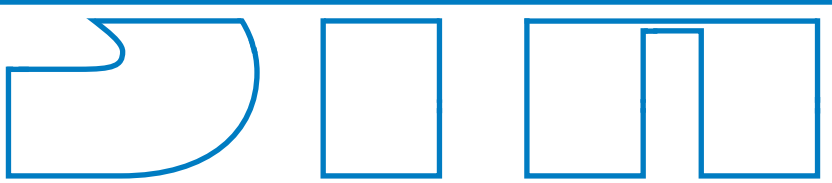
World Health Organization

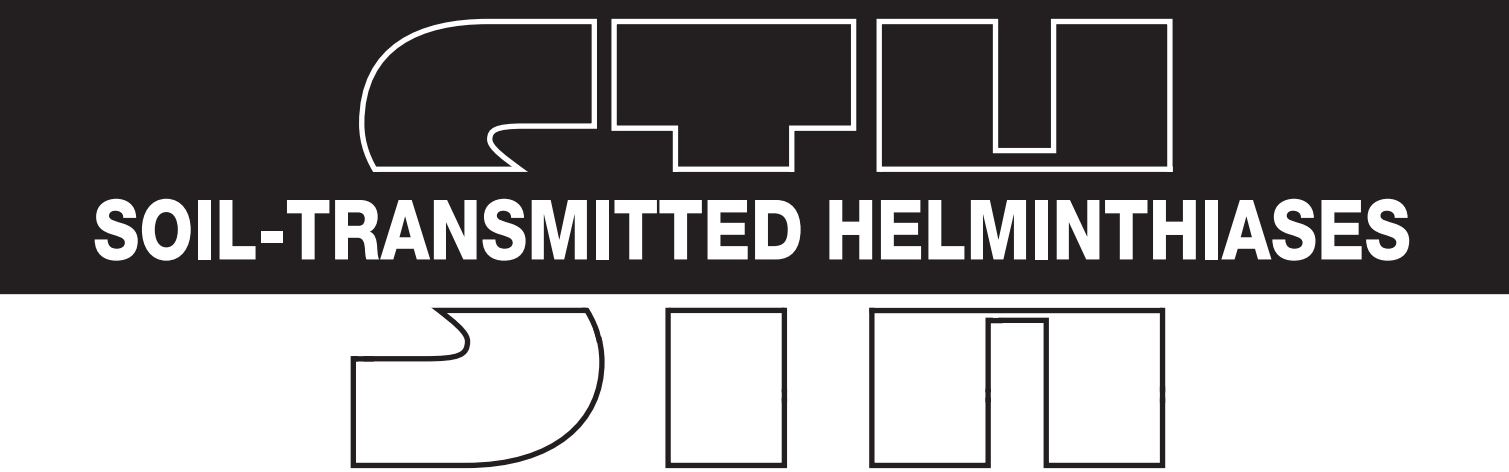
SOIL-TRANSMITTED HELMINTHIASES



ELIMINATING SOIL-TRANSMITTED HELMINTHIASES AS A PUBLIC HEALTH PROBLEM IN CHILDREN

PROGRESS REPORT 2001–2010 AND STRATEGIC PLAN 2011–2020

World Health Organization



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Contents

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Eliminating soil-transmitted helminthiasis as a public health problem in children: progress report 2001–2010 and strategic plan 2011–2020 is the result of a series of meetings convened by the World Health Organization (WHO) in Geneva, Switzerland, in April and July 2011, with the participation of national control programme managers, independent experts, partners from donor agencies, and representatives of pharmaceutical companies, nongovernmental organizations and academic and research institutions, as well as staff from the WHO Department of Control of Neglected Tropical Diseases, and regional and country offices.

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This document is dedicated to the memory of Dr Likezo Mubila (WHO Regional Office for Africa) for her significant contribution to overcoming neglected tropical diseases in Africa.

Glossary of terms

The definitions given below apply to the terms as used in this document. They may have different meanings in other contexts.

anthelminthic

A medicine used to expel helminths (worms) in humans. The action of the medicine kills the worms and facilitates their explusion from the human body. The anthelminthics most commonly used to treat intestinal worm infections in children are the benzimidazoles (albendazole and mebendazole).

coverage

The proportion of the target population reached by an intervention (for example, the percentage of preschool-age children and school-age children receiving preventive chemotherapy on a treatment day).

elimination as a public-health problem

For operational purposes, WHO defines STH as a public-health problem when more than 1% of the at-risk population has infection of moderate or high intensity and its control requires the delivery of one or more public health interventions. Elimination of STH as a public-health problem refers to elimination of the morbidity caused by the infections in children. The goal is not to eliminate the parasites but to reduce the morbidity they cause to levels that can be controlled through routine health-care or school-based services.

intensity of infection

The number of **helminths** (worms) infecting an individual. The intensity of infection with soil-transmitted helminths can be measured *directly*, by counting the number of expelled worms after anthelminthic treatment, or *indirectly*, by counting the number of helminth eggs excreted in faeces (expressed as eggs per gram, **epg**). Indirect methods are less intrusive, more convenient and more commonly used.

Three classes of intensity (light, moderate and heavy) of infection are defined for each STH; the thresholds for each class are shown below.[1]

Organism	Light-intensity infections	Moderate-intensity infections	Heavy-intensity infections
Ascarsis lumbricoides	1 – 4 999 epg	5 000 – 49 999 epg	>50 000 epg
Trichuris trichiura	1 – 999 epg	1 000 – 9 999 epg	>10 000 epg
Hookworms (*Necator americanus* or *Ancylostoma duodenale*)	1 – 1 999 epg	2 000 – 3 999 epg	>4 000 epg

epg = eggs per gram of faeces.

morbidity

The clinical consequences of infections and diseases that adversely affect human health. Morbidity from STH is usually subtle (for example, malabsorption, stunted growth) and proportional to the number of worms infecting an individual.

neglected tropical diseases (NTDs)

A group of diseases that historically has been overlooked. WHO is working to overcome 17 neglected tropical diseases.

preschool-age children (pre-SAC)

Children aged between 1 and 4 years.

prevalence of any STH infection

The percentage of individuals in a population infected with at least one species of soil-transmitted helminth.

preventive chemotherapy

Use of anthelminthic as a public health tool to target simultaneously the prevalent helminth infections in the area.

school-age children (SAC)

Children aged between 5 and 14 years who may or may not be enrolled in school. The exact ages of school enrolment may vary slightly between different countries. Because peak prevalence and intensity of STH infection occur primarily in school-age, and because this risk population is easily accessed through schools, deworming activities are implemented through the school system. If the school age is different (for example, from 6 to 15 years) in a particular country, this population would be the target of the school deworming activities.

soil-transmitted helminthiases (STH)

Intestinal infections in humans caused by worms. Four species of nematodes are collectively referred to as soil-transmitted helminths: *Ascaris lumbricoides* (the roundworm), *Trichuris trichiura* (the whipworm) and *Necator americanus* or *Ancylostoma duodenale* (the hookworms).

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[1] Adapted from *Preventive chemotherapy in human helminthiasis* (*8*).

Executive summary

Soil-transmitted helminthiases (STH) affect more than 2 billion people worldwide. In 2001, the World Health Assembly resolved to attain by 2010 a minimum target of regular administration of chemotherapy to at least 75% and up to 100% of all school-age children at risk of morbidity from the disease.

To achieve the target set by World Health Assembly Resolution WHA54.19, efforts must be intensified to eliminate STH as a public-health problem. In 2010, only about a third of children requiring treatment had access to anthelminthic medicines and two thirds had not been reached.

Eliminating soil-transmitted helminthiasis as a public health problem in children: progress report 2001–2010 and strategic plan 2011–2020 reports the progress made during the first 10 years of implementing control programmes, and identifies new opportunities and challenges for scaling up control activities. A timeline is proposed for achieving the 75% coverage target by 2020. The strategic plan sets out a dynamic approach to achieve the elements of Resolution WHA54.19 based on an evaluation of progress and an analysis of why the target has not been universally achieved. Identification of the problems that impede greater access to anthelminthic medicines is the key to proposing practical solutions that can be implemented within the context of preventive chemotherapy.

Progress report 2001–2010

Despite the important increase in the number of children who receive preventive chemotherapy every year, only 200 million school-age children of the 600 million in need received treatment in 2010. Large-scale and successful control activities implemented during 2001–2010 demonstrate the feasibility of large-scale deworming, and these experiences have informed the development of tools to facilitate the work of control managers.

Strategic plan 2011–2020

Strategic approaches have been proposed for each of the challenges identified, and milestones have been set for eliminating morbidity from STH in children by 2020. The situation in each WHO region has been analysed and priority countries have been identified.

The strategic plan suggests future directions for strengthening political commitment and coordination, building technical capacity, facilitating sustainability and improving monitoring capacities.

Significant donations of anthelminthic medicines by GlaxoSmithKline and Johnson & Johnson and increased interest in neglected tropical diseases by many partners offer a unique opportunity to control STH in the next 10 years.

The partners and experts who met in April and July 2011 to discuss the draft strategic plans for STH and schistosomiasis agreed with WHO's recommendations that control of STH, schistosomiasis and lymphatic filariasis should be integrated but that a global strategy for each of these three neglected tropical diseases better responds to their particular challenges and geographical distribution.

WHO will therefore publish three strategic plans: one for lymphatic filariasis (published in 2010), one for STH (the present document) and one for schistosomiasis (due for publication in 2012) with an introduction that will present the concept of NTD and the characteristic of preventive chemotherapy. The introduction will also highlight the common features and the synergies of the strategies for the control of NTD eligible for preventive chemotherapy (lymphatic filariasis, schistosomiasis, soil-transmitted helminthiasis, onchocerciasis and trachoma) reinforcing the call for integration of the three control activities among themselves and within other existing infrastructures in health or education field.

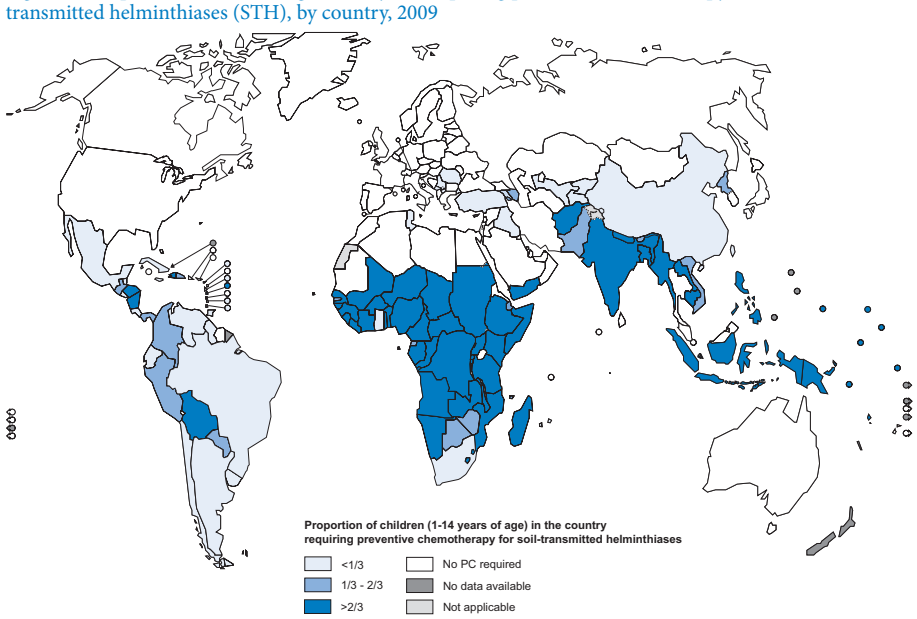
Section 1

Introduction

1.1 Soil-transmitted helminthiases

Soil-transmitted helminthiases (STH) is a term referring to a group of parasitic diseases caused by nematode worms that are transmitted to humans by faecally-contaminated soil. The soil-transmitted helminths of major concern to humans are *Ascaris lumbricoides*, *Trichuris trichiura*, *Necator americanus* and *Ancylostoma duodenale*. The latest estimates indicate that more than 2 billion people are infected with these parasites. The highest prevalence occurs in areas where sanitation is inadequate and water supplies are unsafe. *Figure 1* shows the proportion of children aged 1–14 years requiring preventive chemotherapy in each endemic country.

Figure 1. Proportion of children aged 1–14 years requiring preventive chemotherapy (PC) for soil-transmitted helminthiases (STH), by country, 2009



The burden of disease from STH is mainly attributed to their chronic and insidious impact on the health and quality of life of those infected rather than to the mortality they cause. Infections of heavy intensity impair physical growth and cognitive development and are a cause of micronutrient deficiencies including iron-deficiency anaemia leading to poor school performance and absenteeism in children, reduced work productivity in adults and adverse pregnancy outcomes (*1*).

1.2 Evolution of the global strategy to control STH

The global strategy to control STH has evolved with advances in modern chemotherapy. The first major historical effort to control worm diseases was the Rockefeller Foundation's hookworm eradication campaign in the United States in the early 1900s. The first broad-spectrum anthelminthic (phenothiazine) was developed for veterinary use in 1938. Since then, broad-spectrum anthelminthics have been discovered and developed. The first benzimidazole developed for human use (thiabendazole) was licensed in 1962; WHO reviewed the feasibility of large-scale chemotherapy in 1967, learning from successes in Japan and Mexico. By the 1980s, mebendazole, a more efficacious and safe medicine, became widely available and mathematical models were developed to identify the most cost-effective frequency of treatment to reduce worm burdens (*2*, *3*).

Accumulated scientific knowledge and the availability of safe anthelminthics such as mebendazole and albendazole laid the foundation for a global strategy to control STH that was widely advocated during the 1990s. In its 1993 World Development Report, the World Bank ranked the control of morbidity attributable to STH as the most cost-effective intervention for school-age children (*4*). The application of regular chemotherapy to control STH was discussed at a WHO Informal Consultation in 1996 (*5*). In 1998, Prime Minister Hashimoto of Japan

Box 1. Schistosomiasis and soil-transmitted helminth infections (resolution WHA54.19)[a]

In 2001, the Fifty-fourth World Health Assembly expressed concern that the high prevalence and morbidity of STH and schistosomiasis was occurring among the poorest populations in the least-developed countries of the world.

Recognizing that repeated chemotherapy with safe, single-dose, affordable medicines at regular intervals reduces levels of infection below those associated with morbidity, resolution WHA54.19 urged Member States:

- to give high priority to implementing or intensifying control of STH and schistosomiasis in areas of high transmission while monitoring the quality and efficacy of medicines;
- to sustain successful control activities in low-transmission areas in order to eliminate STH and schistosomiasis as a public-health problem;
- to promote access to safe water, sanitation and health education through intersectoral collaboration;
- to mobilize resources in order to sustain control activities for STH and schistosomiasis.

The resolution urged all Member States where STH are endemic to attain by 2010 a minimum target of regular administration of chemotherapy to at least 75% and up to 100% of all school-age children at risk of morbidity. At the time the resolution was adopted, scientific evidence was available to assure the safety of anthelminthic medicines and their impact on the health of school-age children as an at-risk population. Since 2001, additional evidence has confirmed the benefits to safety and health of two other at-risk groups: preschool-age children and women of reproductive age, including pregnant women (after the first trimester) and lactating mothers.

[a] The full text of the resolution is available at: http://apps.who.int/gb/archive/pdf_files/WHA54/ea54r19.pdf

proposed a parasite control initiative at the G8 summit in Denver, USA, which secured a commitment for international cooperation. Around the same time, concurrent administration of albendazole and praziquantel to simultaneously treat STH and schistosomiasis was shown to be safe (*6*). In 2001, the Fifty-fourth World Health Assembly adopted resolution WHA54.19, urging Member States to ensure access to essential medicines for STH and schistosomiasis in endemic areas for the treatment of both clinical cases and groups at high risk for morbidity (*Box 1*). The resolution specified a minimum target for global coverage: that by 2010 at least 75% of all school-age children at risk of morbidity from STH and schistosomiasis should be regularly treated in order to eliminate these two diseases as a public-health problem (*7*).

In 2001, WHO recommended the integration of STH control into existing primary health-care and school-based systems (*8*). The second meeting of Partners for Parasite Control (Rome, Italy, 2002) urged endemic countries to develop national plans of action for STH and schistosomiasis control, supported by ministries of health and education, and suggested that STH and schistosomiasis control programmes be integrated with national lymphatic filariasis elimination programmes in order to reduce costs and increase efficiencies.

In 2005, this concept culminated in the development of a strategy for the integrated control of a group of diseases (STH, schistosomiasis, lymphatic filariasis, onchocerciasis and, in some instances, trachoma) using preventive chemotherapy. The strategy was advocated by WHO and several partners including the Global Network for Neglected Tropical Diseases, the Schistosomiasis Control Initiative and the Global Alliance for the Elimination of Lymphatic Filariasis (see also *section 1.5*).

1.3 Setting the global strategy

1.3.1 Controlling morbidity

The strategy recommended by WHO (9) to control morbidity from STH (defined as the elimination of infections of moderate and high intensity) involves the periodic administration of anthelminthic medicines (mainly single-dose albendazole (400 mg) and mebendazole (500 mg)) to the following populations at risk of the disease (*10*):

- preschool-age children (aged 1–4 years);[1]
- school-age children (aged 5–14 years);[1]
- women of reproductive age (including pregnant women in the second and third trimesters and lactating mothers);[2]
- adult groups particularly exposed to STH infections (for example, tea-pickers and miners).

The recommended treatment schedule of once or twice annual administration is determined by the initial prevalence of infection with any STH (*A. lumbricoides*, *T.*

[1] School-age children and preschool-age children harbour the highest worm burdens and are the main source of environmental contamination.

[2] Women of childbearing age require intense amounts of micronutrients and are particularly vulnerable to STH morbidity.

trichiura or hookworms (*Necator americanus* and *Ancylostoma duodenale*) in school-age children. The aim is to reduce and maintain low levels of infection and thus protect individuals at risk from morbidity caused by STH (*Box 2*). *Figure 2* shows the steps that each country should take to eliminate morbidity from STH.

Box 2. Why eliminate morbidity not parasites?

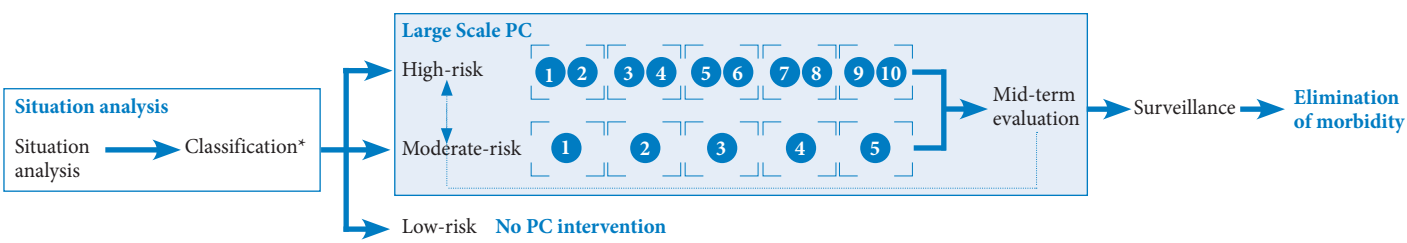
Ideally, an effective and efficient sanitation infrastructure would interrupt transmission of STH and impede the development of morbidity. In reality, the resources required in endemic countries to sustain such infrastructure are rarely available (*3*). Eliminating morbidity is more feasible; demonstrated progress will strengthen efforts to improve sanitation infrastructure.

Given that

- morbidity from STH becomes prominent only when worm burdens are relatively high;
- eliminating moderate and heavy intensity infections is achievable (*2*);
- preventive chemotherapy is feasible in countries with limited resources(*11*);
- anthelminthic medicines used for preventive chemotherapy are available at low cost or are donated

Preventive chemotherapy represents a cost-effective and easy-to-implement short-to-medium term strategy for eliminating morbidity associated with STH, while improved access to sanitation is a long-term strategy towards the same goal.

Figure 2. Steps that should each country should conduct to eliminate the morbidity due to STH



* Classification is done by implementation area

Legend:

One year

1 Large-scale preventive chemotherapy of
- single-administartion of 1 tablet of albendazole (400mg per tablet) or membendazole (500mg per tablet) per child
- above 75% treatment coverage per implementation area

Table 1 presents the WHO recommended schedule of treatment according to the baseline prevalence of STH infection.

Table 1. Recommended frequency of re-treatment with preventive chemotherapy for soil-transmitted helminthiases (STH) in school-age children, by category of risk[a]

Category of risk	Prevalence of any STH among school-age children	Re-treatment schedule
High-risk areas	≥50%	Twice a year
Moderate-risk areas	≥20% and <50%	Once a year
Low-risk areas	<20%	None (case-by-case treatment)

[a] Adapted from *Preventive chemotherapy in human helminthiasis* (8).

1.3.2 Integrating control activities

Within the public health sector, at international, national and community levels, there are competing demands for funds. Limited financial resources need to be invested in those areas of greatest public-health need and where cost effectiveness is demonstrated. The recommended strategy for STH control (ensuring regular treatment of all populations at risk of developing morbidity) includes its integration within existing public-health activities in order to reduce costs and increase effectiveness.

Deworming school-age children in schools. The school system offers an ideal setting for deworming and the provision of health education messages to children:

- **school enrolment** has increased in recent years: in 2008, the net enrolment rate was 94% in Latin America and the Caribbean, 76% in sub-Saharan Africa and 88% in South and West Asia (*12*);
- **teachers can administer the medicines**: anthelminthic medicines are safe, administration is simple and only minimal training is required;
- **children and their families trust the school** and accept health interventions provided by schools.

An important advantage of deworming in schools is its low cost. In 2010, a review of cost in seven countries in four WHO regions estimated the average cost of treating 1 000 000 children at US$ 72 000 (or 7.2 cents per child). This estimate included procurement and distribution of medicines, training of teachers, and supervision and monitoring (*13*).

Deworming preschool-age children during vaccination campaigns. Vaccination and supplementary campaigns (for example, vitamin A distribution) offer convenient opportunities to deworm preschool-age children:

- deworming usually increases the coverage of vaccination and supplementary campaigns (*14*);
- health personnel are skilled in providing medicines to children.

Adding deworming to vaccination and supplementary campaigns can be done at extremely low cost because the infrastructure and the personnel in place to distribute vitamins or vaccines can also easily administer the deworming tablets.

Deworming women of childbearing age in maternal and child health services. STH are strongly associated with iron-deficiency anaemia during pregnancy (*15*). Data have shown that deworming during pregnancy (after the first trimester) associated with iron supplementation reduces maternal anemia, increases the weight of the newborn and also reduces infant mortality (*16*). Furthermore, provision of deworming for women of childbearing age is feasible even in resource-poor settings (*17*).

1.4 STH and neglected tropical diseases

In 2003, a historical paradigm shift occurred for a number of chronically endemic tropical diseases, now known collectively as neglected tropical diseases (NTDs). Many of these diseases, while preventable and/or treatable, had been neglected in the global public-health agenda because of their relatively low mortality compared with the "big three" (HIV/AIDS, malaria and tuberculosis). Realizing that many of these diseases affect similar populations (poor or marginalized people living in settings where poverty is widespread, resources are limited, and access to sanitation is poor), a collective response to overcome these diseases emerged as a new concept in light of economics, public health and human rights. The international community recognized that such diseases required more attention. In 2005 in Berlin, Germany, WHO convened a meeting of partners and experts to secure strategic and technical guidance and take this agenda forward. A NTD control strategy was defined by WHO in 2006 (*18*).

Integrated preventive chemotherapy is defined as a rational approach to control STH, lymphatic filariasis (LF), onchocerciasis, schistosomiasis and blinding trachoma (*8*). Control or elimination of these diseases is based on providing large-scale periodic treatment. For some of these diseases, the same medicines are administered concurrently (for example, albendazole is given to treat both LF and STH; ivermectin is given to treat both LF and onchocerciasis) (*19*). Activities to administer these medicines on a large scale should be integrated, as should other associated activities such as staff training, data collection, and development of materials for advocacy and community mobilization. Preventive chemotherapy activities for STH should thereby coordinated with those for LF, onchocerciasis and schistosomiasis, attaining simultaneously high coverage of all the NTDs for which preventive chemotherapy is the recommended control strategy.

Since the medicine to eliminate blinding trachoma (azithromycin) cannot be

distributed simultaneously with anthelminthic medicines because of its safety profile, integrating activities for deworming and trachoma will mainly involve training distributors and providing health education for children.

This approach is being implemented globally, and more than half a billion individuals are estimated to be treated every year for NTDs. The success of the approach is boosted by a number of factors: clear demonstration of the association of these infections with poverty and economic burden (*20*); their geographical overlap (*21*); the impact of preventive chemotherapy not only in reducing morbidity but also in sustaining decreases in transmission (*22*); and the possibility of expansion to target virtually any helminth infection, as shown in the case of fascioliasis and foodborne trematode infections (*23*). In addition, mechanisms for delivering medicines are established for helminth control and can be used as a platform to target other communicable diseases such as trachoma (*24*).

In 2007, WHO convened the first Global Partners' Meeting on NTDs attended by some 200 participants, including representatives of WHO Member States, United Nations agencies, the World Bank, philanthropic foundations, universities, pharmaceutical companies, international nongovernmental organizations and other institutions dedicated to contributing their time, efforts and resources to overcome NTDs (*25*). Since then, donors have made significant commitments, medicine donation programmes have been set up, and national governments in endemic countries are engaged in efforts to implement and scale-up activities to control and eliminate NTDs.

1.5 Purpose of the strategic plan 2011–2020

The target date of 2010 for attaining 75% coverage of regular administration of preventive chemotherapy to school-age children at risk of morbidity from STH and schistosomiasis (*7*) was not reached. Only a third of all children in need have received appropriate treatment for STH (*26*).

The purpose of the strategic plan is to propose a revitalized global strategy for eliminating STH as public health problem in childhood by 2020, in line with elimination of LF and that of morbidity from schistosomiasis by 2020.

The plan is intended to guide governments in countries where STH are endemic, as well as all the relevant donors and partners, towards a world free from the burden of STH. It also forecasts the amount of medicines required during the 10-year plan period to implement the strategy and achieve the goal.

Deworming campaign in a village in Umarkot district, Sindh province, Pakistan, November 2011. A health worker gives a deworming tablet to a child.

Section 2

Progress report 2001–2010

2.1. Achievements

Progress has been achieved during 2001–2010 in expanding coverage of preventive chemotherapy to school-age children and preschool-age children and developing tools to facilitate this expansion.

2.1.1 Expanding coverage

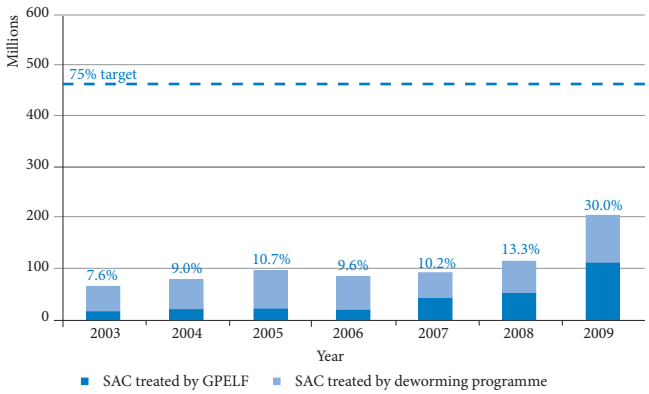
School-age children. School-age children are usually the greatest beneficiaries of deworming programmes because, of the three high-risk groups (preschool-age children, school-age children and women of childbearing age), they bear the highest burden of STH-attributable disease.

Before 2000, a limited number of national STH control programmes had been implemented (for example, in Guinea and Mexico). The World Food Programme (WFP) was a major implementation agency, providing deworming to more than 1.5 million children in 23 countries (*27*).

By 2001, other countries had initiated national or subnational STH control activities (including Afghanistan, Cambodia, Honduras, Malawi, Nepal, Nicaragua and Uganda). The results obtained by these programmes have been important in acquiring experience of programme management and attracting the interest of donors and partners.

Between 2001 and 2009, the number of school-age children benefiting from deworming programmes had tripled to more than 200 million (*Figure 3*) in over 60 countries (*26*). The number of beneficiaries includes those treated through the Programme for the Elimination of Lymphatic Filariasis (PELF), which administers albendazole and ivermectin (or albendazole and diethylcarbamazine), to communities at risk of STH in countries where LF is endemic. The number of school-age children treated in the context of GPELF has increased from approximately 14.8 million in 2003 to 110.3 million in 2009 (*Figure 3*).

Figure 3. Number of school-age children (SAC) treated* by tthe Global Programme to Eliminate Lymphatic Filariasis (GPELF) and deworming programmes, by year, 2003–2009



[a] The number of children treated may include those who were not considered in need of preventive chemotherapy. However, estimated coverage uses the number of children requiring preventive chemotherapy as the denominator.

The majority (73%) of STH-endemic countries now have specific deworming programmes for school-age children (*Table 2*). Most countries in WHO's African Region and the Region of the Americas have implemented deworming programmes targeting school-age children. All eight endemic countries in the South-East Asia Region have deworming programmes, reaching approximately 40% of this target age group.

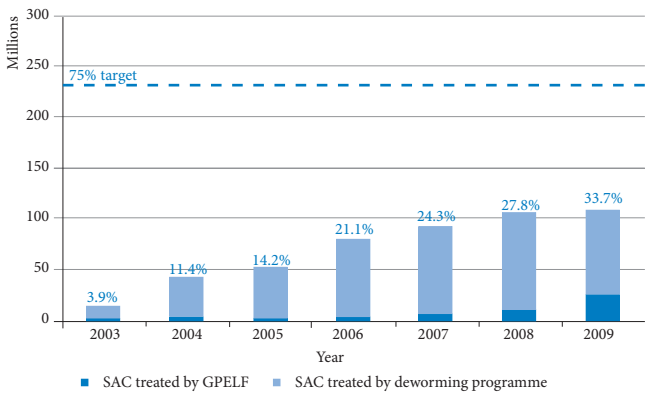
By 2010, the first countries to have reached the target of 75% national coverage were Mexico (by 2000), Cambodia and Nicaragua (in 2004), and Afghanistan, Burkina Faso, Burundi, Bhutan, Ecuador, the Lao People's Democratic Republic, Mali, Myanmar, Swaziland and Viet Nam (between 2005 and 2006). Many of these countries continue to maintain high coverage rates despite ongoing challenges. WHO will continue to publish regular updates of the progress of programmes in the PCT (preventive chemotherapy and transmission control) databank.

Table 2. Countries requiring preventive chemotherapy (PC) for soil-transmitted helminthiases in school-age children (SAC) by WHO region, 2009

WHO region	Number of countries requiring PC	Estimated number of SAC requiring PC (million)	Number of countries that reported PC for SAC before 2009	Number of countries that reported above 75% coverage for SAC 2006-2009	SAC coverage in 2009
African	42	189.9	36	13	25%
Americas	30	31.4	20	11	57%
South-East Asia	8	265.2	8	3	39%
European	11	3.1	3	1	11%
Eastern Mediterranean	8	53.5	6	1	3%
Western Pacific	13	66.1	12	5	15%
Global	**112**	**609.2**	**85**	**34**	**30%**

Preschool-age children. The United Nations Children's Fund (UNICEF) has been the lead implementation agency for deworming preschool-age children since WHO and UNICEF published the joint statement on treatment of preschool children for STH control in 2004 (*28*). In addition, some preschool-age children, as with school-age children, receive deworming within GPELF. It is estimated that the number of preschool-age children benefiting from deworming increased seven-fold between 2003 and 2009 (*Figure 4*).

Figure 4. Number of preschool-age children (pre-SAC) treated* by the Global Programme to Eliminate Lymphatic Filariasis (GPELF) and deworming programmes, by year, 2003–2009



[a] The number of children treated may include those who were not considered in need of preventive chemotherapy. However, estimated coverage uses the number of children requiring preventive chemotherapy as the denominator.

All WHO regions report deworming activity targeting preschool-age children. The African Region leads the way, with the highest number of implementing countries and the highest number of preschool-age children treated (*Table 3*).

Table 3. Countries requiring preventive chemotherapy (PC) for soil-transmitted helminthiases in preschool-age children (pre-SAC) by WHO region, 2009

WHO region	Number of countries requiring PC	Estimated number of pre-SAC requiring PC (million)	Number of countries that reported PC for pre-SAC before 2009	Number of countries that reported above 75% coverage for pre-SAC 2006-2009	pre-SAC coverage in 2009
African	42	93.8	35	32	46%
Americas	30	14.0	12	5	24%
South-East Asia	8	106.8	7	4	38%
European	11	1.2	2	1	3%
Eastern Mediterranean	8	24.5	3	3	4%
Western Pacific	13	33.0	12	7	13%
Global	**112**	**273.3**	**71**	**52**	**34%**

2.1.2 Developing tools

In order to scale-up national programmes for integrated NTD control (including deworming), WHO has collaborated with technical partners to develop new tools.

Tally sheets and joint reporting form. Collection of reliable information on selected epidemiological indicators and treatment coverage is essential to define those areas where deworming interventions are needed, to select the most appropriate interventions, to forecast the quantity of anthelminthic medicines required for each distribution cycle, and to provide baseline data for monitoring the impact of programmes and adjusting their implementation, as necessary. In order to improve data collection and reporting from the peripheral level to district and national levels and on to WHO, reporting forms have been developed for each administrative level and made available online (peripheral level: tally sheets; district level: tabulated summary form; national level: joint reporting form).[1]

PCT databank. The information collected through the Joint Reporting Form, which collates treatment data at the national level, is stored in the PCT databank.[2] For each endemic country the databank records the numbers of school-age children and preschool-age children in need of deworming and the number of these children treated every year. According to the databank, the estimated number of people of all ages at risk for STH infection, and for whom deworming is considered beneficial, in 2009, is over 880 million globally, in 112 countries (*Table 4*).

Table 4. Countries requiring preventive chemotherapy (PC) for soil-transmitted helminthiases (STH) and status of plans of action (PoA) for integrated control of neglected tropical diseases in countries where STH are endemic, by WHO region, 2010

WHO region	Number of countries where PC is required for STH control	Number of countries where PoA for integrated control of NTD have been finalized or are being developed
African	42	26
Americas	30	6
South-East Asia	8	2
European	11	2
Eastern Mediterranean	8	4
Western Pacific	13	4
Global	**112**	**44**

[1] Monitoring drug coverage for preventive chemotherapy is also accessible online at: http://www.who.int/neglected_diseases/preventive_chemotherapy/monitoring_evaluation_manual/en/

[2] The PCT databank is accessible online at: http://www.who.int/neglected_diseases/preventive_chemotherapy/databank/en/index.html

National plans of action for integrated control of neglected tropical diseases. Integration of disease control programmes targeting the same geographical areas, the same populations and using similar interventions towards the same goal of reducing poverty into one national NTD control programme is becoming a necessity rather than an option in order to increase cost-efficiency, maximize benefits and ensure access to treatment.

As a first step in the expansion of national programmes for integrated NTD control, ministries of health in countries where STH are endemic have been encouraged to prepare multi-year national plans of action that define the epidemiological situation of each disease, the scale of co-endemicity, national goals and objectives and actions for achieving them, and a budget. These integrated control activities are usually done in collaboration with national partners (ministries of education, ministries responsible for safe water and sanitation) and international partners (donors, NGOs and academic institutions providing technical support).

By April 2011, 44 of the 112 STH-endemic countries that required deworming programmes had drafted, revised or finalized national plans of action (*Table 4*). The development process for these plans has proven beneficial in forging strong commitment from NTD programme managers and in-country stakeholders; the process has also driven the donation of medicines into countries with action plans and the infrastructure to deliver the intervention.

Country profiles. Conducting parasitological surveys can be costly and time-consuming. In order to minimize diversion of limited financial and human resources available for STH control from actual implementation of administering medicines, attempts have been made to utilize all existing epidemiological data to map STH distribution and to estimate the population requiring deworming for each endemic country. Where no epidemiological data were available, other parameters (for example, prevalence of STH in ecologically similar neighbouring areas, and sanitation coverage) were taken into consideration to identify the areas where preventive chemotherapy should be implemented and to estimate the population at risk.

Country profiles summarize the information needed by public-health professionals involved in implementing and monitoring the annual progress of deworming programmes. The profiles include the most recent epidemiological information, maps of the geographical distribution of STH, recommended integrated interventions by district and a progress chart of treatment coverage. Country profiles are regularly updated on line.[1] *Annex I* provides an example of a country profile (for Ghana).

Guidelines and manuals. During 2001–2010, WHO has published a number of technical and advisory documents to support the scaling-up of the control of STH worldwide.[2]

Several of these documents were produced to convince decision-makers in government ministries and donor communities about the simplicity and cost-effectiveness of the deworming intervention:

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[1] The country profiles are accessible online at: http://www.who.int/neglected_diseases/preventive_chemotherapy/profiles/en/
[2] All of these documents are available online at: http://www.who.int/intestinal_worms/resources/en/

- the newsletter *Action Against Worms* (2003–2009);
- the joint statement for school deworming by WHO and the World Bank (*29*);
- the joint statement for worm control by WHO and UNICEF (*28*);
- the document stressing the evidence that deworming helps meet the Millennium Development Goals (*30*);
- the report *Deworming for Health and Development* (*31*).

A second group of documents was produced to facilitate the work of programme managers in endemic countries:

- the guidelines *Helminth control in school-age children* (*32*) and its second edition (published in 2012);
- the manual for teachers *How to deworm school children* (*33*);
- the manual *How to add deworming to vitamin A distribution* (*34*).
- the manual *Preventive chemotherapy in human helminthiasis* (*9*) for health professionals and programme managers;
- the manual *Monitoring drug coverage for preventive chemotherapy* (*35*).

A third group of technical documents addresses specific issues in STH control:

- the manual *Assuring the safety of preventive chemotherapy interventions for the control of neglected tropical diseases* (*36*).

2.2 Opportunities

The concept of using an integrated approach to control several NTDs (see *section 1.5*) has increased the cost effectiveness of control activities (*37*), generating interest from manufacturers, decision-makers in endemic countries, donor agencies, NGOs and academic institutions (*18*).

Scaling up deworming during the 10-year period of the strategic plan will ensure that the opportunities provided by a myriad of dedicated and committed partners are not be lost. Never before has such a focused effort been undertaken to overcome the burden of disease caused by NTDs in general and STH in particular.

2.2.1 Drug donations

GlaxoSmithKline is increasing its donation of albendazole through WHO to 400 million tablets a year for the five-year period 2012–2016 for the treatment of STH in school-age children; this brings to 1 billion the number of albendazole tablets it donates annually, including the 600 million tablets for use in the Global Programme to Eliminate Lymphatic Filariasis. Likewise, Johnson and Johnson has increased donated mebendazole from 50 million to 200 million tablets a year, providing sufficient quantities to control intestinal worms in children worldwide.

WHO views this development as a landmark event in the global effort to control STH infections and a major contribution to stepping up school based deworming, improving public health in developing countries and reaching the targets set by the WHA resolution 54.19.

2.2.2 Working in partnership

In addition to government ministries of health and education, the main partners in the area of STH control and their roles are summarized in *Annex II*.

The combined effort of partners has stimulated decision-makers in many STH-endemic countries, resulting in the development of national plans of action for integrated control of NTDs in more countries. Comprehensive national plans have contributed to the clarification of needs for STH control, providing a better idea of the expected progression of programmes at national, regional and global levels. Furthermore, the process of developing national plans by NTD coordinators, disease programme managers and collaborating partners as a team has helped increase political commitment, attracting financial resources to start deworming programmes in many countries (*Annex III*).

Operational experience is accumulating through the implementation of large-scale deworming programmes in an increasing number of countries. This experience provides valuable evidence and knowledge of programme implementation, helps to refine the forecast for deworming medicines, informs the development of new tools and training materials, and establishes an expert pool of managers with first-hand experience in programme management and implementation.

Academia has contributed significantly to the global effort to control NTDs. From 2006 (the year in which WHO established the Department of Control of Neglected Tropical Diseases), the number of scientific publications with NTD in their keywords has increased 40-fold, leading to a widening resource of robust scientific evidence on different aspects of NTD prevention and control.

There has also been an increasing number of bilateral and multilateral donors, development banks and philanthropic foundations whose interest and investment in NTD control (and in some cases specifically in STH control) has been vital in scaling up NTD control programmes.

This effort culminated in 2010 when WHO launched *Working to overcome the global impact of neglected tropical diseases* (*18*). This first report on NTDs acknowledges all the partners committed to NTD control and serves as a cornerstone in fostering ongoing and future donations and active involvement in prevention and control activities worldwide.

2.3 Challenges

Despite the significant expansion of opportunities, a number of challenges remain to be overcome if global control of STH is to be achieved and sustained.

2.3.1 Commitment and coordination

Political commitment. Successful control of STH and maintenance of the benefits to health require clear national goals and strong long-term commitment from national governments, donors and partners. This political commitment is

inadequate in many endemic countries, partly due to the lack of a clear global goal and targets, and partly due to "neglect" of the magnitude of the disease burden caused by STH and the resultant disproportionate funding for other diseases with higher profiles.

In-country coordination. Decision-makers and control managers frequently view control of NTDs as a group of vertical programmes competing among themselves for resources and organized within a specialized hierarchy. Programme managers may not be aware of similar activities conducted by colleagues not only in the ministry of health but also in ministries of education and by NGOs. Several opportunities for integration are lost because coordination is lacking. This includes not only activities related to distribution of medicines but also to improvements in accessing safe water, sanitation and health education. STH are strongly linked to poor sanitation; however, coordination among personnel working in STH control and those working in sanitation is woefully unexplored.

International coordination. At the global level, donor agencies, manufacturers, bilateral agencies, private foundations and NGOs, despite their good will to contribute to STH control, sometimes overlap in their efforts to provide deworming interventions.

In addition, two anthelminthic medicines (albendazole and mebendazole) are donated by two different manufacturers. Albendazole is donated both for the elimination of LF and for STH control, and specification of the programme for which the medicine is needed is required before dispatch to endemic countries. New donations of medicines are expected to provide additional impetus towards scaling up STH control activities but might also pose some coordination challenges.

2.3.2 Technical issues

Technical capacity. In some countries where STH control is needed, national staff, teachers and community distributors might not have the necessary technical capacity to plan and implement comprehensive STH control activities for example, social mobilization, health education, medicine logistics, anthelminthic administration, monitoring and evaluation, and managing severe adverse events.

Insufficient provision of technical support to countries. Given the simultaneous start-up of control activities in several countries, the capacity of international and academic organizations to provide technical support may be insufficient.

Unclear guidance and training needs on:

– ***Mapping and/or re-mapping and survey methodology***. Despite the availability of guidance on how to map and estimate the prevalence and intensity of STH (*9*), a lack of capacity at the national level to evaluate the existing data has frequently been observed. Occasionally, lack of capacity has resulted in overestimating the need for mapping, resulting in the diversion of resources from essential deworming activities.

– *STH control programme planning and implementation*. Although WHO has published manuals on preventive chemotherapy and monitoring and evaluation,

programme managers have experienced difficulties in applying recommendations for an integrated approach at national and district levels.

– *Reaching non-enrolled school-age children*. Rates of school enrolment and school attendance vary by country. Reaching those who are not enrolled (or not attending schools) through school-based control programmes in countries or areas where school attendance is low remains a challenge.

– *Monitoring and reporting*. National programme managers are required to complete multiple types of forms and annual progress reports for different diseases and for different anthelminthic manufacturers. This reporting requirement poses a considerable burden on health staff and programme managers. In addition, lack of resources and appropriately trained health staff have hindered practical implementation in countries of WHO's monitoring and evaluation manual (*34*).

Lack of strategy and coordination for health education. Health education is an essential component of the STH control programme; however, the provision of effective health education messages is frequently not optimally incorporated into school curricula, relying on the good will of individual teachers.

2.3.3 Operational capacity

Sustainability. One of the potential challenges to expanding STH control is the perception by local decision-makers and potential donors that control programmes are too heavily dependent on external support and thus cannot be maintained with local resources. Clear evidence is also lacking to demonstrate that the frequency of deworming activities can be reduced without transmission returning to its original levels and, that even in some cases, transmission can eventually be interrupted through regular drug administration coupled with improved sanitation, safe water and appropriate health education.

Lack of financial resources. Competing priorities have prevented many endemic countries from securing sufficient local financial resources to either scale up or maintain STH control activities, despite the proven cost-effectiveness of this intervention.

Nevertheless, even countries with very limited resources and minimal external support have been able to successfully conduct control activities.

Limited use of resources outside the health field. In recent years organizations aiming at improving education standards in developing countries became interested in school health activities and in particular deworming as a mean of increasing enrolment and attendance and improving school performance. The fact that School-based deworming is a simple intervention that can be safely delivered through the education system is potentially very attractive for this group of donors but until now the interest did not materialize in concrete support.

Problems related to customs clearance, importation and value of medicines. Importing donated medicines may be difficult if the operation is not properly planned in advance and the value attributed to the medicine by donors does not correspond to its market price.

Cost-containment strategies. Insufficient attention is given to strategies that contain the costs of many aspects of the control programme that are not related to medicines (for example, mapping, teacher training, reducing the frequency of distribution after 5–6 years of implementation, and monitoring).

Guidance on sustaining STH control activities after successful LF control or after years of successful implementation of school-based deworming programmes. In the many areas where PELF ends after 5 or 6 rounds of mass drug administration (MDA), it is essential to ensure that, where needed, administration of albendazole and mebendazole continues in the context of STH control in order to sustain the reduced morbidity from STH achieved through MDA in PELF. Managers of school deworming programmes confront a similar situation after years of successful implementation; guidance is needed to help managers decide whether to maintain or reduce the same frequency of the intervention.

2.3.4 Monitoring and evaluation

Insufficient capacity within the programme. Monitoring the progress of deworming programmes and evaluating their impact on public health are essential for programme managers and policy-makers to assess whether objectives are being met and, if necessary, to correct the implementation strategy. However, national programmes often lack capacity to conduct such activities efficiently.

Need for standard indicators for monitoring and for evaluation within the programme. Confusion has arisen regarding which indicators should be collected annually by national deworming programmes and which should be collected periodically for monitoring purposes. Furthermore, there is no consensus on the types of impact indicators or standard operating procedures required to regularly collect these indicators, such as nutritional status including absorption of micronutrients, and school attendance and performance.

Reporting of adverse events. Adverse events after administration of anthelminthic medicines are rarely reported. The reasons for this should be clarified to determine whether such events are rare or underreported. A standard method to investigate and report adverse events should be adopted.

Possible development of resistance to anthelminthics. To date, no cases of resistance to the anthelminthic medicines used for STH control have been reported. However, as activities to administer medicines are progressively scaled up in many countries, and as only a limited armamentarium of medicines is currently available for large-scale deworming programmes, monitoring and evaluation activities should include periodic assessments of their efficacy.

Transmission of data. In some instance where NGOs were implementing deworming activities, a lack of information sharing between the implementers and the MoH has been documented. In other cases data available at MoH level were not transmitted appropriately and timely to regional offices. In both cases this resulted in a underestimation of the country coverage and in underutilization of the in-country technical capacities.

Section 3

Strategic plan 2011–2020

3.1 Background

The past decade has seen a significant accumulation of scientific evidence and operational experience on effective STH control from many countries. In addition, funds and donations of anthelminthic medicines have become available for global STH control on an unprecedented scale. In response to these opportunities, policy-makers and decision-makers in many endemic countries are developing comprehensive action plans at various levels of government. The time is opportune to consolidate the actions of relevant stakeholders and accelerate the process of scaling up preventive chemotherapy interventions.

This strategic plan outlines the framework for achieving the global goal of eliminating STH as a public health problem in children, based on an analysis of the current situation and the challenges to the scaling-up process. This chapter also illustrates how different stakeholders can contribute to achieving the global goal (*Box 3*).

3.2 Vision, goal, objectives and target

Box 3. Global STH control programme

Vision

A world free of childhood morbidity due to STH.

Goal

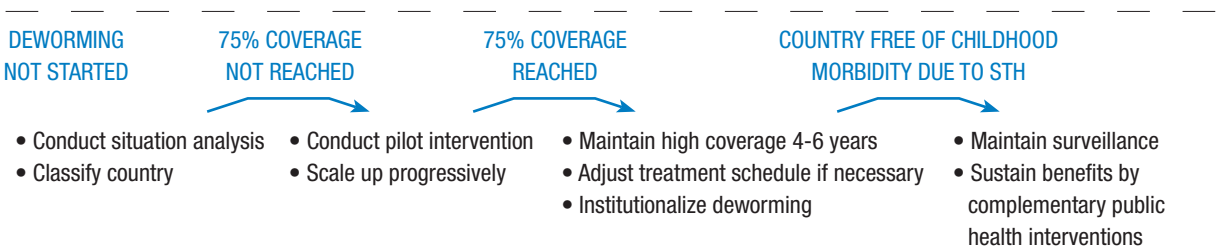
To reduce morbidity from STH in preschool-age children (aged 1–4 years) and school-age children (aged 5–14 years) to a level below which it would not be considered a public health problem.

STH is considered as a public health problem when:
the prevalence of STH infection of moderate and high intensity among school-age children is over 1%

Objectives

All the countries where STH is considered as a public health problem **starts** national STH control programmes by 2015.

All the countries where STH is considered as a public health problem **reach 75% national coverage** and **100% geographical coverage** by 2020.



3.3 Strategic approaches and actions

Several strategic approaches can be used to overcome the challenges that impede national programmes from starting and scaling up deworming interventions. These are also strategies for maintaining high deworming coverage throughout the

duration of a large-scale deworming programme and for containing costs during the maintenance phase.

This section of the strategic plan presents the strategic approaches and actions for each of the global challenges identified (see *section 2.3*); the organization or group of organizations responsible for implementation and a timeframe are proposed.

3.3.1 Strengthening political commitment

Strategic approach	Strategic action	Responsible party
Strengthening political commitment	Develop a communication strategy to address each of the key audiences (e.g. intersectoral, United Nations agencies, nongovernmental organizations, ministries of health, ministries of education, private sector and others)	WHO headquarters and regional offices
	Develop a national policy on STH control, including health education and improved water and sanitation as key complementary interventions to preventive chemotherapy interventions Assure that control of STH is included in the Ministry of Education and water development sector plans	Ministries of health, education, water supply, sanitation and development (with WHO support)
	Document the benefits to health and the economy of STH control (knowledge translation and dissemination)	Academic and research institutions
	Advocate improvements to water and sanitation	WHO and partners

Weak political commitment is one of the major impediments to starting and scaling up national STH control programmes. This may reflect a lack of knowledge about the cost effectiveness of the interventions in reducing STH-attributable morbidity. To address this limitation, WHO has accepted responsibility for ensuring a more active role in the development of an effective communication strategy targeting decision-makers in national governments (for example, in the Ministry of Health and the Ministry of Education), the donor community and other partners. This is one way to advocate the importance of STH control and build political commitment for national STH control programmes. The communication strategy should stress the benefits of deworming in the groups at risk (preschool-age children, school-age children and women of childbearing age) and also the need for concerted efforts among the partners to undertake integrated interventions whenever possible. Once political commitment is assured, a national policy on STH control should be adopted. The policy should clearly outline the importance of regular preventive chemotherapy as a key intervention, with improved sanitation and water supply and appropriate health education as complementary interventions. This policy will then serve as a motivating force for action at district and municipal levels of government. WHO should facilitate and sustain this process.

3.3.2 Harmonizing coordination

Strategic approach	Strategic action	Responsible party
Harmonizing coordination	Coordinate among in-country stakeholders (governments, nongovernmental organizations) through, for example, a national NTD steering committee	Ministry of health
	Develop a national plan of action for integrated NTD control	Ministry of health
	Review annually national programmes through regional programme review groups	WHO
	Conduct intersectoral coordination through education and water and sanitation networks at regional and country levels	WHO, ministries of health, education, water supply, sanitation and development, NGOs
	Coordinate the global STH control programme	WHO
	Coordinate medicine supplies	WHO, donors, national governments

In order to guide efficient concerted efforts from a variety of partners for starting and scaling up deworming interventions, coordination at all levels is critical.

At **country level**, implementation of STH control activities should be integrated with other activities to control or eliminate NTDs as well as other existing initiatives for health, education, and water and sanitation. This integration requires intersectoral coordination among not only NTD control programmes but also all the stakeholders. Intersectoral coordination can be best facilitated by the establishment of an NTD Steering Committee responsible for developing national plans of action for integrated NTD control and coordinating the different partners. This committee should include all in-country partners, at all stages of planning and implementation, to clarify their roles and responsibilities and identify any opportunities for integration.

At **regional level**, the progress of national STH control programmes should be reviewed annually within the context of an overall NTD control plan to ensure comprehensive review of all preventive chemotherapy-based NTD control or elimination programmes. Such a review will also ensure that national programmes have been planned and implemented in a feasible and efficient manner and that the forecast of requirements for anthelminthic medicines meets national needs. Using the Global Programme to Eliminate Lymphatic Filariasis (GPELF) model, the review can be carried out by the regional programme review groups that review the progress made by national LF elimination programmes towards anthelminthic coverage. Expanding the mandate of these groups to encompass other NTDs would involve revising their terms of references and the composition of technical committee members with the support of WHO's regional offices. Any newly formulated groups can be piloted in 2012 and be fully operational from 2013.

At **global level**, the progress of the global STH control programme should be monitored and evaluated in order to identify any discrepancies from an expected progression and to coordinate with the WHO regional offices. Also, the dispatch of albendazole and mebendazole for STH should be coordinated as much as possible with that of albendazole for LF and that of praziquantel for schistosomiasis control. To this end, WHO plays a pivotal role in facilitating and coordinating medicine donations and serves as a liaison between the beneficiary endemic countries and the donors. This facilitating and coordinating activity will help to ensure that anthelminthic medicines reach national programmes on time and in sufficient amounts, particularly in areas where multiple NTDs are concurrently endemic and thus where preventive chemotherapy interventions would normally be integrated.

3.3.3 Building technical capacity and providing guidance

Strategic approach	Strategic action	Responsible party
Building technical capacity	Build capacity for programme managers on implementation (including resource identification, fundraising, monitoring and evaluation, and quality assurance)	WHO headquarters and regional offices, ministries of health and education, NGOs, academic and research institutions
	Develop operational tools, guides and manuals up to peripheral level to facilitate programme implementation (including those targeting the educational sector)	WHO, ministries of health and education, NGOs, academic and research institutions
Providing technical support to endemic countries	Develop, disseminate and maintain up-to-date WHO manuals up to the peripheral level - on surveys - mapping - reaching non-enrolled school-age children - scaling down strategy	WHO, ministries of health, NGOs, academic and research institutions
	Establish a technical expert group on STH control at global level	WHO
	Establish regional pools of experts to provide country support	WHO, NGOs, academic and research institutions
	Appoint national programme officers based in endemic countries	WHO headquarters and regional offices

Lack of technical capacity at national, district and peripheral levels for planning and implementation of national STH control programmes is a challenge. Programme managers and other national personnel involved in the planning,

implementation and monitoring and evaluation of activities in integrated NTD control programmes, including STH control components, should convene periodically to build capacity. Operational tools, guidelines and manuals to support national staff (from the health and education sectors) and facilitate implementation of national programmes should be made available at every level in all countries where STH are a public-health problem. In particular, guidance is needed on how to reach non-enrolled school-age children, how to map and re-map, and how to scale down interventions after successful implementation.

A pool of experts on STH control who can provide technical support to countries should be established in each region. In addition, a technical expert group on STH should be established at the global level to address technical issues raised by national and regional programmes. The establishment of national programme offices can help to progress programmes at the local level.

3.3.4 Improving sustainability and facilitating full governmental responsibility

Strategic approach	Strategic action	Responsible party
Improving sustainability	Create local partnerships	Ministry of health, WHO regional offices
Facilitating full governmental responsibility for STH control as donor support phases out	Improve access to external financial support	Ministry of health, WHO
	Make the deworming programme a standard component of school activities	Ministry of education
	Increase cost-efficiency of preventive chemotherapy interventions for STH control	Ministry of health

The creation of a local partnership for NTD control can benefit sustainability by allowing efficient use of available resources and avoiding duplication. Sustainability can also be increased by improving cost efficiency (for example, by progressively reducing training costs and the frequency of drug administration). The inclusion of preventive chemotherapy interventions within routine school-based or health-care activities will further reduce operational costs.

The following table presents the possible role of different partners according to their capacity and mandate.

Partner	Role
WHO	- Develop and disseminate guidelines and manuals - Establish roadmap, global strategies and policies - Provide technical assistance for developing and implementing national plans and for monitoring and evaluating programmes - Procure and supply medicines
Ministries of Health and Ministries of Education	- Advocate for political commitment in countries - Develop national plans and annual work plans - Provide operational management - Coordinate national and subnational activities - Coordinate logistics - Ensure continuous commitment to monitoring and evaluation of the programmes
NGOs	- Assist ministries of health and ministries of education in implementation, advocacy, resource mobilization, monitoring and evaluation
Academic and research institutions	- Assist ministries of health and ministries of education in mapping, monitoring and evaluation - Conduct operational research to facilitate implementation and assessment of the programmes
Bilateral & multilateral donors, Philanthropic foundations	- Provide financial support for procurement, implementation, monitoring and evaluation, and operational research

3.3.5 Refining monitoring capacities

Strategic approach	Strategic action	Responsible party
Defining standard indicators for monitoring performance of programmes	Increase accuracy of collection of: - process indicators - performance indicators (including coverage and its validation) - impact indicators (health, nutritional and education outcomes)	WHO, NGOs, academic and research institutions
	Provide technical guidance for integrated collection of the above indicators	WHO, academic and research institutions
	Provide technical guidance for collection of the above indicators	WHO headquarters and regional offices

A system for recording global and national coverage is in place (the PCT databank). Coverage is the most important process indicator and is reported annually by each ministry of health; regional summaries are prepared by WHO's regional offices. In addition, coverage data are received by a number of NGOs

implementing STH control. The accuracy of all reported data should be improved by devising an appropriate mechanism to validate coverage. For example, in a recent survey conducted by Children Without Worms among NGOs, the use of more than 80 million tablets of anthelminthic medicines (procured independently by the NGOs) was not properly recorded (unpublished data, 2010).

In addition to coverage data, managers of STH control programmes need a set of additional process indicators to be able to manage the different aspects of the control programme (such as training, medicine procurement, and development of health education material).

A more precise estimation of the impact of deworming programmes, in terms not only of health and nutrition but also of educational achievements, is required. This impact assessment is especially important for donors in order to justify and eventually expand investments in STH control. It is recognized that the collection of these indicators may be difficult and expensive and may not be required for all control programmes; however, standardizing impact assessment would be important for comparing results in different settings and setting up specific surveys in sentinel-identified countries, possibly through WHO collaborating centres working with national and international research institutions.

Strategic approach	Strategic action	Responsible party
Integrating forms and tools for different diseases and donors	Consolidate integrated tools and their dissemination (including drug application forms, annual reporting forms, the funding gap analysis tool and adverse event report forms)	WHO

National programme managers are overburdened with multiple reporting requirements (drug application forms, annual reporting forms and adverse event report forms) for different NTDs or multiple donation programmes and with forwarding them to donors and partners at different times of the year. Where possible, such forms should be consolidated not only to reduce the administrative burden but also to facilitate the reviews by regional programme review groups of applications and progress. Similarly, a single template of a standardized national plan of action for integrated NTD control should be developed and disseminated to guide national programmes and facilitate review of the plans by donors and regional programme review groups.

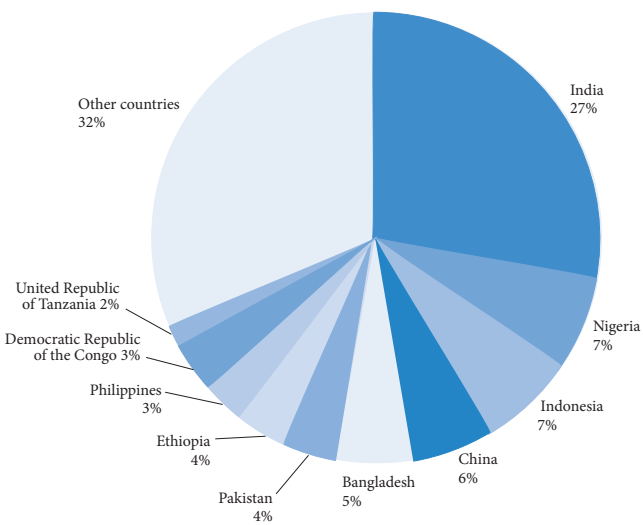
Strategic approach	Strategic action	Responsible party
Monitoring anthelminthic efficacy	Establish and implement a standard operating procedure for the periodic assessment of anthelminthic efficacy	WHO, academic and research institutions

As more national programmes implement routine large-scale preventive chemotherapy interventions, the risk of emerging resistance to these medicines should be considered (although no resistance has yet been confirmed in human deworming programmes). In order to detect such an occurrence as early as possible, and implement corrective measures promptly, a standard operating procedure to periodically assess anthelminthic efficacy within national programmes should be developed.

3.4 Expected increase in the number of countries implementing preventive chemotherapy for STH and reaching 75% coverage 2011–2025

Figure 5 shows the 10 countries with larger number of children (pre school and school-age children) in need of deworming. These 10 countries alone contain more than two thirds of the total number of children.

Figure 5. Ten countries with larger numbers of children (school-age and preschool-age) in need of deworming



Figures 6 and 7 show the expected progression in the proportion of endemic countries that start the implementation and reach 75% coverage of PC for the control of STH for pre-SAC and SAC.

Figure 6. Expected increase in the proportion of countries implementing preventive chemotherapy for the control of STH in preschool-age and school-age children, by year

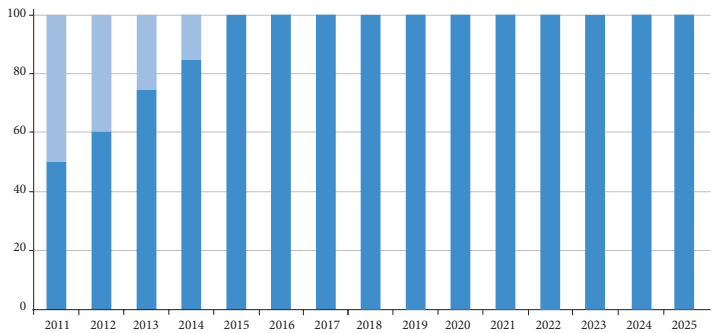
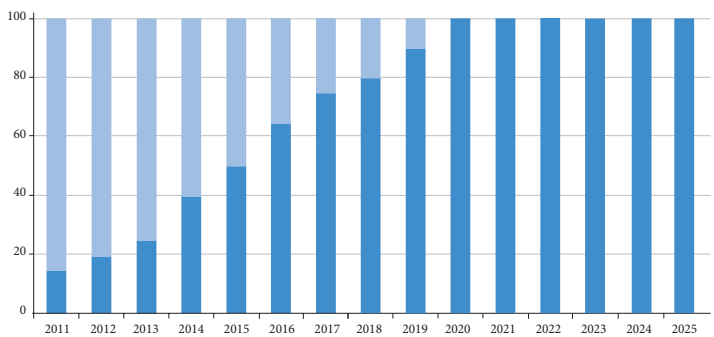


Figure 7. Expected increase in the proportion of countries reaching 75% coverage for preventive chemotherapy for the control of STH in preschool-age and school-age children, by year



3.5. Milestones

Milestones have been set to monitor and evaluate the global progress of STH control to ensure that programmes are on the right track (*Table 5*).

Table 5. Milestones for global control of soil-transmitted helminthiases

Year	Milestone
2012	• Communication strategy for control of STH (and other NTDs) developed • Regional programme review groups expanded • National plans of action for NTD control developed by 50% of countries requiring preventive chemotherapy for STH • National policies for STH control involving intersectoral collaboration (for example, from education and water and sanitation sectors) exist in 50% of countries requiring preventive chemotherapy for STH • Standard operating procedures to evaluate drug resistance developed
2013	• National plans of action for NTD control developed by 75% of countries requiring preventive chemotherapy for STH • National policies for STH control involving intersectoral collaboration (for example, in education and water and sanitation sectors) exist in 75% of countries requiring preventive chemotherapy for STH • Manuals for control of STH in all at-risk groups produced and disseminated • Mapping to identify areas requiring preventive chemotherapy completed in all countries where STH are endemic
2015	• National plans of action for NTD control developed by 100% of countries requiring preventive chemotherapy for STH • National policies for STH control involving intersectoral collaboration (for example, in education and water and sanitation sectors) available in 100% of countries requiring preventive chemotherapy for STH • 50% of countries requiring preventive chemotherapy for STH have achieved 75% national coverage of SAC and pre-SAC, and 50% of SAC and pre-SAC needing treatment worldwide have been treated
2020	• 100% of countries requiring preventive chemotherapy for STH have achieved 75% national coverage of SAC and pre-SAC • 100% of countries requiring preventive chemotherapy for STH regularly assess intensity of the infections in sentinel sites • Less than 1% of countries requiring preventive chemotherapy for STH have infection of high or moderate intensity • 75–100% of children (SAC and pre-SAC) needing preventive chemotherapy worldwide have been treated

NTD, neglected tropical disease; pre-SAC, preschool-age children; SAC, school-age children

Section 4

Forecast of requirements for anthelminthic medicines, 2011–2020

The aim of forecasting the number of individuals requiring preventive chemotherapy for STH and the corresponding amount of anthelminthic medicines is to guide national programme managers and partners through the various steps required to achieve the milestones and global target set out in this strategic plan for 2011–2020.

This section elucidates the method used to forecast the number of children (school-age and preschool-age, separately) in need of preventive chemotherapy for STH and their associated needs for anthelminthic medicines during the 10-year plan period.

The forecast does not take into consideration the funding available to implement or scale-up deworming activities. Rather, it indicates (particularly in scenario 2) **the minimum requirements for achieving the global target**, starting with the existing institutional capacity (assumed to be based on reported progress in deworming activities). These requirements should be used as (i) a reference to evaluate whether the STH programme is making progress towards achieving the regional and global target, and to adjust the pace of activities as necessary; and (ii) guidance for resource mobilization, and regional and national planning.

This preliminary forecast will serve as a base to which activities can be added as more funding and technical support to strengthen institutional capacity becomes available. The forecast will be updated annually as the status in countries of national plans, funding and progress in deworming activities evolves.

Data source

Data were collected from a variety of sources (*Table 6*).

Table 6. Data sources used to forecast requirements for anthelminthic medicines[a]

Type of data	Data source
Estimated number of school-age and preschool-age children requiring preventive chemotherapy for STH	Weekly Epidemiological Record 2011 (26)
Implementation data on deworming for STH between 2003 and 2009, by country Proportion (%) of school-age and preschool-age children in population, by country	PCT databank
Population living in LF-endemic areas Albendazole need forecast for LF	Global Programme to Eliminate Lymphatic Filariasis
Number of school-age and preschool-age children requiring second rounds of drug administration (that is, those living in high-risk areas)	National plans of action Country profiles Communication with national authorities

[a] From 2012, national plans of action and annual progress reports will be analysed to adjust the forecast annually.

Population requiring preventive chemotherapy through STH priority programmes

School-age and preschool-age children requiring preventive chemotherapy for STH for a particular year (say, Year 1) comprising:

1. those living in LF-endemic areas who would be treated in Year 1 by GPELF;
2. those living in LF-endemic areas who would not be treated in Year 1 by GPELF (and who would thus need to receive albendazole or mebendazole via STH deworming programmes);
3. those living in non-LF areas who would need to receive albendazole or mebendazole via STH deworming.

The total number of children in 2 and 3 above are those who need to be targeted by priority STH deworming programmes.

Setting scenarios

Based on the strategic target that all countries requiring preventive chemotherapy for STH would achieve national coverage rates of at least 75% and up to 100% by 2020, three scenarios were formulated:

Scenario 1: all the countries will reach 100% national coverage, by 2020;
Scenario 2 : all the countries requiring PC for STH will reach 75% national coverage by 2020;

Extrapolating the number of children targeted and the number of tablets required

Forecasting the scale up of deworming activities between 2011 and 2020 was extrapolated from the three scenarios by analysing the reported progress of STH deworming activities between 2003 and 2009 and the number of children requiring treatment via STH deworming programmes. These forecasts were multiplied by the proportion of school-age children and preschool-age children requiring two rounds of preventive chemotherapy (that is, those living in areas where the prevalence of STH exceeds 50%) in order to forecast the number of albendazole or mebendazole tablets required every year up to 2020.

Validation

The results of the forecasts were validated in consultation with WHO's regional offices.

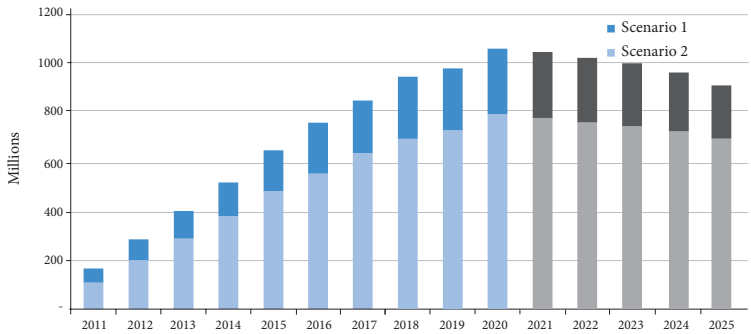
Notes

The Region of the Americas is undertaking a detailed forecasting exercise of the requirements for anthelminthic medicines to treat STH and other NTDs, country by country, in accordance with the objectives of its regional plan; when the results are available, the current preliminary estimates may change.

Population growth is not incorporated into this preliminary forecast, nor is the increase in the intervals between treatments that may be required after 5 or 6 years of intervention.

The following graphs present the number of tablets that should be distributed in school deworming programmes, taking into consideration that several children will receive albendazole through GPELF but assuming that the albendazole for this purpose will be procured under another mechanism.

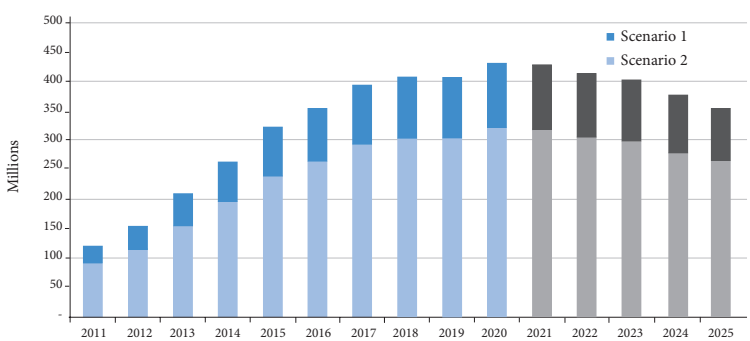
Figure 8. Global
Estimated number of albendazole (ALB) and mebendazole (MBD) tablets required to achieve the global target for coverage of school-age children by 2020



Scenario	Number of ALB/MBD tablets required (million)														
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
	159	277	392	509	646	751	850	932	978	1,054	1,041	1,016	996	958	902
	119	208	294	382	485	563	637	699	733	791	781	762	747	718	676

Scenario 1: All countries reach 100% national coverage by 2020
Scenario 2: All countries reach 75% national coverage by 2020

Figure 9. Global
Estimated number of albendazole (ALB) and mebendazole (MBD) tablets required to achieve the global target for coverage of preschool-age children by 2020



Scenario	Number of ALB/MBD tablets required (million)														
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
	119	153	209	264	321	354	393	408	407	430	427	413	401	375	354
	89	115	157	198	241	266	294	306	305	322	320	310	301	282	266

Scenario 1: All countries reach 100% national coverage by 2020
Scenario 2: All countries reach 75% national coverage by 2020

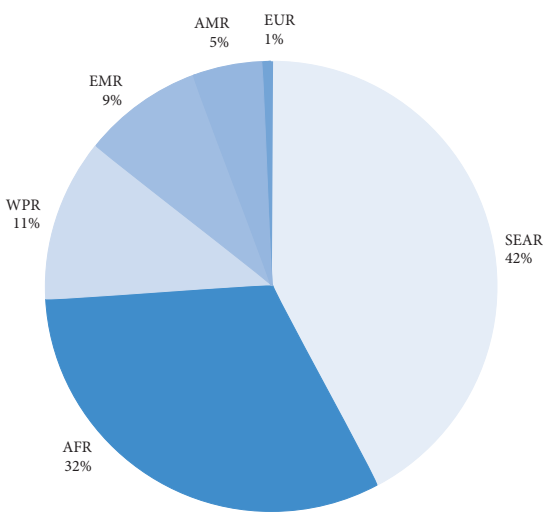
Section 5

Regional highlights and priorities

Soil-transmitted helminthiases are endemic in all the six WHO regions. Of the total number of children requiring treatment, three quarters are in countries of the South-East Asia and African regions, and approximately one quarter in the Western Pacific Region, the Eastern Mediterranean Region and the Region of the Americas. Only 4 million children (or less than <1%) are in countries of the European Region (*Figure 10*).

Figure 10. Proportion of children requiring preventive chemotherapy for soil-transmitted helminthiases, by WHO region, 2009

Legend:
AFR: African Region
AMR: Region of the Americas
EMR: Eastern Mediterranean Region
EUR: European Region
SEAR: South-East Asia Region
WPR: Western Pacific Region



In 2009, a total of 314.6 million children were reportedly dewormed, of whom 274 million required preventive chemotherapy. This corresponds to approximately 31% of all children in need of treatment. More than half of all the treatments provided to children occurred in countries in the South-East Asia Region; an additional third occurred in countries in the African Region.

Rates of deworming coverage exceeded 46% in the countries in the Region of the Americas, followed by countries in the South-East Asia Region (39%) and the African Region (32%) (*Table 7*).

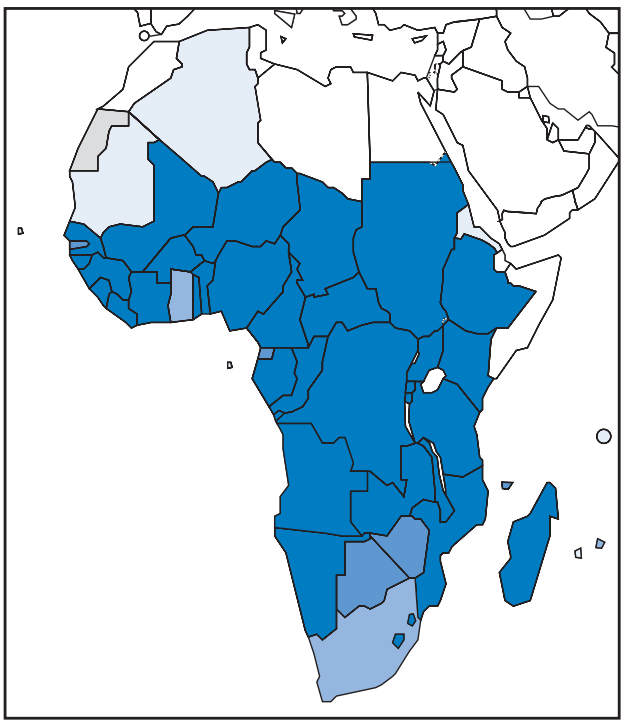
Table 7. Coverage of preventive chemotherapy (PC) for soil-transmitted helminthiases (STH) in preschool-age children (pre-SAC) and school-age children (SAC), by WHO region, 2009

WHO region	Estimated No. of SAC and pre-SAC requiring PC for STH	Regional coverage
African	283 784 317	32%
Americas	45 453 923	46%
South-East Asia	371 953 171	39%
European	4 277 721	9%
Eastern Mediterranean	77 952 920	3%
Western Pacific	99 122 402	14%
Total	**882 544 454**	**31%**

African Region

The burden of disease from STH in WHO's African Region is shown in *Figure 11*. A summary of the main regional indicators is presented in *Table 8*.

Figure 11. Burden of soil-transmitted helminthiases, by country, WHO African Region, 2009



Estimated number of people requiring PC		
pre-SAC	SAC	Total
93 834 170	189 950 147	283 784 317

High burden
Country where the proportion of pre-SAC and SAC population requiring PC is 2/3 or above

Moderate burden
Country where the proportion of pre-SAC and SAC population requiring PC is ≥1/3 and <2/3

Low burden
Country where the proportion of pre-SAC and SAC population requiring PC is less than 1/3

No PC required

No data available

Not applicable

Countries not in AFR

Table 8. Status of preventive chemotherapy (PC) for soil-transmitted helminthiases (STH) in preschool-age children (pre-SAC) and school-age children (SAC), WHO African Region, 2009

Indicators	pre-SAC	SAC
No. of countries where PC is required	42	42
No. of children treated among those in need of PC in 2009	**42 711 551***	**48 338 343***
Regional coverage (%) in 2009	**46%**	**25%**
No. of countries that have never reported PC implementation for STH by 2009	7	8
No. of countries where the highest reported national coverage by 2009 is >0% and <75%	3	21
No. of countries having reportedly achieved 75% national coverage at least once by 2009	32	13

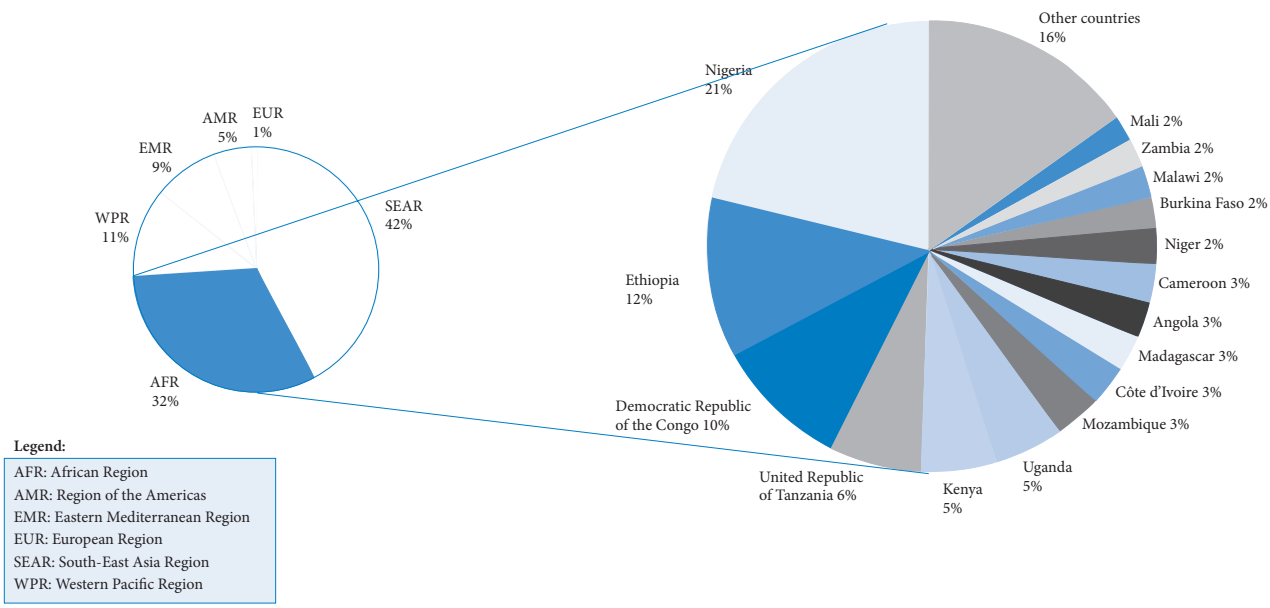
* This number may be lower than the total number of pre-SAC or SAC reported to have received PC for STH.

5.1. African Region

5.1.1 Background

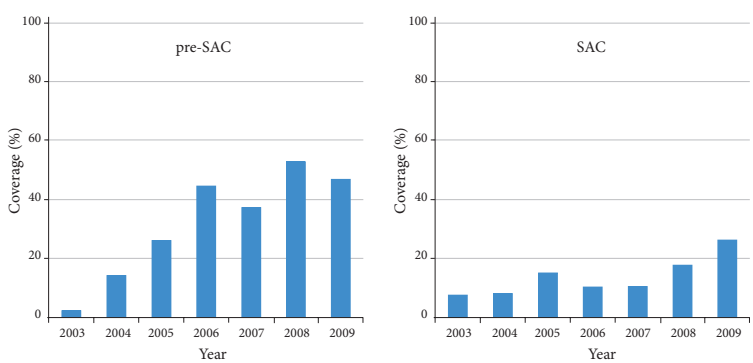
More than 280 million children in need of deworming (30% of the global total) live in the 42 countries of the African Region. More than 40% are from three populous countries (the Democratic Republic of the Congo, Ethiopia and Nigeria) (*Figure 12*).

Figure 12. Proportion of children requiring preventive chemotherapy for soil-transmitted helminthiases, by country, WHO African Region, 2009



Coverage of preventive chemotherapy has been progressively scaling up in this region, reaching 32% in 2009. In the three populous countries, the coverage in school-age children has been consistently below 5% while that in preschool-age children is relatively high.

Figure 13. Coverage of preventive chemotherapy in preschool-age children (pre-SAC) and school-age children (SAC), WHO African Region, by year, 2003–2009



For pre-school children, the Democratic Republic of the Congo achieved national coverage exceeding 75% in 2005 and 2008 (coverage was lower in 2009, at 22%). Since 2005, Ethiopia has been implementing deworming to a large number of preschool-age children, with coverage of 78% in 2009. Nigeria achieved national coverage of 22% in 2006 and 13% in 2008.

In the other countries also, once deworming programmes are initiated, relatively high national coverage has been achieved in preschool-age children (average 80%), while that in school-age children varies by country (*Table 9*).

5.1.2 Regional priorities for 2011–2020

One of the main priorities in the African Region would be to implement and rapidly scale up control activities for school-age children in the Democratic Republic of the Congo, Ethiopia and Nigeria before 2015. To enable this expansion to take place, the actions suggested in *section 3.3.1* (developing a specific communication strategy) should be essential. A similar approach should be taken in countries that have not yet started activities in preschool-age children and/or in school-age children.

A second priority would be to scale up deworming in areas where small-scale control activities (with coverage below 20%) have been initiated and where the LF elimination programme is present. Achieving scale-up in this group of countries would be presumably easier than in the first group since technical capacity and political commitment to a certain extent already exist.

A third priority would be to maintain high coverage in the countries that have exceeded the 75% national coverage. This group of countries would need to start planning to reduce the frequency of interventions and institute deworming in the school system.

Table 9 presents for all the endemic countries of the African Region in 2009 the number of preschool-age children and school-age children requiring preventive chemotherapy, their coverage with the intervention and the status of endemicity for LF.

Tables 10 and *11* present the regional situation for starting and scaling up preventive chemotherapy deworming in school-age children and preschool-age children respectively.

Table 9. National coverage of preschool-age children (pre-SAC) and school-age children (SAC) requiring preventive chemotherapy (PC) for soil-transmitted helminthiases (STH) and status of lymphatic filariasis (LF) endemicity and mass drug administration (MDA), by country, WHO African Region, 2009

Country	pre-SAC requiring PC for STH	National coverage pre-SAC	SAC requiring PC for STH	National coverage SAC	LF endemicity and MDA status
Angola	2 532 354	100%	5 115 727		Endemic, MDA not started
Benin	1 168 747	100%	2 357 012	10%	Endemic, MDA started
Botswana	70 506		170 124		Non-endemic
Burkina Faso	2 355 883		4 224 893	82%	Endemic, MDA started
Burundi	925 228	37%	2 002 967	100%	Non-endemic
Cameroon	2 415 723	100%	4 917 317	65%	Endemic, MDA started
Cape Verde	47 352		124 206	98%	Non-endemic
Central African Republic	521 971		1 138 031		Endemic, MDA not started
Chad	1 585 877	84%	3 098 286		Endemic, MDA not started
Comoros	49 904	100%	101 663		Endemic, MDA started
Congo	440 113		935 094		Endemic, MDA not started
Côte d'Ivoire	2 519 139	100%	5 387 511	100%	Endemic, MDA started
Democratic Republic of the Congo	9 432 837	22%	18 830 830		Endemic, MDA not started
Equatorial Guinea	40 518	100%	83 909	1%	Endemic, MDA not started
Ethiopia	10 659 252	78%	22 461 523	2%	Endemic, MDA started
Gabon	145 518		349 386		Endemic, MDA not started
Gambia	70 678		148 548		Endemic, MDA not started
Ghana	104 675	100%	357 203	100%	Endemic, MDA started
Guinea	1 307 839	100%	2 642 076	13%	Endemic, MDA not started
Guinea-Bissau	210 898	89%	417 401		Endemic, MDA not started
Kenya	5 269 125		10 316 559	36%	Endemic, MDA started
Lesotho	153 388		377 239		Non-endemic
Liberia	504 387	75%	1 049 976		Endemic, MDA not started
Madagascar	2 451 597	21%	5 316 067	70%	Endemic, MDA started
Malawi	2 081 975	91%	4 414 660	71%	Endemic, MDA started
Mali	1 761 949		3 486 783	81%	Endemic, MDA started
Mauritius	6 477		18 216		Non-endemic
Mozambique	3 056 640	98%	6 227 658	7%	Endemic, MDA started
Namibia	221 490		520 771		Non-endemic
Niger	2 514 993	100%	4 355 902	54%	Endemic, MDA started
Nigeria	19 949 979		40 384 176	3%	Endemic, MDA started
Rwanda	1 328 085	92%	2 532 225	100%	Non-endemic
Sao Tome and Principe	13 841		31 585		Endemic, MDA not started
Senegal	1 638 215		3 366 360	3%	Endemic, MDA started
Sierra Leone	762 095	100%	1 508 316	94%	Endemic, MDA started

Country	Pre-SAC requiring PC for STH	National coverage pre-SAC	SAC requiring PC for STH	National coverage SAC	LF endemicity & MDA status
South Africa	955 872		2 326 653		Non-endemic
Swaziland	126 830	63%	306 139	66%	Non-endemic
Togo	760 842	100%	1 682 182	5%	Endemic, MDA started
Uganda	4 980 321	37%	9 615 007	71%	Endemic, MDA started
United Republic of Tanzania	6 104 447	91%	11 759 867	18%	Endemic, MDA started
Zambia	1 827 250	100%	3 654 251	9%	Endemic, MDA not started
Zimbabwe	759 360		1 835 847		Endemic, MDA not started

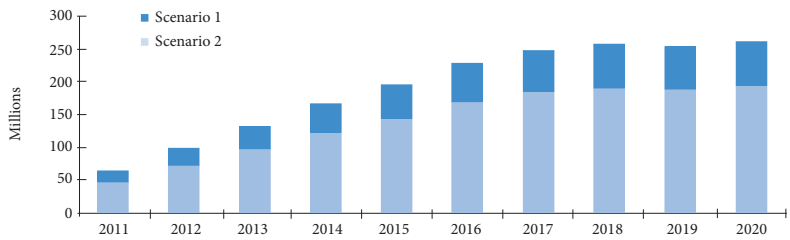
Table 10. School-age children

WHO Region	Number of populous countries in which PC has not started	Number of additional countries in which PC has not started	Number of countries in which PC has been started but not scaled up	Number of countries in which PC coverage is good
AFR	3	3	23	13
Action	Start PC	Start PC	Scale up PC	Maintain PC

Table 11. Preschool-age children

WHO Region	Number of populous countries in which PC has not started	Number of additional countries in which PC has not started	Number of countries in which PC has been started but not scaled up	Number of countries in which PC coverage is good
AFR	1	6	3	32
Action	Start PC	Start PC	Scale up PC	Maintain PC

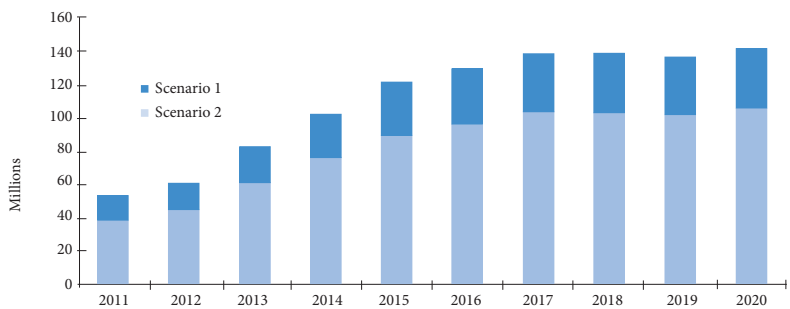
Figure 14. African Region
Estimated number of albendazole (ALB) and mebendazole (MBD) tablets required to achieve the global target for coverage of school-age children by 2020



Scenario	Number of ALB/MBD tablets required (million)									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Scenario 1	66	100	134	168	196	229	249	258	254	261
Scenario 2	50	75	100	126	147	171	187	193	191	196

Scenario 1: All countries reach 100% national coverage by 2020
Scenario 2: All countries reach 75% national coverage by 2020

Figure 15. African Region
Estimated number of albendazole (ALB) and mebendazole (MBD) tablets required to achieve the global target for coverage of preschool-age children by 2020



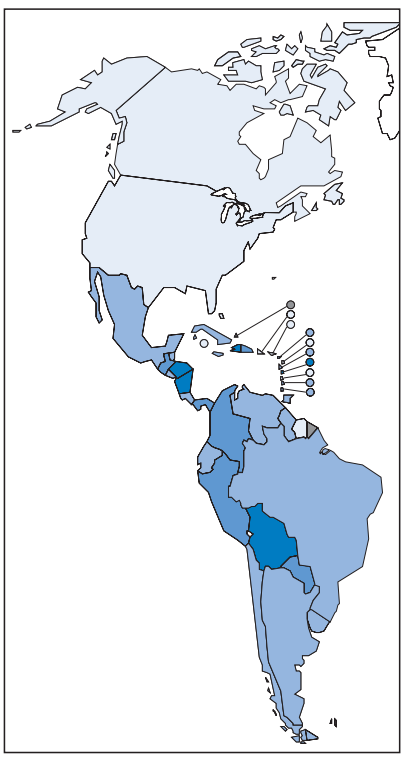
Scenario	Number of ALB/MBD tablets required (million)									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Scenario 1	53	60	82	102	120	129	138	138	136	141
Scenario 2	40	45	61	77	90	97	103	103	102	106

Scenario 1: All countries reach 100% national coverage by 2020
Scenario 2: All countries reach 75% national coverage by 2020

Region of the Americas

The burden of disease from STH in WHO's Region of the Americas is shown in *Figure 16*. A summary of the main regional indicators is presented in *Table 12*.

Figure 16. Burden of soil-transmitted helminthiases, by country, WHO Region of the Americas, 2009



Estimated number of people requiring PC		
pre-SAC	SAC	Total
14 048 625	31 405 298	45 453 923

High burden
Country where the proportion of pre-SAC and SAC population requiring PC is 2/3 or above

Moderate burden
Country where the proportion of pre-SAC and SAC population requiring PC is ≥1/3 and <2/3

Low burden
Country where the proportion of pre-SAC and SAC population requiring PC is less than 1/3

No PC required

No data available

Not applicable

Countries not in AMR

Table 12. Status of preventive chemotherapy (PC) for soil-transmitted helminthiases (STH) in preschool-age children (pre-SAC) and school-age children (SAC), WHO Region of the Americas, 2009

Indicators	pre- SAC	SAC
No. of countries where PC is required	30	30
No. of children treated among those in need of PC in 2009	**3 303 418***	**17 783 774***
Regional coverage (%) in 2009	**24%**	**57%**
No. of countries that have never reported PC implementation for STH by 2009	18	10
No. of countries where the highest reported national coverage by 2009 is >0% and <75%	7	9
No. of countries having reportedly achieved 75% national coverage at least once by 2009	5	11

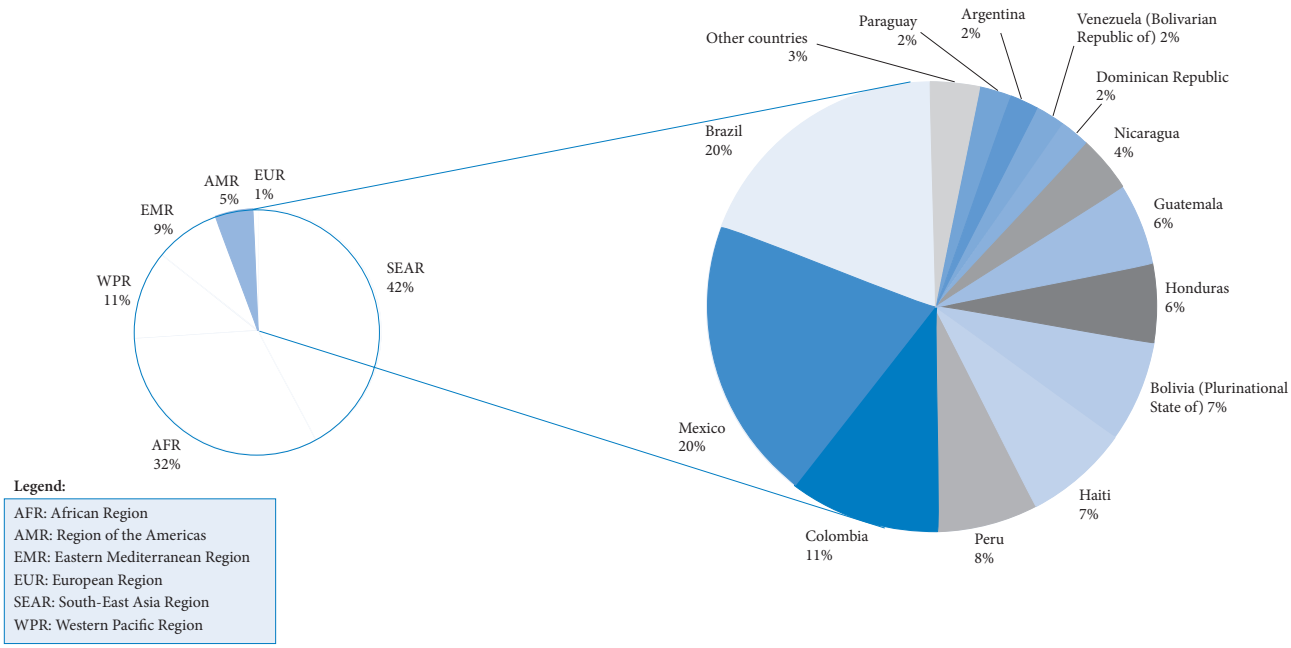
* This number may be lower than the total number of pre-SAC or SAC reported to have received PC for STH.

5.2. Region of the Americas

5.2.1 Background

Approximately 45 million children in need of deworming (corresponding to 5% of the global total) are from countries in the Region of the Americas. This region achieved the highest coverage among all of WHO's regions in 2009 (that is, 46% of preschool-age children and school-age children dewormed). More than 50% of the total number of children in need of treatment are from three populous countries (Brazil, Colombia and Mexico) (*Figure 17*).

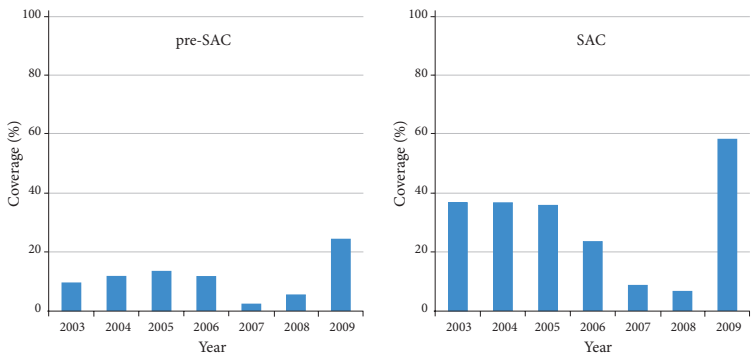
Figure 17. Proportion of children requiring preventive chemotherapy, by country, WHO Region of the Americas, 2009



The PAHO/WHO Directing Council Resolution CD49.R19, signed by Member States in October 2009, focuses on elimination of neglected diseases and other poverty-related infections (12 diseases) of which five are NTDs targeted for preventive chemotherapy. An analysis of the progress, priorities and lines of action for LF, schistosomiasis, onchocerciasis, trachoma and STH was published in 2010 (*38*).

The progression of coverage in children in the Region of the Americas is presented in *Figure 18*. High regional coverage was achieved in 2009, due largely to the high numbers of children treated in Mexico. Four countries reached 75% coverage of both preschool-age children and school-age children (Belize, Guyana, Mexico and Nicaragua); seven additional countries reached the 75% coverage for school-age children (the Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras and Peru). In Colombia, preschool-age children are not treated but the coverage of school-age children is improving. In Brazil, the treatment of school-age children was implemented until 2005 with relatively high coverage (between 40% and 66%) but, since then, it has been interrupted.

Figure 18. Coverage of preventive chemotherapy in preschool-age children (pre-SAC) and school-age children (SAC), WHO Region of the Americas, by year, 2003–2009



5.1.2 Regional priorities for 2011–2020

To address NTDs in a rational way, in 2010, the Region of the Americas divided its countries into four groups (*35*) (*Figure 19*).

Figure 19. Groups of countries targeted for technical cooperation to achieve goals for control and elimination of neglected tropical diseases, WHO Region of the Americas

GROUP 1 Most of the foci for ONCHO, TRA, SCH and LF in LAC **67% of the children of LAC Region at risk of STH**	→	Fully developped integrated, inter-programmatic and inter-sectoral plans to combat NIDs* **11 countries**
GROUP 2 Some foci of ONCHO, TRA and SCH **27% of the children of LAC Region at risk of STH**	→	Improve inter-programmatic and inter-sectoral coordination and includes STH into NIDs* integrated actions **6 countries**
GROUP 3 No evidence of ONCHO, TRA, LF and SCH **5.4% of the children of LAC Region at risk of STH**	→	Focus activities for NIDs* at local level and rural areas **3 countries**
GROUP 4 No evidence of ONCHO, TRA, LF and SCH **1% of the children of LAC Region at risk of STH**	→	Monitoring and evaluation to define ways of action **13 countries**

* In AMRO/PAHO NTDs are defined as NID (Neglected Infectious Diseases).

LAC, Latin America and the Caribbean; LF, lymphatic filiariasis; ONCHO, onchocerciasis; SCH, schistosomiasis; TRA, trachoma.

Groups 1 and 2 are where NTD control will be focused and where 94% of the children in need of deworming in the region are located. In these two groups:

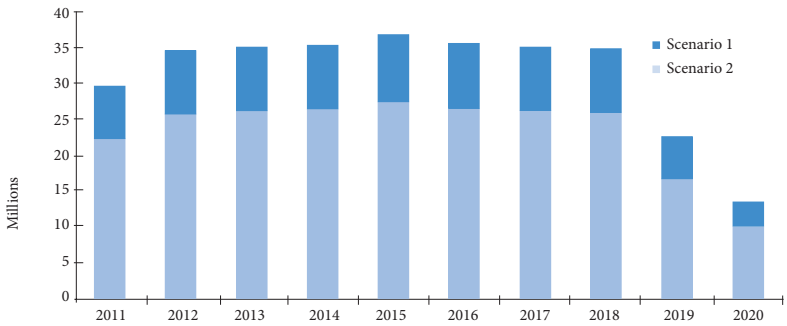
- Eight countries should start regular deworming of children: El Salvador and the Plurinational State of Bolivia (where deworming activities are conducted only by NGOs); Brazil (where deworming has been discontinued); Ecuador (where the report of anthelminthic administration is not detailed); Saint Lucia, Panama and the Bolivarian Republic of Venezuela; and in Colombia where, despite the 28% coverage reached in 2009, deworming activities do not appear to have been regularly organized by the Ministry of Health.
- Four countries should scale up deworming: Guatemala, Guyana, Haiti and Peru.
- Four countries should maintain high coverage: Belize, the Dominican Republic, Honduras and Mexico. Although Nicaragua is included within Group 3 of prioritization, this country should also maintain high coverage.

Table 13 presents for all the endemic countries of the Region of the Americas in 2009 the number of pre-school age children and school-age children requiring preventive chemotherapy, their coverage with the intervention and the status of endemicity for LF.

Table 13. National coverage of preschool-age children (pre-SAC) and school-age children (SAC) requiring preventive chemotherapy (PC) for soil-transmitted helminthiases (STH) and status of lymphatic filariasis (LF) endemicity and mass drug administration (MDA), by country, WHO Region of the Americas, 2009

Country	pre-SAC requiring PC for STH	National coverage Pre-SAC	SAC requiring PC for STH	National coverage SAC	LF endemicity and MDA status
Antigua and Barbuda	38		96		Non-endemic
Argentina	271 799		682 136		Non-endemic
Belize	3 005	100%	7 437	100%	Non-endemic
Bolivia (Plurinational State of)	994 363		2 331 001	9%	Non-endemic
Brazil	3 261 153		5 682 392	<1%	Endemic, MDA started
Chile	36 748		97 151		Non-endemic
Colombia	1 420 684		3 495 826	29%	Non-endemic
Costa Rica	13 949		37 621		Non-endemic
Cuba	44 344		127 294		Non-endemic
Dominica	900		2 269		Non-endemic
Dominican Republic	346 597		664 547	100%	Endemic, MDA started
Ecuador	89 902		231 392	100%	Non-endemic
El Salvador	63 610		184 571	100%	Non-endemic
Grenada	250		636		Non-endemic
Guatemala	967 781		1 602 656	91%	Non-endemic
Guyana	10 025	77%	29 689	91%	Endemic, MDA started
Haiti	999 787	29%	2 385 794	90%	Endemic, MDA started
Honduras	765 391		1 826 936	100%	Non-endemic
Jamaica	34 263	2%	93 265	<1%	Non-endemic
Mexico	2 490 877	100%	6 429 513	100%	Non-endemic
Nicaragua	537 191	95%	1 337 754	100%	Non-endemic
Panama	124 321		299 996		Non-endemic
Paraguay	269 558		648 859		Non-endemic
Peru	999 228	<1%	2 477 333	90%	Non-endemic
Saint Kitts and Nevis	147		372		Non-endemic
Saint Lucia	11 688		30 305		Non-endemic
Saint Vincent and the Grenadines	157		425		Non-endemic
Trinidad and Tobago	6 002		14 567		Non-endemic
Uruguay	153		398		Non-endemic
Venezuela (Bolivarian Republic of)	284 714		683 067		Non-endemic

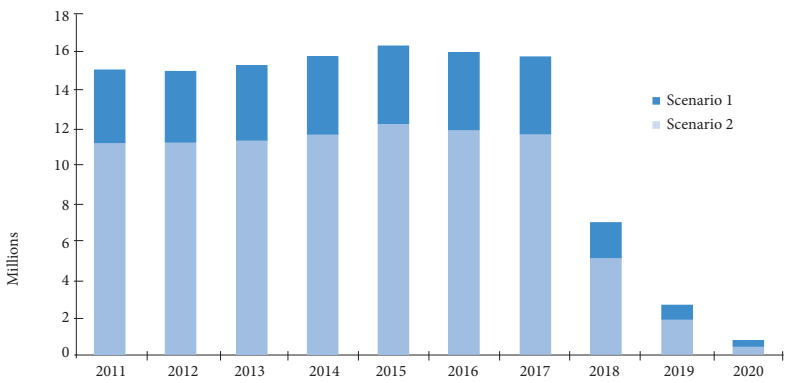
Figure 20. Region of the Americas
Estimated number of albendazole (ALB) and mebendazole (MBD) tablets required to achieve the global target for coverage of school-age children by 2020



Scenario	Number of ALB/MBD tablets required (million)									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Scenario 1	30	34	35	35	37	35	35	35	22	13
Scenario 2	22	26	26	26	27	27	26	26	17	10

Scenario 1: All countries reach 100% national coverage by 2020
Scenario 2: All countries reach 75% national coverage by 2020

Figure 21. Region of the Americas
Estimated number of albendazole (ALB) and mebendazole (MBD) tablets required to achieve the global target for coverage of preschool-age children by 2020



Scenario	Number of ALB/MBD tablets required (million)									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Scenario 1	15	15	15	16	16	16	16	7	3	1
Scenario 2	11	11	11	12	12	12	12	5	2	1

Scenario 1: All countries reach 100% national coverage by 2020
Scenario 2: All countries reach 75% national coverage by 2020

South-East Asia Region

The burden of disease from STH in WHO's South-East Asia Region is shown in *Figure 22*. A summary of the main regional indicators is presented in *Table 14*.

Figure 22. Burden of soil-transmitted helminthiases, by country, WHO South-East Asia Region, 2009

Estimated number of people requiring PC		
pre-SAC	SAC	Total
106 792 931	265 160 240	371 953 171

High burden
Country where the proportion of pre-SAC and SAC population requiring PC is 2/3 or above

Moderate burden
Country where the proportion of pre-SAC and SAC population requiring PC is ≥1/3 and <2/3

Low burden
Country where the proportion of pre-SAC and SAC population requiring PC is less than 1/3

No PC required

No data available

Not applicable

Countries not in SEAR

Table 14. Status of preventive chemotherapy (PC) for soil-transmitted helminthiases (STH) in preschool-age children (pre-SAC) and school-age children (SAC), WHO South-East Asia Region, 2009

Indicators	pre-SAC	SAC
No. of countries where PC is required	8	8
No. of children treated among those in need of PC in 2009	**41 009 540***	**103 820 516***
Regional coverage (%) in 2009	**38%**	**39%**
No. of countries that have never reported PC implementation for STH by 2009	1	0
No. of countries where the highest reported national coverage by 2009 is >0% and <75%	3	5
No. of countries having reportedly achieved 75% national coverage at least once by 2009	4	3

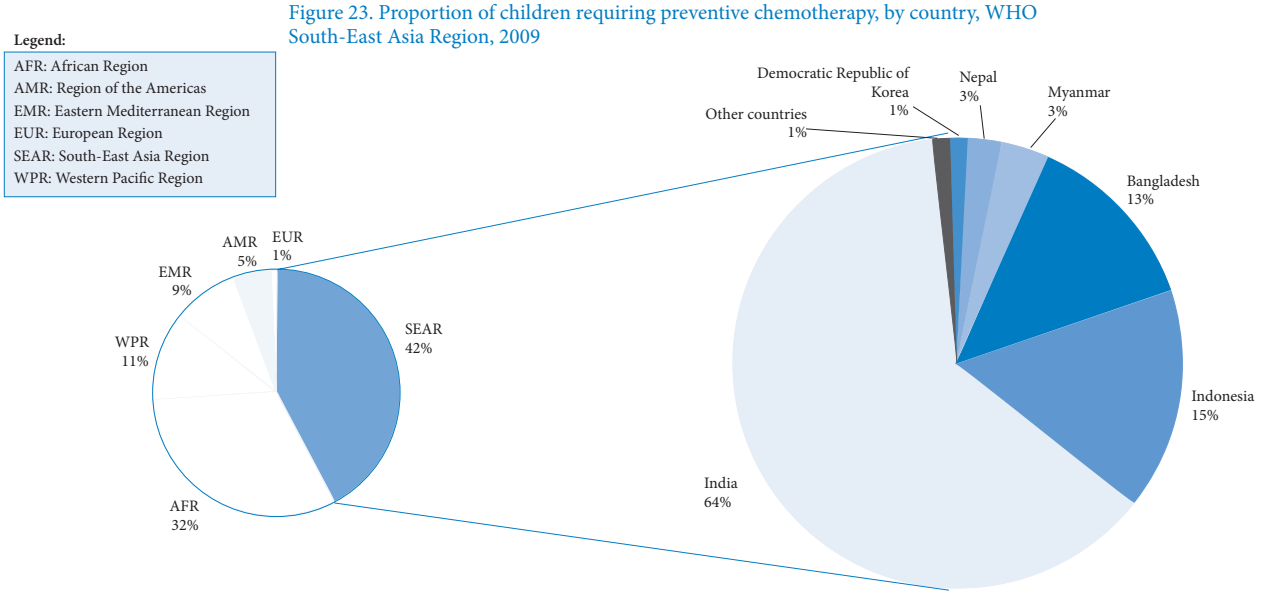
* This number may be lower than the total number of pre-SAC or SAC reported to have received PC for STH.

5.3. South-East Asia Region

5.3.1 Background

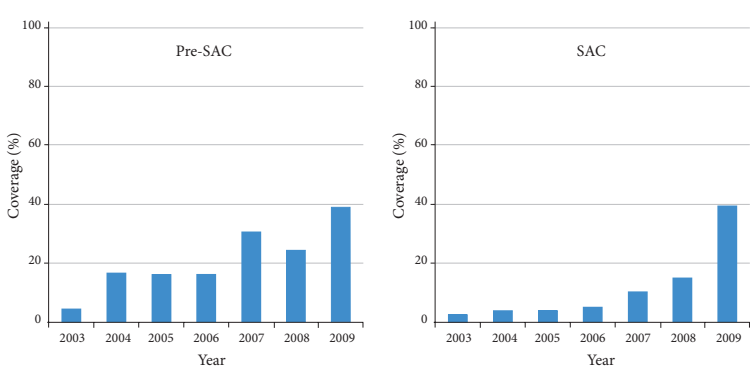
About 42% of children worldwide in need of treatment are in the South-East Asia Region. This is also the region where a large number of deworming interventions are taking place (in 2009, about 145 million children needing preventive chemotherapy were dewormed). Approximately 64% of the children who require deworming in this region are from India, 15% from Indonesia and 13% from Bangladesh (*Figure 23*).

Figure 23. Proportion of children requiring preventive chemotherapy, by country, WHO South-East Asia Region, 2009



The progression of coverage in preschool-age children and school-age children in the South-East Asia Region is presented in *Figure 24*. Deworming in India has been constantly scaling up in recent years. An important contribution to child deworming is provided by the distribution of albendazole through the Global

Figure 24. Coverage of preventive chemotherapy in preschool-age children (pre-SAC) and school-age children (SAC), WHO South-East Asia, by year, 2003–2009



Programme to Eliminate Lymphatic Filariasis (GPELF). The other countries in the region (Bangladesh, Bhutan, the Democratic Republic of Korea, Myanmar, Nepal and Timor-Leste) also have deworming programmes specifically targeting school-age children in place.

Table 15 presents for all the endemic countries of the South-East Asia Region in 2009 the number of preschool-age children and school-age children requiring preventive chemotherapy, their coverage with the intervention and the status of endemicity for LF.

Tables 16 and *17* present the regional situation for starting and scaling up preventive chemotherapy in school-age children and preschool-age children respectively.

Table 15. National coverage of preschool-age children (pre-SAC) and school-age children (SAC) requiring preventive chemotherapy (PC) for soil-transmitted helminthiases (STH) and status of lymphatic filariasis (LF) endemicity and mass drug administration (MDA), by country, WHO South-East Asia Region, 2009

Country	pre-SAC requiring PC for STH	National coverage Pre-SAC	SAC requiring PC for STH	National coverage SAC	LF endemicity & MDA status
Bangladesh	13 315 222	100%	34 556 371	36%	Endemic, MDA started
Bhutan	19 728		50 147		Non-endemic
Democratic People's Republic of Korea	509 106	100%	1 482 986	100%	Non-endemic
India	69 606 616	29%	171 373 387	45%	Endemic, MDA started
Indonesia	16 685 884	6%	41 390 043	9%	Endemic, MDA started
Myanmar	3 689 259	87%	8 776 117	86%	Endemic, MDA started
Nepal	2 818 439	100%	7 214 486	33%	Endemic, MDA started
Timor-Leste	148 677		316 703		Endemic, MDA started

Table 16. School-age children

WHO Region	Number of populous countries in which PC has not started	Number of additional countries in which PC has not started	Number of countries in which PC has been started but not scaled up	Number of countries in which PC coverage is good
SEAR	0	1	4	3
Action	Start PC	Start PC	Scale up PC	Maintain PC

Table 17. Preschool-age children

WHO Region	Number of populous countries in which PC has not started	Number of additional countries in which PC has not started	Number of countries in which PC has been started but not scaled up	Number of countries in which PC coverage is good
SEAR	1	1	2	4
Action	Start PC	Start PC	Scale up PC	Maintain PC

5.3.2 Regional priorities for 2011–2020

One of the first priorities in the region will be to promote political commitment for STH control in India in order to start STH control activities before the end of the LF elimination programme and to maintain the health advantages obtained. The Regional Office also highlights the need to develop technical capacity in the field of integrated NTD control, improve coordination between the Ministry of Health and the Ministry of Education, and to establish a plan for resource mobilization.

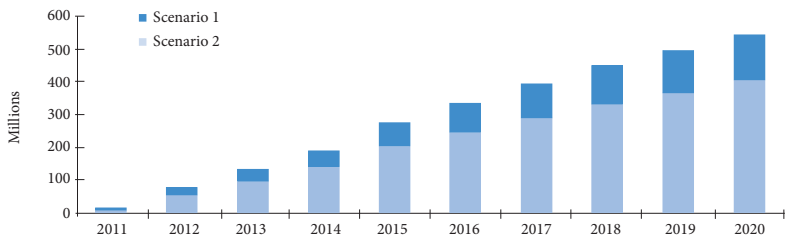
Indonesia is scaling up NTD control and has already developed a plan of action for integrated control of NTDs, which has helped to identify potential donors. Technical support should be provided as a priority to this country to facilitate this process.

Timor-Leste should re-establish sustainable control of STH. Although technical capacity is available in the country, the programme has been discontinued due to lack of funds. Integration of STH control with that of lymphatic filariasis (which has also been temporarily discontinued) should be advocated.

Four countries (Bangladesh, the Democratic People's Republic of Korea, Myanmar and Nepal) have achieved high national coverage in recent years; continuous efforts and technical support are essential to maintaining the high coverage.

Reinforcement of monitoring, evaluation and reporting to better understand the programme's progress would be important in many countries, as in Bhutan.

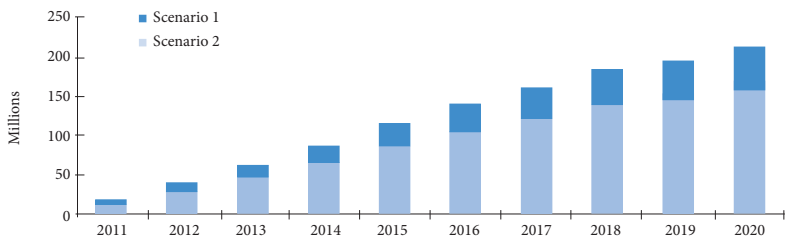
Figure 25. South-East Asian Region
Estimated number of albendazole (ALB) and mebendazole (MBD) tablets required to achieve the global target for coverage of school-age children by 2020



Scenario	Number of ALB/MBD tablets required (million)									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Scenario 1	18	79	136	193	279	338	396	452	499	548
Scenario 2	13	59	102	145	209	253	297	339	375	411

Scenario 1: All countries reach 100% national coverage by 2020
Scenario 2: All countries reach 75% national coverage by 2020

Figure 26. South-East Asian Region
Estimated number of albendazole (ALB) and mebendazole (MBD) tablets required to achieve the global target for coverage of preschool-age children by 2020



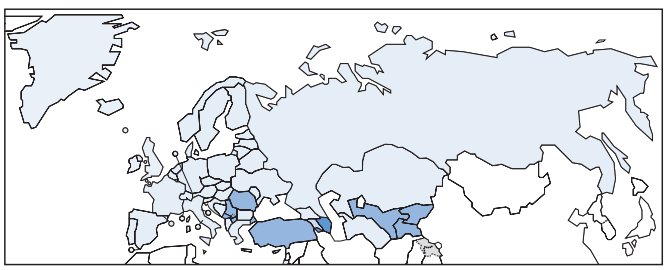
Scenario	Number of ALB/MBD tablets required (million)									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Scenario 1	18	41	63	87	116	140	162	184	195	212
Scenario 2	14	30	47	65	87	105	122	138	146	159

Scenario 1: All countries reach 100% national coverage by 2020
Scenario 2: All countries reach 75% national coverage by 2020

European Region

The burden of disease from STH in WHO's European Region is shown in *Figure 27*. A summary of the main regional indicators is presented in *Table 18*.

Figure 27 . Burden of soil-transmitted helminthiases, by country, WHO European Region, 2009



Estimated number of people requiring PC		
pre-SAC	SAC	Total
1 223 098	3 054 623	4 277 721

High burden
Country where the proportion of pre-SAC and SAC population requiring PC is 2/3 or above

Moderate burden
Country where the proportion of pre-SAC and SAC population requiring PC is ≥1/3 and <2/3

Low burden
Country where the proportion of pre-SAC and SAC population requiring PC is less than 1/3

No PC required

No data available

Not applicable

Countries not in EUR

Table 18. Status of preventive chemotherapy (PC) for soil-transmitted helminthiases (STH) in preschool-age children (pre-SAC) and school-age children (SAC), European Region, 2009

Indicators	pre-SAC	SAC
No. of countries where PC is required	11	11
No. of children treated among those in need of PC in 2009	**30 547***	**339 289***
Regional coverage (%) in 2009	**3%**	**11%**
No. of countries that have never reported PC implementation for STH by 2009	9	8
No. of countries where the highest reported national coverage by 2009 is >0% and <75%	1	2
No. of countries having reportedly achieved 75% national coverage at least once by 2009	1	1

* This number may be lower than the total number of pre-SAC or SAC reported to have received PC for STH.

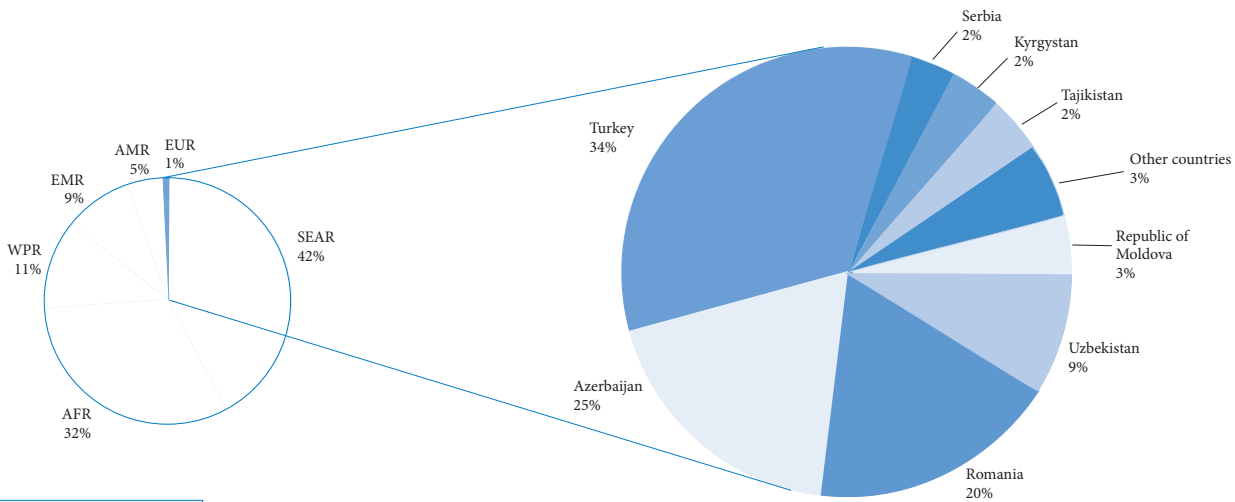
5.4. European Region

5.4.1 Background

STH is a public-health problem in 11 of the 53 countries in the region, and the number of children who need treatment corresponds to less than 1% of the total worldwide. More than 75% of the children requiring treatment are from three countries (Azerbaijan, Romania and Turkey) (*Figure 28*).

In EURO countries a relatively high prevalence of infection with *Enterobius vermicularis* it is also reported. These infections are also cured when individuals are treated with albendazole or mebendazole.[1]

Figure 28. Proportion of children requiring preventive chemotherapy, by country, WHO European Region, 2009



Legend:

AFR: African Region
AMR: Region of the Americas
EMR: Eastern Mediterranean Region
EUR: European Region
SEAR: South-East Asia Region
WPR: Western Pacific Region

A pilot project initiated in Turkey has become inactive; no activities are reported in Romania; and a national programme is in place in Azerbaijan.

The progression of coverage in preschool-age children and school-age children in the European Region is presented in *Figure 29*.

[1] A relatively high prevalence of *Hymenolepis nana* that is sensitive to low dosages of praziquantel has also been reported.

Figure 29. Coverage of preventive chemotherapy in preschool-age children (pre-SAC) and school-age children (SAC), WHO European Region, by year, 2003–2009

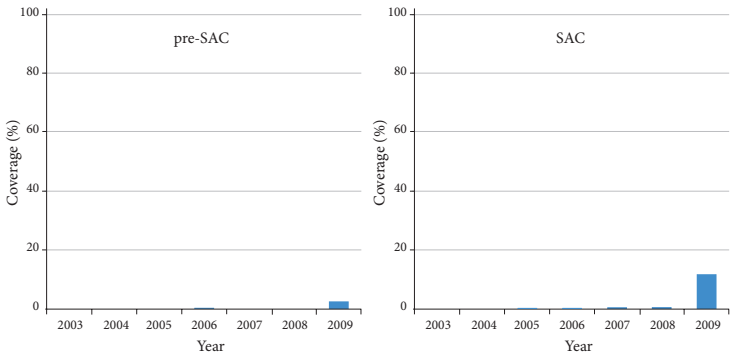


Table 19 presents for all the endemic countries of the European Region in 2009 the number of preschool-age children and school-age children requiring chemotherapy, their coverage with the intervention and the status of endemicity for lymphatic filariasis.

Table 19. National coverage of preschool-age children (pre-SAC) and school-age children (SAC) requiring preventive chemotherapy (PC) for soil-transmitted helminthiases (STH) and status of lymphatic filariasis (LF) endemicity and mass drug administration (MDA), by country, WHO European Region, 2009

Country	pre-SAC requiring PC for STH	National coverage Pre-SAC	SAC requiring PC for STH	National coverage SAC	LF endemicity & MDA status
Armenia	12 869		29 124		Non-endemic
Azerbaijan	325 481		755 705	35%	Non-endemic
Kyrgyzstan	30 547	100%	73 289	100%	Non-endemic
Montenegro	1 702		4 659		Non-endemic
Republic of Moldova	33 474		83 871		Non-endemic
Romania	237 047		611 820		Non-endemic
Serbia	26 598		67 666		Non-endemic
Tajikistan	30 696		74 555		Non-endemic
The Former Yugoslav Republic of Macedonia	5 265		15 334		Non-endemic
Turkey	407 549		1 056 261		Non-endemic
Uzbekistan	111 869		282 338		Non-endemic

Tables 20 and *21* present the regional situation for starting and scaling up preventive chemotherapy in school-age children and preschool-age children respectively.

Table 20. School-age children

WHO Region	Number of additional countries in which PC has not started	Number of countries in which PC has been started but not scaled up	Number of countries in which PC coverage is good
EURO	8	2	1
Action	Start PC	Scale up PC	Maintain PC

Table 21. Preschool-age children

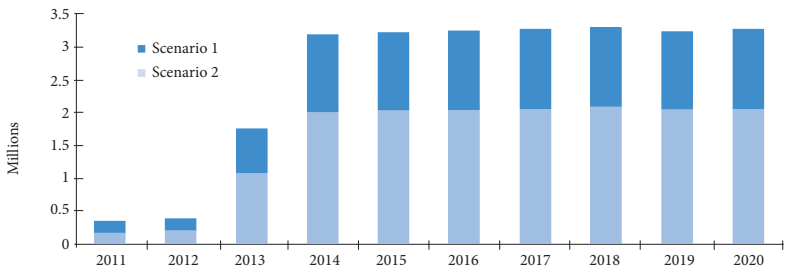
WHO Region	Number of additional countries in which PC has not started	Number of countries in which PC has been started but not scaled up	Number of countries in which PC coverage is good
EURO	9	1	1
Action	Start PC	Scale up PC	Maintain PC

5.4.2 Regional priorities for 2011–2020

Coordination of deworming activities should not place an undue organizational or financial burden on ministries of health in this region; therefore, advocating the benefits to health and educational of the intervention would be useful to reinforce deworming efforts in the countries and encourage scale up of the activities.

Reinforcement of monitoring, evaluation and reporting to better understand the programme's progress would also be important to ensure that the programme has successfully achieved elimination of morbidity from moderate and heavy intensity STH infection.

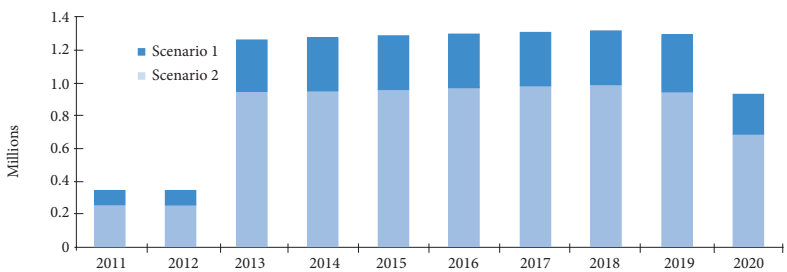
Figure 30. European Region
Estimated number of albendazole (ALB) and mebendazole (MBD) tablets required to achieve the global target for coverage of school-age children by 2020



Scenario	Number of ALB/MBD tablets required (million)									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Scenario 1	0.3	0.4	1.7	3.2	3.2	3.2	3.3	3.3	3.2	3.2
Scenario 2	0.3	0.3	1.3	2.4	2.4	2.4	2.4	2.5	2.4	2.4

Scenario 1: All countries reach 100% national coverage by 2020
Scenario 2: All countries reach 75% national coverage by 2020

Figure 31. European Region
Estimated number of albendazole (ALB) and mebendazole (MBD) tablets required to achieve the global target for coverage of preschool-age children by 2020



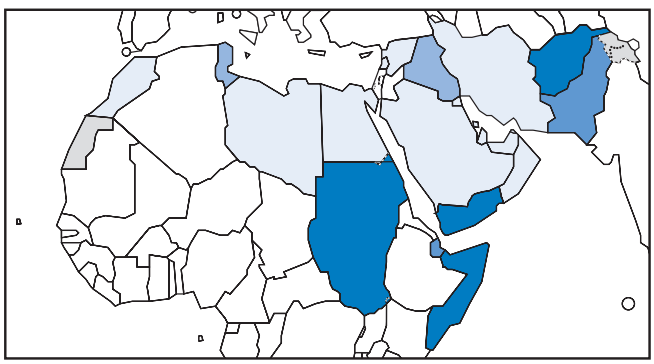
Scenario	Number of ALB/MBD tablets required (million)									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Scenario 1	0.3	0.3	1.3	1.3	1.3	1.3	1.3	1.3	1.2	0.9
Scenario 2	0.2	0.2	0.9	0.9	1.0	1.0	1.0	1.0	0.9	0.7

Scenario 1: All countries reach 100% national coverage by 2020
Scenario 2: All countries reach 75% national coverage by 2020

Eastern Mediterranean Region

The burden of disease from STH in WHO's Eastern Mediterranean Region is shown in *Figure 32*. A summary of the main regional indicators is presented in *Table 22*.

Figure 32. Burden of soil-transmitted helminthiases, by country, WHO Eastern Mediterranean Region, 2009



Estimated number of people requiring PC		
pre-SAC	SAC	Total
26 461 154	53 491 766	77 952 919

High burden
Country where the proportion of pre-SAC and SAC population requiring PC is 2/3 or above

Moderate burden
Country where the proportion of pre-SAC and SAC population requiring PC is ≥1/3 and <2/3

Low burden
Country where the proportion of pre-SAC and SAC population requiring PC is less than 1/3

No PC required

No data available

Not applicable

Countries not in EMR

Table 22. Status of preventive chemotherapy (PC) for soil-transmitted helminthiases (STH) in preschool-age children (pre-SAC) and school-age children (SAC), WHO Eastern Mediterranean Region, 2009

Indicators	pre-SAC	SAC
No. of countries where PC is required	**8**	**8**
No. of children treated among those in need of PC in 2009	**877 363***	**1 609 882***
Regional coverage (%) in 2009	4%	3%
No. of countries that have never reported PC implementation for STH by 2009	5	2
No. of countries where the highest reported national coverage by 2009 is >0% and <75%	0	5
No. of countries having reportedly achieved 75% national coverage at least once by 2009	3	1

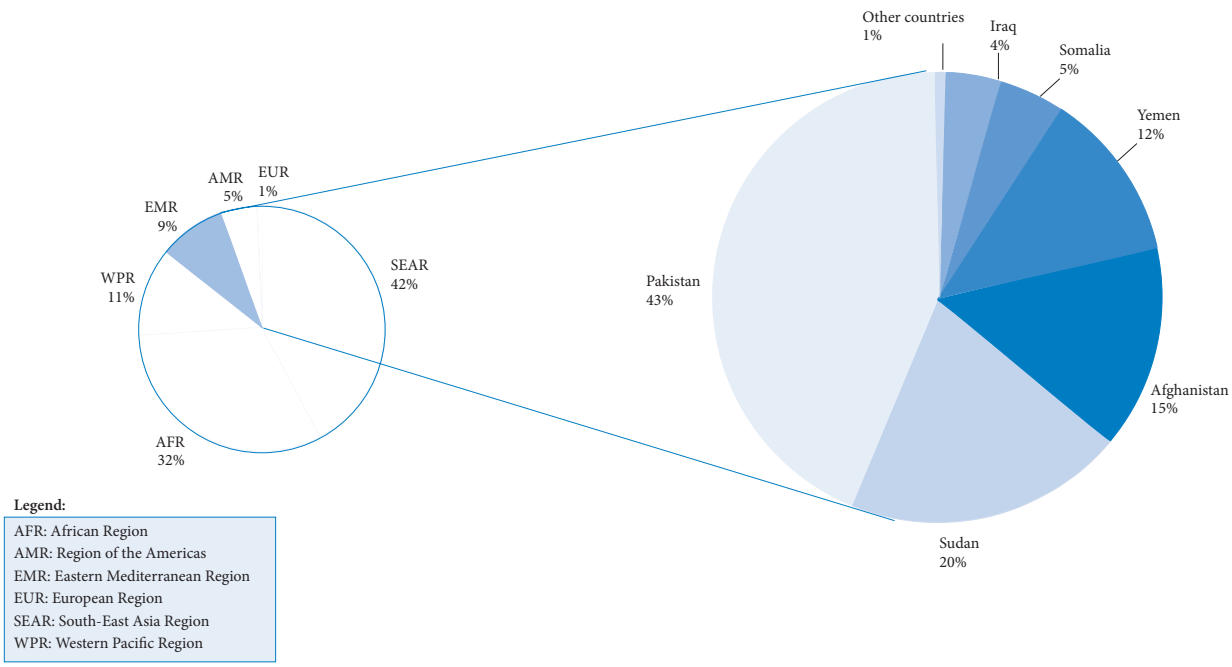
* This number may be lower than the total number of pre-SAC or SAC reported to have received PC for STH.

5.5. Eastern Mediterranean Region

5.5.1 Background

Approximately 78 million children are in need of deworming in the Eastern Mediterranean Region. This corresponds to 9% of the total number of children in need of deworming worldwide. Over 60% of the children in need in this region are from Pakistan and Sudan, followed by 27% from Afghanistan and Yemen (*Figure 33*).

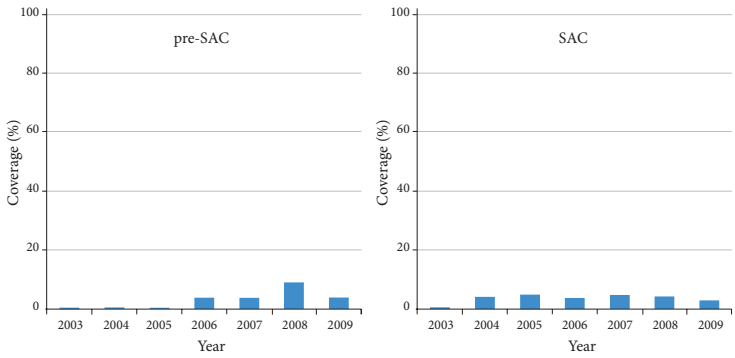
Figure 33. Proportion of children requiring preventive chemotherapy, by country, WHO Eastern Mediterranean Region, 2009



Deworming has been active in this region during the past decade. Since 2004, Afghanistan has reported high rates of coverage (65–80%) for school-age children, but in 2009, political instability interrupted deworming activities. Sudan achieved high coverage rates (up to 79%) in 2008 for preschool-age children, but in 2009, again for security reasons, the campaign was interrupted.

The progression of coverage in preschool-age children and school-age children in the Eastern Mediterranean is presented in *Figure 34*.

Figure 34. Coverage of preventive chemotherapy in preschool-age children (pre-SAC) and school-age children (SAC), WHO Eastern Mediterranean Region, by year, 2003–2009



5.5.2 Regional priorities for 2011–2020

One of the main challenges in the region is the lack of political stability, which hinders implementation of the existing programmes and discourages potential donors.

Under such circumstances, strong advocacy of the benefits to health and education of the intervention would be useful to increase political commitment and reinforce deworming efforts in the countries. Strengthening the monitoring, evaluation and reporting mechanism to better understand the programme's progress and assess the needs for technical and financial assistance would also be important in the region.

Table 23 presents for all the endemic countries in the Eastern Mediterranean Region in 2009 the number of preschool-age children and school-age children requiring preventive chemotherapy, their coverage with the intervention and the status of endemicity for LF.

Table 23. National coverage of preschool-age children (pre-SAC) and school-age children (SAC) requiring preventive chemotherapy (PC) for soil-transmitted helminthiases (STH) and status of lymphatic filariasis (LF) endemicity and mass drug administration (MDA), by country, WHO Eastern Mediterranean Region, 2009

Country	pre-SAC requiring PC for STH	National coverage pre-SAC	SAC requiring PC for STH	National coverage SAC	LF endemicity & MDA status
Afghanistan	3 947 938		7 944 997	<1%	Non-endemic
Djibouti	37 851	100%	89 547		Non-endemic
Iraq	962 641		2 198 280		Non-endemic
Pakistan	10 492 546		23 462 926	<1%	Non-endemic
Somalia	1 283 849	66%	2 462 440	<1%	Non-endemic
Sudan	4 659 984		10 651 528	6%	Endemic, MDA not started
Tunisia	75 254		192 763		Non-endemic
Yemen	3 001 092		6 489 285	12.%	Endemic (small area) MDA started

Tables 24 and *25* present the regional situation for starting and scaling up preventive chemotherapy in school-age children and preschool-age children respectively.

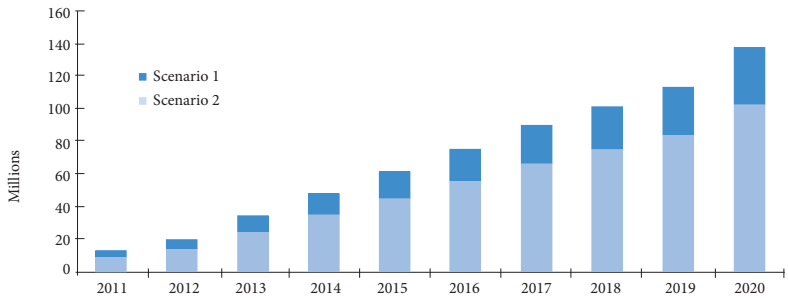
Table 24. School-age children

WHO Region	Number of additional countries in which PC has not started	Number of countries in which PC has been started but not scaled up	Number of countries in which PC coverage is good
EMR	6	2	0
Action	Start PC	Scale up PC	Maintain PC

Table 25. Preschool-age children

WHO Region	Number of additional countries in which PC has not started	Number of countries in which PC has been started but not scaled up	Number of countries in which PC coverage is good
EMR	6	1	1
Action	Start PC	Scale up PC	Maintain PC

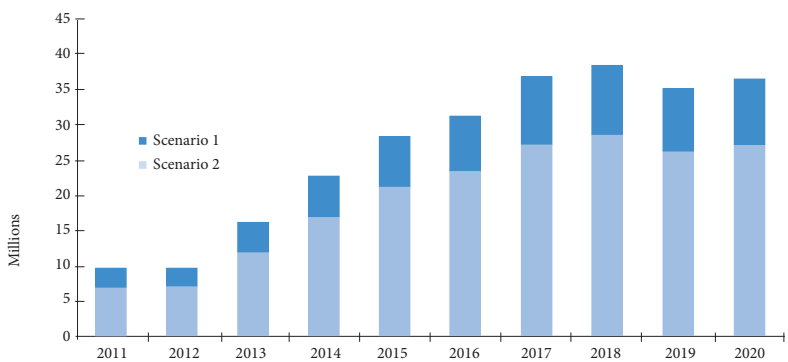
Figure 35. Eastern Mediterranean Region
Estimated number of albendazole (ALB) and mebendazole (MBD) tablets required to achieve the global target for coverage of school-age children by 2020



Scenario	Number of ALB/MBD tablets required (million)									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Scenario 1	13	20	34	47	61	75	89	101	112	137
Scenario 2	10	15	25	36	46	56	67	75	84	103

Scenario 1: All countries reach 100% national coverage by 2020
Scenario 2: All countries reach 75% national coverage by 2020

Figure 36. Eastern Mediterranean Region
Estimated number of albendazole (ALB) and mebendazole (MBD) tablets required to achieve the global target for coverage of preschool-age children by 2020



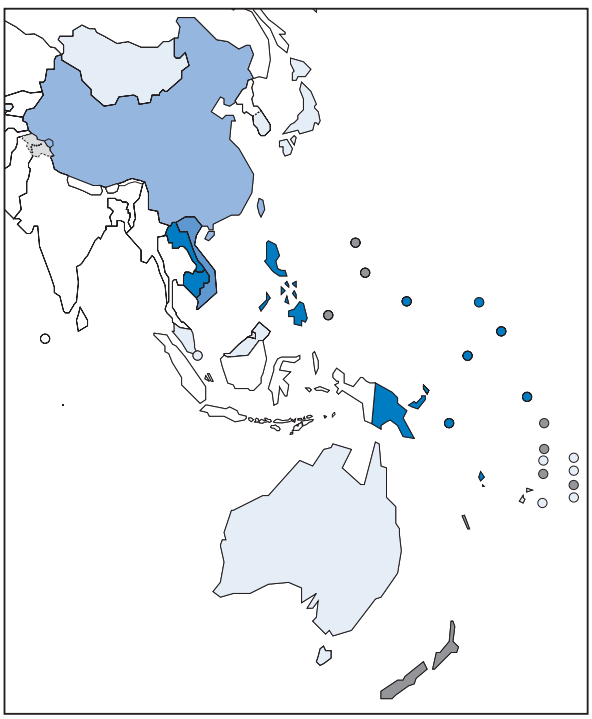
Scenario	Number of ALB/MBD tablets required (million)									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Scenario 1	10	10	16	23	28	31	37	38	35	36
Scenario 2	7	7	12	17	21	23	27	29	26	27

Scenario 1: All countries reach 100% national coverage by 2020
Scenario 2: All countries reach 75% national coverage by 2020

Western Pacific Region

The burden of disease from STH in WHO's Western Pacific Region is shown in *Figure 37*. A summary of the main regional indicators is presented in *Table 26*.

Figure 37. Burden of soil-transmitted helminthiases, by country, Western Pacific Region, 2009



Estimated number of people requiring PC		
pre-SAC	SAC	Total
32 973 548	66 148 854	99 122 402

High burden
Country where the proportion of pre-SAC and SAC population requiring PC is 2/3 or above

Moderate burden
Country where the proportion of pre-SAC and SAC population requiring PC is ≥1/3 and <2/3

Low burden
Country where the proportion of pre-SAC and SAC population requiring PC is less than 1/3

No PC required

No data available

Not applicable

Countries not in WPR

Table 26. Status of preventive chemotherapy (PC) for soil-transmitted helminthiases (STH) in preschool-age children (pre-SAC) and school-age children (SAC), WHO Western Pacific Region, 2009

Indicators	pre-SAC	SAC
No. of countries where PC is required	13	13
No. of children treated among those in need of PC in 2009	**4 141 501***	**9 986 576***
Regional coverage (%) in 2009	**13%**	**15%**
No. of countries that have never reported PC implementation for STH by 2009	1	1
No. of countries where the highest reported national coverage by 2009 is >0% and <75%	5	7
No. of countries having reportedly achieved 75% national coverage at least once by 2009	7	5

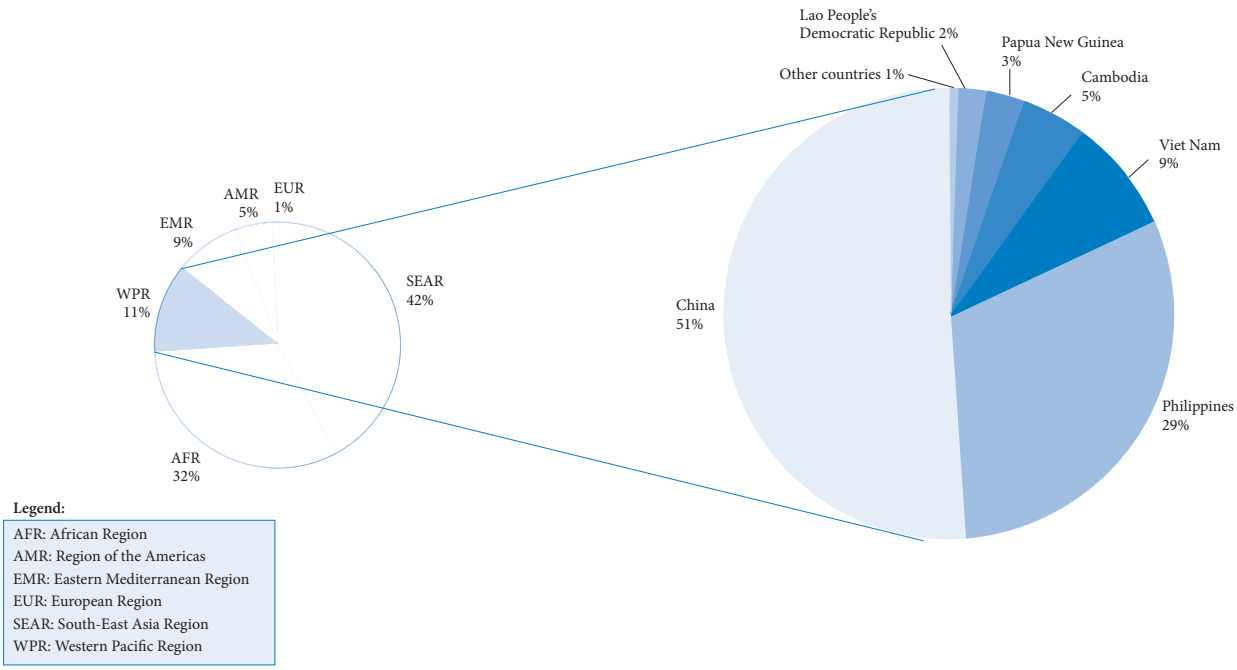
* This number may be lower than the total number of pre-SAC or SAC reported to have received PC for STH.

5.6. Western Pacific Region

5.6.1 Background

Approximately 99 million children are in need of deworming in the Western Pacific Region (corresponding to 11% of the total number of children in need of deworming worldwide). Half of the children in need of deworming are estimated to be in China and an additional third in the Philippines (*Figure 38*).

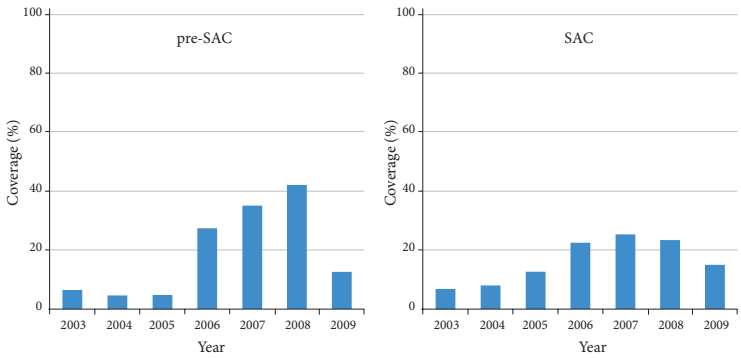
Figure 38. Proportion of children requiring preventive chemotherapy, by country, WHO Western Pacific Region, 2009



Coverage of preventive chemotherapy has scaled up progressively during the past decade, reaching 14% in 2009.

In China, large-scale deworming programmes have not yet been initiated. In the Philippines, no deworming was implemented until 2009 but start-up activities were initiated in 2010. The countries from the Mekong sub-region (Cambodia, the Lao People's Democratic Republic and Viet Nam) were among the first countries in the world to achieve 75% national coverage of preventive chemotherapy in schoolchildren. All three countries maintain high national coverage. In Papua New Guinea, where more than 2 million children are known to require treatment, only small-scale deworming activities are taking place. Data on STH prevalence and implementation of control activities is lacking in a number of Pacific Islands. The progression of coverage in preschool-age children and school-age children is presented in *Figure 39*.

Figure 39. Coverage of preventive chemotherapy in preschool-age children (pre-SAC) and school-age children (SAC), WHO Western Pacific Region, by year, 2003–2009



5.6.2 Regional priorities for 2011–2020

In China, the largest country in the region, advocating the benefits to health and education of preventive chemotherapy would be useful to increase political commitment and reinforce deworming efforts in the country. Reinforcement of monitoring, evaluation and reporting to better understand the programme's progress would also be important.

In the Pacific Islands, increased political commitment and funding are required to strengthen the technical capacity of national programmes. In the Mekong countries, dependence from external funds should be reduced and deworming activities should be institutionalized in a sustainable manner. Technical support should be provided in order to evaluate the possibility of scaling down activities.

Table 27 presents for all the endemic countries in the Western Pacific Region in 2009 the number of preschool-age children and school-age children requiring preventive chemotherapy, their coverage with the intervention and the status of endemicity for LF.

Tables 28 and *29* present the regional situation for starting and scaling up preventive chemotherapy in school-age children and preschool-age children respec-

Table 27. National coverage of preschool-age children (pre-SAC) and school-age children (SAC) requiring preventive chemotherapy (PC) for soil-transmitted helminthiases (STH) and status of lymphatic filariasis (LF) endemicity and mass drug administration (MDA), by country, WHO Western Pacific Region, 2009[a]

Country	pre-SAC requiring PC for STH	National coverage pre-SAC	SAC requiring PC for STH	National coverage SAC	LF endemicity & MDA status
Cambodia	1 281 142	2%	3 287 175	74%	Endemic, MDA started
China	18 200 000		33 800 000		Non-endemic
Kiribati	5 539	100%	13 764		Endemic, MDA started
Lao People's Democratic Republic	616 419	100%	1 582 462	59%	Endemic, MDA started
Marshall Islands	5 080		12 622		Endemic, MDA started
Micronesia (Federated States of)	7 821		20 090		Endemic, MDA started
Nauru	836		2 077		Non-endemic
Papua New Guinea	762 561		1 717 054	<1%	Endemic, MDA started
Philippines	8 565 082	15%	20 356 443	18%	Endemic, MDA started
Solomon Islands	58 216	96%	131 031		Non-endemic
Tuvalu	881		2 175		Endemic, MDA started
Vanuatu	26 611	100%	58 920		Endemic, Surveillance
Viet Nam	3 443 361	62%	5 165 041	57%	Endemic, Surveillance

[a] Recent surveys (2011) show that Tonga (5 000 pre-SAC and 24 000 SAC) is in need of PC for the treatment of STH. In addition Samoa and Malaysia are in in need of PC for treatment of STH although the exact number of peolple have not been evaluated yet.

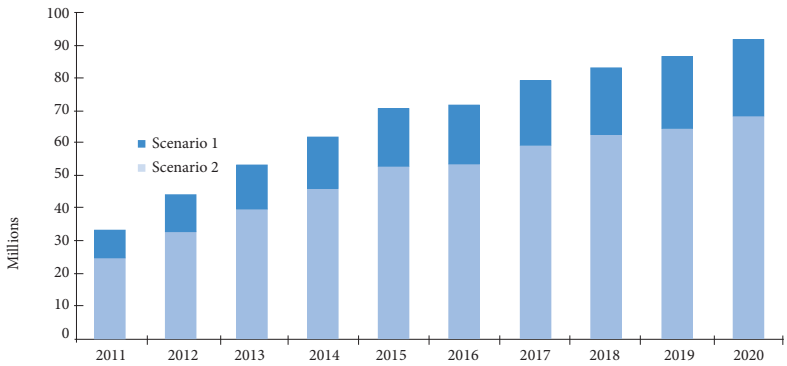
Table 28. School-age children

WHO Region	Number of populous countries in which PC has not started	Number of additional countries in which PC has not started	Number of countries in which PC has been started but not scaled up	Number of countries in which PC coverage is good
WPR	1	8	3	1
Action	Start PC	Start PC	Scale up PC	Maintain PC

Table 29. Preschool-age children

WHO Region	Number of populous countries in which PC has not started	Number of additional countries in which PC has not started	Number of countries in which PC has been started but not scaled up	Number of countries in which PC coverage is good
WPR	1	5	3	4
Action	Start PC	Start PC	Scale up PC	Maintain PC

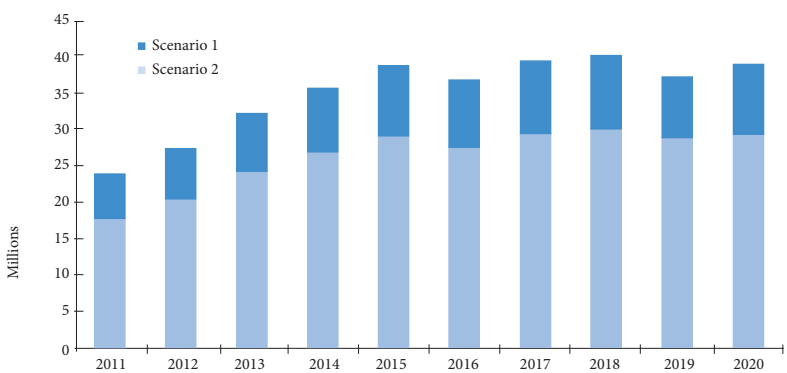
Figure 40.Western Pacific Region
Estimated number of albendazole (ALB) and mebendazole (MBD) tablets required to achieve the global target for coverage of school-age children by 2020



Scenario	Number of ALB/MBD tablets required (million)									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Scenario 1	33	44	53	62	70	71	79	83	86	92
Scenario 2	25	33	40	46	53	54	59	62	65	69

Scenario 1: All countries reach 100% national coverage by 2020
Scenario 2: All countries reach 75% national coverage by 2020

Figure 41. Western Pacific Region
Estimated number of albendazole (ALB) and mebendazole (MBD) tablets required to achieve the global target for coverage of preschool-age children by 2020



Scenario	Number of ALB/MBD tablets required (million)									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Scenario 1	24	27	32	35	39	37	39	40	37	39
Scenario 2	18	21	24	27	29	27	29	30	28	29

Scenario 1: All countries reach 100% national coverage by 2020
Scenario 2: All countries reach 75% national coverage by 2020

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Annexes

ANNEX I. Country profile for Ghana

Ghana

2010

The control of neglected tropical diseases represents a major challenge to those providing health-care services in the endemic countries. The purpose of this country profile is to provide public health professionals with the most recently available epidemiological information on diseases for which a strategy and tools to implement large-scale preventive chemotherapy exist.

This summary outlines the burden of targeted diseases and program implementation outcomes in **Ghana**.

BASIC COUNTRY DATA

Total population	24,332,755
Population 1–4 years (Pre-SAC)	2,691,273
Population 5–14 years (SAC)	5,866,905
Population female 15–49 years	6,057,177
Population requiring preventive chemotherapy (PC)	
Lymphatic filariasis (LF)	11,925,399
Schistosomiasis (SCH) *	24,332,755
Soil-transmitted helminthiasis (STH)	
- Pre-SAC	104,675
- SAC	357,203
Onchocerciasis (Oncho) *	3,200,000
Trachoma	
Development status[1]	Non LDC
Income status[2]	LIC
School enrolment data	
Gross enrolment rate	
Girls enrolment ratio (gross)	

* Provisional estimates, to be refined

AFRICAN REGION

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

Sources: Population data - United Nations, Population Division, The World Population Prospects - the 2008 revision, New York, 2009; Population requiring PC for STH - STH: estimates of the number of children needing preventive chemotherapy and number treated, 2009. WER, N°25, 2011, 86:257–268. Population requiring PC for LF - PELF; Population requiring PC for SCH - estimates based on L.Chitsulo et al. / Acta Tropica 77(2000)41-51; Population requiring PC for Oncho - APOC; Population requiring PC for Trachoma - GET2020; School enrolment data - UNESCO Institute of Statistics, 2000 Assessment.

[1] United Nations classification; [2] World Bank classification.

SITUATION ANALYSIS OF PREVENTIVE CHEMOTHERAPY DISEASES

PCT disease	Endemicity status (endemic/non-endemic)	Disease distribution (Nationwide/partial)	Mapping status (Complete/in progress/not started)	Implementation status (Complete/in-progress/not started)
Lymphatic filariasis	Endemic	Partial	Complete	In progress
Schistosomiasis	Endemic	Nationwide	Complete	In progress
Soil-transmitted helminthiasis	Endemic	Partial	Complete	In progress
Onchocerciasis	Endemic	Partial	Complete	In progress
Trachoma	Endemic	Partial	Complete	Complete
Loa-loa	Endemic			

COUNTRY PROFILE
PREVENTIVE CHEMOTHERAPY AND TRANSMISSION CONTROL ■ DEPARTMENT OF CONTROL OF NEGLECTED TROPICAL DISEASES
World Health Organization

2010

GHANA

COUNTRY PROFILE

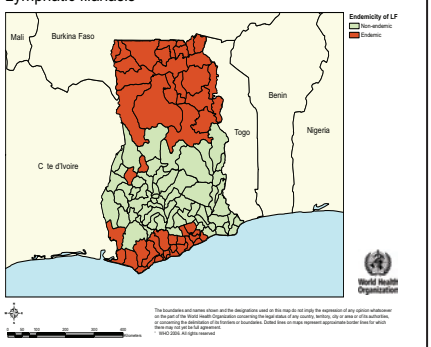
PREVENTIVE CHEMOTHERAPY AND TRANSMISSION CONTROL ■ DEPARTMENT OF CONTROL OF NEGLECTED TROPICAL DISEASES

World Health Organization

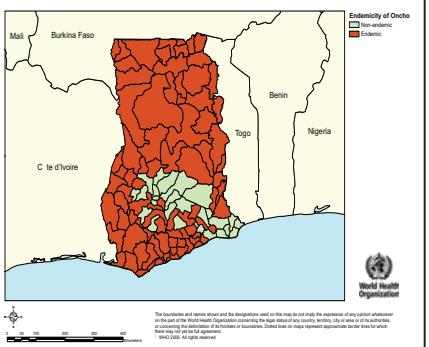
2

Maps of infection/disease endemicity

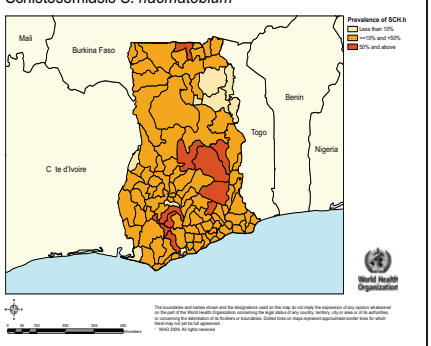
Lymphatic filariasis



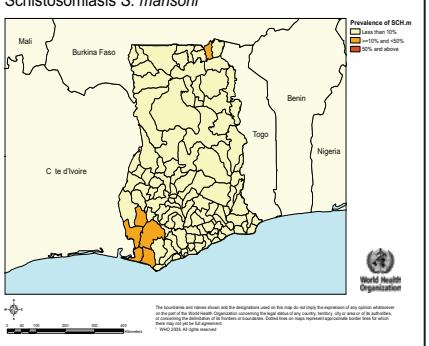
Onchocerciasis



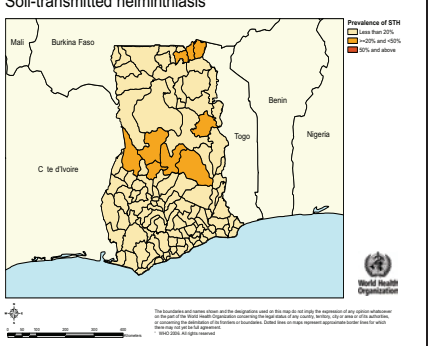
Schistosomiasis *S. haematobium*



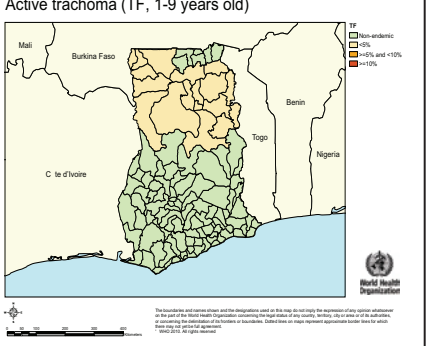
Schistosomiasis *S. mansoni*



Soil-transmitted helminthiasis



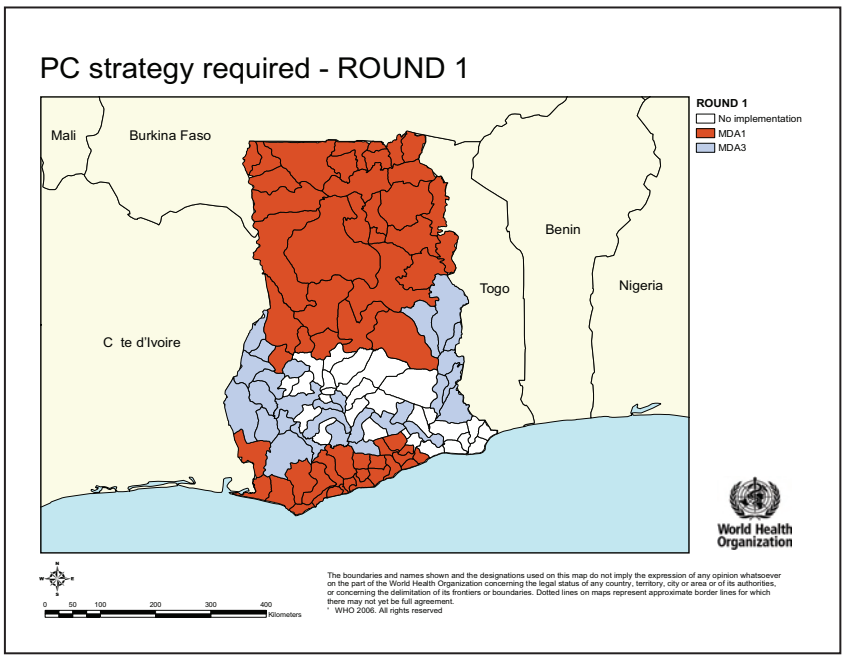
Active trachoma (TF, 1-9 years old)

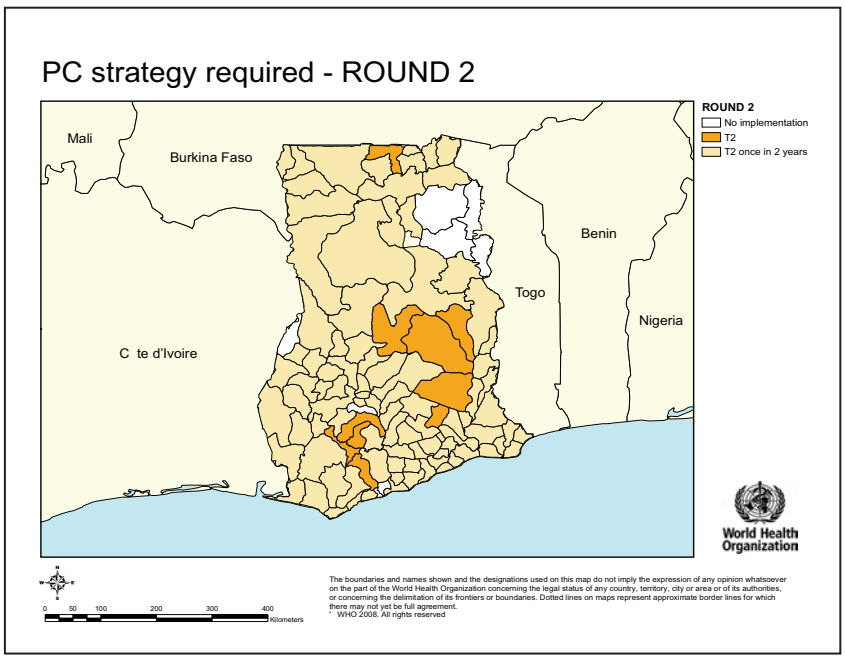


Maps of preventive chemotherapy strategy required

2010

GHANA





MDA1 (IVM+ALB), MDA2 (DEC+ALB), MDA3 (IVM), T1 (ALB or MBD + PZQ), T2 (PZQ), T3 (ALB or MBD)

World Health Organization

2010

GHANA

COUNTRY PROFILE

PREVENTIVE CHEMOTHERAPY AND TRANSMISSION CONTROL ■ DEPARTMENT OF CONTROL OF NEGLECTED TROPICAL DISEASES

World Health Organization

4

Preventive chemotherapy implementation

PREVENTIVE CHEMOTHERAPY IMPLEMENTATION

		2006	2007	2008	2009	2010
ROUND 1	**MDA1 (IVM + ALB)**					
	Population targeted	8,511,783	9,278,935	10,232,775	9,627,213	9,966,010
	Population treated	6,032,545	5,932,174	7,228,639	7,204,038	7,491,873
	Geographical coverage	100%	100%	100%	100%	93.2%
	Programme coverage	70.9%	63.9%	70.6%	74.8%	75.2%
	MDA2 (DEC + ALB)					
	Population targeted					
	Population treated					
	Geographical coverage					
	Programme coverage					
	MDA3 (IVM)					
	Population targeted	2,900,000		3,200,000		
	Population treated	1,069,137		1,835,162		1,515,039
	Geographical coverage			100%		
	Programme coverage	36.9%		53.7%		
	T1 (ALB or MBD + PZQ)					
	Population targeted					
	Population treated					
	Geographical coverage					
	Programme coverage					
	T2 (PZQ)					
	Population targeted					
	Population treated					
	Geographical coverage					
	Programme coverage					
	T3 (ALB or MBD)				SAC	SAC
	Population targeted					
	Population treated				1,241	35,799
	Geographical coverage					
	Programme coverage					
	A (AZI)					
	Population targeted	875,141	957,000	957,000		
	Population treated	770,124	899,580	147,122		
	Geographical coverage					
	Programme coverage	88.0%	94.0%	15.4%		
ROUND 2	**T1 (ALB or MBD + PZQ)**					SAC
	Population targeted					
	Population treated					1,739,837
	Geographical coverage					
	Programme coverage					
	T2 (PZQ)			SAC	SAC	
	Population targeted			1,259,050		
	Population treated			582,835	309,780	
	Geographical coverage					
	Programme coverage			46.3%		
	T3 (ALB or MBD)	Pre-SAC/SAC	PreSAC	PreSAC	PreSAC	
	Population targeted		2,749,678	2,801,570	2,930,743	
	Population treated	842,902	2,368,769	2,574,215	2,860,983	
	Geographical coverage					
	Programme coverage		86.2%	91.9%	102.4%	

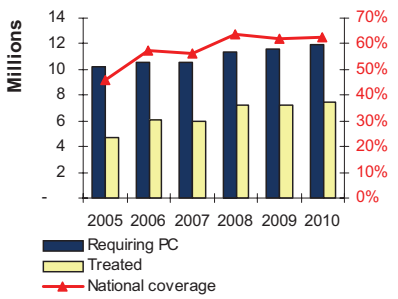
Geographical coverage - proportion (%) of endemic districts covered with preventive chemotherapy;
Programme coverage - proportion (%) of individuals who were treated as per the programme target.

National disease-specific coverage

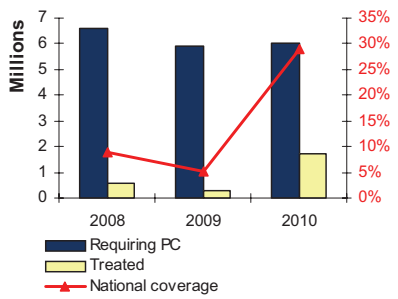
2010

GHANA

LYMPHATIC FILARIASIS



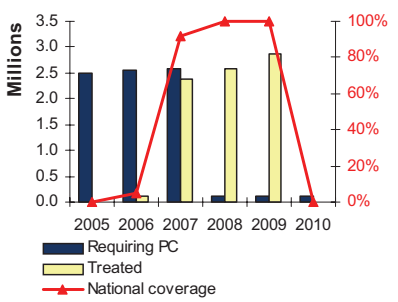
SCHISTOSOMIASIS *



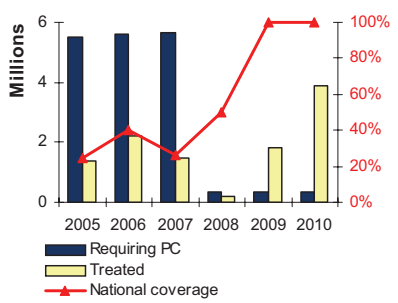
* SAC

SOIL-TRANSMITTED HELMINTHIASIS

Pre-SAC **

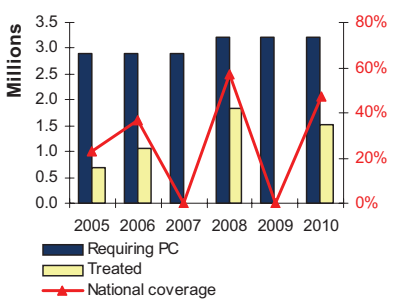


SAC **

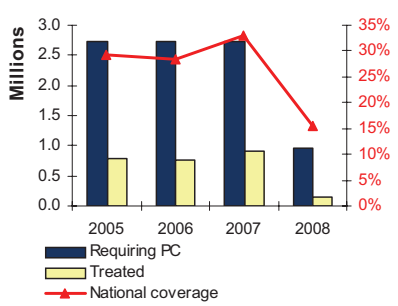


** In 2008 population of PreSAC and SAC at risk was reduced based on data published in the *Report on Schistosomiasis mapping in Ghana*, Ghana NTD Control Programme, 2009. In 2008 all PreSAC were covered (national caverage 100%).

ONCHOCERCIASIS ***



TRACHOMA



*** Number of people treated via LF programme (MDA1) is not included in this chart.

National disease-specific coverage - proportion (%) of individuals in the population requiring preventive chemotherapy for the specific disease (see Basic country data on page 1) that have been treated.

World Health Organization

2010

GHANA

COUNTRY PROFILE

PREVENTIVE CHEMOTHERAPY AND TRANSMISSION CONTROL ■ DEPARTMENT OF CONTROL OF NEGLECTED TROPICAL DISEASES

Monitoring decline of disease endemicity
(in sentinel sites or periodic surveys)

Data source:

LYMPHATIC FILARIASIS	Years ->
Cumulative number of SS with base line mf>1% identified (of total)	
Percent of the SS (with a baseline of >1%) which have Mf prev <1% in year	
No. of IUs where MDA discontinued after meeting epidemiological criteria	

Data source:

SOIL-TRANSMITTED HELMINTHIASIS	Years ->
STH prevalence in pre-SAC (range)	
STH prevalence in SAC (range)	

Data source:

SCHISTOSOMIASIS	Years ->
S. haematobium prevalence (range)	
S. mansoni prevalence (range)	

Data source:

ONCHOCERCIASIS	Years ->
Number of endemic communities	
Number of endemic communities with baseline >1%	
Number of endemic communities discontinued after meeting epidemiological criteria	

Data source:

TRACHOMA	Years ->
TF/TI ratio in 1-9 years old	
Trachomatous trichiasis males & females > 30 years old	
Districts achieving Ultimate Intervention Goals, %	
"CHANCE" at least 80%	

For more detailed information, please contact:

Preventive Chemotherapy and Transmission Control, Department of Control of Neglected Tropical Diseases
World Health Organization, 20, avenue Appia, 1211 Geneva 27, Switzerland

We would also like to be informed as soon as possible if we have made any errors in detailing your activities or if you have any other comments. Thank you for your collaboration.

Our contact e-mail is pctdata@who.int

World Health Organization

ANNEX II. Partners

A growing number of diverse partners are working to overcome neglected tropical diseases including soil-transmitted helminthiases. Their contribution is enhancing the potential for control and the opportunities for cooperation.

Partners include:

- **academia and research institutes** (Centre for Neglected Tropical Diseases at the Liverpool School of Hygiene and Tropical Medicine, George Washington University, London School of Hygiene and Tropical Medicine, Global Network for Neglected Tropical Diseases at the Sabin Institute, McGill University, Partnership for Child Development at Imperial College London, RTI International, Sabin Institute, Schistosomiasis Control Initiative at Imperial College London, Swiss Tropical and Public Health Institute)

- **bilateral organizations** (Global Partnership for Education at the World Bank, Japan International Cooperation Agency, United Kingdom Department for International Development, United States Agency for International Development, United States Centers for Disease Control and Prevention)

- **multilateral agencies** (African Development Bank, Asian Development Bank, Inter-American Development Bank, UNICEF, USAID, WFP, World Bank)

- **nongovernmental organizations** (the Carter Center, Children Without Worms, Deworm the World, Family Health International, Hellen Keller International, RTI International, Save the Children, World Vision)

- **pharmaceutical companies** (Bayer, GlaxoSmithKline, Johnson & Johnson, Merck KGaA)

- **philanthropic foundations** (Bill & Melinda Gates Foundation, Children's Investment Fund Foundation, Global Network for Neglected Tropical Diseases, Ivo de Carneri Foundation, Rostropovich Foundation, Task Force for Global Health)

- Many local organizations provide key assistance for different aspects of preventive chemotherapy activities.

Soil-transmitted helminths are responsible for diseases that thrive where there is poverty and disadvantage. These parasites infect more than 2 billion people in more than 100 countries adversely affecting nutritional status and impairing cognitive processes; in conclusion they make it more difficult for infected populations to surmount poverty.

In 2001, the World Health Assembly, with Resolution 54.19, set the global target of treating at least 75% of children at-risk; in the first 10 years of implementation, the managers of control programmes worldwide made a great effort reaching almost one third of the children in need of treatment.

Global health has dramatically changed since 2001: the control of soil-transmitted helminthiases is now part of a comprehensive set of efforts to control neglected tropical diseases in which the preventive chemotherapy interventions for the different diseases are increasingly integrated and delivered as a package; in addition donations of drugs by partners have made this intervention even more cost-effective.

For the first time in history the elimination of soil-transmitted helminthiases as a public health problem is achievable: this document is intended to guide and coordinate the efforts of all the partners involved.

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http://www.who,int/neglected_diseases/en

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