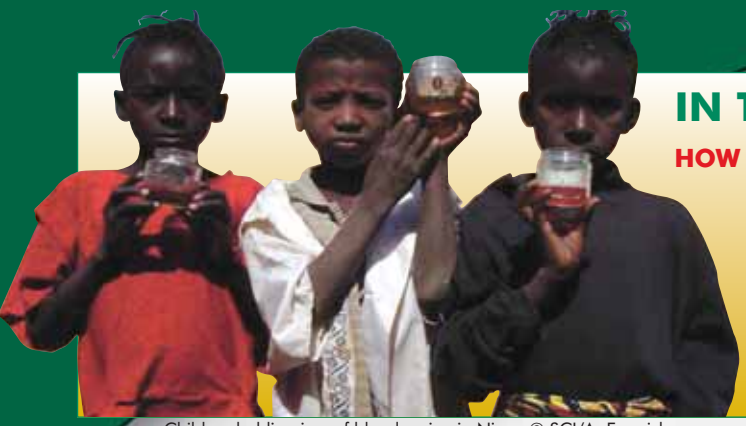
ACTION AGAINST WORMS

JANUARY 2004 ISSUE 4

PPC NEWSLETTER



Children holding jars of bloody urine in Niger. © SCI/A. Fenwick.

IN THIS ISSUE:

ARE YOU DEWORMING?

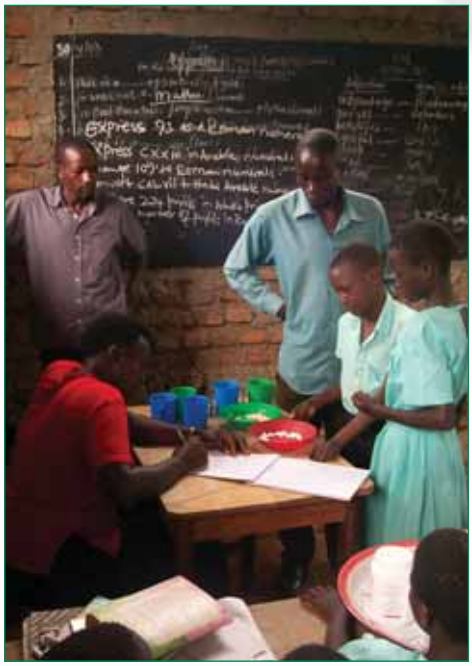
What would you do with US$ 10 000? You work in a rural district with a population of 200 000, the area is poor, there is no sanitation system, and your community has a variety of problems including malaria, respiratory tract infections, diarrhoea, and malnutrition.

You could spend the money on one of these priority programmes – but you could also use it to deworm 50 000 children in your district. This would lower anaemia levels, boost the number of children coming to school, and significantly improve their growth and their ability to concentrate and to play; the children would suffer less from other diseases and would feel very much healthier. **Deworming is one of the easiest, cheapest and most effective health interventions you can invest in**. Sadly, it is still among those that are given the least priority.

TARGET, PIGGYBACK, REPEAT, STOCK

Whether you are a district health officer or an NGO, whether you want to set up a worm control programme or simply add deworming to your existing work, the approach is the same.

- **Target.** Focus on those who need treatment most. First and foremost, this means school-age children, but if your programme reaches preschool children or women, treat them too – the drugs are cheap and safe and will dramatically improve health.
- **Piggyback.** Do not set up a new programme – use systems that already exist. Piggyback deworming onto the school system or the programme you already run.
- **Repeat.** Treat your high-risk groups repeatedly. With the dramatic fall in drug prices, this is completely realistic. Deworming should become a regular part of a child's schooling, a regular treatment offered at mother-and-child health clinics, and a standard part of every immunization campaign.
- **Stock.** Every local health unit or pharmacy should be stocked with deworming drugs and health workers should know the symptoms of infection and be aware that treatment is safe.



Ugandan children receiving deworming tablets at school in 2003. © SCI/C. Kamenka.

www.who.int/wormcontrol

SIX STEPS TO START DEWORMING

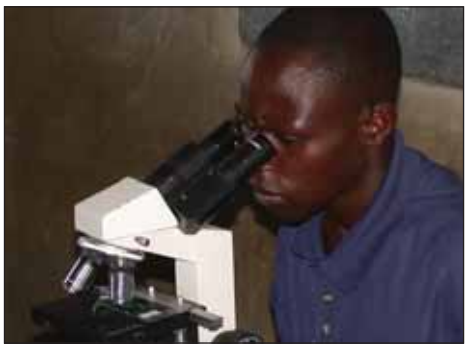
Outlined below are six simple steps that will help you start deworming. You will find that they overlap to some extent, so that – depending on your situation – you may be able to skip some entirely. They concentrate on school-based deworming, but the information will also be helpful if you decide to treat people in other high-risk groups.

STEP 1: COLLABORATION

Delivering deworming drugs through schools comes under the jurisdiction of both the health and education sectors, and one of the most important prerequisites for a successful programme is to build strong collaboration between these two from the outset. Meetings should be held to decide who will be responsible for what, a joint timetable for training sessions arranged, and a consensus reached on a shared budget.

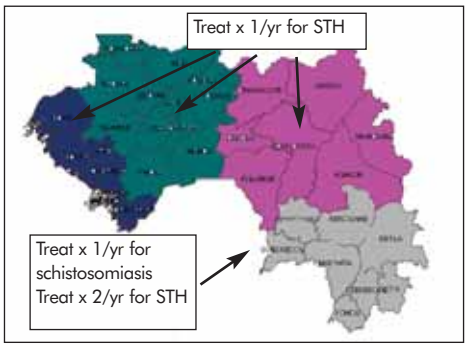
STEP 2: RAPID APPRAISAL

Next, you need to assess the situation and for this data are frequently already available. However, if the data are extremely old, a rapid appraisal will give you a good idea of the current situation so that you can start making decisions immediately. As the goal is to treat as many people as possible, the survey costs should be kept to a minimum. The most technical skill will be required of your microscopists, who must know how to prepare and read a Kato–Katz slide – a simple technique that can be learned in half a day.



A Ugandan microscopist. © SCI/R. Stothard.

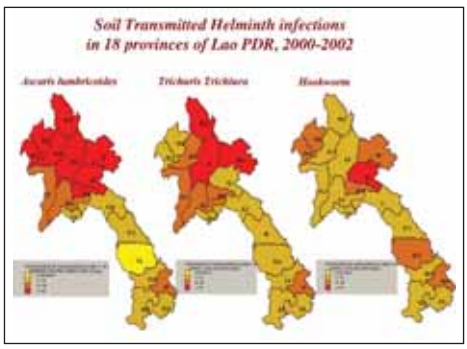
For a national survey, a simple sampling frame has been developed: you divide the country into different ecological areas and carry out a survey in each one. The principle behind this approach is that, because worms need specific conditions in order to survive (soil-transmitted helminths (STH) need a humid climate and poor sanitation; schistosomes also need fresh water and certain snails as intermediate hosts), each area is likely to have a different transmission pattern. Based on your results, it is then possible to devise a strategy for each region.



A "What to Do" Map of Guinea

MAPPING

Once you have your survey results, mapping can be very helpful to visually show which areas are the most heavily infected, how many people require treatment, and which areas are free of infection. Information on a number of different variables – for example population densities, number of health centres, water developments – can then be overlaid using systems such as HealthMapper (http://www.who.int/csr/mapping/en/).



Maps of Lao PDR showing the prevalence of STH

TOOLS FOR A RAPID APPRAISAL

Kato–Katz kits (for STH and intestinal schistosomiasis)

WHO recommends using Kato–Katz kits for measuring STH and intestinal schistosomes eggs because they are cheap, they give a standardized reading (eggs per gram of faeces) and the technique is easy for a laboratory microscopist to learn. Using a small plastic spatula and template, a small amount of faeces is measured out and then placed on a slide and examined under a microscope. The eggs of the three STH (hookworm, whipworm and roundworm) and of intestinal schistosomes can then be identified and counted. Hookworm eggs disappear within a few hours, so it is important to read the slide within 2 hours of its preparation.

Each kit costs about US$ 40 and can be used for 2000 tests. The templates and spatulas can be washed and reused.

Questionnaire (for urinary schistosomiasis only)

Child with bloody urine indicating urinary schistosomiasis. © SCI/A. Fenwick.

The questionnaire method is inexpensive and simply asks children whether they have seen blood in their urine over the past month. The child will answer "yes" or "no". This response will therefore tell you whether urinary schistosomiasis is present or not in the school; it cannot tell you how many eggs each child has, i.e., the intensity of infection. By definition, however, a child with bloody urine is already heavily infected. With this information you can rank the schools from the worst affected to the least affected and then identify the areas that need treatment most urgently.

Urine filtration kits (for urinary schistosomiasis only)

As for the Kato–Katz method, you need trained laboratory microscopists to use the urine filtration technique. However, it is a straight forward procedure and will indicate whether schistosome eggs are present and how many. A standard quantity of urine (10 ml) is drawn into a syringe and then passed through a small filter of standard size. The filter is then placed on a slide and examined under a microscope.

Each kit costs about US$ 50 and can be used for 500 tests. You will also need syringes. At the end of each day, the syringes can be washed and reused. If tests are negative, the filters can also be reused.

Software for entry and analysis of survey data

Easy-to-install software is available for inputting each child's data (STH and schistosome egg counts, height, weight, age, identification number and haemoglobin, if this has been measured). Simple calculations can then be carried out or the data can be exported to EpiInfo, Excel or other packages for more sophisticated analysis.

FIGURE 1. HOW TO CARRY OUT A RAPID APPRAISAL IN YOUR DISTRICT

NOTE: This approach does not follow a rigorous epidemiological method. It is an operational approach that allows you to rapidly assess the situation and then act.

HOW TO CHOOSE YOUR SCHOOLS AND CHILDREN

SAMPLING FOR STH

Choose 5–10 schools in different areas of your district. In each school, select 50 children from any of the three upper classes (where the infection rates will be the highest). Take a stool sample from each child and examine it for STH eggs using the Kato–Katz method. In the same sample you will also see the eggs of intestinal schistosomes if they are present.

SAMPLING FOR SCHISTOSOMIASIS

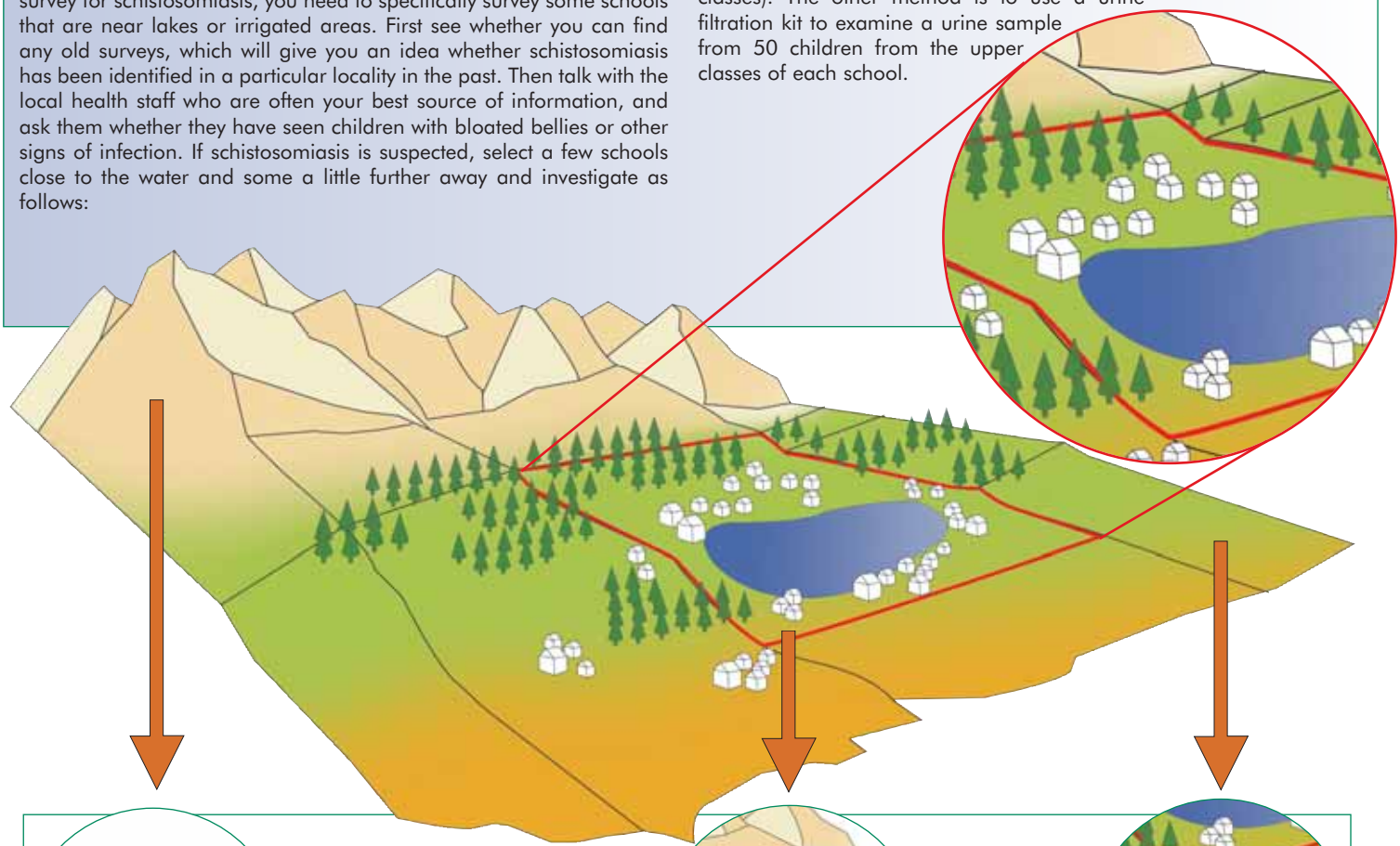
By chance, the schools you choose for STH may be in areas that are free of schistosomiasis (which is found only around water). To survey for schistosomiasis, you need to specifically survey some schools that are near lakes or irrigated areas. First see whether you can find any old surveys, which will give you an idea whether schistosomiasis has been identified in a particular locality in the past. Then talk with the local health staff who are often your best source of information, and ask them whether they have seen children with bloated bellies or other signs of infection. If schistosomiasis is suspected, select a few schools close to the water and some a little further away and investigate as follows:

FOR INTESTINAL SCHISTOSOMIASIS

From each school you have chosen, select 50 children from the upper classes and ask each child to provide a stool sample. Using the Kato–Katz method, examine the samples for intestinal schistosome eggs.

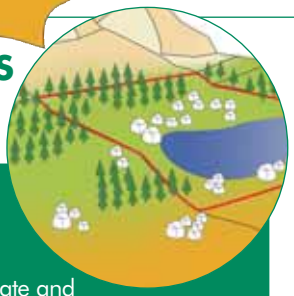
FOR URINARY SCHISTOSOMIASIS

For urinary schiostosomiasis, select the schools in the same way. You then have the choice of two methods to assess the magnitude of the problem. The simplest approach is to use the standard questionnaire. Send 50 questionnaires to each school (one per child in the upper classes). The other method is to use a urine filtration kit to examine a urine sample from 50 children from the upper classes of each school.

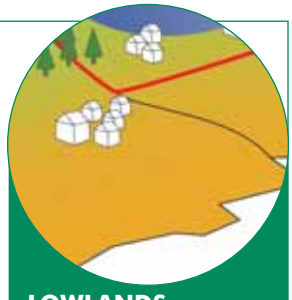


THE ECOLOGICAL AREAS OF TRANSMISSION

MOUNTAINS
A high-altitude area with a cold winter season: STH eggs are not likely to survive in this climate.



HIGHLANDS
Densely populated area with a cool climate and no sanitation: STH transmission is very probable. Freshwater lakes containing snails, bordered by particularly poor communities with no sanitation: schistosomiasis extremely likely, especially for fishermen.



LOWLANDS
Area with a hot and humid climate nearly all year round: ideal for STH transmission and schistosomiasis if fresh water present.

STEP 3: MAKING A PLAN

Since the stool and urine samples are analysed on the day of the survey, it should not take long to collate the results and produce a short report that describes the prevalence and intensity of infection in each school and each area. WHO recommendations should then be used to decide on appropriate action (Tables 1 and 2). Schistosomiasis and STH have slightly different cut-offs for action; crucially, however, where the two infections co-exist they are treated at the same time.

Roundworms

TABLE 1. RECOMMENDED TREATMENT STRATEGY FOR STH

Category	Prevalence*	Action in schools**	Action in the community
I: High	≥ **70%**	Treat all school-age children 2–3 times each year	Treat preschool children and women of childbearing age whenever they have contact with health services, for example at mother and child clinics.
II: Moderate	≥ **50%**	Treat all school-age children at least once each year	
III: Low	< **50%**	Treat only symptomatic individuals (i.e. those who pass worms in their stools).	Treat only symptomatic individuals (i.e. those who pass worms in their stools).

* Refers to the percentage of children with any of the three STH infections. The software automatically calculates this for you.
** Enrolled and non-enrolled school-age children.

TABLE 2. RECOMMENDED TREATMENT STRATEGY FOR SCHISTOSOMIASIS

Category	Prevalence	Action in schools**	Action in the community
I: High	≥ **30%** urinary schistosomiasis*** or ≥ **50%** intestinal schistosomiasis	Treat school-age children once a year	Praziquantel should be available in dispensaries and clinics for treatment of suspected cases. High–risk groups should be treated.
II: Moderate	< **30%** urinary schistosomiasis*** or ≥ **10–<50%** intestinal schistosomiasis	Treat school-age children once every 2 years	Praziquantel should be available in dispensaries and clinics for treatment of suspected cases.
III: Low	< **10%** infected with urinary or intestinal schistosomiasis	Treat school-age children twice during their primary schooling, for example once on entry and once on exit	

** Enrolled and non-enrolled school-age children.
*** Urinary schistosomiasis: use the questionnaire method to assess the prevalence of children reporting blood in their urine.

STEP 4: ORDERING THE DRUGS

In calculating the number of drugs to order, take into account whether you need to treat for both infections, how frequently you will treat, and who you are going to target.

There are four drugs for treating STH:

- albendazole and mebendazole, which are particularly attractive because the dose is one tablet for everyone aged 2 years or more
- pyrantel and levamisole, which are a little more complicated to administer as the dose is based on body weight.

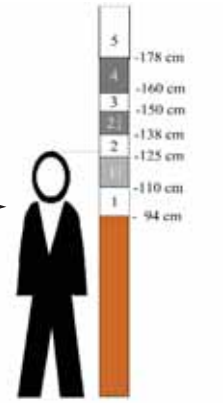
TABLE 3. DRUG DOSES FOR TREATING STH

Drug	Doses by age	
	1–2 years	2 years upwards
Albendazole (400-mg tablets)	1/2 tablet	1 tablet
Mebendazole (500-mg tablets)	1 tablet	

For schistosomiasis, there is just one drug, praziquantel. The correct dose is calculated on the basis of body weight (40–60 mg/kg) so you need reliable scales. However, you can also use height instead of weight to calculate the correct number of tablets to administer; for this purpose, WHO has developed a "praziquantel dose pole" designed to deliver the standard dose of 40 mg/kg (see Table 4).

TABLE 4. PRAZIQUANTEL DOSES FOR TREATING SCHISTOSOMIASIS

Drug	Doses by age	
	1–5 years	6 years upwards
Praziquantel (600-mg tablets)	Unlikely to be infected in most situations, but it is safe to treat this age group.	Use scales or the WHO praziquantel dose pole →



WHO CAN YOU TREAT?

	0–1 years	1–2 years	2–5 years	6 years plus	Pregnant women
For STH	X	✓	✓	✓	✓
For schistosomiasis	X	▲	▲	✓	✓

X **For both STH and schistosomiasis:** Children under the age of 1 year should not be treated for either infection because 1) they are unlikely to be infected and 2) the safety of the drugs for this age group has not been assessed.

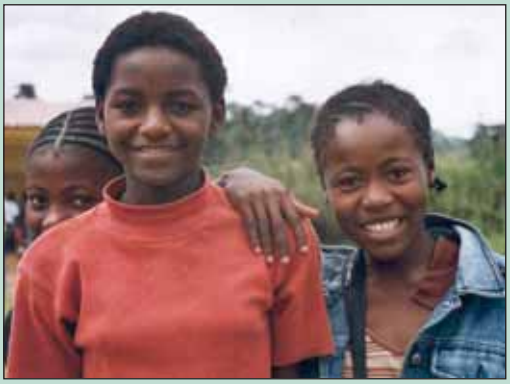
✓ **For STH:** From the time a child starts crawling and exploring its environment – often putting its hands in its mouth – it is at risk of STH infection. In an endemic area, children will be repeatedly re-infected and, without treatment, the number of worms living inside them steadily increases. By the time they reach school age, they can be harbouring hundreds of worms and the situation is serious. It is safe to treat children for STH from the age of 1 year onwards with albendazole or mebendazole. It is also safe to treat pregnant women (preferably after the first trimester).

▲ ✓ **For schistosomiasis:** Children under 5 years do not usually have much contact with water, and so are unlikely to be heavily infected. Serious infection usually begins from the age of 6 years onwards when they learn to swim and play in water. In highly endemic areas, however, 1–5-year-olds might need treatment. Praziquantel is safe from the age of 1 year onwards, and can also be given to pregnant women (preferably after the first trimester).

WHY SCHOOL-AGE CHILDREN?

For a rapid appraisal, school-age children are surveyed because they are an easy group to reach and because they mirror the worm infection in their community. School-age children are also the most important group to target when you start your deworming programme for a number of other reasons:

- ***Vulnerability.*** Typically, 6–15-year-olds have the highest intensity of worm infections of any age group.
- ***Health and learning.*** The impact of infection on



Adolescent girls in Cameroon. © WHO/PVC/H. Allen

AND WHY