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Malaria Prevention Measures and Household Characteristics of Children Living with Biological Parents Compared to Children Living with Non-Parent Guardians included in the 2009 Uganda Malaria Indicator Survey

By

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Master of Public Health

Global Epidemiology

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By

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Bachelor of Arts

Johns Hopkins University

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Abstract

Malaria Prevention Measures and Household Characteristics of Children Living with Biological Parents Compared to Children Living with Non-Parent Guardians included in the 2009 Uganda Malaria Indicator Survey

By Samantha Dolan

Background: Uganda has more than 2.7 million orphans or children living with non-parent guardians (NPG) who may have limited access to malaria prevention measures compared to children living with their biological parents (BP).

Methods: We analyzed weighted data from the 2009 Uganda Malaria Indicator Survey for malaria and prevention measures including blood smear readings, insecticide-treated net (ITN) ownership and use, and household characteristics for children under 5 years (under-fives) living with either NPG or BP. Two-sided Rao Scott Chi-square tests were used to compare categorical data and Wilcoxon rank sum tests were used for testing distribution differences between continuous variables.

Results: Of 3933 under-fives, 707 (18%) were categorized as living with NPG during household surveys. The median age and sex of the head of the household differed for each group; for children living with NPG the median age was 54 (47-63) years while for children living with BP it was 34 (28-40) years ($p<.01$), 46% of heads of households for children living with NPG were male, while for children living with BP, 82% were male ($p<.01$). Of children living with NPG, 76% lived in a home with an ITN compared to 80% of children living with BP ($p=.33$). Of those households with a bednet for sleeping, 42% (95% CI: 33-50) of children living with NPG versus 25% (95% CI: 21-28) of children living with BP did not have any children sleep under the bednet the night before the survey ($p<.01$). Of children living with NPG, 45% (95% CI: 41-49) had a positive malaria blood smear, compared to 42% (95% CI: 40-44) of children living with BP ($p=0.31$). Adjusting for age, age and sex of the head of the household, wealth, and whether children slept under a bednet the night before the survey, the odds ratio of a positive malaria blood smear was over four times greater for children living with NPG than those living with BP (OR: 4.2, 95% CI: 1.8-9.7, $p<.01$). There were statistically significant interaction terms between guardianship and whether children slept under a bednet ($p<.01$) as well as age of the head of the household ($p=.02$).

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Acronyms

ACTs	Artemisinin-based combination therapy
BP	Biological parents
DALYs	Disability adjusted life years
IRS	Indoor residual spraying
ITNs	Insecticide treated bednets
LLINs	Long-lasting insecticidal nets
MIS	Malaria Indicator Survey
NPG	Non-parent guardians
RDTs	Rapid diagnostic tests
SSA	Sub-Saharan Africa
UBOS	Uganda Bureau of Statistics
UMSP	Uganda Malaria Surveillance Project
USAID	United States Agency for International Development

Chapter I: Background/Literature Review

Malaria

Malaria is an infectious disease of humans and other animals caused by the parasites of the genus *Plasmodium,* which is transmitted by the bite of an infected female *anopheles* mosquitoes in tropical and subtropical regions of the world[1]. Four species of the *Plasmodium* parasite are responsible for most human cases of malaria in Africa: *P. falciparum, P. vivax, P. ovale,* and *P. malariae*. The global burden of malaria affects the nearly 3.3 billion individuals at risk for the disease in 109 different countries, the majority in sub-Saharan Africa (SSA) [2].

The *P. falciparum* species causes the most severe form of malaria, accounts for most malarial deaths, and is the dominate species in SSA[3, 4]. In 2010, the World Health Organization estimated that there were 174,000,000 cases of malaria in Africa and 596,000 deaths[4]. P. *falciparum* infection can clinically manifest as an acute febrile illness and if untreated can rapidly progress to other severe and life threatening conditions such as cerebral malaria, respiratory distress, and severe anemia [5]. In areas with high and intense malaria transmission, such as SSA, young children, with inadequate immunity to malaria and pregnant women are the populations most vulnerable to acute illness and severe forms of the disease[6]. Persistent sub-clinical infections (parasitemia), particularly in children can lead to other ill-health outcomes (e.g. anemia) as well as cognitive impairments[7].

Malaria control is difficult, especially in SSA due to efficient vector mosquitoes responsible for transmitting the parasite, the high prevalence of the species of parasite

that is most deadly, climate favorable to transmission, poor public health infrastructure, and the high costs of effective control intervention[6]. Currently, the four most effective malaria control interventions are prompt and effective malaria case management with Artemisinin-based combination therapy (ACTs), increase in the distribution of insecticide treated bednets (ITNs), a rise in indoor residual spraying (IRS), and intermittent preventive treatment of malaria in pregnant women [8].

Between 2000 and 2011, the burden of malaria has declined by 33% in the World Health Organization's defined African region[9]. However millions still suffer despite the distribution of effective prevention methods and the use of highly effective drugs for treatment of malaria. Rapid declines in the burden of malaria in SSA (and globally) are challenged by emerging antimalarial drug resistance (artemisinins), insecticide resistance (pyrethreoids), treatment of unconfirmed cases, inability of public and government commitments to provide sustained support for drugs and prevention methods, and poor healthcare infrastructure [4].

Malaria due to P. *falciparum* not only affects an individual's health, but their livelihood, their family's income, and contributes to government expenses. It has been estimated that the direct costs of malaria morbidity and mortality are at least US$ 12 billion per year in Africa[10]. Around 35.4 million disability adjusted life years (DALYs) in sub-Saharan Africa are estimated to be due to the burden of malaria[11]. Individuals and their family members must pay for healthcare services, transportation to clinics, might lose work days, and have to pay funeral costs. Governments have to supply drugs, public health interventions, and health facilities[2].

Uganda is one of the SSA countries most severely affected by the burden of malaria, with one-hundred percent of its population at risk for malaria infection[12]. Uganda, with a population of 35,600,000 people[12] and a life expectancy of 50 years[13], has some of the highest transmission rates and has the third highest number of deaths attributed to malaria within Africa[14]. In 2007, there were around 12,700,000 reported malaria cases and 47,000 deaths due to malaria[14]. For children under five years, malaria is responsible for almost half of inpatient deaths[12]. Mortality from malaria in children is estimated to be between 70,000 and 100,000 deaths annually[13].

In over 90% of Uganda, malaria transmission is stable and perennial, the remainder of the country has unstable transmission, particularly in the highland areas of the country[13]. Of the areas with stable transmission, 70% have very high transmission levels where individuals experience more than 100 infective bites per person per year. It has been approximated that an individual living in one of the higher transmission areas can receive up to 1,500 infectious bites per year[14]. There are two peaks in rainfall in the country, one from March to May and the other from September to December; malaria transmission peaks following the rainy seasons. *P. falciparum* accounts for approximately 90 to 98% of diagnosed cases of malaria in Uganda and the parasite is predominantly transmitted by the *Anopheles gambiae* and *A. funestus* mosquito species.

Through the country's National Malaria Control Program, long-lasting insecticidal nets (LLINs), IRS, environmental management, malaria case management with ACTs, treatment and prevention during pregnancy, and early detection and response to epidemics have been implemented throughout the country[13]. IRS coverage is targeted in epidemic-prone areas and around 6 million LLINs have been distributed. For

case management, ACTs replaced the less efficacious combination of chloroquine and sulphadoxine-pyremethamine.

Orphans and Vulnerable Children

In Uganda, close to 3 million children ages 0 to 17 were orphans as of 2009, 1.2 million of them were orphaned due to HIV/AIDS[15]. In the early 1990s, the HIV epidemic in Uganda caused a rise in adult mortality; in the late 1990s, incidence of HIV began to stabilize and then decline, however orphan prevalence remained high[16]. Many of these children either live with their surviving parent, or become absorbed into the households of their extended families [17]. However, more recently, due to the increase in the number of orphans, and the weakening of the extended family's ability to take care of additional children, there has been an increase in the number of child-headed households[18]. Orphans are typically taken into female-headed households and often by older relatives, mainly grandmothers[19].

Orphans and children living with non-parent guardians (NPG) are often more vulnerable to poor health, economic loss, educational boundaries, and psychological issues; they face different challenges than those children living with their biological parents (BP)[16, 20-22]. Regarding education, they are less likely to be at the same educational level as non-orphans[16]. Studies have found inconsistent results concerning the differences in health indicators for orphans compared to biological children. One study from Kenya, found that the prevalence of fever, malaria parasitaemia, history of illness, hemoglobin levels, use of bednets, and height-for-age Z scores did not differ between orphans and non-orphans. Although this study did find that orphans had weight-

for-height Z scores that were 0.3 standard deviations below those of non-orphans[23]. A cross-sectional survey performed in central Kampala, Uganda, found that orphans were sick more often than non-orphans in the two weeks preceding the survey, however there was no significant difference in health seeking behavior or growth indicators between orphans and non-orphans[20]. Another study found that orphaned children experience a wide range of health risks and have limited access to material and social resources[21]. Those households absorbing orphans are more likely to be monetarily poor, because there is an increase in the "dependency ratio", where fewer individuals are supporting more dependents, and where having unmet needs, such as lack of education, food, medical care, and clothes, is common[22].

Child-headed households are distinctively different than adult-headed households. Heads of households who are children generally have less knowledge about the signs and symptoms of malaria, they're less likely to seek health care, and they're more likely to use herbal remedies for the treatment of malaria[24]. For the purposes of this study, child-headed households were not included in the analysis.

Malaria Indicator Survey, Uganda

The Malaria Indicator Survey (MIS) was implemented in Uganda to determine the progress being made in malaria control and prevention. The objectives of the 2009 MIS included:

- "Measure the extent of ownership and use of mosquito bed nets
- Assess coverage of the intermittent preventive treatment program for pregnant women

- Identify practices used to treat malaria among children under age 5 and the use of specific anti-malarial medications
- Measure the prevalence of malaria and anemia among children age 0-59 months
- Determine the species of plasmodium parasite most prevalent in Uganda
- Assess knowledge, attitudes, and practices regarding malaria in the general population"

This study aims to determine whether orphans and children under 5 years of age in Uganda living with NPG, captured in the MIS of 2009, have different malaria prevention and disease indicators compared to children living with BP. Few previously published studies have addressed this issue. Findings of this study will help to determine whether the MIS is capturing a representative sample of Ugandan children, in particular ensuring that children living with NPG are included. The MIS data is important for determining the burden of malaria within many of the sub-Saharan African countries and helps to identify gaps in prevention and regions which need additional interventions or assistance.

Chapter II: Manuscript

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Samantha Dolan

Abstract

Background: Uganda has more than 2.7 million orphans or children living with non-parent guardians (NPG) who may have limited access to malaria prevention measures compared to children living with their biological parents (BP).

Methods: We analyzed weighted data from the 2009 Uganda Malaria Indicator Survey for malaria and prevention measures including blood smear readings, insecticide-treated net (ITN) ownership and use, and household characteristics for children under 5 years (under-fives) living with either NPG or BP. Two-sided Rao Scott Chi-square tests were used to compare categorical data and Wilcoxon rank sum tests were used for testing distribution differences between continuous variables.

Results: Of 3933 under-fives, 707 (18%) were categorized as living with NPG during household surveys. The median age and sex of the head of the household differed for each group; for children living with NPG the median age was 54 (47-63) years while for children living with BP it was 34 (28-40) years ($p<.01$), 46% of heads of households for children living with NPG were male, while for children living with BP, 82% were male ($p<.01$). Of children living with NPG, 76% lived in a home with an ITN compared to 80% of children living with BP ($p=.33$). Of those households with a bednet for sleeping, 42% (95% CI: 33-50) of children living with NPG versus 25% (95% CI: 21-28) of children living with BP did not have any children sleep under the bednet the night before the survey ($p<.01$). Of children living with NPG, 45% (95% CI: 41-49) had a positive malaria blood smear, compared to 42% (95% CI: 40-44) of children living with BP ($p=0.31$). Adjusting for age, age and sex of the head of the household, wealth, and whether children slept under a bednet the night before the survey, the odds ratio of a positive malaria blood smear was over four times greater for children living with NPG than those living with BP (OR: 4.2, 95% CI: 1.8-9.7, $p<.01$). There were statistically significant interaction terms between

guardianship and whether children slept under a bednet ($p<.01$) as well as age of the head of the household ($p=.02$).

Introduction

Among the Ugandan population, malaria is a severe health burden that affects millions of people. One-hundred percent of the population is at risk of malaria infection, Uganda experiences some of the highest transmission rates in Africa[12, 14] and the parasite species contributing to the most morbidity is *Plasmodium flaciparum* transmitted mainly by bite of an infected female *Anopheles gambia*e mosquitoes. Children under five years and pregnant women are most at risk of acquiring the infection and developing severe malarial disease due to their lack of immunity and weak immune system. The most severe manifestation in children being cerebral malaria, respiratory distress, and severe anemia [5]. In Uganda, between 70-100,000 deaths are reported to be due to malaria in children under-five annually[13].

Uganda has a large number of orphaned and vulnerable children due to the large HIV epidemic peaking in the early 1990s[16]. Approximately 1.2 million children in Uganda are orphaned due to HIV/AIDS, contributing to the 3 million total orphans in the country[15]. In many sub-Saharan African countries, orphans live with a surviving parent or become absorbed into the households of their extended family [17]. Often, orphans are taken in by older female relatives, mainly grandmothers[19]. As the number of orphans increases, the ability of extended families to take care of these children has decreased, potentially leading to orphans being more vulnerable to poor health, economic loss, educational boundaries, and psychological problems[16, 20-22].

Few studies have assessed how the burden of diseases, other than HIV/AIDS, differs between orphans and children living with non-parent guardians (NPG) compared to those children living with their biological parents (BP). One study in Kenya found that

the prevalence of fever, malaria, parasitaemia, history of illness, hemoglobin levels, use of bednets, and height-for-age Z scores did not differ between orphans and non-orphans[23]. Another study from Uganda concluded that orphans were sick more often that non-orphans two weeks preceding a cross-sectional survey[20]. This study aims to determine whether malaria prevention and disease indicators differ between those children living with NPG compared to those living with BP.

Methods

Survey Methods

The Uganda Bureau of Statistics (UBOS) and the Uganda Malaria Surveillance Project (UMSP) implemented the Malaria Indicator Survey (MIS) for the National Malaria Control Program in Uganda in 2009. A two-stage sample design was utilized to conduct a cross-sectional study of health and demographic characteristics by household. The sample of households was stratified into 10 survey regions throughout the country. Each of the regions was made up of 8 to 10 contiguous administrative districts; language and cultural characteristics were similar throughout each of the regions. The ten regions of Uganda included: North East, Mid Northern, West Nile, Mid Western, South Western, Mid Eastern, Central 1, Central 2, East Central, and Kampala. There were 17 clusters identified per survey region. Clusters were first selected from a list of enumeration areas from the 2002 Population Census, 170 clusters were identified by probability proportional to size. The sampling frame for the selection of households was created from a complete listing of all households in the selected sample points. Then twenty-eight households in each cluster were systematically sampled from the household listing.

The data was collected in 80 districts of Uganda from November 4, 2009 to December 24, 2009 from a total of 4,421 of the 4,760 households selected. The MIS are conducted to correspond with the high malaria transmission season.

Women aged 15 to 49 years were considered eligible for individual interviews if they were either permanent residents of the household in the sample or visitors present in the household on the night before the survey. The women were asked about malaria prevention during pregnancy and treatment of childhood fevers for each of their children. Children aged 0-59 months, listed in the household roster, were eligible for anemia and malaria testing. Testing for anemia and malaria was done for children ages 0-59 months using a finger or heel prick, using HemoCue machines and malaria rapid diagnostic tests (RDTs). Blood smears were made and transported to another location in order to determine the plasmodium parasite species.

Two types of questionnaires were used for the MIS; they were translated into 6 major languages common in Uganda (Ateso-Karamojong, Luganda, Lugbara, Luo, Runyankore-Rukiga, and Runyoro-Rutoro). The first type of questionnaire was the Household Questionnaire, used to identify women eligible for the individual interview and children who could be tested for anemia and malaria. This questionnaire was used to create a line listing of members and visitors in each household. Information collected included: age, sex, relationship to the head of the household, characteristics of the household's dwelling unit, ownership of various durable goods, and ownership and use of mosquito nets. The second type of questionnaire was the Woman's Questionnaire, which collected information on: background characteristics, full reproductive history including children ever born and died, antenatal care and preventive malaria treatment for most

recent birth, prevalence and treatment of fever among children under age 5, and knowledge about malaria.

Children 0 to 59 months included in the Household Questionnaire had blood samples collected by finger or heel prick. These samples were used to do on-the-spot testing for anemia and malaria and to prepare thick and thin blood smears to determine malaria parasitemia. The testing for malaria used Paracheck Pf™ RDT, which tests for the species *Plasmodium falciparum*. HemoCue analyzers were used to determine each child's hemoglobin level. Thick and thin blood smears were collected with the completed questionnaires in the field; they were then logged in at UBOS headquarters in Kampala, and were read for plasmodium parasite species at the UMSP Molecular Research Laboratory at Mulago Hospital in Kampala.

Bednet ownership and use was assessed by the surveyor. Whether a net was observed in the household was determined by the surveyor asking the surveyed individuals if they could have a look at the net(s) to establish the brand of the net. The surveyor asked if the mosquito net was ever soaked or dipped in a liquid to repel mosquitoes or bugs and how many months ago this occurred to determine if the net was an ITN. The line number of each person who slept under each mosquito net the night prior to the survey was recorded; this information was used to identify how many household members under the age of 5 slept under the bednet.

Analysis Methods

Data from the 2009 MIS were provided by the United States Agency for International Development (USAID) and downloaded from the agency's Demographic

and Health Surveys website[25]. The data collected from the household and woman's questionnaires were downloaded and merged to create a complete dataset including all possible children included in the surveys. Observations missing a household line number, missing data on age, and missing or having an undefined code for the variable for their relationship to the head of the household were dropped from the dataset. Only household members under the age of 5 years were included in the combined dataset. All duplicate observations were dropped because children included in the woman's questionnaire are included in the household questionnaire.

Children less than five years were categorized by guardianship into two groups, children living with NPG and children living with their biological parents, based on their relationship to the head of the household. Children who were listed as son or daughter were considered to be living with their biological parents; children living with NPG included: grandchild, niece/nephew by marriage, other relative, adopted/foster/step-child, and not related. Those children who were identified as brothers or sisters, son-in-law or daughter-in-law, or parent-in-law were not included in the analysis.

Age was categorized into four groups by the age of each child in months; 0-5, 6-11, 12-23, and 24-59 months old. The relationship structure of the adults in each household was categorized into five groups: one adult, two adults of the opposite sex, two adults both the same sex, three or more related adults, or unrelated adults. Children under 5 who slept under a bednet the night before the survey were categorized into three groups: all children, some children, and no children. Malaria blood smear results were either considered positive or negative. Anemia level was categorized into four groups

based on hemoglobin levels adjusted for altitude (g/dl); 10.0-10.9 (Mild), 7.0-9.9 (Moderate), <7.0 (Severe), and >10.9 (Not anemic).

The wealth index was calculated by the data compilers (ICF International). This index used data on each household's ownership of consumer goods, dwelling characteristics, sources of drinking water, sanitation facilities, and other characteristics that relate to a household's socioeconomic status to create wealth categories. Each asset was assigned a weight from a principal component analysis, the resulting scores were standardized in relation to a standard normal distribution; mean of zero and standard deviation of one. Scores were assigned for each asset; the sum of the scores was calculated for each household. For each individual, the scores were ranked based on the score of the household they lived; the scores were then divided into quintiles. This method created a single asset index for wealth based on data from the entire county's sample. The wealth index categories were richest, rich, middle, poor, and poorest.

Sampling weights were applied to the data, a household weight and an individual weight. To calculate the household weight for a household, the inverse of the selection probability for the household was multiplied by the inverse of the household response rate for each household's response rate group. The individual weight was calculated by multiplying the household weight by the inverse of the individual response rate of an individual's response rate group. Each of the weights was standardized by dividing each weight by the average of the initial weights. Sampling weights were calculated to six decimals.

Data were analyzed with SAS 9.3 (SAS Institute, Cary, NC). Variable distributions were characterized (means, medians, standard deviations, interquartile

ranges). Bivariate frequencies were performed on characteristics comparing children living with NPG and those living with BP. Weighted frequencies were calculated with the surveyfreq procedure, strata were considered the cluster number for each household, cluster was the household number in the cluster, and the weight was identified as the sample weight (previously calculated by the data compilers) divided by 1,000,000, as suggested by the data providers[26]. Two-sided Rao-Scott chi-square tests of independence were used for categorical variable comparisons, t-tests were used for normally distributed continuous variables, and two-sided Wilcoxon rank sum tests were used to test distribution differences between non-normally distributed continuous variables [27].

Multivariable logistic regression models were utilized to assess guardianship of children with three outcomes: a positive malaria blood smear, anemia, and whether children under 5 slept under a bednet the night before the survey. After assessing for interaction, confounding was assessed using a backwards elimination approach. The best model was determined by whether the odds ratio for guardianship, when controlling for the other variables, was within 10% of the estimate for the odds ratio of the full model. Precision of the estimates were compared if more than one of the candidate models was within 10% of the estimate from the full model, this was based on the width of the 95% confidence interval for the odds ratio. Variables with biologically plausibility of being associated with the outcome were controlled for in the model.

The variables for guardianship, sex, age, sex of the head of household, age of the head of household, the relationship structure of the household, and wealth index were controlled for in each of the logistic regression models. Guardianship was a dichotomous

variable, children living with biological parents (referent) and children living with non-parent guardians. Sex, age, age of the head of the household, the relationship structure of the household, and wealth index were categorized as previously described above. For the two variables assessing sex and sex of the head of the household, male was the referent group. Two adults of the opposite sex was the referent group for the relationship structure of the household, and the richest wealth group was used as the referent for the wealth index. The age of the head of the household was transformed into a dichotomous variable, less than 40 years (referent) and 40 to 97 years. The variable for whether children under five slept under a bednet the night before the survey was grouped into two categories, no children (referent) and some or all children. Anemia was categorized into two groups based on hemoglobin level adjusted for altitude, not anemic, ≥11.0 g/dl (referent) and < 11.0 g/dl.

The indicator variable for whether children slept under a bednet was assessed in the logistic regressions with the outcomes for malaria and anemia, and was used as the outcome variable in the final logistic regression. For the logistic regression which assessed the outcome for anemia, the children ages 0 to 5 months were not included and the children aged 24 to 59 months were used as the referent, and malaria blood smear result was included. For the outcome of whether children slept under a bednet the night before the survey, anemia was controlled for in the model.

Statistical significance was determined at a two-sided 0.05 level for all tests. Crude estimates were reported for demographic and household characteristics, weighted estimates were reported for malaria prevention and disease indicators.

IRB Approval

This study received an IRB exemption (Appendix: A).

Results

There were a total of 4,118 children under the age of five years with qualified relationships to the head of the household in the combined household and woman's questionnaires [Figure 1]. Of these children, 3933 (96%) were considered usual residents of the household by the head of the household and slept in the household the night before the survey was completed. Of these children, there were 3,226 (82%) children living with their biological parents, while 707 (18%) children were children living with NPG. Of children living with NPG, 595 (84%) were grandchildren, 58 (8%) were not related to the head of the household, 33 (5%) niece/nephew by marriage, 15 (2%) were other relative, and 6 (1%) were adopted/foster/step children.

There was no significant difference between the age (in months) of children living with their biological parents versus children living with NPG (mean 30.2 and 29.6 months respectively) [Table 1]. Fotry-nine percent of children in each of the two groups of children were male. Significant differences in the sex and age of the head of the household were found between children living with NPG and those living with BP. Eighty-two percent of children living with BP had a male head of household, while 46% of children living with NPG had a male head of household (Rao Scott Chi-square p value: <.0001). The median age of the head of household for those children living with BP was 34 years while for children living with NPG it was 54 years (Wilcoxon Rank Sum p value: <.0001).

Similar proportions of children were living in households in the poorest wealth quintile, 23% of children living with BP compared to 22% of children living with NPG, while 22% of children living with NPG lived in households in the richest wealth category compared to 16% of children living with their biological parents. For the relationship structure of the household, 62% of children living with their biological parents were living in a household with two adults of opposite sex, while children living with NPG only had 15% living in these types of household structures. Children living with NPG had the highest proportion (62%) of children living with three or more related adults, compared to only 23% of children living with their biological parents. There were significant differences in the proportions of children included in each of the categories for relationship structure of the household (Rao Scott Chi-square p value: <.01).

There was a significant difference between the two groups of children for whether they lived in a household that had a bednet for sleeping [Table 2]. Children living with NPG were less likely to have a bednet for sleeping than children living with their biological parents (OR: 0.7 [95% CI: 0.5, 0.9]). Also, of the 2539 (65%) observations that had information about bednet use, it was less likely for children living with NPG to live in a household where all or some of the children in the household slept under a bednet the night before the survey compared to children living with their biological parents ("all children" OR: 0.5 [95%CI: 0.3-0.7], "some children" OR: 0.5 [95% CI: 0.3-0.8]).

Of the households surveyed, 1650 (42%) had information regarding a bednet being observed in the home and whether the bednet was an ITN. Of these observations, there was no significant difference in the weighted proportions of households having a net observed between children living with NPG and those living with their biological

parents (90% vs. 84% respectively) [Table 2]. When assessing whether a net was an ITN, fewer households for children living with NPG had ITNs (76%) compared to children living with BP (80%), this difference was not significant.

Of the 3823 (97%) children with blood smear readings, the weighted proportions of children in each group, based on parent guardianship, having a positive malaria blood smear were not significantly different; 45% of blood smears were positive for children living with NPG, and 42% were positive for children living with BP. There were also no significant differences between the anemia levels; 5% of children living with NPG had severe anemia compared to 4% of children living with BP, 42% and 38% of the children were not anemic, respectively.

The best multivariable analysis comparing the odds of a child having a positive to a negative malaria blood smear found that there was a significant association with this outcome and guardianship [Table 3]. Children living with NPG predicted a greater likelihood of having a positive malaria blood smear (OR: 4.2, 95% CI: 1.8, 9.7). This model included age, sex and age of the head of the household, wealth index, whether children slept under a bednet, and the interaction terms for guardianship with age of head of household and whether children slept under bednet. There was an upward trend in the predicted odds of the association of the age of a child and the odds of a positive malaria blood smear. Sex and age of the head of the household were not significant predictors of a positive malaria blood smear. This model predicted a greater likelihood of child having a positive malaria blood smear for those children living in households in the wealth index categories for poorest, poor, middle, and rich, when compared to the richest households. In particular, those children living in the poorest households were over six times more

likely to have a positive malaria blood smear than those children living in the richest households (OR: 6.5, 95% CI: 4.2, 10.3). There was no significant association found between a positive malaria blood smear and whether children slept under a bednet the night before the survey (OR: 1.0, 95% CI: 0.7, 1.4).

For the comparison of a child having anemia versus not being anemic, the best multivariable model did not find a significant association between this outcome and guardianship, when age, sex and age of head of household, relationship structure, wealth index, whether children slept under a bednet, and malaria blood smear result were included in the model [Table 4]. Also, the model predicted that anemic children were more likely to be ages 6 to 11 and 12 to 23 months compared to those children ages 24 to 59 months (OR: 4.9, 95% CI: 3.2, 7.5 and OR: 2.9, 95% CI: 2.0,4.0 respectively). The model predicted that among all children, anemic children were over three times more likely to also have a positive malaria blood smear result (OR: 3.4, 95% CI: 2.5, 4.5). There was no significant association found between anemia and relationship structure of the household or whether children slept under a bednet the night before the survey.

When comparing whether children slept under a bednet the night before the survey and guardianship, the best multivariable analysis found a significant association between these variables [Table 5]. The model was able to predict that children living with NPG were less likely to sleep under a bednet the night before the survey than children living with their biological parents (OR: 0.6, 95% CI: 0.4, 0.9). This model included age and the age of the head of the household. These variables indicated that children living with a head of household between 40 and 97 years were less likely to sleep under a bednet the night before the survey than children living with heads of households less than

40 years (OR: 0.6, 95% CI: 0.4, 0.9). Also, this model predicted that children ages 6 to 11 months and 12 to 23 months were more likely to sleep under a bednet the night before the survey than children ages 0 to 5 months (OR: 1.5, 95% CI: 1.0, 2.3 and OR: 1.6, 95% CI: 1.0, 2.4, respectively).

Discussion

The findings of this study bring to light some of the issues concerning bednet ownership versus bednet use and how these factors affect the prevalence of malaria among children living with NPG compared to those living with BP. We found that despite there being similarities in some of the demographic characteristics and malaria prevention indicators between the two groups of children, household structure characteristics and bednet usage differed. We predicted children living with NPG to have a greater risk of having a positive malaria blood smear when household characteristics and bednet usage were considered concurrently.

Our results found that children living with NPG were both more likely to have a positive malaria blood smear and less likely to sleep under a bednet the night before the survey, when compared to children living with BP. Considering the percentage of bednets found in households did not significantly differ by guardianship, these findings suggest that there may be a lack of households with NPG using bednets which may contribute to the burden of malaria among the children living in these homes. It is important to note that we found significant interactions to exist between the result of a malaria blood smear with both the age of the head of the household and whether children slept under a bednet the night before the survey. These interactions further suggest that caregivers over the age

of 40 years may not be using bednets appropriately in order to protect young children from infectious mosquitoes. Education on the proper use of bednets may be lacking among NPG, despite high levels of bednet ownership.

Household characteristics greatly differed by guardianship and reflected the findings from other studies concerning the household structure and caregiver characteristics for children living with NPG. The NPG tended to be older and a greater proportion were female compared to BP. Also, more children living with NPG were living in homes with three or more caregivers, indicating they may be living with extended families or in a combined family household. The wealth index also differed by guardianship, with greater proportions of NPG in the richer categories while BP tended to be in the poorer categories. This result may reflect the contribution of an additional wage earner in homes with three or more adults.

Children living with NPG have similar demographic characteristics when compared to children living with BP. These findings suggest that there is no preferential or discriminatory treatment of children who may be considered orphans when they move into the households of extended family members. For instance, it many communities, older, male children may be more highly valued, and so they may remain with a single biological parent after the death of the other parent. However, our findings indicate that there is an even distribution of both age and sex between the two groups of children based on guardianship.

Implications of our findings concern the need for additional education on proper bednet use among certain types of guardians and may possibly elucidate the dynamic nature of households that take in additional children. Children living with NPG may live

with caregivers who do not fully understand the importance of a bednet for preventing malaria or how to properly use and care for a bednet, especially when young children are living in the home. These caregivers may need to be targeted for additional education on the use of bednets for malaria prevention. These findings may also indicate that when additional children become a part of households that include extended family members, malaria prevention practices diminish, due to the additional burden of more children. Further messaging may be needed to remind newly expanded households that it is important to continue malaria prevention, especially when young children become members of the household.

Strengths and Weaknesses

Strengths of this study include the utilization of MIS data which is well representative of Uganda's population in terms of demographic characteristics and health indicators. The MIS is a well known, multi-lateral, proficient survey, which is held in high regard for its methodology and accuracy in collecting country wide data throughout sub-Saharan Africa. This study benefits from the high standards, expertise, and experience of the DHS data collectors. The MIS is able to collect robust, precise data, allowing this study to identify significant and accurate associations for burdens of disease and household characteristics for Ugandan children under five years.

The use of weighted statistics, which accounted for the MIS's two-stage sample design, allowed for the observed results to be compared to the weighted results. This comparison showed that our observed results were comparable to the weighted results, therefore indicating that our results and conclusions can be more broadly generalized and

extrapolated beyond the observations collected in the 2009 MIS, possibly to the entire country of Uganda.

There are several limitations for this study regarding how the data were collected and analyzed. During the administration of the women's questionnaire for the MIS, women of child bearing age are identified and information regarding their children and current or past pregnancies are collected. The data is compiled so that each child reported by a mother is given an individual line number recording them as a member of the mother's household and is also recorded in the household questionnaire. Therefore, children who are living in households that do not include their biological mothers would not be included in the women's questionnaire; they would only be reported in the household questionnaire by the head of the household. Each of the questionnaires collects different information and so not all children included in the MIS have the same amount of information; health care seeking and disease treatment information were missing for children who were only included in the household questionnaire. Therefore, for this study, only data collected in the household questionnaire could be analyzed for all children included in the MIS.

In addition to having incomplete information for children who were only captured in the household questionnaire, data on nutrition indicators were not collected or were missing for all of the children analyzed in the survey. Having access to this type of information may help explain some of the results found in our analysis concerning anemia prevalence among the children who were analyzed for this study. Anemia prevalence is often associated with cases of malaria, but can also be affected by poor nutrition and co-morbidities.

The wealth index was created in a way where each individual in a household has the same wealth index score based on the living conditions and ownership of consumer goods observed and recorded during the survey. Wealth indices cannot be compared between individuals without looking at additional household characteristics; the number of individuals in a home and the number that contribute to the purchasing of consumer goods. If more people are contributing to the purchase of household goods or maintenance of a home, then the home would have a higher wealth index score. Therefore, homes with multiple wage earners would most likely be categorized into the wealthier indices. In this study, children living with NPG tended to live in wealthier homes, but they also lived in a higher proportion of homes that had three or more adults. Children living with BP tended to live in two parent homes and higher proportions lived in poorer homes. The difference in the number of adults for the relationship structures of the households for the two groups of children may also explain the differences seen in the wealth categories. The number of adults in a household may act as a proxy for a household's wealth. Therefore this is not an indication that children living in these types of households have greater access to resources, it is only an indication of these types of households having a greater total income than households with fewer adults regardless of the number of dependents in the household.

The prevalence odds ratios reported for the associations in this study may overstate the prevalence ratios for those events which are considered to be common events (those which occur >10%). This can be problematic when logistic regression is applied to the data in order to calculate an adjusted odds ratio[9].

Finally, the categorization of children living with NPG and those living with BP may not accurately reflect the true differentiation of children that we attempted to compare. The categories were derived from each child's relationship to the head of the household, self reported by the head of the household. Definitions of relationships to the head of the household may differ both within and between families. This is especially important when a parent remarries or families merge to create extended family households. Children who should be considered step children to the head of the household may be classified and recorded as a biological son or daughter to the head of the household. These classifications may not be consistently used by whoever is reporting the relationship status or even within a family and are likely to have different meanings for each household.

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Tables and Figures

Table 1. Demographic and Household Characteristics for Children living with Non-Parent Guardians (NPG) and Biological Parents Under 5 Years who are Usual Residents and Slept in the House the Night prior to the Survey (n=3933)

Characteristics	Guardianship				
	Non-Parent		Biological Parent		
	Mean, S.d.	n	Mean, S.d.	n	P value**
Age, months					0.3027
0-5	2.7, 1.6	61	2.8, 1.6	284	
6-11	8.6, 1.8	58	8.4, 1.6	346	
12-23	17.2, 3.2	142	17.3, 3.4	643	
24-59	40.9, 9.9	446	41.2, 10.4	1953	
Total	30.2, 16.6	707	29.6, 17.1	3226	0.3778^^
	Prevalence (95%CI)^	**n**	**Prevalence (95%CI)^**	**n**	
Sex					0.9828
Male	49 (45, 53)	354	49 (47, 52)	1597	
Female	51 (47, 55)	353	51 (48, 53)	1629	
Sex of Head of HH					<.0001†
Male	46 (40, 52)	342	82 (80, 85)	2661	
Female	54 (48, 60)	365	18 (15, 20)	565	
Age of head of Household, median years (IQR)	54 (47-63)		34 (28-40)		<.0001†*
Wealth quintile					0.1074
Poorest	22 (17, 27)	156	23 (21, 25)	872	0.0984
Poorer	18 (14, 23)	117	22 (20, 24)	642	0.0192†
Middle	17 (12, 21)	134	21 (18, 24)	611	0.0139†
Richer	22 (17, 26)	142	18 (16, 21)	600	0.5526
Richest	22 (17, 26)	158	16 (14, 18)	501	-
Relationship structure, Number of adults					<.0001†
One	8 (5, 12)	53	11 (9, 13)	333	<.0001†
Two, opp. sex	15 (11, 19)	100	62 (59, 65)	1986	-
Two, same sex	10 (7, 12)	68	2 (1, 3)	66	<.0001†
Three + related	62 (56, 67)	446	23 (20, 25)	775	<.0001†
Unrelated	6 (3, 8)	40	2 (1, 3)	66	<.0001†
Total		**707**		**3226**	

†Statistically significant at a 0.05 level

^ Prevalence and corresponding 95% CI weighted for multistage sampling design

^^ T- test p value

*Wilcoxon Rank Sum p value

**Rao Scott Chi-square p value

Table 2. Malaria Prevention and Disease Indicators by Guardianship for Children Under 5 Years who were Usual Residents and Slept in the House the Night before the Survey (n=3933)

Indicators	Guardianship				OR (95% CI)	P value^^
	Non-Parent		Biological Parent			
	Prevalence (95%CI)	n	Prevalence (95%CI)	n		
Have bednet for sleeping						
Yes	58.5 (54.3, 62.7)	411	67.4 (65.0, 70.0)	2128	0.7 (0.5, 0.9)	0.0092†
No	41.5 (37.3, 45.7)	296	32.6 (30.1, 35.0)	1098	1.0	-
Net observed*, n=1650 (42%)						
Yes	90.3 (87.1, 93.6)	174	83.8 (80.7, 87.0)	1236	1.8 (0.98, 3.3)	0.0534
No	9.7 (6.4, 12.9)	27	16.2 (13.0, 19.3)	213	1.0	-
ITN ownership, n = 1650 (42%)						
Yes	75.9 (70.6, 81.1)	147	80.3 (76.7, 84.0)	1177	0.8 (0.5, 1.3)	0.3258
No	24.1 (18.9, 29.4)	57	19.7 (16.0, 23.4)	272	1.0	-
Children under 5 slept under bednet last night*, n=2539 (65%)**						0.0002†
All Children	42.0 (34.2, 49.7)	174	54.6 (50.6, 58.6)	1213	0.5 (0.3, 0.7)	<.0001†
Some Children	16.5 (10.6, 22.4)	78	20.9 (17.0, 24.7)	442	0.5 (0.3, 0.8)	0.0037†
No	41.6 (33.4, 49.7)	159	24.5 (21.2, 27.9)	473	1.0	-
Malaria blood smear, n=3823 (97%)**						
Positive	45.0 (40.8, 49.3)	318	41.9 (39.7, 44.1)	1348	1.1 (0.9, 1.5)	0.3060
Negative	55.0 (50.7, 59.2)	372	58.1 (56.0, 60.3)	1785	1.0	-
Anemia level (Hemoglobin), adjusted for altitude^						0.3894
Severe (<7.0 g/dl)	5.0 (3.3, 6.6)	35	4.4 (3.5, 5.2)	150	1.0 (0.6, 1.7)	0.9332
Moderate (7-.0-9.9 g/dl)	32.3 (28.6, 36.0)	244	36.4 (34.1, 38.6)	1169	0.8 (0.7, 1.1)	0.1244
Mild (10.0-10.9 g/dl)	21.0 (17.0, 24.9)	155	21.5 (19.4, 23.6)	662	0.9 (0.6, 1.2)	0.4391
Not Anemic (>10.9 g/dl)	41.8 (37.4, 46.2)	257	37.8 (35.6, 40.0)	1151	1.0	-
Total	**707**		**3226**			

*2283 observations missing
**110 observations missing
***1394 observations indicated no bednet in household or were missing
^110observations missing
^^Rao Scott Chi Square p value
†Statistically significant at a 0.05 level

Table 3.Multivariable Logistic Regression Output for the Likelihood of a Child having a Positive Malaria Blood Smear for those Children Under 5 Years who are Usual Residents and Slept in the Household Last Night (n= 3816)

Malaria Blood Smear									
	Unadjusted Model			**Full Model***			**Model 1***		
	OR	**95% CI**	**P value**	**OR**	**95% CI**	**P value**	**OR**	**95% CI**	**P value**
Guardianship									
Biological Parent	1.0	-	-	1.0	-	-	1.0	-	-
Non-Parent	1.1	0.9, 1.5	0.2934	4.2	1.8, 9.9	0.0011†	4.2	1.8, 9.7	0.0007†
Sex									
Male	1.0	-	-	1.0	-	-			
Female	1.1	0.96, 1.4	0.1345	1.2	0.9, 1.5	0.2217			
Age, months			<.0001†			<.0001†			<.0001†
0-5	1.0	-	-	1.0	-	-	1.0	-	-
6-11	2.4	1.5, 3.7	0.0002†	3.0	1.6, 5.7	0.0006†	3.0	1.9, 5.6	0.0006†
12-23	3.1	2.1, 4.8	<.0001†	3.9	2.2, 6.8	<.0001†	3.8	2.2, 6.6	<.0001†
24-59	5.1	3.4, 7.5	<.0001†	6.5	3.8, 10.9	<.0001†	6.3	3.8, 10.7	<.0001†
Sex of Head of Household									
Male	1.0	-	-	1.0	-	-	1.0	-	-
Female	1.1	0.9, 1.3	0.5899	1.3	0.8, 2.0	0.2360	1.2	0.9, 1.7	0.2702
Age of Head of Household									
< 40 years	1.0	-	-	1.0	-	-	1.0	-	-
40-97 years	1.1	0.9, 1.3	0.6410	1.0	0.6, 1.4	0.9482	1.1	0.7, 1.5	0.7474
Relationship Structure of Household			0.0147†			0.2492			
Two adults, opposite sex	1.0	-	-	1.0	-	-			
One adult	1.1	0.8, 1.5	0.5286	0.9	0.5, 1.6	0.7781			
Two adults, same sex	1.0	0.6, 1.6	0.9104	1.1	0.5, 2.4	0.9670			

Three + related adults	1.0	0.8, 1.3	0.9652	1.3	0.9, 1.7	0.2375			
Unrelated adults	0.3	0.2, 0.6	0.0007†	0.5	0.3, 1.2	0.1120			
Wealth index			<.0001†			<.0001†			<.0001†
Richest	1.0	-	-	1.0	-	-	1.0	-	-
Poorest	5.2	3.6, 7.5	<.0001†	6.2	3.9, 9.9	<.0001†	6.5	4.2, 10.3	<.0001†
Poor	3.7	2.5, 5.3	<.0001†	4.8	2.9, 7.9	<.0001†	5.2	3.3, 8.3	<.0001†
Middle	3.2	2.1, 4.8	<.0001†	3.5	2.1, 6.0	<.0001†	3.8	2.3, 6.4	<.0001†
Rich	2.5	1.7, 3.7	<.0001†	2.9	1.7, 4.8	<.0001†	3.0	1.8, 4.8	<.0001†
Children Sleep under Bednet*									
No	1.0	-	-	1.0	-	-	1.0	-	-
Some or All	0.8	0.6, 1.0	0.0700	0.8	0.6, 1.1	0.7112	1.0	0.7, 1.4	0.7973
Interaction of Guardianship and Age of Head of Household			0.0839			0.0113†			0.0171†
Biological Parent, <40 years for age of head of household	1.0	-	-	1.0	-	-	1.0	-	-
Biological Parent, 40-97 years for age of head of household	1.1	0.8, 1.3	0.7025	1.0	0.7, 1.4	0.9482	1.1	0.8, 1.5	0.7474
Non- Parent, <40 years for age of head of household	1.8	1.1, 2.9	0.0272†	4.2	1.8, 9.9	0.0011†	4.2	1.8, 9.7	0.0007†
Non- Parent, 40-97 years for age of head of household	1.1	0.8, 1.4	0.5108	1.5	0.9, 2.7	0.1508	1.8	1.1, 3.0	0.0338†
Interaction of Guardianship and Children Sleep Under Bednet			0.0412†			0.0042†			0.0023†
Biological Parent, No Children Slept under Bednet	1.0	-	-	1.0	-	-	1.0	-	-
Biological Parent, Some/All Children Slept under Bednet	0.9	0.6, 1.2	0.4011	0.9	0.7, 1.3	0.7112	1.0	0.7, 1.4	0.7973
Non-Parent, No Children Slept under Bednet	1.5	0.9, 2.5	0.1235	4.2	1.8, 9.9	0.0011†	4.2	1.8, 9.7	0.0007†
Non-Parent, Some/All Children Slept under Bednet	0.7	0.5, 1.0	0.0706	1.5	1.1, 0.3	0.2933	1.4	0.7, 2.9	0.3027

*n= 2462

†Statistically significant at a 0.05 level

Table 4. Multivariable Logistic Regression Output for the Likelihood of a Child having Anemia (<11.0 g/dl Hemoglobin) for those Children Under 5 Years who are Usual Residents and Slept in the Household Last Night (n= 3816)

Anemia									
	Unadjusted Model			**Full Model***			**Model 1***		
	OR	**95% CI**	**P value**	**OR**	**95% CI**	**P value**	**OR**	**95% CI**	**P value**
Guardianship									
Biological Parent	1.0	-	-	1.0	-	-	1.0	-	-
Non-Parent	0.8	0.7, 1.1	0.2098	0.9	0.6, 1.3	0.4435	0.9	0.6, 1.3	0.4329
Sex									
Male	1.0	-	-	1.0	-	-			
Female	0.9	0.8, 1.1	0.4668	0.7	0.6, 1.0	0.0171			
Age, months, n= 3487			<.0001†			<.0001†			<.0001†
24-59	1.0	-	-	1.0	-	-	1.0	-	-
6-11	3.4	2.5, 4.8	<.0001†	4.9	3.2, 7.6	<.0001†	4.9	3.2, 7.5	<.0001†
12-23	2.3	1.8, 3.0	<.0001†	2.9	2.0, 4.1	<.0001†	2.9	2.0, 4.0	<.0001†
Sex of Head of Household									
Male	1.0	-	-	1.0	-	-	1.0	-	-
Female	1.0	0.8, 1.3	0.8673	1.4	1.0, 2.1	0.0875	1.4	1.0, 2.1	0.0744
Age of Head of Household									
< 40 years	1.0	-	-	1.0	-	-	1.0	-	-
40-97 years	0.9	0.7, 1.1	0.1576	0.8	0.6, 1.1	0.1679	0.8	0.6, 1.1	0.1566
Relationship Structure of Household			0.2032			0.1950			0.1829
Two adults, opposite sex	1.0	-	-	1.0	-	-			
One adult	1.0	0.7, 1.3	0.9035	0.8	0.4, 1.4	0.4324	0.8	0.4, 1.5	0.4545
Two adults, same sex	1.2	0.7, 1.9	0.5105	2.3	0.8, 6.6	0.1201	2.2	0.8, 6.0	0.1175
Three + related adults	1.0	0.8, 1.2	0.7722	1.2	0.9, 1.7	0.2033	1.2	0.9, 1.6	0.1935

Unrelated adults	0.6	0.4, 0.9	0.0218†	0.9	0.5, 1.6	0.6394	0.8	0.5, 1.6	0.5896
Wealth index			<.0001†			0.3803			0.3679
Richest	1.0	-	-	1.0	-	-			
Poorest	1.8	1.4, 2.4	<.0001†	1.3	0.9, 2.0	0.1392	1.4	0.9, 2.0	0.1332
Poor	1.7	1.2, 2.3	0.0019†	1.4	0.9, 2.1	0.1568	1.4	0.9, 2.1	0.1811
Middle	1.4	1.0, 1.9	0.0268†	1.1	0.7, 1.7	0.7367	1.1	0.7, 1.7	0.7708
Rich	1.0	0.8, 1.4	0.8346	1.0	0.7, 1.5	0.9853	1.0	0.6, 1.5	0.9746
Children Sleep under Bednet, n=2465									
No	1.0	-	-	1.0	-	-	1.0	-	-
Some or All	0.9	0.7, 1.2	0.3759	0.9	0.6, 1.2	0.3308	0.9	0.6, 1.2	0.3089
Malaria Blood Smear									
Negative	1.0	-	-	1.0	-	-	1.0	-	-
Positive	3.4	2.8, 4.1	<.0001	3.5	2.6, 4.6	<.0001	3.4	2.5, 4.5	<.0001†

*n= 2248

†Statistically significant at a 0.05 level

Table 5. Multivariable Logistic Regression Output for the Likelihood of Children Sleeping Under a Bednet the Night before the Survey for those Children Under 5 Years who are Usual Residents and Slept in the Household Last Night (n= 2535)

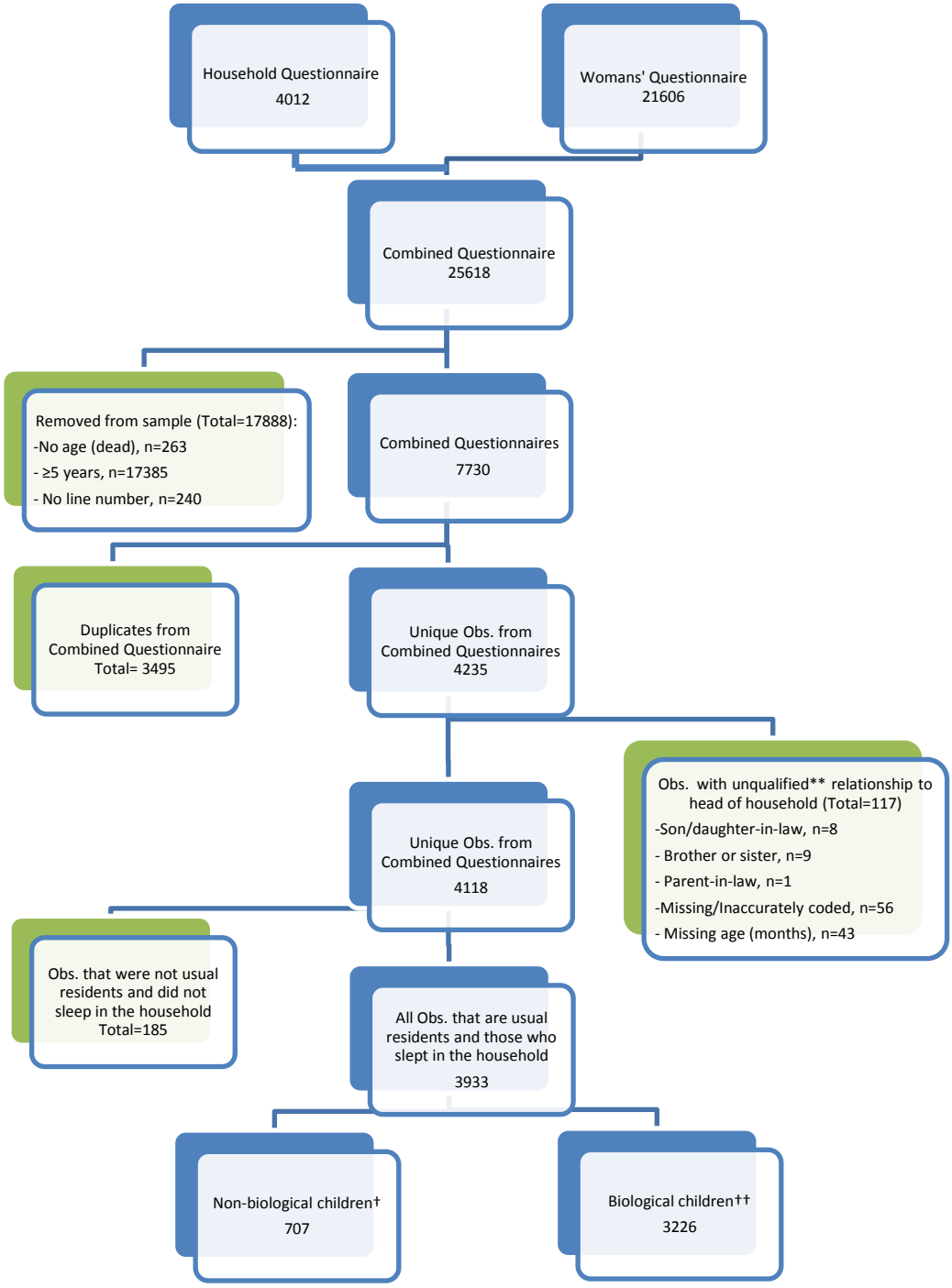
Children Sleeping Under Bednet									
	Unadjusted Model			**Full Model***			**Model 1**		
	OR	**95% CI**	**P value**	**OR**	**95% CI**	**P value**	**OR**	**95% CI**	**P value**
Guardianship									
Biological Parent	1.0	-	-	1.0	-	-	1.0	-	-
Non-Parent	0.5	0.3, 0.7	<.0001†	0.6	0.4, 0.9	0.0224†	0.6	0.4, 0.9	0.0179†
Sex									
Male	1.0	-	-	1.0	-	-			
Female	1.2	0.9, 1.5	0.1585	1.2	0.9, 1.6	0.1612			
Age, months			0.0098†			0.0064†			0.0275†
0-5	1.0	-	-	1.0	-	-	1.0	-	-
6-11	1.6	1.1, 2.4	0.0224†	1.7	1.1, 2.6	0.0091†	1.5	1.0, 2.3	0.0424†
12-23	1.7	1.1, 2.5	0.0152†	1.7	1.1, 2.6	0.0203†	1.6	1.0, 2.4	0.0306†
24-59	1.0	0.7, 1.3	0.8922	1.0	0.7, 1.4	0.8804	1.0	0.7, 1.3	0.8065
Sex of Head of Household									
Male	1.0	-	-	1.0	-	-			
Female	1.0	0.7, 1.4	0.8318	1.1	0.7, 1.9	0.6207			
Age of Head of Household									
< 40 years	1.0	-	-	1.0	-	-	1.0	-	-
40-97 years	0.5	0.4, 0.7	<.0001†	0.6	0.4, 0.9	0.0185†	0.6	0.4, 0.9	0.0096†
Relationship Structure of Household			0.0861			0.8979			
Two adults, opposite sex	1.0	-	-	1.0	-	-			
One adult	1.1	0.6, 2.0	0.7452	1.1	0.5, 2.1	0.8999			
Two adults, same sex	1.1	0.5, 2.5	0.8446	1.2	0.4, 3.2	0.7368			

Three + related adults	0.6	0.5, 0.9	0.0151†	0.9	0.6, 1.4	0.6644
Unrelated adults	0.6	0.3, 1.3	0.1802	0.7	0.3, 1.7	0.4238
Wealth index			0.2243			0.1377
Richest	1.0	-	-	1.0	-	-
Poorest	1.1	0.6, 1.8	0.8117	1.0	0.6, 1.8	0.9011
Poor	0.8	0.5, 1.5	0.5357	0.8	0.4, 1.4	0.4399
Middle	0.8	0.4, 1.3	0.3336	0.7	0.4, 1.2	0.2175
Rich	0.6	0.4, 1.1	0.0915	0.6	0.3, 1.1	0.0734
Anemia						
Not Anemic	1.0	-	-	1.0	-	-
Mild, moderate, or severe anemia	0.9	0.7, 1.2	0.3759	0.8	0.6, 1.1	0.2134

*n=2465

†Statistically significant at a 0.05 level

Figure 1. Flow Chart of Distribution of Observations by Questionnaire*



*Boxes in green indicate those observations which were dropped from the sample

**Unqualified relationship to head of household included:son-in-law, daughter-in-law, brother or sister, parent-in-law, missing, or inaccurately coded

†Non-biological children were those with a relationship to the head of the household that included: grandchild, niece/nephew by marriage, other relative, adopted/foster/step child, or not related

††Biological children were those with a relationship to the head of the household of son or daughter

Chapter III:

Summary

This study contributes to the small body of scientific research concerning health indicators for orphans and children living with NPG in comparison to those children living with BP. Uganda has a large orphan population, largely attributable to the HIV epidemic, and past studies have found inconsistent results for health indicators among orphans. The data provided by the 2009 MIS allowed us to analyze differences in demographic and household characteristics, as well as malaria prevention methods and indicators for children under five years surveyed in Uganda. We found that despite demographic characteristics being similar for children living with NPG and BP, household characteristics differed significantly. A higher proportion of children living with NPG lived with heads of households who were female and older when compared to heads of households for children living with NPG. Relationship structures of households as well as wealth distributions also significantly differed between the two groups of children. Bednet ownership was similar between the two groups of children; however there were significant differences in whether children under five slept under a bednet the night before the survey. Anemia and the proportion of positive malaria blood smear readings were similar for the two groups of children. Our multivariable logistic regressions found that children living with NPG were four times more likely to have a positive malaria blood smear and less likely to sleep under a bednet the night before the survey compared to children living with BP. Findings of this study conclude that despite bednet ownership being similar between households for children living with NPG and

those living with BP, bednet usage differs significantly and may affect malaria prevalence.

Public Health Implications

Findings of this study illuminate the possible differences in bednet use in larger, less traditional households, compared to two parent, family homes in Uganda. Households extending resources and care to orphans and other young, vulnerable children may have fewer resources to ensure all children under five are adequately protected by a bednet. Also, the combining of households or the introduction of a child into a household may disrupt routine practices in many respects, including how often bednets are used for sleeping and by whom. The public health implications of this study address the need for additional targeting of education on proper bednet use and malaria prevention efforts for households that include children living with NPG.

Possible Future Directions

Additional studies are needed to more accurately identify differences in malaria prevention methods and disease indicators between children living with NPG compared to those living with BP. Studies exploring and surveying the caregivers of children living with NPG may gain additional information on why these caregivers are more or less likely to use a bednet and under what circumstances. Also, additional studies using rigorous definitions for orphans, vulnerable children, and other types of children who may be lacking proper health care and disease prevention methods may assist in explicitly identifying those children most at risk for malaria. The inclusion of nutritional indicators in future studies along with malaria indicators would help us to better understand how anemia prevalence is associated with malaria prevalence. These types of

additional studies would allow us to target those children deemed most at risk for malaria in order to provide resources and education to prevent future cases of malaria from occurring.

Appendices

Appendix A: IRB Exemption

EMORY UNIVERSITY

Institutional Review Board

February 22, 2012

RE: Determination: No IRB Review Required
eIRB # 56399 - "Malaria Disease and Prevention Indicators among Non-Biological Children surveyed in Households included in the Malaria Indicator Survey in Uganda, 2009"

Dear Samantha Dolan:

Thank you for requesting a determination from our office about the above-referenced project. Based on our review of the materials you provided, we have determined that it does not require IRB review because it does not meet the definition(s) of "research" involving "human subjects" or the definition of "clinical investigation" as set forth in Emory policies and procedures and federal rules, if applicable.

Based on the information included in the submission, you will be using publically available data to analyze the malaria prevention indicators for orphans and foster children included in the Malaria Indicator Survey for 2009 in Uganda.

As such, the IRB has determined that this study does not constitute "human subjects research" under the foregoing definition because there is no identifiers being used that could lead to any linkage and publically available.

This determination could be affected by substantive changes in the study design or subject population. If the project changes in any substantive way, please contact our office for clarification.

Thank you for consulting the IRB.

Sincerely,

Aric Edwards, BA
IRB Analyst Assistant
This letter has been digitally signed

Emory University
1599 Clifton Road, 5th Floor - Atlanta, Georgia 30322
Tel: 404.712.0720 - Fax: 404.727.1358 - Email: irb@emory.edu - Web: http://www.irb.emory.edu

Appendix B: Variable Interaction and Confounding Analysis Using Logistic Regression

Outcome: Malaria Blood Smear Result

Full Model with all Interaction Terms with Exposure Variable (biostatus)

```
procsurveylogisticdata=model ;
where malaria ne .;
classmonthage(ref='0')  relst (ref='0') wealth (ref='0') /param=ref;
model malaria (event = '1') = biostatus sex monthagesexhhhagehhhrelst
wealth childnetbiostatus*sex
biostatus*monthagebiostatus*sexhhhbiostatus*agehhhbiostatus*relstbiosta
tus*wealth biostatus*childnet;
strata HV001;
cluster HV002;
weightHHweight;
run;
```

Type 3 Analysis of Effects

Effect	DF	Wald Chi-Square	Pr>ChiSq
biostatus	1	1.0419	0.3074
sex	1	0.9281	0.3354
monthage	3	42.1950	<.0001
sexhhh	1	1.2820	0.2575
agehhh	1	0.0279	0.8672
relst	4	5.4983	0.2399
wealth	4	51.2614	<.0001
childnet	1	0.1645	0.6850
biostatus*sex	1	0.3398	0.5599
biostatus*monthage	3	2.5050	0.4744
biostatus*sexhhh	1	0.2543	0.6141
biostatus*agehhh	1	5.6618	0.0173
biostatus*relst	4	3.4848	0.4802
biostatus*wealth	4	1.1553	0.8854
biostatus*childnet	1	8.6088	0.0033

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Wald Chi-Square	Pr>ChiSq
Intercept		1	-3.3329	0.4215	62.5301	<.0001
Biostatus		1	1.0034	0.9830	1.0419	0.3074
Sex		1	0.1283	0.1332	0.9281	0.3354
Monthage	**1**	1	1.0016	0.3507	8.1564	0.0043
Monthage	**2**	1	1.3127	0.3110	17.8175	<.0001
Monthage	**3**	1	1.7534	0.2927	35.8842	<.0001
Sexhhh		1	0.3198	0.2824	1.2820	0.2575
Agehhh		1	-0.0320	0.1913	0.0279	0.8672
Relst	**1**	1	-0.1950	0.3461	0.3176	0.5730
Relst	**2**	1	0.2529	0.5742	0.1940	0.6596
Relst	**3**	1	0.2617	0.1865	1.9683	0.1606
Relst	**4**	1	-0.8353	0.5903	2.0019	0.1571
Wealth	**1**	1	1.8686	0.2804	44.4212	<.0001
Wealth	**2**	1	1.6154	0.2959	29.7940	<.0001
Wealth	**3**	1	1.2745	0.3129	16.5909	<.0001
Wealth	**4**	1	1.0913	0.3021	13.0452	0.0003
Childnet		1	-0.0728	0.1794	0.1645	0.6850
biostatus*sex		1	0.1955	0.3353	0.3398	0.5599
biostatus*monthage	**1**	1	0.9986	0.8240	1.4686	0.2256
biostatus*monthage	**2**	1	0.5045	0.7352	0.4709	0.4926
biostatus*monthage	**3**	1	0.8957	0.6657	1.8105	0.1784
biostatus*sexhhh		1	-0.2162	0.4287	0.2543	0.6141
biostatus*agehhh		1	-0.9997	0.4202	5.6618	0.0173
biostatus*relst	**1**	1	0.0794	0.6517	0.0149	0.9030
biostatus*relst	**2**	1	-0.9718	0.8420	1.3320	0.2484
biostatus*relst	**3**	1	-0.5038	0.4695	1.1514	0.2833

biostatus*relst	**4**	1	0.2485	0.9173	0.0734	0.7865
biostatus*wealth	**1**	1	-0.0167	0.5675	0.0009	0.9765
biostatus*wealth	**2**	1	0.0851	0.5820	0.0214	0.8837
biostatus*wealth	**3**	1	0.3703	0.6469	0.3276	0.5670
biostatus*wealth	**4**	1	-0.2185	0.5884	0.1379	0.7104
biostatus*childnet		1	-1.0630	0.3623	8.6088	0.0033

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	70.8	**Somers' D**	0.423
Percent Discordant	28.4	**Gamma**	0.427
Percent Tied	0.8	**Tau-a**	0.202
Pairs	1448797	**c**	0.712

Reduced Model #1

```
procsurveylogisticdata=model ;
where malaria ne .;
classmonthage(ref='0')  relst (ref='0') wealth (ref='0') /param=ref;
model malaria (event = '1') = biostatus sex monthagesexhhhagehhhrelst
wealth childnetbiostatus*agehhhbiostatus*childnet/ rsq ;
contrast'biostatus'biostatus1/est=exp;
contrast'biostatus=1,agehhh=1'biostatus1agehhh1biostatus*agehhh1/est
=exp;
contrast'biostatus=1,agehhh=0'biostatus1agehhh0biostatus*agehhh0/est
=exp;
contrast'biostatus=0,agehhh=1'biostatus0agehhh1biostatus*agehhh0/est
=exp;
contrast'biostatus=0,agehhh=0'biostatus0agehhh0biostatus*agehhh0/est
=exp;
contrast'biostatus=1,childnet=1'biostatus1childnet1biostatus*childnet1/
est =exp;
contrast'biostatus=1,childnet=0'biostatus1childnet0biostatus*childnet0/
est =exp;
contrast'biostatus=0,childnet=1'biostatus0childnet1biostatus*childnet0/
est =exp;
contrast'biostatus=0,childnet=0'biostatus0childnet0biostatus*childnet0/
est =exp;
strata HV001;
cluster HV002;
weightHHweight;
```

```
run;
```

Type 3 Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
biostatus	1	10.7139	0.0011
sex	1	1.4932	0.2217
monthage	3	56.2834	<.0001
sexhhh	1	1.4045	0.2360
agehhh	1	0.0042	0.9482
relst	4	5.3940	0.2492
wealth	4	67.0031	<.0001
childnet	1	0.1371	0.7112
biostatus*agehhh	1	6.4157	0.0113
biostatus*childnet	1	8.2021	0.0042

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept		1	-3.4319	0.3834	80.1262	<.0001
biostatus		1	1.4325	0.4376	10.7139	0.0011
sex		1	0.1495	0.1223	1.4932	0.2217
monthage	**1**	1	1.1062	0.3225	11.7673	0.0006
monthage	**2**	1	1.3643	0.2851	22.8967	<.0001
monthage	**3**	1	1.8641	0.2689	48.0452	<.0001
sexhhh		1	0.2541	0.2144	1.4045	0.2360
agehhh		1	-0.0122	0.1877	0.0042	0.9482
relst	**1**	1	-0.0788	0.2798	0.0794	0.7781
relst	**2**	1	0.0175	0.4228	0.0017	0.9670
relst	**3**	1	0.2028	0.1717	1.3953	0.2375
relst	**4**	1	-0.6722	0.4229	2.5260	0.1120
wealth	**1**	1	1.8515	0.2401	59.4807	<.0001
wealth	**2**	1	1.6250	0.2527	41.3555	<.0001
wealth	**3**	1	1.3030	0.2747	22.4997	<.0001
wealth	**4**	1	1.0657	0.2597	16.8325	<.0001

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr > ChiSq**
childnet	1	-0.0664	0.1793	0.1371	0.7112
biostatus*agehhh	1	-1.0074	0.3977	6.4157	0.0113
biostatus*childnet	1	-0.9753	0.3405	8.2021	0.0042

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
sex	1.161	0.914	1.476
monthage 1 vs 0	3.023	1.607	5.687
monthage 2 vs 0	3.913	2.238	6.842
monthage 3 vs 0	6.450	3.808	10.927
sexhhh	1.289	0.847	1.963
relst 1 vs 0	0.924	0.534	1.599
relst 2 vs 0	1.018	0.444	2.331
relst 3 vs 0	1.225	0.875	1.715
relst 4 vs 0	0.511	0.223	1.170
wealth 1 vs 0	6.370	3.979	10.197
wealth 2 vs 0	5.079	3.095	8.334
wealth 3 vs 0	3.680	2.148	6.306
wealth 4 vs 0	2.903	1.745	4.830

Contrast Estimation and Testing Results by Row								
Contrast	**Type**	**Row**	**Estimate**	**Standard Error**	**Alpha**	**Confidence Limits**	**Wald Chi-Square**	**Pr > ChiSq**
biostatus	**EXP**	**1**	4.1892	1.8334	0.05	1.7767 9.8778	10.7139	0.0011
biostatus=1,agehhh=1	**EXP**	**1**	1.5112	0.4343	0.05	0.8604 2.6542	2.0640	0.1508
biostatus=1,agehhh=0	**EXP**	**1**	4.1892	1.8334	0.05	1.7767 9.8778	10.7139	0.0011

Contrast Estimation and Testing Results by Row									
Contrast	**Type**	**Row**	**Estimate**	**Standard Error**	**Alpha**	**Confidence Limits**		**Wald Chi-Square**	**Pr > ChiSq**
biostatus=0,agehhh=1	**EXP**	**1**	0.9879	0.1854	0.05	0.6838	1.4271	0.0042	0.9482
biostatus=0,agehhh=0	**EXP**	**1**	1.0000	0	0.05	.	.	.	.
biostatus=1,childnet=1	**EXP**	**1**	1.4783	0.5498	0.05	0.7131	3.0643	1.1045	0.2933
biostatus=1,childnet=0	**EXP**	**1**	4.1892	1.8334	0.05	1.7767	9.8778	10.7139	0.0011
biostatus=0,childnet=1	**EXP**	**1**	0.9358	0.1678	0.05	0.6584	1.3299	0.1371	0.7112
biostatus=0,childnet=0	**EXP**	**1**	1.0000	0	0.05	.	.	.	.

Assessment of Confounding Using Logistic Regression

Crude Estimate for Exposure (biostatus) and Outcome (malaria)

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	-0.3304	0.0465	50.4470	<.0001
biostatus	1	0.1314	0.1251	1.1038	0.2934

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	1.140	0.892	1.457

Stratification on Sex

Sex=0

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	-0.4032	0.0648	38.6681	<.0001
biostatus	1	0.1611	0.1620	0.9889	0.3200

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	1.175	0.855	1.614

Sex =1

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard**	**Wald**	**Pr>ChiSq**

			Error	Chi-Square	
Intercept	1	-0.2603	0.0645	16.2934	<.0001
biostatus	1	0.1034	0.1670	0.3834	0.5358

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	1.109	0.799	1.539

Stratification on Age (Months)

Monthage = 0

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	-1.6508	0.1645	100.7238	<.0001
biostatus	1	-0.00913	0.2787	0.0011	0.9739

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.991	0.574	1.711

Monthage = 1

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	-0.7973	0.1166	46.7424	<.0001
biostatus	1	0.0445	0.3077	0.0209	0.8850

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	1.045	0.572	1.911

Monthage = 2

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	-0.5343	0.1074	24.7615	<.0001
biostatus	1	0.1281	0.2340	0.2999	0.5839

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	1.137	0.719	1.798

Monthage = 3

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	-0.0480	0.0630	0.5798	0.4464
biostatus	1	0.1029	0.1707	0.3636	0.5465

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	1.108	0.793	1.549

Stratification on Age of Head of Household

Agehhh = 0

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	-0.3427	0.0550	38.8714	<.0001
biostatus	1	0.5688	0.2571	4.8946	0.0269

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	1.766	1.067	2.923

Agehhh= 1

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	-0.2971	0.0871	11.6217	0.0007
biostatus	1	0.0465	0.1524	0.0929	0.7605

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	1.048	0.777	1.412

Stratification on Sex of Head of Household

Sexhhh = 0

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**

Intercept	1	-0.3573	0.0498	51.4507	<.0001
biostatus	1	0.3287	0.1643	4.0050	0.0454

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	1.389	1.007	1.917

Sexhhh = 1

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	-0.2080	0.1227	2.8734	0.0901
biostatus	1	-0.1388	0.2069	0.4502	0.5022

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.870	0.580	1.306

Stratification on relationship structure of household

Relst= 0

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	-0.3461	0.0584	35.1354	<.0001
biostatus	1	1.0625	0.3039	12.2251	0.0005

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	2.894	1.595	5.249

Relst = 1

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	-0.2622	0.1422	3.3987	0.0652
biostatus	1	0.4958	0.2801	3.1346	0.0766

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	1.642	0.948	2.843

Relst = 2

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	-0.2137	0.1516	1.9869	0.1587
biostatus	1	-0.2199	0.2859	0.5915	0.4418

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.803	0.458	1.406

Relst = 3

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	-0.2554	0.0938	7.4085	0.0065
biostatus	1	-0.1041	0.1758	0.3504	0.5539

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.901	0.639	1.272

Relst = 4

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	-1.4747	0.1787	68.1231	<.0001
biostatus	1	0.2381	0.3396	0.4917	0.4832

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	1.269	0.652	2.469

Stratification on Wealth Index

Wealth = 0

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**

Intercept	1	-1.3790	0.1629	71.6197	<.0001
biostatus	1	-0.1370	0.2846	0.2317	0.6303

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.872	0.499	1.523

Wealth = 1

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	0.1894	0.0829	5.2158	0.0224
biostatus	1	0.3138	0.2266	1.9187	0.1660

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	1.369	0.878	2.134

Wealth = 2

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	-0.1543	0.0837	3.3967	0.0653
biostatus	1	0.3937	0.2336	2.8392	0.0920

Odds Ratio Estimates		
Effect	**Point Estimate**	**95% Wald Confidence Limits**

biostatus	1.482	0.938	2.343

Wealth = 3

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	-0.3030	0.1162	6.8033	0.0091
biostatus	1	0.3747	0.2250	2.7721	0.0959

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	1.455	0.936	2.261

Wealth = 4

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	-0.5156	0.1179	19.1235	<.0001
biostatus	1	0.0664	0.3145	0.0446	0.8327

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	1.069	0.577	1.980

Stratification on whether Children Slept under Bednet

childnet = 0

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	-0.3853	0.1297	8.8319	0.0030
biostatus	1	0.3966	0.2466	2.5871	0.1077

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	1.487	0.917	2.410

childnet = 1

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	-0.5247	0.0691	57.6755	<.0001
biostatus	1	-0.2412	0.1723	1.9605	0.1615

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.786	0.561	1.101

Assessing Confounding with Multiple Predictor Variables using a backwards elimination approach

	Variables in Model	OR for biostatus	OR for interaction terms	OR 95% CI
1	Biostatus, sex, monthage, sexhhh, wealth, relst, agehhh, childnet, biostatus*agehhh, biostatus*childnet	4.189		1.777, 9.878
	Non-parent guardian, head of household >40 years		1.5	
	Non-parent guardian, head of household <40 years		4.2	
	Biological parent, head of household > 40 years		1.0	
	Biological parent, head of household< 40 years		1.0	

	Non-parent guardian, some/all slept under bednet		1.5	
	Non-parent guardian, none slept under bednet		4.2	
	Biological parent, some/all slept under bednet		0.9	
	Biological parent, none slept under bednet		1.0	
2	Biostatus, sex, monthage, sexhhh, wealth, agehhh, childnet, biostatus*agehhh, biostatus*childnet	4.224		1.832, 9.737
	Non-parent guardian, head of household >40 years		1.8	
	Non-parent guardian, head of household <40 years		4.2	
	Biological parent, head of household > 40 years		1.1	
	Biological parent, head of household< 40 years		1.0	
	Non-parent guardian, some/all slept under bednet		1.4	
	Non-parent guardian, none slept under bednet		4.2	
	Biological parent, some/all slept under bednet		1.0	
	Biological parent, none slept under bednet		1.0	
3*	Biostatus, monthage, sexhhh, wealth, agehhh, childnet, biostatus*agehhh, biostatus*childnet	4.218		1.842, 9.658
	Non-parent guardian, head of household >40 years		1.8	
	Non-parent guardian, head of household <40 years		4.2	
	Biological parent, head of household > 40 years		1.1	
	Biological parent, head of household< 40 years		1.0	
	Non-parent guardian, some/all slept under bednet		1.4	
	Non-parent guardian, none slept under bednet		4.2	
	Biological parent, some/all slept under bednet		1.0	
	Biological parent, none slept under bednet		1.0	
4	Biostatus, monthage, wealth, agehhh, childnet, biostatus*agehhh, biostatus*childnet	4.412		1.966, 9.899
	Non-parent guardian, head of household >40 years		1.9	
	Non-parent guardian, head of household <40 years		4.4	
	Biological parent, head of household > 40 years		1.0	
	Biological parent, head of household< 40 years		1.0	
	Non-parent guardian, some/all slept under bednet		1.6	
	Non-parent guardian, none slept under bednet		4.4	
	Biological parent, some/all slept under bednet		1.0	
	Biological parent, none slept under bednet		1.0	
5	Biostatus, agehhh, childnet, biostatus*agehhh, biostatus*childnet	2.886		1.371, 6.077
	Non-parent guardian, head of household >40 years		1.5	
	Non-parent guardian, head of household <40 years		2.9	
	Biological parent, head of household > 40 years		1.1	
	Biological parent, head of household< 40 years		1.0	
	Non-parent guardian, some/all slept under bednet		1.2	
	Non-parent guardian, none slept under bednet		2.9	
	Biological parent, some/all slept under bednet		0.9	
	Biological parent, none slept under bednet		1.0	
6	Biostatus	1.141		0.892, 1.457

*Best Model

Outcome: Anemia

Full Model with all Interaction Terms with Exposure Variable (biostatus)

```
procsurveylogisticdata=anemiamodel ;
where anemia ne .;
classmonthage(ref='0')  relst (ref='0') wealth (ref='0') /param=ref;
model anemia (event = '1') = biostatus sex monthagesexhhhagehhhrelst
wealth childnet malaria biostatus*sex
biostatus*monthagebiostatus*sexhhhbiostatus*agehhhbiostatus*relstbiosta
tus*wealth biostatus*childnetbiostatus*malaria;
strata HV001;
cluster HV002;
weightHHweight;
run;
```

Type 3 Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
biostatus	1	0.0893	0.7650
sex	1	5.4531	0.0195
monthage	2	55.6457	<.0001
sexhhh	1	1.8429	0.1746
agehhh	1	2.0136	0.1559
relst	4	4.6068	0.3301
wealth	4	4.1594	0.3849
childnet	1	0.1606	0.6886
malaria	1	58.1972	<.0001
biostatus*sex	1	0.5696	0.4504
biostatus*monthage	2	1.1792	0.5545
biostatus*sexhhh	1	0.0933	0.7600
biostatus*agehhh	1	0.5236	0.4693
biostatus*relst	4	1.8017	0.7722
biostatus*wealth	4	0.6923	0.9523
biostatus*childnet	1	1.2426	0.2650
biostatus*malaria	1	0.0151	0.9022

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept		1	-0.4026	0.2920	1.9009	0.1680
biostatus		1	0.2129	0.7124	0.0893	0.7650
Sex		1	-0.3308	0.1417	5.4531	0.0195
monthage	**1**	1	1.5768	0.2423	42.3366	<.0001
monthage	**2**	1	0.9911	0.1931	26.3322	<.0001
Sexhhh		1	0.3940	0.2902	1.8429	0.1746
agehhh		1	-0.2409	0.1698	2.0136	0.1559
Relst	**1**	1	-0.2311	0.3729	0.3841	0.5354
Relst	**2**	1	0.9666	0.8308	1.3536	0.2447
Relst	**3**	1	0.2204	0.1690	1.6997	0.1923
Relst	**4**	1	-0.0806	0.3486	0.0534	0.8173
Wealth	**1**	1	0.3180	0.2210	2.0707	0.1502
Wealth	**2**	1	0.4007	0.2538	2.4917	0.1145
Wealth	**3**	1	0.1192	0.2508	0.2260	0.6345
Wealth	**4**	1	0.0326	0.2272	0.0206	0.8859
childnet		1	-0.0700	0.1747	0.1606	0.6886
malaria		1	1.2437	0.1630	58.1972	<.0001
biostatus*sex		1	0.2436	0.3228	0.5696	0.4504
biostatus*monthage	**1**	1	0.1885	0.5684	0.1100	0.7402
biostatus*monthage	**2**	1	0.4593	0.4326	1.1270	0.2884
biostatus*sexhhh		1	-0.1374	0.4498	0.0933	0.7600
biostatus*agehhh		1	0.3784	0.5230	0.5236	0.4693
biostatus*relst	**1**	1	-0.5827	0.8211	0.5037	0.4779
biostatus*relst	**2**	1	-0.7526	1.0424	0.5213	0.4703
biostatus*relst	**3**	1	-0.6429	0.4924	1.7041	0.1918
biostatus*relst	**4**	1	-0.5679	0.7882	0.5191	0.4712
biostatus*wealth	**1**	1	0.0682	0.5562	0.0150	0.9024
biostatus*wealth	**2**	1	-0.3373	0.5330	0.4005	0.5268
biostatus*wealth	**3**	1	-0.1213	0.5570	0.0474	0.8276
biostatus*wealth	**4**	1	0.0224	0.5163	0.0019	0.9655
biostatus*childnet		1	-0.3899	0.3498	1.2426	0.2650

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr > ChiSq**
biostatus*malaria	1	-0.0453	0.3689	0.0151	0.9022

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	70.1	**Somers' D**	0.409
Percent Discordant	29.3	**Gamma**	0.411
Percent Tied	0.6	**Tau-a**	0.193
Pairs	1191015	**c**	0.704

Assessment of Confounding Using Logistic Regression

Crude Estimate for Exposure (biostatus) and Outcome (anemia)

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	0.4965	0.0490	102.7098	<.0001
Biostatus	1	-0.1649	0.1315	1.5726	0.2098

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.848	0.655	1.097

Stratification on Sex

Sex=0

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	0.5338	0.0732	53.1633	<.0001

Biostatus	1	-0.1825	0.1713	1.1357	0.2866

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.833	0.596	1.166

Sex=1

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	0.4605	0.0692	44.3475	<.0001
Biostatus	1	-0.1479	0.1672	0.7829	0.3763

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.863	0.622	1.197

Stratification on Age (months)

Monthage = 0

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	0.2505	0.0640	15.3412	<.0001
Biostatus	1	-0.2221	0.1647	1.8185	0.1775

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
biostatus	0.801	0.580	1.106

Monthage= 1

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	1.4333	0.1378	108.1411	<.0001
Biostatus	1	0.0418	0.3782	0.0122	0.9120

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	1.043	0.497	2.188

Monthage= 2

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	1.0265	0.1085	89.4979	<.0001
Biostatus	1	0.2406	0.2630	0.8370	0.3603

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	1.272	0.760	2.130

Stratification on Age of Head of Household

Agehhh = 0

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	0.5243	0.0575	83.1214	<.0001
Biostatus	1	-0.0920	0.3099	0.0882	0.7665

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.912	0.497	1.674

Agehhh = 1

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	0.4212	0.0966	19.0106	<.0001
Biostatus	1	-0.1016	0.1642	0.3826	0.5362

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
Biostatus	0.903	0.655	1.246

Stratification on Sex of Head of Household

Sexhhh = 0

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	0.4606	0.0531	75.2554	<.0001

Biostatus	1	0.0278	0.1533	0.0329	0.8561

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
Biostatus	1.028	0.761	1.388

Sexhhh = 1

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	0.6668	0.1174	32.2652	<.0001
Biostatus	1	-0.4654	0.1977	5.5394	0.0186

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.628	0.426	0.925

Stratification on relationship structure of household

Relst= 0

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	0.4765	0.0629	57.4628	<.0001
Biostatus	1	0.2710	0.2698	1.0091	0.3151

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
biostatus	1.311	0.773	2.225

Relst= 1

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	0.5731	0.1281	20.0252	<.0001
Biostatus	1	-0.7368	0.3014	5.9744	0.0145

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.479	0.265	0.864

Relst = 2

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	0.9459	0.1166	65.8671	<.0001
Biostatus	1	-0.5439	0.2840	3.6679	0.0555

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.580	0.333	1.013

Relst = 3

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	0.5326	0.0968	30.2622	<.0001
Biostatus	1	-0.2144	0.1738	1.5206	0.2175

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.807	0.574	1.135

Relst = 4

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	-0.1276	0.1033	1.5258	0.2167
Biostatus	1	0.1839	0.1618	1.2918	0.2557

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	1.202	0.875	1.651

Stratification on wealth index

Wealth =0

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr>ChiSq
Intercept	1	0.1549	0.1356	1.3041	0.2535
Biostatus	1	0.00902	0.2197	0.0017	0.9672

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	1.009	0.656	1.552

Wealth = 1

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	0.8086	0.0920	77.1872	<.0001
Biostatus	1	-0.3407	0.2431	1.9642	0.1611

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.711	0.442	1.145

Wealth = 2

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	0.7136	0.1168	37.3263	<.0001
Biostatus	1	-0.3654	0.3085	1.4027	0.2363

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.694	0.379	1.270

Wealth = 3

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	0.4422	0.0953	21.5130	<.0001
Biostatus	1	0.3048	0.2190	1.9374	0.1639

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	1.356	0.883	2.083

Wealth = 4

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	0.2267	0.1113	4.1488	0.0417
Biostatus	1	-0.1830	0.3457	0.2803	0.5965

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.833	0.423	1.640

Stratification on whether children slept under a bednet

Childnet= 0

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	0.3811	0.1297	8.6285	0.0033
Biostatus	1	0.3264	0.2423	1.8151	0.1779

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	1.386	0.862	2.228

Childnet=1

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	0.3693	0.0687	28.9226	<.0001
Biostatus	1	-0.2756	0.1877	2.1556	0.1420

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.759	0.526	1.097

Stratification by malaria blood smear result

Malaria = 0

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	0.0256	0.0666	0.1476	0.7008
biostatus	1	-0.1525	0.1708	0.7967	0.3721

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.859	0.614	1.200

Malaria = 1

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr > ChiSq**
Intercept	1	1.2854	0.0887	209.9078	<.0001
biostatus	1	-0.3246	0.1861	3.0404	0.0812

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.723	0.502	1.041

Assessing Confounding with Multiple Predictor Variables using the backwards elimination approach

	Variables in Model	OR for biostatus	OR 95% CI
1	Biostatus, sex, monthage, agehhh, sexhhh, relst, wealth, childnet, malaria	0.849	0.559, 1.290
2	Biostatus, sex, monthage, agehhh, sexhhh, wealth, childnet, malaria	0.924	0.615, 1.389
3	Biostatus, sex, monthage, sexhhh, wealth, childnet, malaria	0.842	0.581, 1.220
4	Biostatus, sex, monthage, sexhhh, wealth, malaria	0.826	0.627, 1.087
5	Biostatus, sex, monthage, wealth, malaria	0.853	0.657, 1.107
6	Biostatus, monthage, wealth, malaria	0.852	0.657, 1.105
7	Biostatus, monthage, malaria	0.838	0.645, 1.088
8	Biostatus, malaria	0.804	0.624, 1.036
9*	Biostatus, monthage, agehhh, sexhhh, relst, wealth, childnet, malaria	0.848	0.560, 1.282
10	Biostatus, monthage, agehhh, sexhhh, wealth, childnet, malaria	0.920	0.615, 1.376
11	Biostatus, monthage, sexhhh, wealth, childnet, malaria	0.836	0.579, 1.206
12	Biostatus, monthage, sexhhh, wealth, malaria	0.824	0.626, 1.084
13	Biostatus, monthage, wealth	0.852	0.657, 1.105

*****Best Model

Outcome: Children Slept Under Bednet Last Night

Full Model with all Interaction Terms with Exposure Variable (biostatus):

```
procsurveylogisticdata=childnetmodel ;
wherechildnet ne .;
classmonthage(ref='0')  relst (ref='0') wealth (ref='0') /param=ref;
modelchildnet (event = '1') = biostatus sex monthagesexhhhagehhhrelst
wealth anemia biostatus*sex
biostatus*monthagebiostatus*sexhhhbiostatus*agehhhbiostatus*relstbiosta
tus*wealth biostatus*anemia;
strata HV001;
cluster HV002;
weightHHweight;
run;
```

Type 3 Analysis of Effects			
Effect	**DF**	**Wald Chi-Square**	**Pr>ChiSq**
biostatus	1	0.2498	0.6172
sex	1	1.8554	0.1732
monthage	3	9.7047	0.0213
sexhhh	1	0.0855	0.7700
agehhh	1	4.7838	0.0287
relst	4	3.6008	0.4627
wealth	4	6.3537	0.1742
anemia	1	0.1497	0.6988
biostatus*sex	1	0.1226	0.7262
biostatus*monthage	3	2.2003	0.5319
biostatus*sexhhh	1	0.0710	0.7899
biostatus*agehhh	1	0.3091	0.5782
biostatus*relst	4	4.9778	0.2896
biostatus*wealth	4	2.9910	0.5593
biostatus*anemia	1	3.3241	0.0683

Analysis of Maximum Likelihood Estimates						
Parameter		**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept		1	1.4764	0.3498	17.8136	<.0001
Biostatus		1	-0.3752	0.7507	0.2498	0.6172
Sex		1	0.2176	0.1597	1.8554	0.1732
Monthage	**1**	1	0.6347	0.2477	6.5678	0.0104
Monthage	**2**	1	0.4621	0.2507	3.3964	0.0653
Monthage	**3**	1	0.0379	0.1953	0.0377	0.8461
Sexhhh		1	0.0999	0.3419	0.0855	0.7700
Agehhh		1	-0.4662	0.2131	4.7838	0.0287
Relst	**1**	1	-0.0712	0.4407	0.0261	0.8717
Relst	**2**	1	-0.1412	0.6184	0.0521	0.8194
Relst	**3**	1	0.0124	0.2340	0.0028	0.9576
Relst	**4**	1	-0.8645	0.4700	3.3832	0.0659
Wealth	**1**	1	-0.1273	0.3420	0.1386	0.7097
Wealth	**2**	1	-0.4968	0.3726	1.7775	0.1825
Wealth	**3**	1	-0.5381	0.3645	2.1793	0.1399
Wealth	**4**	1	-0.6491	0.3679	3.1125	0.0777
Anemia		1	-0.0646	0.1671	0.1497	0.6988
biostatus*sex		1	-0.0998	0.2849	0.1226	0.7262
biostatus*monthage	**1**	1	-0.4831	0.4950	0.9528	0.3290
biostatus*monthage	**2**	1	0.3629	0.5309	0.4673	0.4942
biostatus*monthage	**3**	1	-0.3044	0.3536	0.7412	0.3893
biostatus*sexhhh		1	0.1292	0.4851	0.0710	0.7899
biostatus*agehhh		1	-0.2817	0.5066	0.3091	0.5782

biostatus*relst	**1**	1	0.4526	0.8564	0.2793	0.5972
biostatus*relst	**2**	1	0.6592	0.9989	0.4355	0.5093
biostatus*relst	**3**	1	-0.1760	0.5743	0.0939	0.7593
biostatus*relst	**4**	1	1.5348	0.8972	2.9264	0.0871
biostatus*wealth	**1**	1	0.4805	0.6093	0.6219	0.4303
biostatus*wealth	**2**	1	1.0550	0.6525	2.6144	0.1059
biostatus*wealth	**3**	1	0.6053	0.6370	0.9029	0.3420
biostatus*wealth	**4**	1	0.2708	0.6448	0.1764	0.6745
biostatus*anemia		1	-0.5997	0.3289	3.3241	0.0683

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	63.2	**Somers' D**	0.273
Percent Discordant	35.9	**Gamma**	0.275
Percent Tied	0.8	**Tau-a**	0.102
Pairs	1134036	**c**	0.636

Assessment of Confounding Using Logistic Regression

Crude Estimate for Exposure (biostatus) and Outcome (whether children under 5 sleep under a bednet)

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	1.1205	0.0924	147.1467	<.0001
biostatus	1	-0.7800	0.1929	16.3458	<.0001

Odds Ratio Estimates		
Effect	**Point Estimate**	**95% Wald**

		Confidence Limits	
biostatus	0.458	0.314	0.669

Stratification on sex

Sex=0

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	1.0177	0.1171	75.5674	<.0001
biostatus	1	-0.7119	0.2330	9.3377	0.0022

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.491	0.311	0.775

Sex=1

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	1.2232	0.1248	96.0362	<.0001
biostatus	1	-0.8488	0.2403	12.4731	0.0004

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.428	0.267	0.685

Stratification on age (months)

Monthage=0

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	1.0170	0.1030	97.4078	<.0001
biostatus	1	-0.6281	0.2151	8.5283	0.0035

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.534	0.350	0.813

Monthage=1

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	1.5667	0.2324	45.4607	<.0001
biostatus	1	-1.0270	0.4087	6.3138	0.0120

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.358	0.161	0.798

Monthage = 2

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr>ChiSq
Intercept	1	1.5673	0.1956	64.1881	<.0001
biostatus	1	-0.8528	0.4643	3.3734	0.0663

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.426	0.172	1.059

Monthage =3

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	1.0987	0.1860	34.8899	<.0001
biostatus	1	-1.0994	0.3418	10.3455	0.0013

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.333	0.170	0.651

Stratification on age of the head of the household

Agehhh= 0

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	1.2638	0.1165	117.6110	<.0001

biostatus	1	-0.4783	0.4241	1.2718	0.2594

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.620	0.270	1.423

Agehhh= 1

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	0.7612	0.1432	28.2716	<.0001
biostatus	1	-0.4828	0.2327	4.3052	0.0380

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.617	0.391	0.974

Stratification on the sex of the head of the household

Sexhhh= 0

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	1.0937	0.1002	119.0586	<.0001
biostatus	1	-0.9622	0.2482	15.0320	0.0001

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.382	0.235	0.621

Sexhhh= 1

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	1.2559	0.2307	29.6375	<.0001
biostatus	1	-0.7447	0.3220	5.3485	0.0207

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.475	0.253	0.893

Stratification on relationship structure of household

Relst = 0

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	1.1639	0.1202	93.7706	<.0001
biostatus	1	-0.8850	0.4646	3.6284	0.0568

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.413	0.166	1.026

Relst= 1

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	1.2946	0.3562	13.2068	0.0003
biostatus	1	-0.4010	0.4904	0.6687	0.4135

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.670	0.256	1.751

Relst= 2

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	1.3294	0.2352	31.9521	<.0001
biostatus	1	-0.2615	0.5582	0.2195	0.6394

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.770	0.258	2.299

Relst= 3

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr>ChiSq
Intercept	1	1.0094	0.1645	37.6586	<.0001
biostatus	1	-0.8756	0.2576	11.5530	0.0007

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.417	0.251	0.690

Relst= 4

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	0.3244	0.1138	8.1234	0.0044
biostatus	1	0.7855	0.2053	14.6437	0.0001

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	2.194	1.467	3.280

Stratification on wealth index

Wealth = 0

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	1.4866	0.2538	34.2980	<.0001

biostatus	1	-1.2813	0.3852	11.0645	0.0009

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.278	0.131	0.591

Wealth = 1

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	1.3664	0.1566	76.1022	<.0001
biostatus	1	-0.8119	0.3875	4.3907	0.0361

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.444	0.208	0.949

Wealth = 2

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	1.0355	0.2053	25.4495	<.0001
biostatus	1	-0.3341	0.4467	0.5593	0.4545

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
biostatus	0.716	0.298	1.719

Wealth = 3

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	0.9655	0.1683	32.9253	<.0001
biostatus	1	-0.6863	0.3198	4.6057	0.0319

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.503	0.269	0.942

Wealth = 4

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	0.8151	0.1881	18.7871	<.0001
biostatus	1	-0.9051	0.4261	4.5115	0.0337

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.404	0.175	0.932

Stratification on anemia

Anemia = 0

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	1.1205	0.1295	74.8957	<.0001
biostatus	1	-0.3775	0.2755	1.8767	0.1707

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.686	0.400	1.177

Anemia = 1

Analysis of Maximum Likelihood Estimates					
Parameter	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr>ChiSq**
Intercept	1	1.1087	0.1118	98.3296	<.0001
biostatus	1	-0.9795	0.2297	18.1875	<.0001

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
biostatus	0.376	0.239	0.589

Assessing Confounding with Multiple Predictor Variables using a backwards elimination approach

	Variables in Model	OR for biostatus	OR 95% CI
1	Biostatus, sex, monthage, agehhh, sexhhh, relst, wealth, anemia	0.591	0.376, 0.928
2	Biostatus, monthage, agehhh, sexhhh, relst, wealth, anemia	0.593	0.377, 0.931
3	Biostatus, monthage, agehhhsexhhh, wealth, anemia	0.573	0.366, 0.896
4	Biostatus, monthage, agehhh wealth, anemia	0.616	0.403, 0.941
5	Biostatus, monthage, agehhh anemia	0.646	0.425, 0.981
6	Biostatus, monthage, agehhh	0.606	0.401, 0.917
7	Biostatus, sex, monthage, agehhh, sexhhh, relst, anemia	0.611	0.393, 0.952
8	Biostatus, sex, monthage, agehhh, sexhhh, anemia	0.594	0.382, 0.924
9	Biostatus, sex, monthage, agehhh, anemia	0.646	0.425, 0.983
10	Biostatus, sex, monthage, agehhh	0.607	0.401, 0.919
11*	Biostatus, monthage, agehhh	0.606	0.401, 0.917
12	Biostatus	0.458	0.314, 0.669

*Best Model

Appendix C: Additional Exploratory Analyses

Usual Residents and Whether a Child Slept in the Household Last Night for Children living with Non-Parent Guardians (NPG) and Biological Children

	Children, n (col, row %)							
	Children living with NPG			Biological			All	P value
	Col %	Wt.% (95%CI)	n	Col %	Wt.% (95%CI)	n		
Usual Resident								<.0001*
Yes	93.8	94.4 (92.3, 96.5)	721	99.9	99.9 (99.9, 100)	3345	4066	
No	6.2	5.6 (3.5, 7.7)	48	0.1	0.1 (0.0, 0.15)	4	52	
Slept in Household Last Night								0.0474*
Yes	98.2	98.4 (97.3, 99.4)	755	96.5	96.8 (95.9, 97.7)	3230	3985	
No	1.8	1.6 (0.6, 2.7)	14	3.6	3.2 (2.3, 4.1)	119	133	
Total			769			3349	4118	

*Rao-Scott Chi-square p value, significance determined at a level of 0.05

Biological Status and Age of Children Under 5 Years by Relationship to the Head of the Household who are Usual Residents and Slept in the House Last Night (n=3933)

Biological Status	Relationship to Head of HH	Median Age (Years), (IQR)	Median Age (Months), (IQR)	Col %	Wt. % (95%CI)	n
Biological	**Son or daughter**	2 (1-3)	29 (15-44)	82%	83.3 (81.3, 85.3)	3226
Children living with NPG	**All Subsets**	2 (1-3)	30 (16-44)	18.0%	16.7 (14.7, 18.7)	707
Total						3933
	Subsets of Children Living with NPG					
	Grandchild	2 (1-3)	30 (16-43)	84.2	86.2 (82.7, 89.6)	595
	Niece/nephew by marriage	3 (1-4)	42 (24-50)	4.7	2.9 (1.8, 4.2)	33
	Other relative	3 (2-4)	37 (26-49)	2.1	2.3 (0.8, 3.9)	15
	Adopted/foster /step child	1 (0-2)	16 (8-33)	0.9	0.9 (0.1, 1.6)	6
	Not related	3 (1-4)	35 (15-49)	8.2	7.7 (5.1, 10.3)	58

Age Distribution by Biological Status for Children Under 5 Years who are Usual Residents and Slept in the House Last Night (n=3933)

	Biological Status				
	Non-Biological		Biological		
Age, years	**Col %**	**n**	**Col %**	**n**	**T test P Value**
0	16.8	119	19.5	630	
1	20.1	142	19.9	643	
2	19.7	139	19.9	642	
3	23.6	167	20.5	661	
4	19.8	140	20.2	650	
Mean, s.d.	2.1, 1.4		2.0, 1.4		0.1692
Median (IQR)	2 (1-3)		2 (1-3)		
Age, months					
0-5	8.6	61	8.8	284	
6-11	8.2	58	10.7	346	
12-23	20.1	142	19.9	643	
24-59	63.1	446	60.5	1953	
Mean, s.d.	30.2, 16.6		29.6, 17.1		0.3778
Median (IQR)	30 (16-44)		29 (15-44)		
Total	707		3226		

Relationship to Head of Household by Biological Status and Subsets with whether a Child Slept in the Household Last Night and if they Have a Bednet for Sleeping for Children Under 5 Years

All Children, n=4118				
Relationship to Head of Household	**Slept in Household Last Night, n (col%)**		**Bednet for sleeping, n(col%)**	
	Yes	**No**	**Yes**	**No**
Son or daughter	3230 (81.1)	119 (89.5)	2210 (82.9)	1139 (78.4)
Grandchild	626 (15.7)	10 (7.5)	369 (13.8)	267 (18.4)
Niece/nephew	34 (0.9)	1 (0.8)	22 (0.8)	13 (0.9)
Other relative	21 (0.5)	3 (2.3)	14 (0.5)	10 (0.7)
Adopted/foster/step child	10 (0.3)	0	7 (0.3)	3 (0.2)
Not related	64 (1.6)	0	44 (1.7)	20 (1.4)
Total	3985	133	2666	1452

Non-Biological Children, n=769				
Relationship to Head of Household	**Slept in Household Last Night, n (col%)**		**Bednet for sleeping, n(col%)**	
	Yes	**No**	**Yes**	**No**
Grandchild	626 (82.9)	10 (71.4)	369 (80.9)	267 (85.3)
Niece/nephew	34 (4.5)	1 (7.1)	22 (4.8)	13 (4.2)
Other relative	21 (2.8)	3 (21.4)	14 (3.1)	10 (3.2)
Adopted/foster/step child	10 (1.3)	0	7 (1.5)	3 (1.0)
Not related	64 (8.5)	0	44 (6.	20 (6.4)
Total	755	14	456	313

Biological Children, n=3349				
Relationship to Head of Household	**Slept in Household Last Night, n (col%)**		**Bednet for sleeping, n(col%)**	
	Yes	**No**	**Yes**	**No**
Son or daughter	3230 (100)	119 (100)	2210 (100)	1139 (100)

Age distribution by Malaria Blood Smear Outcome for Children Under 5 Years

All Children, n=3912		**Malaria Blood Smear**						
		Positive			**Negative**			**Rao-Scott Chi-square p value**
Age (Months)		**% of Total**	**Wt.%(95% CI)**	**n**	**% of Total**	**Wt.%(95% CI)**	**n**	
	0-5	1.3	1.3 (0.9, 1.7)	51	7.4	6.9 (5.9, 7.9)	288	
	6-11	3.0	3.0 (2.4, 3.6)	119	7.1	6.4 (5.5, 7.3)	277	
	12-23	7.5	7.8 (6.7, 9.0)	294	12.6	13.2 (11.8, 14.7)	494	
	24-59	31.6	30.3 (28.5, 32.0)	1235	29.5	31.1 (29.0, 33.3)	1154	
Total				1699			2213	<.0001

Non-Biological Children, n=741		**Malaria Blood Smear**						
		Positive			**Negative**			**Rao-Scott Chi-square p value**
Age (Months)		**% of Total**	**Wt.%(95% CI)**	**n**	**% of Total**	**Wt.%(95% CI)**	**n**	
	0-5	1.2	1.3 (0.5, 2.0)	9	7.4	6.4 (4.5, 8.2)	55	
	6-11	2.0	2.3 (1.1, 3.6)	15	5.8	5.1 (3.6, 6.7)	43	
	12-23	8.2	7.6 (5.5, 9.7)	61	11.9	11.7 (8.9, 14.6)	88	
	24-59	34.1	33.7 (29.7, 37.7)	253	29.3	31.9 (27.7, 36.0)	217	
Total				338			403	<.0001

Biological Children, n=3171		**Malaria Blood Smear**						
		Positive			**Negative**			**Rao-Scott Chi-square p value**
Age (Months)		**% of Total**	**Wt.%(95% CI)**	**n**	**% of Total**	**Wt.%(95% CI)**	**n**	
	0-5	1.3	1.3 (0.9, 1.8)	42	7.4	7.0 (5.8, 8.1)	233	
	6-11	3.3	3.1 (2.4, 3.8)	104	7.4	6.7 (5.7, 7.7)	234	
	12-23	7.4	7.9 (6.6, 9.2)	233	12.8	13.6 (11.9, 15.2)	406	
	24-59	31.0	29.5 (27.6, 31.5)	982	30.0	31.0 (28.6, 33.3)	937	
				1361			1810	<.0001

Age distribution by Anemia Level for Children Under 5 Years

All Children, n=3912									
		Anemia level, adjusted for altitude							
Age (Months)		**Severe (<7.0 g/dl)**		**Moderate (7-.0-9.9 g/dl)**		**Mild (10.0-10.9 g/dl)**		**Not Anemic (>10.9 g/dl)**	
		Col %	**n**	**Col %**	**n**	**Col %**	**n**	**Col %**	**n**
	0-5	6.4	12	7.0	101	7.1	59	11.7	170
	6-11	23.3	44	12.8	184	10.7	89	5.5	79
	12-23	36.0	68	25.2	363	20.2	168	13.0	189
	24-59	34.4	65	55.1	795	61.9	514	70.0	1012
Chi-square p value		<.0001							
Non-Biological Children, n=742									
	0-5	5.4	2	7.6	20	6.2	10	11.8	33
	6-11	13.5	5	10.6	28	9.3	15	3.6	10
	12-23	37.8	14	25.3	67	21.1	34	12.2	34
	24-59	43.2	16	56.6	150	63.4	102	72.4	202
Chi-square p value		<.0001							
Biological Children, n=3170									
	0-5	6.6	10	6.9	81	7.3	49	11.7	137
	6-11	25.7	39	13.2	156	11.1	74	5.9	69
	12-23	35.5	54	25.1	296	20.0	134	13.2	155
	24-59	32.2	49	54.8	645	61.6	412	69.2	810
Chi-square p value		<.0001							

Whether the Household has a Bednet for Sleeping and Outcome of Malaria Blood Smear Reading

All Children		**Malaria, n (col%, row %)**		
		Yes	**No**	**Total**
Have bednet for sleeping	**Yes**	976 (59, 40)	1490 (69, 60)	2466
	No	690 (41, 51)	667 (31, 49)	1357
	Total	1666	2157	

Chi-square :<.0001, OR (95% CI): 0.63 (0.55, 0.72)

Observations missing malaria indicator: Yes Bednet n=73, No Bednet n=37

Non-Biological children		**Malaria, n (col%, row %)**		
		Yes	**No**	**Total**
Have bednet for sleeping	**Yes**	155 (49, 39)	247 (66, 61)	402
	No	163 (51, 57)	125 (34, 43)	288
	Total	318	372	690

Chi-square :<.0001, OR (95% CI): 0.48 (0.35, 0.66)

Observations missing malaria indicator: Yes Bednet n=9, No Bednet n=8

Biological Children		**Malaria, n (col%, row %)**		
		Yes	**No**	**Total**
Have Bednet for sleeping	**Yes**	821 (61, 40)	1243 (70, 60)	2064
	No	527 (39, 49)	542 (30,51)	1069
	Total	1348	1785	3133

Chi-square :<.0001, OR (95% CI): 0.68 (0.59, 0.79)

Observations missing malaria indicator: Yes Bednet n=64, No Bednet n=29

Whether the Household has a Bednet for Sleeping and Anemia Level Adjusted for Altitude

All Children, n=3912 (Observations missing malaria indicator: Yes Bednet n=70, No Bednet n=40)									
	Anemia level, adjusted for altitude								
Have bednet for sleeping	**Severe (<7.0 g/dl)**		**Moderate (7-.0-9.9 g/dl)**		**Mild (10.0-10.9 g/dl)**		**Not Anemic (>10.9 g/dl)**		Total
	Col %	**n**	**Col %**	**n**	**Col %**	**n**	**Col %**	**n**	
Yes	52	97	62	881	64	522	69	969	2469
No	48	88	38	532	36	295	31	439	1354
Total		185		1413		817		1408	3823
Chi-square p value		<.0001							

Non-Biological Children, n=691 (Observations missing malaria indicator: Yes Bednet n=8, No Bednet n=8)									
	Anemia level, adjusted for altitude								
Have bednet for sleeping	**Severe (<7.0 g/dl)**		**Moderate (7-.0-9.9 g/dl)**		**Mild (10.0-10.9 g/dl)**		**Not Anemic (>10.9 g/dl)**		Total
	Col %	**n**	**Col %**	**n**	**Col %**	**n**	**Col %**	**N**	
Yes	46	16	57	140	59	91	61	156	403
No	54	19	43	104	41	64	39	101	288
Total		35		244		155		257	691
Chi-square p value		0.3938							

Biological Children, n=3132 (Observations missing malaria indicator: Yes Bednet n=62, No Bednet n=32)									
	Anemia level, adjusted for altitude								
Have bednet for sleeping	**Severe (<7.0 g/dl)**		**Moderate (7-.0-9.9 g/dl)**		**Mild (10.0-10.9 g/dl)**		**Not Anemic (>10.9 g/dl)**		Total
	Col %	**n**	**Col %**	**n**	**Col %**	**n**	**Col %**	**n**	
Yes	54	81	63	741	65	431	71	813	2066
No	46	69	37	428	35	231	29	338	1066
Total		150		1169		662		1151	3132
Chi-square p value		<.0001							

Whether the Household has a Bednet for Sleeping and Anemia Outcome

All Children		**Anemia, n (col%, row %)**		
		Yes	**No**	**Total**
Have bednet for sleeping	**Yes**	1500 (62, 61)	969 (69, 39)	2469
	No	915 (38, 68)	439 (31, 32)	1354
	Total	2415	1408	3823

Chi-square :<.0001, OR (95% CI): 0.74 (0.65, 0.85)

Observations missing malaria indicator: YesBednet n=70, No Bednet n=40

Non-Biological Children		**Anemia, n (col%, row %)**		
		Yes	**No**	**Total**
Have bednet for sleeping	**Yes**	247 (57, 61)	156 (61, 39)	403
	No	187 (43, 65)	101 (39, 35)	288
	Total	434	257	691

Chi-square : 0.3290, OR (95% CI): 0.86 (0.62, 1.2)

Observations missing malaria indicator: YesBednet n=8, No Bednet n=8

Biological Children		**Anemia, n (col%, row %)**		
		Yes	**No**	**Total**
Have bednet for sleeping	**Yes**	1253 (63, 61)	813 (71, 39)	2066
	No	728 (37, 68)	338 (29, 32)	1066
	Total	1981	1151	3132

Chi-square :<.0001, OR (95% CI): 0.72 (0.61, 0.84)

Observations missing malaria indicator: YesBednet n=62, No Bednet n=32

Treatment and Disease Indicators for Children under 5 Years who are Usual Residents or Visitorsin Woman's Questionnaire (n=3454)

Had Fever in the Last Two Weeks	**n (col %)**	**Wt. % (95% CI)**
Yes	1619 (47)	51 (49, 53)
No	1792 (52)	47 (45, 50)
Don't Know	7 (0.2)	0.2 (0.02, 0.4)
Code-9 (Missing value)	36 (1.0)	1.4 (0.6, 2.1)
Place first sought treatment for fever, top 3*		
Code- 12 (can't find code)	419 (31)	29 (26, 32)
Government Hospital	325 (24)	28 (24, 31)
Government Health Center	179 (10)	14 (11, 17)
Days after fever sought advice or treatment*		
0	301 (23)	18 (16, 21)
1	375 (28)	31 (27, 35)
2	345 (26)	25 (22, 28)
3	186 (14)	
>3	131 (9)	
Child has fever/cough now **		
Yes	776 (43)	47 (43, 51)
No	700 (43)	42 (38, 46)
Don't Know	65 (4)	4 (3, 6)
Code-9 (Missing value)	78 (5)	6 (4, 9)
Medication taken for fever/cough *-**		
Fansidar	75 (5)	5 (3, 7)
Chloroquine	194 (12)	12 (9, 14)
Quinine	321 (20)	19 (17, 22)
Combination w/artemisinin	400 (25)	23 (20, 27)
Chloroquine w/fansidar	19 (1)	1 (0.4, 2)
Homepak red	5 (0.3)	0.5 (0, 1)
Other	38 (2)	2 (1, 3)
What causes malaria: mosquito bites		
Yes	2897 (84)	85 (83, 87)
Are there ways to avoid getting malaria?		
Yes	2926 (85)	84 (82, 86)

*2116 observations missing

** 1835 observations missing

*** 1835 observations missing

Appendix D: MIS Household Questionnaire

UGANDA BUREAU OF STATISTICS
2009 UGANDA MALARIA INDICATOR SURVEY
HOUSEHOLD QUESTIONNAIRE - **ENGLISH**

SECTION 1A: IDENTIFICATION

1. REGION
2. DISTRICT
3. COUNTY
4. SUBCOUNTY/TOWN
5. PARISH/LC2 NAME
6. EA NAME
7. UMIS NUMBER
8. URBAN=1, PERI URBAN=2, RURAL=3
9. NAME OF HEAD OF HOUSEHOLD
10. HOUSEHOLD NUMBER
11. HOUSEHOLD SAMPLE NUMBER

SECTION 1B: INTERVIEWER VISITS

	1	2	3	FINAL VISIT
1. DATE				1. DAY
				2. MONTH
				3. YEAR
2. INTERVIEWER'S NAME				4. INT. NUMBER
3. RESULT*				5. RESULT
4. NEXT VISIT: DATE				6. TOTAL NUMBER OF VISITS
5. TIME				

*RESULT CODES:
1 COMPLETED
2 NO HOUSEHOLD MEMBER AT HOME OR NO COMPETENT RESPONDENT AT HOME AT TIME OF VISIT
3 ENTIRE HOUSEHOLD ABSENT FOR EXTENDED PERIOD OF TIME
4 POSTPONED
5 REFUSED
6 DWELLING VACANT OR ADDRESS NOT A DWELLING
7 DWELLING DESTROYED
8 DWELLING NOT FOUND
9 OTHER (SPECIFY)

7. TOTAL PERSONS IN HOUSEHOLD
8. TOTAL ELIGIBLE WOMEN
9. TOTAL ELIGIBLE CHILDREN
10. LINE NO. OF RESPONDENT TO HOUSEHOLD QUESTIONNAIRE

6. LANGUAGE OF THE QUESTIONNAIRE
7. LANGUAGE USED IN THE INTERVIEW
8. NATIVE LANGUAGE OF RESPONDENT
9. TRANSLATOR USED (NOT AT ALL=1; SOMETIMES=2; ALL THE TIME=3)

LANGUAGE USED: 1 ATESO-KARAMOJONG, 2 LUGANDA, 3 LUGBARA, 4 LUO, 5 RUNYANKORE-RUKIGA, 6 RUNYORO-RUTORO, 7 ENGLISH, 8 OTHER

SUPERVISOR	FIELD EDITOR	OFFICE EDITOR	KEYED BY
NAME	NAME		
DATE	DATE		

INTRODUCTION AND CONSENT

Hello. My name is _____. I am working with UBOS in collaboration with MOH. We are conducting a national survey about malaria and would very much appreciate your participation in this survey.This information will help the government to plan health services. As part of the survey we would first like to ask some questions about your household. These questions will take about 15 minutes to complete. Whatever information you provide will be kept strictly confidential, and will not be shared with anyone other than members of our survey team.

Participation in this survey is voluntary, and if we should come to any question you don't want to answer, just let me know and I will go on to the next question; or you can stop the interview at any time. However, we hope you will participate in the survey since your views are important.

At this time, do you want to ask me anything about the survey? May I begin the interview now?

Signature of Interviewer: _____ Date: _____

RESPONDENT AGREES TO BE INTERVIEWED . . . 1 RESPONDENT DOES NOT AGREE TO BE INTERVIEWED . . . 2 → END

START TIME: ☐☐☐☐ HOURS END TIME: ☐☐☐☐ HOURS

SECTION 2. HOUSEHOLD SCHEDULE

LINE NO.	USUAL RESIDENTS AND VISITORS	RELATIONSHIP TO HEAD OF HOUSEHOLD	SEX	RESIDENCE		AGE	ELIGIBILITY	
	Please give me the names of the persons who usually live in your household and guests of the household who stayed here last night, starting with the head of the household. AFTER LISTING THE NAMES AND RECORDING THE RELATIONSHIP AND SEX FOR EACH PERSON, ASK QUESTIONS 2A-2C TO BE SURE THAT THE LISTING IS COMPLETE. THEN ASK APPROPRIATE QUESTIONS IN COLUMNS 5-7 FOR EACH PERSON.	What is the relationship of (NAME) to the head of the household? SEE CODES BELOW.	Is (NAME) male or female?	Does (NAME) usually live here?	Did (NAME) stay here last night?	How old is (NAME)?	CIRCLE LINE NUMBER OF ALL WOMEN AGE 15-49 YEARS	CIRCLE LINE NUMBER OF ALL CHILDREN AGE 0-4 YEARS (0-59 MONTHS)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			M F	Y N	Y N	IN YEARS		
01			1 2	1 2	1 2		01	01
02			1 2	1 2	1 2		02	02
03			1 2	1 2	1 2		03	03
04			1 2	1 2	1 2		04	04
05			1 2	1 2	1 2		05	05
06			1 2	1 2	1 2		06	06
07			1 2	1 2	1 2		07	07
08			1 2	1 2	1 2		08	08

CODES FOR Q. 3: RELATIONSHIP TO HEAD OF HOUSEHOLD

01 = HEAD
02 = WIFE OR HUSBAND
03 = SON OR DAUGHTER
04 = SON-IN-LAW OR DAUGHTER-IN-LAW
05 = GRANDCHILD
06 = PARENT
07 = PARENT-IN-LAW
08 = BROTHER OR SISTER
09 = NIECE/NEPHEW BY BLOOD
10 = NIECE/NEPHEW BY MARRIAGE
11 = OTHER RELATIVE
12 = ADOPTED/FOSTER/STEP CHILD
13 = NOT RELATED
98 = DON'T KNOW

LINE NO.	USUAL RESIDENTS AND VISITORS	RELATIONSHIP TO HEAD OF HOUSEHOLD	SEX	RESIDENCE		AGE	ELIGIBILITY	
	Please give me the names of the persons who usually live in your household and guests of the household who stayed here last night, starting with the head of the household. AFTER LISTING THE NAMES AND RECORDING THE RELATIONSHIP AND SEX FOR EACH PERSON, ASK QUESTIONS 2A-2C TO BE SURE THAT THE LISTING IS COMPLETE. THEN ASK APPROPRIATE QUESTIONS IN COLUMNS 5-7 FOR EACH PERSON.	What is the relationship of (NAME) to the head of the household? SEE CODES BELOW.	Is (NAME) male or female?	Does (NAME) usually live here?	Did (NAME) stay here last night?	How old is (NAME)?	CIRCLE LINE NUMBER OF ALL WOMEN AGE 15-49 YEARS	CIRCLE LINE NUMBER OF ALL CHILDREN AGE 0-4 YEARS (0-59 MONTHS)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			M F	Y N	Y N	IN YEARS		
09			1 2	1 2	1 2		09	09
10			1 2	1 2	1 2		10	10
11			1 2	1 2	1 2		11	11
12			1 2	1 2	1 2		12	12
13			1 2	1 2	1 2		13	13
14			1 2	1 2	1 2		14	14
15			1 2	1 2	1 2		15	15
16			1 2	1 2	1 2		16	16

TICK HERE IF CONTINUATION SHEET USED ☐

2A) Just to make sure that I have a complete listing. Are there any other persons such as small children or infants that are not listed? YES ☐ → ADD TO TABLE NO ☐

2B) Are there any other people who may not be members of your family, such as domestic servants, lodgers, or friends who usually live here? YES ☐ → ADD TO TABLE NO ☐

2C) Are there any guests or temporary visitors staying here, or anyone else who stayed here last night, who have not been listed? YES ☐ → ADD TO TABLE NO ☐

CODES FOR Q. 3: RELATIONSHIP TO HEAD OF HOUSEHOLD

01 = HEAD	05 = GRANDCHILD	10 = NIECE/NEPHEW BY MARRIAGE
02 = WIFE OR HUSBAND	06 = PARENT	11 = OTHER RELATIVE
03 = SON OR DAUGHTER	07 = PARENT-IN-LAW	12 = ADOPTED/FOSTER/STEP CHILD
04 = SON-IN-LAW OR DAUGHTER-IN-LAW	08 = BROTHER OR SISTER	13 = NOT RELATED
	09 = NIECE/NEPHEW BY BLOOD	98 = DON'T KNOW

SECTION 3: HOUSEHOLD CHARACTERISTICS

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
101	What is the main source of drinking water for members of your household?	**PIPED WATER** PIPED INTO DWELLING . . . . . 11 PIPED INTO YARD/COMPOUND . . . 12 PUBLIC TAP . . . . . 13 **WATER FROM OPEN WELL** OPEN WELL IN YARD/COMPOUND . . 21 OPEN PUBLIC WELL . . . . . 22 **WATER FROM COVERED WELL OR BOREHOLE** PROTECTED WELL IN YARD/COMPOUND . . . . . 31 PROTECTED PUBLIC WELL . . . . . 32 BOREHOLE. . . . . 33 **SURFACE WATER** PROTECTED SPRING . . . . . 41 UNPROTECTED SPRING . . . . . 42 RIVER/STREAM . . . . . 43 POND/LAKE . . . . . 44 DAM . . . . . 45 RAINWATER . . . . . 51 WATER TRUCK . . . . . 61 BOTTLED WATER . . . . . 71 OTHER _____ 96 (SPECIFY)	
102	What kind of toilet facility do members of your household usually use?	FLUSH TOILET. . . . . 01 VIP LATRINE . . . . . 02 COVERED PIT LATRINE NO SLAB . . . . 03 COVERED PIT LATRINE W/ SLAB . . . . 04 UNCOVERED PIT LATRINE NO SLAB . . 05 UNCOVERED PIT LATRINE W/ SLAB . . 06 COMPOSTING TOILET . . . . . 07 NO FACILITY/BUSH/FIELD . . . . . 08 OTHER _____ 96 (SPECIFY)	
104	Does your household have: a) Electricity? b) A radio? c) A cassette player? d) A television? e) A mobile phone? f) A fixed phone? g) A refrigerator? h) A table? i) A chair? j) A sofa set? k) A bed? l) A cupboard? m) A clock?	YES NO ELECTRICITY . . . . . 1 2 RADIO . . . . . 1 2 CASSETTE PLAYER . . . . . 1 2 TELEVISION . . . . . 1 2 MOBILE PHONE . . . . . 1 2 FIXED PHONE . . . . . 1 2 REFRIGERATOR . . . . . 1 2 TABLE . . . . . 1 2 CHAIRS . . . . . 1 2 SOFA SET . . . . . 1 2 BED . . . . . 1 2 CUPBOARD . . . . . 1 2 CLOCK 1 2	
105	What type of fuel does your household mainly use for cooking?	ELECTRICITY . . . . . 01 LPG/NATURAL GAS . . . . . 02 BIOGAS . . . . . 03 PARAFFIN / KEROSENE . . . . . 04 CHARCOAL . . . . . 05 FIREWOOD. . . . . 06 STRAW/SHRUBS/GRASS. . . . . 07 ANIMAL DUNG . . . . . 08 NO FOOD COOKED IN HOUSEHOLD. . . 95 OTHER _____ 96 (SPECIFY)	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
106	What is the main source of energy for lighting in the household?	ELECTRICITY ..... 01 SOLAR ..... 02 GAS ..... 03 PARAFFIN-HURRICANE LAMP ... 04 PARAFFIN-PRESSURE LAMP ..... 05 PARAFFIN-WICK LAMP ..... 06 FIREWOOD ..... 07 CANDLES ..... 08 OTHER _____ 96 (SPECIFY)	
107	MAIN MATERIAL OF THE FLOOR RECORD OBSERVATION. MARK ONLY ONE.	**NATURAL FLOOR** EARTH/SAND ..... 11 EARTH AND DUNG ..... 12 **FINISHED FLOOR** PARQUET OR POLISHED WOOD ..... 31 MOSAIC OR TILES ..... 33 BRICKS ..... 34 CEMENT ..... 35 STONES ..... 36 OTHER _____ 96 (SPECIFY)	
108	MAIN MATERIAL OF THE ROOF. RECORD OBSERVATION. MARK ONLY ONE.	**NATURAL ROOFING** THATCHED ..... 11 MUD ..... 12 **FINISHED ROOFING** WOOD/PLANKS ..... 21 IRON SHEETS ..... 22 ASBESTOS ..... 23 TILES ..... 24 TIN ..... 25 CEMENT ..... 26 OTHER _____ 96 (SPECIFY)	
109	MAIN MATERIAL OF THE EXTERIOR WALLS. RECORD OBSERVATION. MARK ONLY ONE.	**NATURAL WALLS** THATCHED/STRAW ..... 11 **RUDIMENTARY WALLS** MUD AND POLES ..... 21 UN-BURNT BRICKS ..... 22 UN-BURNT BRICKS WITH PLASTER 23 BURNT BRICKS WITH MUD ..... 24 **FINISHED WALLS** CEMENT BLOCKS ..... 31 STONE ..... 32 TIMBER ..... 33 BURNT BRICKS WITH CEMENT .... 34 OTHER _____ 96 (SPECIFY)	
110	How many rooms in your household are used for sleeping? (INCLUDING ROOMS OUTSIDE THE MAIN DWELLING)	ROOMS ..... ☐☐	
111	How many sleeping spaces like mats, mattresses, or beds are available in your household?	NUMBER OF SLEEPING SPACES .. ☐☐	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
112	Does any member of your household own or have:	YES NO	
	a) A watch?	WATCH 1 2	
	b) A bicycle?	BICYCLE 1 2	
	c) A motorcycle or motor scooter?	MOTORCYCLE/SCOOTER ... 1 2	
	d) An animal-drawn cart?	ANIMAL-DRAWN CART 1 2	
	e) A car or truck?	CAR/TRUCK 1 2	
	f) A boat with a motor	BOAT WITH MOTOR 1 2	
	g) A boat without a motor	BOAT WITH NO MOTOR 1 2	
	e) A bank account?	BANK ACCOUNT 1 2	
113	How many acres of agricultural land do members of this household own?	ACRES..... [ ][ ][ ][ ].[ ]	
		9995 OR MORE ACRES.....9995.0 DON'T KNOW.....9999.8	
114	How many of the following animals/birds does this household own? IF NONE, ENTER '00'. IF MORE THAN 95, ENTER '95'. IF UNKNOWN, ENTER '98'.		
	a) Local Cattle?	LOCAL CATTLE ..... [ ][ ]	
	b) Exotic/Cross Cattle?	EXOTIC/CROSS CATTLE.... [ ][ ]	
	c) Goats?	GOATS ..... [ ][ ]	
	d) Sheep?	SHEEP ..... [ ][ ]	
	e) Pigs?	PIGS ..... [ ][ ]	
	f) Chickens?	CHICKENS ..... [ ][ ]	
115	How far is it to the nearest market place? WRITE '00' IF LESS THAN ONE KILOMETRE IF MORE THAN 95 KM, WRITE 95 CIRCLE '98' IF DON'T KNOW	KILOMETRES ..... [ ][ ] DON'T KNOW 98	
116	Now I would like to ask you about the food your household eats. How many meals does your household usually have per day?	MEALS ..... [ ]	
117	In the past week, on how many days did the household eat meat?	DAYS ..... [ ]	
118	How often in the last year did you have problems in satisfying the food needs of the household?	NEVER ..... 1 SELDOM ..... 2 SOMETIMES ..... 3 OFTEN..... 4 ALWAYS 5	
119	How far is it to the nearest health facility? WRITE '00' IF LESS THAN ONE KILOMETRE IF MORE THAN 95 KM, WRITE 95 CIRCLE '98' IF DON'T KNOW	KILOMETRES ..... [ ][ ] DON'T KNOW 98	
120	If you were to go to this facility, how would you *most likely* go there?	CAR/MOTORCYCLE ..... 1 PUBLIC TRANSPORT (BUS, TAXI) ... 2 ANIMAL/ANIMAL CART ..... 3 WALKING ..... 4 BICYCLE ..... 5 OTHER _____ 6 (SPECIFY)	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
121	At any time in the past 12 months, has anyone come into your dwelling to spray the interior walls against mosquitoes?	YES . . . . . 1 NO . . . . . 2 DON'T KNOW 8	→ 121D
121A	How many months ago was the dwelling last sprayed? IF LESS THAN ONE MONTH, RECORD '00' MONTHS AGO.	MONTHS AGO	
121B	Who sprayed the dwelling?	GOVERNMENT WORKER/PROGRAM 1 PRIVATE COMPANY . . . . . 2 NGO . . . . . 3 OTHER _____ 6 (SPECIFY) (SPECIFY) DON'T KNOW 8	
121C	Did you pay for your dwelling to be sprayed?	YES . . . . . 1 NO . . . . . 2 DON'T KNOW 8	
121D	Is there a community worker or community medicine distributor (CMD) who distributes malaria medicines in your village or community?	YES 1 NO 2 DON'T KNOW 8	→ 122
121E	Does the community health worker currently have malaria medicines available?	YES . . . . . 1 NO . . . . . 2 DON'T KNOW 8	
122	Does your household have any mosquito nets that can be used while sleeping?	YES . . . . . 1 NO 2	→ 201
123	How many mosquito nets does your household have?	NUMBER OF NETS	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES			SKIP
		NET # 1	NET # 2	NET # 3	
124	May I have a look at (all) the net(s) to establish the brand?	OBSERVED . . . 1 NOT OBSERVED 2	OBSERVED . . . 1 NOT OBSERVED 2	OBSERVED . . . 1 NOT OBSERVED 2	
125	How many months ago did your household obtain the mosquito net? IF LESS THAN ONE MONTH, WRITE '00'.	MONTHS AGO [ ][ ] MORE THAN 36 MONTHS AGO. . . 95 NOT SURE 98	MONTHS AGO [ ][ ] MORE THAN 36 MONTHS AGO. . . 95 NOT SURE 98	MONTHS AGO [ ][ ] MORE THAN 36 MONTHS AGO. . . 95 NOT SURE 98	
126	Where did you get the mosquito net from?	PUBLIC SECTOR GOV'T HOSPITAL . . 01 GOV'T HEALTH CENTER . . . . 02 PRIVATE MEDICAL SECTO PRIVATE HOSPITAL/ CLINIC . . . . 03 PHARMACY . . . . . 04 OTHER SOURCE SHOP . . . . 05 OPEN MARKET . . . 06 HAWKER . . . . 07 PROJECT/NGO . . . 08 CAMPAIGN . . . . . 09 CHURCH . . . . 10 OTHER ________ 96 DOES NOT KNOW 98	PUBLIC SECTOR GOV'T HOSPITAL . . 01 GOV'T HEALTH CENTER . . . . 02 PRIVATE MEDICAL SECTOR PRIVATE HOSPITAL/ CLINIC . . . . 03 PHARMACY . . . . . 04 OTHER SOURCE SHOP . . . . 05 OPEN MARKET . . . 06 HAWKER . . . . 07 PROJECT/NGO . . . 08 CAMPAIGN . . . . . 09 CHURCH . . . . 10 OTHER ________ 96 DOES NOT KNOW 98	PUBLIC SECTOR GOV'T HOSPITAL . . 01 GOV'T HEALTH CENTER . . . . 02 PRIVATE MEDICAL SECTOR PRIVATE HOSPITAL/ CLINIC . . . . 03 PHARMACY . . . . . 04 OTHER SOURCE SHOP . . . . 05 OPEN MARKET . . . 06 HAWKER . . . . 07 PROJECT/NGO . . . 08 CAMPAIGN . . . . . 09 CHURCH . . . . 10 OTHER ________ 96 DOES NOT KNOW 98	
127	OBSERVE OR ASK THE BRAND OR TYPE OF MOSQUITO NET.	'LONGLASTING' NET PERMANET . . . . . 11 DURANET . . . . . 12 INTERCEPTOR. . . . 13 NETPROTECT. . . . . 14 OLYSET. . . . . 15 DAWANET. . . . . . . 16 ICONLIFE. . . . . 17 (SKIP TO 131) FACTORY NET WITH INSECTICIDE KIT KO NET . . . . 21 KOOPER NET . . . 22 ICONET . . . . 23 SAFI NET . . . . 24 FACTORY NET WITH NO INSECTICIDE B52 . . . . 31 BAMBOO HUT . . . 32 CENTURY . . . . . 33 LUCKY NET . . . . . 34 VICTORIA . . . . . 35 HOMEMADE NET . . 41 OTHER ________ 96 (SPECIFY) DK BRAND 98	'LONGLASTING' NET PERMANET . . . . . 11 DURANET . . . . . 12 INTERCEPTOR. . . . 13 NETPROTECT. . . . . 14 OLYSET. . . . . 15 DAWANET. . . . . . . 16 ICONLIFE. . . . . 17 (SKIP TO 131) FACTORY NET WITH INSECTICIDE KIT KO NET . . . . 21 KOOPER NET . . . 22 ICONET . . . . 23 SAFI NET . . . . 24 FACTORY NET WITH NO INSECTICIDE B52 . . . . 31 BAMBOO HUT . . . 32 CENTURY . . . . . 33 LUCKY NET . . . . . 34 VICTORIA . . . . . 35 HOMEMADE NET . . 41 OTHER ________ 96 (SPECIFY) DK BRAND 98	'LONGLASTING' NET PERMANET . . . . . 11 DURANET . . . . . 12 INTERCEPTOR. . . . 13 NETPROTECT. . . . . 14 OLYSET. . . . . 15 DAWANET. . . . . . . 16 ICONLIFE. . . . . 17 (SKIP TO 131) FACTORY NET WITH INSECTICIDE KIT KO NET . . . . 21 KOOPER NET . . . 22 ICONET . . . . 23 SAFI NET . . . . 24 FACTORY NET WITH NO INSECTICIDE B52 . . . . 31 BAMBOO HUT . . . 32 CENTURY . . . . . 33 LUCKY NET . . . . . 34 VICTORIA . . . . . 35 HOMEMADE NET . . 41 OTHER ________ 96 (SPECIFY) DK BRAND 98	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES			SKIP
129	Since you got the mosquito net, was it ever soaked or dipped in a liquid to repel mosquitoes or bugs?	YES . . . . 1 NO . . . . 2 (SKIP TO 131) NOT SURE 8	YES . . . . 1 NO . . . . 2 (SKIP TO 131) NOT SURE 8	YES . . . . 1 NO . . . . 2 (SKIP TO 131) NOT SURE 8	
130	How many months ago was the net last soaked or dipped? IF LESS THAN 1 MONTH, RECORD '00'.	MONTHS AGO . . . [ ][ ] 25 OR MORE MONTHS AGO . . . 95 NOT SURE 98	MONTHS AGO . . . [ ][ ] 25 OR MORE MONTHS AGO . . . 95 NOT SURE 98	MONTHS AGO . . . [ ][ ] 25 OR MORE MONTHS AGO . . . 95 NOT SURE 98	
131	Did anyone sleep under this mosquito net last night?	YES . . . . 1 (SKIP TO 132) NO . . . . 2 NOT SURE . . . . . 8 (SKIP TO 133)	YES . . . . 1 (SKIP TO 132) NO . . . . 2 NOT SURE . . . . . 8 (SKIP TO 133)	YES . . . . 1 (SKIP TO 132) NO . . . . 2 NOT SURE . . . . . 8 (SKIP TO 133)	
131A	What are some of the reasons why this net was not used?	TOO HOT . . . . A DON'T LIKE SMELL B NO MOSQUITOES C NET TOO OLD/TOO MANY HOLES . . D NET NOT HANG . . . . E OTHER___________ X (SPECIFY) DON'T KNOW . . . . Z (ALL SKIP TO 133)	TOO HOT . . . . A DON'T LIKE SMELL B NO MOSQUITOES C NET TOO OLD/TOO MANY HOLES . . D NET NOT HANG . . . . E OTHER___________ X (SPECIFY) DON'T KNOW . . . . Z (ALL SKIP TO 133)	TOO HOT . . . . A DON'T LIKE SMELL B NO MOSQUITOES C NET TOO OLD/TOO MANY HOLES . . D NET NOT HANG . . . . E OTHER___________ X (SPECIFY) DON'T KNOW . . . . Z (ALL SKIP TO 133)	
132	Who slept under this mosquito net last night? RECORD THE PERSON'S NAME AND LINE NUMBER FROM THE HOUSEHOLD SCHEDULE	NAME ________ LINE NUMBER [ ][ ] NAME ________ LINE NUMBER [ ][ ] NAME ________ LINE NUMBER [ ][ ] NAME ________ LINE NUMBER [ ][ ] NAME ________ LINE NUMBER [ ][ ]	NAME ________ LINE NUMBER [ ][ ] NAME ________ LINE NUMBER [ ][ ] NAME ________ LINE NUMBER [ ][ ] NAME ________ LINE NUMBER [ ][ ] NAME ________ LINE NUMBER [ ][ ]	NAME ________ LINE NUMBER [ ][ ] NAME ________ LINE NUMBER [ ][ ] NAME ________ LINE NUMBER [ ][ ] NAME ________ LINE NUMBER [ ][ ] NAME ________ LINE NUMBER [ ][ ]	
133		GO BACK TO 124 FOR NEXT NET; OR, IF NO MORE NETS, GO TO 201.	GO BACK TO 124 FOR NEXT NET; OR, IF NO MORE NETS, GO TO 201.	GO BACK TO 124 FOR NEXT NET; OR, IF NO MORE NETS, GO TO 201.	

NO.	QUESTIONS AND FILTERS	NET # 4	NET # 5	NET # 6	SKIP
124	May I have a look at (all) the net(s) to establish the brand?	OBSERVED ... 1 NOT OBSERVED 2	OBSERVED ... 1 NOT OBSERVED 2	OBSERVED ... 1 NOT OBSERVED 2	
125	How many months ago did your household obtain the mosquito net? IF LESS THAN ONE MONTH, WRITE '00'.	MONTHS AGO [ ][ ] MORE THAN 36 MONTHS AGO... 95 NOT SURE 98	MONTHS AGO [ ][ ] MORE THAN 36 MONTHS AGO... 95 NOT SURE 98	MONTHS AGO [ ][ ] MORE THAN 36 MONTHS AGO... 95 NOT SURE 98	
126	Where did you get the mosquito net from?	PUBLIC SECTOR GOV'T HOSPITAL .. 01 GOV'T HEALTH CENTER .... 02 PRIVATE MEDICAL SECTOR PRIVATE HOSPITAL/ CLINIC......... 03 PHARMACY ..... 04 OTHER SOURCE SHOP .... 05 OPEN MARKET ... 06 HAWKER .... 07 PROJECT/NGO ... 08 CAMPAIGN ..... 09 CHURCH .... 10 OTHER ______ 96 DOES NOT KNOW 98	PUBLIC SECTOR GOV'T HOSPITAL .. 01 GOV'T HEALTH CENTER .... 02 PRIVATE MEDICAL SECTOR PRIVATE HOSPITAL/ CLINIC......... 03 PHARMACY ..... 04 OTHER SOURCE SHOP .... 05 OPEN MARKET ... 06 HAWKER .... 07 PROJECT/NGO ... 08 CAMPAIGN ..... 09 CHURCH .... 10 OTHER ______ 96 DOES NOT KNOW 98	PUBLIC SECTOR GOV'T HOSPITAL .. 01 GOV'T HEALTH CENTER .... 02 PRIVATE MEDICAL SECTOR PRIVATE HOSPITAL/ CLINIC......... 03 PHARMACY ..... 04 OTHER SOURCE SHOP .... 05 OPEN MARKET ... 06 HAWKER .... 07 PROJECT/NGO ... 08 CAMPAIGN ..... 09 CHURCH .... 10 OTHER ______ 96 DOES NOT KNOW 98	
127	OBSERVE OR ASK THE BRAND OR TYPE OF MOSQUITO NET.	'LONGLASTING' NET PERMANET ..... 11 DURANET ..... 12 INTERCEPTOR.... 13 NETPROTECT..... 14 OLYSET......... 15 DAWANET....... 16 ICONLIFE........ 17 (SKIP TO 131) FACTORY NET WITH INSECTICIDE KIT KO NET .... 21 KOOPER NET ... 22 ICONET .... 23 SAFI NET....... 24 FACTORY NET WITH NO INSECTICIDE B52 .... 31 BAMBOO HUT ... 32 CENTURY ..... 33 LUCKY NET..... 34 VICTORIA ..... 35 HOMEMADE NET .. 41 OTHER ______ 96 (SPECIFY) DK BRAND 98	'LONGLASTING' NET PERMANET ..... 11 DURANET ..... 12 INTERCEPTOR.... 13 NETPROTECT..... 14 OLYSET......... 15 DAWANET....... 16 ICONLIFE........ 17 (SKIP TO 131) FACTORY NET WITH INSECTICIDE KIT KO NET .... 21 KOOPER NET ... 22 ICONET .... 23 SAFI NET....... 24 FACTORY NET WITH NO INSECTICIDE B52 .... 31 BAMBOO HUT ... 32 CENTURY ..... 33 LUCKY NET..... 34 VICTORIA ..... 35 HOMEMADE NET .. 41 OTHER ______ 96 (SPECIFY) DK BRAND 98	'LONGLASTING' NET PERMANET ..... 11 DURANET ..... 12 INTERCEPTOR.... 13 NETPROTECT..... 14 OLYSET......... 15 DAWANET....... 16 ICONLIFE........ 17 (SKIP TO 131) FACTORY NET WITH INSECTICIDE KIT KO NET .... 21 KOOPER NET ... 22 ICONET .... 23 SAFI NET....... 24 FACTORY NET WITH NO INSECTICIDE B52 .... 31 BAMBOO HUT ... 32 CENTURY ..... 33 LUCKY NET..... 34 VICTORIA ..... 35 HOMEMADE NET .. 41 OTHER ______ 96 (SPECIFY) DK BRAND 98	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES			SKIP
129	Since you got the mosquito net, was it ever soaked or dipped in a liquid to repel mosquitoes or bugs?	YES . . . . . 1 NO . . . . . 2 (SKIP TO 131) ← NOT SURE 8	YES . . . . . 1 NO . . . . . 2 (SKIP TO 131) ← NOT SURE 8	YES . . . . . 1 NO . . . . . 2 (SKIP TO 131) ← NOT SURE 8	
130	How many months ago was the net last soaked or dipped? IF LESS THAN 1 MONTH, RECORD '00'.	MONTHS AGO . . . ☐☐ 25 OR MORE MONTHS AGO . . . 95 NOT SURE 98	MONTHS AGO . . . ☐☐ 25 OR MORE MONTHS AGO . . . 95 NOT SURE 98	MONTHS AGO . . . ☐☐ 25 OR MORE MONTHS AGO . . . 95 NOT SURE 98	
131	Did anyone sleep under this mosquito net last night?	YES . . . . . 1 (SKIP TO 132) ↵ NO . . . . . 2 NOT SURE . . . . . 8 (SKIP TO 133) ↵	YES . . . . . 1 (SKIP TO 132) ↵ NO . . . . . 2 NOT SURE . . . . . 8 (SKIP TO 133) ↵	YES . . . . . 1 (SKIP TO 132) ↵ NO . . . . . 2 NOT SURE . . . . . 8 (SKIP TO 133) ↵	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES			SKIP
		NET # 4	NET # 5	NET # 6	
131A	What are some of the reasons why this net was not used?	TOO HOT .... A DON'T LIKE SMELL B NO MOSQUITOES C NET TOO OLD/TOO MANY HOLES .. D NET NOT HANG .... E OTHER__________ X (SPECIFY) DON'T KNOW ..... Z (ALL SKIP TO 133)	TOO HOT .... A DON'T LIKE SMELL B NO MOSQUITOES C NET TOO OLD/TOO MANY HOLES .. D NET NOT HANG .... E OTHER__________ X (SPECIFY) DON'T KNOW ..... Z (ALL SKIP TO 133)	TOO HOT .... A DON'T LIKE SMELL B NO MOSQUITOES C NET TOO OLD/TOO MANY HOLES .. D NET NOT HANG .... E OTHER__________ X (SPECIFY) DON'T KNOW ..... Z (ALL SKIP TO 133)	
132	Who slept under this mosquito net last night? RECORD THE PERSON'S NAME AND LINE NUMBER FROM THE HOUSEHOLD SCHEDULE	NAME ________ LINE NUMBER [ ][ ] NAME ________ LINE NUMBER [ ][ ] NAME ________ LINE NUMBER [ ][ ] NAME ________ LINE NUMBER [ ][ ] NAME ________ LINE NUMBER [ ][ ]	NAME ________ LINE NUMBER [ ][ ] NAME ________ LINE NUMBER [ ][ ] NAME ________ LINE NUMBER [ ][ ] NAME ________ LINE NUMBER [ ][ ] NAME ________ LINE NUMBER [ ][ ]	NAME ________ LINE NUMBER [ ][ ] NAME ________ LINE NUMBER [ ][ ] NAME ________ LINE NUMBER [ ][ ] NAME ________ LINE NUMBER [ ][ ] NAME ________ LINE NUMBER [ ][ ]	
133		GO BACK TO 124 FOR NEXT NET; OR, IF NO MORE NETS, GO TO 201.	GO BACK TO 124 FOR NEXT NET; OR, IF NO MORE NETS, GO TO 201.	GO TO 124 IN FIRST COLUMN OF A NEW QUESTIONNAIRE; OR, IF NO MORE NETS, GO TO 201.	

SECTION 4: ANEMIA AND MALARIA TESTING FOR CHILDREN AGE 0-4 (0-59 MONTHS)

201	CHECK COLUMN 9. WRITE THE LINE NUMBER AND NAME FOR ALL CHILDREN 0-4 YEARS IN Q. 202 IN ORDER BY LINE NUMBER. IF MORE THAN 6 CHILDREN, USE ADDITIONAL QUESTIONNAIRES. **BE SURE TO FILL Qs. 209 AND 211.**			
		CHILD 1	**CHILD 2**	**CHILD 3**
202	LINE NUMBER FROM COLUMN 9 NAME FROM COLUMN 2	LINE NUMBER ... ☐☐ NAME _____	LINE NUMBER ... ☐☐ NAME _____	LINE NUMBER ... ☐☐ NAME _____
203	IF MOTHER INTERVIEWED, COPY CHILD'S MONTH AND YEAR FROM BIRTH HISTORY AND ASK DAY; IF MOTHER NOT INTERVIEWED, ASK: What is (NAME'S) birth date?	DAY ..... ☐☐ MONTH ..... ☐☐ YEAR ☐☐☐☐	DAY ..... ☐☐ MONTH ..... ☐☐ YEAR ☐☐☐☐	DAY ..... ☐☐ MONTH ..... ☐☐ YEAR ☐☐☐☐
204	CHECK 203: CHILD BORN IN OCTOBER 2004 OR LATER?	YES ..... 1 NO ..... 2 (GO TO 203 FOR NEXT CHILD OR, IF NO MORE, GO TO 215)	YES ..... 1 NO ..... 2 (GO TO 203 FOR NEXT CHILD OR, IF NO MORE, GO TO 215)	YES ..... 1 NO ..... 2 (GO TO 203 FOR NEXT CHILD OR, IF NO MORE, GO TO 215)
206	LINE NUMBER OF PARENT OR ADULT RESPONSIBLE FOR CHILD. RECORD '00' IF NOT LISTED.	LINE NUMBER ... ☐☐	LINE NUMBER ... ☐☐	LINE NUMBER ... ☐☐
207	READ ANEMIA CONSENT STATEMENT TO PARENT OR OTHER ADULT RESPONSIBLE FOR CHILD. CIRCLE CODE AND SIGN.	GRANTED 1 (SIGN) _____ REFUSED 2	GRANTED 1 (SIGN) _____ REFUSED 2	GRANTED 1 (SIGN) _____ REFUSED 2
208	READ MALARIA CONSENT STATEMENT TO PARENT OR OTHER ADULT RESPONSIBLE FOR CHILD. CIRCLE CODE AND SIGN.	GRANTED 1 (SIGN) _____ REFUSED 2	GRANTED 1 (SIGN) _____ REFUSED 2	GRANTED 1 (SIGN) _____ REFUSED 2
	CONDUCT TESTS FOR WHICH CONSENT IS GRANTED AND CONTINUE TO 209			
209	RECORD RESULT CODE OF ANEMIA TEST.	TESTED ..... 1 NOT PRESENT ..... 2 REFUSED ..... 3 OTHER ..... 6 (SKIP TO 211)	TESTED ..... 1 NOT PRESENT ..... 2 REFUSED ..... 3 OTHER ..... 6 (SKIP TO 211)	TESTED ..... 1 NOT PRESENT ..... 2 REFUSED ..... 3 OTHER ..... 6 (SKIP TO 211)
210	RECORD HEMOGLOBIN LEVEL HERE AND IN THE ANEMIA PAMPHLET.	G/DL ☐☐.☐	G/DL ☐☐.☐	G/DL ☐☐.☐
211	RECORD RESULT CODE OF MALARIA TEST	TESTED ..... 1 NOT PRESENT ..... 2 REFUSED ..... 3 OTHER ..... 6 (SKIP TO 215)	TESTED ..... 1 NOT PRESENT ..... 2 REFUSED ..... 3 OTHER ..... 6 (SKIP TO 215)	TESTED ..... 1 NOT PRESENT ..... 2 REFUSED ..... 3 OTHER ..... 6 (SKIP TO 215)
212	BAR CODE LABEL PASTE BAR CODE HERE AND ON SLIDE AND ON TRANSMITTAL FORM.			
213	RESULT OF MALARIA TEST	POSITIVE ..... 1 NEGATIVE ..... 2 (SKIP TO 215) OTHER 6	POSITIVE ..... 1 NEGATIVE ..... 2 (SKIP TO 215) OTHER 6	POSITIVE ..... 1 NEGATIVE ..... 2 (SKIP TO 215) OTHER 6
214	READ INFORMATION FOR MALARIA TREATMENT AND CONSENT STATEMENT TO PARENT OR OTHER ADULT RESPONSIBLE FOR THE CHILD. ASK ABOUT ANY TREATMENT THE CHILD HAS ALREADY RECEIVED.	ACCEPTED MEDICINE 1 (SIGN) _____ REFUSED ..... 2 ALREADY HAS ACT . 3 NOT ELIGIBLE ..... 4 OTHER 6	ACCEPTED MEDICINE 1 (SIGN) _____ REFUSED ..... 2 ALREADY HAS ACT . 3 NOT ELIGIBLE ..... 4 OTHER 6	ACCEPTED MEDICINE 1 (SIGN) _____ REFUSED ..... 2 ALREADY HAS ACT . 3 NOT ELIGIBLE ..... 4 OTHER 6
215		GO BACK TO 203 IN NEXT COLUMN IN THIS QUESTIONNAIRE OR IN THE FIRST COLUMN OF THE ADDITIONAL QUESTIONNAIRE(S); IF NO MORE CHILDREN, END INTERVIEW.		

		CHILD 4	CHILD 5	CHILD 6
202	LINE NUMBER FROM COLUMN 10 NAME FROM COLUMN 2	LINE NUMBER ... NAME _____	LINE NUMBER ... NAME _____	LINE NUMBER ... NAME _____
203	IF MOTHER INTERVIEWED, COPY CHILD'S MONTH AND YEAR FROM BIRTH HISTORY AND ASK DAY; IF MOTHER NOT INTERVIEWED, ASK: What is (NAME'S) birth date?	DAY ..... MONTH ..... YEAR	DAY ..... MONTH ..... YEAR	DAY ..... MONTH ..... YEAR
204	CHECK 203: CHILD BORN IN JANUARY 2004 OR LATER?	YES ..... 1 NO ..... 2 (GO TO 203 FOR NEXT CHILD OR, IF NO MORE, GO TO 215)	YES ..... 1 NO ..... 2 (GO TO 203 FOR NEXT CHILD OR, IF NO MORE, GO TO 215)	YES ..... 1 NO ..... 2 (GO TO 203 FOR NEXT CHILD OR, IF NO MORE, GO TO 215)
206	LINE NUMBER OF PARENT OR ADULT RESPONSIBLE FOR CHILD. RECORD '00' IF NOT LISTED.	LINE NUMBER ...	LINE NUMBER ...	LINE NUMBER ...
207	READ ANEMIA CONSENT STATEMENT TO PARENT OR OTHER ADULT RESPONSIBLE FOR CHILD. CIRCLE CODE AND SIGN.	GRANTED 1 (SIGN) REFUSED 2	GRANTED 1 (SIGN) REFUSED 2	GRANTED 1 (SIGN) REFUSED 2
208	READ MALARIA CONSENT STATEMENT TO PARENT OR OTHER ADULT RESPONSIBLE FOR CHILD. CIRCLE CODE AND SIGN.	GRANTED 1 (SIGN) REFUSED 2	GRANTED 1 (SIGN) REFUSED 2	GRANTED 1 (SIGN) REFUSED 2
	CONDUCT TESTS FOR WHICH CONSENT IS GRANTED AND CONTINUE TO 209			
209	RECORD RESULT CODE OF ANEMIA TEST.	TESTED ..... 1 NOT PRESENT ..... 2 REFUSED ..... 3 OTHER ..... 6 (SKIP TO 211)	TESTED ..... 1 NOT PRESENT ..... 2 REFUSED ..... 3 OTHER ..... 6 (SKIP TO 211)	TESTED ..... 1 NOT PRESENT ..... 2 REFUSED ..... 3 OTHER ..... 6 (SKIP TO 211)
210	RECORD HEMOGLOBIN LEVEL HERE AND IN THE ANEMIA PAMPHLET.	G/DL .	G/DL .	G/DL .
211	RECORD RESULT CODE OF MALARIA TEST	TESTED ..... 1 NOT PRESENT ..... 2 REFUSED ..... 3 OTHER ..... 6 (SKIP TO 215)	TESTED ..... 1 NOT PRESENT ..... 2 REFUSED ..... 3 OTHER ..... 6 (SKIP TO 215)	TESTED ..... 1 NOT PRESENT ..... 2 REFUSED ..... 3 OTHER ..... 6 (SKIP TO 215)
212	BAR CODE LABEL PASTE BAR CODE HERE AND ON SLIDE AND ON TRANSMITTAL FORM.			
213	RESULT OF MALARIA TEST	POSITIVE ..... 1 NEGATIVE ..... 2 (SKIP TO 215) OTHER 6	POSITIVE ..... 1 NEGATIVE ..... 2 (SKIP TO 215) OTHER 6	POSITIVE ..... 1 NEGATIVE ..... 2 (SKIP TO 215) OTHER 6
214	READ INFORMATION FOR MALARIA TREATMENT AND CONSENT STATEMENT TO PARENT OR OTHER ADULT RESPONSIBLE FOR THE CHILD. ASK ABOUT ANY TREATMENT THE CHILD HAS ALREADY RECEIVED.	ACCEPTED MEDICINE 1 (SIGN) REFUSED ..... 2 ALREADY HAS ACT . 3 NOT ELIGIBLE ..... 4 OTHER 6	ACCEPTED MEDICINE 1 (SIGN) REFUSED ..... 2 ALREADY HAS ACT . 3 NOT ELIGIBLE ..... 4 OTHER 6	ACCEPTED MEDICINE 1 (SIGN) REFUSED ..... 2 ALREADY HAS ACT . 3 NOT ELIGIBLE ..... 4 OTHER 6
215		GO BACK TO 203 IN NEXT COLUMN IN THIS QUESTIONNAIRE OR IN THE FIRST COLUMN OF THE ADDITIONAL QUESTIONNAIRE(S); IF NO MORE CHILDREN, END INTERVIEW.		

CONSENT STATEMENT FOR ANEMIA TEST

As part of this survey, we are asking that children all over the country take an **anemia** test. Anemia is a serious health problem that usually results from poor nutrition, infection, or disease. This survey will help the government to develop programs to prevent and treat anemia.

We request that all children under 5 years participate in the anemia testing part of this survey and give a few drops of blood from a finger. The equipment used in taking the blood is clean and completely safe. It has never been used before and will be thrown away after each test.

The blood will be tested for anemia immediately and the result will be told to you right away. The result will be kept confidential.

Do you have any questions about the anemia test?

You can say yes to the test or you can say no. It is up to you to decide.
Will you allow [NAME(S) OF CHILD(REN)] to participate in the **anemia** test?

CONSENT STATEMENT FOR MALARIA TEST

As part of this survey, we are asking that children all over the country take a test to see if they have **malaria**. Malaria is a serious illness caused by a parasite transmitted by a mosquito bite. This survey will help the government to develop programs to prevent malaria.

We request that all children under 5 years participate in the malaria testing part of this survey and give a few drops of blood from a finger. The equipment used in taking the blood is clean and completely safe. It has never been used before and will be thrown away after each test. (We will use blood from the same finger prick made for the anemia test).

The blood will be tested for malaria immediately and the result will be told to you right away. The result will be kept confidential.

Do you have any questions about the malaria test?

You can say yes to the test or you can say no. It is up to you to decide.
Will you allow [NAME(S) OF CHILD(REN)] to participate in the **malaria** test?

TREATMENT FOR CHILDREN WITH POSITIVE MALARIA TESTS

IF MALARIA TEST IS POSITIVE: The malaria test shows that your child has malaria. We can give you free medicine.
The medicine is called COARTEM/ACT. COARTEM/ACT is very effective and in a few days it should get rid of the fever and other symptoms.

BEFORE PROVIDING COARTEM/ACT, FIRST ASK IF THE CHILD IS ALREADY TAKING OTHER MEDICINES AND IF SO, ASK TO SEE THEM. IF CHILD IS ALREADY TAKING COARTEM/ACT, CHECK ON THE DOSE ALREADY AVAILABLE. FOLLOW THE NATIONAL TREATMENT GUIDELINE FOR MALARIA. BE CAREFUL NOT TO OVERTREAT.

You do not have to give the child the medicine. This is up to you. Please tell me whether you accept the medicine or not.

TREATMENT WITH COARTEM/ACT	
Weight (in Kg) – Approximate age	Dosage *
5 kgs. to less than 15 kgs. (under 3 years)	1 tablet twice daily for 3 days
15 kgs. to less than 25 kgs. (3 -8 years)	2 tablets twice daily for 3 days

First day starts by taking first dose followed by the second one 8 hours later; on subsequent days the recommendation is simply "morning" and "evening" (usually around 12 hours apart).
Take the medicine (crushed for smaller children) with high fat food or drinks like milk.

Make sure that the FULL 3 days treatment is taken at the recommended times, otherwise the infection may return.
If your child vomits within an hour of taking the medicine, you will need to get get additional tablets and repeat the dose.

ALSO TELL THE PARENT/CARE TAKER:

If [NAME] has any of the following symptoms, you should take him/her to a health professional for treatment immediately:

- -- High fever
- -- Fast or difficult breathing
- -- Not able to drink or breastfeed
- -- Gets sicker or does not get better in 2 days

INTERVIEWER'S OBSERVATIONS

TO BE FILLED IN AFTER COMPLETING INTERVIEW

COMMENTS ABOUT RESPONDENT:

COMMENTS ON SPECIFIC QUESTIONS:

ANY OTHER COMMENTS:

SUPERVISOR'S OBSERVATIONS

NAME OF THE SUPERVISOR: _____ DATE: _____

Questionnaires | 103

Appendix E: MIS Woman's Questionnaire

UGANDA BUREAU OF STATISTICS
UGANDA MALARIA INDICATOR SURVEY 2009
WOMAN'S QUESTIONNAIRE • ENGLISH

SECTION 1A: IDENTIFICATION

1. REGION _____
2. DISTRICT _____
3. COUNTY _____
4. SUBCOUNTY/TOWN _____
5. PARISH/LC2 NAME _____
6. EA NAME _____
7. HOUSEHOLD NUMBER .....
8. NAME AND LINE NUMBER OF WOMAN _____

SECTION 1B: INTERVIEWER VISITS

	1	2	3	FINAL VISIT
DATE				DAY / MONTH / YEAR
INTERVIEWER'S NAME				INT. NUMBER
RESULT*				RESULT
NEXT VISIT: DATE				TOTAL NUMBER OF VISITS
TIME				

*RESULT CODES:
1 COMPLETED 4 REFUSED
2 NOT AT HOME 5 PARTLY COMPLETED 8 OTHER _____ (SPECIFY)
3 POSTPONED 6 INCAPACITATED

LANGUAGE OF THE QUESTIONNAIRE 7
LANGUAGE USED IN THE INTERVIEW .....
NATIVE LANGUAGE OF RESPONDENT .....
TRANSLATOR USED (NOT AT ALL=1; SOMETIMES=2; ALL THE TIME=3) .....

LANGUAGE USED: 1 ATESO-KARAMOJONG 4 LUO 7 ENGLISH
2 LUGANDA 5 RUNYANKOLE-RUKIGA 8 OTHER
3 LUGBARA 6 RUNYORO-RUTORO

SUPERVISOR	FIELD EDITOR	OFFICE EDITOR	KEYED BY
NAME _____	NAME _____		
DATE _____	DATE _____		

INTRODUCTION AND CONSENT

Hello. My name is _____. I am working with the MOH and UBOS. We are conducting a national survey about malaria and would very much appreciate your participation in this survey. This information will help the government to plan health services. These questions will take about 15 minutes to complete. Whatever information you provide will be kept strictly confidential and will not be shared with anyone other than members of our survey team.

Participation in this survey is voluntary, and if we should come to any question you don't want to answer, just let me know and I will go on to the next question; or you can stop the interview at any time. However, we hope you will participate in the survey since your views are important.

At this time, do you want to ask me anything about the survey? May I begin the interview now?

Signature of interviewer: _____ Date: _____

RESPONDENT AGREES TO BE INTERVIEWED . . . 1 RESPONDENT DOES NOT AGREE TO BE INTERVIEWED . . . . 2 → END

SECTION 1 - RESPONDENT'S BACKGROUND

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
101	RECORD THE TIME.	HOUR ..... [ ][ ] MINUTES ..... [ ][ ] MORNING ..... 1 AFTERNOON ..... 2 EVENING/NIGHT 3	
102	In what month and year were you born?	MONTH ..... [ ][ ] DON'T KNOW MONTH ..... 98 YEAR ..... [ ][ ][ ][ ] DON'T KNOW YEAR 9998	
103	How old are you? COMPARE AND CORRECT 102 AND/OR 103 IF INCONSISTENT.	AGE IN COMPLETED YEARS [ ][ ]	
104	Have you ever attended school?	YES ..... 1 NO 2	→ 107
105	What is the highest level of school you attended: primary, 'O' level, 'A' level, or university or tertiary?	PRIMARY ..... 1 'O' LEVEL ..... 2 'A' LEVEL ..... 3 UNIVERSITY/TERTIARY 4	
106	What is the highest (class/year) you completed at that level? IF COMPLETED LESS THAN ONE YEAR AT THAT LEVEL, RECORD '00'.	CLASS/YEAR ..... [ ][ ]	
107	Do you read a newspaper or magazine almost every day, at least once a week, less than once a week or not at all?	ALMOST EVERY DAY ..... 1 AT LEAST ONCE A WEEK ..... 2 LESS THAN ONCE A WEEK ..... 3 NOT AT ALL ..... 4 CANNOT READ 8	
108	Do you listen to the radio almost every day, at least once week, less than once a week or not at all?	ALMOST EVERY DAY ..... 1 AT LEAST ONCE A WEEK ..... 2 LESS THAN ONCE A WEEK ..... 3 NOT AT ALL 4	
109	Do you watch television almost every day, at least once a week, less than once a week or not at all?	ALMOST EVERY DAY ..... 1 AT LEAST ONCE A WEEK ..... 2 LESS THAN ONCE A WEEK ..... 3 NOT AT ALL 4	
110	As you know, some women take up jobs for which they are paid in cash or kind. Others sell things, have a small business or work on the family farm or in the family business. In the last seven days, have you done any of these things or any other work?	YES ..... 1 NO 2	→ 113
111	Although you did not work in the last seven days, do you have any job or business from which you were absent for leave, illness, vacation or any other such reason?	YES ..... 1 NO 2	→ 113

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
112	Have you done any work in the last 12 months?	YES . . . . . 1 NO 2	→ 115
113	Are (were) you paid in cash or kind for this work or are (were) you not paid at all?	CASH ONLY . . . . . 1 CASH AND KIND . . . . . 2 IN-KIND ONLY . . . . . 3 NOT PAID 4	
114	What is your occupation, that is, what kind of work do you mainly do? INTERVIEWER: PROBE TO OBTAIN DETAILED INFORMATION ON THE KIND OF WORK RESPONDENT DOES.	_____ _____ _____ ☐☐☐	→ 116
115	What have you been doing for most of the time over the last 12 months?	GOING TO SCHOOL/STUDYING . . . 01 LOOKING FOR WORK . . . . . 02 RETIRED . . . . . 03 TOO ILL TO WORK . . . . . 04 HANDICAPPED, CANNOT WORK . . . 05 HOUSEWORK/CHILD CARE . . . . . 06 OTHER _____ 96 (SPECIFY)	
116	What is your ethnic group?	BAGANDA. . . . . 01 BANYANKORE. . . . . 02 ITESO. . . . . 03 LUGBARA/MADI. . . . . 04 BASOGA. . . . . 05 LANGI. . . . . 06 BAKIGA. . . . . 07 KARIMOJONG. . . . . 08 ACHOLI. . . . . 09 BAGISU/SABINY. . . . . 10 ALURI/JOPADHOLA. . . . . 11 BANYORO. . . . . 12 BATORO. . . . . 13 OTHER _____ 96 (SPECIFY)	

SECTION 2. REPRODUCTION

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
201	Now I would like to ask about all the births you have had during your life. Have you ever given birth?	YES . . . . . 1 NO 2	→ 206
202	Do you have any sons or daughters to whom you have given birth who are now living with you?	YES . . . . . 1 NO 2	→ 204
203	How many sons live with you? And how many daughters live with you? IF NONE, RECORD '00'.	SONS AT HOME . . . . . [ ][ ] DAUGHTERS AT HOME . . . . . [ ][ ]	
204	Do you have any sons or daughters to whom you have birth who are alive but do not live with you?	YES . . . . . 1 NO 2	→ 206
205	How many sons are alive but do not live with you? And how many daughters are alive but do not live with you? IF NONE, RECORD '00'.	SONS ELSEWHERE . . . . . [ ][ ] DAUGHTERS ELSEWHERE . [ ][ ]	
206	Have you ever given birth to a boy or girl who was born alive but later died? IF NO, PROBE: Any baby who cried or showed signs of life but did not survive?	YES . . . . . 1 NO 2	→ 208
207	How many boys have died? And how many girls have died? IF NONE, RECORD '00'.	BOYS DEAD . . . . . [ ][ ] GIRLS DEAD . . . . . [ ][ ]	
208	SUM ANSWERS TO 203, 205, AND 207, AND ENTER TOTAL. IF NONE, RECORD '00'.	TOTAL . . . . . [ ][ ]	
209	CHECK 208: Just to make sure I have this right: you have had in TOTAL ____births during your life. Is that correct? YES → ; NO → PROBE AND CORRECT 201-208 AS NECESSARY.		
210	Are you pregnant now?	YES . . . . . 1 NO . . . . . 2 UNSURE 8	
211	CHECK 208: ONE OR MORE BIRTHS → ; NO BIRTHS Q.208 IS '00' →		224

212 Now I would like to record the names of all your births, whether still alive or not, starting with the first one you had.
RECORD NAMES OF ALL THE BIRTHS IN 213. RECORD TWINS AND TRIPLETS ON SEPARATE LINES.
(IF THERE ARE MORE THAN 12 BIRTHS, USE AN ADDITIONAL QUESTIONNAIRE, STARTING WITH THE SECOND ROW).

213 What name was given to your (first/next) baby? (NAME)	214 Were any of these births twins?	215 Is (NAME) a boy or a girl?	216 In what month and year was (NAME) born? PROBE: What is his/her birthday?	217 Is (NAME) still alive?	218 IF ALIVE: How old was (NAME) at his/her last birthday? RECORD AGE IN COMPLETED YEARS.	219 IF ALIVE: Is (NAME) living with you?	220 IF ALIVE: RECORD HOUSE-HOLD LINE NUMBER OF CHILD (RECORD '00' IF CHILD NOT LISTED IN HOUSEHOLD)	221 IF DEAD: How old was (NAME) when he/she died? IF '1 YR', PROBE: How many months old was (NAME)? RECORD DAYS IF LESS THAN 1 MONTH; MONTHS IF LESS THAN TWO YEARS; OR YEARS.	222 Were there any other live births between (NAME OF PREVIOUS BIRTH) and (NAME), including any children who died after birth?
01	SING . . 1 MULT . . 2	BOY . . 1 GIRL . . 2	MONTH ☐☐ YEAR ☐☐☐☐	YES . . 1 NO . . . 2 → 221	AGE IN YEARS ☐☐	YES . . . 1 NO 2	LINE NUMBER ☐☐ → (NEXT BIRTH)	DAYS . . . 1 ☐☐ MONTHS . 2 ☐☐ YEARS . . 3 ☐☐	
02	SING . . 1 MULT . . 2	BOY . . 1 GIRL . . 2	MONTH ☐☐ YEAR ☐☐☐☐	YES . . 1 NO . . . 2 → 221	AGE IN YEARS ☐☐	YES . . . 1 NO 2	LINE NUMBER ☐☐ → (GO TO 222)	DAYS . . . 1 ☐☐ MONTHS . 2 ☐☐ YEARS . . 3 ☐☐	YES . . . . 1 ADD BIRTH NO . . . . . 2 NEXT BIRTH
03	SING . . 1 MULT . . 2	BOY . . 1 GIRL . . 2	MONTH ☐☐ YEAR ☐☐☐☐	YES . . 1 NO . . . 2 → 221	AGE IN YEARS ☐☐	YES . . . 1 NO 2	LINE NUMBER ☐☐ → (GO TO 222)	DAYS . . . 1 ☐☐ MONTHS . 2 ☐☐ YEARS . . 3 ☐☐	YES . . . . 1 ADD BIRTH NO . . . . . 2 NEXT BIRTH
04	SING . . 1 MULT . . 2	BOY . . 1 GIRL . . 2	MONTH ☐☐ YEAR ☐☐☐☐	YES . . 1 NO . . . 2 → 221	AGE IN YEARS ☐☐	YES . . . 1 NO 2	LINE NUMBER ☐☐ → (GO TO 222)	DAYS . . . 1 ☐☐ MONTHS . 2 ☐☐ YEARS . . 3 ☐☐	YES . . . . 1 ADD BIRTH NO . . . . . 2 NEXT BIRTH
05	SING . . 1 MULT . . 2	BOY . . 1 GIRL . . 2	MONTH ☐☐ YEAR ☐☐☐☐	YES . . 1 NO . . . 2 → 221	AGE IN YEARS ☐☐	YES . . . 1 NO 2	LINE NUMBER ☐☐ → (GO TO 222)	DAYS . . . 1 ☐☐ MONTHS . 2 ☐☐ YEARS . . 3 ☐☐	YES . . . . 1 ADD BIRTH NO . . . . . 2 NEXT BIRTH
06	SING . . 1 MULT . . 2	BOY . . 1 GIRL . . 2	MONTH ☐☐ YEAR ☐☐☐☐	YES . . 1 NO . . . 2 → 221	AGE IN YEARS ☐☐	YES . . . 1 NO 2	LINE NUMBER ☐☐ → (GO TO 222)	DAYS . . . 1 ☐☐ MONTHS . 2 ☐☐ YEARS . . 3 ☐☐	YES . . . . 1 ADD BIRTH NO . . . . . 2 NEXT BIRTH
07	SING . . 1 MULT . . 2	BOY . . 1 GIRL . . 2	MONTH ☐☐ YEAR ☐☐☐☐	YES . . 1 NO . . . 2 → 221	AGE IN YEARS ☐☐	YES . . . 1 NO 2	LINE NUMBER ☐☐ → (GO TO 222)	DAYS . . . 1 ☐☐ MONTHS . 2 ☐☐ YEARS . . 3 ☐☐	YES . . . . 1 ADD BIRTH NO . . . . . 2 NEXT BIRTH

213 What name was given to your next baby? (NAME)	214 Were any of these births twins?	215 Is (NAME) a boy or a girl?	216 In what month and year was (NAME) born? PROBE: What is his/her birthday?	217 Is (NAME) still alive?	218 IF ALIVE: How old was (NAME) at his/her last birthday? RECORD AGE IN COMPLETED YEARS.	219 IF ALIVE: Is (NAME) living with you?	220 IF ALIVE: RECORD HOUSEHOLD LINE NUMBER OF CHILD (RECORD '00' IF CHILD NOT LISTED IN HOUSEHOLD).	221 IF DEAD: How old was (NAME) when he/she died? IF '1 YR', PROBE: How many months old was (NAME)? RECORD DAYS IF LESS THAN 1 MONTH; MONTHS IF LESS THAN TWO YEARS; OR YEARS.	222 Were there any other live births between (NAME OF PREVIOUS BIRTH) and (NAME), including any children who died after birth?
08	SING . . 1 MULT . . 2	BOY . . 1 GIRL . . 2	MONTH YEAR	YES . . 1 NO . . . 2 → 221	AGE IN YEARS	YES . . . 1 NO 2	LINE NUMBER (GO TO 222)	DAYS . . . 1 MONTHS 2 YEARS . . 3	YES . . . . 1 ADD BIRTH NO . . . . . 2 NEXT BIRTH
09	SING . . 1 MULT . . 2	BOY . . 1 GIRL . . 2	MONTH YEAR	YES . . 1 NO . . . 2 → 221	AGE IN YEARS	YES . . . 1 NO 2	LINE NUMBER (GO TO 222)	DAYS . . . 1 MONTHS 2 YEARS . . 3	YES . . . . 1 ADD BIRTH NO . . . . . 2 NEXT BIRTH
10	SING . . 1 MULT . . 2	BOY . . 1 GIRL . . 2	MONTH YEAR	YES . . 1 NO . . . 2 → 221	AGE IN YEARS	YES . . . 1 NO 2	LINE NUMBER (GO TO 222)	DAYS . . . 1 MONTHS 2 YEARS . . 3	YES . . . . 1 ADD BIRTH NO . . . . . 2 NEXT BIRTH
11	SING . . 1 MULT . . 2	BOY . . 1 GIRL . . 2	MONTH YEAR	YES . . 1 NO . . . 2 → 221	AGE IN YEARS	YES . . . 1 NO 2	LINE NUMBER (GO TO 222)	DAYS . . . 1 MONTHS 2 YEARS . . 3	YES . . . . 1 ADD BIRTH NO . . . . . 2 NEXT BIRTH
12	SING . . 1 MULT . . 2	BOY . . 1 GIRL . . 2	MONTH YEAR	YES . . 1 NO . . . 2 → 221	AGE IN YEARS	YES . . . 1 NO 2	LINE NUMBER (GO TO 222)	DAYS . . . 1 MONTHS 2 YEARS . . 3	YES . . . . 1 ADD BIRTH NO . . . . . 2 NEXT BIRTH

223	Have you had any live births since the birth of (NAME OF LAST BIRTH)? IF YES, RECORD BIRTHS IN TABLE.	YES . . . . . 1 NO 2	

224 COMPARE 208 WITH NUMBER OF BIRTHS IN HISTORY ABOVE AND MARK:

NUMBERS ARE SAME → CHECK:

NUMBERS ARE DIFFERENT → (PROBE AND RECONCILE)

CHECK:
- FOR EACH BIRTH: MONTH AND YEAR OF BIRTH IS RECORDED. ☐
- FOR EACH BIRTH SINCE OCTOBER 2004: MONTH AND YEAR OF BIRTH ARE RECORDED. ☐
- FOR EACH LIVING CHILD: CURRENT AGE IS RECORDED. ☐
- FOR EACH DEAD CHILD: AGE AT DEATH IS RECORDED. ☐
- FOR AGE AT DEATH 12 MONTHS OR 1 YEAR: PROBE TO DETERMINE EXACT NUMBER OF MONTHS. ☐

225 CHECK 216 AND ENTER THE NUMBER OF BIRTHS IN 2004 OR LATER. IF NONE, RECORD '0'. ☐

SECTION 3. ANTENATAL CARE AND CHILDREN'S FEVER TREATMENT

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
301	CHECK 216 AND 225 : ONE OR MORE BIRTHS IN 2004 OR LATER NO BIRTHS/ NO BIRTH IN 2004 OR LATER → 350		
302	CHECK 216 AND ENTER IN 303 THE NAME AND LINE NUMBER OF THE MOST RECENT BIRTH SINCE 2004 EVEN IF THE CHILD IS NO LONGER ALIVE. Now I would like to ask you some questions about your last pregnancy that ended in a live birth.		
303	NAME AND LINE NUMBER FROM 213	NAME OF LAST BIRTH _____ LINE NUMBER	
304	Did you see anyone for antenatal care for this pregnancy? IF YES: Whom did you see? Anyone else? PROBE TO IDENTIFY EACH TYPE OF PERSON AND RECORD ALL MENTIONED	**HEALTH PERSONNEL** DOCTOR ..... A NURSE/MIDWIFE ..... B MEDICAL ASSISTANT/ CLINICAL OFFICER ..... C NURSING AIDE .. D **OTHER PERSON** TRADITIONAL BIRTH ATTENDANT.. E OTHER _____ X (SPECIFY) NO ONE ..... Y	
305	CHECK 304: SAW NO ONE FOR ANTENATAL CARE CODE 'Y' CIRCLED CODE 'A', 'B', 'C', 'D' E' OR 'X' CIRCLED → 307		
306	What was the main reason why you did not see anyone for antenatal care?	CLINIC TOO FAR ..... 1 HAD NO MONEY ..... 2 HAD NO TIME ..... 3 NOT AWARE HAD TO ATTEND ..... 4 DID NOT WANT TO ATTEND ..... 5 OTHER _____ 6 (SPECIFY) DON'T KNOW ..... 8 (ALL SKIP TO 308)	
307	Where did you receive antenatal care for this pregnancy? Anywhere else? RECORD ALL MENTIONED. IF UNABLE TO DETERMINE IF A HEALTH FACILITY IS PUBLIC OR PRIVATE MEDICAL, WRITE THE NAME OF THE PLACE _____ (NAME OF PLACE)	**HOME** YOUR HOME ..... A TBA'S HOME ..... B OTHER HOME ..... C **PUBLIC SECTOR** GOVERNMENT HOSPITAL ..... D GOVERNMENT HEALTH CENTER .. E GOVERNMENT HEALTH POST .... F OTHER PUBLIC _____ G (SPECIFY) **PRIVATE MED. SECTOR** PRIVATE HOSPITAL/CLINIC ..... H OTHER PRIVATE MEDICAL _____ I (SPECIFY) OTHER _____ X (SPECIFY)	
308	During this pregnancy, did you take any drugs to keep you from getting malaria?	YES ..... 1 NO ..... 2 DON'T KNOW ..... 8 → 316	

309	What drugs did you take? RECORD ALL MENTIONED. IF TYPE OF DRUG IS NOT DETERMINED, SHOW HER THE TYPICAL ANTIMALARIAL DRUGS. TREATMENT WITH SP/FANSIDAR USUALLY CONSISTS OF TAKING 3 BIG WHITE TABLETS AT THE HEALTH FACILITY.	SP/FANSIDAR ..... A CHLOROQUINE ..... B OTHER _____ X (SPECIFY) DON'T KNOW ..... Z	
310	CHECK 309: SP/FANSIDAR TAKEN FOR MALARIA PREVENTION? CODE 'A' CIRCLED CODE 'A' NOT CIRCLED → 316		
311	How many times did you take SP/FANSIDAR during this pregnancy?	NUMBER OF TIMES	
312	CHECK 311: NUMBER OF TIMES SP/FANSIDAR TAKEN DURING THIS PREGNANCY. ONE TIME TWO OR MORE TIMES → 315		
313	Can you tell me why you took or received SP/FANSIDAR only one time?	NOT OFFERED AT CLINIC, UNKNOWN REASON ..... 1 TOO LATE IN PREGNANCY ..... 2 REACTED TO FIRST DOSE ..... 3 DID NOT WANT TO TAKE ..... 4 OTHER _____ 6 (SPECIFY) DON'T KNOW 8	
314	CHECK 304: ANTENATAL CARE FROM HEALTH PERSONNEL DURING PREGNANCY. CODE 'A', 'B', 'C', 'D', E' OR 'X' CIRCLED OTHER → 316		
315	Did you get the SP/FANSIDAR during any antenatal care visit, during another visit to a health facility or from another source?	ANTENATAL CARE VISIT ..... 1 ANOTHER FACILITY VISIT ..... 2 OTHER SOURCE 6	
316	CHECK 216 AND 225: ONE OR MORE BIRTHS IN 2004 OR LATER NO BIRTHS/ NO BIRTH IN 2004 OR LATER → 350		
317	CHECK 216 AND ENTER IN THE TABLE THE LINE NUMBER, NAME, AND SURVIVAL STATUS OF EACH BIRTH IN 2004 OR LATER. ASK QUESTIONS ABOUT THE BIRTHS AS APPROPRIATE. BEGIN WITH THE LAST BIRTH. IF THERE ARE MORE THAN 3 BIRTHS, USE LAST 2 COLUMNS OF ADDITIONAL QUESTIONNAIRES. Now I would like to ask you some questions about the health of all your children born in the last five years. We will talk about each separately.		

NO.	QUESTIONS AND FILTERS	LAST BIRTH	NEXT-TO-LAST BIRTH	SECOND-FROM-LAST BIRTH
317A	LINE NUMBER FROM 213	LAST BIRTH LINE NO. ☐☐	NEXT-TO-LAST BIRTH LINE NO. ☐☐	SECOND-FROM-LAST BIRTH LINE NO. ☐☐
317B	FROM 213 AND 217	NAME ______________ LIVING ☐ DEAD ☐	NAME ______________ LIVING ☐ DEAD ☐	NAME ______________ LIVING ☐ DEAD ☐
317C	Did you ever breastfeed (NAME)?	YES . . . . 1 NO . . . . 2 (SKIP TO 317G)	YES . . . . 1 NO . . . . 2 (SKIP TO 317G)	YES . . . . 1 NO . . . . 2 (SKIP TO 317G)
317D	CHECK 317B: IS CHILD LIVING?	LIVING ☐ DEAD ☐ (SKIP TO 317F)		
317E	Are you still breastfeeding (NAME)?	YES . . . . 1 (SKIP TO 318) NO 2		
317F	For how many months did you breastfeed (NAME)?	MONTHS . . . . . ☐☐ DON'T KNOW . . . 98	MONTHS . . . . ☐☐ STILL BF . . . . 95 DON'T KNOW . . . 98	MONTHS . . . . . ☐☐ STILL BF . . . . 95 DON'T KNOW . . . 98
317G	CHECK 317B: IS CHILD LIVING?	LIVING ☐ DEAD ☐ (SKIP TO 349)	LIVING ☐ DEAD ☐ (SKIP TO 349)	LIVING ☐ DEAD ☐ (SKIP TO 349)
318	Has (NAME) been ill with a fever at any time in the last 2 weeks?	YES . . . . 1 NO . . . . 2 (SKIP TO 349) DON'T KNOW 8	YES . . . . 1 NO . . . . 2 (SKIP TO 349) DON'T KNOW 8	YES . . . . 1 NO . . . . 2 (SKIP TO 349) DON'T KNOW 8
NO.	QUESTIONS AND FILTERS	LAST BIRTH NAME______________	NEXT-TO-LAST BIRTH NAME______________	SECOND-FROM-LAST BIRTH NAME______________
319	Now I would like to know how much (NAME) was given to drink (including breast milk) during the illness with a fever. Was he/she given less than usual to drink, about the same amount, or more than usual to drink? IF LESS, PROBE: Was he/she given much less than usual to drink or somewhat less?	MUCH LESS . . . . . 1 SOMEWHAT LESS 2 ABOUT THE SAME 3 MORE . . . . 4 NOTHING TO DRINK 5 DON'T KNOW 8	MUCH LESS . . . . . 1 SOMEWHAT LESS . 2 ABOUT THE SAME . 3 MORE . . . . 4 NOTHING TO DRINK 5 DON'T KNOW 8	MUCH LESS . . . . . 1 SOMEWHAT LESS . 2 ABOUT THE SAME . 3 MORE . . . . 4 NOTHING TO DRINK 5 DON'T KNOW 8
320	When (NAME) had a fever, was he/she given less than usual to eat, about the same amount, more than usual or nothing to eat? IF LESS, PROBE: Was he/she given much less than usual to eat or somewhat less?	MUCH LESS . . . . . 1 SOMEWHAT LESS . 2 ABOUT THE SAME . 3 MORE . . . . 4 STOPPED FOOD . 5 NEVER GAVE FOOD 6 DON'T KNOW 8	MUCH LESS . . . . . 1 SOMEWHAT LESS . 2 ABOUT THE SAME . 3 MORE . . . . 4 STOPPED FOOD . 5 NEVER GAVE FOOD 6 DON'T KNOW 8	MUCH LESS . . . . . 1 SOMEWHAT LESS . 2 ABOUT THE SAME . 3 MORE . . . . 4 STOPPED FOOD . 5 NEVER GAVE FOOD 6 DON'T KNOW 8
321	Did you seek advice or treatment for the illness from any source?	YES . . . . 1 (SKIP TO 322) NO 2	YES . . . . 1 (SKIP TO 322) NO 2	YES . . . . 1 (SKIP TO 322) NO 2
321A	Why have you not sought advice or treatment from any source?	CHILD JUST FELL ILL . . A CHILD NOT VERY ILL . . B CLINIC TOO FAR . . . . C HAVE NO MONEY . . . D WAITING FOR CHILD'S FATHER . . . . E DON'T KNOW WHAT TO DO . . . . F ALREADY HAD MEDICINE AT HOME G OTHER ______________ X (SPECIFY) SKIP TO 326	CHILD JUST FELL ILL . . A CHILD NOT VERY ILL . . B CLINIC TOO FAR . . . . C HAVE NO MONEY . . . D WAITING FOR CHILD'S FATHER . . . . E DON'T KNOW WHAT TO DO . . . . F ALREADY HAD MEDICINE AT HOME G OTHER ______________ X (SPECIFY) SKIP TO 326	CHILD JUST FELL ILL . . A CHILD NOT VERY ILL . . B CLINIC TOO FAR . . . . C HAVE NO MONEY . . . D WAITING FOR CHILD'S FATHER . . . . E DON'T KNOW WHAT TO DO . . . . F ALREADY HAD MEDICINE AT HOME G OTHER ______________ X (SPECIFY) SKIP TO 326

NO.	QUESTIONS AND FILTERS	LAST BIRTH NAME_____________	NEXT-TO-LAST BIRTH NAME_____________	SECOND-FROM-LAST BIRTH NAME_____________
322	Where did you seek advice or treatment? Anywhere else? RECORD ALL MENTIONED. IF UNABLE TO DETERMINE IF A HEALTH FACILITY IS PUBLIC OR PRIVATE MEDICAL, WRITE THE THE NAME OF THE PLACE. _______________ (NAME OF PLACE(S))	**PUBLIC SECTOR** GOVT HOSPITAL . . A GOVT. HEALTH CENTER . . . . . . B GOVT. HEALTH POST . . . . C CLINIC/OUTREACH SERVICES . . . D COMMUNITY HEALTH WORKER/CMD E OTHER PUBLIC _______________ F (SPECIFY) **PRIVATE MEDICAL SECTOR** PVT. HOSPITAL/ CLINIC . . . . G PHARMACY/ DRUG SHOP . H PVT DOCTOR . . . I CLINIC/OUTREACH SERVICES . . . J COMMUNITY HEALTH WORKER/CMD K OTHER PRIVATE MED. _______________ L (SPECIFY) **OTHER SOURCE** SHOP . . . . M TRADITIONAL PRACTITIONER N OTHER _______________ X (SPECIFY)	**PUBLIC SECTOR** GOVT HOSPITAL . . A GOVT. HEALTH CENTER . . . . . . B GOVT. HEALTH POST . . . . C CLINIC/OUTREACH SERVICES . . . D COMMUNITY HEALTH WORKER/CMD E OTHER PUBLIC _______________ F (SPECIFY) **PRIVATE MEDICAL SECTOR** PVT. HOSPITAL/ CLINIC . . . . G PHARMACY/ DRUG SHOP . H PVT DOCTOR . . . I CLINIC/OUTREACH SERVICES . . . J COMMUNITY HEALTH WORKER/CMD K OTHER PRIVATE MED. _______________ L (SPECIFY) **OTHER SOURCE** SHOP . . . . M TRADITIONAL PRACTITIONER N OTHER _______________ X (SPECIFY)	**PUBLIC SECTOR** GOVT HOSPITAL . . A GOVT. HEALTH CENTER . . . . . B GOVT. HEALTH POST . . . . C CLINIC/OUTREACH SERVICES . . . D COMMUNITY HEALTH WORKER/CMD E OTHER PUBLIC _______________ F (SPECIFY) **PRIVATE MEDICAL SECTOR** PVT. HOSPITAL/ CLINIC . . . . G PHARMACY/ DRUG SHOP . H PVT DOCTOR . . . I CLINIC/OUTREACH SERVICES . . . J COMMUNITY HEALTH WORKER/CMD K OTHER PRIVATE MED. _______________ L (SPECIFY) **OTHER SOURCE** SHOP . . . . M TRADITIONAL PRACTITIONER N OTHER _______________ X (SPECIFY)

NO.	QUESTIONS AND FILTERS	LAST BIRTH NAME____________	NEXT-TO-LAST BIRTH NAME____________	SECOND-FROM-LAST BIRTH NAME____________
323	CHECK 322:	TWO OR MORE CODES CIRCLED ☐ ↓ ONLY ONE CODE CIRCLED ☐ (SKIP TO 325)	TWO OR MORE CODES CIRCLED ☐ ↓ ONLY ONE CODE CIRCLED ☐ (SKIP TO 325)	TWO OR MORE CODES CIRCLED ☐ ↓ ONLY ONE CODE CIRCLED ☐ (SKIP TO 325)
324	Where did you first seek advice or treatment? USE LETTER CODE FROM 322.	FIRST PLACE . . . ☐	FIRST PLACE . . . ☐	FIRST PLACE . . . ☐
324A	How far did you travel for this advice or treatment?	LESS THAN 1KM. . . . . 1 BETWEEN 1-4 KM. . . . 2 MORE THAN 5KM. . . . 3 DON'T KNOW. 8	LESS THAN 1KM. . . . . 1 BETWEEN 1-4 KM. . . . 2 MORE THAN 5KM. . . . 3 DON'T KNOW. 8	LESS THAN 1KM. . . . . 1 BETWEEN 1-4 KM. . . . 2 MORE THAN 5KM. . . . 3 DON'T KNOW. 8
325	How many days after the fever began did you first seek advice or treatment for (NAME)? IF THE SAME DAY, RECORD '00'	DAYS . . . . ☐☐	DAYS . . . . . . ☐☐	DAYS . . . . ☐☐
325A	At any time during the illness, did (NAME) have blood taken from his/her finger or heel for testing?	YES . . . . 1 NO . . . . 2 DON'T KNOW . . . 8	YES . . . . 1 NO . . . . 2 DON'T KNOW . . . 8	YES . . . . 1 NO . . . . 2 DON'T KNOW . . . 8
326	Is (NAME) still sick with a fever?	YES . . . . 1 NO . . . . 2 DON'T KNOW . . . 8	YES . . . . 1 NO . . . . 2 DON'T KNOW . . . 8	YES . . . . 1 NO . . . . 2 DON'T KNOW . . . 8
327	At any time during the illness, did (NAME) take any drugs for the illness?	YES . . . . 1 NO . . . . 2 (GO BACK TO 317A IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 350) DON'T KNOW 8	YES . . . . 1 NO . . . . 2 (GO BACK TO 317A IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 350) DON'T KNOW 8	YES . . . . 1 NO . . . . 2 (GO TO 317A IN NEXT-TO-LAST COLUMN OF NEW QUESTIONNAIRE; OR, IF NO MORE BIRTHS, GO TO 350) DON'T KNOW 8
328	What drugs did (NAME) take? Any other drugs? RECORD ALL MENTIONED.	ANTIMALARIAL DRUGS SP/FANSIDAR . . . A CHLOROQUINE . B CHLOROQUINE WITH FANSIDAR . . . C HOMAPAK RED. . . . . D GREEN . . . . . . E COARTEM/ACT . . F OTHER ANTI-MALARIAL ________ . . . G (SPECIFY) ANTIBIOTIC DRUGS PILL/SYRUP . . . H INJECTION . . . I OTHER DRUGS PANADOL . . . . J ASPRIN . . . . K IBUPROFEN . . . L OTHER ________ X (SPECIFY) DON'T KNOW . . . . . Z	ANTIMALARIAL DRUGS SP/FANSIDAR . . . A CHLOROQUINE . B CHLOROQUINE WITH FANSIDAR . . . C HOMAPAK RED. . . . . D GREEN . . . . E COARTEM/ACT . . F OTHER ANTI-MALARIAL ________ . . . G (SPECIFY) ANTIBIOTIC DRUGS PILL/SYRUP . . . H INJECTION . . . I OTHER DRUGS PANADOL . . . . J ASPRIN . . . . K IBUPROFEN . . . L OTHER ________ X (SPECIFY) DON'T KNOW . . . . . Z	ANTIMALARIAL DRUGS SP/FANSIDAR . . . A CHLOROQUINE . B CHLOROQUINE WITH FANSIDAR . . . C HOMAPAK RED. . . . . D GREEN . . . . E COARTEM/ACT . . F OTHER ANTI-MALARIAL ________ . . . G (SPECIFY) ANTIBIOTIC DRUGS PILL/SYRUP . . . H INJECTION . . . I OTHER DRUGS PANADOL . . . . J ASPRIN . . . . K IBUPROFEN . . . L OTHER ________ X (SPECIFY) DON'T KNOW . . . . . Z

NO.	QUESTIONS AND FILTERS	LAST BIRTH NAME_____	NEXT-TO-LAST BIRTH NAME_____	SECOND-FROM-LAST BIRTH NAME_____
329	CHECK 328: ANY CODE A-G CIRCLED?	YES / NO (GO BACK TO 317A IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 348A)	YES / NO (GO BACK TO 317A IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 348A)	YES / NO (GO TO 317A IN NEXT-TO-LAST COLUMN OF NEW QUESTIONNAIRE; OR, IF NO MORE BIRTHS, GO TO 348A)
331	CHECK 328: SP/FANSIDAR ('A') GIVEN	CODE 'A' CIRCLED / CODE 'A' NOT CIRCLED (SKIP TO 334)	CODE 'A' CIRCLED / CODE 'A' NOT CIRCLED (SKIP TO 334)	CODE 'A' CIRCLED / CODE 'A' NOT CIRCLED (SKIP TO 334)
332	How long after the fever started did (NAME) first take SP/Fansidar?	SAME DAY . . . . . 0 NEXT DAY . . . . . 1 TWO DAYS AFTER FEVER . . . . . 2 THREE OR MORE DAYS AFTER FEVER . . 3 DON'T KNOW . . . 8	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . 3 DON'T KNOW . . . 8	SAME DAY . . . . . 0 NEXT DAY . . . . . 1 TWO DAYS AFTER FEVER . . . . . 2 THREE OR MORE DAYS AFTER FEVER . . 3 DON'T KNOW . . . 8
333	For how many days did (NAME) take the SP/Fansidar? IF 7 DAYS OR MORE, WRITE 7.	DAYS . . . . . [ ] DON'T KNOW . . . 8	DAYS . . . . . [ ] DON'T KNOW . . . 8	DAYS . . . . . [ ] DON'T KNOW . . . 8
334	CHECK 328: CHLOROQUINE ('B') GIVEN	CODE 'B' CIRCLED / CODE 'B' NOT CIRCLED (SKIP TO 337)	CODE 'B' CIRCLED / CODE 'B' NOT CIRCLED (SKIP TO 337)	CODE 'B' CIRCLED / CODE 'B' NOT CIRCLED (SKIP TO 337)
335	How long after the fever started did (NAME) first take chloroquine?	SAME DAY . . . . . 0 NEXT DAY . . . . . 1 TWO DAYS AFTER FEVER . . . . . 2 THREE OR MORE DAYS AFTER FEVER . . 3 DON'T KNOW . . . 8	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . 3 DON'T KNOW . . . 8	SAME DAY . . . . . 0 NEXT DAY . . . . . 1 TWO DAYS AFTER FEVER . . . . . 2 THREE OR MORE DAYS AFTER FEVER . . 3 DON'T KNOW . . . 8
336	For how many days did (NAME) take the chloroquine? IF 7 DAYS OR MORE, WRITE 7.	DAYS . . . . . [ ] DON'T KNOW . . . 8	DAYS . . . . . [ ] DON'T KNOW . . . 8	DAYS . . . . . [ ] DON'T KNOW . . . 8
337	CHECK 328: CHLOROQUINE WITH FANSIDAR ('C') GIVEN	CODE 'C' CIRCLED / CODE 'C' NOT CIRCLED (SKIP TO 340)	CODE 'C' CIRCLED / CODE 'C' NOT CIRCLED (SKIP TO 340)	CODE 'C' CIRCLED / CODE 'C' NOT CIRCLED (SKIP TO 340)

NO.	QUESTIONS AND FILTERS	LAST BIRTH NAME_____	NEXT-TO-LAST BIRTH NAME_____	SECOND-FROM-LAST BIRTH NAME_____
338	How long after the fever started did (NAME) first take Chloroquine with Fansidar?	SAME DAY . . . . . 0 NEXT DAY . . . . . 1 TWO DAYS AFTER FEVER . . . . . 2 THREE OR MORE DAYS AFTER FEVER . . 3 DON'T KNOW . . . 8	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . 3 DON'T KNOW . . . 8	SAME DAY . . . . . 0 NEXT DAY . . . . . 1 TWO DAYS AFTER FEVER . . . . . 2 THREE OR MORE DAYS AFTER FEVER . . 3 DON'T KNOW . . . 8
339	For how many days did (NAME) take the Chloroquine with Fansidar? IF 7 DAYS OR MORE, WRITE 7.	DAYS . . . . . ☐ DON'T KNOW . . . 8	DAYS . . . . . ☐ DON'T KNOW . . . 8	DAYS . . . . . ☐ DON'T KNOW . . . 8
340	CHECK 328: HOMAPAK - RED ('D') GIVEN	CODE 'D' CIRCLED ☐ ↓ CODE 'D' NOT CIRCLED (SKIP TO 343) ☐ →	CODE 'D' CIRCLED ☐ ↓ CODE 'D' NOT CIRCLED (SKIP TO 343) ☐ →	CODE 'D' CIRCLED ☐ ↓ CODE 'D' NOT CIRCLED (SKIP TO 343) ☐ →
341	How long after the fever started did (NAME) first take red Homapak?	SAME DAY . . . . . 0 NEXT DAY . . . . . 1 TWO DAYS AFTER FEVER . . . . . 2 THREE OR MORE DAYS AFTER FEVER . . 3 DON'T KNOW . . . 8	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . 3 DON'T KNOW . . . 8	SAME DAY . . . . . 0 NEXT DAY . . . . . 1 TWO DAYS AFTER FEVER . . . . . 2 THREE OR MORE DAYS AFTER FEVER . . 3 DON'T KNOW . . . 8
342	For how many days did (NAME) take the red Homapak? IF 7 DAYS OR MORE, WRITE 7.	DAYS . . . . . ☐ DON'T KNOW . . . 8	DAYS . . . . . ☐ DON'T KNOW . . . 8	DAYS . . . . . ☐ DON'T KNOW . . . 8
343	CHECK 328: HOMAPAK-GREEN ('E') GIVEN	CODE 'E' CIRCLED ☐ ↓ CODE 'E' NOT CIRCLED (SKIP TO 345A) ☐ →	CODE 'E' CIRCLED ☐ ↓ CODE 'E' NOT CIRCLED (SKIP TO 345A) ☐ →	CODE 'E' CIRCLED ☐ ↓ CODE 'E' NOT CIRCLED (SKIP TO 345A) ☐ →
344	How long after the fever started did (NAME) first take the green Homapak?	SAME DAY . . . . . 0 NEXT DAY . . . . . 1 TWO DAYS AFTER FEVER . . . . . 2 THREE OR MORE DAYS AFTER FEVER . . 3 DON'T KNOW . . . 8	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . 3 DON'T KNOW . . . 8	SAME DAY . . . . . 0 NEXT DAY . . . . . 1 TWO DAYS AFTER FEVER . . . . . 2 THREE OR MORE DAYS AFTER FEVER . . 3 DON'T KNOW . . . 8

NO.	QUESTIONS AND FILTERS	LAST BIRTH NAME_____	NEXT-TO-LAST BIRTH NAME_____	SECOND-FROM-LAST BIRTH NAME_____
345	For how many days did (NAME) take the green Homapak? IF 7 DAYS OR MORE, WRITE 7.	DAYS . . . . . [ ] DON'T KNOW . . . 8	DAYS . . . . . [ ] DON'T KNOW . . . 8	DAYS . . . . . [ ] DON'T KNOW . . . 8
345A	CHECK 328: COARTEM/ACT ('F') GIVEN	CODE 'F' CIRCLED → ; CODE 'F' NOT CIRCLED (SKIP TO 346)	CODE 'F' CIRCLED → ; CODE 'F' NOT CIRCLED (SKIP TO 346)	CODE 'F' CIRCLED → ; CODE 'F' NOT CIRCLED (SKIP TO 346)
345B	How long after the fever started did (NAME) first take COARTEM/ACT?	SAME DAY . . . . . 0 NEXT DAY . . . . . 1 TWO DAYS AFTER FEVER . . . . . 2 THREE OR MORE DAYS AFTER FEVER . . 3 DON'T KNOW . . . 8	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . 3 DON'T KNOW . . . 8	SAME DAY . . . . . 0 NEXT DAY . . . . . 1 TWO DAYS AFTER FEVER . . . . . 2 THREE OR MORE DAYS AFTER FEVER . . 3 DON'T KNOW . . . 8
345C	For how many days did (NAME) take the COARTEM/ACT? IF 7 DAYS OR MORE, WRITE 7.	DAYS . . . . . [ ] DON'T KNOW . . . 8	DAYS . . . . . [ ] DON'T KNOW . . . 8	DAYS . . . . . [ ] DON'T KNOW . . . 8
346	CHECK 328: OTHER ANTIMALARIAL ('Q') GIVEN	CODE 'Q' CIRCLED → ; CODE 'Q' NOT CIRCLED → (GO BACK TO 303 IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 348A)	CODE 'Q' CIRCLED → ; CODE 'Q' NOT CIRCLED → (GO BACK TO 303 IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 348A)	CODE 'Q' CIRCLED → ; CODE 'Q' NOT CIRCLED → (GO TO 303 IN NEXT-TO-LAST COLUMN OF NEW QUESTIONNAIRE; OR, IF NO MORE BIRTHS, GO TO 348A)
347	How long after the fever started did (NAME) first take (OTHER ANTIMALARIAL)?	SAME DAY . . . . . 0 NEXT DAY . . . . . 1 TWO DAYS AFTER FEVER . . . . . 2 THREE OR MORE DAYS AFTER FEVER . . 3 DON'T KNOW . . . 8	SAME DAY . . . . 0 NEXT DAY . . . . 1 TWO DAYS AFTER FEVER . . . . 2 THREE OR MORE DAYS AFTER FEVER . . 3 DON'T KNOW . . . 8	SAME DAY . . . . . 0 NEXT DAY . . . . . 1 TWO DAYS AFTER FEVER . . . . . 2 THREE OR MORE DAYS AFTER FEVER . . 3 DON'T KNOW . . . 8
348	For how many days did (NAME) take the (OTHER ANTIMALARIAL)? IF 7 DAYS OR MORE, WRITE 7.	DAYS . . . . . [ ] DON'T KNOW . . . 8	DAYS . . . . . [ ] DON'T KNOW . . . 8	DAYS . . . . . [ ] DON'T KNOW . . . 8

NO.	QUESTIONS AND FILTERS	LAST BIRTH NAME_____	NEXT-TO-LAST BIRTH NAME_____	SECOND-FROM-LAST BIRTH NAME_____
348A	CHECK 322 ANY CODE A-N CIRCLED?	YES / NO → 348D	YES / NO → 348D	YES / NO → 348D
348B	Did you pay any money when you sought advice or treatment for [NAME] from any source during this episode of fever?	YES ..... 1 NO ..... 2 → 348D DON'T KNOW 8	YES ..... 1 NO ..... 2 → 348D DON'T KNOW 8	YES ..... 1 NO ..... 2 → 348D DON'T KNOW 8
348C	How much did you pay? IF GOODS OR SERVICES USED AS PAYMENT, ASK FOR AN ESTIMATE IN LOCAL CURRENCY.	DON'T KNOW.....99998	DON'T KNOW.....99998	DON'T KNOW.....99998
348D	CHECK 328 ANY CODES A-X CIRCLED?	YES / NO → 348G	YES / NO → 348G	YES / NO → 348G
348E	Did you pay any money for any of the medicines [NAME] took during this episode of fever?	YES ..... 1 NO ..... 2 → 348G DON'T KNOW 8	YES ..... 1 NO ..... 2 → 348G DON'T KNOW 8	YES ..... 1 NO ..... 2 → 348G DON'T KNOW 8
348F	How much did you pay? IF GOODS OR SERVICES USED AS PAYMENT, ASK FOR AN ESTIMATE IN LOCAL CURRENCY.	DON'T KNOW.....99998	DON'T KNOW.....99998	DON'T KNOW.....99998
348G	Was [NAME] admitted or hospitalized during this episode of fever?	YES ..... 1 NO ..... 2 → (348K) DON'T KNOW 8	YES ..... 1 NO ..... 2 → (348K) DON'T KNOW 8	YES ..... 1 NO ..... 2 → (348K) DON'T KNOW 8
348H	For how many days was [NAME] admitted or hospitalized? IF DISCHARGED SAME DAY RECORD "00"	# OF DAYS	# OF DAYS	# OF DAYS
348I	Did you pay any money for the admission?	YES ..... 1 NO ..... 2 → (348K) DON'T KNOW 8	YES ..... 1 NO ..... 2 → (348K) DON'T KNOW 8	YES ..... 1 NO ..... 2 → (348K) DON'T KNOW 8
348J	How much did you pay for [NAME'S] admission? IF GOODS OR SERVICES USED AS PAYMENT, ASK FOR AN ESTIMATE IN LOCAL CURRENCY.	DON'T KNOW.....99998	DON'T KNOW.....99998	DON'T KNOW.....99998
348K	CHECK 321 CODE "I" CIRCLED?	YES / NO → (348N)	YES / NO → (348N)	YES / NO → (348N)
348L	While seeking advice or treatment for [NAME] during this episode of fever, did you spend any money on transportation?	YES ..... 1 NO ..... 2 → (348N) DON'T KNOW 8	YES ..... 1 NO ..... 2 → (348N) DON'T KNOW 8	YES ..... 1 NO ..... 2 → (348N) DON'T KNOW 8
348M	How much did you spend on transportation?	DON'T KNOW.....99998	DON'T KNOW.....99998	DON'T KNOW.....99998

NO.	QUESTIONS AND FILTERS	LAST BIRTH NAME_____	NEXT-TO-LAST BIRTH NAME_____	SECOND-FROM-LAST BIRTH NAME_____
348N	Did you or other members of your household have to borrow money in order to pay for these costs?	YES ..... 1 NO ..... 2 NO COST DURING EPISODE ..... 3 (348P) DON'T KNOW 8	YES ..... 1 NO ..... 2 NO COST DURING EPISODE ..... 3 (348P) DON'T KNOW 8	YES ..... 1 NO ..... 2 NO COST DURING EPISODE ..... 3 (348P) DON'T KNOW 8
348O	Did you or other members of your household have to sell things that you own in order to pay for these costs?	YES ..... 1 NO ..... 2 DON'T KNOW 8	YES ..... 1 NO ..... 2 DON'T KNOW 8	YES ..... 1 NO ..... 2 DON'T KNOW 8
348P	Did you or any other member of your household have to take time off from your normal duties to care for [NAME] during this episode of fever?	YES ..... 1 NO ..... 2 (349) DON'T KNOW 8	YES ..... 1 NO ..... 2 (349) DON'T KNOW 8	YES ..... 1 NO ..... 2 (349) DON'T KNOW 8
348Q	How many days did you or other household members have to take off?	# OF DAYS ☐☐	# OF DAYS ☐☐	# OF DAYS ☐☐
349		GO BACK TO 317A IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 350.	GO BACK TO 317A IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 350.	GO TO 317A IN NEXT-TO-LAST COLUMN OF NEW QUESTIONNAIRE; OR, IF NO MORE BIRTHS, GO TO 350.

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
350	I would like to ask you a few questions about fever in children. When a child is sick with fever, how long after the fever begins should the child be taken for treatment?	SAME DAY ..... 01 NEXT DAY ..... 02 TWO DAYS AFTER ONSET OF FEVER ..... 03 THREE OR MORE DAYS AFTER ONSET OF FEVER ..... 04 FEVER IS NORMAL IN CHILDREN, NO TREATMENT NECESSARY ..... 05 DEPENDS ON HOW SERIOUS THE FEVER IS ..... 06 OTHER _____ 96 (SPECIFY) DON'T KNOW 98	
351	In your opinion, what causes malaria? PROBE: ANYTHING ELSE? RECORD ALL MENTIONED	MOSQUITO BITES ..... A EATING MAIZE ..... B EATING MANGOES ..... C EATING DIRTY FOOD ..... D DRINKING UNBOILED WATER ..... E GETTING SOAKED WITH RAIN ..... F COLD/CHANGING WEATHER ..... G WITCHCRAFT ..... H CONTACT WITH INFECTED PERSON ..... I OTHER _____ X (SPECIFY) DON'T KNOW ..... Z	
351A	Are there ways to avoid getting malaria?	YES ..... 1 NO 2	→ 353A
352	What are the ways to avoid getting malaria? PROBE: ANYTHING ELSE? RECORD ALL MENTIONED	SLEEP UNDER MOSQUITO NET ..... A SLEEP UNDER AN INSECTICIDE TREATED NET ..... B TAKING PREVENTIVE MEDICATION ..... C USE MOSQUITO REPELLANT ..... D SPRAYING HOUSE WITH INSECTICIDE ..... E USING MOSQUITO COILS ..... F DESTROY MOSQUITO BREEDING SITES ..... G OTHER _____ X (SPECIFY) DON'T KNOW ..... Z	
353	What medicine may be given to a pregnant women to help them avoid getting malaria? RECORD ALL MENTIONED	SP/FANSIDAR ..... A CHLOROQUINE ..... B CHLOROQUINE W/ FANSIDAR ..... C COARTEM/ACT ..... D OTHER _____ X (SPECIFY) DON'T KNOW ..... Z	
353A	CHECK 353 SP/FANSIDAR MENTIONED CODE 'A' CIRCLED ☐ CODE 'A' NOT CIRCLED ☐		→ 355
354	How many times does a woman need to take SP/FANSIDAR during her pregnancy to avoid getting malaria?	NUMBER OF TIMES ..... ☐☐ DON'T KNOW 98	
355	During the past 12 months, have you seen or heard any messages about malaria?	YES ..... 1 NO 2	→ END
356	Where did you hear or see message(s)? PROBE: ANYWHERE ELSE? RECORD ALL MENTIONED	RADIO ..... A TV ..... B NEWSPAPER/LEAFLET ..... C HEALTH WORKER/CHW ..... D NEIGHBOR ..... E COMMUNITY LEADER ..... F OTHER _____ X (SPECIFY) DON'T KNOW ..... Z	
357	RECORD THE END TIME.	HOUR ..... ☐☐ MINUTES ..... ☐☐	

INTERVIEWER'S OBSERVATIONS

TO BE FILLED IN AFTER COMPLETING INTERVIEW

COMMENTS ABOUT RESPONDENT:

COMMENTS ON SPECIFIC QUESTIONS:

ANY OTHER COMMENTS:

SUPERVISOR'S OBSERVATIONS

NAME OF SUPERVISOR: _____ DATE: _____