




2010 Malaria Household Survey in Nine States of Nigeria



Malaria Control Booster Project

National Malaria Control Program (NMCP)
Federal Ministry of Health (FMOH)



The 2010 Malaria Household Survey in Nine States of Nigeria was implemented by the National Malaria Control Programme (NMCP). The study was conducted between April and July 2010. Public Health Services and Solutions (PHSS) provided technical assistance to the project, and funding was made available by the World Bank–supported Malaria Control Booster Project (MCBP).

Further information about the 2010 Malaria Household Survey in Nine States of Nigeria can be obtained from the NMCP, PHSS, and World Bank, Abuja, Nigeria. The full details of the survey are available at www.nmcpnigeria.org, www.thephss.org, and www.worldbank.org/nigeria.



National Malaria Control Programme
Federal Ministry of Health
Abuja, Nigeria



World Bank, Nigeria

2010 MALARIA HOUSEHOLD SURVEY IN NINE STATES OF NIGERIA

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FOREWORD

High morbidity and mortality among children under five years and pregnant women are major public health concerns in Nigeria. Major childhood killer diseases such as malaria, pneumonia, diarrhea, and vaccine-preventable diseases contribute to the high mortality rate in children under five years. Malaria contributes the most to childhood and under-age-five mortality, at 30 percent and 25 percent, respectively, and more than 10 of 100 deaths in pregnant women are attributable to malaria. The burden of malaria continues to constitute a major public health burden in Nigeria.

In 2006, the federal government of Nigeria (FGN) received a credit from the International Development Agency (IDA), a member of the World Bank Group, to finance the Nigerian Malaria Control Booster Project (MCBP) to improve access to and utilization of a well-defined set of Malaria Package Plus (MPP) interventions in seven states in Nigeria. These MPP interventions consist of key maternal and child health interventions that can reduce morbidity and mortality with marginal cost increase compared to malaria-specific interventions alone.

A survey was conducted during October and November 2006 to establish baseline measures of key indica-

tors set by the project. In 2010, a follow-up survey was conducted to document progress made since 2006.

I am pleased that the 2010 Malaria Household Survey report is completed and results are presented. The results show significant progress since 2006, particularly in the areas of long-lasting insecticide-treated nets, intermittent preventive therapy, and health education and promotion. Progress has been observed in the area of malaria treatment with artemisinin-based combination therapy and health care-seeking behavior in the target states. However, the program requires intensified action to achieve its goals and objectives before the end of the project.

The findings of the 2010 Malaria Household Survey in Nine States of Nigeria further strengthen the case for investing in malaria control. The achievements thus far need to be sustained, and more successes need to be recorded.

Professor Onyebuchi Chukwu

Honorable Minister
Federal Ministry of Health
Abuja, Nigeria

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I wish to thank my staff and the monitoring and evaluation team for providing valuable support in the areas of questionnaire development, training of personnel, and supervision of data collectors. The survey could not have been possible without the active participation and logistics support of the State Ministries of Health and Malaria Control Booster Project units of the ministries.

We are grateful to all of the LGA data collectors and supervisors, who worked very hard during the survey. Finally, our thanks go to all of the mothers and caregivers who provided valuable information during the survey.

Dr. Babajide Coker

National Coordinator

National Malaria Control Programme

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ACRONYMS

ACT	Artemisinin-Based Combination Therapy	LGA	Local Government Area
ANC	Antenatal Care	LQAS	Lot Quality Assurance Sampling
ARI	Acute Respiratory Infection	M&E	Monitoring and Evaluation
BCC	Behavior Change and Communication	MPP	Malaria Plus Package
CA	Catchment Area	NMCP	National Malaria Control Programme
CHEW	Community Health Extension Worker	ORS	Oral Rehydration Solution
DPT	Diphtheria, Pertussis, and Tetanus	ORT	Oral Rehydration Therapy
EBF	Exclusive Breast Feeding	PHSS	Public Health Services and Solutions
EOP	End of Project	PPS	Probability Proportion to Size
FIC	Fully Immunized Children	RA	Reliability Assessment
FMOH	Federal Ministry of Health	RBM	Roll Back Malaria
ICC	Interclass Correlation	RHF	Recommended Home Fluid
IPT	Intermittent Preventive Therapy	SA	Supervision Area
IRS	Indoor Residual Spraying	SMS	Short Message System
ITN	Insecticide-Treated Net	SP	Sulfadoxine-Pyrimethamine
IVM	Integrated Vector Management		
LC-LQAS	Large Country Lot Quality Assurance Sampling		

EXECUTIVE SUMMARY

The National Malaria Control Programme (NMCP) with support from the World Bank is implementing a malaria control and prevention program titled Malaria Package Plus (MPP) in seven Nigerian states. The program adopted the Lot Quality Assurance Sampling (LQAS) methodology to monitor program achievements. A survey was conducted during April to July 2010 to document progress made since 2006 by the program. Two states, one in the north and one in the south, were included as control states because they did not participate in the MPP.

The survey was organized and implemented by the states at the local government area level with support from the NMCP and World Bank consultants. The consulting firm Public Health Services and Solutions (PHSS) was responsible for training, monitoring and supervision, data entry, cleaning, and analysis. The surveyors received training on LQAS principles, data collection, and hand tabulation of results. They were supervised by NMCP facilitators, PHSS, and World Bank team members. Data quality was ensured through supervision and spot checks. The data set was cleaned using the double entry method. Data entry was done using FoxPro, and analysis was done with EpiInfo software. All stakeholders were consulted, and their input was taken into consideration for questionnaire development, training, data analysis, and report writing.

The survey findings showed impressive improvement in ownership of long-lasting insecticide-treated nets (LLINs), with 81 percent of households having at least two LLINs in project areas compared to 42 percent in control states. The comparative figure of ownership of one LLIN or insecticide-treated net (ITN) in 2006 and 2008 is 2 percent and 88 percent, respectively. The progress is also observed in utilization of LLINs. Forty-five percent of children under five years of age slept under an LLIN in project areas compared to 36

percent in control states. Use of LLINs among pregnant mothers increased from 8 percent in 2006 to 39 percent in 2010. However, the coverage of indoor residual spraying in households remained low, at 5.6 percent. The improvement is also seen in antenatal care (ANC). The ANC rate of one or more increased from 62 percent in 2006 to 71.7 percent in 2010. Of these, 16.6 percent received two or more doses of intermittent preventive therapy (IPT) during pregnancy. In 2006 the IPT coverage was 9 percent. Of children under five years of age with fever, 5.8 percent received treatment with artemisinin-based combination therapy (ACT) in 2010 compared to less than 1 percent in 2006.

Among the indicators of other child survival interventions: immunization, exclusive breast feeding, and oral rehydration therapy (ORT) use, only immunization coverage showed significant improvement since 2006. During this period, diphtheria, tetanus, and pertussis (DPT3) and measles coverage increased three times (DPT3 12 vs. 27.8 percent and measles 13 vs. 47.4 percent).

The Malaria Household Survey 2010 included Knowledge, Attitude, and Practice (KAP) questions to find the respondents' level of KAP on key areas of prevention and treatment of malaria. About 75 percent of respondent mothers know when to seek treatment for malaria and 61.7 percent know at least two symptoms of malaria. Approximately 47 percent of mothers know at least two ways to prevent malaria, but only 32.1 percent know that ITN can prevent malaria. Twenty-five percent know how to prevent malaria during pregnancy with IPT.

Although progress has been made since 2006, the program must intensify its effort in the area of ACT, IPT, and other child survival interventions (ORT, immunization, and breast feeding) to reach its target

by the end of the project. The inclusion of behavior change and communication (BCC) in the project activity will empower communities, households, and caregivers to prevent malaria and seek care with ap-

propriate treatment. The use of LQAS as a tool to monitor programs at the local government area level should be continued.

INTRODUCTION

The National Malaria Control Program (NMCP) of the Federal Ministry of Health (FMOH) with support from The World Bank is implementing a five-year Malaria Control Booster Project (MCBP) in seven states (Kano, Jigawa, Bauchi, Gombe, Anambra, Akwa Ibom, and Rivers) of Nigeria. The goal of the project is to provide key preventive and curative interventions against malaria and other diseases associated with maternal and child mortality through the Malaria Plus Package (MPP). The MPP is in line with the Maternal Newborn and Child Health Strategy of Federal Ministry of Health¹ and strategic plan of the NMCP.² The project agreed to monitor output and outcome indicators using a decentralized population-based approach and adopted Lot Quality Assurance Sampling (LQAS) method. A baseline survey was conducted by the states and local government areas (LGAs) in 2006 as

part of the monitoring plan.³ In 2010 a follow-up survey was conducted to document progress made since 2006 using the same LQAS method. To compare the data from the intervention area, two states, one in the north (Kaduna) and another in the south (Delta) were kept as the control states.

The primary objectives of the 2010 Malaria Household Survey in Nine States of Nigeria were to document progress made since 2006 against the key indicators of the program, particularly in the area of long-lasting insecticide-treated nets (LLINs), intermittent preventive therapy (IPT), indoor residual spraying (IRS), and artemisinin-based combination therapy (ACT) and highlight areas of weakness for program managers and decision makers to mobilize resources and make adjustment in the project to achieve its goal.

SURVEY IMPLEMENTATION

Geographic Area

The survey was conducted in nine states, five of which are in the northern region (Kano, Jigawa, Bauchi, Gombe, and Kaduna) and the remaining four in the southern region (Anambra, Delta, Akwa Ibom, and Rivers) of Nigeria. In each region, one state acted as the control (Kaduna in the north, and Delta in the south). These two control states are not supported by the World Bank Malaria Control Booster Project (MCBP), but are Global Fund–assisted states. The map in Figure 1 presents the survey states (intervention and control).

Sample Design

A multistage random sampling methodology was used to select 19 households in each local government area (LGA). In the first stage, 84 LGAs were selected,

with simple random sampling from 263 LGAs in the nine states. The number of LGAs selected per state was calculated using a combined cluster sampling and Lot Quality Assurance Sampling (LQAS) methodology known as Large Country LQAS (LC-LQAS). The number of LGAs included in the sample was determined by the LC-LQAS sample size formula.⁴ This sample size n is dependent on six parameters: (1) the number of samples collected in each supervision area (SA) m ; (2) the total number of SAs in a catchment area (CA) N ; (3) the total population in the CA (usually based on a national census) N_{cen}^* ; (4) the average of the square of the populations in each SA $\overline{M^2}$; (5) an estimate of the intraclass correlation (ICC) $\hat{\rho}$; and (6) the maximum desired length for the confidence interval I_{max} , which in this case is 0.20.

$$n = N \frac{(1 + (m - 1)\hat{\rho})}{\left(\frac{I_{max} N_{cen}^*}{1.96}\right)^2 \left(\frac{(m - 1)(1 - \hat{\rho})}{NM^2}\right) + m\hat{\rho}}$$

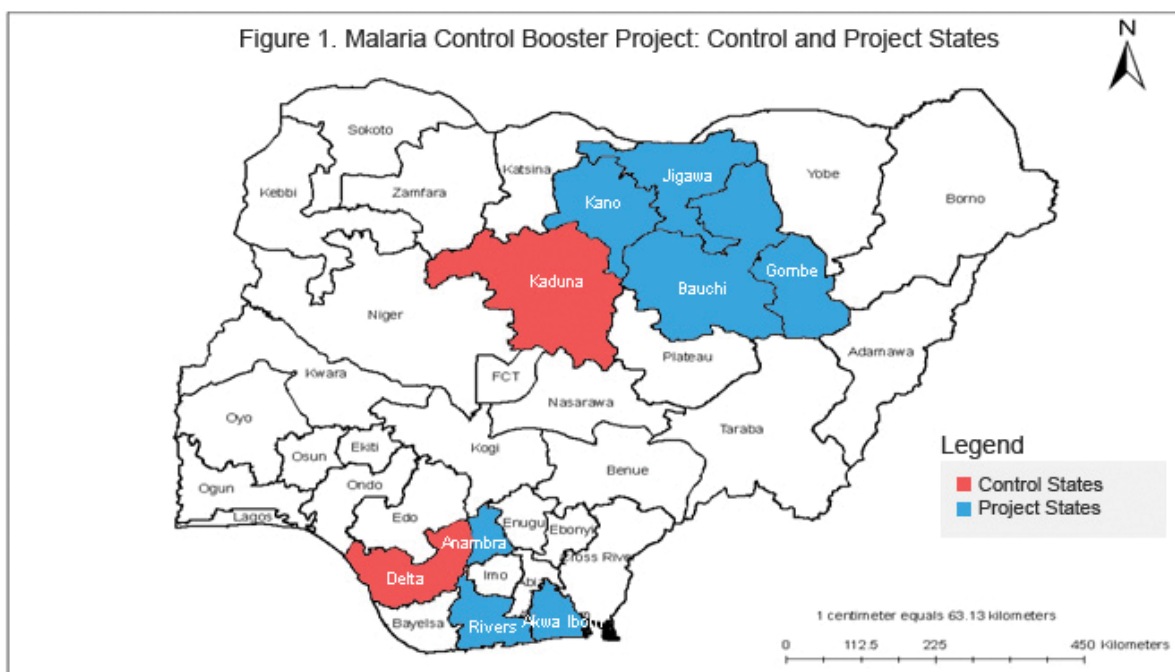


Table 1 presents by state the number of LGAs selected and the LQAS sample size of 19 used in each LGA.

In the second stage, 19 villages were selected randomly using Probability Proportional to Size Sampling (PPS) in each LGA. The lists of villages were collected from the LGAs. Village population sizes were estimated using the most recent census.

Finally, at the village level, a starting point for the first respondent was randomly selected from a map constructed by the data collector using the segmentation sampling technique. A household was defined as groups of persons who eat from the same cooking pot. Once the starting point was selected, the interviewer administered one of four sets of questionnaires to an eligible respondent. The interviewer then went to the next-nearest door and checked at that household for eligible respondents and administered the appropriate questionnaire. Only one eligible respondent was interviewed in every household, with the exception of mothers with children with diarrhea or fever. If an eligible respondent was absent or more than 20 minutes away, the interviewer went

to the next-nearest door and checked at that household for an eligible respondent. The interviewer continued this process until he or she found an eligible respondent for all six questionnaires included in the set. The inclusion criteria for selection of six respondents are as follows:

1. Head of household
2. Mother or caregiver of an infant aged 0 to 11 months
3. Mother or caregiver of a child aged 12 to 23 months
4. Mother or caregiver of a child aged 0 to 59 months
5. Mother or caregiver of a child aged 0 to 59 months with diarrhea
6. Mother or caregiver of children aged 0 to 59 months with fever

All 19 sets of questionnaires administered in the villages selected from each LGA using PPS had their own randomly selected starting point. A total of 9,576 interviews were conducted in 1,596 settlements (intervention 1,235; control 361) in 84 LGAs in nine states.

TABLE 1. SAMPLED LGAS BY STATE AND SAMPLE SIZE

<i>State</i>	<i>Total Number of LGAs</i>	<i>Number of LGAs Sampled</i>	<i>Sample Size</i>	<i>Sets of Questionnaires</i>
Northern Region				
Kano	44	10	19	190
Jigawa	27	9	19	171
Bauchi	20	9	19	171
Gombe	11	8	19	152
Kaduna (control)	23	9	19	171
Total	125	45		
Southern Region				
Rivers	23	10	19	190
Akwa Ibom	31	10	19	190
Anambra	21	9	19	171
Delta (control)	25	10	19	190
Total	100	39		1596

Questionnaires

Six sets of data collection instruments were used for the survey. The survey instruments were similar to those used in the 2006 LQAS survey, except that the diarrhea and fever modules were separated and questions related to acute respiratory infections (ARIs) were excluded.

The questionnaires were divided into different sections to cover malaria and other child survival interventions. There are six questionnaires and 29 sections in one set of questionnaires (Table 2).

Pretest Activities

The questionnaires were reviewed by a technical group at the National Malaria Control Programme (NMCP) and were field tested. After the field test, similar questions that applied to different instru-

ments were harmonized and uniform code patterns were used. A behavior change and communication (BCC) section was added to all questionnaires to assess knowledge of malaria control and prevention in the population. Instruments used by the NMCP in a previous survey on Knowledge, Attitude, and Practice (KAP) were used to add similar questions for comparison. Informed consent was added to all questionnaires and made mandatory for every instrument administered.

Training of Field Staff

Training workshops prepared the participants on the concepts and techniques of data collection using the LQAS methodology. Three participants (one supervisor and two interviewers) were selected from each LGA. The training was held in five centers: Kano (Kano and Jigawa), Anambra (Anambra and Delta), Akwa Ibom (Akwa Ibom and Rivers), Gombe

TABLE 2. QUESTIONNAIRE OF 2010 MALARIA HOUSEHOLD SURVEY

<p>1. Household Survey</p> <p>Section 1: Household Assets</p> <p>Section 2: Respondents Background</p> <p>Section 3: Indoor Residual Spraying</p> <p>Section 4: Bed Nets</p> <p>Section 5: Behavior Change and Communication</p> <p>2. Mothers of Children 0-11 Months</p> <p>Section 1: Mother's Background</p> <p>Section 2: Infant's Background</p> <p>Section 3: Pregnancy and Intermittent Preventive Therapy</p> <p>Section 4: Bed nets</p> <p>Section 5: Breastfeeding and Infant/Child Nutrition</p> <p>Section 6: Diarrhea and Fever Prevalence</p> <p>Section 7: Behavior Change and Communication</p> <p>3. Mothers of Children 12-23 Months</p> <p>Section 1: Mother's Background</p> <p>Section 2: Child's Background</p> <p>Section 3: Childhood Immunizations</p> <p>Section 4: Diarrhea and Fever Prevalence</p> <p>Section 5: Behavior Change and Communication?</p>	<p>4. Mothers of Children 0-59 Months</p> <p>Section 1: Household Assets</p> <p>Section 2: Mother's Background</p> <p>Section 3: Child's Background</p> <p>Section 4: Bed Nets</p> <p>Section 5: Diarrhea and Fever Prevalence</p> <p>Section 6: Behavior Change and Communication</p> <p>5. Mothers of Children 0-59 Months with Diarrhea in the Last Two Weeks</p> <p>Section 1: Mother's Background</p> <p>Section 2: Child's Background</p> <p>Section 3: Diarrhea Case Management</p> <p>6. Mothers of Children 0-59 Months with Fever in the Last Two Weeks</p> <p>Section 1: Mother's Background</p> <p>Section 2: Child's Background</p> <p>Section 3: Malaria Case Management</p> <p>Section 4: Diarrhea and Fever Prevalence</p> <p>Section 5: Behavior Change and Communication</p>
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(Gombe and Kaduna), and Bauchi. The training workshop lasted for five days in each of the five centers. Gombe training planned for the Bauchi center was postponed because of state-level activities and conducted separately.

Fieldwork

Data Collection Period. The data were collected during the week immediately after the training workshop in each LGA between April–July 2010. For most LGAs, data collection took over an average of seven days.

Monitoring and Supervision. Each LGA data collection team had two local interviewers and a local LGA supervisor who worked in the LGA health program to support the team in identifying and randomly selecting the starting point. A total of 86 LGA interviewers and 43 LGA supervisors were involved in data collection in the north, and 76 LGA interviewers and 38 LGA supervisors were engaged in the south. The supervisors were responsible for the review of all completed questionnaires to ensure there were no inconsistencies or missing data. In the case of missing data or inconsistencies, the supervisor assisted the interviewer to obtain the data. NMCP monitoring and evaluation (M&E) officers, state Roll Back Malaria (RBM) officers, Public Health Services and Systems (PHSS) Consultants, and a World Bank Consultant provided supervision and monitoring of the training and data collection.

A supervisory checklist was used by all consultants and supervisors, and corrections were made on the spot where necessary. At the end of the day, data collectors were briefed about mistakes and areas of concern. As part of the quality assurance efforts, reliability assessment (RA) was conducted in all of the states. One household per LGA was selected, and the household head was reinterviewed, with data checked against previous interviews conducted by data collectors. The RA result shows that some of the states had better

agreement than others. Overall, all states passed the minimum criteria set for RA.

PHSS developed a Web and short message system (SMS)-based, real-time monitoring system to monitor large-scale surveys. At the end of the day, supervisors and monitors sent an SMS message with key information about the location and interview status of the questionnaire. Those who had access to the Internet sent information via a Web-based application that produced a report showing the survey status in the various locations and by supervisor. An interactive map displayed this information by LGA and state. The real-time monitoring system made the survey transparent and accountable and enabled completion on schedule. It also allowed monitors and supervisors to support the team as needed.

After data collection, the state teams returned to the training venue. They were trained by master trainers to hand tabulate the LGA-level data and use LQAS decision rules to identify LGAs with indicator values below the decision rule. Teams were also trained to aggregate LGA data to calculate point estimates for the state for key indicators.

Data Processing and Analysis

The data were entered into the FoxPro program. A double entry method was used to ensure an error-free database. Two data sets were compared using the dual check Epi Info version 3.5.1 Compare Subroutine and FoxPro Dual Check Command. The compare subroutine function was applied to key indicators.

The analysis covered six different questionnaires (household and mothers of children 0 to 11 months, 12 to 23 months, 0 to 59 months, 0 to 59 months with diarrhea, and 0 to 59 months with fever). The following core and program indicators were analyzed and are presented in this report.

Key Indicators

- Percentage of children under five years with fever treated with an effective antimalarial (ACT) within 24 hours
- Percentage of infants aged 0 to 6 months that were fed breast milk only in the last 24 hours
- Percentage of children under 5 years who slept under an insecticide-treated net (ITN) the night preceding the survey
- Percentage of pregnant women who received two or more doses of IPT

All Indicators

- Percentage of households with at least two LLINs
- Percentage of children under 5 years who slept under an LLIN the night preceding the survey
- Percent of children aged 0 to 59 months with diarrhea in the last two weeks who received oral rehydration solution (ORS), recommended home fluids (RHF), or both

- Percentage of infants aged 12 to 23 months who were vaccinated with the diphtheria, tetanus, pertussis (DPT3) and measles vaccines
- Percentage of infants aged 0 to 6 months who were fed breast milk only in the last 24 hours
- Percentage of women with children under 1 year who received antenatal care (ANC) care during last pregnancy
- Percentage of pregnant women who received two or more doses of intermittent preventive therapy (IPT)
- Percentage of children under 5 years with fever treated with an effective antimalarial (ACT) within 24 hours from the onset of symptoms
- Percentage of mothers who recognize signs of severe illness in children and know when and where to obtain help.
- Percentage of mothers and caregivers who know the danger signs for malaria

RESULTS AND DISCUSSION

Demographic and Socioeconomic Characteristics of the Respondents

Table 3 shows demographic and socioeconomic characteristics of the surveyed population by project and control states. In general, the control area had a better socioeconomic standard than the project area. Most of the respondents for the household questionnaire are male in both control (61.4 percent) and project (82.3 percent) states. However, the number of female respondents in the control area was twice that of the project area (39.6 vs. 17.7 percent). Overall, 78.7 percent of respondents were male and 21.3 percent were female. Ten percent of the respondents were under 30 years, 45 percent were between 30 and 50 years, and another 45 percent were older than 50 years. The distributions of age-group between project and control groups are similar. A total of 93.4 percent of respondents in project area were married compared to 86.9 percent in control states. There were more singles and widows in control areas than in project areas (13 vs. 8 percent). In regard to education, 37.1 percent in project areas had no education compared to 24.7 percent in control areas. More respondents in control area had secondary and higher education than in project area (46.3 vs. 34.8 percent). This is due to the low literacy rate in northern states compared to that in southern states. With regard to electricity, 69.2 percent had access and 50 percent did not. In terms of household assets, households in control areas possessed more televisions, cars, and refrigerators than those in project areas. Well water is the main source of drinking water in both control and project areas (55.1 vs. 56.5 percent). However, 30.7 percent of households in control areas have access to piped water compared to 15.9 percent of households in project areas. More people bought

water in project areas than in control areas (23.3. 13.1 percent). Seventy-eight percent of households in project areas had access to agricultural land compared to 57.1 percent in control households. In regard to waste management, 24.4 percent of households in control areas had flush toilets and 55.1 percent had pit latrines. The corresponding figures for project areas were 12.5 percent and 72.4 percent, respectively. The main flooring material in 77 percent of homes in control areas was cement compared to 54.5 percent in project areas. Dirt, sand, and dung floors are three times more common in project areas than in control areas (39.5 vs. 13.9 percent).

The state-level analyses of demographic and socioeconomic status are given in Annex 1. In general, northern states (Kano, Jigawa, Bauhci, Gombe, and Kaduna) have a poorer socioeconomic status than the southern states (Akwalbom, Anambra, Delta, and Rivers). The number of female respondents in Kano, Jigawa, and Bauchi was less than five percent. In northern states, 94 to 99 percent of respondents are married. The percentage of widows in southern states varied between 5 and 12 percent. The age-group did not show much difference in its distribution. Jigawa and Gombe had the highest number of respondents (62 and 63 percent) with no education. More than 90 percent of respondents in Anambra and Rivers had primary to higher secondary education. Of households in Anambra, 88.9 percent had access to electricity and Jigawa had the lowest number of households with electricity (23.7 percent). Seventy-five percent of households in Anambra reported having a television compared to less than 20 percent in Bauchi, Gombe, and Jigawa. Fifty-two percent of households in Anambra had a refrigerator, whereas less than 10 percent in Bauhci, Jigawa, and Gombe reported having one. Possession of a bicycle or motorcycle was more common in northern states than in southern states. Of households in Anambra, 32.7

TABLE 3. DEMOGRAPHIC AND SOCIOECONOMIC CHARACTERISTICS

Percentage distribution of demographic and socioeconomic characteristics (n = 1,596)

<i>Variable</i>	<i>Project (n = 1,235) (%)</i>	<i>Control (n = 361) (%)</i>	<i>All (n = 1,596) (%)</i>
Gender			
Male	83.8	61.4	78.7
Female	16.2	38.6	21.3
Marital Status			
Single	2.0	5.0	2.7
Married	93.4	86.9	91.9
Widow	4.4	7.5	5.1
Others	0.2	0.6	0.3
Age			
15–19	0.6	1.1	0.7
19–24	2.9	5.3	3.4
25–29	6.6	6.0	6.5
30–34	10.3	13.2	10.9
35–39	10.1	9.4	9.9
40–44	13.0	13.5	13.1
45–49	10.9	10.2	10.8
50–54	12.2	7.1	11.2
55+	33.4	34.2	33.6
Education			
No education	37.1	24.7	34.3
Primary	28.2	29.1	28.4
Secondary	22.3	33.0	24.7
Higher secondary	12.5	13.3	12.7
Access to electricity	50.0	69.2	54.3
Household Asset			
Radio	80.8	77.6	80.1
Television	42.7	64.5	47.7
Refrigerator	21.9	32.9	24.4
Bicycle	47.0	38.4	45.0
Motorcycle	45.8	44.8	45.6
Car	15.6	17.6	16.1
Land ownership	78.0	57.1	73.3
Source of Drinking Water			
Piped into residence	6.2	10.9	7.2
Piped into yard	2.4	5.0	3.0
Public piped	7.3	14.8	9.0
Well with pump	23.7	8.6	20.3
Well without pump	32.8	46.5	35.9
Cart pusher	1.3	1.1	1.3
Tanker truck	22.0	12.0	19.8
Rain water	2.0	0.6	1.6
Other	2.2	0.6	1.8
Toilet Type			
Flush toilet	12.5	24.4	15.2
Pit	72.4	55.1	68.5
Bush	10.3	15.2	11.5
Other	4.7	5.3	4.8
Main Type of Flooring in the House			
Dirt, sand, dung	39.5	13.9	33.7
Wood or plank	0.6	2.8	1.1
Cement	54.5	77.0	59.6
Parquet or polished wood	0.2	0.0	0.1
Tiles	2.4	1.4	2.2
Other	2.8	5.0	3.3

percent had a car; in Gombe, only 6.8 percent reported having a car. Landownership ranged between 60 and 80 percent in all states except Delta, where half of the respondents reported having no access to agricultural land. In all northern states, well water is the main source of drinking water (67 to 80 percent), whereas in southern states the majority of households' drinking water source is piped water or tanker truck (43 to 70 percent). Most of the latrines in the northern states and Akwlbom are of the pit type (85 to 95 percent), except in Bauchi, where 24 percent do not have a toilet. In households in Anambra and Delta, 42.7 percent and 37.9 percent, respectively, reported having a flush toilet. Dirt, sand, and dung are the main type of flooring in northern states (44 to 70 percent) except Kaduna (21 percent), whereas 68 to 90 percent of households in southern states have a cement floor.

Long-Lasting Insecticide-Treated Net (LLIN)

During the last few years, the program made tremendous effort to improve household ownership and use of LLIN and distributed millions of LLINs in all intervention states. A total of 1.8 million LLINs were distributed in the seven Booster-supported states in 2008, targeting pregnant women and children under five years through immunization plus days. In 2009, the country adopted the policy of universal coverage, with 12.4 million LLINs distributed to the seven states during the campaign. LLIN distribution included a state-wide comprehensive logistics plan of transportation, storage, household registration, training, advocacy, social mobilization, and communication, monitoring, and supervision at the LGA, ward, and distribution points. The effort at the state level was complemented by the NMCP, development partners, and civil society organizations.

Ownership of LLIN. Figure 2 presents the percentage of households with at least two LLINs. Jigawa had

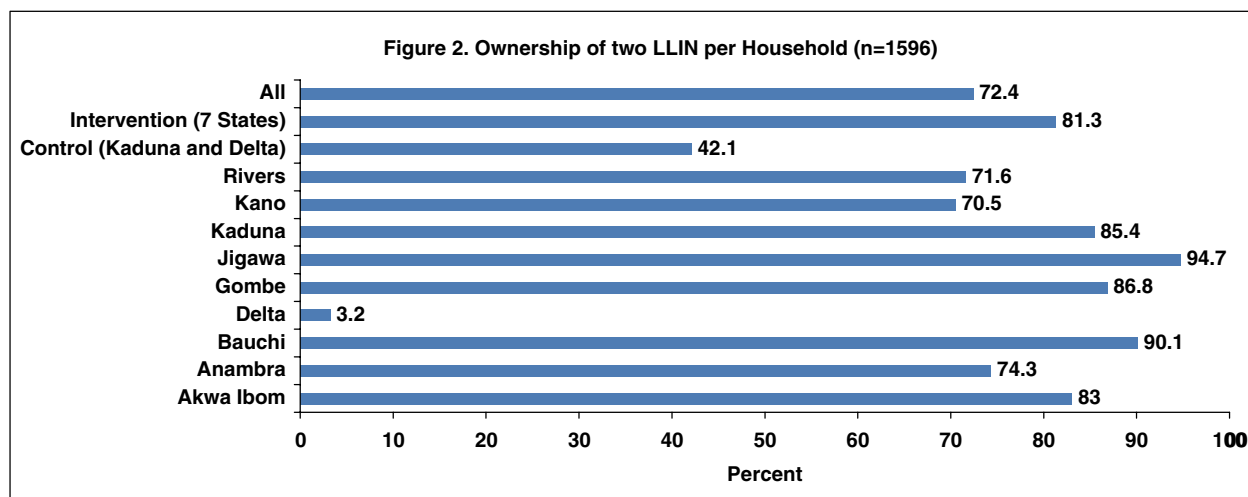
the highest ownership rate (94.7 percent), followed by Bauchi (90.1 percent). Delta had the lowest number of households, with two LLNs (3.2 percent). The lower rate in Delta is due to the campaign being conducted after the survey. N ownership in the intervention states is 81.3 percent and in the control states is 42.1 percent. The rate is almost double in the intervention area compared with the control area. At the aggregate level, the project has exceeded the target of 80 percent for this indicator.

Use of LLIN. Figure 3 shows that 42.5 percent of children under five years slept under an LLIN the night before the survey. The highest rate was observed in Gombe (79.6 percent) followed by Kaduna (67.8 percent). In these states, LLIN was distributed just before the survey. Kaduna is a control state for MCBP but is a Global Fund-supported state. Delta, a control state, had the lowest LLIN rate (6.3 percent). Overall, intervention states have a significantly higher rate of LLIN use (44.6 percent) than control states (35.5 percent).

Use of LLIN during Pregnancy and after Child-birth. In 2010, LQAS survey mothers with infants (0 to 11 months) were asked if they slept under a bed net during their last pregnancy. Thirty-two percent of mothers reported that they slept under an LLIN during their last pregnancy (Figure 4). They were then asked if they slept under a bed net last night. Thirty-nine percent of mothers reported sleeping under an LLIN last night. However, this number dropped to 32 percent when verified by hanging and report of sleeping under the net.

Household Indoor Residual Spraying (IRS)

As part of the integrated vector management (IVM) for control of mosquitos and breeding places, the NMCBP introduced IRS initially as a pilot in the seven states in a few wards in one LGA. Findings from this



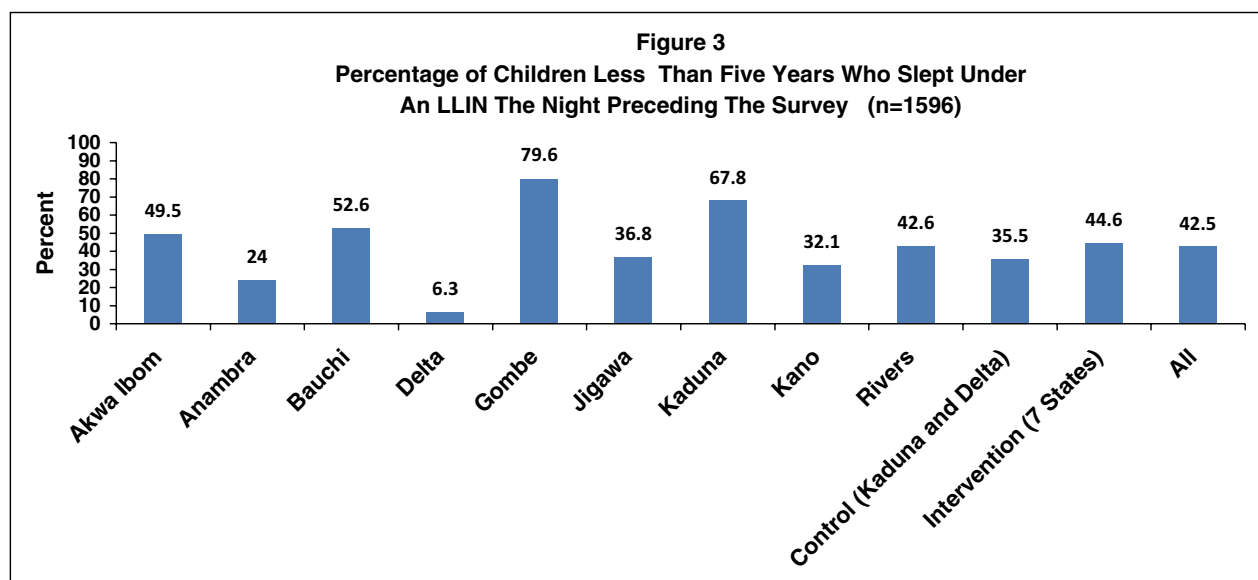
initial phase will be used to scale up the intervention in two LGAs in each state.

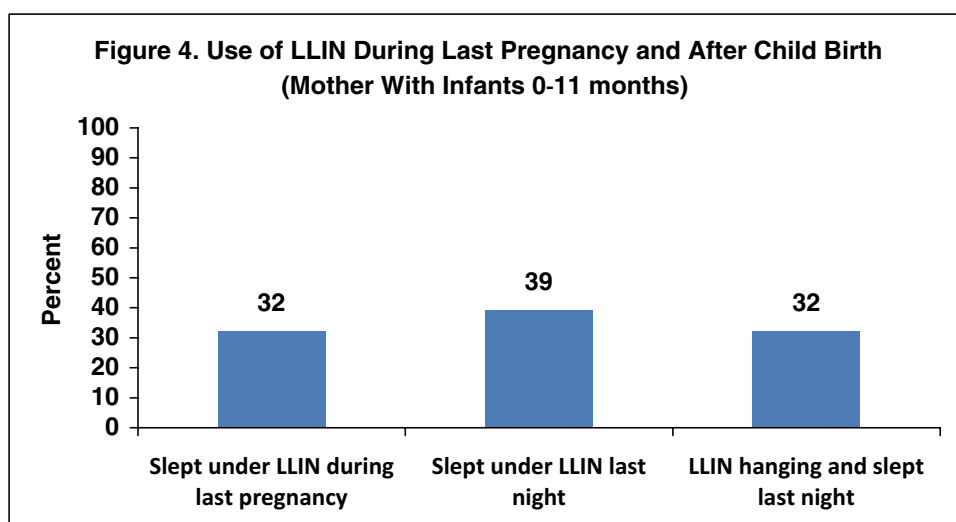
Table 4 shows that 5.8 percent households were sprayed with IRS in last 12 months. Jigawa and Kaduna started spraying with IRS in 2009, with 27.5 percent of households in Jigawa sprayed with IRS, followed by Kaduna (17.0 percent). All other states had less than 1 percent of households sprayed with IRS.

In control states, 8.3 percent of households are sprayed with IRS compared to 5.0 percent in interventions states.

Antenatal Care (ANC) and Intermittent Preventive Therapy (IPT)

Antenatal Care (ANC). ANC was analyzed for mothers who received at least one visit from a doctor, nurse, midwife, or community health extension worker (CHEW) during pregnancy and four or more visits from the same group of providers (Figure 5). The national guideline and World Health Organization (WHO) recommend at least four visits during pregnancy.





From the result of the nine states surveyed, at least 71.7 percent mothers with infants aged 0 to 11 months received at least one ANC during pregnancy from a doctor, nurse, midwife, or CHEW. Anambra leads, with 83.6 percent, followed by Kaduna (69.6 percent). In Jigawa, Kano, Gombe, and Akwa Ibom fewer than half of the mothers received ANC during pregnancy.

TABLE 4. HOUSEHOLD INDOOR RESIDUAL SPRAYING (IRS)

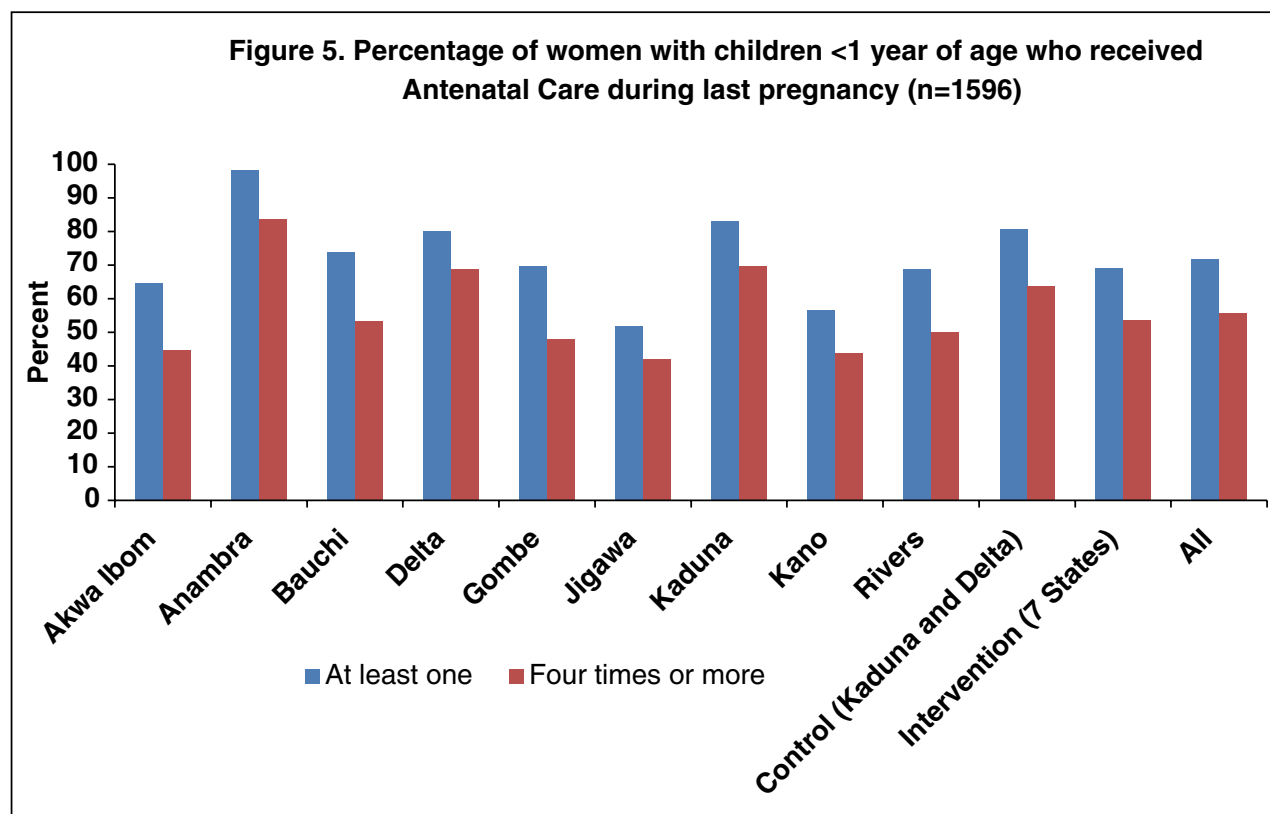
Percent of households sprayed with IRS in previous 12 months

State	N	%
Akwa Ibom	190	1.1
Anambra	171	2.3
Bauchi	171	0.6
Delta	190	0.5
Gombe	152	0.0
Jigawa	171	27.5
Kaduna	171	17.0
Kano	190	3.7
Rivers	190	0.5
Control (Kaduna and Delta)	361	8.3
Intervention (7 states)	1235	5.0
All	1596	5.8

IPT during Pregnancy. Over the last few years, NMCP promoted IPT during pregnancy and supplied IPT drugs to the states. The program also trained health workers on IPT as part of the training on malaria in pregnancy in all of the states. In addition, various BCC materials were also produced. Kaduna ranked first with 45.6 percent, followed by Gombe with 34.2 percent of mothers receiving IPT during her last pregnancy (Figure 6). Anambra had the lowest IPT coverage (12.3 percent). The control states had a higher IPT rate (28.3 percent) than intervention states (16.6 percent). However, improvement did occur in accessing IPT in 2010 compared to the 2006 survey result.

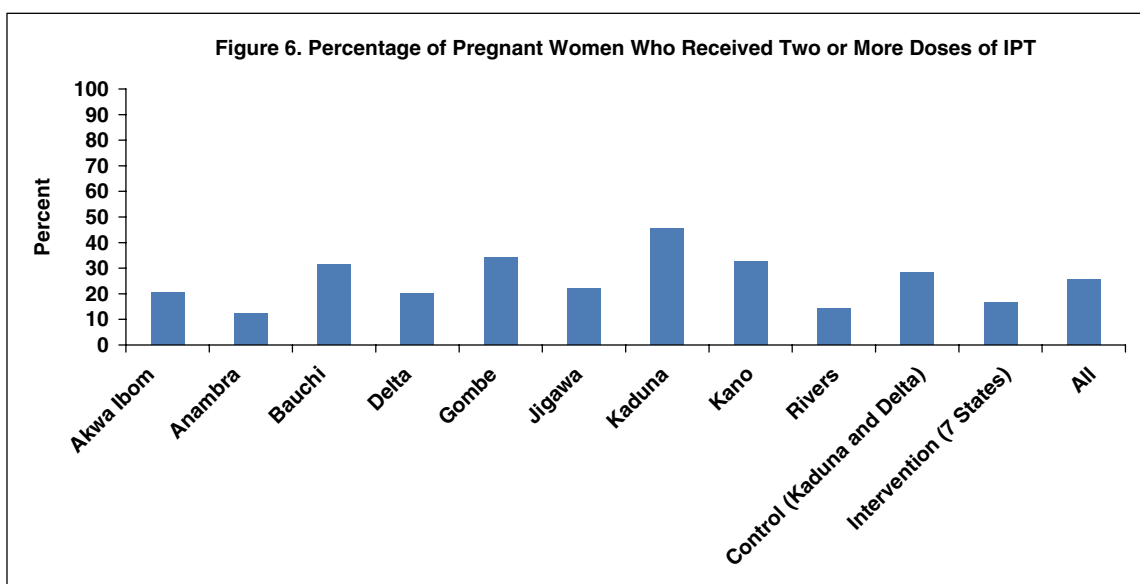
Fever and Artemisinin-Based Combination Therapy (ACT)

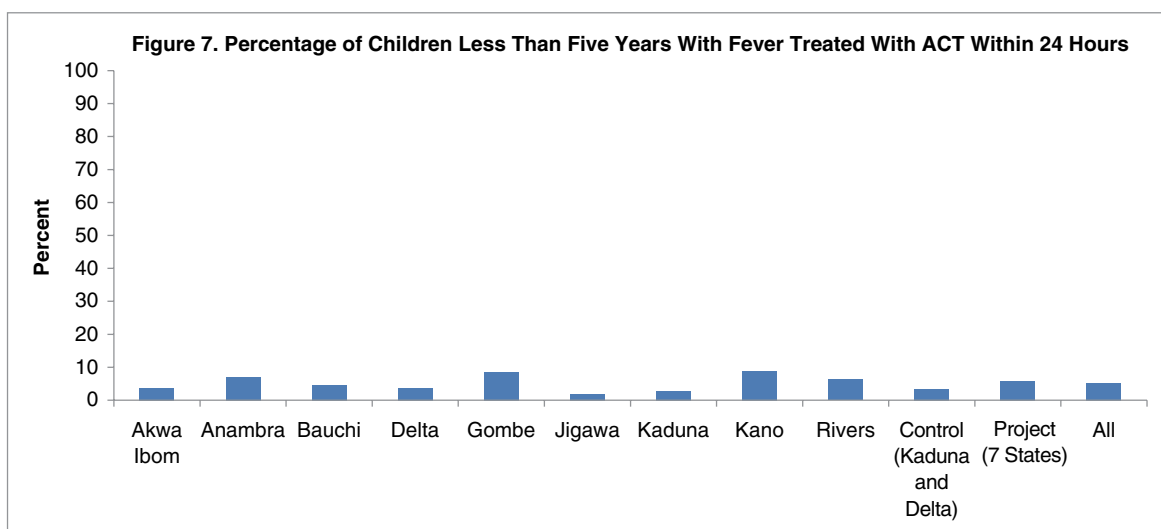
Malaria continues to be the leading cause of disease in children under five years and the major reason for seeking health care. It is estimated that 30 percent of childhood deaths are due to malaria. This is also the major health care expenditure of the family and reason for absence in the school. Most of the deaths in children occur within 24 hours. The na-



tional guideline recommends seeking care within 24 hours and treatment with ACT. The NMCP and RBM partners supported states to introduce ACT as the drug of choice and provided guidelines, training

of health care providers, and drugs for treatment of childhood malaria. Figure 7 presents treatment with ACT within 24 hours in different states and by intervention and control area. Overall, only 5.3 percent





of children received treatment with ACT within 24 hours. In Kano, 8.9 percent children received treatment with ACT within 24 hours. The rate is lowest in Jigawa, at 1.8 percent. The rate in intervention states is almost double (5.8 percent) that of control states (3.3 percent). There was improvement in accessing ACT in 2010 compared to 2006 result.

was better in the northern region compared to the south, which can be attributed to cultural practices.

Twenty-seven percent of those younger than six months were bottle fed, 10.4 percent of infants between 6 and 11 months were not given any solid or semisolid food.

Breastfeeding

Exclusive breast feeding (EBF) up to five months is recommended by the national guideline and is a key determinant of child survival. Of mothers with infants (0 to 5 months), 85 percent were currently breast feeding and 25 percent were EBF (Table 5). Of infants younger than six months, 63 percent were given plain water while breast feeding. Approximately 11 percent of infants were given infant formula. Generally, EBF

Diarrhea and Oral Rehydration Therapy (ORT)

Approximately 15 to 20 percent of deaths in children under five years are attributed to diarrheal illness, which is one of the main causes of morbidity in children, with consequences of malnutrition and death. In the survey population among children under five with diarrhea, 29.5 percent received ORT during diarrhea (Table 6). The rate of ORT use was highest (60.2

TABLE 5. BREASTFEEDING AND EXCLUSIVE BREASTFEEDING (EBF)

Infants aged between 0 and 11 and 0 and 5 months; percent distribution by current breast feeding, EBF, and breast milk plus other liquids

Age (months)	Currently Breast-feeding (%)	Exclusive Breast-feeding (%)	Breast Milk and Other Foods						
			Plain Water (%)	Infant Formula (%)	Other Milk (%)	Fruit Juice (%)	Tea/Coffee (%)	Other Liquid (%)	Traditional Medicine (%)
0–5	85.1	24.9	63.1	10.6	8.1	1.5	1.9	7.5	4.6

TABLE 6. ORAL REHYDRATION THERAPY (ORT) DURING DIARRHEA

Percentage of children aged 0 to 59 months with diarrhea in the last two weeks who received oral rehydration solution (ORS), RHF, or both

State	N	%
Akwa Ibom	190	18.9
Anambra	171	22.2
Bauchi	171	20.5
Delta	190	13.2
Gombe	152	21.1
Jigawa	171	25.1
Kaduna	171	60.2
Kano	190	52.1
Rivers	190	31.6
Control (Kaduna and Delta)	361	35.5
Intervention (7 states)	1235	27.8
All	1596	29.5

percent) in Kaduna, followed by Kano (52.1 percent). ORT coverage in Delta is the lowest, at 13.2 percent.

ORT coverage in intervention states is lower (27.8 percent) than in control states (35.5 percent).

Vaccination of Infants

Vaccine-preventable diseases account for more than 20 percent of infant deaths in Nigeria. The vaccination coverage figure shown in Table 7 is by card and history. Anambra ranked first in DPT3 coverage (65.5 percent), and Kaduna ranked first in measles coverage (71.3 percent). Overall, 30 percent are fully immunized children (FIC). The FIC rate was almost half for children at 12 months (16 percent). FIC coverage is higher (41 percent) in control areas than in intervention states (26.2 percent). The control states have better performance for DPT3 and FIC.

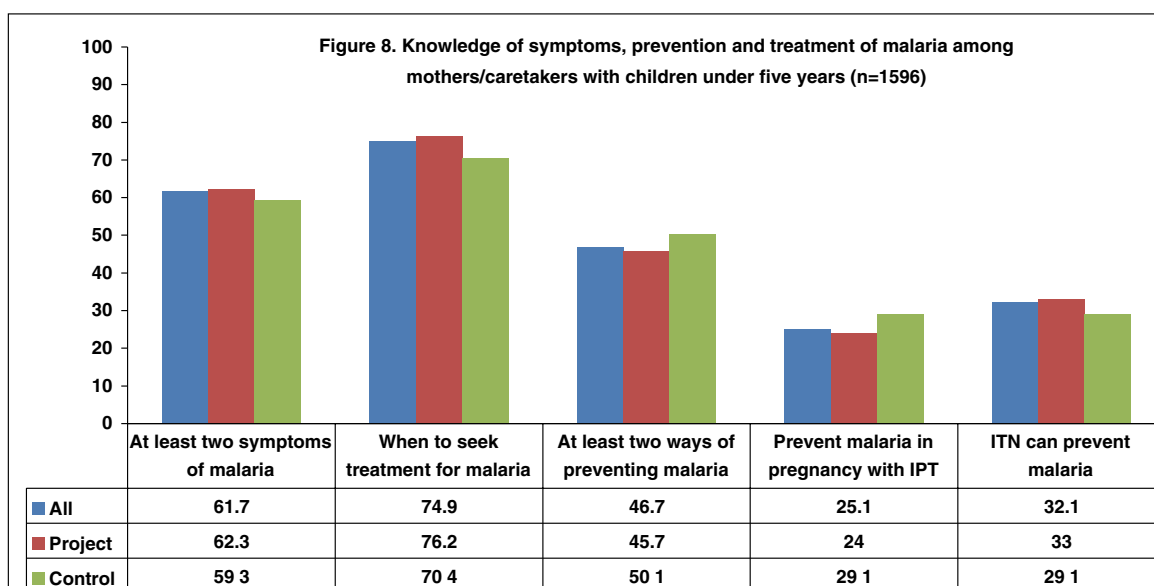
Behavior Change and Communication (BCC)

The NMCCBP has as part of its component objectives the strengthening of the health care system to improve delivery of the Malaria Plus Package (MPP) interventions in target states, which included strengthening community mobilization and communication for behavior change. During the past few years, the NMCCBP developed a BCC strategy for

TABLE 7. DPT3 AND MEASLES VACCINATION OF INFANTS

Percent of infants aged 12 to 23 months who are vaccinated with DPT3 and measles; percent of FIC

State	N	DPT3 (%)	Measles (%)	FIC (%)
Akwa Ibom	190	59.5	55.3	36.8
Anambra	171	65.5	66.1	52.0
Bauchi	171	22.2	45.6	14.0
Delta	190	47.9	57.4	38.4
Gombe	152	32.2	42.1	23.0
Jigawa	171	5.8	30.4	1.8
Kaduna	171	54.4	71.3	43.9
Kano	190	21.6	40.0	14.7
Rivers	190	55.8	51.1	38.9
Control (Kaduna and Delta)	361	51.0	64.0	41.0
Intervention (7 states)	1235	38.0	47.4	26.2
All	1596	40.9	51.0	29.5



effective communication at the provider, household, and community levels. The BCC approach included communication through multiple channels. At the community level, role model caregivers and religious and traditional leaders were mobilized to convey the message about malaria. In addition, radio, television, and print media were also used. Figure 8 shows various knowledge indicators by control and intervention area. Approximately 75 percent of respondent mothers know when to seek treatment for malaria and 61.7 percent know at least two symptoms of malaria. About 47 percent of mothers know at least two ways to prevent malaria, but only 32.1 percent know that ITN can prevent malaria. Twenty-five percent know how to prevent malaria during pregnancy with IPT.

Intensification of BCC efforts is needed, especially in the area of IPT and ITN and their use.

Progress by Selected Indicators

Table 8 presents changes in selected indicators from the baseline LQAS survey in 2006. A remark-

able change is observed in LLIN coverage from 2 to 88 percent. The use of ITN also rose from 3 to 44.6 percent. The other indicator showing significant improvement is IPT in pregnant women (9.0 vs. 16.6 percent). A total of 5.8 percent of children received ACT for treatment of malaria compared to zero in 2006. Five percent of households were sprayed with IRS compared to 3 percent in 2006.

In 2010, 72 percent of mothers received at least one antenatal visit compared to 62 percent in 2006. No significant changes were observed in ORT use during diarrhea and exclusive breast feeding. The coverage of infant vaccination of DPT3 and measles almost tripled between 2006 and 2010.

The behavior change components were not assessed in the 2006 survey, so a comparison cannot be made to show progress levels.

Analysis of Project Outcome Indicators

Table 9 presents data from the baseline, midline, and end of project (EOP) targets by project out-

TABLE 8. CHANGES IN SELECTED INDICATORS BETWEEN 2006 AND 2010 LQAS SURVEYS

<i>Indicator</i>	<i>2006 (%)</i>	<i>2010 (%)</i>
IRS		
Percent of households sprayed with IRS in previous 12 months	3.0	5.0
LLIN		
Percentage of households with at least one ITN or LLIN	2.2	88.0
Percentage of children under 5 years who slept under an LLIN the night before the survey	3.0	44.6
ACT		
Percentage of children under 5 years with fever treated with an effective antimalarial within 24 hours from the onset of symptom	0.0	5.8
IPT		
Percentage of pregnant women who received two or more doses of IPT	9.0	16.6
ANC		
Percentage of women with children under 1 year who received ANC care during last pregnancy (one or more visits)	62.0	72.0
ORT		
Percent of children aged 0–59 months with diarrhea in the last two weeks who received ORS, RHF, or both	26.0	27.8
Vaccination		
Percent of infants aged 12–23 months who were vaccinated with the DPT3 vaccines	12.0	38.0
Percent of infants aged 12–23 months who were vaccinated with the measles vaccines	13.0	47.4
Exclusive Breast Feeding		
Percent of infants aged 0–6 months who were fed breast milk only in the last 24 hours	27.0	25.9

come indicators. Except for the indicator related to LLINs, no other indicators have reached their targets. The remarkable gain achieved in LLIN coverage as a result of mass distribution of LLINs state by state in the shortest possible time and firm commitment of development partners and federal, state, and local government and social mobilization at the community level. However, the greatest challenge remains the use of LLINs every night throughout the year. The progress on ACT is the lowest of all indicators and unlikely to meet its target by the end of the project unless drastic actions are taken to make ACT available at the community level. Community-directed intervention has the greatest potential to make this indicator achievable if implemented quickly and effectively. Similarly, role model mothers can be useful in prevention of malaria in pregnancy with IPT

intervention; the target of 80 percent for two doses of IPT during pregnancy can be achieved if IPT is made available at the primary health care level.

There is a steady increase in ANC from 62 to 72 percent. With increased awareness and provision of services, expectations are that the 80 percent target can be achieved by the EOP. The coverage of DPT3 and measles vaccination made some improvement compared to baseline. However, without scale up of interventions and mobilization of resources, it will be difficult to achieve the target by the EOP. Similarly, ORT and EBF require integrated community-level interventions. It is expected that the integrated maternal, newborn, and child health strategy and interventions aimed at the community and primary care levels will improve coverage in these areas.

TABLE 9. PROJECT OUTCOME INDICATORS: BASELINE, MIDLINE, AND END OF PROJECT

<i>Indicator</i>	<i>2006 (%)</i>	<i>2010 (%)</i>	<i>EOP (%)</i>
LLIN			
Percentage of households with at least one ITN or LLIN	2.2	88.0	80
Percentage of children under 5 years who slept under an LLIN the night before the survey	3.0	44.6	80
ACT			
Percentage of children under 5 years with fever treated with an effective antimalarial within 24 hours from the onset of symptom	0.0	5.8	80
IPT			
Percentage of pregnant women who received two or more doses of IPT	9.0	16.6	60
ANC			
Percentage of women with children under 1 year who received ANC care during last pregnancy (one or more visits)	62.0	72.0	80
ORT			
Percent of children aged 0–59 months with diarrhea in the last two weeks who received ORS, RHF, or both	26.0	27.8	50
Vaccination			
Percent of infants aged 12–23 months who are vaccinated with the DPT3 vaccines	12.0	38.0	80
Percent of infants aged 12–23 months who are vaccinated with the measles vaccines	13.0	47.4	80
Exclusive Breast Feeding			
Percent of infants aged 0–6 months who were fed breast milk only in the last 24 hours	27.0	25.9	50

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ANNEX 1. DEMOGRAPHIC AND SOCIOECONOMIC CHARACTERISTICS BY STATE

Variable	Akw-Ibom n = 190 (%)	Anambra n = 171 (%)	Bauchi n = 171 (%)	Delta n = 190 (%)	Gombe n = 152 (%)	Jigawa n = 171 (%)	Kaduna n = 171 (%)	Kano n = 190 (%)	Rivers n = 190 (%)
Gender									
Male	66.7	53.5	97.1	42.9	90.8	98.8	81.9	96.3	84.7
Female	33.3	46.5	2.9	57.1	9.2	1.2	18.1	3.7	15.3
Marital Status									
Single	2.1	3.6	1.8	6.9	0.7	2.3	0.5	2.6	2.7
Married	89.9	81.7	98.2	79.8	94.0	96.5	99.5	93.7	91.9
Widow	7.9	14.8	0.0	12.2	3.3	1.2	0.0	3.7	5.1
Others	0.0	0.0	0.0	1.1	2.0	0.0	0.0	0.0	0.3
Age									
15–19	2.4	0.0	0.6	2.5	0.0	0.0	0.0	0.5	0.0
19–24	7.2	2.1	3.6	7.6	1.4	1.2	3.4	2.1	2.2
25–29	8.4	5.3	9.0	5.9	6.8	4.3	6.1	4.3	8.1
30–34	11.4	12.6	9.6	12.7	12.2	7.3	13.5	8.6	12.6
35–39	7.8	9.5	11.4	8.5	10.8	11.0	10.1	5.9	15.6
40–44	7.8	7.4	13.8	11.0	11.5	14.0	15.5	20.9	11.9
45–49	10.2	9.5	9.6	9.3	10.1	11.6	10.8	15.0	8.9
50–54	10.2	12.6	12.6	10.2	8.8	20.7	4.7	9.1	11.9
55+	34.7	41.1	29.9	32.2	38.5	29.9	35.8	33.7	28.9
Education									
No education	13.7	7.6	56.1	15.3	63.2	62.0	35.1	53.2	10.5
Primary	48.4	43.9	20.5	32.6	19.1	7.1	9.5	21.6	23.2
Secondary	31.6	32.2	12.9	42.1	9.9	8.8	9.9	14.2	42.6
Higher secondary	6.3	16.4	10.5	10.0	7.9	10.5	14.4	11.1	23.7
Access to electricity	62.4	88.9	38.6	79.4	32.4	23.7	57.9	48.4	51.1
Household Asset									
Radio	83.6	87.7	77.8	64.2	69.1	75.9	92.4	91.0	77.9
Television	62.4	74.9	18.3	69.5	16.7	13.8	59.1	36.2	47.7
Refrigerator	27.0	51.8	10.1	34.4	9.7	5.5	31.2	13.3	32.3
Bicycle	60.2	17.1	50.6	29.3	46.7	40.4	48.5	74.9	36.5
Motorcycle	56.1	36.8	42.0	30.5	46.0	44.7	60.6	63.9	30.1
Car	16.8	32.7	11.2	11.8	6.8	10.2	24.1	16.4	13.8
Land ownership	82.9	62.7	86.1	49.7	79.9	79.8	65.2	84.4	71.4

ANNEX 1. DEMOGRAPHIC AND SOCIOECONOMIC CHARACTERISTICS BY STATE (continued)

Variable	Akw-ibom n = 190 (%)	Anambra n = 171 (%)	Bauchi n = 171 (%)	Delta n = 190 (%)	Gombe n = 152 (%)	Jigawa n = 171 (%)	Kaduna n = 171 (%)	Kano n = 190 (%)	Rivers n = 190 (%)
Source of drinking water									
Piped into residence	2.6	1.8	4.1	8.9	4.0	11.2	13.0	5.3	13.8
Piped into yard	1.1	2.9	0.6	7.4	1.3	5.3	2.4	2.1	3.7
Public piped	16.4	17.5	5.8	25.3	2.0	2.9	3.0	1.1	4.8
Well with pump	20.1	25.7	16.4	8.9	15.9	36.5	8.3	37.0	13.8
Well without pump	5.8	1.2	62.6	31.1	51.7	28.2	63.9	43.4	40.2
Cart pusher	0.5	0.0	1.8	0.5	0.7	0.0	1.8	5.8	0.0
Tanker truck	49.7	31.6	8.2	16.3	23.2	15.3	7.1	4.8	20.6
Rain water	0.0	8.8	0.6	0.5	1.3	0.6	0.6	0.0	2.6
Other	3.7	10.5	0.0	1.1	0.0	0.0	0.0	0.5	0.5
Toilet Type									
Flush toilet	9.5	42.7	2.9	37.9	2.0	2.9	9.4	4.2	22.6
Pit	79.4	49.1	90.1	28.9	84.8	72.9	84.2	95.3	36.6
Bush	2.1	6.4	7.0	23.7	12.6	24.1	5.8	0.0	21.5
Other	9.0	1.8	0.0	9.5	0.7	0.0	0.6	0.5	19.4
Flooring in the house									
Dirt, sand, dung	24.3	3.5	62.6	7.9	63.2	69.4	20.5	43.9	16.3
Wood or plank	0.0	0.6	0.0	4.7	2.6	0.0	0.6	0.0	1.1
Cement	70.9	90.1	6.6	75.3	33.6	21.2	78.9	54.5	68.4
Parquet or polished wood	0.0	0.0	0.6	0.0	0.7	0.0	0.0	0.0	0.0
Tiles	3.7	5.8	0.0	2.6	0.0	0.0	0.0	6.8	2.2
Other	1.1	0.0	9.5	0.0	9.4	0.0	1.6	7.4	3.3

ANNEX 2: SELECTED INDICATORS BY STATE

Indicator	AI (%)	Anam-bra (%)	Bau-chi (%)	Delta (%)	Combe (%)	Jiga-wa (%)	Ka-duna (%)	Kano (%)	Riv-ers (%)	Con-trol (%)	Interven-tion (%)	All (%)
IRS												
Percent of households sprayed with IRS in last 12 months	1.1	2.3	0.6	0.5	0.0	27.5	17.0	3.7	0.5	8.3	5.0	5.8
LLIN												
Percentage of households with at least two LLINs	83.0	74.3	90.1	3.2	86.8	94.7	85.4	70.5	71.6	42.1	81.3	72.4
Percentage of children under 5 years who slept under an LLIN the night before the survey	49.5	24.0	52.6	6.3	79.6	36.8	67.8	32.1	42.6	35.5	44.6	42.5
ACT												
Percentage of children under 5 years with fever treated with an effective antimalarial within 24 hours from the onset of symptom	3.7	7.0	4.7	3.7	8.6	1.8	2.9	8.9	6.3	3.3	5.8	5.3
IPT												
Percentage of pregnant women who received two or more doses of IPT	20.5	12.3	31.6	20.0	34.2	22.2	45.6	32.6	14.2	28.3	16.6	25.6
Knowledge												
Percentage of mothers who know at least two symptoms of malaria	53.7	47.4	69.0	46.8	72.4	62.0	73.1	73.7	59.5	59.3	62.3	61.7
Percentage of mothers who know when to seek treatment	68.9	70.8	80.7	57.9	88.8	71.9	76.6	82.1	72.1	70.4	76.2	74.9
Percentage of mothers who know at least two ways of preventing malaria	45.8	32.2	52.6	36.3	45.4	43.3	65.5	66.3	33.7	50.1	45.7	46.7
Percentage of mothers who know how to prevent malaria in pregnancy with IPT	29.5	20.5	31.0	17.9	37.5	12.3	41.5	20.0	18.9	29.1	24.0	25.1
Percentage of mothers who know LLINs can prevent malaria	33.2	24.6	36.3	3.2	46.1	24.0	57.9	45.8	22.6	29.1	33.0	32.1
ANC												
Percentage of women with children younger than 1 year who received ANC care during last pregnancy	44.7	83.6	53.2	68.9	48.0	42.1	69.6	43.7	50.0	63.6	53.8	55.9
ORT												
Percent of children aged 0–59 months with diarrhea in the last two weeks who received ORS, RHF, or both	18.9	22.2	20.5	13.2	21.1	25.1	60.2	52.1	31.6	35.5	27.8	29.5
Vaccination												
Percent of infants aged 12–23 months who were vaccinated with the DPT3 vaccines	59.5	65.5	22.2	47.9	32.2	5.8	54.4	21.6	55.8	51.0	38.0	40.9
Percent of infants aged 12–23 months who were vaccinated with the measles vaccines	55.3	66.1	45.6	57.4	42.1	30.4	71.3	40.0	51.1	64.0	47.4	51.0
EBF												
Percent of infants aged 0–6 months who were fed breast milk only in the last 24 hours	37.3	6.8	33.8	7.9	31.7	25.4	45.1	19.4	34.1	21.7	25.9	24.9

ANNEX 3. LIST OF SUPERVISORS, INTERVIEWERS, AND MONITORS

<i>State</i>	<i>LGA</i>	<i>Name</i>	<i>Survey Designation</i>
Akwa IBOM	Ibeno	Iniobong C. Okon	Supervisor
Akwa Ibom	Ibeno	Ekaete N. Umoh	Interviewer
Akwa Ibom	Ibeno	Sunday J. Akpan	Interviewer
Akwa Ibom	Ikono	Godwin Archibong	Supervisor
Akwa Ibom	Ikono	Solomon O. Ette	Interviewer
Akwa Ibom	Ikono	Florence S. Ekanem	Interviewer
Akwa Ibom	Ini	Uduak Umo-Udofia	Supervisor
Akwa Ibom	Ini	Godwin G. Akpaidem	Interviewer
Akwa Ibom	Ini	Udo Okonnah	Interviewer
Akwa Ibom	Itu	Veronica I. Itina	Supervisor
Akwa Ibom	Itu	Alice Okon Esien	Interviewer
Akwa Ibom	Itu	Okon B. Ekanem	Interviewer
Akwa Ibom	Esit Eket	Evelyn J. Eyo	Supervisor
Akwa Ibom	Esit Eket	R. B. Archibong	Interviewer
Akwa Ibom	Esit Eket	Udo W. Enombong	Interviewer
Akwa Ibom	Nsit Ubium	Ezekiel Nkanta	Supervisor
Akwa Ibom	Nsit Ubium	Emmanuel Akpan	Interviewer
Akwa Ibom	Nsit Ubium	Glory E. D. Akpan	Interviewer
Akwa Ibom	Okobo	Essien K. Akpan	Supervisor
Akwa Ibom	Okobo	Emem U. Akpan	Interviewer
Akwa Ibom	Okobo	Eyo A. Okoh	Interviewer
Akwa Ibom	Onna	Joan Ekong	Supervisor
Akwa Ibom	Onna	Enobong Eteh	Interviewer
Akwa Ibom	Onna	U. D. Uko	Interviewer
Akwa Ibom	Oruk anam	Bassey E. Akpan	Supervisor
Akwa Ibom	Oruk anam	Joseph M. Udo	Interviewer
Akwa Ibom	Oruk anam	Rosemary Idiong	Interviewer
Akwa Ibom	Ukanafun	Micheal O. Akpan	Supervisor
Akwa Ibom	Ukanafun	Aniekan F. Umanah	Interviewer
Akwa Ibom	Ukanafun	Inemesit I. Udom	Interviewer
Anambra	Anaocha	Dr. S. A. Nwabueze	Supervisor
Anambra	Anaocha	Ilika Chinazo	Interviewer
Anambra	Anaocha	Udoji Grace	Interviewer
Anambra	Awka North	Virginia N. Onwuvunka	Supervisor
Anambra	Awka North	Bridget Nwanelo	Interviewer

(continued)

ANNEX 3. LIST OF SUPERVISORS, INTERVIEWERS, AND MONITORS *(continued)*

<i>State</i>	<i>LGA</i>	<i>Name</i>	<i>Survey Designation</i>
Anambra	Awka North	Onuchukwu Lotanna	Interviewer
Anambra	Awka South	Ike Edith	Supervisor
Anambra	Awka South	Nwafor Victoria	Interviewer
Anambra	Awka South	Obieze Uju	Interviewer
Anambra	Dunukofia	B. O. Okonkwo	Supervisor
Anambra	Dunukofia	Anakwenze Chinonye	Interviewer
Anambra	Dunukofia	Obidi S. Mbonu	Interviewer
Anambra	Idemili North	M. E. Chukwujeku	Supervisor
Anambra	Idemili North	Achebe Chizoba	Interviewer
Anambra	Idemili North	Augustina Chukwura	Interviewer
Anambra	Idemili South	Lambert C. Okeke	Supervisor
Anambra	Idemili South	Igbokwe Tobenna	Interviewer
Anambra	Idemili South	J. I. Ukuagba	Interviewer
Anambra	Njikoka	Dr. Njelita Chukwudi	Supervisor
Anambra	Njikoka	C. O. Arachie	Interviewer
Anambra	Njikoka	E. Chiekezie	Interviewer
Anambra	Nnewi North	Adogu	Supervisor
Anambra	Nnewi North	Dr. Frances Ilika	Interviewer
Anambra	Nnewi North	P. Akaegbobi	Interviewer
Anambra	Onitsha North	Julie N. Echendu	Supervisor
Anambra	Onitsha North	L. O. Chukwurah	Interviewer
Anambra	Onitsha North	Ejiofo Chikaodili	Interviewer
Bauchi	Alkaleri	Muhd Lawal Ibrahim	Supervisor
Bauchi	Alkaleri	Hamza Sajeje	Interviewer
Bauchi	Alkaleri	Ibrahim Yolama	Interviewer
Bauchi	Damban	Abubakar Musa Usman	Supervisor
Bauchi	Damban	Abubakar H. Bappah	Interviewer
Bauchi	Damban	Ajiya Daboh	Interviewer
Bauchi	Darazo	Danladi Abdul Mohammed	Supervisor
Bauchi	Darazo	Abdu Mohammed	Interviewer
Bauchi	Darazo	Adamu Dauda Udabo	Interviewer
Bauchi	Gamawa	Aliyu Jibrin Wandas	Supervisor
Bauchi	Gamawa	Bala Zailani	Interviewer
Bauchi	Gamawa	Sani Adamu	Interviewer
Bauchi	Jama'are	Haruna Adamu Tiffi	Supervisor

(continued)

ANNEX 3. LIST OF SUPERVISORS, INTERVIEWERS, AND MONITORS *(continued)*

<i>State</i>	<i>LGA</i>	<i>Name</i>	<i>Survey Designation</i>
Bauchi	Jama'are	Muhktar Moh'd	Interviewer
Bauchi	Jama'are	Saidu Abubakar	Interviewer
Bauchi	Katagum	Aliyu Munkaila	Supervisor
Bauchi	Katagum	Inuwa Garba Shekal	Interviewer
Bauchi	Katagum	Shehu Gana	Interviewer
Bauchi	Kirfi	Dr. Lawan S. Abubakar	Supervisor
Bauchi	Kirfi	Hajara Moses John	Interviewer
Bauchi	Kirfi	Shehu Umar	Interviewer
Bauchi	Shira	Musa A. Muhammad	Supervisor
Bauchi	Shira	Adamu Garba Yusuf	Interviewer
Bauchi	Shira	Mohd Kabir Umar	Interviewer
Bauchi	Warji	Sulaiman Danladi	Supervisor
Bauchi	Warji	Abdu Saleh Garba	Interviewer
Bauchi	Warji	Iliya D. Ishaku	Interviewer
Delta	Aniocha North	Dr. A .N. Okolo	Supervisor
Delta	Aniocha North	Teresa Anikwue	Interviewer
Delta	Aniocha North	Franca Omesiete	Interviewer
Delta	Burutu	Dr. Ogheneruru Layegue	Supervisor
Delta	Burutu	Charles Kokole	Interviewer
Delta	Burutu	Wikimor O. Frederick	Interviewer
Delta	Ethiope West	Moriafe I . Anna	Supervisor
Delta	Ethiope West	Mrs.J Egbejule	Interviewer
Delta	Ethiope West	Mrs. Akpotaire	Interviewer
Delta	Isoko North	Dr J. Uyovwiesevwa	Supervisor
Delta	Isoko North	Mrs Offi Rhoda	Interviewer
Delta	Isoko North	Ove Florence	Interviewer
Delta	Ndokwa East	Mrs. M. E. Oyemike	Supervisor
Delta	Ndokwa East	Gloria Olodu	Interviewer
Delta	Ndokwa East	Mrs. Ejech Christy	Interviewer
Delta	Ndokwa West	Mrs. J. Nwokolo	sSupervisor
Delta	Ndokwa West	Mr. John Chisunum	Interviewer
Delta	Ndokwa West	Mrs. H. Izuegbu	Interviewer
Delta	Sapele	Ikikiru Pius	Supervisor
Delta	Sapele	Owen G. Oghenenyerovwo	Interviewer
Delta	Sapele	Mrs. R. V. Akpokona	Interviewer

(continued)

ANNEX 3. LIST OF SUPERVISORS, INTERVIEWERS, AND MONITORS *(continued)*

<i>State</i>	<i>LGA</i>	<i>Name</i>	<i>Survey Designation</i>
Delta	Ughelli North	Oyeh Juliet Oke	Supervisor
Delta	Ughelli North	Daniel Atete	Interviewer
Delta	Ughelli North	Helen Erueh	Interviewer
Delta	Uvwie	Dr. H. Ohwojedo	Supervisor
Delta	Uvwie	Mrs. Ogbemudia	Interviewer
Delta	Uvwie	Mrs. M Sakpaide	Interviewer
Delta	Warri South	Dr. Taigbenu	Supervisor
Delta	Warri South	Dorothy N. Ehighelua	Interviewer
Delta	Warri South	Marian Ayemere	Interviewer
Gombe	Akko	Ahmed Audu	Supervisor
Gombe	Akko	David Ayo	Interviewer
Gombe	Akko	Moh'd Saleh	Interviewer
Gombe	Y/DEBA	Moh'd Lawan	Supervisor
Gombe	Y/DEBA	Habu Kachalla	Interviewer
Gombe	Y/DEBA	Margaret Magaji	Interviewer
Gombe	Balanga	Sulaiman Mamman	Supervisor
Gombe	Balanga	Edward Usman	Interviewer
Gombe	Balanga	Andrew Tanko	Interviewer
Gombe	Billiri	Esther Holen	Supervisor
Gombe	Billiri	Yusuf Ankama	Interviewer
Gombe	Billiri	Moh'd Zainab	Interviewer
Gombe	Funakaye	Garba Baba	Supervisor
Gombe	Funakaye	Kwiraga Aliyu	Interviewer
Gombe	Funakaye	Musa Dauda	Interviewer
Gombe	Kaltungo	Ahmed Audu	Supervisor
Gombe	Kaltungo	Ibrahim Idi	Interviewer
Gombe	Kaltungo	Boyi Diba	Interviewer
Gombe	Kwami	Aishatu Haruna	Supervisor
Gombe	Kwami	Salihi Adamu	Interviewer
Gombe	Kwami	Moh'd U. Usman	Interviewer
Gombe	Nafada	Sulaiman I. Nafada	Supervisor
Gombe	Nafada	Moh'd Yaya	Interviewer
Gombe	Nafada	Babayo A. Nafada	Interviewer
Jigawa	Auyo	Mohd Gagarawa	Supervisor
Jigawa	Auyo	Ibrahim Uba Moh'd	Interviewer

(continued)

ANNEX 3. LIST OF SUPERVISORS, INTERVIEWERS, AND MONITORS *(continued)*

<i>State</i>	<i>LGA</i>	<i>Name</i>	<i>Survey Designation</i>
Jigawa	Auyo	Yakubu Hamed	Interviewer
Jigawa	Birnin Kudu	Lawan Abdu	supervisor
Jigawa	Birnin Kudu	Moh'd Yahaya	Interviewer
Jigawa	Birnin Kudu	Musa Idris	Interviewer
Jigawa	Birniwa	Bala Birniwa	Supervisor
Jigawa	Birniwa	Lawan Umar	Interviewer
Jigawa	Birniwa	Moh'd Ali Idris	Interviewer
Jigawa	Buji	Kasim Hassan	Supervisor
Jigawa	Buji	Shehu Suleman	Interviewer
Jigawa	Buji	Shuaibu Shehu	Interviewer
Jigawa	Dutse	Bilya Haruna	supervisor
Jigawa	Dutse	Baffa Abdullahi	Interviewer
Jigawa	Dutse	Sani Yusuf	Interviewer
Jigawa	Garki	Magaji Abdulhamid	Supervisor
Jigawa	Garki	Alkassim Y. Abubakar	Interviewer
Jigawa	Garki	Kabiru Shehu	Interviewer
Jigawa	Guri	Adamu Garba Abubakar	Supervisor
Jigawa	Guri	Muh'd Garba	Interviewer
Jigawa	Guri	Moh'd Mai- Samari	Interviewer
Jigawa	Malam Madori	Danlami Aliyu	Supervisor
Jigawa	Malam Madori	Hamza M. Bello	Interviewer
Jigawa	Malam Madori	Shettima Maigana	Interviewer
Jigawa	Ringim	Surajo Nuhu	Supervisor
Jigawa	Ringim	Musa Abdullahi	Interviewer
Jigawa	Ringim	Saidu Magaji	Interviewer
Kaduna	Chikun	Hajara Usman Ahmed	Supervisor
Kaduna	Chikun	Michael Yafai	Interviewer
Kaduna	Chikun	Ruth Yohana	Interviewer
Kaduna	Giwa	Ibrahim Sani	Supervisor
Kaduna	Giwa	Babangida Saleh	Interviewer
Kaduna	Giwa	Shehu Umar	Interviewer
Kaduna	Kachia	Angela A Sheyin	Supervisor
Kaduna	Kachia	Aliyu D Gimba	Interviewer
Kaduna	Kachia	Hosea Shekarau	Interviewer
Kaduna	Kaduna South	Umar S. Kwasallo	Supervisor
Kaduna	Kaduna South	Ibrahim Yusuf	Interviewer

(continued)

ANNEX 3. LIST OF SUPERVISORS, INTERVIEWERS, AND MONITORS *(continued)*

<i>State</i>	<i>LGA</i>	<i>Name</i>	<i>Survey Designation</i>
Kaduna	Kaduna South	Salisu Shuaibu	Interviewer
Kaduna	Kaura	Daniel Adamu	Supervisor
Kaduna	Kaura	Ishaku Kanwai	Interviewer
Kaduna	Kaura	Simon Bonat	Interviewer
Kaduna	Kudan	Bello Abdullahi Alhazawa	Supervisor
Kaduna	Kudan	Jibril Dalhatu	Interviewer
Kaduna	Kudan	Saidu M. Dahiru	Interviewer
Kaduna	Sabon-Gari	Habila Barem	Supervisor
Kaduna	Sabon-Gari	Aliyu A. Umar	Interviewer
Kaduna	Sabon-Gari	Sanusi Hamza	Interviewer
Kaduna	Soba	Sulaiman H. Yusuf	Supervisor
Kaduna	Soba	Musa Abubakar	Interviewer
Kaduna	Soba	Shehu Kasim	Interviewer
Kaduna	Zangon Kataf	Tasiu Garba	Supervisor
Kaduna	Zangon Kataf	Bulus Y. Atar	Interviewer
Kaduna	Zangon Kataf	Sarkwai Christopher	Interviewer
Kano	Bagwai	Abdulrahman Yakubu	Supervisor
Kano	Bagwai	Abdullahi Dahiru	Interviewer
Kano	Bagwai	Yahaya Yusuf	Interviewer
Kano	Gaya	Ali Aminu	Supervisor
Kano	Gaya	Ibrahim Abubakar	Interviewer
Kano	Gaya	Ibrahim M Kademi	Interviewer
Kano	Gwale	M. N. Mahmaoud	Supervisor
Kano	Gwale	Abba Usaini	Interviewer
Kano	Gwale	Hadiza Yusuf	Interviewer
Kano	Kiru	Shehu Musa Ishaq	Supervisor
Kano	Kiru	Binta Tanimu	Interviewer
Kano	Kiru	Sulaiman Datti Yako	Interviewer
Kano	Kura	Auwal Bello	Supervisor
Kano	Kura	Harira Ibrahim	Interviewer
Kano	Kura	Jaafar Lawan	Interviewer
Kano	Madobi	Mohd Sani Ibrahim	Supervisor
Kano	Madobi	Haladu Abdu	Interviewer
Kano	Madobi	Zainab Hassan	Interviewer
Kano	Minjibir	Aishatu Yahaya Muhammad	Supervisor
Kano	Minjibir	Magaji Ubale Ado	Interviewer
Kano	Minjibir	Sani Haruna	Interviewer

(continued)

ANNEX 3. LIST OF SUPERVISORS, INTERVIEWERS, AND MONITORS *(continued)*

<i>State</i>	<i>LGA</i>	<i>Name</i>	<i>Survey Designation</i>
Kano	Rimin-Gado	Garba B. Bebeji	Supervisor
Kano	Rimin-Gado	Binta Ismail	Interviewer
Kano	Rimin-Gado	Ibrahim Yusuf	Interviewer
Kano	Shanono	Auwalu Ibrahim	Supervisor
Kano	Shanono	Abdullahi Abubakar	Interviewer
Kano	Shanono	Muhd A Ahmad	Interviewer
Kano	Tsanyawa	Lamido T Sanusi	Supervisor
Kano	Tsanyawa	Nasiru S. Gwarzo	Interviewer
Kano	Tsanyawa	Mrs Magajiya Mohd	Interviewer
Rivers	Ahoada East	Macaulay Precious	Supervisor
Rivers	Ahoada East	Killie Destiny	Interviewer
Rivers	Ahoada East	Okechukwu E. Igbudu	Interviewer
Rivers	Ahoada West	Onita E. Onisoya	Supervisor
Rivers	Ahoada West	Onoleka Luis	Interviewer
Rivers	Ahoada West	Samuel Agamini	Interviewer
Rivers	Akuku Toru	Markba Georgewill	Supervisor
Rivers	Akuku Toru	Limejuice Bobmanuel	Interviewer
Rivers	Akuku Toru	Menia Sokari	Interviewer
Rivers	Andoni	Kingston P. Urum	Supervisor
Rivers	Andoni	Lieze Gibson	Interviewer
Rivers	Andoni	Okuba Ekeneokot	Interviewer
Rivers	Bonny	Sotonye Ate	Supervisor
Rivers	Bonny	Augusta Jumbo	Interviewer
Rivers	Bonny	Ibifuro Benstone	Interviewer
Rivers	Etche	Titus Nweke	Supervisor
Rivers	Etche	Njoku Goodness	Interviewer
Rivers	Etche	K. Amakolonwa	Interviewer
Rivers	Obio/Akpor	Florence N. Woko	Supervisor
Rivers	Obio/Akpor	Dorathy Amadi	Interviewer
Rivers	Obio/Akpor	Okocha Pauline	Interviewer
Rivers	Omumma	Amadi Chikwe	Supervisor
Rivers	Omumma	Otuka John	Interviewer
Rivers	Omumma	Okere A. Uloma	Interviewer
Rivers	Oyigbo	Janet Okere	Supervisor
Rivers	Oyigbo	Victor Enyinnah	Interviewer
Rivers	Oyigbo	Nwogu O. John	Interviewer
Rivers	Tai	Nbulee Asabue	Supervisor

(continued)

ANNEX 3. LIST OF SUPERVISORS, INTERVIEWERS, AND MONITORS (*continued*)

<i>State</i>	<i>LGA</i>	<i>Name</i>	<i>Survey Designation</i>
Rivers	Tai	Ebenezer N.	Interviewer
Rivers	Tai	Sunday W. Nkoo	Interviewer
National	NMCP	Oyeleke Timothy Oluwa Femi	Monitor
National	NMCP	Bankole Afolabi Owolabi	Monitor
National	NMCP	Samual Olusegun Aragbaiye	Monitor
National	NMCP	Nyeomasila Chizi Kingsley	Monitor
National	NMCP	Adeniyi Julius Funminiyi	Monitor
National	NMCP	Lomowu Kayode Isaac	Monitor
National	NMCP	Ogunniyi Babatunde Folus	Monitor

ANNEX 4. SAMPLED LOCAL GOVERNMENT AREAS

<i>State</i>	<i>LGA</i>	<i>State</i>	<i>LGA</i>
Akwa Ibom	Ibendo	Delta	Aniocha North
Akwa Ibom	Ikono	Delta	Burutu
Akwa Ibom	Ini	Delta	Ethiope West
Akwa Ibom	Itu	Delta	Isoko North
Akwa Ibom	Nsit Eket	Delta	Ndokwa East
Akwa Ibom	Nsit-Ubium	Delta	Ndokwa West
Akwa Ibom	Okobo	Delta	Sapele
Akwa Ibom	Onna	Delta	Ughelli North
Akwa Ibom	Oruk-Anam	Delta	Uvwie
Akwa Ibom	Ukanafun	Delta	Warri South
Kano	Bagwai	Rivers	Ahoada East
Kano	Gaya	Rivers	Ahoada West
Kano	Gwale	Rivers	Akuku Toru
Kano	Kiru	Rivers	Andoni
Kano	Kura	Rivers	Bonny
Kano	Madobi	Rivers	Etche
Kano	Minjibir	Rivers	Obio/Akpor
Kano	Rimin-Gado	Rivers	Omumma
Kano	Shanono	Rivers	Oyigbo
Kano	Tsanyawa	Rivers	Tai
Bauchi	Alkaleri	Anambra	Anaocha
Bauchi	Damban	Anambra	Awka North
Bauchi	Darazo	Anambra	Awka South
Bauchi	Gamawa	Anambra	Dunukofia
Bauchi	Jama'are	Anambra	Idemili North
Bauchi	Katagum	Anambra	Idemili South
Bauchi	Kirfi	Anambra	Njikoka
Bauchi	Shira	Anambra	Nnewi North
Bauchi	Warji	Anambra	Onitsha North
Jigawa	Auyo	Kaduna	Chikun
Jigawa	Birnin Kudu	Kaduna	Giwa
Jigawa	Birniwa	Kaduna	Kachia
Jigawa	Buji	Kaduna	Kaduna South
Jigawa	Dutse	Kaduna	Kaura
Jigawa	Garki	Kaduna	Kudan
Jigawa	Guri	Kaduna	Sabon-Gari
Jigawa	Malam Madori	Kaduna	Soba
Jigawa	Ringim	Kaduna	Zangon Kataf
Gombe	Akko		
Gombe	Yamaltu-Deba		
Gombe	Balanga		
Gombe	Billiri		
Gombe	Funna-Kaye		
Gombe	Kaltungo		
Gombe	Kwami		
Gombe	Nafada		

2010 Malaria Household Survey in Nine States of Nigeria



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