment practices for diarrhoea among caregivers in Nigeria[108]. Nearly 45 percent of children with diarrhoea were aged 6-23 months, thus implying that complementary feeding introduction is a very delicate transition period and continued breastfeeding until age 2 is highly recommended.

Women's and children's health findings are consistent with low Maternal New-born and Child Health Weeks (MNCHW) campaigns coverage. According to survey results, overall, only 29 percent of households surveyed lived in an area where a MNCHW campaign was implemented, and less than half (14 percent) received some MNCHW services. Households located in the North East and South East had even less chance of benefitting of an MNCHW campaign (only 4 percent of households received some service). Considering all health indicators reviewed, MNCHWs should definitely be implemented and improved to reach more women and children.

As for malaria, survey results indicate that 60 percent of households in the survey domain possess at least one mosquito net, a great improvement compared to NNHS 2014 and MICS 2011, where 53 and 45 percent were reported respectively. However the custom of protecting children, by making them sleep under a mosquito nets, is still low (nearly 60 percent of surveyed household possess a mosquito net, but only 40 percent of children sleep under them), it has undergone a great improvement. Last year only one in four children was sleeping under a mosquito net, while this year there were two in five children. At regional level, greatest achievements were reported in the Northern zones, where rates where all above 40 percent. A very odd data is that of Katsina, where 90 percent of net was reported, but only 24 percent of children slept under them. Although it should be interpreted with caution, this finding raises the issue of ownership of nets, which does not always translate to usage. Post distribution educational campaign should therefore be incorporated into future distribution campaigns to help increase net utilisation.

Overall 23 percent of children reported to have had fever before the survey, Fever prevalence was highest in the South South and South East zones (34 and 32 percent respectively) – where malaria is known to be most predominant. Despite the consistent number of children affected by fever – nearly one in four – and despite WHO recommendations – only 9 percent of them were reported to have

[108]Knowledge, attitude and practice of home management of childhood diarrhoea among caregivers of under-5 children with diarrhoeal disease in northwestern Nigeria. *Journal of Tropical Pediatrics 2012*.

been tested from a finger or a heel with Rapid Diagnostic Testing (RDT). Overall, 35 percent of children with fever were given an anti-malarial treatment – but only 14 percent received artemisinin combination therapies (ACTs), which should be the first line treatment for malaria. In conclusion, despite national malaria prevention programs having an impact and progress being achieved, the proportion of children who receive first line treatment is still severely below the national target – at least 80 percent by 2010, as specified in the National Malaria Strategic Plan.

For the control of malaria, the National Strategic Plan also recommends early case management against the adverse consequences of malaria in pregnancy with three or more doses of sulphadoxin pyrimethamine (SP)/Fansidar. However, a decade after the policy recommendation, the coverage of intermittent preventive treatment of malaria in pregnancy (IPT) use during pregnancy is still very low and only 6 percent of women aged 15-49 years who had a live birth during the two years preceding the survey took SP/Fansidar three or more times during ANC. The percentage was double for older women, as compared to teenagers (6 versus 3 percent).

The gap between Northern and Southern zones is still significant, and the problem becomes even more severe when comparing the female gender in these zones with the rest of the country[109]. In the light of this and other survey findings, policy and programme implementation should discourage a "one size fit all" approach and ensure specific focus by zone, state and age groups. In this regard, it would be strongly advised to follow WHO latest recommendations for reducing malnutrition. Given that most, if not all, countries affected by malnutrition lack the resources to fully and immediately scale up all necessary interventions, the most cost-effective scenario should be to scale up a subset of these interventions in the highest-burden regions of the country. This scenario is estimated to be between 1.5 and 3.3 times more cost-effective than scaling up all 10 interventions nationwide[110].

The situation is extremely critical in the Northeast, due to Boko Haram conflict: new harvest stocks is improving food availability, but production is well below average. According to FEWS NET monitoring, much of Borno, Yobe, and Adamawa, will be in Crisis through March 2016. The situation should therefore be addressed with priority.

---

[109]Patterns of Inequality in Human Development Across Nigeria's Six Geopolitical Zones, Developing Countries Studies, IISTE, 2014

[110]The World Bank, with support from the Bill & Melinda Gates Foundation, has been working to assess cost-effectiveness of nutrition-specific interventions that have been shown to be effective in reducing malnutrition in five countries. These studies have analysed the costs of scaling up 10 nutrition-specific interventions according to three different settings, and then linked these costs to expected impacts, including lives saved, cases of stunting averted, and disability-adjusted life years saved. Possible scenario were: (1) focusing on only the regions with the highest burden of malnutrition, (2) scaling up only a subset of interventions, and (3) scaling up a subset of interventions only in the regions with the highest burden of malnutrition. Given that most, if not all, countries lack the resources to fully and immediately scale up all interventions, the most cost-effective scenario was found to scale up a subset of the 10 interventions in the highest-burden regions of the country. This scenario would be between 1.5 and 3.3 times more cost-effective than scaling up all 10 interventions nationwide. Disease Control Priorities. In Developing Countries – Bill & Melinda Gates Foundation and WHO.

The final remainder of this report concerns the data quality issue. Overall report score is acceptable, however only 37 percent of children were found to have exact age calculated, which is slightly lower than 2014 findings (40 per cent). Children and women age distribution is still distorted by age heaping, thus affecting survey findings based on age. This is particularly visible in the children HAZ curve, which is flatter than normal. The overall ratio of boys to girls was within the 1.2 range, however in three states had boys/girls ratio above 1.2 which might indicate a sex bias in these domains. A great variability was also reported among teams and states. More effort is strongly advised in future surveys to correct these trends and improve overall data quality.

References

Summary of Child Survival Partnership, The Lancet under nutrition series, 2008

Federal Ministry of Health Saving newborn lives in Nigeria: Newborn health in the context of the Integrated Maternal, Newborn and Child Health Strategy, Second edition, 2011

Tracking Progress on Child and Maternal Nutrition, UNICEF 2009

UNICEF Global Nutrition Database, 2012, based on MICS, DHS and other national surveys, 2007–2011

Children reducing mortality: Fact Sheet 178, September 2014, WHO Media Centre

UNHCR Standardised Expanded Nutrition Survey Guidelines for Refugee Populations, UNHCR 2013.

An Assessment of the Age Reporting in the IPUMS-Microdata, Minnesota Population Center, Minnesota University 2014.

WHO Child growth standards and the identification of severe acute malnutrition in infants and children, A Joint Statement, WHO and UNICEF, 2009

United Nation Children's Fund, World Health Organization. The World Bank, UNICEF-WHO-World Bank Joint Child Malnutrition Estimates, 2013

FEWSNET, Nigeria, October 2015-March 2016.

WHO, Global Database on Child Growth and Malnutrition at
http://www.who.int/nutgrowthdb/about/introduction/en/index2.html

2015 Global Nutrition Report, International Food Policy Research Institute, 2015.

Test characteristics of MUAC, University of Gent, 2012.

Validation of arm circumference is an indicator of risk of death in one to four years old children. Nutrition Research 1986.

The Nutrition Challenge in Sub-Saharan Africa, Regional Bureau for Africa, UNDP 2012.
UNICEF Global Nutrition Database, 2012, based on MICS, DHS and other national surveys, 2007–2011.

Proposed Global Targets for Maternal, Infants and Young Children Nutrition, WHO, 2012.

The determinants of child health and nutrition-A meta-analysis. Washington, D.C.: World Bank 2005

Are determinants of Rural and Urban Food Security and Nutritional Status Different? Some Insights from Mozambique. World Development, 1999

Nutrition in the first 1,000 days, State of the World's Mothers 2012, Save the Children, 2012

Tracking progress on Child and Maternal Nutrition, A survival and development priority, Unicef 2009

Nigerian National Routine Immunisation Strategic Plan (2013-15), National Primary Health Care Development Agency, Nigeria 2012.

The Nigerian Vaccine Wastage Study Report – November 2011, WHO-UNICEF-CDC.

Measles, Fact sheet N°286 - Reviewed February 2015, WHO.

Measles pre-elimination Programme Fact sheet, Regional Office for Africa, WHO, 2014

Northern Nigeria Maternal, Newborn and Child Health Programme: Selected Analyses from Population-Based Baseline Survey. Columbia University 2012.

Determinants of routine immunization coverage in Bungudu, Zamfara State, Northern Nigeria, May 2010, Pan African Medical Journal 2014.

Childhood Malnutrition and Infection Network. Multi-country analysis of the effects of diarrhoea on childhood stunting. Int Journal of Epidemiology 2008.

Diarrhoea incidence in low- and middle income countries in 1990 and 2010: a systematic review. BMC Public Health 2012.

Assessment of the risk of zinc deficiency in populations and options for its control. International Zinc Nutrition Consultative Group (IZiNCG) technical document #1. Food Nutrition Bulletin 2004.
Global and regional child mortality and burden of disease attributable to zinc deficiency. European Journal of Clinical Nutrition 2009.

Therapeutic effects of oral zinc in acute and persistent diarrhea in children in developing countries: pooled analysis of randomized controlled trials. American Journal of Clinical Nutrition 2000.

Nigeria food consumption and nutrition survey 2001-2003: summary. International Institute of Tropical Agriculture, 2004.

Promotion of Zinc Tablets with ORS through Child Health Weeks Improves Caregiver Knowledge, Attitudes, and Practice on Treatment of Diarrhoea in Nigeria, International Center for Diarrhoeal Disease Research, Health and Population Nutrition Journal, 2015.

Knowledge, attitude and practice of home management of childhood diarrhoea among caregivers of under-5 children with diarrhoeal disease in northwestern Nigeria. Journal of Tropical Pediatrics 2012.

WHO Readings on diarrhoea, student Manual 1992

Diarrhea is a Major killer of Children with Severe Acute Malnutrition Admitted to Inpatient Set-up in Lusaka, Zambia, Nutrition Journal 2011.

Incidence of acute lower respiratory infections in a low socioeconomic community, Nigerian Journal of Paediatrics 1991

Acute respiratory infections in Nigerian children: prospective cohort study of incidence and case management, Journal of Tropical Pediatrics, 1994

Malaria continues to threaten pregnant women and children. Washington, DC: Population Reference Bureau; 2001.

Nigeria. Federal Ministry of Health, National Malaria Control Programme. Strategic Plan 2009-2013: "A Road Map for Malaria Control in Nigeria", abridged version. Abuja: Yaliam Press; 2009

Nigeria Malaria Indicator Survey, Nigeria 2010.

Ownership and utilisation of long lasting insecticide treated nets following free distribution campaign in South West Nigeria, Pan African Medical Journal, 2014.
Sleeping under Insecticide-treated Nets to Prevent Malaria in Nigeria: What Do We Know? Health and Population Nutrition Journal, 2013.

Population based prevalence of malaria among pregnant women in Enugu State, Nigeria: the Healthy Beginning Initiative. Malaria Journal 2015.

World Health Organisation. Roll Back Malaria Factsheet No.94. Geneva, 2001.

Strategic Plan for Rolling Back Malaria in Nigeria 2001-2005. Abuja, Nigeria: Federal Ministry of Health; 2001. Federal Ministry of Health

Knowledge and utilization of intermittent preventive treatment for malaria among pregnant women attending antenatal clinics in primary health care centers in rural southwest, Nigeria: a cross-sectional study. BMC Pregnancy Childbirth, 2009.

Perceptions of intermittent preventive treatment of malaria in pregnancy (IPTp) and barriers to adherence in Nasarawa and Cross River States in Nigeria, Malaria Journal 2013.

Ransom Elder, Nutrition of Women and Adolescent Girls: Why It Matters, Population Reference Bureau, 2003

Which Anthropometric Indicators Identify a Pregnant Woman as Acutely Malnourished and Predict Adverse Birth Outcomes in the Humanitarian Context? PLoS Currents, June 2013

Progress for Children: a Report Card on Maternal Mortality, UNICEF 2008

WHO, UNICEF, UNFPA and The World Bank estimates. Trends in maternal mortality: 1990 to 2010.

Contraceptive practices in Nigeria: Literature review and recommendation for future policy decisions, Journal of Contraception, May 2010.

Late antenatal care booking and its predictors among women in south western Nigeria. Online Journal of Health Allied Science 2008.

The Millennium Development Goals Report 2015, United Nations 2015.

Gestational age at booking for antenatal care in a tertiary health facility in north-central, Nigeria. Nigeria Medical Journal December 2012.
UNAIDS report on the global AIDS epidemic. 2010. Joint United Nations program on HIV/AIDS.
World Health Organization, Joint United Nations Programme on HIV/AIDS, United Nations Children's Fund, Towards Universal Access: Scaling up Priority HIV/AIDS Interventions in the Health Sector. Progress report, 2011

Government of Nigeria, Federal Ministry of Health, National Strategic Plan for HIV/AIDS 2010-2015.

UNAIDS. 2014 Progress Report on the global plan towards the elimination of new HIV infections among children by 2015 and keeping their mothers alive. 2014.

An end to perinatal HIV: Success in the US requires ongoing and innovative efforts that should expand globally. Journal of Public Health Policy 2007

Provider Initiated HIV Testing During Antenatal Care and Labour – Knowledge and Acceptability of Patients in a Nigeria Teaching Hospital, European Journal of Preventive Medicine, July 2015.

Nigeria Millennium Development Goals. 2013 Report.

National Guidelines for the Development of Primary Health Care System in Nigeria. NPHCDA 2012.

Tracking progress on child and maternal nutrition: A survival and development priority, UNICEF 2009

Vitamin A Supplementation: A decade of progress, The United Nations Children's Fund (UNICEF), 2007

Guideline: Vitamin A supplementation in infants and children 6–59 months of age, World Health Organization, Geneva 2011

Tracking progress on child and maternal nutrition: A survival and development priority, UNICEF 2009

Deworming to combat the health and nutritional impact of helminth infections, WHO, 2014

Soil transmitted helminth infection: Fact sheet No 366, WHO, 2013

2013 Nigeria MDGs Report, UNDP, 2013

Nigeria Food Security Outlook, October 2014 to March 2015 (FEWS NET)

WHO Multicentre Growth Reference Study Group: WHO Child Growth Standards: Length/ height-for-age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-age: Methods and development. Geneva, World Health Organization, 2006.

WHO. Physical Status: The Use and Interpretation of Anthropometry – Report of a WHO Expert. Committee. Technical Report Series 854. Geneva, World Health Organization, 1995.

Nigeria: National Bureau of Statistics; Final Report Multiple Indicator Cluster Survey 2011, January 2012

SMART (Standardised Monitoring and Assessments of Relief and Transition) Guidelines: SMART methodology version 2006.

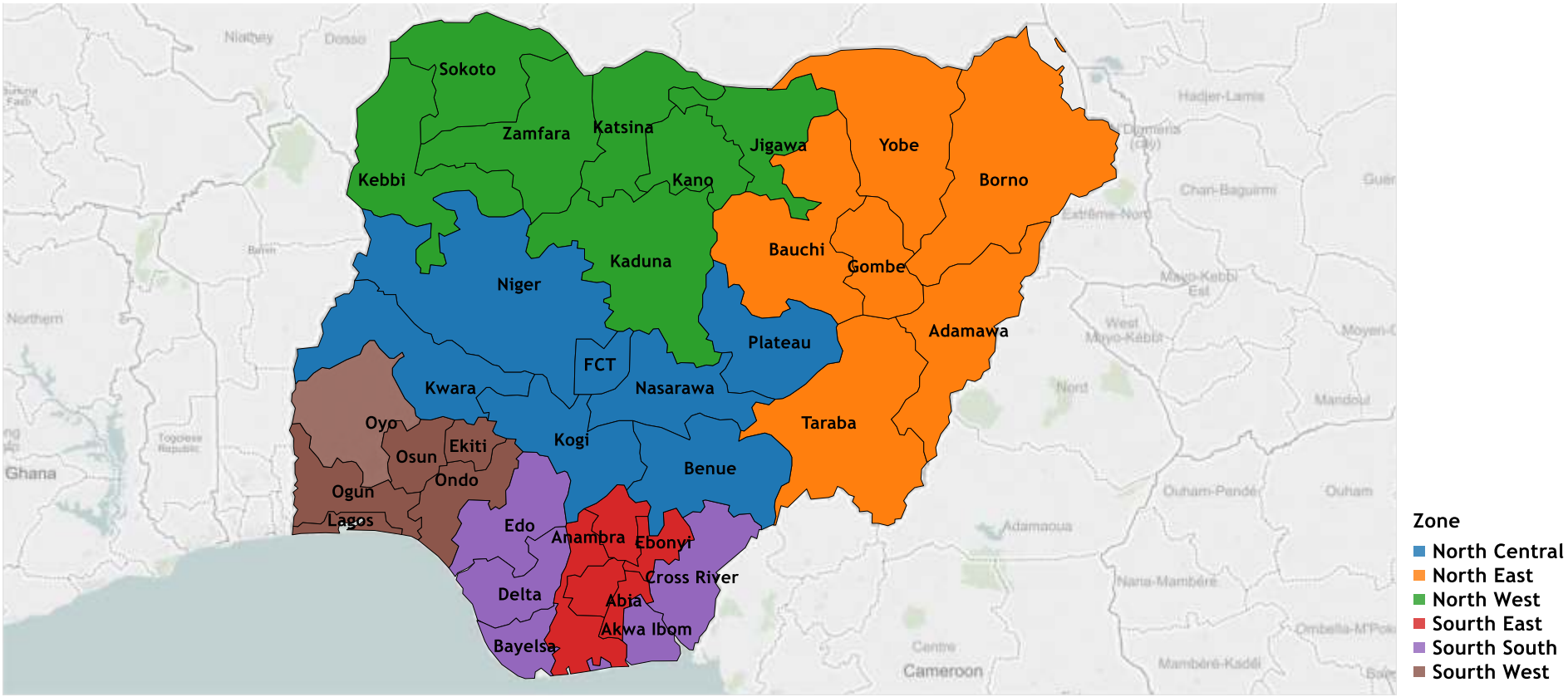
National Population Commission (NPC) [Nigeria]. Nigeria Demographic and Health Survey 2013. Calverton, Maryland, USA: National Population Commission and ICF Macro.

Nigeria: Family Planning Analysis: Selected Demographic and Socio-Economic Variables, UNFPA, 2010.

Annexes

Annex 1: Nigeria Geopolitical Map

Map of Nigeria by Geo-political Zones



Annex 2: Data Quality

Annex 2A

State	Sample Size Total (Including Missing)	Overall Quality Score	Number of duplicates	% with no exact birthday	# Missing WH	WH # flags SMART	WH # flags WHO	# Missing HA	HA # flags SMART	HA # flags WHO	% Missing Ht./ Wt.
Abia	303	3	0	53	26	2	1	29	9	1	8.6%
Adamawa	487	9	0	62	9	8	2	8	12	1	1.8%
Akwa Ibom	329	5	0	52	8	3	0	7	18	2	2.4%
Anambra	291	8	0	55	17	2	1	21	10	0	5.8%
Bauchi	902	13	0	83	22	17	4	29	39	11	2.4%
Bayelsa	353	6	0	69	4	6	2	5	16	2	1.1%
Benue	495	6	0	66	12	12	1	21	24	3	2.4%
Borno	704	1	0	88	9	8	0	15	12	2	1.3%
Cross River	415	0	0	44	6	9	2	8	18	1	1.4%
Delta	323	10	0	63	3	2	1	5	13	0	0.9%
Ebonyi	501	9	0	39	4	15	5	10	23	2	0.8%
Edo	468	2	0	29	21	3	0	24	16	0	4.5%
Ekiti	337	3	0	34	7	4	0	9	13	3	2.1%
Enugu	426	1	0	34	11	8	0	12	16	1	2.6%
FCT Abuja	509	0	0	33	28	9	4	29	23	2	5.5%
Gombe	771	9	0	67	22	22	2	22	43	7	2.9%
Imo	350	7	0	46	22	5	0	28	8	0	6.3%
Jigawa	891	19	0	89	14	22	7	19	35	10	1.6%
Kaduna	735	19	0	68	4	21	1	5	32	7	0.5%
Kano	741	10	0	86	31	18	2	36	28	1	4.2%
Katsina	834	13	0	79	20	31	5	20	44	7	2.4%
Kebbi	848	25	0	84	6	28	8	5	28	7	0.7%
Kogi	448	13	0	16	12	1	0	13	6	1	2.7%
Kwara	479	2	0	23	9	6	1	11	25	3	1.9%

Annex 2 A continued

State	Sample Size Total (Including Missing)	Overall Quality Score	Number of duplicates	% with no exact birthday	# Missing WH	WH # flags SMART	WH # flags WHO	# Missing HA	HA # flags SMART	HA # flags WHO	% Missing Ht./Wt.
Lagos	603	3	0	23	15	9	3	17	20	1	2.5%
Nasarawa	511	8	0	67	12	7	1	12	20	4	2.3%
Niger	721	15	0	70	12	13	3	9	30	3	1.7%
Ogun	484	1	0	25	11	2	0	12	12	0	2.3%
Ondo	382	7	0	49	13	12	2	16	18	4	3.4%
Osun	277	4	0	37	5	5	1	5	10	2	1.8%
Oyo	423	1	0	37	5	5	1	5	10	2	1.2%
Plateau	491	9	0	56	7	10	1	8	25	2	1.4%
Rivers	303	2	0	60	3	4	2	1	13	4	1.0%
Sokoto	822	15	0	90	5	23	6	6	29	5	0.6%
Taraba	523	6	0	73	7	10	1	7	19	1	1.3%
Yobe	778	8	0	97	17	15	2	19	27	4	2.2%
Zamfara	802	23	0	89	12	22	3	14	29	7	1.5%
AVERAGE		8	0.00	57.72	12.19	10.78	2.03	14.11	20.89	3.05	0.02

Annex 2B

State	% flags WHZ (SMART)	% flags HAZ (SMART)	% flags WHZ (WHO)	% flags HAZ (WHO)	WHZ mean (SMART flags)	WHZ mean (WHO flags)	SD WH (WHO)	SD WH (SMART)	SD HA (WHO)	SD HA (SMART)	overall sex ratio Chi2
Abia	0.7%	3.3%	0.4%	0.4%	-0.47	-0.45	1.04	1.02	1.35	1.21	0.848
Adamawa	1.7%	2.5%	0.4%	0.2%	-0.30	-0.35	1.17	1.09	1.34	1.22	0.924
Akwa Ibom	0.9%	5.6%	0.0%	0.6%	-0.64	-0.62	1.01	0.94	1.46	1.19	0.637
Anambra	0.7%	3.7%	0.4%	0.0%	-0.23	-0.25	0.98	0.96	1.33	1.13	0.517
Bauchi	1.9%	4.5%	0.5%	1.3%	-0.45	-0.46	1.17	1.09	1.37	1.22	0.239
Bayelsa	1.7%	4.6%	0.6%	0.6%	-0.15	-0.16	1.07	1.01	1.37	1.18	0.062
Benue	2.5%	5.1%	0.2%	0.6%	-0.03	-0.06	1.08	0.93	1.45	1.25	0.362
Borno	1.2%	1.7%	0.0%	0.3%	-0.66	-0.69	1.10	1.04	1.20	1.13	0.841
CrossRiver	2.2%	4.4%	0.5%	0.2%	-0.50	-0.49	1.14	1.04	1.48	1.24	0.188
Delta	0.6%	4.1%	0.3%	0.0%	-0.28	-0.26	1.00	0.97	1.44	1.28	0.257
Ebonyi	3.0%	4.7%	1.0%	0.4%	-0.36	-0.37	1.14	1.02	1.45	1.21	0.069
Edo	0.7%	3.6%	0.0%	0.0%	-0.34	-0.34	1.06	1.02	1.35	1.19	0.619
Ekiti	1.2%	4.0%	0.0%	0.9%	-0.29	-0.30	1.02	0.95	1.27	1.08	0.908
Enugu	1.9%	3.9%	0.0%	0.2%	-0.15	-0.20	1.13	1.00	1.37	1.19	0.148
FCT Abuja	1.9%	4.8%	0.8%	0.4%	-0.24	-0.25	1.08	1.02	1.44	1.22	0.357
Gombe	2.9%	5.7%	0.3%	0.9%	-0.40	-0.44	1.17	1.02	1.45	1.21	0.618
Imo	1.5%	2.5%	0.0%	0.0%	-0.36	-0.42	1.11	1.03	1.33	1.18	0.099
Jigawa	2.5%	4.0%	0.8%	1.1%	-0.56	-0.56	1.19	1.11	1.40	1.21	0.040
Kaduna	2.9%	4.4%	0.1%	1.0%	-0.35	-0.37	1.27	1.13	1.38	1.22	0.084
Kano	2.5%	4.0%	0.3%	0.1%	-0.45	-0.47	1.18	1.07	1.41	1.22	0.721
Katsina	3.8%	5.4%	0.6%	0.9%	-0.46	-0.50	1.25	1.09	1.46	1.23	0.740
Kebbi	3.3%	3.3%	1.0%	0.8%	-0.49	-0.53	1.22	1.09	1.36	1.19	0.799
Kogi	0.2%	1.4%	0.0%	0.2%	-0.18	-0.17	0.98	0.96	1.21	1.16	0.878
Kwara	1.3%	5.3%	0.2%	0.6%	-0.33	-0.32	1.10	1.03	1.41	1.18	0.961
Lagos	1.5%	3.4%	0.5%	0.2%	-0.41	-0.39	1.05	0.99	1.36	1.20	0.694
Nasarawa	1.4%	4.0%	0.2%	0.8%	-0.13	-0.17	1.12	1.06	1.32	1.17	0.140

Annex 2B continued

State	% flags WHZ (SMART)	% flags HAZ (SMART)	% flags WHZ (WHO)	% flags HAZ (WHO)	WHZ mean (SMART flags)	WHZ mean (WHO flags)	SD WH (WHO)	SD WH (SMART)	SD HA (WHO)	SD HA (SMART)	overall sex ratio Chi2
Niger	1.8%	4.2%	0.4%	0.4%	-0.35	-0.34	1,.10	1.,00	1.40	1.23	0.048
Ogun	0.4%	2.5%	0.0%	0.0%	-0.45	-0.46	1.05	1.03	1.36	1.23	0.656
Ondo	3.3%	4.9%	0.5%	1.1%	-0.37	-0.43	1.08	0.94	1.38	1.21	0.663
Osun	1.8%	3.7%	0.4%	0.7%	-0.39	-0.42	1.07	0.98	1.34	1.16	0.032
Oyo	1.2%	2.4%	0.2%	0.5%	-0.39	-0.42	1.07	0.98	1.34	1.16	0.531
Plateau	2.1%	5.2%	0.2%	0.4%	-0.16	-0.15	1.08	0.97	1.49	1.28	0.739
Rivers	1.3%	4.3%	0.7%	1.3%	-0.25	-0.23	0.98	0.95	1.36	1.19	0.421
Sokoto	2.8%	3.6%	0.7%	0.6%	-0.55	-0.55	1.22	1.11	1.36	1.19	1.000
Taraba	1.9%	3.7%	0.2%	0.2%	-0.08	-0.08	1.18	1.08	1.34	1.18	0.780
Yobe	2.0%	3.6%	0.3%	0.5%	-0.66	-0.67	1.14	1.05	1.32	1.16	0.003
Zamfara	2.8%	3.7%	0.4%	0.9%	-0.22	-0.22	1.26	1.13	1.30	1.16	0.426
AVERAGE	0.02	0.04	0.00	0.01	-0.37	-0.39	1.15	1.05	1.50	1.35	0.488

Annex 2C

State	Overall age distribution Chi2	DPS Weight	DPS Height	DPS MUAC	Skewness WHZ WHO	Skewness WHZ SMART	Kurtosis WHZ WHO	Kurtosis WHZ SMART	Poisson distribution SMART WHZ
Abia	0.477	6	6	8	-0.11	-0.20	0.10	-0.07	0.06
Adamawa	0.020	4	8	8	-0.39	-0.02	0.63	-0.39	0.30
Akwa Ibom	0.165	4	8	8	0.36	0.06	2.29	0.31	0.91
Anambra	0.003	8	6	5	-0.47	-0.39	0.44	0.25	0.24
Bauchi	0.000	4	7	8	-0.15	-0.10	0.47	-0.23	0.78
Bayelsa	0.001	5	7	4	0.02	0,05	0.83	-0.13	0.50
Benue	0.066	5	8	8	-0.31	0.02	1.92	-0.11	0.77
Borno	0.159	3	5	6	-0.42	-0.27	0.28	-0.19	0.05
CrossRiver	0.138	5	5	7	0.23	-0.02	1.31	0.16	0.11
Delta	0.214	5	8	7	-0.26	-0.52	1.42	0.69	0.62
Ebonyi	0.770	3	7	10	-0.10	-0.06	1.44	-0.02	0.45
Edo	0.095	3	7	6	0.12	0.02	0.76	-0.18	0.71
Ekiti	0.382	4	6	5	-0.09	-0.03	0.46	-0.53	0.17
Enugu	0.345	6	7	7	-0.36	0.01	1.34	-0.33	0.24
FCT Abuja	0.438	6	5	6	0.04	0.12	0.43	-0.19	0.78
Gombe	0.133	4	6	8	-0.40	-0.22	1.31	0.10	0.01
Imo	0.644	4	5	10	-0.41	-0.08	0.71	-0.03	0.00
Jigawa	0.000	3	6	8	-0.05	-0.07	0.47	-0.20	0.14
Kaduna	0.694	3	8	9	-0.04	-0.10	0.90	-0.35	0.00
Kano	0.000	2	7	6	-0.19	-0.08	0.66	-0.06	0.23
Katsina	0.002	3	8	4	-0.29	-0.20	0.74	-0.26	0.28
Kebbi	0.000	3	8	9	-0.42	-0.27	1.17	0.03	0.00
Kogi	0.000	6	8	5	-0.08	-0.22	0.57	0.16	0.34
Kwara	0.070	5	7	7	-0.01	-0.12	1.00	-0.07	0.12
Lagos	0.069	2	6	6	0.07	-0.04	0.64	0.07	0.03
Nasarawa	0.010	3	9	9	-0.33	-0.07	0.44	-0.11	0.36

Annex 2C continued

State	overall age distribution Chi2	DPS Weight	DPS Height	DPS MUAC	Skewness WHZ WHO	Skewness WHZ SMART	Kurtosis WHZ WHO	Kurtosis WHZ SMART	Poisson distribution SMART WHZ
Niger	0,000	5	5	5	-0.08	-0.22	1.59	-0.10	0.07
Ogun	0,151	5	4	7	-0.14	-0.04	-0.02	-0.26	0.52
Ondo	0,105	4	9	4	-0.51	-0.10	1.35	0.00	0.51
Osun	0,365	7	6	7	-0.38	-0.17	1.23	-0.10	0.44
Oyo	0,473	4	7	7	-0.18	-0.11	0.00	-0.31	0.16
Plateau	0,009	6	9	10	-0.05	-0.21	1.63	0.14	0.75
Rivers	0,207	7	10	5	0.09	-0.12	0.56	0.12	0.42
Sokoto	0,001	5	10	9	-0.06	-0.12	0.78	-0.05	0.68
Taraba	0,001	5	6	7	-0.21	-0.20	0.85	-0.24	0.11
Yobe	0,018	2	6	6	-0.20	-0.18	0.74	-0.16	0.26
Zamfara	0,000	3	9	9	-0.01	-0.09	0.86	-0.38	0.04
AVERAGE	0,168	4	7	7	-0.16	-0.12	0.87	-0.08	0.33

Annex 3: List of Indicators

S.N	Indicators	Numerator	Denominator
1. Child Nutrition			
1.1	**Underweight**		
1.1.1	Underweight prevalence	Number of children under age 5 who fall below minus two standard deviations from the median weight for age of the WHO standard	Total number of children age 0-59 months
1.1.2	Moderate underweight prevalence	Number of children under age 5 who fall between below minus two to greater than or equal to minus three standard deviations from the median weight for age of the WHO standard	Total number of children age 0-59 months
1.1.3	Severe underweight prevalence	Number of children under age 5 who fall below minus three standard deviations from the median weight for age of the WHO standard	Total number of children age 0-59 months
1.2	**Stunting**		
1.2.1	Stunting prevalence	Number of children under age 5 who fall below minus two standard deviations from the median height for age of the WHO standard	Total number of children age 0-59 months
1.2.2	Moderate Stunting prevalence	Number of children under age 5 who fall between below minus two to greater than or equal to minus three standard deviations from the median height for age of the WHO standard	Total number of children age 0-59 months
1.2.3	Severe Stunting prevalence	Number of children under age 5 who fall below minus three standard deviations from the median height for age of the WHO standard	Total number of children age 0-59 months
1.3	**Wasting (Z-Score)**		
1.3.1	Wasting prevalence	Number of children age 0-59 months who fall below minus two standard deviations from the median weight for height of the WHO standard	Total number of children age 0-59 months
1.3.2	Moderate Wasting prevalence	Number of children age 0-59 months who fall between below minus two to greater than or equal to minus three standard deviations from the median weight for height of the WHO standard	Total number of children age 0-59 months
1.3.3	Severe Wasting prevalence	Number of children age 0-59 months who fall below minus three standard deviations from the median weight for height of the WHO standard	Total number of children age 0-59 months
1.4	**Acute malnutrition (MUAC /or bilateral edema)**		
1.4.1	Wasting prevalence	Number of children age 6-59 months who fall below MUAC 125 mm	Total number of children age 6-59 months
1.4.2	Moderate Wasting prevalence	Number of children age 6-59 months fall between below MUAC 125 mm and greater or equal to 115 mm	Total number of children age 6-59 months
1.4.3	Severe Wasting prevalence	Number of children age 6-59 months who fall below MUAC 115 mm	Total number of children age 6-59 months

S.N	Indicators	Numerator	Denominator
1.5	**Acute Malnutrition (WHZ / or bilateral edema)**		
1.5.1	Acute malnutrition prevalence	Number of children age 6-59 months who fall below minus two standard deviations from the median weight for height of the WHO standard	Total number of children age 6-59 months
1.5.2	Moderate acute malnutrition prevalence	Number of children age 6-59 months who fall between below minus two to greater than or equal to minus three standard deviations from the median weight for height of the WHO standard	Total number of children age 6-59 months
1.5.3	Severe acute malnutrition prevalence	Number of children age 6-59 months who fall below minus three standard deviations from the median weight for height of the WHO standard	Total number of children age 6-59 months
1.6	**Overweight**		
1.6.1	Overweight prevalence	Number of children under age 5 who are above two standard deviations of the median weight for height of the WHO standard	Total number of children age 0-59 months
2. Women Nutrition			
2.1	Acute Malnutrition prevalence	Number of women age 15 - 49 years who fall below MUAC 230 mm	Total number of women age 15 to 49
2.2	Moderate Acute Malnutrition prevalence	Number of women age 15 - 49 years who fall between below MUAC 230 mm and greater than or equal to 180 mm	Total number of women age 15 to 49
2.3	Severe Acute Malnutrition prevalence	Number of women age 15 - 49 years who fall below MUAC 180 mm	Total number of women age 15 to 49
3. Child Health			
3.1	Diphtheria, tetanus-pertussis (DTP) or DTP, Hepatitis b and Haemophilus influenza type b (Penta) immunization coverage	Number of children age 12-23 months who received the third dose of DTP/Penta vaccine (DTP3/Penta3) before the survey	Total number of children age 12 to 23 months
3.2	Measles immunization coverage	Number of children age 12 to 23 months who received measles vaccine before the survey	Total number of children age 12 to 23 months
3.3	Prevalence of diarrhea among children under age 5 years	Number of children under age 5 years who had diarrhea in the last two weeks	Total number of children under age 5 years
3.4	Diarrhoea treatment with oral rehydration salts (ORS) and zinc	Number of children under age 5 years with diarrhea in the previous 2 weeks who received ORS and Zinc	Total number of children under age 5 years with diarrhea in the previous 2 weeks

S.N	Indicators	Numerator	Denominator
3.5	Antibiotic treatment for children with Acute Respiratory Infection (ARI) or suspected pneumonia	Number of children under age 5 years with ARI symptoms/ suspected pneumonia in the last 2 weeks who received antibiotics	Total number of children under age 5 years with ARI symptoms/ suspected pneumonia in the last 2 weeks
4. Malaria			
4.1	Household availability of mosquito nets	Number of households with; (a) at least one mosquito nets (b) at least one mosquito nets for every two people	Total number of households surveyed
4.2	Children under age 5 who slept under a mosquito net	Number of children under age 5 years who slept under a mosquito net the previous night	Total number of children under age 5 who spent the previous night in the interviewed households
4.3	Anti-malarial treatment of children under age 5	Number of children under age 5 years with fever in the last 2 weeks who received any antimalarial treatment	Total number of children under age 5 years with fever in the last 2 weeks
4.4	Treatment with Artemisinin-based Combination Therapy (ACT) among children who received anti-malarial treatment	Number of children under age 5 years with fever in the last 2 weeks who received ACT (or other first-line treatment according to national policy)	Total number of children under age 5 years with fever in the last 2 weeks who received any anti-malarial drugs
4.5	Intermittent preventive treatment for malaria during pregnancy	Number of women age 15-49 years who received three or more doses of SP/Fansidar, at least one of which was received during an ANC visit, to prevent malaria during their last pregnancy that led to a live birth in the last 2 years	Total number of women age 15-49 years with a live birth in the last 2 years
5. Reproductive Health			
5.1	Skilled attendant at delivery	Number of women age 15-49 years with a live birth in the last 2 years who were attended by skilled health personnel during their most recent live birth	Total number of women age 15-49 years with a live birth in the last 2 years
5.2	Contraceptive prevalence rate	Number of women age 15-49 years currently married or in union who are using (or whose partner is using) a (modern or traditional) contraceptive method	Total number of women age 15-49 years who are currently married or in union
5.3	Antenatal care coverage	Number of women age 15-49 years with a live birth in the last 2 years who were attended during their last pregnancy that led to a live birth a. at least once by skilled health personnel b. at least four times by any provider	Total number of women age 15-49 years with a live birth in the last 2 years

S.N	Indicators	Numerator	Denominator
6. HIV			
6.1	HIV testing during antenatal care	Number of women age 15-49 years who had a live birth in the last 2 years and received antenatal care during the pregnancy of their most recent birth, reporting that they were offered and accepted an HIV test during antenatal care and received their results	Total number of women age 15-49 years who had a live birth in the last 2 years
7. MNCHW			
7.1	MNCHW coverage	Number of households reached with MNCHW in the last six months	Total number of households
7.2	Vitamin A supplementation among children	Number of children age 6-59 months who received at least one high-dose vitamin A supplement in the 6 months preceding the survey	Total number of children age 6-59 months
7.3	Deworming among children	Number of children age 12-59 months who given an anthelmintic drug in the 6 months preceding the survey	Total number of children age 12-59 months

Annex 4: Survey Implementation Timeline

Activities	May-15				Jun-15				Jul-15				Aug-15				Sep-15				Oct-15			
	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
Planning the survey																								
Selecting indicators with partners																								
Engage partners for support																								
Write survey protocol																								
Planning and budgeting activities																								
Organizing logistics																								
Sampling and printing of EA maps																								
Presentation to survey steering committee																								
Developing survey tools																								
Design paper and electronic data collection tools																								
Programing of tablets																								
Pretest the application of tablets																								
Pretest the functionality of dashboard																								
Preparing training manual																								
Training of Data Collectors																								
Recruiting field staffs																								
Finalizing training document																								
Field test of tablets and dashboard																								
Provide training for enumerators																								
Implementation																								
Establishing filed teams																								
Assigning supervisor and coordinators																								
Conducting field work																								
Data Cleaning, Analysis & Reporting																								
Data cleaning and analysis																								
Prepare draft summary report																								
Share final summary report																								
Prepare final report																								
Dissemination																								

Report on the Nutrition and Health Situation of Nigeria November 2015

Contact Details:

National Bureau of Statistics

Isiaka Olarewajua (Director; Real Sector and Household Statistics Department)
iolarewaju@nigerianstat.gov.ng

Adeyemi Adeniran (Assistant Director; Real Sector and Household Statistic Department)
yemi_adeniran@yahoo.com

UNICEF

Arjan de Wagt: (UNICEF Nigeria - Chief of Nutrition) adewagt@unicef.org

Sara Gari-Sanchis: (WCARO – Nutrition Monitoring Specialist) sgarisanchis@unicef.org

Assaye Bulti: (UNICEF Nigeria – Nutrition Officer) bassaye@unicef.org