

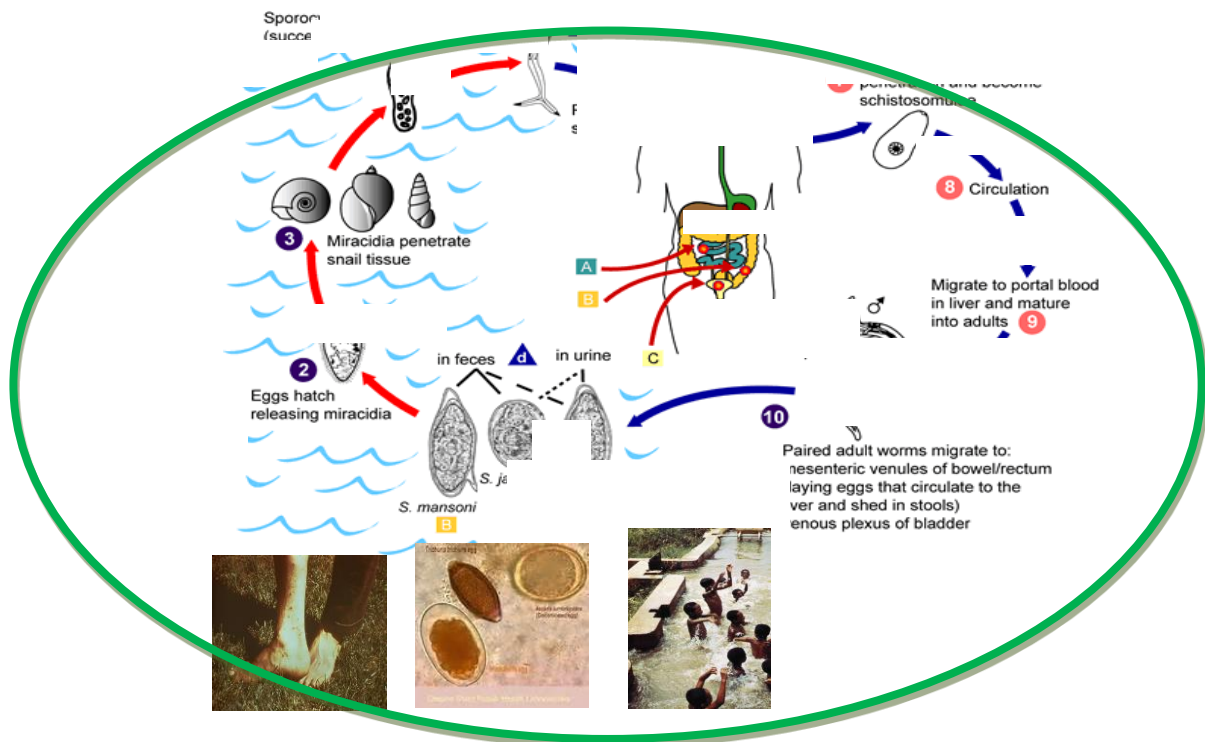
NATIONAL PROTOCOL

FOR

INTEGRATED EPIDEMIOLOGICAL MAPPING AND BASELINE SURVEY

OF

SCHISTOSOMIASIS AND SOIL TRANSMITTED HELMINTHS



Version 1.2 (2013)



FEDERAL MINISTRY OF HEALTH, NIGERIA

NATIONAL PROTOCOL FOR INTEGRATED
EPIDEMIOLOGICAL MAPPING AND BASELINE
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TRANSMITTED HELMINTHS

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2013

FEDERAL MINISTRY OF HEALTH, NIGERIA



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List of Acronyms

CDC	Centre for Disease Control
CIFF	Children's Investment Fund Foundation
FCT	Federal Capital Territory
FMOH	Federal Ministry of Health
JSS	Junior Secondary School
LGA	Local Government Area
NGDO	Non-Governmental Development Organization
NHMIS	National Health Management Information System
NHREC	National Health Research Ethical Committee
NTDs	Neglected Tropical Diseases
PCT	Preventive Chemotherapy
SCH	Schistosomiasis
SMOH	State Ministry of Health
STH	Soil Transmitted Helminths
SUBEB	State Universal Basic Education Board
WHO	World Health Organization
GIS	Geographic Information System

Foreword

Schistosomiasis and Soil Transmitted Helminths are among the group of diseases known as Neglected Tropical Diseases (NTDs). They cause debility and intractable chronic infections in endemic Communities, States and Countries.

In the last five years, there has been renewed efforts to significantly reduce the burden of these diseases through preventive chemotherapy interventions with substantial upscaling of epidemiological mapping activities in Nigeria. This was as a result of supportive and collaborative efforts of partners and stakeholders.

This mapping protocol seeks to define standard operating procedures for the epidemiological mapping and baseline survey of schistosomiasis and soil transmitted helminths in Nigeria and essentially to align our control efforts with the current global initiatives. It is hoped that this manual will serve as a very useful tool for all health workers, health institutions, both government and private sectors without compromising the standard.

I wish to appreciate the contributions of all concerned in the development and finalization of this mapping protocol and enjoin all stakeholders to adhere to this standard so as to successfully achieve the goal of the National programme.

On behalf of the Government of Nigeria, I pledge every commitment towards the Control and elimination of schistosomiasis and soil transmitted Helminths in Nigeria.

Prof. C. O. Onyebuchi Chukwu

Honourable Minister of Health

Federal Republic of Nigeria

Acknowledgements

This protocol for the epidemiological mapping and baseline survey of schistosomiasis and soil transmitted helminths is a veritable tool for effective implementation of deworming programme in Nigeria. It contains technical and operational instructions for all health workers implementing the control and elimination of schistosomiasis and soil transmitted helminths.

On behalf of the Federal Ministry of Health (FMOH), I wish to acknowledge with many thanks the Children's Investment Fund Foundation (CIFF) UK, for their contributions and financial support in the development and finalization of this document. We express our thanks to all development partners {Sightsavers, Mission to Save the Helpless (MITOSATH), The Carter Center (TCC), CBM/Vision 2020 Support Programme, World Health Organization (WHO), Helen Keller International (HKI) and Schistosomiasis Control Initiative (SCI) UK}. for their support.

The chairperson of the NTDs steering committee Prof. Adenike Abiose and her members are also appreciated for their support and guidance throughout the entire process. My sincere thanks also go to the in-country consultants who painstakingly reviewed and provided great insights that led to the finalization of this protocol.

The Head, NTDs Division Dr. Uwaezuoke Onyebuchi and the entire NTDs staff are all appreciated. Finally, my special thanks to the Coordinator, National schistosomiasis and soil transmitted helminths control programme Dr. Obiageli Nebe and her team for their relentless efforts in the development of this document.

Dr. Bridget Okoeguale

Director, Public Health

1.0 Background Information

1.1 Country Profile and Geography

Nigeria is the most populous country in Africa with a 2011 projected population of over 162 million (NPC, 2006). Nigeria occupies the area along the West Coast of Africa between latitude 4° and 14° N and longitude 5° and 14° E covering an area of about 923,768 square kilometres and bordered in the North by the Republics of Niger and Chad and in the East by Cameroon while Benin Republic borders it in the West and Atlantic Ocean to the south. Nigeria has a coast line of about 3,122 kilometres. The seat of government Abuja is located at the Federal Capital Territory, which has about 713 square kilometres. There are 36 States in the Federation with population range from 1,405,201 to 9,013,534 (NPC 2006)

There are two main seasons, rainy season from March to October and dry season from November to February. There are wide climatic variations in the different regions of the country. Near the coast, the seasons are not sharply defined. Temperatures rarely exceed 32° C (90° F), but humidity is very high and nights are hot. Inland, there are two distinct seasons: a wet season from April to October, with generally lower temperatures, and a dry season from November to March, with midday temperatures that surpass 38° C (100° F) but relatively cool nights, dropping as low as 12° C (54° F).

Average rainfall along the coast varies from about 180 cm (70 in) in the west to about 430 cm (170 in) in certain parts of the east. Inland, it decreases to around 130 cm (50 in) over most of central Nigeria and only 50 cm (20 in) in the extreme north. Two principal wind currents affect Nigeria. The harmattan from the northeast is dry and carries a reddish dust from the desert; it causes high temperatures during the day and cool nights. The southwest wind brings cloudy and rainy weather ([Encyclopedia of the Nations](#)).

A greater part of the country consists of a low plateau intersected by two main rivers, the Niger and Benue. Along the coast is a belt of mangrove forests and the vegetation gradually thins into the Sahel savannah in the far north corresponding to average rainfall that ranges in the respective regions. Beyond the coast, lowlands follow the

valleys of the Niger and Benue; otherwise the land gives way to a broad, hilly, forest belt that gradually rises to the rocky terrain of Jos and Bauchi plateau. These plateaux are a region of savannah, which stretches to the semi-desert Sahel zone in the extreme north. In the east is the Adamawa Plateau, which borders Cameroon and is Nigeria's highest point, Dimlang (Vogel Peak), 2,042 m (6,699 ft) high. [Climate change, global warming](#) caused by the [greenhouse effect](#), and the resulting increase in global [temperatures](#), are possibly causing tropical diseases and vectors to spread to higher altitudes in mountainous regions, and to higher latitudes that were previously spared.

1.2. Information on Schistosomiasis and STH In Nigeria

1.2.1 Schistosomiasis

Schistosomiasis, also known as Bilharzia, is a disease caused by parasitic blood flukes of the genus *Schistosoma*. Three species of this worm cause human Schistosomiasis, two of which occur in Nigeria. These are *S. haematobium* which causes urinary Schistosomiasis and *S. mansoni*, which causes intestinal schistosomiasis. It is considered by the World Health Organization as the second most socio-economically devastating parasitic disease, next only to malaria, with hundreds of millions infected worldwide both in the tropical and subtropical regions. (Iarotski & Davis 1981). Schistosomiasis is considered one of the Neglected Tropical Diseases (NTDs).

The parasites that cause schistosomiasis infect certain types of freshwater snails (*Biomphalaria* species, the intermediate host for *Schistosoma mansoni*, *Bulinus* species the intermediate host for *Schistosoma haematobium* and *Schistosoma intercalatum*). The infective form of the parasite is known as cercariae, which emerges from the snail, hence contaminating the water where they are found. Schistosomiasis transmission is usually seasonal and focal in distribution primarily due to the variation in temperature and irrigation cycles. Transmission can take place in large lakes, rivers, ponds and streams, and these are abundant in Nigeria. Also, man-made water bodies (dams, irrigation schemes and canals) are prevalent in the Nigeria agricultural sector which increase predisposition to schistosomiasis.

Schistosomiasis is endemic in many countries in Africa. While many communities in a country may be affected by the disease, its distribution is focal, and can vary even across 5-10 km. The presence of water bodies capable of supporting transmission

underlies the distribution of the disease. Suitable water bodies include perennial or seasonal ponds, streams, rivers and lakes, which are abundant in Nigeria. Also, man-made water bodies (dams, irrigation schemes and canals) are prevalent in the Nigeria agricultural sector and may support schistosomiasis transmission. Factors that determine whether a water body can support transmission include environmental parameters such as altitude, temperature, vegetation cover, water chemistry, turbidity and speed of flow. Other factors that affect endemicity are socio-economic and socio-cultural aspect such as access to safe-piped water, proper environmental sanitation and general literacy levels. Therefore, schistosomiasis transmission does not occur in all existing water bodies, it depends on the availability of snail intermediate host and water use by humans. Given this situation, before implementation of a national control programme, it is important to know the disease distribution and the level of infection (prevalence) across the country for effective use of the limited resources for treatment of people who need it most.

Nigeria is estimated to have the highest burden of schistosomiasis in Africa, containing about 116 million out of the estimated 555 million Africans at risk of this disease as of 2006 [Hotez and Kamath. 2009].

The National Schistosomiasis Control Programme was initiated in 1988 and the goal of the program is to deliver regular anti-helminthic drugs to at least 75% of school-age children in endemic areas in the country in line with WHO recommendations. In Nigeria, Schistosomiasis is a disease of considerable Public Health importance due to inadequate portable water and activities related to water resource development schemes for irrigation, fishing and hydro-electricity. The disease mainly affects poor rural communities. School age children usually have the highest level of infection. Schistosomiasis can cause diseases such as cancer of the bladder, anaemia, liver dysfunction among others.

Focal studies on Schistosomiasis in some parts of Nigeria have reported different prevalence figures ranging from 0.3% to 13.6% between 2006 and 2009 (Atu *et al.*, 2006; Ibrahim *et al.*, 2006; Mordi and Ngwodo 2007; Uneke *et al.*, 2009; Okonko *et al.*, 2009; Fadeyi *et al.* 2009)

The distribution of the different species depends mainly on the ecology of the snail hosts. Natural ponds and lakes are typical sources of infection, but over the past few decades man-made reservoirs and irrigation systems have contributed to the spread of schistosomiasis. The disease is largely a rural problem, but urban foci can be found in many endemic areas (Akufongwe et al., 1995)

Snail populations, cercarial density, and patterns of human water contact show strong temporal and spatial variations, resulting in a focal distribution of the infection within countries, regions, and villages. Those at high risk of infection are people involved in fishing activities, farming, bathing, paddling of canoes, swimming and possibly handling of infected snail host in the case of collecting edible ones (Akufongwe et al., 1995)

In Nigeria, *Schistosoma haematobium* infection had been found in many parts of the country with varying intensities and prevalence rates and incidence is believed to be on the increase. The true epidemiological data appears difficult in developing nations, because of inadequate researches and no epidemiological control/ information centre on tropical diseases despite its relevance in planning for control in any locality.

Current Situation:

Though there is a National Programme in place, Schistosomiasis has not witnessed large-scale control efforts in Nigeria. Control to date has been small scale and limited in geographic and therapeutic coverage. This is due to under-funding and limited prevalence data as at 2012 for scale up of control activities. NGDOs in Nigeria are supporting the implementation of integrated control of Schistosomiasis and other Neglected Tropical Diseases in various States. An integrated Mapping/baseline survey has been partially or fully completed in some States. (See Annex A)

Epidemiological mapping of Schistosomiasis started in Nigeria in 2008 with Ekiti State as a pilot project supported by the Ekiti State Government. The epidemiological mappings that were conducted were funded by the Federal Ministry of Health and some of the in-country NGDO partners. The surveys were facilitated by the Federal Ministry of Health Technical officers and independent consultants. A total of eighteen (18) States (Ekiti, Enugu, Gombe, Ogun, Sokoto, Plateau, Nassarawa, Imo, Ebonyi,

Anambra, Abia, Zamfara, Ondo, Delta, Edo, Jigawa, Katsina and Kaduna) have been fully mapped for Schistosomiasis.

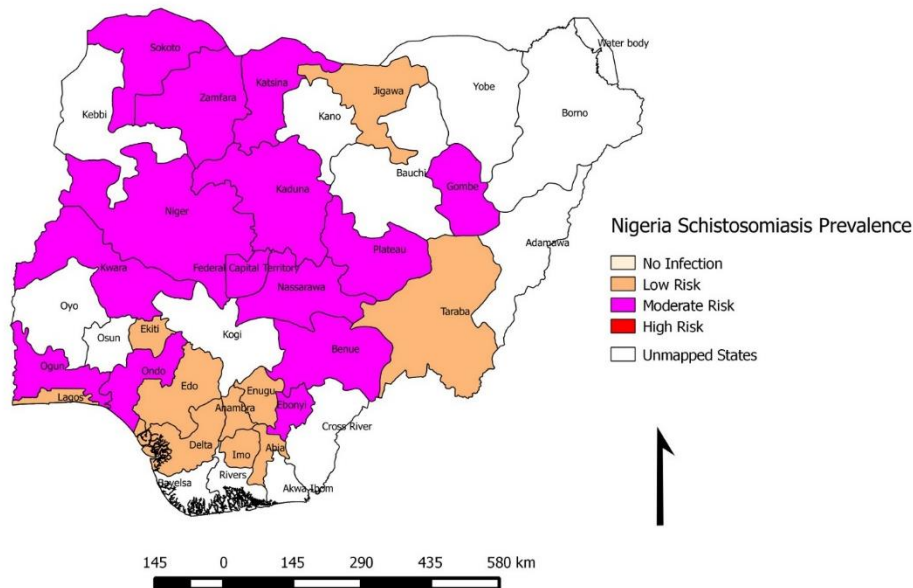


Figure 1: Mapping Status of Schistosomiasis across the states of Nigeria as at Dec 2013

Mapping Gaps for Schistosomiasis:

From the available mapping data 19 States in Nigeria will need to be partially or fully mapped for SCH. Fourteen (14) states (Kebbi, Kogi, Akwa-Ibom, Yobe, , Kano, Lagos, Bayelsa, Rivers, Ekiti, Osun and Oyo) of the unmapped states will be supported with fund from Children Investment Fund Foundation (CIFF).

Nine (9) further states and the Federal Capital Territory (Taraba, Ondo, Niger, Kwara, Borno, Benue, Bauchi, Adamawa, Cross River and FCT) still requires either full or partial mapping (Annex A).

1.2.2 Soil Transmitted Helminths

Soil Transmitted Helminth (STH) infections are among the most common infections worldwide and affect the poorest and most deprived communities. They are transmitted by eggs present in human faeces which in turn contaminate soil in areas where sanitation is poor. Soil-transmitted helminth infection is found mainly in areas with warm and moist climates where sanitation and hygiene are poor, including in temperate zones during warmer months. (CDC - January 10, 2013).

The Soil Transmitted Helminth (STH) control programme was initiated in 2007. In line with WHO recommendation, the programme has set a target of regular administration of anthelmintic drugs to at least 75% of school-age children in endemic areas in the country at risk of morbidity.

STH's are among the Neglected Tropical Diseases which are endemic in Nigeria and the country has one of the highest burden of this disease in Africa. The species of STH in Nigeria are: *Ascaris lumbricoides*, *Trichuris trichiuria*, *Ancylostoma duodenale* and *Necator americanus*. The burden of STH disease is estimated to be highest in children, in which there is evidence that STH infection may cause Anaemia, Vitamin A deficiency, malnutrition, loss of appetite, retarded growth, reduced learning ability.

The Soil Transmitted Helminths (STH), primarily *Ascaris lumbricoides*, hookworms (*Necator americanus*, and *Ancylostoma duodenale*), and *Trichuris trichiura*, was reported to be highly prevalent in Nigeria, as in most of sub-Saharan Africa (Kirwan *et al.*, 2009a; Chan 1997; Kirwan *et al.*, 2009b; Uneke *et al.*, 2007; Hotez and Kamath 2009, Adeoye *et al.* 2013). Intestinal helminths infections (*Ascaris*, *Trichuris* and hookworm) in Nigeria remain as prevalent as they were in the 1970s. The majority of those affected are young children between the ages of 5 and 14 years living in rural areas and urban slums. Cultural, socio-economic and environmental factors are major contributors to the persistence of these infections (Olaniyi *et al.*, 2007).

Some of the NGDO partners have been implementing school based de-worming programmes using Mebendazole tablets in the country. There are obvious gaps in terms of documentation on mass de-worming through the Immunization plus Days (IPDs) currently going on in most states in Nigeria. There was no base-line data collection for tracking progress and determination of areas of high priority for targeting intervention before the commencement of such activities. Inputs of the National Programme on de-worming activities for better coordination are highly desirable.

STH control strategy in Nigeria includes:

- Morbidity control using chemotherapy (Mebendazole/albendazole) targeted at school age children;
- Health education and promotion targeted at all community members.

- Collaboration with appropriate stakeholders for the provision of adequate sanitation and portable water.

Current situation: STH has not witnessed large-scale control efforts in Nigeria. Control to date has been small scale and limited in geographic and therapeutic coverage. This is due to under-funding and limited prevalence data for control activities. NGOs in Nigeria are supporting the implementation of integrated control of STH in various States. An integrated Mapping/baseline survey has been partially or fully completed in some States. (Annex A).

A total of sixteen (16) States (Enugu, Gombe, Ogun, Sokoto, Plateau, Nassarawa, Imo, Ebonyi, Anambra, Abia, Zamfara, Delta, Edo, Katsina, Kaduna and Jigawa) have been fully mapped for STH. (Annex A).

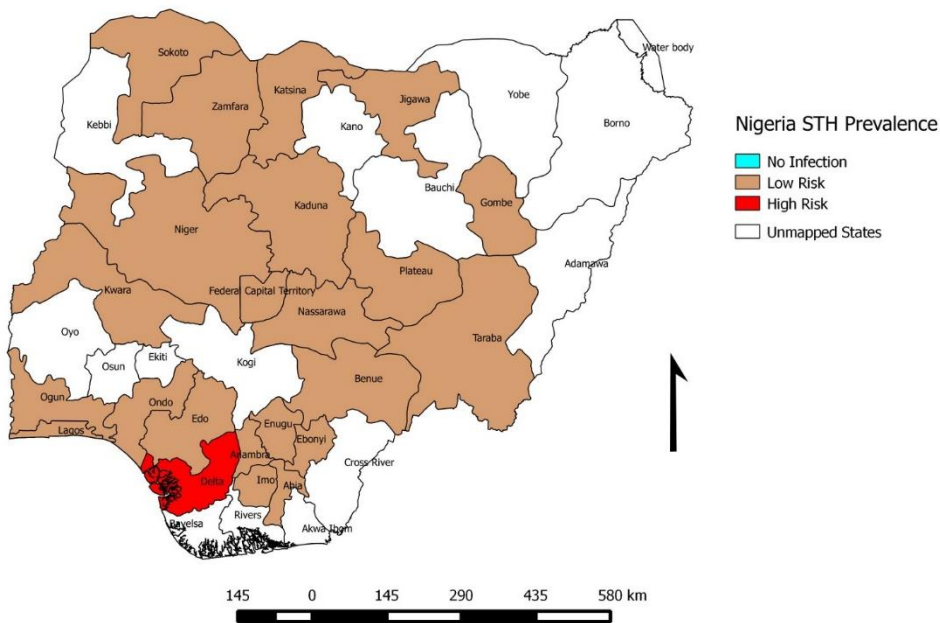


Figure 2: Mapping Status of STH across states in Nigeria as at Dec, 2013

Mapping Gaps for STH: From the available mapping data, 24 States in Nigeria will need to be partially or fully mapped. Fourteen (14) states (Kebbi, Kogi, Akwa-Ibom, Yobe, Kaduna, Jigawa, Katsina, Kano, Lagos, Bayelsa, Rivers, Ekiti, Osun and Oyo) of the unmapped states will be supported with funds from Children’s Investment Fund Foundation (CIFF).

Eleven (11) outstanding States (Ekiti, Ondo, Taraba, Niger, Kwara, Borno, Benue, Bauchi, Adamawa, Cross River, and FCT) still require either full or partial mapping (Annex A).

2.0 Justification for Mapping

A schistosomiasis distribution and prevalence map of the country is needed as a basis for planning interventions. This can be achieved through the disease mapping processes described in this guide.

The control strategy in Nigeria includes:

- Morbidity control using chemotherapy (Praziquantel ®) targeted at school age children;
- Health education and promotion targeted at all community members.
- Collaboration with appropriate stakeholders for the provision of adequate sanitation and potable water.
- Snail (intermediate host) control.

2.1 Mapping Aim

To determine the epidemiological distribution of Schistosomiasis and Soil Transmitted Helminth (STH) infection in states in Nigeria in order to identify the areas that qualify for preventative chemotherapy (PCT). Specifically the implementation unit will be the LGA and hence, a prevalence estimate for both Schistosomiasis and STH is required for each LGA, in order to decide frequency of treatment strategy according to the WHO guidelines (Annex B).

2.2 Mapping Objectives

- To determine the prevalence and endemicity of Schistosomiasis and STH infections in all LGAs in Nigeria
- To obtain baseline information that will enable estimation of drug requirements for preventive chemotherapy (PCT) interventions in targeted endemic LGAs in Nigeria such that each LGA can be assigned to a prevalence band and treatment frequency for both Schistosomiasis and STH as shown in Table 1.

- To provide baseline data necessary for planning, monitoring and evaluation (M&E) of the impact of the control programme.
- To enhance knowledge of the spatial distribution of Schistosomiasis and STH infections in Nigeria.
- To build the capacity of the State and LGA technical officers on integrated epidemiological mapping and baseline survey of Schistosomiasis and STH in Nigeria.

2.3 Mapping Strategies

In the recent past there was a paucity of data in Nigeria on the number of people affected or at risk of schistosomiasis and STH infections. This has since improved with partners' support for epidemiological mapping activities in the country. Until the result of the mapping exercise is available little is known about the distribution of endemic foci within the Local Government areas (LGAs) in the various states of the federation and this poses a big problem for the National control programme.

This survey protocol describes the design and implementation of a field survey to determine the prevalence of schistosomiasis and STH infections, to guide the development and implementation of control strategies. The present protocol is based on WHO recommendations and the experiences of national NTD programmes and partners.

3.0 Methodology

State-wide mapping for Schistosomiasis and Soil Transmitted Helminths (STH) infections will be conducted in a coordinated manner across unmapped LGAs in each State in Nigeria using WHO framework. The survey is going to be based on standard diagnostic procedures for the examination of urine and faecal samples from school-aged children to detect the presence of schistosome and intestinal helminth eggs. Enrolled school-age children will be targeted through the examination of urine and stool samples. Stool samples will be processed using the Kato-Katz method while the urine samples will be processed using haemstick and urine filtration/sedimentation techniques.

Basic demographic information will be collected on the children, through a questionnaire which includes WASH indicators. The current forms used by the National De-worming Programme has been reviewed and uploaded into electronic data capturing devices (Smartphones) and will be utilised for data collection. However, in some LGAs where schistosomiasis has been mapped, the children will only be tested for STH. All the LGAs in each state will be surveyed. However five randomly selected schools from different communities in each LGA of the state will be surveyed. A stratified random cluster sampling procedure is proposed, with samples from 50-60 school children of different sexes (5 – 16) years old from each school.

One team of 56 people will be responsible for each state and they will be divided into eight sub-groups to ensure geographical coverage and 2 LGAs will be covered in a day; with each sub-team using a vehicle for transportation to the survey site.

Urine and stool samples from school children will be collected from the field and taken to the laboratory on daily basis. Samples examination will be carried out in standard government hospital laboratories where there are generators back up. Supervision of samples examinations will be the responsibilities of the FMOH Laboratory Scientists for quality control.

Camcorders and digital cameras will be used to enable documentation of water contact behavioural activities in schistosomiasis transmission sites.

3.1 Sampling frame

A simple random sampling procedure will be used for the integrated epidemiological mapping/baseline survey of Schistosomiasis and STH in Nigeria targeting enrolled school-age children through the examination of urine and stool samples. Five to ten schools would be selected from an LGA ensuring good geographical spread. For example, if 5 schools are needed in an LGA with a total of 10 Wards, a number should be assigned to each Ward and a table of random numbers used to select 5 wards.

Once the 5 wards are identified, one school in each ward can be randomly selected, a sampling frame for each of the ward will then be compiled by the State/LGA team. The sampling frame is the list of all primary schools in each ward. Primary Schools in northern Nigeria will include non-formal schools (“Madrasat”/Islamic Schools)

There may be some hard-to-reach communities that do not have a school or have low enrolment. The LGA's Education officers will compile a list of such communities. In this case, Junior Secondary Schools can be considered (JSS 1 – 3). This list should be treated as a separate sampling frame, and a proportional number of communities would be selected for survey. However, in areas with large water bodies, schools in the sampling frame with close proximity to the water bodies and surrounding water networks would be given more weighting in random selection. In zones without clear large water bodies, all schools should be given same weighting in random selection

3.2 Sample size

Generally school age children are recommended, the age-group of 6 -15 years will be considered for Schistosomiasis & STH survey. The reasons are that prevalence is correlated to age, with STH infection being common in 6 – 10 years, while that of Schistosome infection is 10-20 years. In each selected school, a sample size of 50 individuals of both sexes (50% male and 50% female) is represented/aimed for.

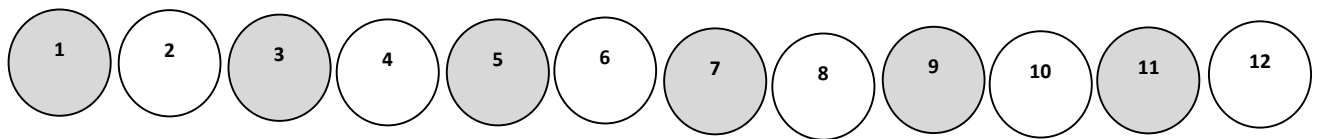
3.3 Selection of enrolled school-age children

Within each selected school, 50 school children aged 6 -15 years old (25 boys and 25 girls) are selected. A systematic sample, which is an approximation of a true random sample, can be used. This is described below:

- The students aged 6-15 years old in the upper classes should be assembled in lines – one line of boys and one line of girls.
- If the number of children in the age group is fewer than or equal to the required number above, select all children.
- If number of children in the age group is more than (but not many more) the required number above, exclude some randomly. For example, if 60 children are available, exclude 10 randomly.
- If number of children in the age group is much more than the required number above, select 50 randomly, by:
 - a. Calculate the sampling interval (SI) for each gender group according to the total number present and the number required.

- b. SI = the total number of students in the line divided by the number of students you need to select, rounded up to the closest whole number. You randomly decide a starting position and select the students according to the SI .

Example 1. If there are around 55 boys in the line and you need to select 25 boys, then $SI = 55/25 = 2.2 \approx 2$. You then select every other child. Randomly decide to start from No 1 or No 2.



4.0 Field Data Collection, Management, Analysis and Monitoring

Data collection in the field is a comprehensive team effort, which requires thorough preparation and excellent coordination. It is extremely important for the survey team to inform school authorities, school children, community leaders and members of the specimen collection day well ahead of time.

Data Collection, Management and Analysis and Monitoring

The FMOH NTDs Data Mangers will be trained on the use of GIS, other softwares and a web-based database for management of the collected data. Data will be collected at the community level using smart phones or other similar technology. This will facilitate data capture (including coordinates of the survey communities) and analysis. Use of this technology will increase efficiency and accuracy in data collection and reporting and will greatly increase the speed with which data is available.

4.1 Mobilization/Sensitization

The State Universal Basic Education Board (SUBEB) personnel will be used in the mobilization of the schools. Their involvement will also help to maximize school attendance on the day of the survey and minimize non-respondents. The programme

will explore the use of mass media, including radio and television, if deemed necessary.

4.2 Survey team

There will be one survey team comprising of laboratory scientists, technicians, Survey recorders, field guides, and drivers. There shall be a team leader for coordination of the team. The Senior Laboratory Scientist should be the team leader.

The team composition and team member responsibilities are shown in table 1:

Table 1: Survey team members and their responsibilities

Role	Suggested numbers	Responsibilities
Survey Recorder	1 per subgroup	The recorder has the overall responsibility in organising and overseeing the epidemiological information collection activities, and therefore should have a thorough knowledge of what to be collected and how they are collected. The recorder is also responsible for completing all forms including lab results on the data capturing device.
Laboratory technician	2 per subgroup	Collection of stool and urine samples, correctly labelling and packaging of samples, testing for haematuria, and preparation of kato-katz and filtration/sedimentation slides.
Field guide	1 per subgroup	Notification, mobilization of the selected schools and organizing the students.
Driver	1per subgroup	Safe-keeping and care of vehicles and other assigned duties.
Laboratory scientist	2 per subgroup	Carry out microscopic examination of all prepared slides.

FMOH Participants

1. Technical officers 2 (Per State)

2. Laboratory Scientists 2 (Per State)
3. In-country Consultant 1 (Per State)
4. Supervisors/data managers 2 (per state)
5. National coordinator Schisto/STH 1

State Participants

1. Technical officers 2
2. Laboratory scientists 3
3. Laboratory Technicians 5
4. Recorders 2 or 3
3. SMOE/SUBEB 2

LGA participants

1. LGA Coordinator 1 (Per LGA)
2. School teacher 1(Per School)
3. Community guide 5(per LGA)

Others

NGDO representatives 2

Monitoring and supervision of the survey exercise will be carried out by FMOH, SMOH, NGDOs and In-country consultants.

4.3 ROLES AND RESPONSIBILITIES OF PARTNERS

4.3.1 Federal Ministry of Health (FMOH)

The FMOH has the responsibility of coordination and providing leadership for the schisto/STH mapping survey in all the states of the federation and shall perform the following roles (amongst others):

1. Provide the implementation guidelines for the mapping survey to all partners (SMOH, NGOs and In-Country Consultants).
2. Appoint In-Country Consultants in accordance with the provision of this National protocol.

3. Provide some personnel (Medical Laboratory Scientists and Recorders) to boost and built the capacity of the states with a view to ensuring quality of data.
4. In collaboration with the supporting NGOS, procure the basic survey laboratory materials required for mapping in a giving state. This may include (but not limited) the following:
 - a. Microscope
 - b. Kato-Katz kits (for stool bioassay)
 - c. Syringe Filtration kit (for urine analysis)
 - d. Malachite green reagents
5. Supervise other partners to ensure that roles and responsibilities are timely and satisfactorily performed in line with the provision of this national protocol.
6. Carry out final data analysis on receipt of the survey data with support from project partners and consultants.
7. Management and custody of the national databank on *schisto*/STH and utilize the available data for planning future de-worming activities and to share amongst the wider NTDs network in Nigeria.
8. Communicate the outcome of the survey and advise the states on Mass Drugs Administration and other activities as may be appropriate.
9. Perform any other such roles and responsibilities that may be required for the smooth implementation of this national protocol.

4.3.2 State Ministry of Health (SMOH)

The national epidemiological mapping survey shall be conducted in all the states of the federation. The SMOH shall be required to perform the following basic roles and responsibilities:

1. Grant permission for the survey to be conducted within a stipulated time and communicate same to the FMOH.
2. In collaboration with the supporting NGO and SUBEB, provide a venue, the number of operational vehicles for the survey as may be stipulated by the FMOH.

3. Provide laboratory space for the examination of stool and urine samples, a number of microscopes, centrifuge and other laboratory equipment as may be stipulated by the FMOH.
4. Provide security for the field teams throughout the duration of the survey.
5. Notify other stakeholders in the state (i.e. SUBEB, LGA Coordinators etc.) of the survey plans, to ensure adequate and timely mobilization.
6. Provide the number of state participants for the survey as may be stipulated by the FMOH.
7. May direct the LGAs and selected communities to perform such other roles that may be required for the smooth conduct of the survey in their areas.
8. Perform any other such role and responsibilities as may be required for the smooth conduct of a quality survey in the state.
9. Utilize the results of the survey for resource mobilization, plan and organize Mass Drugs Administration in the State.

4.3.3 State Universal Basic Education Board (SUBEB)

The national epidemiological mapping survey shall be school base, targeting school-age-children in the age group 6 – 15 years old. SUBEB, which is the supervising agency of the target group shall be required to perform the following roles and responsibilities:

1. In collaboration with the state NTD coordinator, select five (5) primary schools in each LGA for the survey (based on the criteria in section of this national protocol).
2. Mobilize the schools and the communities where the schools are located through the Education Secretaries of the LGAs. The head teachers and community leaders must be clearly informed on the period of the survey, the nature of specimens (stool and urine) to be collect from the school children and any such other information as may be required.
3. Provide local guides to direct the survey teams to the schools during survey activities.
4. Provide any other such assistance as may be required for the smooth conduct of the survey in the state.

5. Utilize the results of the survey for resource mobilization, plan and organize Mass Drugs Administration in the State.

4.3.4 Supporting NGOs

Supporting NGOs will provide support in the process of achieving FMOH's goals in the states where they support. Specifically, the following support may be required:

1. Participate in planning and review meetings with the FMOH and SMOH, in line with provision of this national protocol.
2. Support the state with logistic arrangements, consumables and planning of the mapping activities in states where they operate.
3. On the advice of the FMOH, remunerate members of the survey teams during the period of mapping and handle any such other bills that may be associated with the mapping survey in their states.
4. In collaboration with the FMOH and SMOH, organize training workshops and field practical for survey teams.
5. Supervise the conduct of the survey in collaboration with SMOH.
6. Assist the state in any other way possible to enhance the quality and timely conduct of the survey.

4.3.5 In-Country Consultants:

The In-Country Consultants, who shall be persons with cognate academic qualifications and relevant field experience in Shistosomiasis/STH epidemiology shall among others, perform the following roles:

1. Advise the office of the National Coordinator on mapping plans, procedures and strategies.
2. Participate in the training and selection of survey (field) teams in accordance with the provisions of this national protocol.
3. Supervise the operations (activities) of field teams and supporting NGOs during mapping activities in their state of assignment.
4. Ensure the quality of the mapping activities in terms of quality of materials used, survey procedures and results obtained in line with ethical standards.
5. Participate in State advocacy before mapping and debriefing after mapping.

6. Participate in review meetings during and after mapping.
7. Produce and submit report on mapping exercise to the Federal Ministry of Health.
8. Comply with the Terms of Reference (ToR) guiding their appointment by the FMOH.

4.4 Sample Collection

4.4.1 Collection of urine

Each pupil will be provided with a capped sterile specimen bottle and instructed to fill it with urine and cover it with the cap. It is important that the end of the urine flow is captured, as eggs are more likely to be present here.

4.4.2 Collection of Stool

Each pupil will be provided with a second capped sterile specimen bottle with an applicator stick, tissue paper to wipe their anus after defecation. They will be instructed to pass the stool on a clean white paper and use the applicator stick to transfer adequate portion of the stool into the specimen bottle provided. The two (2) capped specimen bottles will be returned and labelled with specific identification (ID) numbers for the students. All samples collected must be examined the same day.

4.4.3 Collection of Anthropometric parameters

The age and sex of each child will be noted and recorded. Baseline information on these diseases will also be obtained from a teacher using structured questionnaires (Annex C). The survey will also assess other facilitating factors that aid the transmission of Schistosomiasis and Soil transmitted helminths infections in the state.

4.5 Survey Techniques

4.5.1 *Schistosoma haematobium* (in urine)

The use of haemastix provides a means of assessing *S. haematobium* prevalence that is comparable to urine filtration and/sedimentation (Lengeler *et al.*,1993) in sensitivity but is more cost effective. However, due to potential contamination from blood in urine due to other causes (menstruation, infection), specificity can be low. Thus,

samples will be initially screened by haemastix, and positives confirmed by urine filtration/sedimentation. Haemastix negatives do not need to be subjected to urine filtration, as the probability of infection is very low if the haemastix result is negative (Robinson *et al.*, 2009). Microscopy can however be done occasionally as quality assurance measure. Urine filtration and sedimentation will also allow measurement of infection intensity. All eggs on the filter or sediments should be counted.

During this survey two techniques will be used for *S. haematobium*:

- Haemstick for detection of micro-haematuria
- Syringe Urine filtration for *S. haematobium* eggs (determination of intensity)
- Urine sedimentation to determine intensity (Annex G).
- Ova of parasite will be identified using the bench Aids (Annex I)

4.5.2 *Schistosoma mansoni* and STH (in stool)

- Kato/Katz method will be used to determine prevalence and intensity of infection (eggs per gram of faeces – epg) Annex F.

All eggs on the slide for each species should be counted, both in Kato-Katz, and urine filtration/sedimentation.

4.6 Survey Day Activities

1. Start the day early in the morning
 - a. Use the checklist to package the items required in the field for the day (Annex H).
2. Arriving at the school
 - a. Keep the car in a place where it attracts very little attention.
 - b. Team leader contacts head teacher, introduce members of the team, states the aim of the mapping and requests for hall to be used. For this purpose, one classroom and a few benches are needed.
 - c. Team members start setting up survey laboratory (if the screening will be done in the school).
 - d. The school form (Annex D) should be completed by the recorder.
3. Selecting the classes and pupils

- a. Team leader and Head teacher should assemble the upper class pupils.
 - b. Introduce the purpose of the survey to the pupils using very simple language and explain briefly, the negative effects of worms to them.
 - c. The pupils aged 6 -15 years should be separated from the rest and assembled in lines – one line of boys and one line of girls.
 - d. Select the pupils as described in section 3.3.
 - e. Show the specimen containers to the pupils, demonstrate how to unscrew and screw each container and allow few students to do same.
4. Registering pupils and collecting the samples
- a. Selected pupils will be registered and given specific ID numbers.
 - b. Stool and urine samples will be collected as described in section 4.3.
 - c. The pupils submit the stool and urine specimens to the laboratory bench for processing, and proceed to next table where their weight and height are taken and recorded.
 - d. Pupils are directed to the hand-washing area where running water will be provided and exit.
5. Departure from the School
- a. Clean up the area. Return the desks and chairs.
 - b. Thank the HT and others that had helped you
 - c. If there are leftover biscuits give the HT and thank the HT for all the assistance.
 - d. If there are still pupils around tell them you are now leaving to go to another school where you will do the same thing you have done in their school.

Note: Culture sensitivity—the country is diverse with several cultures and practices. If you are working in an area that is unfamiliar please let those with knowledge of the culture and language take the lead while you take a less visible role, even if you are the team leader. In some communities it may be quite all right to have a male adult inspect a female pupils latrines but not in others. In some communities it is acceptable for an adult male to hold a female pupil's hand but not in others. Team should be sensitive to these conventions and expectations and not try to change them. By all means no religious books,

magazines or written materials should be brought to the school or displayed during the mapping exercise as this may lead to a serious misinterpretation that can lead to loss of life.

Unfriendly school or community –observe and be alert to signs of unfriendliness and do not insist when there seems to be no indication of acceptance. Where the signs are clear that the community is not willing please thank them, leave a contact phone for the HT to call whenever they seem prepared to receive the team. Ensure everyone is in the car and leave quietly. Arguments and attempting to persuade the community or the school may not be in the best interest of the team when community acceptance is doubtful. Explain the process and the requirements and if still unsure, leave.

4.7 Health and safety Precautions

- The stool and urine should be considered potentially infectious and should therefore be handled with care to safeguard against self-infection.
- Wear lab coats, gloves and nose mask whenever handling urine and stool samples.
- Benches, instruments and equipment should be routinely decontaminated with disinfectants after use.
- Materials contaminated with infectious waste should be disinfected before disposal.
- Drinking or eating during laboratory procedures is prohibited.
- Appropriate disinfectant(s) should be used for disposal of contaminated cotton wool, wooden spatulas and specimen containers.
- Used specimen containers must be disinfected before washing.
- Students should not assist one another in the collection of samples
- Students should not assist in carrying another student samples.
- Students should not share the stool of another student.
- Provision of tissue paper for the children to clean up after defecating.
- Provision of running water with disinfectants for washing of hands after submission of samples.

4.8 Confidentiality

Records should be safely kept and personal identifier will not be included in the results.

4.9 Electronic Data Collection System

The programme is transiting from the use of existing paper tools to the electronic data collection system. Following this there will be Provision of access codes to the designated NTD Officers/FMOH National Health Information Management System(NHIMS) officer, who will ensure data quality during mapping exercise.

A clear commitment by the funders to support FMOH to host, control and manage an NTD web-based data, that will be linked to the National Health Management Information System (NHMIS) of the Ministry.

The LINKS system should be in such a way that the National programme should have access to the Real Time data as it is being transmitted from the survey communities.

5.0 TRAININGS

Training of the National Programme Technical Officers on the use of Tab Plus, collection of data and management will be conducted. There will be orientation and Data Management training for FMOH NTDs data officers, In-country Consultants and NGDO participants on the use of GIS software and analysis of collated data.

Analysis and uniform reporting and centralized TOT will be organized for the national survey team and others before the commencement of the mapping exercise. A two-day Training of Trainers session will take place for the National Technical Officers, Survey In-country Consultants and NGDO participants who will coordinate and implement the mapping.

Training will also be provided for the staff of state Ministries of Health and Education (including SUBEB) and laboratory staff on the mapping methodology and community mobilization. Trainees will include health personnel, LGA health and education personnel, and state and LGA laboratory Scientists that are employed within state and local governments. They will receive training over 4 days depending on their pre-existing knowledge and experience. Technical assistance will be provided by FMOH, In-country Consultants, APOC and NGDOs in the facilitation of integrated training for mapping at the state level. Joint monitoring will be supported by FMOH, in-country

consultants, APOC and NGOs throughout the survey activities to ensure standard survey protocol is adhered to.

6.0 QUALITY CONTROL

1. Sample examination

a. Stool and urine samples will be prepared as soon as possible and slides will be examined for hookworm eggs within one - two hours of preparation.

b. Results should be entered into the data entry capturing device by the survey recorders.

The team leader is responsible for checking that the electronic forms are being correctly filled and that any errors or issues are identified, followed up and corrected within the team. Quality control is also important to verify the consistency of the microscopic examination during the survey, and it is particularly important for the Kato-Katz technique. Before the survey, all laboratory Scientist should be evaluated to ensure consistency of egg counting. A total of 10 slides should be prepared and each technologist should read each slide and their results compared to that of the team leader i.e. to determine inter-observer variation. A discrepancy of greater than 10% requires a re-evaluation or re-training of the laboratory technologist. If one of the microscopists presents readings which are consistently different to those of the others in the team, he/she must be excluded from the team. Each day during the survey, the team leader should also read 10% of the slides of each microscopist, for quality control purposes, without prior knowledge of the result. In the case of a discrepancy larger than 10%, the slide should be discussed by the two readers, and further slides examined to avoid repeated errors.

7.0 ETHICAL APPROVAL AND CONSENT

Ethical clearance for the survey will be obtained from the National Health Research Ethical Committee (NHREC) of the FMOH and approval will be obtained from the State. Assent will be obtained from the head-teacher and community leaders. Students have the right to decline participation (Annex E).

8.0 DATA ENTRY AND ANALYSIS

The data will be entered directly using the electronic data collection device and uploaded onto the designated FMOH site. A hardcopy backup will be maintained. The designated data manager at the FMOH should ensure adequate data validation for consistencies before analysis using appropriate software.

8.1 Indicators

The key indicators to guide analysis will include:

Parasitological

- Prevalence of SCH and STH infections at community and LGA levels.
- Prevalence of the various parasite species identified at community and LGA levels.
- Prevalence of heamaturia to be analysed.
- Prevalence of multiple infections.
- Intensity of infections (severity of infection), expressed as mean eggs per gram of faeces (epg) and class of intensity for *S. mansoni* and STHs and number of eggs per 10ml urine for *Schistosoma haematobium*.
- Prevalence of SCH and STH in relation to gender.
- Prevalence of SCH and STH in different age groups. (5-10 and 11-16yrs).
- Prevalence of other infections.

Water, Sanitation and Hygiene (WASH)

- Number of schools having source of drinking water within the premises.
- Number of schools that have source of drinking water close to the school.

- Source of improved drinking water (Protected dug well, protected spring, hand pump, bore hole/tube well and sachet water).
- Number of schools having toilet facilities.
- Types of toilet facilities.
- Number of schools with evidence of toilet usage.
- Number of schools with toilet providing water or tissue for use after defecating.
- Number of schools with toilet that have hand washing facilities.
- Number of schools with hand washing facilities: poor (water only), fair (water and soap), Good (water, soap and disposable napkin).
- Number of children that uses school toilet facilities (Urinate).
- Number of children that uses school toilet facilities (Defecate).
- Number of children that had contact with water bodies.
- Types of activities commonly performed.

9.0 BASELINE DATA COLLECTION AT SENTINEL SITES FOR MONITORING AND EVALUATION

9.1 Introduction to Baseline Information

Monitoring and evaluation is an integral and crucial part of the national control programme. This will allow the impact of the programme to be critically and timely assessed. The findings will also help the national programme management team to take necessary actions to improve the programme implementation and safeguard the success of the control programme.

Monitoring and evaluation of a control programme consists of a series of epidemiological surveys at sentinel sites. It starts prior to treatment intervention as Sentinel site baseline data collection, and this will provide invaluable baseline measurements which will serve as a reference against which later years can be compared. It continues throughout the life of the control programme. The monitoring and evaluation activities are coordinated at the national level and conducted by a national team with support from the districts. Data collected are analyzed at the national level and any subsequent actions required according to the results will be

applied to the whole endemic areas as appropriate. Measurement of prevalence alone is not sufficient as an indicator of impact because of the non-linear relationship between prevalence and intensity of infection and prevalence alone does not reflect morbidity. Prevalence may decrease slowly, particularly in moderate or low endemicity areas, while intensity of infection may decline significantly following treatment. Therefore, indicators should include:

- Prevalence of infection
- Intensity of infection
- Prevalence of anemia (hemoglobin level)
- Prevalence of haematuria (in case of *S. haematobium*)

The purpose of impact monitoring is to show:

- How successful the treatment programme has been;
- Whether initial programme objectives have been met;
- What level the disease endemic situation has been reduced to, including prevalence and intensity of infection where applicable
- What degree of improvement in health indicators in children has been achieved, including nutritional status and morbidity markers

The monitoring and evaluation should include two major parts:

- Sentinel site cross-sectional survey
- Rapid re-assessment of disease endemic situation at national level

In addition to these, local health facilities should play an important role in monitoring and evaluation of the control programme by participating in the programme activities and reporting of the routine treatment of Schistosomiasis and STH cases. By this the national control team can obtain important information on Schistosomiasis/STH situation in the country. Local health facilities can achieve this through:

- Adding Schistosomiasis case treatment into monthly reporting forms
- Monitoring routine treatment of Schistosomiasis cases at local health facilities
- Reporting the number of Schistosomiasis cases treated monthly to health authorities

9.2 Sentinel site survey

Selection of the sentinel schools will be according to disease prevalence distribution maps in the country and Schistosomiasis endemicity categories. A proportion of total schools are randomly selected at the national scale and stratified by the endemicity categories (high, moderate or low). To evaluate the national programme, sentinel schools do not have to be in every LGA. Sentinel site survey uses a cross-sectional methodology, including baseline data collection and follow-up surveys following every two rounds of treatment.

9.2.1 Sentinel site selection

After the mapping of Schistosomiasis in the country, Schistosomiasis endemic areas can be categorized according to the thresholds recommended in the preventive chemotherapy guidelines 3: high, moderate and low. Sentinel sites should be selected from each of these areas.

- The number of schools to be selected is dependent on the sample size calculations. Consult a statistician for such calculation for your country.
- The number of schools required for monitoring surveys and their distribution in the country will also depend on logistical and financial restraints.
- The schools should be selected randomly from sampling frames taking into consideration any geographical regions and endemicity categories (high, moderate or low).

The procedures for selecting sentinel sites:

- Group the endemic areas according to the ecological and epidemiological situations. Such information should have been available from the mapping activities.
- Then subgroup the areas into High, Moderate and Low categories according to the preventive chemotherapy guidelines.
- Compile a sampling frame (a list of all primary schools) within each subgroup area.
- Randomly select required number of schools as sentinel sites.

9.2.2 Sentinel site sample size

The sample size for number of schools (sentinel sites) will be decided as described above. The number of school children to be selected and age group are same as for mapping: 50 school children aged 5 - 16 years (gender balanced).

9.2.3 Sentinel site sample selection

Schools (sentinel sites) will be selected randomly within a sampling frame. All schools within a sampling frame should be given same chance to be selected. Random sampling method should be used.

9.2.4 Sentinel site survey techniques

- Kato/Katz thick smears method for *S. mansoni* and STHs. Two slides from a single stool sample should be examined.
- Urine filtration for *S. haematobium*. Minimum 10 ml of urine should be collected.
- Dipstix for detection of haematuria
- Hemocue for hemoglobin level
- Upper-arm Circumference measurement

9.3 Re-Assessment of Endemic Situation

With the control programme progressing, prevalence and intensity of infection will decrease, hence the disease burden in certain areas. The endemicity level may change after a few years of interventions. In addition to the sentinel site survey, it is important to re-assess (re-map) the prevalence and distribution of the diseases throughout the country periodically, so that the focus of control programme and the treatment strategy in each area can be adjusted accordingly. The re-assessment surveys will be carried out every three to five years after the start of the control programme. The survey techniques will be the same as for the initial mapping. One of the following sampling methods can be used:

- Same way as for the initial mapping
- Lot Quality Assurance Sampling (LQAS)

LQAS method is used for identification of endemic areas and at risk populations for targeting of mass drug administration. The method will be used to provide the national

programme with a valid, straight forward and cost-effective approach to assess the distribution of *S. mansoni* and STH and ensure that treatment is targeted cost-effectively. Rather than examining 50 pupils per school, just 15 pupils using the Kato Katz method.

- If all 15 samples are examined and less than 2 samples are positive then the school is defined as a low prevalence (Low risk area) school
- If all 15 samples are examined and 2 to 6 are positive then this school is defined as a moderate prevalence (Moderate risk area) school
- If seven are already positive before examining all 15 samples, then examination should be stopped since this school is defined as a high prevalence (High risk area) school.

10.0 RESULT DISSEMINATION

The FMOH will share the final report for the epidemiological mapping activities with the states, NGDOs, WHO, other stakeholders through the global link systems and in peer review Journals.

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**LIST
OF
ANNEXES
FOR SCH/STH
MAPPING
IN
NIGERIA**

ANNEX 1: Summary of State Mapping Status in Nigeria

S/N	State	NO OF LGAs	Schisto			STH			Funding Partners
			Mapping Required	Surveyed	Remarks	Mapping Required	Surveyed	Status	
1	Abia	17	0	17	Mapping Complete	0	17	Mapping Complete	FMOH/TCC
2	Adamawa	21	21	0	Yet to be mapped	21	0	Yet to be mapped	
3	Akwa Ibom	31	31	0	Yet to be mapped	31	0	Yet to be mapped	CIFF
4	Anambra	21	0	21	Mapping Complete	0	21	Mapping Complete	FMOH/TCC
5	Bauchi	20	20	0	Yet to be mapped	20	0	Yet to be mapped	
6	Bayelsa	8	8	0	Yet to be mapped	8	0	Yet to be mapped	CIFF
7	Benue	23	15	8	Partially Mapped	15	8	Partially Mapped	FMOH
8	Borno	27	27	0	Yet to be mapped	27	0	Yet to be mapped	
9	Cross River	18	6	12	Partially Mapped	6	12	Partially Mapped	FMOH
10	Delta	25	0	25	Mapping Complete	0	25	Mapping Complete	FMOH/TCC
11	Ebonyi	13	0	13	Mapping Complete	0	13	Mapping Complete	FMOH/TCC
12	Edo	18	0	18	Mapping Complete	0	18	Mapping Complete	FMOH/TCC
13	Ekiti	16	0	16	Mapping Complete	16	0	Yet to be mapped	SMOH and FMOH
14	Enugu	17	0	17	Mapping Complete	0	17	Mapping Complete	FMOH
15	FCT	6	4	2	Mapping complete	4	2	Mapping complete	FMOH/FCDA/CBM
16	Gombe	11	0	11	Mapping Complete	0	11	Mapping Complete	FMOH
17	Imo	27	0	27	Mapping Complete	0	27	Mapping Complete	FMOH/TCC
18	Jigawa	27	0	27	Mapping complete	0	27	Mapping complete	CIFF
19	Kaduna	23	0	23	Mapping complete	0	23	Mapping complete	CIFF
20	Kano	44	14	30	Partially Mapped	14	30	Partially Mapped	CIFF
21	Katsina	34	0	34	Mapping complete	0	34	Mapping complete	CIFF
22	Kebbi	21	21	0	Yet to be mapped	21	0	Yet to be mapped	CIFF
23	Kogi	21	21	0	Yet to be mapped	21	0	Yet to be mapped	CIFF

24	Kwara	16	1	15	Partially Mapped	1	15	Partially Mapped	Sightsavers
25	Lagos	20	19	1	Mapping Complete	19	1	Partially Mapped	FMOH/MITOSATH/CIFF
26	Nasarawa	13	0	13	Mapping Complete	0	13	Mapping Complete	FMOH/TCC
27	Niger	25	25	0(3)	Partially Mapped	25	0(3)	Partially Mapped	FMOH
28	Ogun	20	0	20	Completed with retrospective Data from University research work	0	20	Completed with retrospective Data from University research work	
29	Ondo	18	0	18	Mapping Complete	2	16	Partially Mapped	SMOH/FMOH/ MITOSATH
30	Osun	30	30	0	Yet to be mapped	30	0	Yet to be mapped	CIFF
31	Oyo	33	33	0	Yet to be mapped	33	0	Yet to be mapped	CIFF
32	Plateau	17	0	17	Mapping Complete	0	17	Mapping Complete	FMOH/TCC
33	Rivers	23	23	0	Yet to be mapped	23	0	Yet to be mapped	CIFF
34	Sokoto	23	0	23	Mapping Complete	0	23	Mapping Complete	Sightsavers
35	Taraba	16	5	11	Partially mapped	5	11	Partially mapped	MITOSATH/FMOH/DFID
36	Yobe	17	17	0	Yet to be mapped	17	0	Yet to be mapped	CIFF
37	Zamfara	14	0	14	Mapping Complete	0	14	Mapping Complete	Sightsavers
	National Total	774	341	433		359	415		

	SCH	STH
mapping completed	20	17
Not mapped	11	12
partially mapped	6	8
Total	37	37

ANNEX 2: Treatment guideline for SCH/STH

Category	Disease	Prevalence (by parasitological methods)	Action
High-risk	Schistosomiasis	≥50%	Treat all school-age children once per year Also treat adults considered to be at risk
Moderate-risk	Schistosomiasis	≥10% but <50%	Treat all school-age children once every two years Also treat adults considered to be at risk
Low-risk	Schistosomiasis	<10%	Treat all school-age children twice during their primary schooling Praziquantel should be available in dispensaries and clinics
High-risk	STH	≥50%	Treat all school-age children twice per year Also treat: <ul style="list-style-type: none"> • preschool children • women of childbearing age, including pregnant women in the 2nd and 3rd trimesters and lactating women • adults in high risk occupations
Low risk	STH	≥20% but <50%	Treat all school-age children once per year Also treat: <ul style="list-style-type: none"> • preschool children • women of childbearing age, including pregnant women in the 2nd and 3rd trimesters and lactating women • adults in high risk occupations
	STH	<20%	Case-by case management of those infected

Source: WHO/CTD/SIP/98.1

ANNEX 3: Classes of intensity for Schistosomiasis and STH

STOOL EXAMINATION				
Parasite Species	*Light Intensity Infections	*Moderate Intensity Infections	*Heavy Intensity Infections	Remarks
<i>Ascaris lumbricoides</i>	1-4,999 epg	5,000-49,999 epg	50,000 epg	
<i>Trichiuria trichuris</i>	1 -999 epg	1,000 – 9,999 epg	10,000 epg	
<i>Hook worms</i>	1 -1,999 epg	2,000 – 3,999 epg	4,000 epg	
<i>Schistosoma mansoni</i> <i>Schistosoma japonicum</i>	1 -99 epg	100 – 399 epg	400 g	

	*Light Intensity Infections	*Heavy Intensity Infections
<i>Schistosoma haematobium</i>	<50 egg/10 ml	50 egg/10 ml Or visible haematuria

Source: WHO/CTD/SIP/98.2

ANNEX 4: Household/Community Form

NATIONAL SCHISTOSOMIASIS AND SOIL TRANSMITTED HELMINTHS HOUSEHOLD/COMMUNITY FORM

Questionnaire to be completed by the survey team

Team code.....

Respondent: Head or Representative of head of household.

General Information Date...../...../.....

State..... LGA.....Community/village.....

Geographical co-ordinates: Lat (N:.....) Long (E:.....)

Community/Village Population ----- No. of Households -----

Local Languages/dialect of respondent-----

Community ID.....

Instructions: (Please tick the appropriate answer). Your information will be kept strictly confidential.

1. Occupation of respondent:

(i) Unemployed (ii) Student (iii) Housewife (iv) Farming (v) Trading (vi) Artisan (vii) Civil servant (viii) Fisherman (ix) Other (please specify).....

2. Highest level of Education of respondent:

(i) None (ii) Primary (iii) Secondary (iv) Tertiary (v) Quoranic (vi) Others (please specify).....

Community Questions

3. What is the source of water to this household?

(i) tap (ii) Deep well (iii) stream (iv) Dam (v) Pond (vi) Shallow well (vii) bore hole

Others: (specify).....

4. How do you dispose faeces in your household?

(i) Pit latrine (ii) bush (iii) river (iv) water system toilet (v) Others (specify).....

4b. If pit latrine or water system inspect

(i) Poor (ii) Fair (iii) Moderate (iv) Good (v) Excellent

5a. Do you have water bodies like rivers and streams in this community? Yes No

5b. What activities do children perform in the water bodies?

(i) Swimming (ii) Bathing (iii) Washing (iv) Fishing (v) Crossing water (vi) Fetching water (vii) Playing

6. Do people in the community urinate or defecate in the river? Yes No

7. Is rice farmed here? Yes No

7a. If yes, is it paddy or upland? (i) Paddy (ii) Upland

8. Do you carry out irrigation farming here? Yes No

9. Type of health facility nearest to community Distance Km

Disease and Knowledge Questions on Schistosomiasis and Soil Transmitted Helminths

10. Are there Children who pass blood in urine in your household in the past one month?
Yes ... No ... Dont know.....
11. What is the local name for this condition? (schistosomiasis).....
12. What is the cause of bloody urine?
13. Do children in your household suffer from common worms (e.g: roundworm, hookworm, whipworm))?
Yes..... No Don't Know.....
14. What do you think causes worms?
15. What are the local names for worms? (i.e., hookworm, roundworm, and whipworm) _____.
16. How can someone get worm infection?
- A. By eating unwashed food items (e.g: vegetables, fruits, etc).
 - B. By drinking contaminated water.
 - C: By walking barefoot in a contaminated area.
 - D: By a mosquito bite.
 - E: By bathing in contaminated water
 - F: By fishing in contaminated water
 - G: By swimming in contaminated water
 - H: Others
 - I. Don't know
17. How would you recognize a child that has worm infestation?
- A. Loss of appetite, energy and weight.
 - B. Stomach pain, nausea, vomiting, and diarrhea.
 - C. Persistent coughing.
 - D. Blood in the faeces.
 - E. Blood in the urine (red urine).
 - F. Painful and frequent urination.
 - G. Swollen belly/stomach.
 - H. Don't know
- 18a. Have you ever been infected with worms? Yes No
- 18b. If yes, what action did you take when you had worm infection?
- A. Visited the native Doctor
 - B. Visited a modern health facility/hospital
 - C. Purchased drugs from vendors
 - D. Visited pharmacy/chemist shop
 - E. No action
19. Have you taken any de-worming tablets in the past three months? Yes No
20. If yes, who provided the drugs?
- A. Immunization Plus Days (IPD)
 - B. Community Drug Distributors (CDDs)
 - C. Health Facility/hospital
 - D. World Health Organization
 - E. Federal Government
 - F. UNICEF

- G. Pharmaceutical Companies
- H. State Government
- I. LGA
- J. Parents/Friends/Neighbors
- K. Chemist
- L. Others specify.....

21 What would you do if you have schistosomiasis?

- A. Go to native Doctor
- B. Go to a modern health facility/hospital
- C. Purchase drugs from vendors
- D. Visit pharmacy/chemist shop
- E. No action

22. Will you allow your children/ family members to take part in de-worming exercise? Yes No

23. If no give reason for refusal.....

24. What efforts have been taken to control the spread of schistosomiasis and other worm infections in this community? Please explain.....

25a. Do you have any Community Health Association(s)? Yes No

25b. If yes, what is the name of the community health association?

26. What are the functions of the Association?

			Annex 001	
National Schistosomiasis and Soil Transmitted Helminths Control Programme School Information Form of visit.....				Date
SC1	Team No			
SC2	State Name			
SC3	State Code			
SC4	LGA Name			
SC5	LGA Code			
SC6	Community Name			
SC7	School Name			
SC8	Community/School Code			

SC9	Lat:			
SC10	Long:			
SC 11	Elevation			

SC12	School Enrolment			
SC13	No of Male Enrolled			
SC14	No of Female Enrolled			
SC15	No of students sampled			

WS1	Is there a source of drinking water in the school?	N0=0; Yes=1	If WS1=0, GOTO WS3	
WS2	If yes, what type of water source?	Unprotected spring=1		
		Protected spring=2		
		Unprotected dug well=3		
		Protected dug well=4		
		Hand pump/tube well/borehole=5		
		Surface water (river, dam, lake, stream, canal)=6		
		Public piped water/tap/standpipe=7		
		Rainwater collection=8		
		Sachet/Pure water=9		
		Other=99 (Specify):		
WS3	Are there sources of drinking water close to the school	N0=0; Yes=1	If WS3=0, GOTO WS5	
WS4	If yes, what type of water source?	Unprotected spring=1		
		Protected spring=2		
		Unprotected dug well=3		
		Protected dug well=4		
		Hand pump/tube well/borehole=5		
		Surface water (river, dam, lake, stream, canal)=6		
		Public piped water/tap/standpipe=7		

		Rainwater collection=8		
		Sachet/Pure water=9		
		Other=99 (Specify): _____		
WS5	Are there accessible water bodies close to the school	No=0; Yes=1		
PL1	Is there a latrine in the school (<i>observed</i>)?	No=0; Yes=1	If PL1=0, END	
PL2	Evidence of latrine usage observed (<i>faeces in pit</i>)?	No=0; Yes=1		
PL3	What type of latrine is present	Pit latrine without slab or open pit=1		
		Pit latrine with slab=2		
		Ventilated improved pit latrine (VIP)=3		
		Flush or pour flush toilet=4		
		Other=99		
PL4	What is the condition of the latrine?	Poor=0 (Presence of flies, offensive odor and visible stool on floor, absence of roof/door)		
		Fair=1 (Presence of roof/door but dirty floor)		
		Moderate=3 (clean, absence of roof or door)		
		Good=4 (Clean, odorless, no flies, presence of roof and door)		
		Excellent=5 (Very clean, odorless, presence of roof, door and availability of water)		
PL5	Is there water or Tissue for use after defecating?.	Always		
		Sometimes		
		Never		
		Others, (Specify)		
PL6	Is there provision for hand washing after toilet use?	No=0; Yes=1		
PL7	What type of hand washing facilities?	No=0; Yes=1		
		No water=0		
		Water only=1		
		Water and soap=2		
		Water, soap and napkin=3		
		Water, soap and Disposable napkin=4		
		Others= Specify		

	National Schistosomiasis and Soil Transmitted Helminths Information on Students Urine Sample				
	State Code				
	LGA Code				
	Community/School Code				
	Team No				

ANNEX 6: Prototype of Consent Form from NHREC

Research approval number: #####

This approval will elapse on: dd/mm/yyyy

Title of the research:

Epidemiological Mapping and Baseline Survey of Schistosomiasis and Soil Transmitted Helminths in Nigeria)

Name(s) and affiliation(s) of researcher(s) of applicant(s):

Federal Ministry of Health Abuja

Sponsor(s) of research:

Children Investment Funds Foundation, CIFF, UK, RTI/ENVISIONUSA/DFID UK

Purpose(s) of research:

The purpose is to determine the epidemiological distribution of Schistosomiasis and Soil Transmitted Helminth (STH) infection in States in Nigeria in order to identify the areas that qualify for Preventative Chemotherapy (PCT) Interventions.

Procedure of the research, what shall be required of each participant and approximate total number of participants that would be involved in the research:

State-wide mapping for Schistosomiasis and Soil Transmitted Helminths (STH) will be conducted in a coordinated manner across unmapped LGAS in each state in Nigeria using WHO standard protocol. The survey is going to be based on standard diagnostic procedures on the examination of urine and faecal samples from school-aged children in the state for the presence of Schistosome and intestinal helminth eggs. Enrolled school-age children will be targeted through the examination of urine and stool samples. Stool samples will be processed using the kato-katz method while the urine samples will be processed using haemstick and urine filtration techniques.

Basic demographic information will be collected on the children, through a questionnaire which includes WASH indicators. The current forms used by the National De-worming Programme has been reviewed and uploaded into electronic data capturing devices (SMART PHONES) and utilised for data collection. However, in some LGAs where schistosomiasis has been mapped, the children will only be tested for STH. All the LGAs in each state will be surveyed. However five randomly selected schools from five different communities in each LGA of the state will be surveyed in each LGA. A stratified random cluster sampling procedure is proposed, with samples from 50-60 school children of different sexes, 6-15 years old from each school. In total we expect to recruit about 136,500 school age children into this study from the unmapped LGAs in 22 states in the country. One team of 56 people will be responsible for each state and they will be divided into eight sub-groups to ensure geographical coverage and 2 LGAs will be covered in a day; with each sub-team using a vehicle for transportation to the survey site.

Urine and stool samples from school children will be collected from the field and taken to the laboratory on daily basis. Samples examinations will be carried out in standard government hospital laboratories where there are generators back up. Supervision of samples examinations will be the responsibilities of the FMOH Laboratory Scientists for quality control.

Camcorders and digital cameras will be used to enable documentation of water contact behavioural activities in schistosomiasis transmission sites.

Expected duration of research and of participant(s)' involvement:

In total, we expect you to be involved in this research for two years.

Risk(s):

Risks to an integrated/coordinated approach to the epidemiological mapping/baseline survey of Schistosomiasis/Soil Transmitted Helminths are relatively low as there are no invasive procedures involved. There is also extensive experience of mapping activities within the National Programme and across NGDO partners. Planning for interventions amongst the different NTD grants has been harmonised and will be facilitated by Sightsavers and The Carter Center playing the coordinating role in both the DFID and CIFF; RTI/ENVISION grants respectively on behalf of Government of Nigeria.

Resistance within the community to partake in surveys, refusals from children/parents to cooperate will be addressed. Extensive community health education will be undertaken to increase awareness and compliance of school children, teachers and community members to participate and cooperate with the survey teams.

Costs to the participants, if any, of joining the research:

Your participation in this research will not cost you anything.

Benefit(s):

- The prevalence and endemicity of Schistosomiasis and STH infections in all LGAs in Nigeria determined.
- Baseline information that will form the basis for estimation of drug requirements for preventive chemotherapy (PCT) interventions in targeted endemic LGAs in Nigeria obtained.
- Baseline data required or necessary for planning, implementation, monitoring and evaluation of the impact of control programme provided.
- Endemic communities and LGAs will be under Mass Drugs Administration with Praziquantel and Mebendazole tablets after the epidemiological mapping.
- The capacity of the State and LGA technical officers on integrated epidemiological mapping and Baseline survey of Schistosomiasis and STH in Nigeria built.

Confidentiality:

All information collected in this study will be given code numbers and no name will be recorded. This cannot be linked to you in anyway and your name or any identifier will not be used in any publication or reports from this study. As part of our responsibility to conduct this research properly, officials from NAFDAC, NHREC and ethics and food and drugs regulators from the United States may have access to these records.)

Voluntariness:

Your participation in this research is entirely voluntary.

Alternatives to participation:

If you choose not to participate in the survey, this will not affect your treatment during Mass Drugs Administration campaign in any way.

Due inducement(s):

Study participants will not be paid any fees for participating in this research. Rather Mass Drugs Administrations will be carried out in the endemic communities and LGAs.

Consequences of participants' decision to withdraw from research and procedure for orderly termination of participation:

You can also choose to withdraw from the research at any time. Please note that some of the information that has been obtained about you before you chose to withdraw may have been modified or used in reports and publications. These cannot be removed anymore. However the researchers promise to make good faith effort to comply with your wishes as much as is practicable.

Modality of providing treatments and action(s) to be taken in case of injury or adverse event(s):

If you suffer any injury as a result of your participation in this research, you will be treated at any approved government health facilities and the research will bear the cost of this treatment.

What happens to research participants and communities when the research is over:

The researchers will inform the research participants and communities of the outcome of the research through a news bulletin. During the course of this research, they will be informed about any information that may affect their continued participation or their health. The study communities will be treated based on the level of endemicity documented.

Statement about sharing of benefits among researchers and whether this includes or exclude research participants:

The researchers will be co-authors in the publications resulting from the research.

Any apparent or potential conflict of interest:

There is no known conflict of interest in respect of the research.

Statement of person obtaining informed consent:

I have fully explained this research to the research participants and have given sufficient information, including about risks and benefits, to make an informed decision.

DATE: October 2013 SIGNATURE:

NAME: Dr. Obiageli Josephine Nebe

Statement of person giving consent:

I have read the description of the research or have had it translated into language I understand. I have also talked it over with the doctor to my satisfaction. I understand that my participation is voluntary. I know enough about the purpose, methods, risks and benefits of the research study to judge that I want to take part in it. I understand that I may freely stop being part of this study at any time. I have received a copy of this consent form and additional information sheet to keep for myself.

DATE: _____ SIGNATURE: _____

NAME: _____

WITNESS' SIGNATURE (if applicable): _____

WITNESS' NAME (if applicable): _____

Detailed contact information including contact address, telephone, fax, e-mail and any other contact information of researcher(s), institutional HREC and head of the institution:

This research has been approved by the Health Research Ethics Committee of the University of Ibadan and the Chairman of this Committee can be contacted at Building 2, Room 617, University

Old Campus, Ife Road. The phone and fax numbers are 777-7777. In addition, if you have any question about your participation in this research, you can contact the principal investigator, Dr. Adebamowo at his office in Building 2, Room 600, University Old Campus, Ife Road. The phone and fax numbers are 555-5555. You can also contact the Head of the University of Ibadan at Office of the Head, University New Campus, Ife Road. The phone and fax numbers are 333-3333.)

PLEASE KEEP A COPY OF THE SIGNED INFORMED CONSENT.



Standardised Operating Procedures

Kato Katz

Diagnosis of: Schistosoma mansoni, Trichuris trichiura, Ascaris lumbricoides, Ancylostoma duodenale and Necator americanus

General Principle: people infected with STH or intestinal schistosomes pass the eggs of the worms through their faeces. By examining a stool specimen under a microscope it is possible to count the number and the type of eggs that are present.

Safety precautions

- ☐ The stool should be considered potentially infectious.
- ☐ Wear gloves and lab coats whenever handling stool samples.
- ☐ Benches, instruments and equipment should be routinely decontaminated with disinfectants after use.
- ☐ Materials contaminated with infectious waste should be disinfected before disposal.
- ☐ Drinking or eating during laboratory procedures is prohibited.
- ☐ Appropriate disinfectant(s) should be used for disposal of contaminated materials, wooden spatulas and specimen containers and for cleaning of workbenches.
- ☐ Used specimen containers must be disinfected before washing.

Equipment for Kato Katz

Kato-Katz:

- ❖ Stool sample in container (polythene squares tied with grass or plastic pot)
- ❖ Microscopic glass slides
- ❖ Cellophane sheets (hydrophilic, 30 - 50µm thick)
- ❖ Malachite green (or methylene blue)
- ❖ Glycerol
- ❖ Metal sieve (Endecott Sieve) with 200 - 250µm mesh size
- ❖ Slide boxes
- ❖ Newspapers
- ❖ Wooden or plastic applicators


- ❖ Forceps
- ❖ Kato-Katz plastic template with a hole of 6mm on a 1.5mm thick template (delivering 41.7mg of faeces)

Microscopic examination:

- ❖ Microscope
- ❖ Hand tally counter
- ❖ Laboratory forms

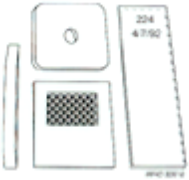



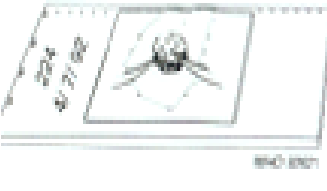
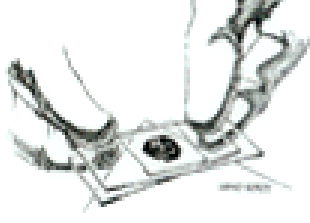

Disinfectants and waste disposal:

- ❖ Disinfectant wipes
- ❖ Medicated soap
- ❖ Methylated spirit
- ❖ Waste container (containing disinfectant)

Preparation of Kato Katz Reagents	Images
Step 1: Weigh out 3g of Malachite green powder (or methylene blue).	
Step 2: Dilute it in 100ml of distilled water (this is the “stock solution”).	
Step 3: Dilute 60ml of glycerine in 40ml of distilled water*.	
Step 4: Take 1 ml of Malachite green (or methylene blue) stock solution and add it to 100ml of the 60% glycerol solution (this is the “working solution”).	
	 <p>Fig 2</p>

*In reference books the ratio is 50% or greater glycerol solution (50ml glycerine and 50ml distilled water). In Uganda they have found this makes too light a solution and thus makes it difficult to read slides after some time has passed.

Kato-Katz Steps	Images
-----------------	--------

<p>Step 1: Place two glass slides alongside each other and label both slides with the sample number and then place a plastic template on top of each.</p>	
<p>Step 2: Place a small amount of the faecal specimen on a newspaper and press through the metal sieve. Using a spatula, scrape the sieved faecal material through the sieve so that only the debris remains on the top.</p>	
<p>Step 3: Scrape up some of the sieved faeces from the underside to fill the hole in the templates, avoiding air bubbles and levelling the faeces off to remove any excess.</p>	
<p>Step 4: Carefully lift off the templates and place it in a bucket of water mixed with concentrated detergent so that they can be reused.</p>	
<p>Step 5: Place one piece of the cellophane, which has been soaked overnight in the malachite green (or methylene blue) working solution, over the faecal specimen.</p>	
<p>Step 1: Place two glass slides alongside each other and label both slides with the sample number and then place a plastic template on top of each.</p>	
<p>Step 2: Place a small amount of the faecal specimen on a newspaper and press through the metal sieve. Using a spatula, scrape the sieved faecal material through the sieve so that only the debris remains on the top.</p>	

<p>Microscopic Examination for <i>S. mansoni</i> and STH</p>	<p>Images</p>
--	---------------

Step 1: After 10 minutes place a little amount of eosin on the slide and place it under microscope using x 100 objective.	
Step 2: Count ALL eggs present using a hand tally counter; start in one corner of the sample and systematically scan the whole sample in a 'zig zag' scheme	
Step 3: Record the number and the type of each egg on a recording form alongside the sample number. If no eggs are seen, record "0".	
Step 4: Remove the faeces and cellophane using a tissue into the waste container and place all slides used when conducting Kato-Katz into the disinfectant. These slides should be cleaned and used again for the survey.	

Note:

The quality control when reading the Kato-Katz slides is important. For example, confirming the agreement % for laboratory technicians to ensure quality (see the agreement % on a specimen collection).

ANNEX 8: Urine Analysis



Standardised Operating Procedures


Hemastix

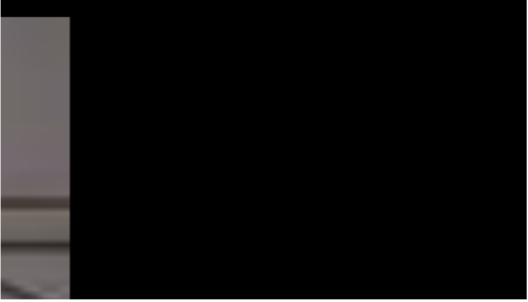



Diagnosis of: Schistosoma haematobium.

All manufactured kits come with instructions on how to use them. It is very important to follow the instructions to ensure the quality of the results.

Equipment for Hemastix test

- ☑ Hemastix test strip and Hemastix pot with scale
- ☑ Scissors
- ☑ Gloves
- ☑ Disinfectants and waste disposal
- ☑ Data collection form

Steps for Reagent Strips	Images
<p>Step 1: Collect a fresh urine specimen in a clean plastic container. Ensure that the urine is tested in the field within 2 hours of collection. If there is a delay, refrigerate the specimen if possible.</p>	
<p>Step 2: Remove one strip from its bottle (you can cut the strip in two to save resources) and label the strips with the patient identification.</p>	
<p>Step 3: Completely immerse the reagent areas of the strip into the urine specimen for a few seconds.</p>	

<p>Step 4: When removing the strip, run its edge against the rim of the container to remove any excess urine.</p>	
<p>Step 6: Put the strip horizontally on the table so that the chemicals do not mix together.</p>	
<p>Step 7: Read the strip between 1 and 2 minutes after it has been dipped in the urine specimen.</p>	
<p>Step 8: Match the colour of the strip with the colour chart on the bottle label and record the results on the monitoring form. Record "0" if the result is negative. 1= trace non-haemolysed 2 = trace haemolysed 3 = + 4 = ++ 5 = +++</p>	

Important Note:

- Do not lay the strip on the colour chart as this will soil the chart
- It is extremely important to read the strip 1-2mins after it has been dipped in the urine sample. Any colour changes that occur after 2 minutes are of no diagnostic value and should be ignored.

Urine Filtration

Diagnosis of: Schistosoma haematobium

All manufactured kits come with instructions on how to use them. It is very important to follow the instructions to ensure the quality of the results.

Safety precautions

- The urine should be considered potentially infectious.
- Wear gloves and lab coats whenever handling urine samples.
- Benches, instruments and equipment should be routinely decontaminated with disinfectants after use.
- Materials contaminated with infectious waste should be disinfected before disposal.

- Drinking or eating during laboratory procedures is prohibited.
- Appropriate disinfectant(s) should be used for disposal of contaminated specimen containers and for cleaning of workbenches.
- Used specimen containers must be disinfected before washing

Equipment

General use:

- Gloves
- Laboratory Forms

Urine Filtration:

- Urine pots (250ml)
- Swinnex Filter Holder
- Tweezers/Forceps
- Syringe, plastic, 10ml
- Nucleopore Membrane Filter,

13mm diameter and pore size 12 μ m

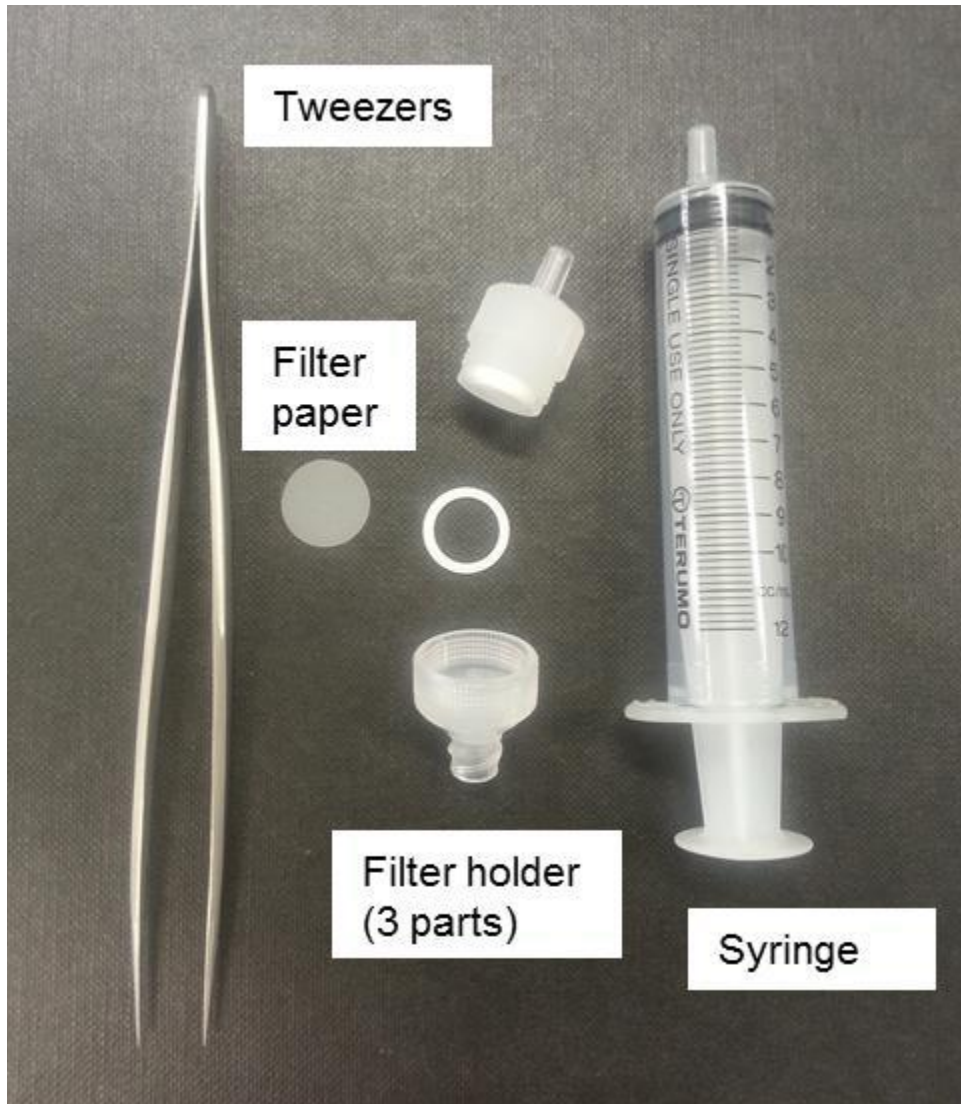
- Microscope glass slides
- Lugol's Iodine (5% solution)

Microscopic examination:

- Microscope
- Hand tally counter

Disinfectants and waste disposal:

- Bucket (to discard urine)
- 1% hypochlorite solution (domestic bleach)
- Methylated Spirit
- Medicated soap
- Rubber washing gloves
- Disinfectant wipes
- Waste container (containing disinfectant)

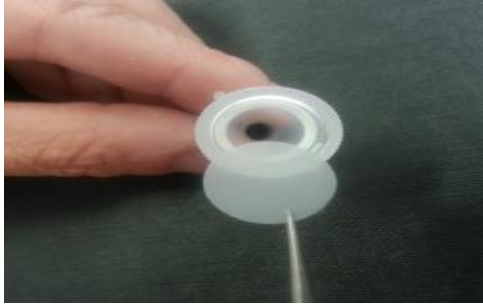
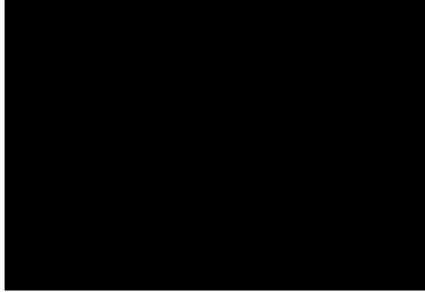
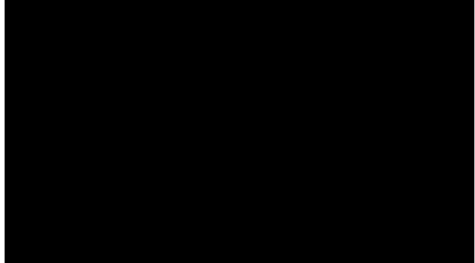



Sample collection:

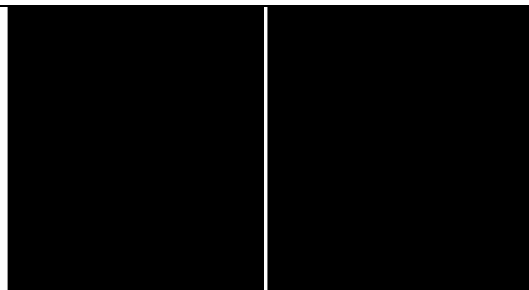
The number of ova in the urine varies throughout the day, with the highest between 10am and 2pm. The specimen should be taken between these times and consist of a single urine sample. Since eggs are more often found at the end of a urine flow, at least 10ml should be collected at the end of urination (the terminal urine). The easiest way to ensure a terminal urine sample is to ask individuals to 'try to fill' a large pot, e.g. 250ml. Note that some children, particularly those who are heavily infected with schistosomiasis, may not be able to provide 10ml of urine. Do not discard these smaller samples, but note the volume (ml) of urine provided. Specimens should be examined as soon as possible after collection

as the eggs may hatch and then become invisible, or crystals may form, making a correct diagnosis more difficult.

IMPORTANT NOTE: To increase the volume of urine provided during sample collection, it would be advisable to promote fluid intake and physical exercise prior to micturition (e.g. provide the children with 2 glasses of water, one hour before urine collection, and request the children to participate in 10 minutes of exercise) (Doehring et al. 1983).

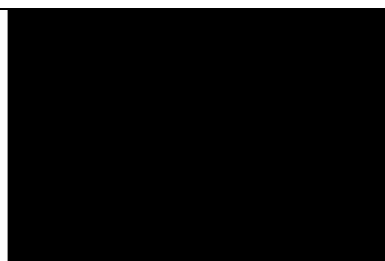
Steps for Urine Filtration	Images
<p>Step 1: Unscrew the filter holder and insert a nucleopore filter between the two parts of the filter holder. Make sure it is correctly held in place before screwing the unit together again.</p>	
<p>Step 2: Thoroughly shake and mix the urine specimen before drawing a 10ml specimen into the syringe. Then attach the filter unit. If less than 10ml urine sample is available, withdraw all urine in the sample pot and note the quantity of urine (ml) on the laboratory form next to the ID number. Do not discard the urine sample if it is less than 10ml.</p>	
<p>Step 3: Keeping the syringe and the unit in a vertical position, press the plunger down to push all the urine through the filter and out into a bucket.</p>	
<p>Step 4: Carefully detach the syringe from the filter unit. Draw air into the syringe, reattach the syringe to the filter unit holder and expel the air again. This is important as it removes any excess</p>	

urine and ensures that the eggs are firmly attached to the filter.



Step 5: Unscrew the filter holder and use a pair of tweezers to remove the filter and place it inverted, onto the glass microscope slide labeled with a unique identification number. The top side of the filter, where the eggs were captured, should be face-up on the slide.
DO NOT DISCARD THE FILTER HOLDER OR SYRINGE.

Step 6: Add one drop of Lugol's iodine and wait 15 seconds for the stain to penetrate the eggs. This makes the eggs more easily visible.



Step 7: Immediately examine the whole filter under a microscope at a low power (x40). Schistosome eggs can be seen clearly because they stain orange. Record the *total number of eggs on the filter*.



Step 8: At the end of the day, wash all reusable equipment (forceps, filter holders, syringes, urine containers, glass slides) in 1% hypochlorite solution (domestic bleach) for use next day, discard used filters and clean the workbench.

Where two urine samples are required: Repeat Steps 1-7 to prepare a second duplicate filter from the same urine sample, and place it on the glass slide next to the first filter, or on another slide labeled with the same ID code. The syringe can be re-used for this second filtration on the same urine sample. However, ensure that a clean syringe is used for each different urine sample (i.e. from two individuals). Two filters from the urine sample should be read by two independent laboratory technicians.

IMPORTANT: Read the slide within an hour of the urine sample being taken otherwise the eggs may be non-viable and become translucent. Do not leave the samples exposed to the sun.

Reagent strips

Reagent strips will be used for the rapid determination of micro haematuria. This method is simple and will follow the following steps:

- 1.0 Dip the reagent strip into the urine sample for a few seconds.
- 2.0 Wait for about 2 minutes and compare the colour of the reagent strip to the colours on the label of the reagent strip container.
- 3.0 Enter the result on the Case Record Form next to the appropriate ID number.
- 4.0 Discard the used reagent strip in the waste container.
- 5.0 Tests scored as positive or trace positive should be verified by urine filtration.

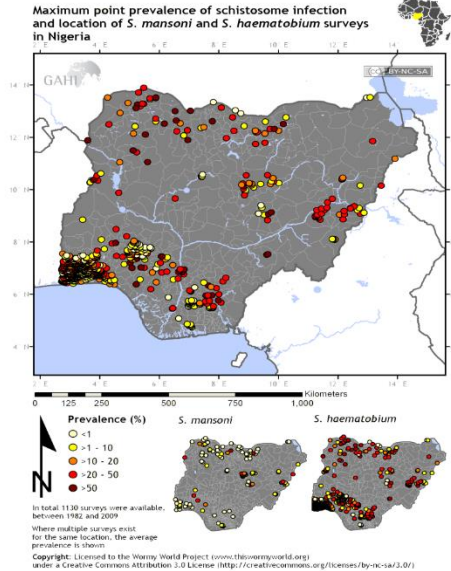
Urine filtration/sedimentation

A minimum of 10 ml of urine should be collected (WHO, 2010) from each child for urine filtration/sedimentation (to determine number of eggs per 10ml of urine). As the excretion of *S. haematobium* eggs follows a circadian rhythm with a peak around noon, urine specimens for filtration/sedimentation should preferably be collected between 10 a.m. and 2 p.m.

TECHNICIANS AND MICROSCOPISTS/Team

		Days (Tick to check for each day)																				
		Qty	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	Microscopes	1																				
2	Extra Microscope bulbs	2																				
3	Generating sets	1																				
4	Fuel	20ltrs																				
5	Hand gloves (1 Packet per LGA)	1																				
6	Face masks (1 packet per LGA)	1																				
7	Disinfectants (2 of 100mls of disinfectant per LGA)	2																				
8	Liquid detergents	1 litrs																				
9	Combi 9	110stps																				
10	Frosted Slides - 450 Slides	1																				
11	cover slips (2 packets of cover slip per LGA)	1																				
12	Kato-katz kits	1																				
13	Centrifuge (2 per State)	1																				
14	Plastic urine centrifugation tubes (250 per LGA)	1																				
15	Plastic bowl with cover for Malachite green solution	2																				
16	Bucket and Cup for water (2 each per team)	1																				
17	Malachite green solution	1 ltr																				
18	10% Formalin	4 ltr																				
19	Extension cables/wires	2																				
20	Pencils	2																				
21	Markers	2																				
22	Pen	2																				
23	Laboratory Log Books	1																				
24	Dropping pipette(1 packet per LGA)	1																				
25	Cotton wool	1 roll																				
26	Tissue papers	1																				
27	Xylene (1 bottle each per LGA)	1																				
28	Spirit (1 bottle each per LGA)	1																				
29	Forceps	1																				

Maximum point prevalence of schistosome infection and location of *S. mansoni* and *S. haematobium* surveys in Nigeria



Distribution of soil transmitted helminth survey data for Nigeria and the average district-level prevalence

