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Evaluation of Integrated Mass Drug Administration for Neglected Tropical Diseases in Madaoua District, Niger

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Evaluation of Integrated Mass Drug Administration for Neglected Tropical Diseases in Madaoua District, Niger

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An abstract of
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Abstract

Evaluation of Integrated Mass Drug Administration for Neglected Tropical Diseases in Madaoua District, Niger
By Megan S. Klingler

Neglected Tropical Diseases (NTDs) are a group of debilitating illnesses that affect the lives of more than one-sixth of the world's population. Preventive chemotherapy partnered with health education is the primary strategy in the control and elimination of NTDs. In December 2012, the Niger Ministry of Health carried out an integrated mass drug administration (MDA) with the goal of eliminating lymphatic filariasis (LF) and trachoma and controlling soil-transmitted helminthiasis (STH) and schistosomiasis. Six months after the MDA, a coverage and knowledge, attitudes and practices (KAP) survey was carried out in the Madaoua district, Niger using the WHO-recommended two staged probability cluster survey design. In each of the selected households, coverage data were collected from all persons, while the KAP survey was administered to one randomly-selected adult (≥ 14 years). A total of 293 households in 30 villages participated in the surveys, with 1711 persons interviewed for coverage and 291 adults for KAP. Overall, 80.2% (95% CI: 78.2-82.1) of those surveyed reported taking at least one medication. Surveyed coverage of ivermectin (60.0%; 95% CI: 57.1-62.9), albendazole (71.3%; 95% CI: 69.0-74.3) and praziquantel (65.6%; 95% CI: 62.8-68.4) was significantly lower than the reported coverage (96.9%, 96.9%, and 86.0%, respectively), while the reported coverage for azithromycin (72.2%) was confirmed by the survey (71.8%, 95 CI: 69.3-74.1). KAP respondents reported that they had heard of LF (66.0%), STH (93.8%), schistosomiasis (72.2%) and trachoma (86.6%), but only 24.0%, 51.8%, 56.2% and 57.9%, respectively, knew at least one symptom. Of 46 respondents who had heard of LF, only 2 respondents (4.3%) knew it was transmitted via a mosquito, and of those who had heard of schistosomiasis, 70.9% believed that one is infected by the sun or heat. There was no significant association between participation in the MDA and knowledge of the NTDs. Knowledge of someone with a NTD did increase the odds of participation: men who knew someone with hydrocele were 4.3 times (95% CI: 4.1-4.4) more likely to take medication. MDA participation appeared not to be affected by the low level of knowledge. With the exception of Ivermectin, drug-specific coverage was adequate.

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Acronyms

ALB – Albendazole

CI – Confidence Interval

CDC – Centers for Disease Control and Prevention

DALY – Disability Adjusted Life Years

IEC – Information, Education and Communication

IRB – Institutional Review Board

IVM – Ivermectin

KAP – Knowledge, Attitudes and Practice

LF- Lymphatic Filariasis

MDA – Mass Drug Administration

MoH – Ministry of Health

NTD – Neglected Tropical Disease

PCT – Preventative Chemotherapy and Transmission Control

PPES – Probability Proportionate to Estimated Size

PZQ – Praziquantel

SAFE – Surgical, Antibiotics, Facial cleanliness and Environmental improvements

SCI - Schistosomiasis Control Initiative

SSA – sub-Saharan Africa

STH – Soil-transmitted Helminthes

TB - Tuberculosis

WASH – Water, sanitation and hygiene

WHA – World Health Assembly

WHO - World Health Organization

Chapter 1: Introduction

1.1 Introduction and Rationale

The Millennium Development Goals of 'making poverty history' and alleviating the suffering of 'the bottom billion' has given new attention and awareness to diseases that until recently seemed forgotten [1]. Neglected tropical diseases (NTDs) are a group of chronic, disabling, and disfiguring diseases that are frequently seen amongst the world's most vulnerable and disadvantaged populations and tend to flourish under conditions of poverty [2, 3]. The World Health Organization (WHO) estimates that more than one billion people, or one-sixth of the world's population, suffer from one or more NTDs [4]. According to a 2010 WHO report, all low-income countries (countries with a per capita income of US$1,035 or less [5]) are affected by at least five NTDs [6].

Niger, a landlocked country in Western Africa with a population of over 17 million people, is one of the poorest countries in the world with a per capita income of US$390 [7]. With over one-half of the population, 59.5%, living below the national poverty line [8], Niger has a "high" level of NTD comorbidity [9]. In 2009, the Niger NTD baseline identified that 34 of its 42 districts had three to six NTDs [9]. In 2010, the WHO Department of Control of Neglected Tropical Diseases listed soil-transmitted helminthiasis (STH), schistosomiasis, lymphatic filariasis (LF) and trachoma as endemic to Niger [10]. STH, schistosomiasis and LF were found to have partial distribution across Niger, while schistosomiasis has a nationwide disease distribution [10].

Preventative chemotherapy (PCT), the pre-emptive administration of drugs to populations at risk, when partnered with health education is one of the main strategies to control and/or eliminate NTDs [11] . In order to make the delivery of PCT more cost-efficient and to conserve resources, there has been a push to combine distribution of medications into an integrated mass drug administration (MDA) [12]. In December 2012, the Niger Ministry of Health (MoH) carried out an integrated MDA using the PCT drugs of ivermectin, albendazole, azithromycin and praziquantel with the target goal of the elimination of LF and trachoma and control of STH and schistosomiasis.

In order to accurately measure the achievement of a MDA, it is important to make sure that the drugs reach everyone that needs them and that the level of drug coverage is high enough to interrupt transmission [13-15]. Drug coverage is determined by dividing the number of persons taking the medication by the total number of targeted persons in the population. Coverage rates of 65% or higher for five consecutive years with albendazole and ivermectin are thought necessary for the elimination of LF [15, 16]. For the elimination of trachoma, the WHO recommends a drug coverage of at least 80% with azithromycin [17]. In 2001, the World Health Assembly (WHA) passed a resolution calling for a minimum of 75% coverage of school-aged children with praziquantel and albendazole for the control of STH and schistosomiasis [2].

Reported drug distribution coverage is typically based on the reports submitted by those disturbing the drugs after the MDA and is determined by calculating the quotient of the number of people who were given the medication divided by the estimated number of targeted individuals in the area. To validate the reports, it is important to periodically conduct an independent coverage survey in the areas where the MDA took place [18]. Surveyed drug coverage is calculated by dividing the total number of individuals reporting to have ingested the drug(s) by the total number of targeted individuals surveyed. The reported drug coverage should reflect the actual drug coverage, but in some instances this is not the case [19, 20]. Discrepancies may be due to 1) the drug distributors leaving behind medicines for household members who were absent during their visit and recorded them as having been consumed; 2) in their excitement to show good performance or gain incentives, drug distributors may report a falsely elevated number of people reached; or 3) the total targeted population (the denominator) used in calculating the reported drug coverage is outdated or incorrect resulting in an inaccurate calculation [21].

The WHO has identified seven reasons in which monitoring drug coverage through coverage surveys is vital for countries and MDA stakeholders. They are as follows:

1. Drug coverage can lead to informed decisions and policy formulation for NTD control.
2. Problems or errors encountered during rounds of MDAs can be revealed and corrective action can then be taken.
3. Coverage surveys provide donors and governments with an overview of their investment in MDAs and of the work being carried out.

4. Workers and volunteers involved in drug delivery can be informed about their efforts.
5. Participation in the MDA is reinforced when communities learn that high coverage has been achieved.
6. Advocacy for more support of NTD control is strengthened by knowledge that MDA programs are meeting their goals
7. An overview of needed drug supplies for future rounds [18]

1.2 Problem Statement

Until coverage goals are reached and sustained, untreated individuals have the potential to act as reservoirs of transmission [22], thus inhibiting reaching the global goals of elimination of LF and trachoma and controlling STH and schistosomiasis. Household surveys that measure the percentage of the targeted population treated in MDAs are a critical evaluation tool, measuring not only how successful the MDA was in reaching the populations in need, but also in identifying sub-groups that were not treated and by aiding in understanding why people did not participate.

As seen in Table 1, Niger's reported coverage surpassed all targeted goals for elimination and control with the exception of azithromycin which fell short of its 80% goal.

Table 1: Summary of Niger's Reported December 2012 Coverage and Coverage Goals

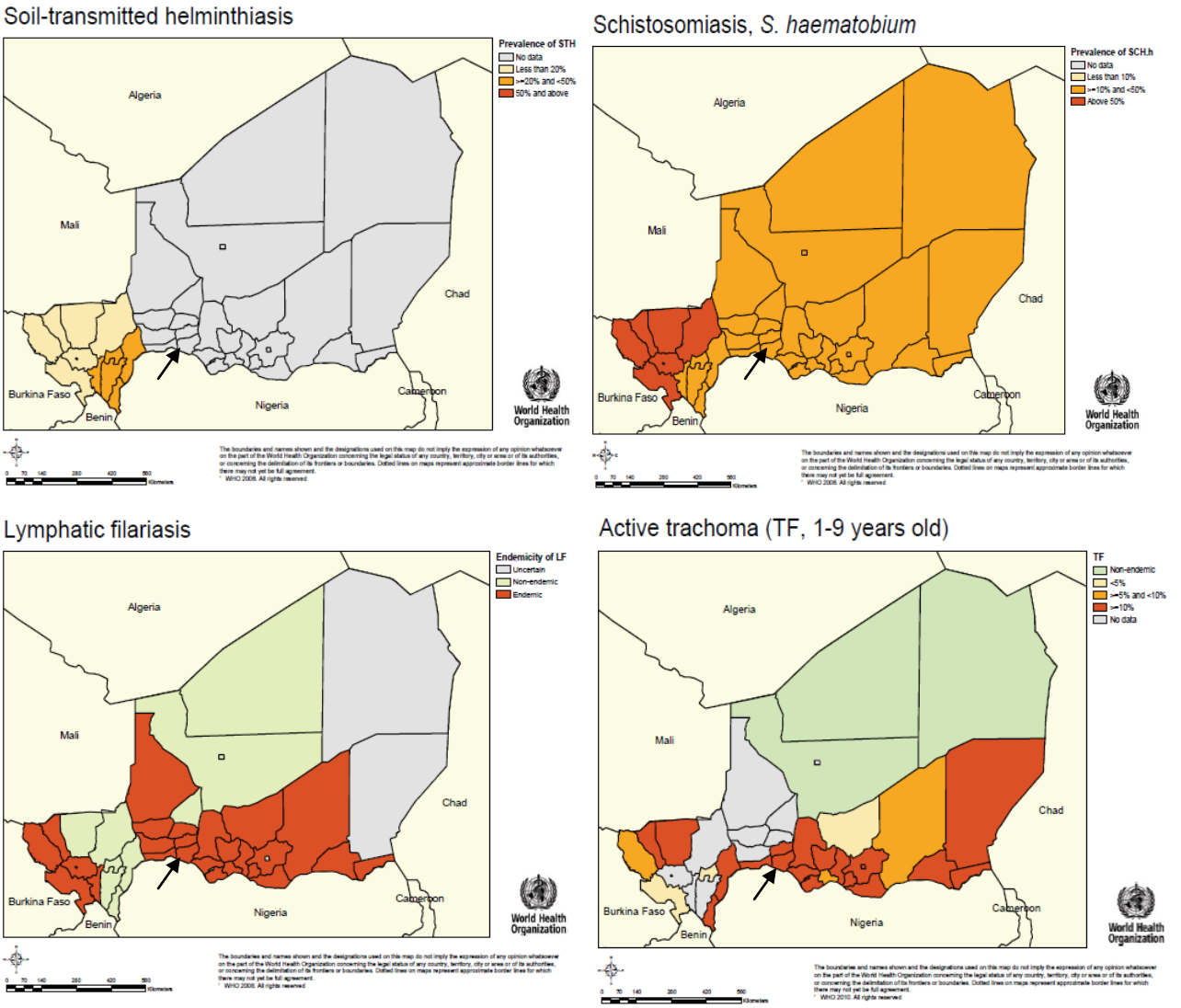
	Reported Coverage*	Inclusion Criteria	Goal for Elimination or Control**
Albendazole	96.9%	≥5 years	65% of persons aged 15 years and above 75% of school-age children (5-14 years)
Ivermectin	96.9%	≥5 years	65% of those aged 5 years and above
Azithromycin	72.2%	≥6 months	80% of those aged 6 months and above
Praziquantel	86.0%	≥5 years	65% of persons aged 15 years and above 75% of school-age children (5-14 years)

*Reported coverage from the Niger Ministry of Health
**Pregnant women and persons with severe illnesses were excluded from the MDA

The location of the surveys was the Madaoua district, which is located in the southern part of the Taouha region along the Nigeria border. The district has an estimated population of just under 120,000

persons (Niger Ministry of Health, 2012). As shown below in the WHO maps, the Madaoua district (indicated with an arrow) is endemic for schistosomiasis, LF and trachoma. There was is no current data for the district in regards to STH [10], but other studies have shown that STH is endemic throughout the nation [9]. Due to Madaoua being an area of endemicity for several NTDs, there is a great need to validate the reported coverage levels in the hopes of future control and elimination of these four NTDs.

Figure 1: WHO's Niger Country Profile of Neglected Tropical Diseases



1.3 Purpose Statement

The purpose of this study is to assess the December 2012 MDA coverage of targeted individuals for the NTDs of LF, schistosomiasis, STH and trachoma in the Madaoua district of Niger through a coverage and KAP survey. Reported coverage should reflect as closely as possible the number of people who actually have ingested the medications [23]. Monitoring and epidemiological assessment of a MDA early in the program provides managers with an opportunity to investigate reasons for low coverage and to implement appropriate action if the program failed to reach the needed coverage of the targeted population [21]. These surveys do not only validate the reported coverage, but can also provide valuable information including basic demographics on the targeted population and the knowledge, attitudes and practices surrounding NTDs and the MDA itself [13].

1.4 Research Objectives

The objectives of these surveys were:

- To estimate the percent drug coverage for STH, Schistosomiasis, LF and trachoma in the endemic NTD communities of Madaoua, Niger.
- To evaluate the knowledge, attitudes and practices concerning STH, schistosomiasis, LF and trachoma and identify changes that can be made to improve drug coverage and NTD knowledge.

1.5 Significance Statement

The results of this evaluation will be used to improve the Niger National Program for the Integration of Neglected Tropical Diseases. Additionally, it will give feedback to all of those involved with the MDA on their efforts and be able to identify areas for improvement. With this information, the Niger MoH will be able to organize more effective campaigns (both educational and MDA) in the future.

Chapter 2: Comprehensive Review of the Literature

2.1 Introduction: Global burden

The Millennium Development Goals of 'making poverty history' and alleviating the suffering of 'the bottom billion' has given new attention and awareness to diseases which till recently seemed forgotten [1]. Neglected Tropical Diseases (NTDs) are a group of debilitating illnesses that affect the lives of more than one-sixth of the world's population. NTDs are the most common conditions affecting the poorest 500 million people living in sub-Saharan Africa (SSA), and when combined produce a burden of disease that may be equivalent to one-half of SSA's malaria burden and more than double that caused by tuberculosis (TB) [24]. NTDs most commonly occur in settings of extreme poverty, especially among the rural poor or disadvantaged urban populations [3]. Found in the Bible, NTDs are ancient and have burdened humans for thousands of years [25, 26]. They are among the leading causes of poverty due to significantly diminishing economic productivity in affected adults and by impairing the intellectual and physical development of the future generations by placing already vulnerable children on a path to lifelong disability that only strengthens the poverty cycle, trapping the world's poorest in continued poverty [27].

Disability adjusted life years (DALYS) are the sum of potential life lost due to premature mortality and/or productive life lost to disability [4]. The combined burden of disease due to NTDs is estimated at 56.6 million DALYs, compared with malaria at 46.5 million and TB at 34.7 million [5]. Newer information indicates that even these high DALY figures still grossly underestimate the global disease burden of NTDs [27-29]. NTDs are responsible for about 500,000 deaths annually [30].

2.2 Sub-Saharan Africa and Niger's NTD Burden

Today, the world's greatest concentration of poverty occurs in sub-Saharan Africa. A recent World Bank analysis showed that 51% of the population of SSA lives on less than US$1.25 per day, and 73% of the population lives on less than US$2 per day [31]. Of the listed NTD, ten of them stand out for their high prevalence and intensity in Africa and up to 90% of the world's disease burden from these conditions is believed to occur in Africa [30]. Due to the high correlation between poverty, child development,

pregnancy outcomes, agricultural worker productivity, NTDs may represent a major reason why the ‘‘bottom 500 million’’ people in SSA cannot escape poverty [3, 30].

Niger, one of the poorest countries in the world, has identified that 34 of its 42 districts have three to six NTDs [9]. In 2010 the WHO Department of Control of Neglected Tropical Diseases listed soil-transmitted helminthiasis (STH), schistosomiasis, lymphatic filariasis (LF), and trachoma as endemic to Niger [10].

2.3 Overview of NTDs

2.3.1 Soil-transmitted helminthes (STH)

It is estimated that 85% of the NTD disease burden results from helminthic, worm-like parasites, infections [3]. Soil-transmitted helminthes (STH) are transmitted by eggs excreted in human feces or urine which contaminate the soil and water sources in areas that lack adequate sanitation [11]. Humans are infected through ingestion of infective eggs (*Ascaris lumbricoides* and *Trichuris trichiura*) or larvae (*Ancylostoma duodenale*) in contaminated foods, hands or utensils or by the penetration of the skin by soil containing infective larvae of hookworms [11]. The WHO estimates that approximately 2 billion people are affected by STH infections worldwide, of whom, more than 300 million suffer from associated severe morbidity from the disease [32].

Hookworm is the most common STH infection in the world and NTD in SSA [24]. It is believed that between one-quarter and one-third of SSA’s population is affected by one or more STH infections [32], with children, especially school-aged children, disproportionately affected [2]. Of the estimated 181 million school-aged children in SSA, almost one-half or 89 million are believed to be infected with hookworm, ascariasis, trichuriasis, or some combination of these STH infections [3, 33].

Children also tend to exhibit higher STH concentrations than any other single population [4] and as a result suffer from physical, mental deficits, malnutrition, stunting, intellectual delays, and cognitive and educational deficits [34-38]. There has been found to be a significant effect of STH infection on school performance and attendance, thus ultimately hurting the future economic productivity; children infected with these parasites are frequently labelled as ‘lazy’ or ‘unintelligent’ [39]. Studies have shown that once a

child is treated for parasite(s), the child quickly achieves a better school attendance record and after receiving just one treatment, children typically exhibit an average weight increase of 0.34kg [40].

Children are not the only one's effected, hookworm has also been recognized as an important cause of anemia and morbidity in women of reproductive age [41]. It is estimated that at any time, almost 7 million pregnant women in SSA are infected with hookworm [42]. Cross-sectional studies from both Africa and Asia have shown evidence that 30–54% of moderate to severe anemia in pregnant women is attributable to hookworm [43, 44]. Further studies have shown that intervention with antenatal anthelmintic substantially increase maternal hemoglobin concentrations as well as the baby's birth weight and survival [34].

In 2001, the 54th World Health Assembly urged its member states to undertake frequent and periodic deworming with praziquantel combined with either albendazole or mebendazole as a means to control and reduce the morbidity caused by STH [45]. Equally important to mass distribution of medications is establishing improved water sources and improved sanitation, only with a combination of both can sustainable reductions in parasite frequency and intensity be reached [46].

2.3.2 Schistosomiasis

Schistosomiasis is the second most prevalent NTD after hookworm with an estimated 600 million cases worldwide, 90% of which are in Africa [28]. Schistosomiasis, or bilharzia, is a parasitic disease caused by trematode flatworms of the genus *Schistosoma* and is typically found in places with poor satiation. Larval forms of the parasites, which are released by freshwater snails, penetrate the skin of people in the water when bathing, swimming, or wading in fresh water [47]. The three main disease-causing species are *S. haematobium, S. mansoni*, and *S. japonicum* [48].

Like STH, schistosomiasis is also associated with impaired growth and development in children. The disease burden is estimated to be at 1.8-4.5 million DALYS [49]. The symptoms of schistosomiasis are not caused by the worms themselves, but by the body's reaction to the eggs as they pass through the blood vessels, intestine, ureters and bladder [50]. The eggs can cause chronic ill-health and be responsible for damage to the liver and intestine (*S. mansoni* and *S. japonicum),* and bladder (*S. haematobium*) [51]. Iron deficiency due to blood loss, which is particularly high in *S. Haematobium*, is a major cause of morbidity in schistosomiasis [49]. In endemic area, hematuria (blood in urine) is the most

common sign of infection in children aged 5–10 years, but is sometimes confused with menstruation in girls [52]. It is estimated that two-thirds of the schistosomiasis cases in Africa are due to infection caused by *S. haematobium* [53].

The use of molluscides, snail pesticides, in the control of schistosomiasis has been found to be complicated, not cost-effective and potentially toxic to other water life [51]. Similar to STH, methods for control include mass drug administration of praziquantel and improved access to safe water and sanitation.

2.3.3 Lymphatic Filariasis (LF)

Lymphatic Filariasis (LF) is caused by the mosquito-transmitted parasite *Wuchereria Bancrofti* [54]. It is not fatal, but is the second leading cause of disability worldwide and has left over 40 million disfigured and debilitated [55]. LF inflicts its millions of sufferers with deformed limbs (elephantiasis) and men with hydroceles (a build-up of fluid around one or both testis). Both men and women potentially can be denied marriage and are unable to work due to the consequence of this disease [39].

There are an estimated 1.3 billion people living at risk of infection with the parasite that causes LF [56, 57]. Approximately 40% of the world's 120 million cases of LF occur in SSA (approximately 46–51 million cases) [30, 46, 58-60], with an estimated 382–394 million people at risk of infection, including 176 million children [61]. It is estimated that 12.5% of LF infections result in lymphedema and 20.8% in hydrocele [61], totaling approximately 5 million cases of lymphedema and 8 million cases of hydrocele in SSA [24]. LF is blamed for roughly US$1 billion in annual losses, largely resulting from the disability linked to hydrocele in men [62, 63].

In 2000, LF was identified as an eradicable or potentially eradicable disease by the International Task Force for Disease Eradication [64]. The most practical and feasible method of controlling LF is rapid reduction of microfilarial (the early stage of the parasite that is found in hosts blood) found in the community by annual MDAs [65]. The WHO recommended drug therapy is a combination of two medicines delivered to entire populations at risk aged 5 years and older. Ivermectin and albendazole are the two medications administered in areas where Onchocerciasis is co-endemic [21]. Research has shown that once yearly treatment with single doses of the two medicines administered together for 4–6 years could lead to possible eradication by reducing transmission to very low levels [66].

2.3.4 Trachoma

Despite being easily prevented, an estimated 8 million people today are needlessly visually impaired due to trachoma [39]. Trachoma is the leading cause of infectious and preventable blindness worldwide [67-69] and is caused by an eye infection with *Chlamydia trachomatis* and is characterized by inflammatory changes in the conjunctiva with subsequent scarring, corneal opacity and blindness in adults [70]. The transmission of trachoma is commonly facilitated by the *M. sorbens* fly, which regularly has contact with eyes and prefers to breed in human feces [70]. Of the 63 million cases of active trachoma globally (some estimates indicate 84 million cases worldwide), just under half, 48%, occur in SSA [71]. Ethiopia has the largest number of cases (10.2 million), followed by Sudan (3.6 million) and Tanzania, Kenya, and Niger (2.0–2.1 million each) [24].

Trachoma is sustained in a setting of poverty. Additional risk factors for trachoma transmission include crowding and household clustering, insufficient access to water, poor sanitation and facial hygiene, and young children as the reservoir of infection [71]. Due to this, women are two to four times more likely to have trichiasis (in-turned eyelashes that scratch the cornea) resulting from an increased exposure to young children [72, 73]. The WHO has targeted the elimination of blinding trachoma by 2020 using the SAFE strategy (**S**urgery, **A**ntibiotics, **F**acial cleanliness and **E**nvironmental improvements). Suggested antibiotic treatment and prevention for trachoma is a single dose of azithromycin every 6 to 12 months [74].

2.4 Preventive Chemotherapy (PCT)

There are safe oral drugs that, if delivered annually, can remove NTDs as a major public health problem. However, typically these drugs are unaffordable for the billion people who are infected and who live on less than $2 per day [39]. Through donations from drug companies, preventive chemotherapy (PCT), the pre-emptive administration of drugs to populations at risk, has been made available to those in need. PCT consists of the regular, large-scale administration of drugs, either one drug or in combination, to entire population groups, with the aim of reducing transmission and associated morbidity. PCT is the public health strategy recommended by the WHO against a group of five neglected tropical diseases (NTDs): LF, onchocerciasis, schistosomiasis and STH, and trachoma [11].

The WHO estimates that in 2008 approximately 670 million people in 75 countries received treatment for NTDs through mass drug administrations (MDAs) of PCT [4]. The PCT goal of STH and schistosomiasis infections is a sustainable reduction in worm burden and control of morbidity, while for LF and trachoma, the overarching goal is to eliminate transmission of the diseases, resulting in much-reduced morbidity in future generations [25].

Pre-emptive treatment is justified by the fact that these diseases are characterized by a chronic progression of morbidity that develops from late and often nonspecific symptoms; individuals may exhibit severe complications or even death and not even be aware they are infected [75]. Therefore, treatment should be provided proactively, without waiting for advanced symptoms to alert the individual to the infection, as at this stage treatment might no longer be effective [75]. The population-based nature of PCT relies on the high safety of the drugs used, which therefore can be administered by supervised nonmedical personnel in 'campaigns' similar to those carried out for vaccination purposes [75]. All this ensures lower costs than those required by clinical case management, thus making PCT a viable intervention in resource-poor settings; the high cost–effectiveness of PCT makes it one of the most successful public health interventions [3].

2.4.1 Integration

In 2006, the United States Agency for International Development established the Neglected Tropical Disease Control Program to facilitate the integration of national programs targeting elimination or control of lymphatic filariasis, onchocerciasis, schistosomiasis, soil-transmitted helminthiasis and blinding trachoma [12]. Coordination of program activities among different disease-specific programs has led to efficiencies of delivery, enhanced effectiveness, increased health benefits, and better use of limited resources [76].

By integrating the MDAs of NTDs in Africa, a "rapid impact" on morbidity, blindness, and skin disease could be achieved at the minimal cost of about US$0.40 per person per year [30]. In sub-Saharan Africa with a total target population of approximately 500 million, an estimated $1.5-2 billion over the next 7 years (through 2020) would almost certainly be enough to take these diseases off the burden of disease list [39]. The estimate of US$0.40 per treatment annually is equivalent to the bulk cost of about 12 condoms for

prevention of HIV transmission or a fourth of the price of a antimalarial bed net [30]. The calculated economic rates of return suggest that investment in control/elimination of these diseases will produce an economic rate of return of 15%–30% [77].

2.4.2 Benefits of Mass Drug Administration

It is the hope that several neglected tropical infections could be eventually controlled to the point of elimination in areas of endemicity [25, 78]. Controlling Africa's neglected diseases is one of the convincing ways to "make poverty history" through affordable, pro-poor, effective, and verified strategies [30]. An added benefit of the MDA activities is its role in strengthening health systems [79]. MDAs provide a valuable entry point for other community-directed health interventions in regions where there is little access to traditional health services [30].

Moreover, it has recently been noted that mass treatment with ivermectin has been shown to not only benefit LF, but also reduce the prevalence of ectoparasitic skin infections such as pediculosis, scabies, and tungiasis [80]. Widespread use of azithromycin, administered for trachoma, could also impact other pediatric bacterial infections, including those caused by group A streptococci [81]. Additionally papers have highlighted the immunosuppressive features of STH, schistosomiasis, and LF and their possible impact on promoting susceptibility to HIV/AIDS, TB, and malaria [49, 50, 82, 83]. It is believed that through controlling or eliminating NTDs, there would be a reduction in the frequency of malaria fevers, the frequency of severe and cerebral malaria, and the prevalence of anemia [84, 85].

2.5 History of Preventive Chemotherapy in Niger

In 2004, Niger established a national program for schistosomiasis and STH (PNLBG) targeting school aged children (5–14 years) and adults. This program was supported by the Schistosomiasis Control Initiative (SCI) and funded by the Bill and Melinda Gates foundation [86]. The program objective, consonant with Resolution WHA 54.19, was to treat 75% of school age children at risk of infection, and the treatment of adults in communities where prevalence is over 50% [87].

Integrated NTD PCT programs were launched in Niger in 2007 with funding from USAID [12] and technical support from SCI [9]. The integrated program was built from the vertical campaigns of the

national schistosomiasis and STH programs [88] and the national program to combat blindness; soon after the LF program followed [9]. By 2009, the integrated program had expanded to 14.3 million treatments in 30 districts in five regions [9]. It was found that by integrating the NTD MDAs, there was a real reduction in the delivery cost and 16–21% of program costs was saved [9].

2.6 Coverage

The percentage of the population covered is the most important factor in determining the success of mass control/elimination programs [89]. Coverage is the percentage of targeted persons who actually received the drug [12]. Reported coverage is based on numbers reported by the drug distributors and their supervisors and has been found that when reported values were subjected to validation studies, there was generally good agreement between the reported and surveyed coverage values [12]. Despite this, reported drug coverages are often characterized as estimates of drug distribution which overestimate the actual drug consumption or compliance with MDA of the population [20, 90].

Mathematical models suggest interrupting transmission is dependent on the baseline population prevalence of the disease and the overall population compliance with MDA programs [16]. The lower the compliance with the MDA and the higher the baseline prevalence of the disease, the more rounds of MDA will be required to interrupt transmission. Ensuring maximal compliance is critical to program success [91].

2.7 Purpose of Surveys

Since achieving and maintaining adequate drug coverage during MDAs is paramount to the success of NTD control and elimination programs, low coverage may require additional MDAs or if unnoticed, may lead to premature impact evaluations [13]. Although the main purpose of drug coverage surveys is to validate reported drug coverage, these surveys also provide an opportunity to gain other valuable information such as demographics, reasons for noncompliance as well as knowledge of diseases [13] . Coverage surveys are recommended by the WHO as a necessary means of program monitoring and are also recommended by drug donation programs [18].

Moreover, the success of a control and elimination program is largely dependent on the community's awareness of the diseases in which they are trying to treat [91]. Through measuring knowledge, attitudes

and practices, program managers and stakeholders can plan, implement, and evaluate a community's understanding of the work being carried out [92]. They can identify information that is commonly believed and attitudes that are commonly held [13]. To a degree, KAP surveys can detect factors that influence behaviors, illustrate reasons for their attitudes, and give light to why people practice certain health behaviors and may be used to identify needs, problems and barriers in program delivery, as well as solutions for improving quality and accessibility of services [92].

Chapter 3: Methodology

3.1 Sampling

To ensure that the coverage survey was representative of the Madaoua district, sampling was carried out using the WHO-recommended two staged probability cluster survey design [13]. The 30 clusters were selected using probability proportional to estimated size (PPES). Estimations of village population size stemmed from a census conducted in 2001. The population adjustments of 3.1% per year to reach the 2013 estimates were based on a combination of historical census surveys and projections made by the Niger's MoH and district level health facilities. In each of the clusters, 10 houses were selected using improved random walk method (Appendix 1) [13, 93]. Coverage data was collected from all persons in the selected households. A proxy was able to answer for children or for absent members of the household. The KAP survey was administered to one adult in the household aged 14 years and older.

3.2 Questionnaires

Questionnaires are used to gather coverage data and information relevant to improving NTD programs including NTD-related attitudes and practices [13]. Standardized questionnaires were translated into the French and were administered by trained interviewers to all eligible persons. The coverage questionnaires included questions asking for the individual's age, gender and participation in the MDA. Respondents were then asked if they took "any" pill during the 2012 MDA. If they said yes, they were then shown the 4 pills offered during the mass distribution and asked to recall which tablets they received and how many of each they consumed (Appendix 2). The KAP questionnaire was used to assess the participant's knowledge, attitudes, and practices concerning the MDA and NTDs by using open-ended questions. The KAP questionnaire assessed respondents' knowledge of LF, STH, schistosomiasis and trachoma; including its symptoms, how one gets the disease, how to prevent, and how to treat. Additional questions were asked addressing participation in MDA, reasons for not participating, side effects, and water and sanitation. To facilitate data entry, commonly anticipated responses were listed on the questionnaire. Additional space was included for answers that were not included on the form to be written down. For the majority of questions, participants could give more than one response (Appendix 3).

3.3 Survey teams and training

The survey team was composed of individuals from international, national, district and local levels. The survey coordinator was positioned at the national level. His primary duties were obtaining ethical approvals, collaborating with officials, participation in survey development, gathering sampling data (population and sub-populations of areas to be surveyed), providing supervision of the interviews and overseeing the data entry.

Interviewers were district level health personnel selected by the Niger MoH. In order to reduce the possibilities of introducing bias into the survey, they were not allowed to have been involved in the December 2012 MDA. The interviewers were placed in teams of two. Both members of the team had to pass one of the two competencies in order to participate in the surveys. S/he needed to be able to understand sampling protocol and the necessity to follow the protocol. The second was a proficiency in the local language, as well as a general knowledge of the area being surveyed.

The Centers for Disease Control and Prevention (CDC) organized a two-day training which included sampling methodology, informed consent and instruction on how to administer a questionnaire. Training emphasized the need for strict adherence to protocol and the principal of randomization. The training included in class lectures, role-play exercises and one day practical training in the field.

3.4 Ethical considerations

The CDC was responsible for the assistance with protocol, providing technical support during the training and implementation, the analysis of data, and the reporting of the data to the Niger MoH. The protocol was evaluated by the CDC institutional review board (IRB) and was assessed to be a program evaluation activity and did not involve human subjects for research. Due to this, the project did not require a human subject research review and it was deemed that the project would provide indirect benefits through the information learned.

The survey coordinator at national level in Niger was responsible for ensuring that any required ethical approvals from national authorities were obtained. Verbal informed consent was collected prior to each interview in the local dialect following a verbal consent script (Appendix 4-6). If the respondent was under

the age of 18, verbal consent was asked from the head of the household or the legal guardian. Additionally, children aged 6 to 18 years were also required to give their own verbal consent to be interviewed.

3.5 Data Analysis

Data was entered into Excel in Niger by trained data entry staff and then sent to the CDC in Atlanta. It was then analyzed and calculated using Epi Info 3.5.4, SAS, version 9.1 and SUDAAN. Data was weighted according to population estimates and household estimates taking into account the probability of selection. Results were stratified by various conditions such as age, gender, knowledge and participation in the MDA. Comparisons of categorical data was made using Mantel Haenszel Chi square test.

Chapter 4: Results

4.1 Coverage Survey

Overall, 1711 participants were interviewed from 293 households in 30 villages. Of those interviewed, 49.9% (n=854) were female (Table 2). The median age of the respondents was 13 years (range: 0-98). Approximately one-fifth of those interviewed were under the age of 5 years (n=315, 18.5%) while over one-third (n=606, 35.4%) were of school-age, 5-14 years.

Table 2: Demographics and Participation Rate

Characteristics of Survey Participants n = 1,706		
	n =	%
under 5 yr.	315	18.5%
5-14 yr.	606	35.4%
15-25 yr.	313	18.3%
26-55 yr.	392	22.9%
≥ 56 yr.	80	4.7%

The overall MDA coverage assessed by the question “Did you take any drugs during the MDA?” was 80.2% (95% confidence interval (CI): 78.2% - 82.1%). Despite the coverage survey being carried out almost equally amongst genders, more women stated that they participated and took medications during the MDA. Of those surveyed, 75.5% (n=614, CI: 72.4%-78.4%) of men took a medication; while 83.7% (n=699, CI: 81.0%-86.1%) of women reported taking a medication during the 2012 MDA. The survey coverage for albendazole, ivermectin, and praziquantel in the targeted population of 5 years and above was 71.3% (95% CI: 69.0%-74.3%), 60.0% (95% CI: 57.1%-62.9%), and 65.6% (95% CI: 69.3%-74.1%), respectively. The survey coverage of azithromycin in the targeted population of 6 months and older was 71.8% (95% CI: 69.3%-74.1%) (Table 3). Levels of coverage were then broken down further into age categories (Table 4). Survey coverage of school-age children (5-14 years) fell at both extremes, achieving the highest drug coverage per age grouping for ivermectin (63.9%) and azithromycin (76.6%) and the

lowest levels of drug coverage of age groups for albendazole (70.3%) and praziquantel (63.1%). Survey coverage of school-age children met none of its targeted coverage goals.

Table 3: Summary of December 2012 MDA Coverage Survey

	Reported Coverage	Survey Coverage	95% CI
Any Drug (n=1651 respondents)		80.2%	78.2% - 82.1%
Albendazole (n = 1155 respondents)	96.9%	71.3%	69.0% – 74.3%
Ivermectin (n = 1156 respondents)		60.0%	57.1% - 62.9%
Azithromycin (n = 1399 respondents)	72.2%	71.8%	69.3% - 74.1%
Praziquantel (n = 1149 respondents)	86.0%	65.6%	62.8% - 68.4%

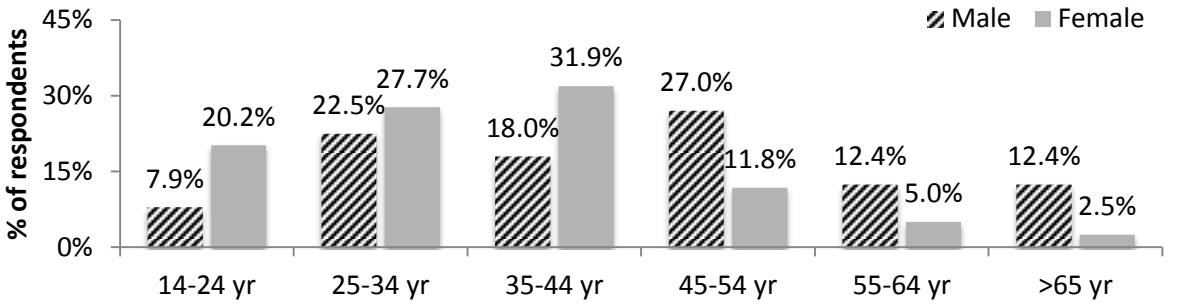
Table 4: Survey Coverage by Drug and Age Group

	6 mon-4yrs.	5-14 yrs.	15-25 yrs.	26-55 yrs.	≥ 56 yrs.
Ivermectin	-	63.9%	60.2%	56.5%	46.7%
Albendazole	-	70.3%	72.0%	72.7%	77.6%
Azithromycin	71.5%	76.6%	69.0%	68.0%	56.9%
Praziquantel	-	63.1%	66.3%	69.2%	65.5%

4.2 Knowledge, Attitudes, and Practices (KAP) Survey

Overall, 291 individuals participated in the KAP survey from 293 households in 30 villages. Two individuals refused to participate in the survey. Of the KAP respondents, 52.1% (151 of 286) were female and the median age of all respondents was 38 years (range: 14-80). Male KAP respondents' median age was 42 years (range 18-80) and among females the median age was 34 years (range: 14-76) (Figure 2). Of those that responded, 76.9% (223 of 290, 95% CI: 71.6% - 81.6%) reported taking medicine during the last MDA, of whom 57.8% (129 of 223) were female. Among KAP respondents, 48.5% (141 of 291) were the head of household.

Figure 2: KAP Participants by Age and Gender



4.2.1 Lymphatic Filariasis (LF) Knowledge

In all, 66.0% (192 of 291; 95% CI: 60.2%-71.4%) of those surveyed had "heard of LF"; 75.3% (143 of 190) of the respondents that had "heard of LF" took medications during the MDA. No significance was found in those who heard of LF and participation in the MDA when compared to those who had not heard of LF. Both males and females aged 25-34 years and females aged 35-44 years were the most likely to have heard of LF (Figs. 3 and 4).

Figure 3: "Have heard of LF" Females by Age

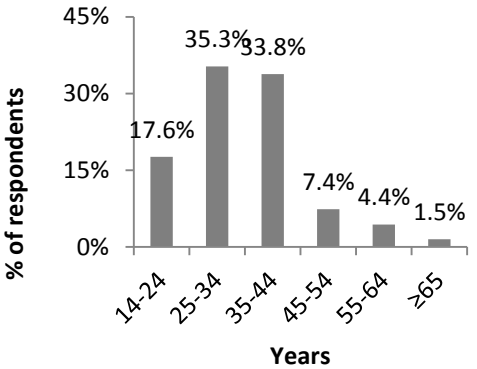
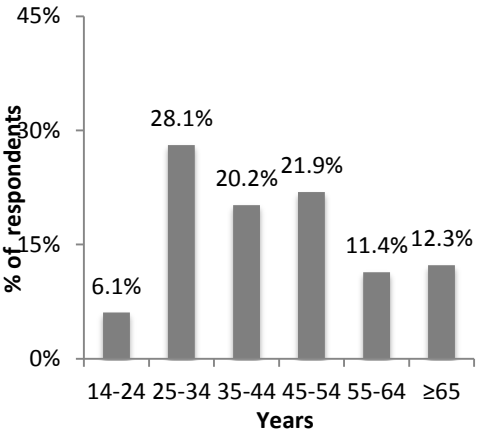


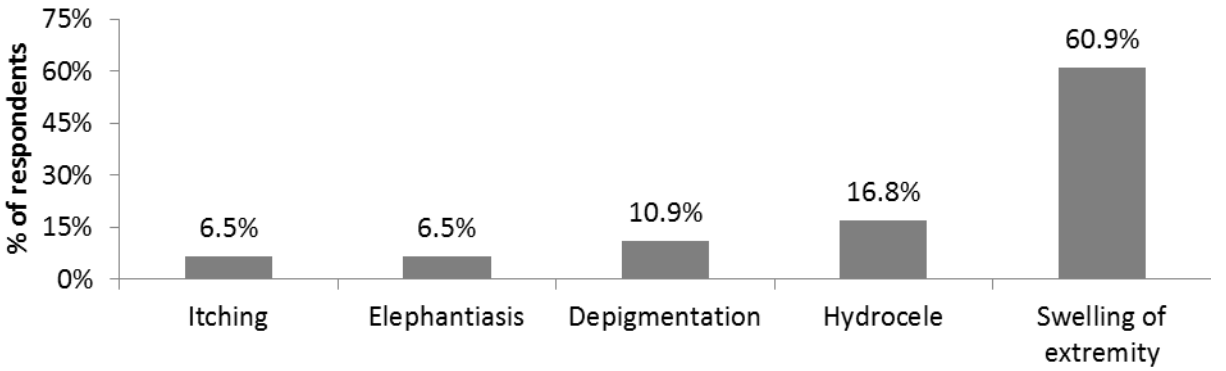
Figure 4: "Have heard of LF" Males by Age



Of those that had heard of LF, 28.2% (46 of 163) of respondents believed they knew one or more symptom(s) of LF. The majority of those that gave a response (60.9%, 28 of 46) correctly reported swelling of extremity as a symptom of LF (Fig. 5). Other correct answer included hydrocele (16.8%) and

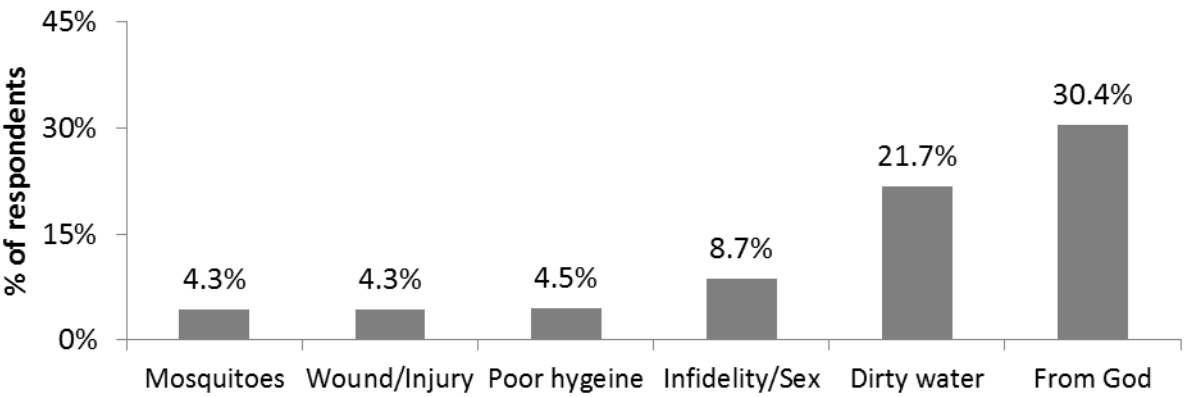
elephantiasis (6.5%). In all, 146 respondents who had heard of LF (76.0%) did not answer the question or stated that they did not know a symptom of LF.

Figure 5: "What are the symptoms of LF?" (n=46)



When interviewed, 24.2% (46 of 190) of respondents believed they knew one or more way(s) in which one becomes infected with LF; but only two individuals (4.3%) correctly knew that LF is transmitted by mosquitoes (Fig. 6). A little less than a third of respondents (30.4%, n=14) believed that developing LF was an act of God; while ten respondents thought LF was transmitted through dirty water. In all, 146 respondents who heard of LF (76.0%) did not answer the question or stated that they did not how one becomes infected with LF.

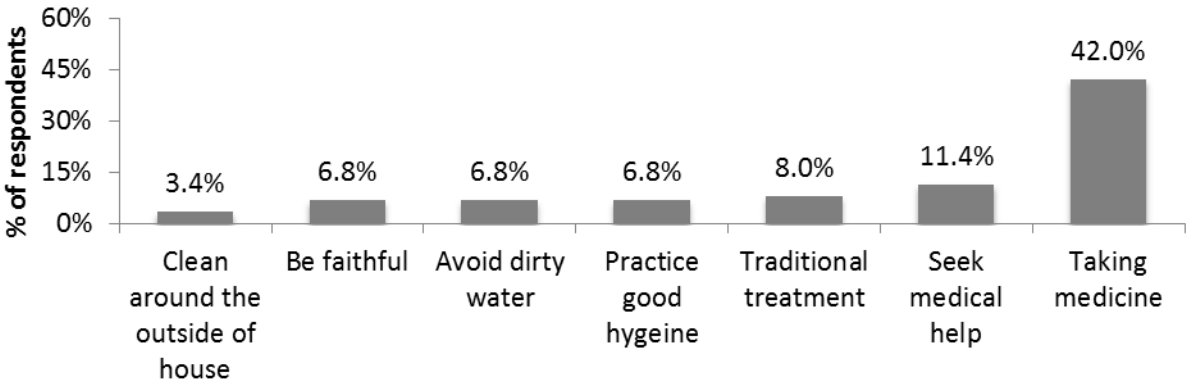
Figure 6: "How does one become infected with LF?" (n=46)



Nearly half of KAP respondents, 47.8% (88 of 184) who had heard of LF believed they knew one or more way(s) in which to prevent LF; 42.0% (37 of 88) of those that gave a response correctly knew that taking medicine can prevent LF (Fig. 7). Other answers that were given were to seek medical help

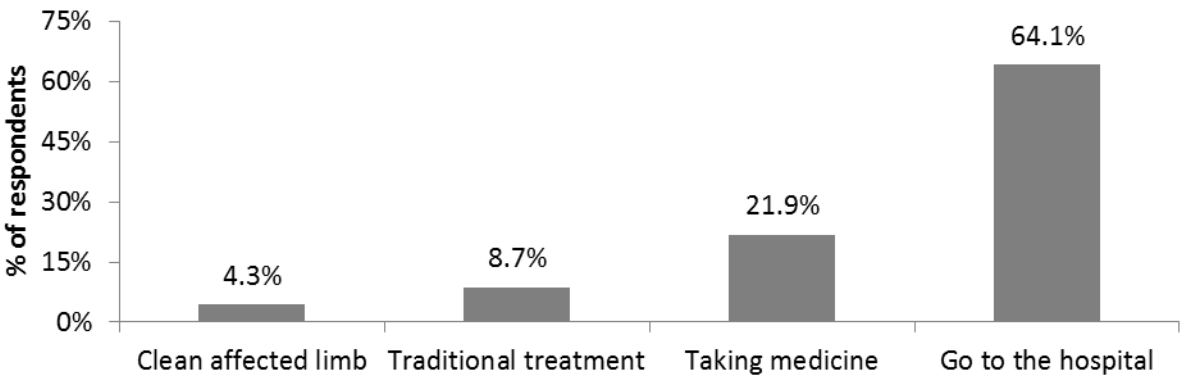
(11.4%) and traditional treatment (8.0%). Being faithful, avoiding dirty water and practice good hygiene were each stated by 6.8% or 6 respondents. In all, 104 (54.2%) respondents did not answer the question or stated that they did not know a way to prevent LF.

Figure 7: "How does one prevent LF" (n=88)



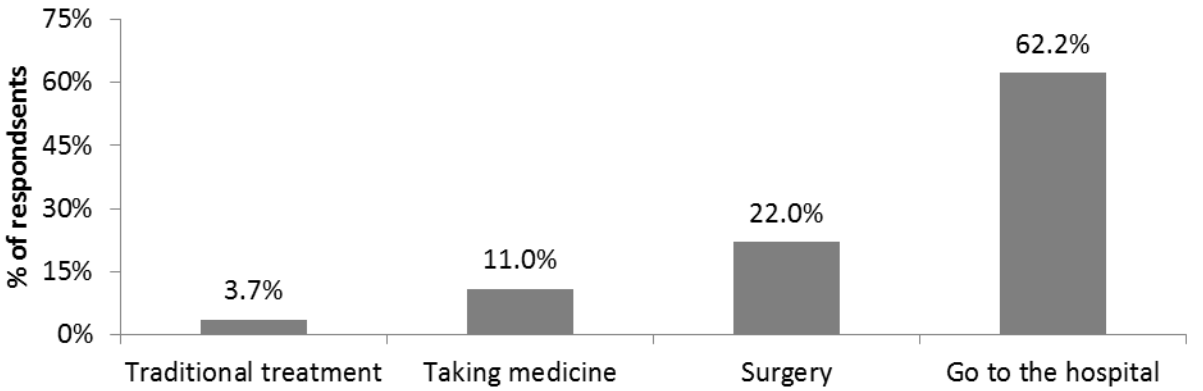
Of those that had heard of LF, 38.5% (65 of 169) of respondents believed they knew one or more way(s) in which to treat elephantiasis. Among those that knew one (or more) methods of treatment, 64.1% (41 of 64) identified going to the hospital could help treat elephantiasis; while only 2 KAP respondents knew that cleaning the affected limb could help treat elephantiasis (Fig. 8). Taking medication was reported by 21.9% of respondents; while 8.7% said that elephantiasis can be treated by traditional treatment. In all, 127 respondents (66.1%) of those that heard of LF did not answer the question or stated that they did not know a way to treat elephantiasis.

Figure 8: "How does one treat elephantiasis?" (n=64)



Nearly half of those having heard of LF (51.8%, 82 of 170) believed they knew one or more way(s) in which to treat hydrocele. Among those that knew how to treat hydrocele, 62.2% (51 of 82) responded that going to a hospital could treat hydrocele (Fig. 9). Other correct answers included having surgery (22.0%, 18 of 82) and taking medicine (11.0%, 9 of 82). In all, 110 respondents (57.3%) who stated they knew of LF did not answer the question or stated that they did not know a way to treat hydrocele.

Figure 9: "How does one treat hydrocele?" (n=82)



4.2.2 Soil-transmitted Helminthiasis (STH) Knowledge

In all, 93.8% (272 of 290; 95% CI: 60.2%-71.4%) of those surveyed had “heard of STH”. In all, 77.0% (208 of 270) of the respondents that had heard of STH took medications during the MDA. Males who “heard of STH” were 4.6 times (95% CI: 4.4–4.8) more likely to take medication during the MDA than those that did not know about STH Both females and males aged 25-34 years and females aged 35-44 years were the most likely to have heard of STH (Figs. 10 and 11).

Figure 10: "Have heard of STH" Females by Age

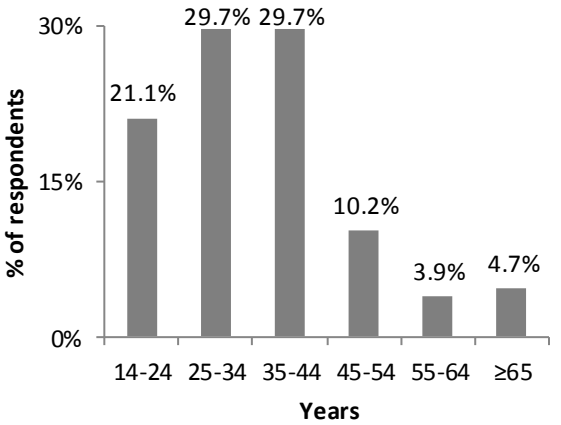
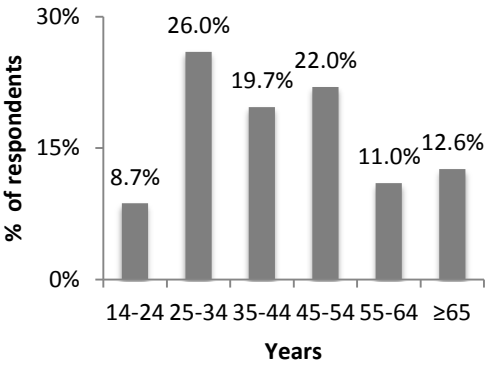
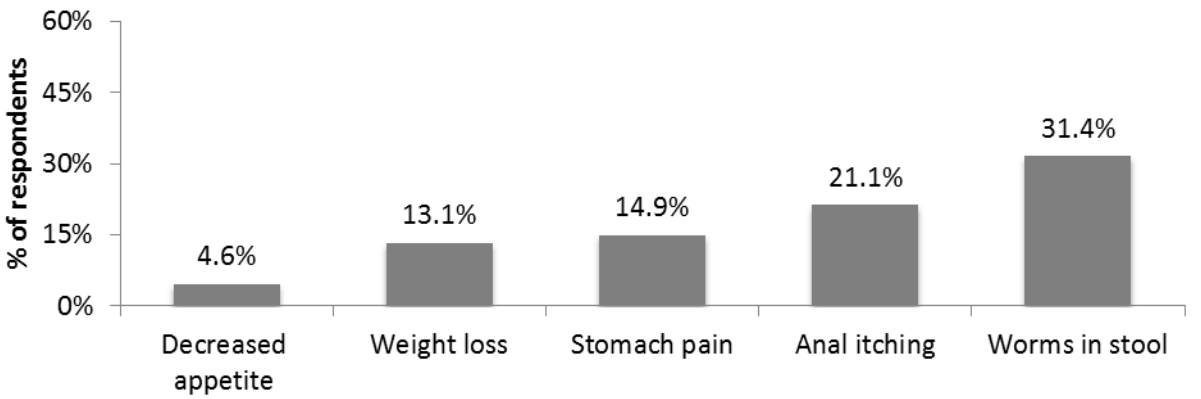


Figure 11: "Have heard of STH" Males by Age



Of those who had "heard of STH", 69.4% (175 of 252) of respondents believed they knew one or more symptom(s) of STH. Correct answers included, worms in stool (31.4%, 55 of 175), anal itching (21.1% 37 of 175), stomach pain (14.9%, 26 of 175) and weight loss (13.1%, 23 of 175) (Fig. 12). In all, 97 respondents (35.7%) of those that "heard of STH" did not answer the question or stated that they did not know a symptom of STH.

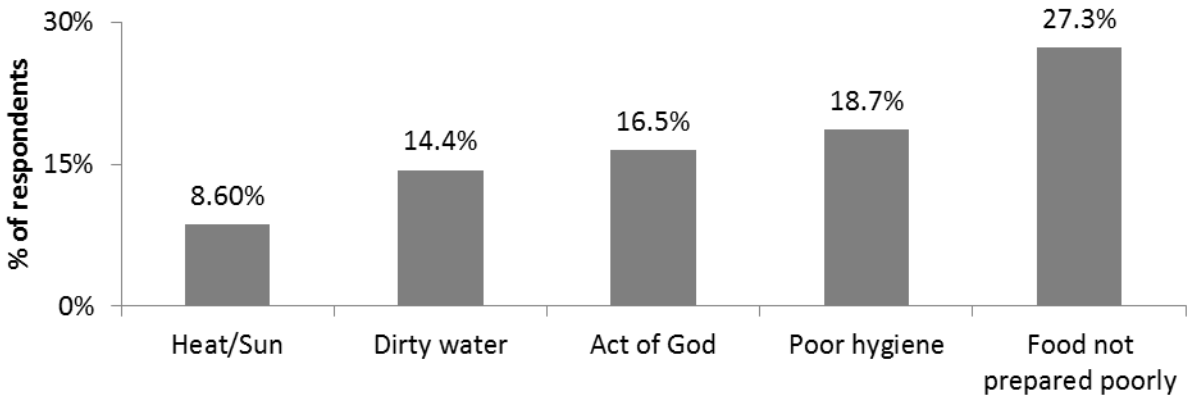
Figure 12: "What are the symptoms of STH?" (n=175)



Over half of those interviewed that "knew of STH", 55.4% (139 of 271) of respondents, stated they know one (or more) ways in which STH is transmitted; twelve of the respondents responded that a person is infected with STH by heat or sun (Fig. 13). The correct answer of through food not being prepared

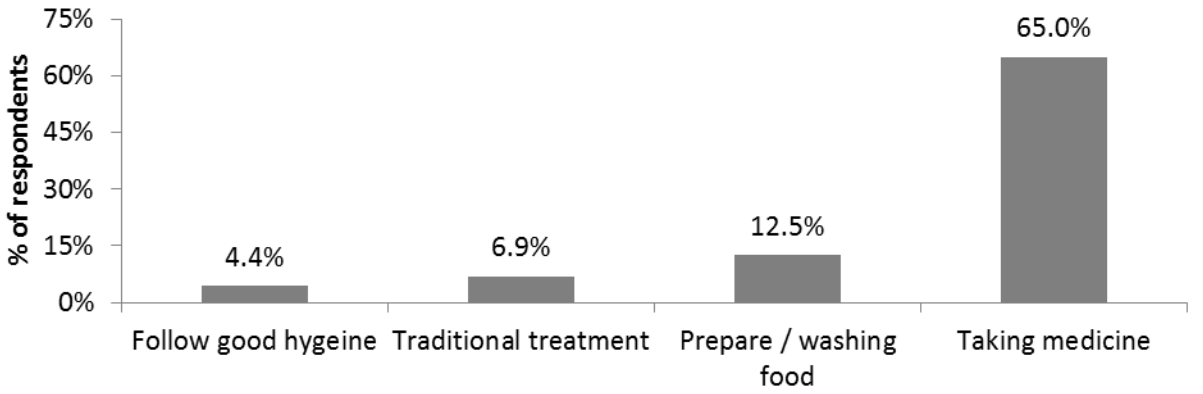
properly was given by 27.3% (38 of 139). In all, 133 of respondents who “knew of STH” (48.9%) did not answer the question or stated that they did not know how one becomes infected with STH.

Figure 13: "How does one become infected with STH?" (n=139)



Of those interviewed, 64.5% (160 of 248) of KAP respondents believed to know one (or more) ways in which STH is prevented; 65.0% (104 of 160) knew that STH can be prevented by taking medicine (Fig. 14). Twenty persons (12.5%) reported that properly preparing and washing food could help prevent STH. In all, 112 respondents (41.2%) of those who knew about STH did not answer the question or stated that they did not know a way in which one prevents STH infection.

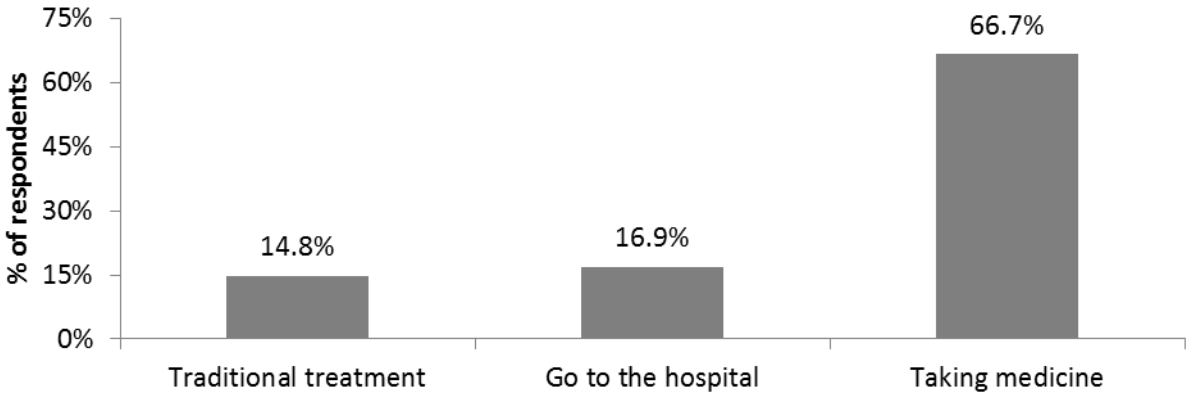
Figure 14: "How does one prevent STH?" (n=160)



The large majority of those who reported hearing of STH, (81.0%, 189 of 232) believed to know one (or more) ways in which it is treated. Of those that replied, respondents correctly answered taking medicine (66.7%, 126 of 189) and going to the hospital (16.9 %, 32 of 189) could treat STH (Fig. 15). In all, 83

respondents (30.5%) did not answer the question or stated that they did not know a way to treat STH infection.

Figure 15: "How does one treat STH?" (n=189)



4.2.3 Schistosomiasis Knowledge

In all, 72.2% (210 of 291; 95% CI: 66.6%-77.2%) of those surveyed had heard of schistosomiasis; 80.3% (167 of 208) of the respondents that had heard of schistosomiasis took medications during the MDA. Respondents who had "heard of schistosomiasis" were 1.9 times (95% CI: 1.89-1.94) more likely to take medications during the MDA than those who had not heard of schistosomiasis. Females aged 35-44 years and males aged 25-34 years were most likely to have heard of schistosomiasis (Figs. 16 and 17).

Figure 16: "Have heard of Schistosomiasis" Females by Age

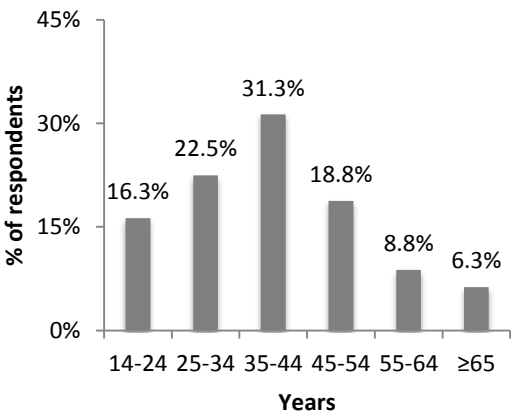
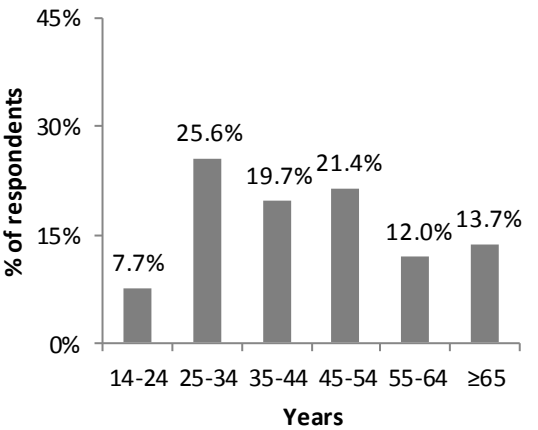
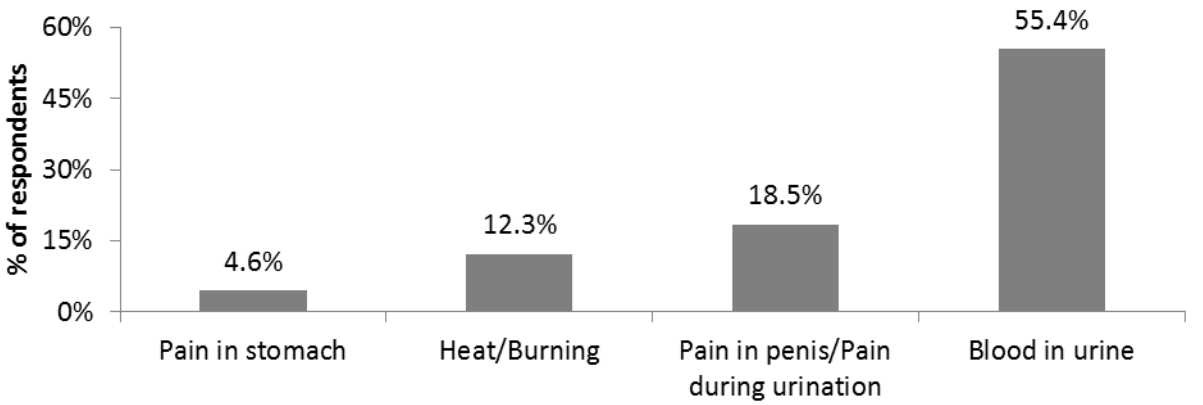


Figure 17: "Have heard of Schistosomiasis" Males by Age



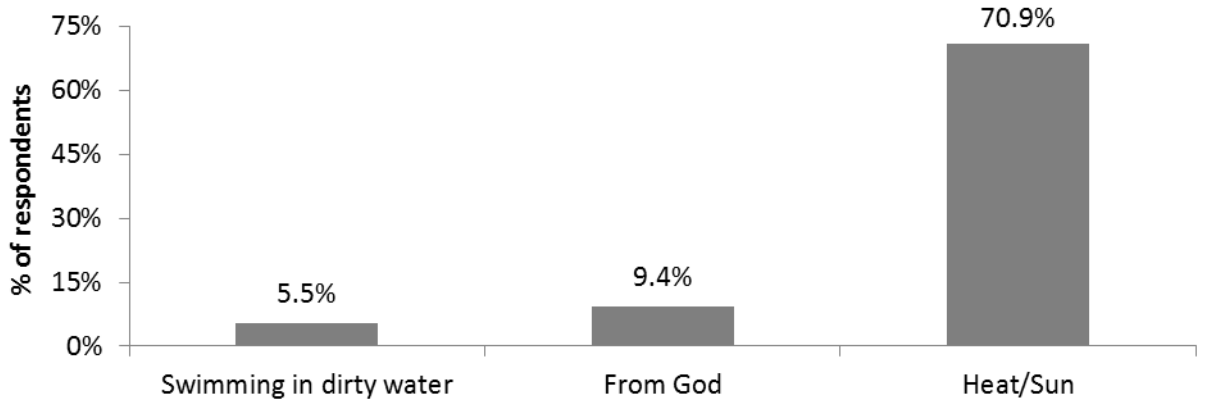
Of those who had heard of schistosomiasis, 68.1% (130 of 191) of respondents believed they knew one or more symptom(s) of schistosomiasis. In all, 55.4% (72 of 130) of respondents correctly answered that bloody urine was a symptom of schistosomiasis while not one respondent reported blood in stool (Fig. 18) as a symptom. In all, 80 respondents (38.1%) of those who had heard of schistosomiasis did not answer the question or stated that they did not know a symptom of schistosomiasis.

Figure 18: "What are the symptoms of schistosomiasis?" (n=130)



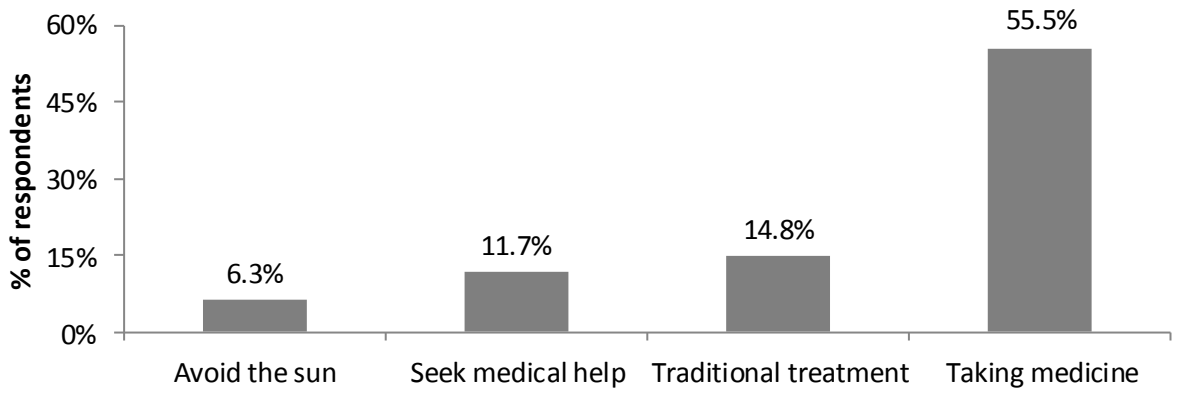
More than 60% (127 of 209) of respondents believed they knew one or more way(s) in which one becomes infected with schistosomiasis. The majority of those that gave a response (70.9%, 90 of 127) answered that one becomes infected by the heat or sun (e.g. “heat”, “heat of the sun”, “working in the sun”, or “sun”) (Fig. 19). Only seven respondents reported that schistosomiasis could be spread through swimming or being in dirty water. In all, 83 respondents (39.5%) did not answer the question or stated that they did not know a way in which one becomes infected with schistosomiasis.

Figure 19: "How does one become infected with schistosomiasis?" (n=127)



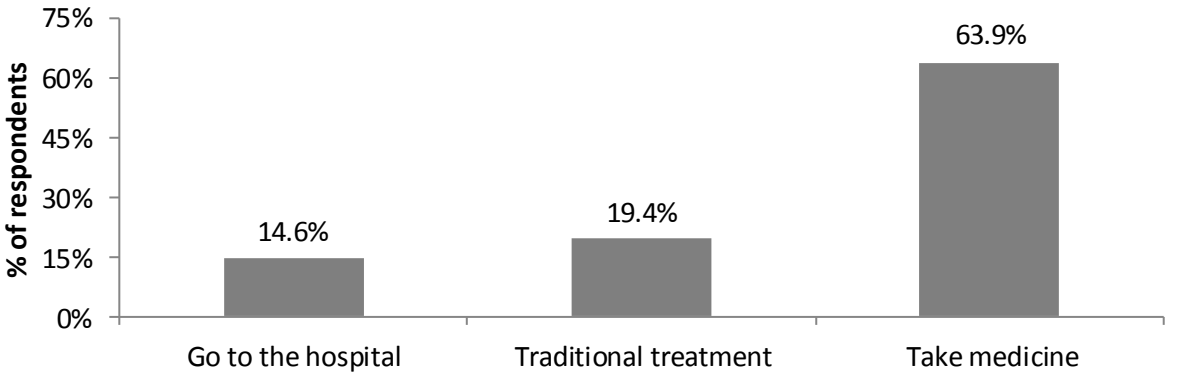
Of those who had heard of schistosomiasis, 65.0% (128 of 197) of respondents believed they knew one or more way(s) in which one can prevent schistosomiasis. In all, 55.5% (71 of 128) responded that schistosomiasis can be prevented by taking medicine; while 1.6% (2 of 128) answered avoiding swimming in water could prevent the transmission of schistosomiasis (Fig. 20). Eight respondents (6.3%) answered that avoiding the sun could prevent the disease. In all, 82 respondents (39.0%) did not answer the question or stated that they did not know a way in which one can prevent schistosomiasis.

Figure 20: "How does one prevent schistosomiasis?" (n=128)



More than half of those who reported hearing of schistosomiasis (57.9%, 144 of 184) believed they knew one or more way(s) in which one can treat schistosomiasis. The majority of which (63.9%, 92 of 144) correctly answered that schistosomiasis could be treated with medicine. Other answers included traditional treatment (19.4%, 28 of 144) and going to the hospital (14.6%, 21 of 144) (Fig. 21). In all, 66 respondents (31.4%) did not answer the question or stated that they did not know how to treat schistosomiasis.

Figure 21: "How does one treat schistosomiasis?" (n=144)



4.2.4 Trachoma Knowledge

In all, 86.6% (252 of 291; 95% CI: 82.1%-90.3%) of those surveyed had heard of trachoma; 76.8% (192 of the 250) of respondents that had heard of trachoma took medications during the MDA. When stratified between gender, men who had heard of trachoma were 1.92 times (95% CI: 1.89-1.94) more likely to take medication during the MDA than those who did not know about trachoma. Both females and males aged 25-34 years and females aged 35-44 years were most likely to have heard of trachoma (Figs. 22 and 23).

Figure 22: "Have heard of Trachoma" Females by Age

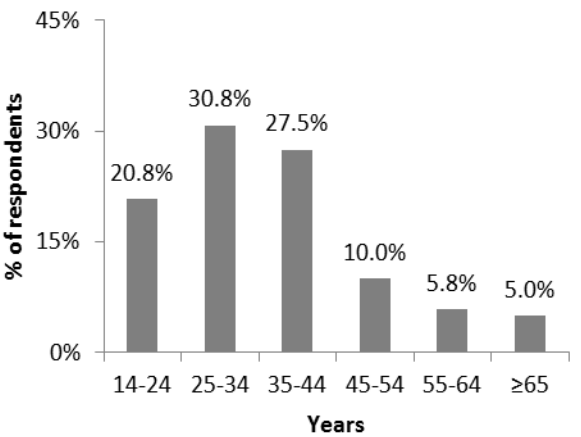
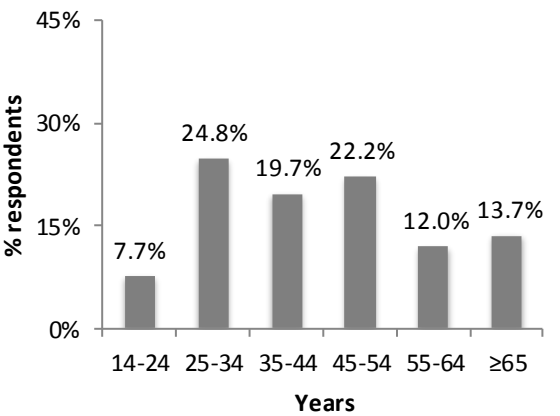


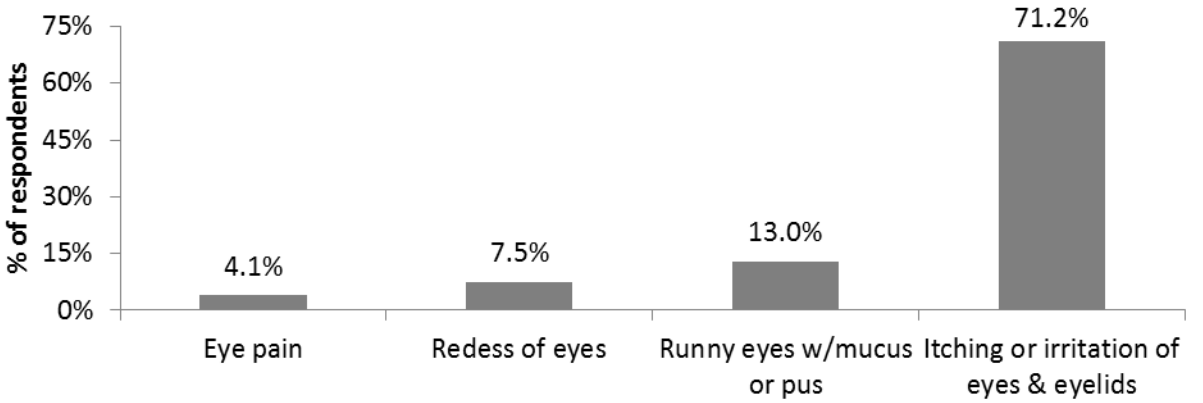
Figure 23: "Have heard of Trachoma" Males by Age



Almost three-fourths of the respondents who had heard of trachoma (73.4%, 146 of 199) believed they knew one or more symptom(s) of trachoma. The majority of respondents, 71.2% (104 of 146), gave a

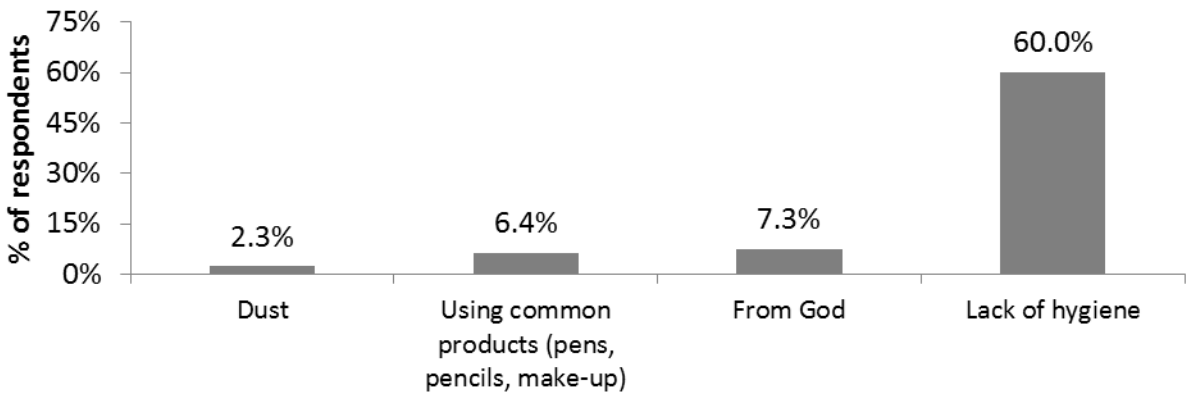
correct response of itching or irritation of eyes and eyelids as a symptom of trachoma (Fig. 24). Other correct answers were eyes runny with mucus and pus (13%, 19 of 199) and redness of eyes (7.5%, 11 of 146). In all, 106 respondents (42.1%) of those who stated they heard of trachoma did not answer the question or stated that they did not know a symptom of trachoma.

Figure 24: "What are the symptoms of trachoma?" (n=146)



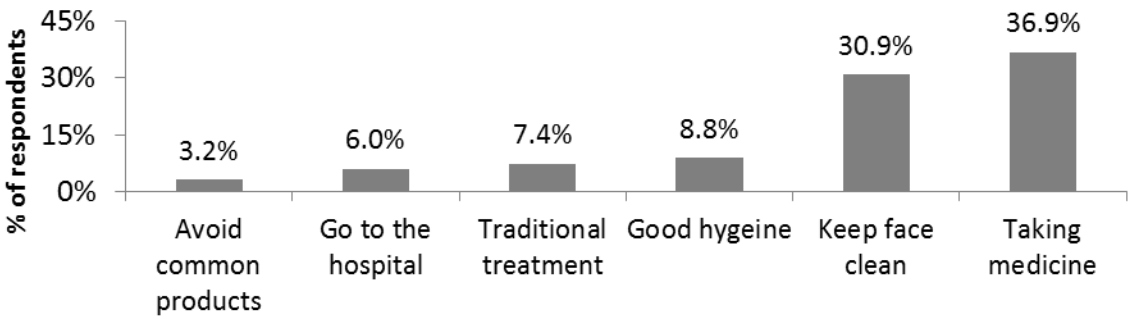
Over half of those that heard of trachoma, 54.6% (119 of 218) of respondents, believed they knew one or more way(s) in which one becomes infected with trachoma. The majority (58.0%, 69 of 119) answered correctly that one becomes infected by the lack of hygiene, both personal and environmental (Fig. 25). Another correct answer that was given by 14 respondents (6.4%) was using common products like pen, pencils or eye make-up. In all, 133 respondents (52.8%) of people who reported hearing of trachoma did not answer the question or stated that they did not know how one becomes infected with trachoma.

Figure 25: "How does one become infected with trachoma?" (n=119)



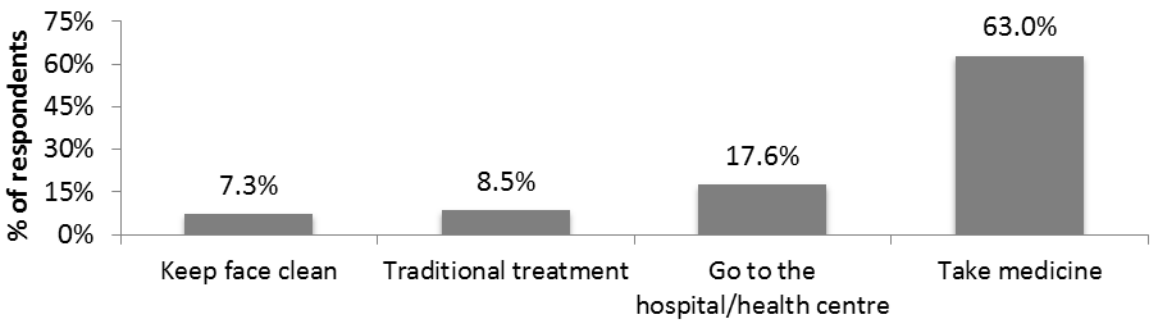
Of those who hear of trachoma, 98.6% (217 of 220) of respondents believed they knew one or more way(s) in which one can prevent trachoma. Of those who responded, 36.9% (80 of 217) correctly stated that trachoma can be prevented by taking medicine; while 30.9% (67 of 217) also correctly answered by keeping one's face clean could prevent trachoma (Fig. 26). In all, 35 respondents (13.9%) did not answer the question or stated that they did not know a way in which one can prevent trachoma.

Figure 26: "How does one prevent trachoma?" (n=217)



The majority of those that heard of trachoma, 80.1% (165 of 206) believed they knew one or more way(s) in which one can treat trachoma. In all, 63.0% (104 of 165) of respondents accurately answered that trachoma could be treated with medicine (Fig. 27); while 12 of 165 answered keeping one's face clean. In all, 87 respondents (34.5%) did not answer the question or stated that they did not know a way one can treat trachoma.

Figure 27: "How does one treat trachoma?" (n=165)



4.2.5 Additional KAP Questions

Additionally, KAP respondents were asked if they knew anyone in their household or village that had symptoms of LF (elephantiasis and/or hydrocele), schistosomiasis (hematuria) or *Trachomatous Trichiasis* (TT). Trachoma was the most commonly identified disease with more than half of the respondents, 69 respondents or 50.7%, reported knowing someone in their village with in-turned eyelashes (Figs. 28 and 29). Additionally, women who knew someone in their house with an in-turned eyelid were 2.05 times (95% CI: 1.98-2.13) more likely to take medication during the mass distribution than women that did not have someone in their household with an in-turned eyelash. Men knowing someone in the household did not significantly change their odds of participation in the MDA. However, men knowing someone in the village with hydrocele were 4.26 times (95% CI: 4.11-4.41) more likely to take medications during the 2012 MDA than men who did not know someone in the village with hydrocele. Women who knew someone in the village with hydrocele were only 1.47 times (95% CI: 1.39-1.55) more likely to take medications during the 2012 MDA than women who did not know someone in the village with hydrocele.

*Figure 28: Know Someone with Symptoms: Within Household**

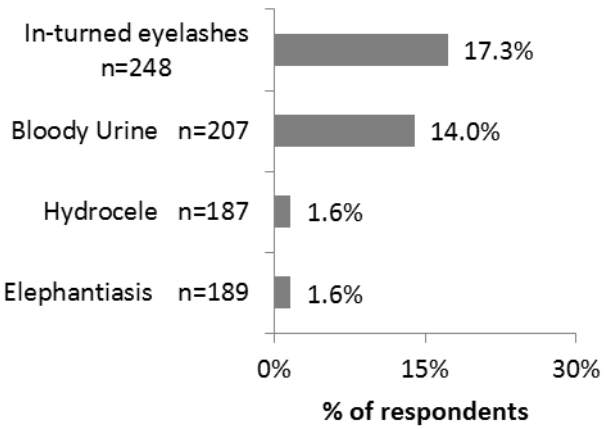
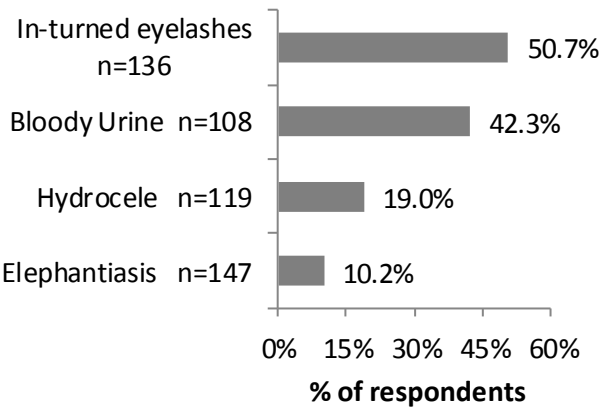


*Figure 29: Know Someone with Symptoms: Within Village**



The most common response for not taking the medicine during the December 2012 was that respondents were not at home (67.3%, 33 of 49). Other common answers are included in Table 4. Of those that took the medicine, 12.0% (25 of 209) reported that they experienced side effects. Fatigue

(33.3%), fever (16.7%) and diarrhea (16.7%) were the most common side effects reported (Table 5). No severe side effects were reported.

Table 4: Reasons for not taking medication during the MDA (n=49)

Why did you not take the medication?	%	n
I was not at home	67.3%	33
The distributor did not come	8.2%	5
I was sick	4.1%	2
Was given no information	4.1%	2
-Other answer with >4% response include: "Was pregnant", "afraid of side effects", "medications were broken", "I was not sick with a disease"		

Table 5: Reported side effects (n=48)

What side effect did you have?	%	n
Fatigue	20.8%	10
Diarrhea	20.8%	10
Dizziness	20.8%	10
Fever	10.4%	5
General pain	10.4%	5
Vomiting	10.4%	5

Of those surveyed, 79.2% (225 of 288) of KAP respondents answered that they could procure water during the dry season in 10 minutes or less. The median time it took to get water during the dry season was 5.0 minutes, the mean time was 9.7 minutes, and range was 0-180 minutes (Fig. 30). Over half of the respondents, (63.4%, 177 of 279) of the respondents answered that they use a field as their main form of sanitation; while the bush was reported by 23.3% (65 of 279) of those surveyed (Table 6). Only 12.9% of KAP respondents (n=37) reported using a latrine to deficate.

Figure 30: Time to Fetch Water in the Dry Season (n=288)

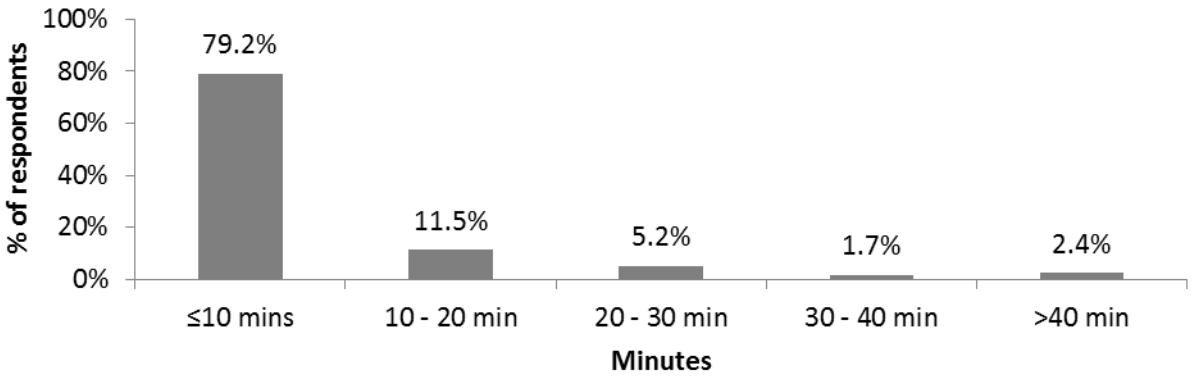


Table 6: Sanitation Characteristics of Survey Population (n=286)

Sanitation	%	n
Field	61.2%	175
The bush	25.5%	73
Latrine	12.9%	37

Chapter 5: Discussion, Conclusions and Recommendations

5.1 Discussion

The objective of this evaluation was not only to estimate the percent drug coverage of LF, STH, schistosomiasis and trachoma in the Madaoua district, but also to evaluate the knowledge, attitudes and practices concerning the neglected diseases in the targeted communities. The information acquired from both surveys provides essential feedback to the Niger MoH and partners. Moreover, the survey results aid in identifying changes that can be made to improve drug coverage for these four endemic diseases in the goal of elimination and control.

Overall, the survey coverage was found to be dramatically lower than the reported coverage with the exception of azithromycin. Due to this, some caution should be taken when interrupting the reported coverage results. Inaccurate figures could have been the result of the 2013 estimated population being calculated on a population adjustment of 3.1% per year. This percent increase was based on a combination of historical census surveys and was added equally each year after the 2001 census. These projections might not have accurately represented the increase for each of the 12 years, thus potentially causing the reported coverages' denominator to either be smaller or larger than the actual target population, thus making accurate coverage rates difficult to calculate. Although the estimated population is not perfect, these projections are our best indicator of population estimates outside of official census.

The "any drug" coverage indicated that the MDA did a good job in moving towards the target goals of the elimination of LF and trachoma and the control of STH and schistosomiasis. When the survey coverage was broken down further, to specific drug coverage and identifying which age groups benefited the most, it is easy to appreciate that progress still needs to be made to obtain the level required for control and elimination of these four diseases.

- **Ivermectin**: The survey coverage for ivermectin was low at 60.0%. The WHO recommended target for elimination of LF is maintaining coverage at or above 65% for 5 years [21]. Not one age grouping (5 -14, 15-25, 26-55 or ≥56 years) reached above the 65% elimination goal.
- **Albendazole:** In the MDA, albendazole serves dual purposes. It is administered alongside ivermectin as PCT for the elimination of LF, but is also useful in the control of STH and

schistosomiasis. Although meeting its coverage goal for LF elimination with levels of coverage above 65% in all four age groups (5-14, 15-25, 26-55 and ≥56 years) [21], albendazole coverage still falls below the target for school-age children needed for the control of STH and schistosomiasis. Our coverage survey found the level of participation in children 5 to 14 years just missed the 75% goal at 70.3% [11].

- **Praziquantel**: Also used in the control of STH and schistosomiasis, praziquantel also fell below the WHO target of 75% [2, 11]. The survey coverage of praziquantel was at its lowest level for school-age children falling far below the goal at 63.1%.
- **Azithromycin:** Azithromycin was the only medication that the reported coverage and the survey coverage were the equivalent. Despite this, azithromycin survey coverage still fell short of its coverage goal needed for the elimination of trachoma. The WHO target for trachoma control is at or above 80% coverage [94]. The azithromycin survey coverage was 71.5% and not one age category met or surpassed the needed coverage. School age children reported the highest coverage at 76.6%.

The coverage survey was subject to several limitations. One limitation is that the survey was conducted 6 months following the MDA introducing the potential for recall bias. However, a 2009 study in Togo examining participation recall after an integrated MDA found that more than 80% of respondents were able to accurately recall compliance of a three drug regimen up to one year post MDA (Budge, unpublished) [13]. The same study conducted by Budge in Togo also demonstrated that survey respondents were able to distinguish between different pills co-administered during an integrated MDA with >80% accuracy, thus signifying that coverage surveys could provide drug-specific coverage estimates following integrated MDAs (Budge, unpublished, ASTMH ppt.). Another limitation to the survey was in the form of data collection. Parents served as proxies for their children who were possibly not at home for the MDA and who took the medications at school. When serving as a proxy, the parent may not have been able to give a reliable report of the true intake of all of the children in their household.

The overall knowledge of the targeted diseases was poor. The majority of KAP respondents had heard of the diseases, but in many cases this familiarity with the disease did not equal actual knowledge of symptoms, transmission, prevention and treatment. It is probable to think that these lower levels of

knowledge of the targeted NTDs could stem from the absence of an educational campaign in the Madaoua district in 2012. Previous studies have shown that in communities that are endemic to NTDs, if the knowledge of the disease is low, the residents in the community will give its prevention a low priority [65]. Likewise, it was shown that if information, education and communication (IEC) activities are carried out in a community, the community's participation in MDAs is increased [95].

A 2010 Cantey et al. study verified that targeted education programs increase MDA participation and drug coverage [91]. It was shown that educational programs need to not only make people aware of the MDA in advance, but also to educate the community on the medications, risk factors, symptoms, and that medications are safe [91]. Moreover, populations living in endemic areas like Madaoua need to be targeted with appropriate health education messages that are culturally specific and have more involvement of the communities themselves, particularly a political or administrative figure, who is respected by the community [89]

There were several limitations to the KAP survey. After conducting the random walk method in order to randomize the selection of households in village, another further step was to be taken. The interviewers were to randomly select an adult, aged 14 or above, in the selected household. Due to circumstances beyond our control, the KAP respondent was not randomly selected and the head of households were asked to represent the family for the survey. If the head of the household was not present at the time of survey or MDA, the wife of the head of household was then selected to participate in the KAP survey. Another limitation to the KAP survey was the questionnaire. Some of the questions appeared to confuse participants as shown by their responses not always addressing what the question intended. The questionnaire also used several skip patterns. These skips seemed not only to confuse some of the interviewers, but also the data entry personal. Due to this, all data needed to be re-verified through scanned copies at the CDC office in Atlanta to ensure surveys information was entered correctly.

5.2 Conclusions

The evaluation of Niger's integrated mass drug administration for neglected tropical diseases was of great importance. Through the coverage survey, a discrepancy was discovered between the initial

reported drug coverage and the survey coverage. Finding where this difference stems from and the early identification of coverage levels lower than that of WHO target goals can lead to improved success of future MDAs in the Madaoua district and aid in the overarching goal of elimination and/or control of NTDs in Niger. If the low levels of coverage were unnoticed, it may have led to premature impact evaluations [13].

The success of a control and elimination program is largely dependent on the community's awareness of the diseases in which they are trying to treat [91]. Through the KAP survey, program evaluators can identify misconceptions in the communities (e.g. sun infects people with schistosomiasis) and detect ways in which to improve the MDA. Regardless of knowledge levels not significantly effecting MDA participation, gaps in education should be addressed. Increase in health education often results in an increase in drug coverage and MDA participation.

Despite the limitations of the coverage and KAP surveys, they serve as great tools for assessing the treatment coverage and barriers to compliance. Through this evaluation, we can identify areas in need of improvement and develop strategies to increase the communities' participation and awareness. The Niger MoH and stakeholders now have a window into the endemic targeted communities and can modify the MDA program with applicable health messages and appropriate drug delivery strategies.

5.3 Recommendations

Education should not only be provided for MDA participation, but also for the early identification and treatment of these diseases in the community. Education concerning NTDs should not be limited to the diseases themselves, but also broader prevention techniques (i.e. boiling water, proper hygiene, etc.) that can help guard against not only the targeted NTDs, but also other deadly and high morbidity diseases.

Moreover, it is paramount to remember that drugs/PCT alone will not eliminate NTDs from endemic countries like Niger. Water, sanitation and hygiene (WASH) measures also play a key role in the success of the elimination and control of these diseases. WASH measures are particularly important as only 12.9% (37 of 286) of the respondents answered that they use a latrine as their main form of sanitation; while 86.7% report defecating in the bush or field. Additionally, there needs to be an increased attention paid to school-age children, as they require the highest levels of coverage.

The WHO has recommended that KAP surveys be integrated with drug-coverage surveys as they expose the factors that contribute to a person's participation or lack thereof in MDAs [96]. The success of an elimination program and MDA is largely dependent on community knowledge of the disease. Because of this, it is important for national governments and elimination programs to not only know the drug coverage of an MDA, but to fully understand the knowledge, attitudes and misconceptions of the subjects at risk and the possible reasons for non-compliance. If these factors are fully understood, health-education messages can be appropriately targeted and motivate the populations to participate [97]. Until coverage goals are reached and sustained, untreated individuals have the potential to act as reservoirs of transmission [22]; thus inhibiting reaching the global goal of elimination of LF and trachoma and controlling STH and schistosomiasis.

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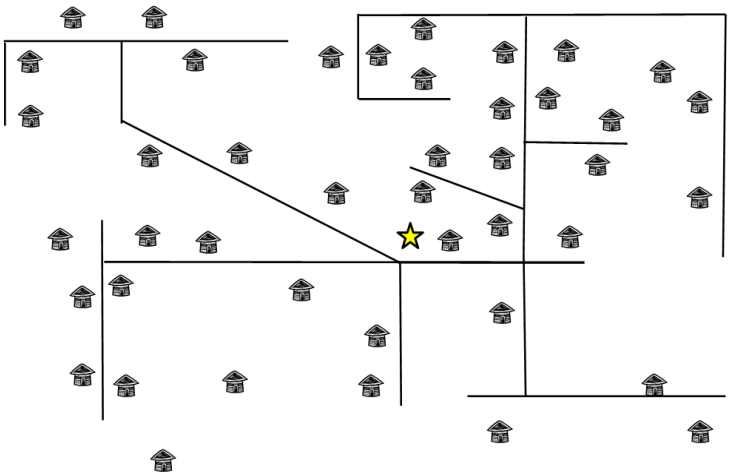
Appendix 1: Random Walk Method

Modified Random Walk Procedure

- **Step 1: Choose a central location**: Choose a central point with the consultation of the village chief or guide. Possible locations include a mosque/church or the chief's house. Then find a crossroad near this centre point.

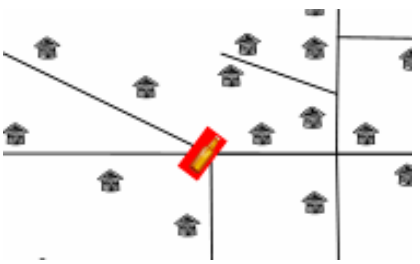
Figure 1: Choosing a central location for the selection of houses



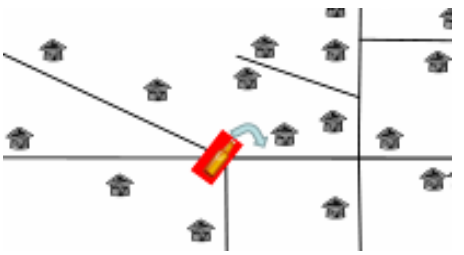
- **Step 2: Turn the bottle or pen** at the crossroad. The direction indicated by the bottle or pen top is the direction you will follow. If there is not a road in the direction indicated, turn the bottle in a clockwise manner until you find a route.

Figure 2: Turning the bottle for the selection of the direction

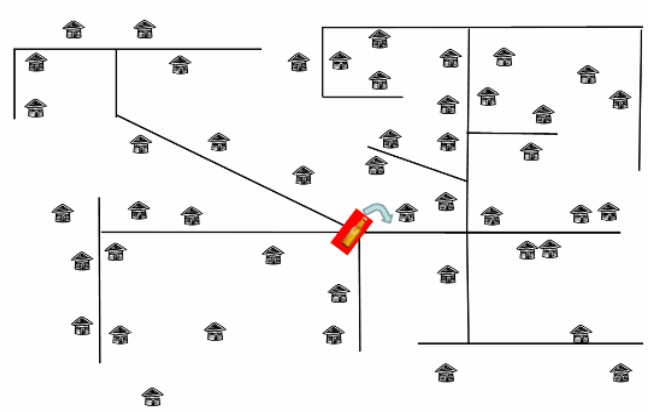
No road in the direction indicated



The bottle is turned clockwise



The selected direction

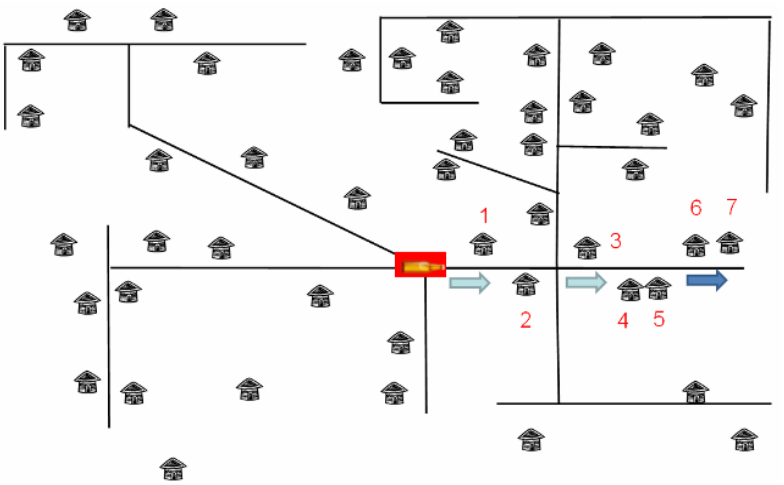


- **Step 3: Walk to the end of the village.** Make an imaginary line between the central point and the village limit. Walk in the direction of this line. Attempt to walk straight forward and maintain on the road if possible. If available, use the sun as a reference guide. Do not only use big roads; instead use the one in the right direction

Figure 3: Walking to the end of the village

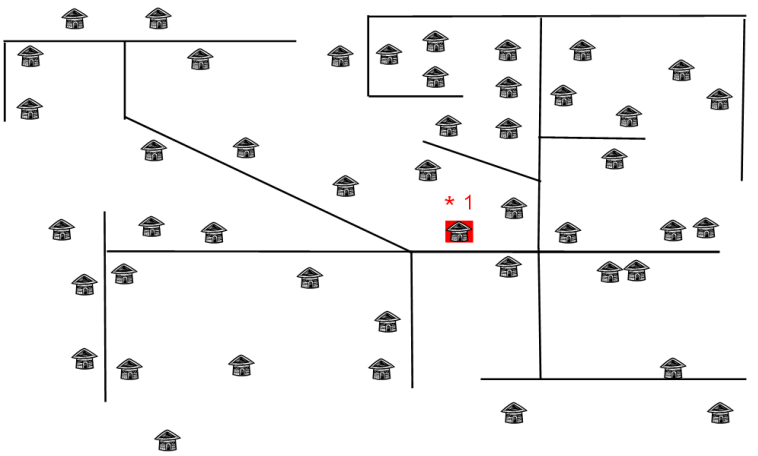
- **Step 4: Count all the houses:** Count all the houses on both sides of the road, between the central point and the village limit, include only habitated houses. Do not count shops, schools, etc. Write out the number of the house with chalk on a tree, fence or the house itself. If some houses are very far from the central point, ask a local resident to estimate the number of houses and include them in the final count of households to the village boundary.

Figure 4: Counting all the houses



- **Step 5: Randomly select the starting house:** Choose a random number between 1 and the total number of houses (by using a banknote or pieces of paper). The house with this number will be the first house for the survey.

Figure 5: The random number was 1

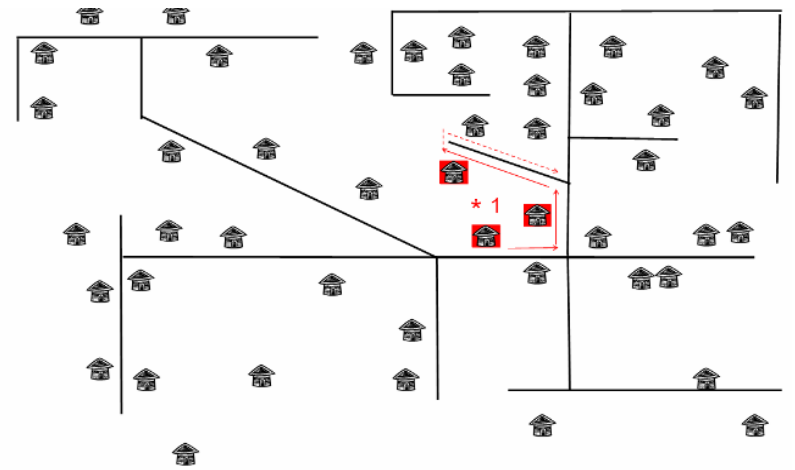


- **Step 6: Selecting of the following houses**

We follow the leave the house "Left-hand Rule".

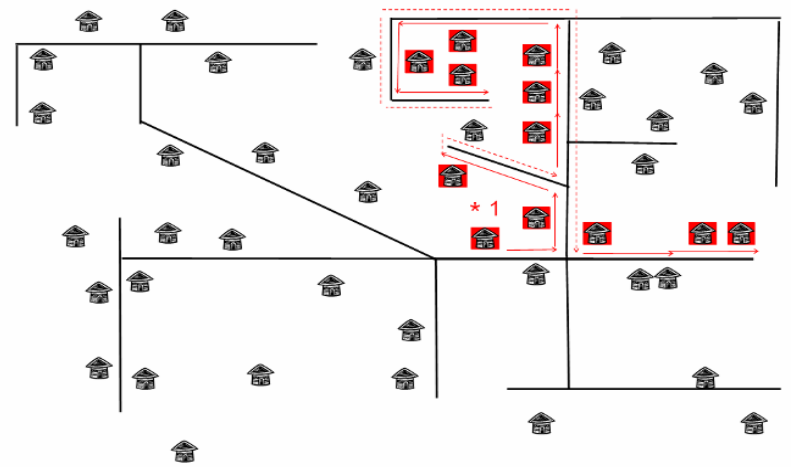
When we leave the house, we take the route away from the centre of the village and choose the next house only on your LEFT-HAND side. If you find a path, road or crossroad to your left, turn left and continue until you reach the sample size.

Figure 6: We select the houses using the “Left-hand Rule”.



Blockages: If you reach the end of the road and you cannot continue walking in the current direction, stop and come back to where you started (as we can see on Figure 7). If you reach the limits of the village without obtaining the correct sample size, go back to the centre of the village and start the process again.

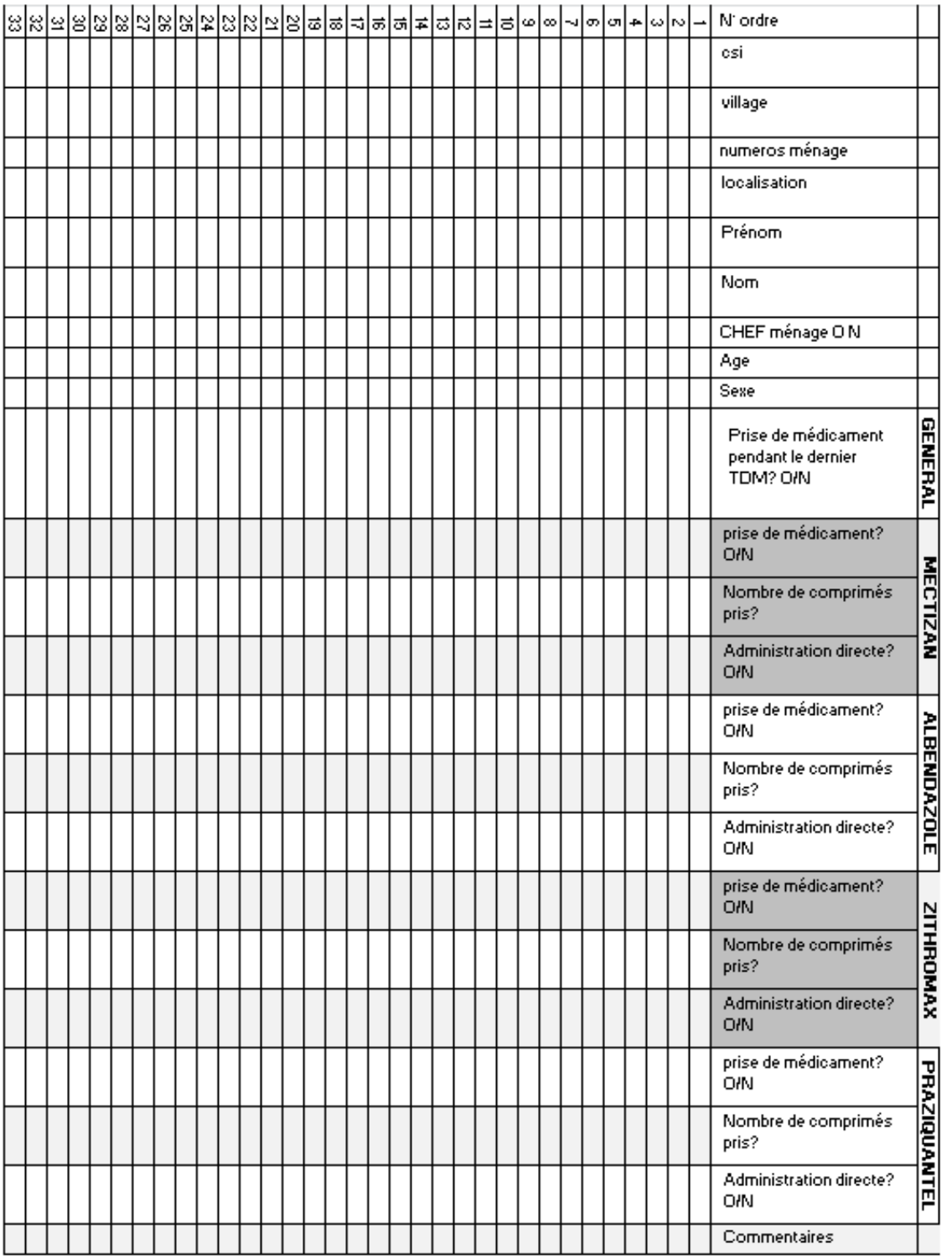
Figure 7: Selection of the houses



For special cases:

- Nomadic populations: Should be included in the survey if they are present.
- Inaccessible locations/villages: Should be replaced with randomly selected accessible villages.
- Inaccessible houses: Must not be replaced.

Appendix 2: Sample Coverage Survey Form



33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	N° ordre	
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																																	Administration directe? O/N	
																																	Commentaires	

Appendix 3: Knowledge, Attitudes and Practices Questionnaire

1. ENQUETEUR _____

2. DISTRICT_____

3. **VILLAGE**_____

4. NUMERO DU MENAGE |__|__|__|

5. AGE DU REPONDEUR |___|___|

6. **SEXE DU REPONDEUR** M / F

7. Est-ce que le chef du ménage est le répondeur ?

a) Oui
b) Non → **8. Pourquoi est-ce qu'il n'est pas présent ?** ***Encerclez TOUTE(s) réponse(s)***

a) Il /Elle est dans les champs
b) Il /Elle est en voyage
c) Il /Elle est décédé
d) Autre _____ (précisez)

9. Statut du Répondant(e) ? ***Encerclez TOUTE(s) réponse(s)***

a) Femme du chef du ménage.
b) Fille/Fils du chef du ménage.
c) Frère/Sœur du chef du ménage.
d) Autre _____ (précisez)

Section 1 – Filariose Lymphatique

10. Avez-vous entendu parler de la filariose lymphatique ? (Eléphantiasis et/ou Hydrocèle)

a) Oui
b) Non
c) Ne sais pas
d) Refuse de répondre

- Mettez « X » sur **11, 12, 13, 14**, **15, 16, 17, 18, & 19.**
- Ensuite *Allez à* ***Section 2***

11. Comment se manifeste la filariose lymphatique ? *Encerclez TOUTE(s) réponse(s)*

a) Fièvre
b) Douleur
c) Augmentation de volume du membre atteint.
d) Eléphantiasis
e) Hydrocèle
f) Dépigmentation
g) Pas de symptôme
h) Autre _____ (précisez)
i) Ne sais pas
j) Refuse de répondre

12. Comment est-ce qu'on peut attraper la filariose lymphatique ? *Encerclez TOUTE(s) réponse(s)*

a) Moustiques
b) Hériter de mes parents / ma famille
c) Mauvaises esprits / sorcellerie
d) Blessures / plaie
e) Fait de Dieu
f) Autre _____ (précisez)
g) Ne sais pas
h) Refuse de répondre

13. Comment est-ce qu'on peut prévenir la filariose lymphatique? *Encerclez TOUTE(s) réponse(s)*

a) Prendre des médicaments
b) Dormir sous une moustiquaire
c) Nettoyer les alentours de la maison
d) Traitement traditionnel
e) Autre _____ (précisez)
f) Ne sais pas
g) Refuse de répondre

14. Comment est-ce qu'on peut traiter l'éléphantiasis? *Encerclez TOUTE(s) réponse(s)*

a) Prendre des médicaments
b) Hygiène du membre atteint
c) Exercice physique régulier du membre atteint en absence de crise
d) Maintenir immobile le membre atteint en cas de crise
e) Aller à l'hôpital
f) Traitement traditionnel
g) Autre _____ (précisez)
h) Ne sais pas
i) Refuse de répondre

15. Comment est-ce qu'on peut traiter l'hydrocèle? *Encerclez TOUTE(s) réponse(s)*

a) Prendre des médicaments
b) Aller à l'hôpital
c) Chirurgie
d) Traitement traditionnel
e) Autre _____ (précisez)
f) Ne sais pas
g) Refuse de répondre

16. Est-ce qu'il y a quelqu'un dans votre ménage qui souffre d'Eléphantiasis ?

a) Oui
b) Non
c) Ne sais pas
d) Refuse de répondre

17. Est-ce qu'il y a quelqu'un dans votre village qui souffre d'Eléphantiasis ?

a) Oui
b) Non
c) Ne sais pas
d) Refuse de répondre

18. Est-ce qu'il y a quelqu'un dans votre ménage qui souffre d'hydrocèle ?

a) Oui
b) Non
c) Ne sais pas
d) Refuse de répondre

19. Est-ce qu'il y a quelqu'un dans votre village qui souffre d'hydrocèle ?

a) Oui
b) Non
c) Ne sais pas
d) Refuse de répondre

Section 2 – Géohelminthiases

20. Avez-vous entendu parler des vers intestinaux?

a) Oui
b) Non
c) Ne sais pas
d) Refuse de répondre

→
- Mettez « X » sur **21, 22, 23 & 24.**
- Ensuite, *Allez à* ***Section 3***

21. Comment se manifestent-ils-les vers intestinaux? *Encerclez TOUTE(s) réponse(s)*

a) Pas de symptôme
b) Mal au ventre
c) Passage fréquente et/ou douloureux des selles
d) Obstruction intestinale
e) Autre _____ (précisez)
f) Ne sais pas
g) Refuse de répondre

22. Comment est-ce qu'on peut attraper les vers intestinaux? *Encerclez TOUTE(s) réponse(s)*

a) Manque d'hygiène (environnement)
b) Manque d'hygiène (personnelle)
c) Nourriture (pas bien lavée/préparé)
d) Mouches ou bestioles
e) Vers à travers la peau de pied
f) L'eau sale
g) Sorcellerie
h) Fait de Dieu
i) Autre _____ (précisez)
j) Ne sais pas
k) Refuse de répondre

23. Comment est-ce qu'on peut prévenir les vers intestinaux? *Encerclez TOUTE(s) réponse(s)*

a) Prendre médicaments
b) Laver les mains
c) Utiliser les latrines
d) Bien préparer/laver la nourriture
e) Porter les chaussures
f) Traitement traditionnel
g) Autre _____ (précisez)
h) Ne sais pas
i) Refuse de répondre

24. Comment est-ce qu'on peut traiter les vers intestinaux? *Encerclez TOUTE(s) réponse(s)*

a) Prendre médicaments
b) Traitement traditionnel
c) Autre _____ (précisez)
d) Ne sais pas
e) Refuse de répondre

Section 3 – Bilharziose / Schistosomiases

25. Avez-vous entendu parler de bilharziose?

a) Oui
b) Non
c) Ne sais pas
d) Refuse de répondre

→
- Mettez « X » sur **26, 27, 28, 29, 30 & 31.**
- Ensuite *Allez à* ***Section 4***

26. Comment se manifeste la bilharziose? *Encerclez TOUTE(s) réponse(s)*

a) Pas de symptôme
b) Mal au ventre
c) Une éruption cutanée, Démangeaisons
d) Une toux
e) Sang dans les selles
f) Sang dans l'urine
g) Autre _____ (précisez)
h) Ne sais pas
i) Refuse de répondre

27. Comment est-ce qu'on peut attraper des infections de bilharziose? *Encerclez TOUTE(s) réponse(s)*

a) Nager dans l'eau sale
b) Boire de l'eau sale
c) Vers à travers la peau de pied
d) Ne pas utiliser les latrines
e) Sorcellerie
f) Fait de Dieu
g) Autre _____ (précisez)
h) Ne sais pas
i) Refuse de répondre

28. Comment est-ce qu'on peut prévenir la bilharziose? *Encerclez TOUTE(s) réponse(s)*

a) Prendre médicaments
b) Eviter de nager dans l'eau
c) Utiliser les latrines
d) Bien préparer/laver la nourriture
e) Porter les chaussures
f) Traitement traditionnel
g) Autre _____ (précisez)
h) Ne sais pas
i) Refuse de répondre

29. Comment est-ce qu'on peut traiter la bilharziose? *Encerclez TOUTE(s) réponse(s)*

a) Prendre médicaments
b) Traitement traditionnel
c) Autre _____ (précisez)
d) Ne sais pas
e) Refuse de répondre

30. Est-ce qu'il y a quelqu'un dans votre ménage qui souffre d'urine sanglante?

a) Oui
b) Non
c) Ne sais pas
d) Refuse de répondre

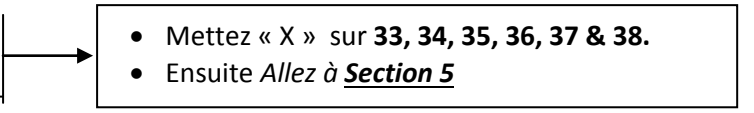
31. Est-ce qu'il y a quelqu'un dans votre village qui souffre d'urine sanglante?

a) Oui
b) Non
c) Ne sais pas
d) Refuse de répondre

Section 4 – Trachome

32. Avez-vous entendu parler de trachome?

a) Oui
b) Non
c) Ne sais pas
d) Refuse de répondre



33. Comment se manifeste le trachome? *Encerclez TOUTE(s) réponse(s)*

a) Pas de symptôme
b) Écoulement des yeux contenant du mucus ou du pus
c) Démangeaisons et l'irritation des yeux et des paupières
d) Sensibilité à la lumière Marqué (photophobie)
e) Vision floue
f) Douleur oculaire
g) Autre _____ (précisez)
h) Ne sais pas
i) Refuse de répondre

34. Comment est-ce qu'on peut attraper des infections de trachome? *Encerclez TOUTE(s) réponse(s)*

a) Manque d'hygiène (Environnent)
b) Manque d'hygiène (Personnelle)
c) Hériter de mes parents / ma famille
d) Mal esprits / le sorcier
e) Mouches ou bestioles
f) L'eau sale
g) Sorcellerie
h) Fait de Dieu
i) Autre _____ (précisez)
j) Ne sais pas
k) Refuse de répondre

35. Comment est-ce qu'on peut prévenir le trachome? *Encerclez TOUTE(s) réponse(s)*

a) Prendre les médicaments
b) Laver le visage
c) Utiliser les latrines
d) Traitement Traditionnel
e) Autre _____ (précisez)
f) Ne sais pas
g) Refuse de répondre

36. Comment est-ce qu'on peut traiter le trachome? *Encerclez TOUTE(s) réponse(s)*

a) Prendre les médicaments
b) Laver le visage
c) Utiliser les latrines
d) Traitement Traditionnel
e) Autre _____ (précisez)
f) Ne sais pas
g) Refuse de répondre

37. Est-ce qu'il y a quelqu'un dans votre ménage qui souffre de cils retourné dans la paupière?

a) Oui
b) Non
c) Ne sais pas
d) Refuse de répondre

38. Est-ce qu'il y a quelqu'un dans votre village qui souffre de cils retourné dans la paupière?

a) Oui
b) Non
c) Ne sais pas
d) Refuse de répondre

Section 5 – Traitement De Masse

39. Avez-vous pris les médicaments quand qu'ils étaient offerts pendant la dernière campagne?

a) Oui
b) Non ➡ **40. Pourquoi vous n'avez pas pris les médicaments? *Encerclez TOUTE(s) réponse(s)***

a) Distributeur/infirmier me disait que je ne devrais pas les prendre
b) Le distributeur n'est pas arrive
c) J'étais enceinte
d) Je n'étais pas à la maison
e) J'étais malade
f) Je ne voulais pas les prendre
g) J'ai peur des symptômes secondaires
h) Le distributeur n'est pas arrive
i) Autre _____ (précisez)
j) Ne sais pas
k) Refuse de répondre

*Si non, allez à **Section 6***

d) Ne sais pas
e) Refuse de répondre

*Allez à **Section 6***

41. Est-ce que le distributeur vous a observé prendre/avale les médicaments pendant la dernière campagne ?

a) Oui
b) Non ➡ **42. Pourquoi vous n'avez pas pris les médicaments devant le distributeur?**

a) Le distributeur ne me l'a pas demandé
b) Distributeur était presse
c) Raisons culturel
d) Autre _____ (précisez)
e) Ne sais pas
f) Refuse de répondre

d) Ne sais pas
e) Refuse de répondre

43. Avez-vous dû payer pour avoir les médicaments?

c) Oui ➡ 44. Combien avez-vous dépensé? _____
d) Non
a) Ne sais pas
b) Refuse de répondre

45. Avez-vous eu des problèmes/effets secondaire après avoir pris les médicaments?

a) Oui ➡ **46. Quel était le problème?** ***Encerclez TOUTE(s) réponse(s)***

a) Mal à la tête
b) Fièvre
c) Vertiges
d) Nausée
e) Douleur testiculaire
f) Démangeaison
g) Douleur générale
h) Diarrhée
i) Vomissement
j) Fatigue
k) Autres _____ (précisez)

b) Non
c) Ne sais pas
d) Refuse de répondre

Section 6

47. Quel est la source de l'eau pour votre ménage? ***Encerclez TOUTE(s) réponse(s)***

e) Puits
f) Forage
g) Source
h) Rivière (mayo)
i) Eau vendue dans les bidons
j) Autre _____ (précisez)
k) Ne sais pas
l) Refuse de répondre

48. Combien de temps devez-vous marcher pour aller chercher de l'eau pendant la saison sèche?

: |__|__|__| (minutes)

49. Où est-ce que les membres de vote famille vont faire les selles de l'habitude?

a) Champ
b) Latrine
c) Rivière
d) Autre _____ (précisez)
e) Ne sais pas
f) Refuse de répondre

FIN

Appendix 4: Adult Verbal Consent Script (French version)

‘Bonjour, je m’appelle <nom>. Je représente la Ministre de la Sante. Nous sommes en train de faire une enquête des maisons en votre village au sujet de traitement du mass (TDM) pour 2011. Nous voulons savoir si vous avez pris les comprimes. Si vous voulez participer dans l’enquête, dites-nous, et nous allons marquer votre réponse. Si vous êtes d’accord, l’enquête prend seulement quelques minutes. Votre participation dans l’enquête ne sera pas vous bénéficier directement, mais les résultats sera aider la Ministre de la Sante améliorer les programs de la sante. C’est à vous de décider si vous voulez participer dans l’enquête. Vous pouvez refuser sans sanction. Voulez-vous participer dans l’enquête ?’

Appendix 5: Verbal Consent Script for an Adult on Behalf of a Child (French version)

‘Bonjour, je m’appelle <nom>. Je représente la Ministre de la Sante. Nous sommes en train de faire une enquête des maisons en votre village au sujet de traitement du mass (TDM) pour 2011. Nous voulons savoir si votre enfant a pris les comprimes. Si vous voulez que votre enfant participer dans l’enquête, dites-nous, et nous allons marquer votre réponse. Si vous êtes d’accord, l’enquête prend seulement quelques minutes. Votre participation dans l’enquête ne sera pas vous bénéficier vous ou votre enfant directement, mais les résultats sera aider la Ministre de la Sante améliorer les programs de la sante. C’est votre choix si vous voulez que votre enfant de participer ou non dans l’enquête. Vous ou votre enfant pouvez refuser sans sanction. Voulez-vous permettre votre enfant de participer dans l’enquête ?’

Appendix 6: Verbal Consent Script for Children Aged 6-18 years (French version)

‘Bonjour, je m’appelle <nom>. Nous sommes ici pour la Ministre de la Sante. Nous voulons que tu participes dans une enquête au sujet de la distribution des médicaments cette année. Les questions vont prendre quelques minutes. Si tu veux participer, dis-nous et nous allons marquer ton réponse. Tu ne dois pas participer. Tu ne seras pas en difficulté si tu dis non. Veux-tu participer?’