



School Health Integrated Programming

Guidelines for School-based Deworming Programs

Information for policy-makers and planners
on conducting deworming as part of an integrated
school health program



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Purpose of the Guidelines

Soil transmitted helminths (or STH) and schistosomiasis are a group of intestinal parasites that disproportionately affect children around the world in terms of both burden of infection as well as consequences of infection. These parasites are classified as Neglected Tropical Diseases, or NTD, due to their high levels of endemicity in developing countries, and particularly affecting the poor and marginalised within these countries. Over 400 million children are estimated to be affected by STH infections. A further 120 million school age children are at risk of infection and require treatment for schistosomiasis (also known as bilharzia)^{1,2}. These infections make children unwell, and affect their physical and mental development, limiting a child's ability to attend and perform well at school. These worm infections can be effectively treated to reduce the burden in an individual with drugs that are safe and effective in a process known as deworming. When deworming pills are distributed en mass to whole communities, districts or even countries, it is known as mass drug administration (MDA), and has public health benefits that reach beyond the individual through removing infectious eggs from the environment and thereby reducing the risk of infection and re-infection to the whole community. Schools are seen as ideal platforms for many health interventions, including distribution of deworming tablets due to the safety and efficacy of the treatment – even an uninfected individual can safely take a deworming tablet; and the close contact and trust that teachers have with communities and with students makes them ideal distributors of the drugs and messengers for deworming. Studies have shown that children who were previously infected with intestinal parasites and then dewormed demonstrate catch-up physical and cognitive growth and attend school more regularly. These benefits to the education sector means teachers and schools are keen to support deworming programs.

The detrimental effects that parasitic worms have on children, their educational attainment and subsequent impact on a countries economic development has led to a substantial and historic response from the global community to tackle the issue. In 2012, multiple pharmaceutical companies, governments and global health organizations signed the 'London Declaration on NTDs'³. As part of the declaration, these stakeholders pledged to sustain and expand efforts to tackle NTDs, including STH and schistosomiasis. More than 2.4 billion tablets for use in NTD treatment and prevention are now being donated annually to countries in need via the WHO⁴. The WHO has set a global target of regularly reaching 75% of children at risk of morbidity due to infection with deworming tablets by 2020^{5,6}.

Similar to any school-based health program, multiple stakeholders are involved in developing and implementing a school-based deworming program. A good program requires strong cross-sectoral collaboration. For example, upstream levels of program design and planning will require support and expertise from Ministry of Health in determining where the program should be focussed based on parasite prevalence maps, as well as in procuring tablets. Ministry of Education will be more involved in school level implementation, guiding teachers for implementation, and planning on the day. Training, monitoring and feedback is frequently performed by both Ministry of Health and Ministry of Education. Good channels of communication for these activities are required at all levels and stages to ensure a smooth running program.

More and more countries are becoming engaged in education-led, large scale school-based deworming programs. These programs are based on evidence either gathered as part of national surveys, or on past knowledge collated from academic publications. A well designed, evidence based program can provide a cost-effective mechanism for addressing children's health and educational needs.

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1. Pullan, R. L., J. L. Smith, R. Jasrasaria, and S. J. Brooker. 2014. "Global Numbers of Infection and Disease Burden of Soil Transmitted Helminth Infections in 2010." *Parasites and Vectors* 7: p.37.
 2. World Health Organization. 2014. "Schistosomiasis: number of people treated worldwide in 2014." *Weekly Epidemiological Record* 5: 91, pp.53-60.
 3. Uniting to Combat Neglected Tropical Diseases. 2012. London Declaration on Neglected Tropical Diseases. London, UK.
 4. Uniting to Combat Neglected Tropical Diseases. 2016. End the Neglect: Fourth Progress Report on the London Declaration on Neglected Tropical Diseases. London, UK.
 5. World Health Assembly (2001) Schistosomiasis and soil transmitted helminth infections. Fifty-Fourth World Health Assembly Resolution (WHA 54.19). Available at: http://www.who.int/neglected_diseases/mediacentre/WHA_54.19_Eng.pdf
 6. World Health Organization. 2012. "Accelerating Work to overcome the Global Impact of Neglected Tropical Diseases: a roadmap for implementation". Available at: http://www.who.int/neglected_diseases/NTD_RoadMap_2012_Fullversion.pdf

The following document provides some key guidelines to provide direction to those planning and implementing a school-based deworming program as part of comprehensive SHN programming. The guidelines draw upon many documents already available from global drivers and supporters of deworming, and deworming children, including those published by the World Health Organization. These guidelines are aimed at the education sector response to deworming, but as this cannot be taken in isolation, key program components that relate to the health sector are also addressed.

Background & Introduction

The following sections detail the scale of the parasitic helminth infection in children, and the key steps necessary to develop and implement a school-based deworming program. The multi-sectoral nature of the program means some of these points are best addressed by Health sectors, and others by Education. Strong coordination and communication between all stakeholders is required to ensure a smooth running program.

Key abbreviations

ABZ	Albendazole
EPIRF	Epidemiological Data Reporting Form
JRF	Joint Reporting Form
JRSM	Joint Request for Selected PC Medicines
NTD	Neglected Tropical Diseases
MBZ	Mebendazole
MDA	Mass Drug Administration
MoE	Ministry of Education
MoH	Ministry of Health
MoU	Memorandum of Understanding
PZQ	Praziquantel
STH	Soil-Transmitted Helminths
WHO	World Health Organization



Worm infections in children

Parasitic worm infection disproportionately affects school age children, with this age group showing highest intensity and highest prevalence compared to any other age group for schistosomiasis, whipworm and roundworm infections. More than 400 million children worldwide are estimated to be infected with soil-transmitted helminthes (STH), which consist of roundworms (*Ascaris*), hookworms (*Necator* and *Ancylostoma*), whipworms (*Trichuris*). Over 120 million school age children are at risk of schistosomiasis (also known as bilharzia)^{7,8}. A further 1 billion children are living in areas stable for transmission for at least one of these parasitic species. This large burden of disease signifies a considerable loss to development, with infected children at greater risk of school absenteeism, poor cognitive and physical development and fatigue^{9,10,11}. Worm eggs that have been excreted from an infected individual into the environment can be ingested directly, or hatch into infective larvae that penetrate the skin on contact with the infective soil or water. After infection, the larvae travel to the gut (for STH), or into blood vessels (in the case of schistosomes) and grow into adult, egg producing parasitic worms. A child who remains infected with worms will be less successful in school and less productive in adulthood¹². Moreover, these

- Pullan, R. L., J. L. Smith, R. Jasrasaria, and S. J. Brooker. 2014. "Global Numbers of Infection and Disease Burden of Soil Transmitted Helminth Infections in 2010." *Parasites and Vectors* 7: 37.
- World Health Organization. 2014. "Schistosomiasis: number of people treated worldwide in 2014." *Weekly Epidemiological Record* 5: 91, 53–60.
- King C.H., Dickman K, Tisch D J. 2005. Reassessment of the cost of chronic helminthic infection: a meta-analysis of disability-related outcomes in endemic schistosomiasis. *Lancet* 6: 365
- World Health Organization. 2006. Preventative chemotherapy in human helminthiasis. Available at: http://apps.who.int/iris/bitstream/10665/43545/1/9241547103_eng.pdf
- Hotez, P.J., D.A.P Bundy, K. Beegle, S. Brooker, L. Drake et al. 2006. Helminth infections: soil-transmitted helminth infections and schistosomiasis. In: *Disease control priorities in developing countries*, 2nd ed. Oxford, Oxford University Press.
- Miguel E., M. Kremer. 2004. Worms: identifying impacts on health and education in the presence of treatment externalities. *Econometrica* 72: 159–217.

parasitic worm infections are disproportionately prevalent in poor populations in developing countries, affecting those least able to cope with the disease the most, and contributing to the persistence of poverty in these populations.

Deworming Children

Simple, safe, and cheap drugs are available to treat worm infections. These drugs have been through extensive safety testing and have been used to mass treat individuals harbouring infection with minimal side effects in countries around the world. Furthermore, regular treatment can prevent the negative consequences of worm infection on children. Pharmaceutical companies are currently donating the drugs required to treat children at risk of these common parasitic worm infections. Mebendazole (MBZ) (donated by Johnson & Johnson) and albendazole (ABZ) (donated by GlaxosmithKline) are used for STH infection, and praziquantel (donated by Merck) is used to treat children at risk of schistosomiasis. The WHO now recommends MDA to treat school-age children at risk of STH or schistosome infection, with the frequency dependent on the prevalence of infection (see table 1 on page 8). The steps detailed in the following pages describe the process to undertaking a deworming program. The global goal, set by the WHO, is to reach annual treatment of 75% of children who are at risk of STH infection by 2020^{13,14}.



13. World Health Organization. 2012. "Accelerating Work to overcome the Global Impact of Neglected Tropical Diseases: A roadmap for implementation". Available at: http://www.who.int/neglected_diseases/NTD_RoadMap_2012_Fullversion.pdf

14. World Health Assembly (2001) Schistosomiasis and soil transmitted helminth infections. Fifty-Fourth World Health Assembly Resolution (WHA 54.19).

Further Reading

The material provided here draws upon numerous publications that have been previously assembled. Some of these may provide useful references for further information regarding deworming programs. Below is a list of key documents.

World Health Organization

Soil transmitted helminthiasis: eliminating soil transmitted helminthiasis as a public health problem in children. Progress report 2001–2010 and strategic plan 2011–2020. (2012)¹⁵

Preventative chemotherapy in human helminthiasis: Coordinated use of antihelminthic drugs in control interventions: a manual for health professionals and programme managers. (2006)¹⁶

Accelerating work to overcome the global impact of neglected tropical diseases: a roadmap for implementation (2012)¹⁷

Helminth control in school-age children: A guide for managers of control programmes (2nd edition) (2011)¹⁸

World Bank

School deworming at a glance. (2003)¹⁹

Rethinking School Health: a key component of education for all. (2011)²⁰

Partnership for Child Development

School-based deworming: A planners guide to proposal development for national school-based deworming programs. (2010)²¹

Monitoring and Evaluation guidance for school health programs. FRESH partners. (2013)²²

Integrated School health a manual for teachers. (2014)²³



An important factor in deworming programs is to ensure that they are supported by **strong cross-sectoral collaboration** amongst government ministries.

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15. World Health Organization. 2012. Soil transmitted helminthiasis: eliminating soil transmitted helminthiasis as a public health problem in children. Progress report 2001–2010 and strategic plan 2011–2020. Available at: http://apps.who.int/iris/bitstream/10665/44804/1/9789241503129_eng.pdf
 16. World Health Organization. 2006. Preventative chemotherapy in human helminthiasis: Coordinated use of antihelminthic drugs in control interventions: a manual for health professionals and programme managers. Available at: http://apps.who.int/iris/bitstream/10665/43545/1/9241547103_eng.pdf
 17. (As 13.)
 18. World Health Organization. 2011. Helminth control in school-age children: A guide for managers of control programmes (2nd edition). Available at: http://apps.who.int/iris/bitstream/10665/44671/1/9789241548267_eng.pdf
 19. World Bank. 2003. School deworming at a glance. March 2013. Available at: http://www.who.int/intestinal_worms/resources/en/at_a_glance.pdf
 20. Bundy, D. 2011. Rethinking School Health: a key component of education for all. Available at: <https://openknowledge.worldbank.org/handle/10986/2267>
 21. Deworm the World. 2010. School-based deworming: A planner's guide to proposal development for national school-based deworming programs. Available at: <http://www.schoolsandhealth.org/Pages/documents.aspx>
 22. UNESCO. 2013. Monitoring and Evaluation Guidance for School Health Programs. Available at: <http://www.schoolsandhealth.org/Pages/documents.aspx>
 23. Partnership for Child Development. 2014. Integrated School Health: A Manual For Teachers. Available at: <http://www.schoolsandhealth.org/Pages/documents.aspx>

School-based Deworming Programs and Policies

Key Reading:

- + School deworming at a glance. World Bank, 2003.²⁴
 - + Rethinking School Health: a key component of education for all. World Bank, 2011.²⁵
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More and more countries are developing large scale deworming programs to tackle the burden of STH and schistosomiasis in children. Deworming programs should be based on evidence, with sequential and systemised steps to ensure good coverage and effective and efficient chains of communication, training and drug distribution. An important factor in deworming programs is to ensure that they are supported by strong cross-sectoral collaboration amongst government ministries. Indeed, the success of any school-based health program depends on the partnership between Ministries of Education and Ministries of Health. It is important to maintain frequent communication between different departments who may be supporting the deworming program, and to ensure that roles and responsibilities are identified and defined. This partnership can be informal, or may take on a more formal memorandum of understanding, with a co-chaired steering committee and task force. It is important that this partnership is reflected from national level down to regions and local levels. Finally, embedding the school-based deworming program within education sector plans and policies will ensure a broader range of funding opportunities, including education sector financing, and will support sustainability of the deworming program.

A comprehensive parasite control program will aim to not only deliver drugs, but also tackle re-infection through integrating other control mechanisms. Schools make an ideal place from which to target these complimentary control mechanisms. For example, through providing health education and hygiene messaging to school children as part of the school curriculum. It is also important to support water and

sanitation infrastructure, associated messaging and behaviour change. By integrating these essential counterparts, worm prevalence can not only be controlled, but it is possible to make steps to eliminate intestinal parasites as a public health problem.

In many countries, enrolment rates are high, however attendance may not always be ideal, and in many cases, those children who are not enrolled or attending school are the poorest children, often most in need for treatment with deworming medication. It is therefore essential to ensure that deworming days are seen as an opportunity to reach out to communities, encourage out of school children and preschool age children to attend and be dewormed. This will have an effect not only on the child who may be relieved of the burden of worm infection, but also a public health effect in preventing re-infection through continual contamination of the environment.

A country's individual policies surrounding school-based deworming should be taken into consideration when planning a deworming program. For example, who should be the target population, and what drugs to use. School-based programs can serve to reach out to the community and out of school children as well as preschool children who are often experiencing the morbidity associated with parasitic worm infection, including stunted growth and development. In considering preschool children, appropriate guidelines should be developed and followed. Both ABZ and MBZ can be safely administered to preschool children, and PZQ has been shown to be safe, however the bitter taste associated with PZQ renders it unpalatable to small children, and the large size makes it difficult to swallow. A paediatric formulation for PZQ is currently under development. In the short-term however, in areas where schistosomiasis is endemic, it is advisable to crush the tablets prior to providing them to children under 5, and to provide bread or food and water with administration.

24. World Bank. 2003. School deworming at a glance. March 2013. Available at: http://www.who.int/intestinal_worms/resources/en/at_a_glance.pdf

25. Bundy, D. 2011. Rethinking School Health: a key component of education for all. Available at: <https://openknowledge.worldbank.org/handle/10986/2267>

Planning and Targeting Deworming

Key Reading:

- + Soil transmitted helminthiases: eliminating soil transmitted helminthiases as a public health problem in children. Progress report 2001–2010 and strategic plan 2011–2020. WHO, 2012.²⁶
- + Preventative chemotherapy in human helminthiasis: Coordinated use of antihelminthic drugs in control interventions: a manual for health professionals and programme managers. 2006.²⁷
- + Helminth control in school-age children: A guide for managers of control programmes (2nd edition). 2011.²⁸
- + School-based deworming: A planners guide to proposal development for national school-based deworming programs. Partnership for Child Development, 2010.²⁹

An important step in planning for deworming is determining **location**, **prevalence**, and **species** of worms. As many areas will not have worms not all children in a country may need to be treated, similarly, presence of schistosomiasis versus STH, and a differing prevalence thresholds, will mean different treatment strategies with different drugs according to the WHO guidelines set out in table 1 below.

Table 1: Prevalence thresholds for mass deworming of schoolchildren for STH and schistosomiasis

	Moderate Risk		High Risk	
	Prevalence Threshold	Treatment Schedule	Prevalence Threshold	Treatment Schedule
STH (Area/District Level)	>=20% - <50%	Treat all children once a year	>=50%	Treat all children twice a year
Schistosomiasis (School Level)				
Intestinal	>=10% - < 50% Intestinal	Treat school children once every 2 years	>=50% Intestinal	Treat school children once a year
Urinary	<30% Urinary		>=30% Urinary	

Further reading: Helminth control in school-age children (WHO, 2011)³⁰

Mapping of the worms therefore allows targeting of treatment to those in need, and thus maximizes cost-effectiveness. Table 1 shows that the treatment strategy for schistosomiasis and STH is different, therefore in countries where these infections are prevalent, both STH and schistosomiasis will need to be mapped. Many countries may already have access to maps, or good data through previous mapping surveys; the Ministries of Health, as well as the Global Atlas of Helminth Infections provide valuable resources for information on helminth prevalence.

26. World Health Organization. 2012. Soil transmitted helminthiases: eliminating soil transmitted helminthiases as a public health problem in children. Progress report 2001–2010 and strategic plan 2011–2020. Available at: http://apps.who.int/iris/bitstream/10665/44804/1/9789241503129_eng.pdf

27. World Health Organization. 2006. Preventative chemotherapy in human helminthiasis: Coordinated use of antihelminthic drugs in control interventions: a manual for health professionals and programme managers. Available at: http://apps.who.int/iris/bitstream/10665/43545/1/9241547103_eng.pdf

28. World Health Organization. 2011. Helminth control in school-age children: A guide for managers of control programmes (2nd edition). Available at: http://apps.who.int/iris/bitstream/10665/44671/1/9789241548267_eng.pdf

29. Deworm the World. 2010. School-based deworming: A planner's guide to proposal development for national school-based deworming programs. Available at: <http://www.schoolsandhealth.org/Pages/documents.aspx>

30. (As 28.)

The Ministries of Health frequently have access to the tools and resources required to determine geographic location of worms, and should be involved or leading the process if required. Academic institutions can also be involved in the process due to access to well-trained parasitologists and modelling experts. The below is a summary intended to guide the process.

Steps in Mapping Worms and Targeting Delivery

- + Existing data, surveys etc. should be collated and mapped.
- + This should be combined with predictive data which can identify areas where worm transmission cannot be occurring based on altitude, temperature and rainfall, for example.
- + Rapid appraisal can be done at low cost to fill in data for areas where no data exists or is out of date but where it is shown worm transmission could be occurring (see Table 2).
- + Based on the data, the country's population, and administrative levels, it should be decided at what level to target areas. For example by state, or by district for STH or by focal area for schistosomiasis.
- + Data on schools and school populations can be mapped onto the same map to form a useful planning tool.

Table 2: How to conduct a rapid appraisal at the district level

Worm Infection	Rapid appraisal notes
Sampling for STH	Choose 5 to 10 primary 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 ³¹ method. In the same sample you will also see the eggs of intestinal schistosomes if they are present. Target districts on the basis of the determined prevalence according to WHO treatment guidelines.
Sampling for schistosomiasis	<p>To survey for schistosomiasis, you need to specifically survey some schools that are near lakes or irrigated areas. From each selected primary school identify 50 children for sampling and surveying for both intestinal and urinary schistosomiasis. If schistosomiasis is suspected, select a few schools close to the water and some a little further away and investigate as follows:</p> <p>FOR INTESTINAL SCHISTOSOMIASIS</p> <p>Ask each selected child to provide a stool sample. Using the Kato–Katz method, examine the samples for intestinal schistosome eggs.</p> <p>FOR URINARY SCHISTOSOMIASIS</p> <p>The simplest approach is to use the standard questionnaire about blood in the urine. Send 50 questionnaires to each school (one per child who provides a stool sample). A full survey can be done, which can identify lower levels of urinary schistosomiasis, whereby selected children provide a urine sample as well. The urine sample can be examined using the urine filtration method³².</p>

Source: Action Against Worms (WHO, 2008)

Further reading: Helminth control in school-age children (WHO, 2011); Preventative Chemotherapy in Human Helminthiasis (WHO, 2006).³³

31. World Health Organization. 2008. Action Against Worms.

Available at: http://www.who.int/neglected_diseases/preventive_chemotherapy/pctnewsletter11.pdf

32. World Health Organization. 2011. Helminth control in school-age children: A guide for managers of control programmes (2nd edition). Available at: http://apps.who.int/iris/bitstream/10665/44671/1/9789241548267_eng.pdf

33. World Health Organization. 2006. Preventative chemotherapy in human helminthiasis: Coordinated use of antihelminthic drugs in control interventions: a manual for health professionals and programme managers. Available at: http://apps.who.int/iris/bitstream/10665/43545/1/9241547103_eng.pdf

Documentation/Indicators on Completion planning and targeting deworming

- + A dataset for school level prevalence of STH, and for schistosomiasis where relevant.
- + National level maps of prevalences, and where possible a risk map developed according to climatic and vegetation indexes.
- + Tables of regional or local level prevalence levels and strategy for deworming according to table 1.



Procurement and Distribution

Key reading:

- + Helminth control in school-age children. WHO, 2011.³⁴
 - + WHO Neglected Tropical Diseases, Preventative Chemotherapy and Transmission Control³⁵
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Procurement of deworming tablets

STH infections can be safely and effectively treated with ABZ or MBZ. The drug of choice will depend on several factors, including national guidelines and requirements for drug management and procurement, cost, availability and effectiveness.

Not all of the STH species are equally susceptible to these drugs, and any historical data investigating cure rates for infections in the geographic location should be reviewed to understand any evidence of drug resistance and lack of efficacy. For example, in many cases hookworm infection has been shown to respond better to treatment with ABZ. In areas where trichiasis (whipworm) is prevalent it may be necessary to include the drug ivermectin to the regime to increase efficacy of the treatment. In these cases, close coordination with other NTD programs is necessary. In particular, in areas where Lymphatic Filariasis (also known as elephantiasis) is prevalent, as there will be scope for integrating activities for maximum impact.

In terms of cost, antihelminthic tablets are traditionally very cheap, averaging around \$0.02 per dose for ABZ and MBZ tablets in large scale deworming programs. Generic and locally procured tablets may be cheap, but require independent testing to ensure their quality.

Since 2012 treatments for all children at risk of infection with STH (mebendazole or albendazole) or schistosomiasis (praziquantel) have been donated by pharmaceutical companies via the WHO through a global donation program. Box 1, below, details the process for requesting drugs from the global donation program.

Using mapping information along with details of the population and the dose guidelines in table 3, estimations of numbers of drugs required can be made for the procurement forms. The numbers being requested are for numbers according to school enrollment figures plus an additional 25% **to cover out of school children**, any preschool children and members of the community who may wish to receive treatment.

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In order to access the donation, Ministries of Health must fill in the Joint Reporting Form (JRF), the Joint Request for Selected PC Medicines (JRSM), and the PC Epidemiological Data Reporting Form (EPIRF) and submit to the WHO country office prior to submitting these documents to the WHO global office. Electronic copies must be sent to PC_JointForms@who.int as well as to the concerned Regional Focal point at least 6–8 months before the planned deworming. These forms can also be used for requests for treatments against other neglected tropical diseases (NTDs) such as onchocerciasis (also known as river blindness) and lymphatic filariasis. Coordination with the country NTD team at MOH can facilitate joint requests and avoid duplication of effort.

On receipt of the forms, the WHO will procure the tablets and ensure timely delivery to the MOH in country.

Calculation for drug requirements:

Number ABZ/MBZ required = number children in areas targeted + 25%

PZQ required = (number children in areas + 25%) * average dose

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34. World Health Organization. 2011. Helminth control in school-age children: A guide for managers of control programmes (2nd edition). Available at: http://apps.who.int/iris/bitstream/10665/44671/1/9789241548267_eng.pdf

35. World Health Organization. 2016. Neglected Tropical Diseases: Preventive chemotherapy and transmission control. Available at: http://www.who.int/neglected_diseases/preventive_chemotherapy/reporting/en/

Table 3: Available Drugs and doses for mass deworming

Worm Infection	Drugs and Doses	Notes
Soil-Transmitted Helminths	Albendazole (ABZ) 400 mg (single dose) or Mebendazole (MBZ) 500 mg (single dose)	Albendazole: 1 – 2 years – Half a tablet 2 years and above – One tablet Mebendazole: 1 year and above – One tablet Do not treat children < 12 months.
Schistosomiasis (Urinary or Intestinal)	Praziquantel (PZQ) 600mg (PZQ 40 mg/kg)	Where there are scales, doses can be based on weight otherwise it should be based on height using a praziquantel tablet pole.

Further reading: Helminth control in school-age children, (WHO, 2011)³⁶

WHO Neglected Tropical Diseases, Preventative Chemotherapy and Transmission Control: http://www.who.int/neglected_diseases/preventive_chemotherapy/reporting/en/³⁷

Distribution of the tablets to schools

The easiest way to distribute tablets is via the training cascade (see next section), along with distribution of materials. The training usually takes place as close to the deworming day as possible, so the drugs will not be stored at local level, or in schools, for long periods of time. However, distribution of tablets takes many forms and will be according to the countries needs and situation.

- + Determine storage and shipping address for drugs at the Ministry of Health where the drugs will be received.
- + The drugs should be stored securely and appropriately until distribution to regional levels.
- + Distribution of drugs can be via health or education sector scheduled visits or may occur via the training, cascade (detailed in step 4 below).
- + Procurement and importation must be arranged in a timely manner.

Key planning points when arranging procurement and distribution of drugs

- + Determine quantities and types of drugs required based on prevalence maps and number of children school enrollment rates + 25%.
- + Complete forms and return to relevant WHO offices in a timely manner, well ahead of planned deworming dates.
- + Determine and follow existing government procedures for drug importation and adhere to any procurement policy, regulations. Procurement procedures may also be determined by donor regulations and conditions.

Documentation/Indicators on Completion of Procurement & Distribution

- + Allocated storage facilities which meet requirements at national level.
- + Completed forms for circulation to WHO with tablet requests for school-based deworming.
- + Confirmation of receipt of the requests and procurement of tablets by WHO or drug companies.
- + Tablets distributed to local level

³⁶ World Health Organization. 2011. Helminth control in school-age children: A guide for managers of control programmes (2nd edition). Available at: http://apps.who.int/iris/bitstream/10665/44671/1/9789241548267_eng.pdf

³⁷ World Health Organization. 2016. Neglected Tropical Diseases: Preventive chemotherapy and transmission control. Available at: http://www.who.int/neglected_diseases/preventive_chemotherapy/reporting/en/

Training of Teachers

Key reading:

- + Integrated School health a manual for teachers. Partnership for Child Development, 2014.³⁸

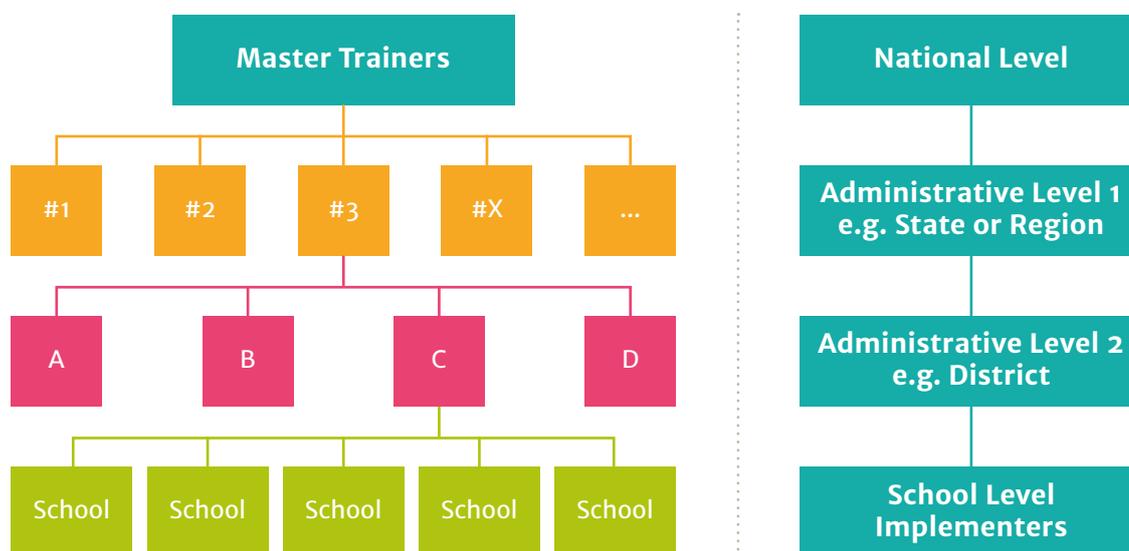
Training for teachers to deliver deworming medication, educate children on worms and on the importance of sensitizing the local community is essential. An understanding of the burden of parasitic worm infection and their negative effects on health and education, as well as the therapeutic benefits of deworming an infected child is key to ensuring full cooperation of teachers during their role as distributors of drugs and health messaging.

Developing Materials for Training

- + In many instances resources already exist for trainers and teachers at various levels, perhaps developed by partner organizations or government bodies. These resources should be reviewed, developed, piloted and finally validated for use at national or regional levels.
- + Training materials could include a Guide for District Level Managers; a Teaching Training Kit, Drug Distribution - Instructions for Teachers and a Handout for Teachers.
- + It is important to contextualize these resources with respect to cultural issues related to sanitation, names of worms and worm infection in local languages, etc.

Planning your training schedule

In order to train a large number of teachers quickly and efficiently, in-service training or cascading training sessions from the national to regional, then local to school level can be effective. The figure below illustrates how training can be effectively cascaded, starting with training of master trainers at national or central level, who then train state or regional level trainers, who can be state health care workers, or teachers. The cascade continues until school level implementers are trained at local level.



Cascaded training design also provides an opportunity for training materials, monitoring forms and medication to be distributed from holding at a national level through the levels to teachers at individual schools, thereby maximizing resource capacity and increasing the speed of dissemination.

Cascaded training sessions for deworming can also be coordinated with other training sessions to save travel and teaching time for all personnel involved.

38. Partnership for Child Development. 2014. Integrated School Health: A Manual For Teachers. Available at: <http://www.schoolsandhealth.org/Pages/documents.aspx>

Master training should be carried out in a team comprising MoE, MoH and any other key technical bodies. The number of master trainers to be trained should be determined by the number of next level trainings to be conducted with 3 or 4 master trainers attending each 'next level' training sessions.

In approximately 2 days, master trainers can be briefed thoroughly on a roll out plan and extensively trained in school-based deworming, equipping them to begin conducting next level of training sessions.

Administrative or Next Level Training:

In approximately 3 days master trainers train the next level of personnel in deworming then supervise as this level then trains the next.

The necessity of these cascade levels are determined by size of the targeted population and country size as well as number of schools and teachers and administrative setup.

Teacher Training: Takes approximately half a day and one teacher training session should cater for approximately 30 teachers, and a maximum of 40 teachers.

The training should aim to encompass two teachers from each school involved in the deworming program, ideally inclusive of the head teacher or school director and will be led by two previously trained individuals from one level above; Master trainers, administrative level 2 or 3 (depending on cascade size).

Documentation & Indicators on Completion of Training Cascade

- + Publication of a suite of translated training materials for various levels of the training cascade. These can be adapted from tools that are already available.
- + Development and publication of a suite of context specific manuals and guidelines relevant to deworming implementation.
- + A training schedule that can distribute training to all levels.
- + A fully enacted cascaded training from master level training to teacher training.
- + Distribution of tablets to all relevant local levels via training cascade.
- + Distribution of other required materials to local levels via training cascade. These materials include: tablet poles (where relevant), monitoring forms, teacher companion manuals.



Community Sensitization

Key reading:

- + Helminth control in school-age children: A guide for managers of control programmes. WHO, 2011.³⁹
-

A final key step in the program prior to mass deworming is communication with parents, community leaders, religious leaders and local health agents about the objectives of the deworming in schools and what they should expect.

Community sensitization ensures that teachers, parents and children are aware of the occurrence, reasons, benefits and safety of deworming.

The campaign should be made appropriate for the area in which it is occurring in terms of language and media. Potential community sensitization methods include press conferences, use of radio, television and posters as well as communicating via any existing community groups, religious leaders or community infrastructure.

Good community sensitization is vital to the success and sustainability of a program. It will ensure good turn out on deworming day, and that parents, children and students are aware that non-enrolled children are welcome to come for deworming, as well as other members of the community that the MoH may want to target, such as women of child bearing age. Community sensitization can also ensure that there is understanding of the goals of the program. Ensuring communities are aware of the potential side effects will help avoid concerns relating to minor side-effects which can occur when treating children with heavy worm loads.

Documentation & Indicators on Completion of Community Sensitization

- + Development and publication of context specific materials for mass communication of various aspects of the deworming program, including its benefits, what deworming entails and who it is targetting, risks associated and dates for planned deworming days.
- + Guidelines for school directors to communicate with communities and students about the deworming day.



Community sensitization ensures that teachers, parents and children are aware of the **occurrence, reasons, benefits and safety of deworming.**

39. World Health Organization. 2011. Helminth control in school-age children: A guide for managers of control programmes (2nd edition). Available at: http://apps.who.int/iris/bitstream/10665/44671/1/9789241548267_eng.pdf

Implementing Deworming

Key reading:

- + Helminth control in school-age children: A guide for managers of control programmes. WHO, 2011.⁴⁰
- + Preventative chemotherapy in human helminthiasis. WHO, 2006.⁴¹
- + The sequence of implementation is important and the following are key points to ensure smooth running.

Key Points When Planning for Implementation

- + Initial planning and mapping is crucial in the plan in order to achieve accurate forecasting for drug requirements and targeting of drugs to children.
- + Deworming day should be planned to occur during term time and during a season when most children, teachers and drug supplies will be able to get to all schools.
- + Drugs and tablet poles (for schistosomiasis) should be procured early enough to allow for arrival prior to implementation and storage arrangements should be made. In some cases this will be months in advance.
- + Training of teachers and delivery of drugs to school should occur close to deworming day so knowledge is fresh, and drugs are not stored at schools for too long a time period.
- + Community sensitization campaigns should run for several months prior to deworming.
- + It is ideal if all schools within an area can be dewormed on the same day and if children are dewormed regardless of whether they were enrolled in school or not.
- + Having a second deworming day, or a 'mop up' day can help ensure that students who were absent on deworming day are still provided deworming tablets.

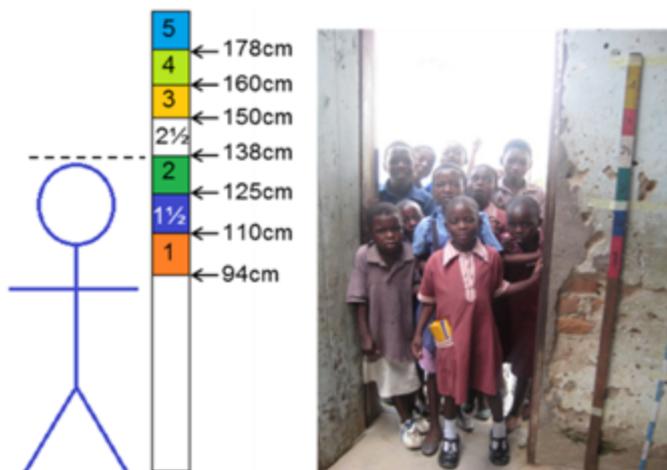
Key Points on the Day



- + School-based deworming is carried out by two teachers per school who attended the teacher training session. The trained teachers can also train their colleagues to help in the deworming activities if there are many children to be dewormed in a school.
- + The target groups for deworming include schoolchildren aged around 6 years to 15 years, since the prevalence and the intensity of worm infection are high in this age group. Children who are usually infected only with STH can also be dewormed with ABZ or MBZ.
- + Children will require food with the medication and either the school should provide this or children should be requested to bring some food from home. Alternatively deworming should occur only in the morning, with children having eaten before they came to school.
- + Children enrolled should be requested to invite their non-enrolled brothers, sisters, cousins, friends, neighbors etc. to come along for treatment on the appointed treatment day in the school.
- + On average, a person will need 1 tablet of either ABZ (400mg) or MBZ (500mg) for STH, and – where schistosomiasis has been detected – 3 to 5 tablets of praziquantel (600mg) for schistosomes. The quantity of praziquantel will depend on the height of the child. The dose pole should be used to quantify the amount of praziquantel the child needs. (see figure). In case the two types of worms co-exist in the same area, both treatments should be done concurrently.

40. World Health Organization. 2011. Helminth control in school-age children: A guide for managers of control programmes (2nd edition). Available at: http://apps.who.int/iris/bitstream/10665/44671/1/9789241548267_eng.pdf

41. World Health Organization. 2006. Preventative chemotherapy in human helminthiasis: Coordinated use of antihelminthic drugs in control interventions: a manual for health professionals and programme managers. Available at: http://apps.who.int/iris/bitstream/10665/43545/1/9241547103_eng.pdf



Documentation & Indicators on Completion of Implementation

- + Distribution of STH deworming tablets (MBZ or ABZ) to all eligible students, non-enrolled children and key community members.
- + Where relevant distribution of the correct dosage of PZQ tablets to each child deemed at risk of schistosome infection.



Monitoring & Evaluation

Key reading:

- + Monitoring and Evaluation guidance for school health programs. FRESH partners, 2013.⁴²

National deworming programs should be monitored and evaluated to ensure they are functioning properly and having the desired effect. Identifying challenges in program implementation allows for adaptation and program strengthening. Monitoring can be for the processes involved in the program (**process monitoring**), and should be continuously done at every deworming day for all schools. Additional monitoring should also be done on the impact of the program (**impact monitoring**) which includes assessing things such as change in prevalence of infection, changes in school participation attributable to children having been dewormed.

Process Monitoring

- + Should be done continuously throughout the program and includes monitoring the number of children dewormed and the number of tablets distributed.
- + This monitoring should also apply to the teacher training as a method of quality assurance.
- + Monitoring forms should be provided to schools and teachers at the training sessions and training should explicitly detail how these should be completed and by when.
- + There should also be in place a system for collating and using the data which is generated and captured on the forms given
- + There should also be in place a feedback system.

Deworming Indicators

- + The following should be tracked as a minimum
 - a. The number of tablets received by each school;
 - b. the number of teachers trained in each school;
 - c. the date of deworming;

- d. the number of school children dewormed;
- e. the number of out of school children dewormed;
- f. the number of community members dewormed (teachers, mothers, preschool etc)
- g. the number of tablets utilized; and
- h. the number of tablets returned (this should be confirmed).

It is important that all children chew or swallow the deworming tablets. Sometimes this is not possible, and thus the tablet is spoiled, and the child is not dewormed. Number of spoiled tablets should ideally be included in the monitoring for deworming day. A high number of spoiled tablets may indicate more water is required on deworming day to aid in the intake of tablets, or more community sensitization and health education can help children understand themselves why it is important to be dewormed.

Impact Monitoring

- + Impact assessments should occur every 2-3 years in pre-identified sentinel schools using rapid appraisal techniques. This is another reason why initial situation assessment and mapping is essential.
- + Baseline and follow up indicators should be decided upon and measured before interventions begin (baseline) and 2-3 years later (follow-up).
- + Common indicators to measure include worm prevalence, school attendance and severity of anemia.

Documentation & Indicators on Completion of Monitoring & Evaluation

- + Monitoring forms developed and distributed that capture the key indicators for the deworming program.
- + Accurate and completed forms transferred back up the monitoring chain to central level.
- + Follow up prevalence surveys conducted in identified sentinel schools according to the planned timeline.

42. UNESCO. 2013. Monitoring and Evaluation Guidance for School Health Programs. Available at: <http://www.schoolsandhealth.org/Pages/documents.aspx>

Funding and Budgeting

Key reading:

- + Helminth control in school-age children: A guide for managers of control programmes. WHO, 2011.⁴³

A successful program requires accurate budgeting to request and mobilize the required funds either from Ministries of Finance or supporting partners. Deworming is highly cost efficient, with the costs of treatment for both STH and SCH estimated to be less the US\$0.50 per child, and \$0.25 when treatment for STH only is required. This is the total cost, including training of teachers, as well as procurement and distribution of drugs to students⁴⁴. Having developed the in-depth plan for a deworming program according to the steps above, the budget for each step should be determined. The budget for a national school deworming program should include the cost of the following items and should specify who is providing the funds or supplying each item:

1. Planned distribution of the drugs within the country according to the planning and targeting section above (delivering drugs once or twice a year for example);
2. Tools required for deworming, for example, height poles for distribution of praziquantel; water if it is to be purchased;
3. Staffing requirements for each of the phases of the program;
4. Travel costs for staff involved within the phases of the program;
5. Printing and translation of all training materials and planning and monitoring forms;
6. Per diems and allowances for trainees;
7. Costs of training halls;
8. Cost of radio or TV time and flyers, posters and teaching materials for sensitization;

In addition, if the prevalence and geographic location of worms is not already known, and therefore surveys are required for mapping baseline prevalence and evidence generation, additional materials will be needed. Surveys are usually coordinated by the Ministry of Health who may have the requisite training

and materials. If budget for the survey is to be included, the following should be considered:

1. Kato-Katz Kits to measure STH and intestinal schistosome eggs (a kit for about US\$40 will be for about 2,000 tests);
2. Where relevant, urine filtration kits (a kit for US\$50 will be for about 500 tests) to measure urinary schistosomes;
3. Microscopes – if microscopy is to be conducted in schools microscopes with mirror lenses are best which don't require electricity;
4. Gloves, soap, disinfectant for laboratory work
5. Vehicle costs for travel to schools by survey teams;
6. Salaries and per diems for trained parasitologists.

You will require the following pieces of information to ensure your budget and related plan are accurate:

1. Areas of the country to be treated for which worm infections (STH and schistosomiasis);
2. Number of children to be treated for each infection (with the added 25% additional tablets to cover out of school children);
3. Number and type of pills required;
4. Number of schools and their locations;
5. Number of teachers to be trained and likely training plan;
6. Likely community sensitization campaign;
7. Schedule for drug importation, storage and method of distribution.

Documentation & Indicators on Completion of Funding and Budgeting

- + A detailed budget that that accounts for all the processes listed in the previous sections of this guidance.

43. World Health Organization. 2011. Helminth control in school-age children: A guide for managers of control programmes (2nd edition). Available at: http://apps.who.int/iris/bitstream/10665/44671/1/9789241548267_eng.pdf

44. The Partnership for Child Development. 1999. The cost of large-scale school health programmes which deliver antihelminthics to children in Ghana and Tanzania. *Acta Tropica*.

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