



# CROSSING THE BILLION

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Lymphatic filariasis, onchocerciasis,  
schistosomiasis, soil-transmitted  
helminthiasis and trachoma

Preventive chemotherapy for  
neglected tropical diseases

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World Health  
Organization

Crossing the billion. Lymphatic filariasis, onchocerciasis, schistosomiasis, soil-transmitted helminthiases and trachoma: preventive chemotherapy for neglected tropical diseases

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WE REPRESENT ONE  
OF THE LARGEST,  
MOST EXPANSIVE  
EFFORTS IN PUBLIC  
HEALTH HISTORY.  
THIS IS OUR  
STORY ...

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noun \ni-'glekt-id\ \'trä-pi-kəl\ \di-'zēz\

**Neglected tropical diseases** are a medically diverse group of conditions that persist among low-income populations in developing regions of Africa, Asia and the Americas. They are caused by a variety of pathogens, such as viruses, bacteria, protozoa and helminths.

# CROSSING THE

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# BILLION

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# THE STORY

*“We are often captivated by big ideas and movements that have the power to change the world in positive ways far beyond our imagination. The delivery of preventive chemotherapy for neglected tropical diseases is just that. The community of stakeholders, partners and donors has a moral imperative to complete this effort.”*

© WHO/ Pierre Albouy

## Neglected Tropical Diseases, our future big win.

Some 18 diseases, with different aetiologies, signs, symptoms and prognosis, share one common purpose: to further deprive already disadvantaged and neglected populations. Grouping these diseases together under the umbrella of “neglected tropical diseases” has focused efforts to overcome them by both the health ministries of those countries in which they are endemic and international developmental organizations, foundations, nongovernmental organizations and the pharmaceutical industry. One of the aims of Goal 3 of the United Nations Sustainable Development Goals is to “end the epidemics” of these diseases by 2030. This can be achieved by implementing a comprehensive, holistic strategy of community-based, large-scale preventive chemotherapy and individual treatments supported by vector control, and providing safe water, sanitation and hygiene delivered in tandem with universal health coverage.

Preventive chemotherapy, one of the interventions deployed to combat neglected tropical diseases, is one of the largest, most successful public health interventions in history. It reduces the impact of diseases in areas far removed from the global spotlight. It represents an effort that is plain and simple and, fundamentally, a routine extension of one person giving a pill to another. However, delivering preventive chemotherapy is a marathon effort that requires consistent, dedicated work by donors and hundreds of thousands of health workers and volunteers year in year out.

The principle is also simple: six medicines administered in seven different combinations make it possible to treat more than one disease at a time. Putting this principle into practice is, however, an enormous task, as nearly one fifth of the globe must be covered. Preventive chemotherapy requires three main activities: the access to highly effective essential medicines, mostly donated, the decision of governments to commit human and financial resources, and the delivery of those medicines to those who require treatment. The difference that these efforts make to the lives of individuals, families and communities is generational and is a significant part of our collective work towards more sustainable, resilient, productive and equitable societies.

It has now been 10 years since the strategy of combining preventive chemotherapy and integrating strategies to treat the five targeted neglected tropical diseases began. As the community of experts, partners, donors, public health workers and volunteers coheres around this strategy and vision, it is now becoming feasible to eliminate or control these heavy burdens on humanity. This would be nothing less than a major historical achievement for the public health community.

The following pages provide a framework for understanding this integrated strategy as it has matured and continued to demonstrate its potential over the past decade. It also gives a snapshot of where we stand and will, I hope, serve as a signpost for action in the coming years as we strengthen the efforts of partners, donors and governments in this final stretch towards achieving the control and elimination goals of the 2030 Agenda for Sustainable Development.



**Dr Margaret Chan**  
Director-General  
World Health Organization



# PREVENTIVE CHEMOTHERAPY TREATMENT FOR NEGLECTED TROPICAL DISEASES

# THE INTERVENTION

Tailored preventive chemotherapy to combat neglected tropical diseases throughout the range of geographical settings and circumstances.

The term “preventive chemotherapy against neglected tropical diseases” (NTDs) defines the strategy of treating infected individuals to reduce morbidity and preventing transmission by administering medicines in communities at risk. Presently, WHO recommends preventive chemotherapy as a strategy to control a group of helminthic diseases (caused by worms) – lymphatic filariasis, onchocerciasis, schistosomiasis, hook-worm infection, ascariasis and trichuriasis – and the bacterial infections that cause trachoma.

These infections impose a huge burden on poor populations in the developing world, even though they can be treated with low-cost, safe oral medications administered alone or in combination annually or semi-annually. Identifying every infected individual is, however, an expensive, almost impossible task. Many earlier control programmes that adopted a “test-and-treat” approach had limited effect. The preventive chemotherapy approach first identifies infected communities and then administers the recommended medicines to either the entire eligible population (e.g. against lymphatic filariasis, onchocerciasis and trachoma) or the most vulnerable sub-groups (e.g. preschool and school-age children for soil-transmitted helminthiasis and schistosomiasis) and women of child-bearing age except during the first trimester of pregnancy (e.g. for soil-transmitted helminthiasis).

The aim of preventive chemotherapy is to avert the morbidity that invariably accompanies these infections. Early, regular administration of the medicines reduces the burden, alleviates suffering and reduces the extent, severity and long-term consequences of morbidity in infected individuals, eventually ensuring greater productivity and a better quality of life for people in poor settings. Under certain epidemiological conditions, community-wide preventive chemotherapy contributes to a sustained reduction in transmission.

As the aim of preventive chemotherapy is to reach large numbers of people, often in areas that are difficult to reach, the best use must be made of the existing health system and innovative drug distribution channels to ensure sustainable administration of the medicines. These channels also help to improve maternal health and the development of children into adults free of the burden of disabling disease. As communities are often affected by more than one disease that can be treated by preventive chemotherapy, coordinated, integrated approaches to administering the medicines are cost-efficient and cost-effective.

Preventive chemotherapy requires firstly that the affected communities have access to safe, quality-assured medicines that can be delivered to each eligible individual. Then, the individuals must actually swallow the medicine. Social mobilization, communication for behavioural change, monitoring and close supervision are keys to achieving high coverage of targeted and eligible at-risk groups each year.

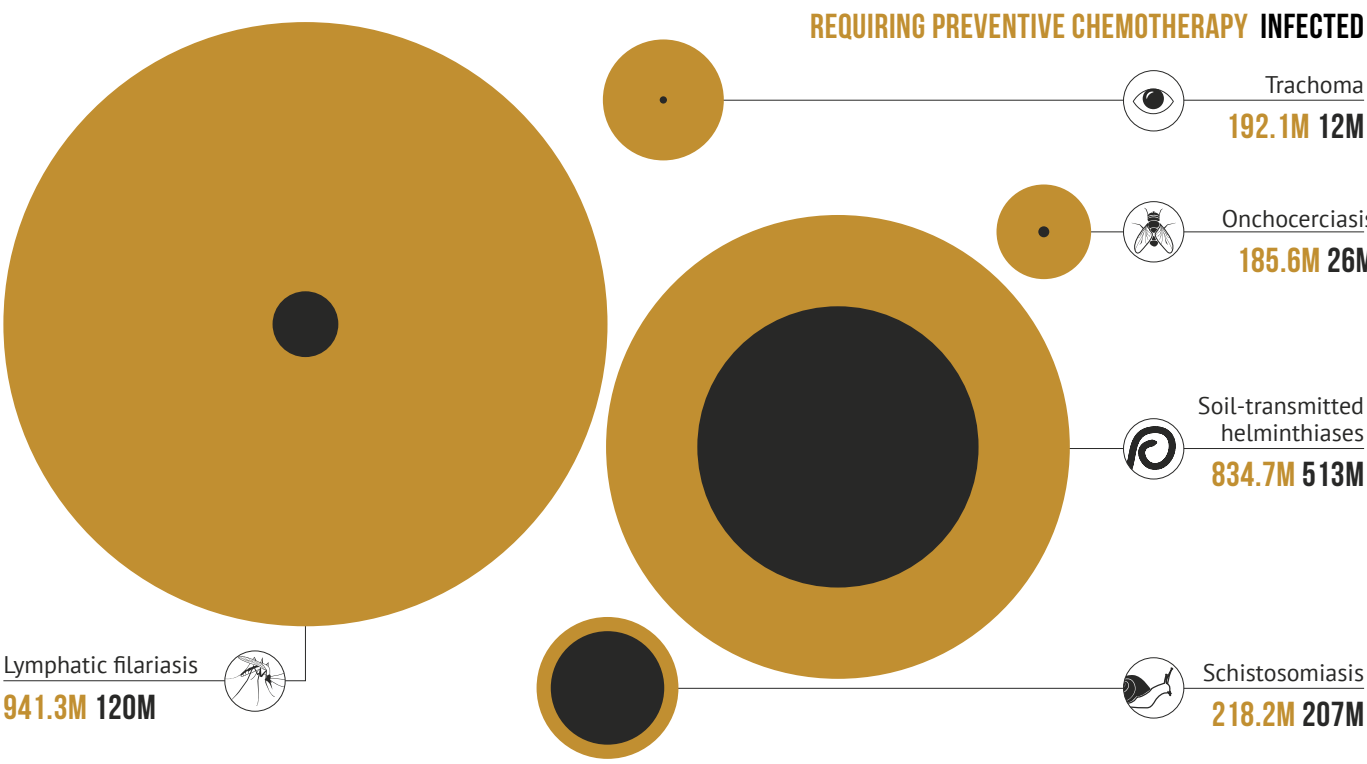
Preventive chemotherapy is achievable, as proven by the increasing numbers of people being reached each year. In 2015, over 1.5 billion<sup>1</sup> treatments were administered to almost 1 billion individuals for at least one of the targeted infections: lymphatic filariasis, onchocerciasis, schistosomiasis soil-transmitted helminthiasis and trachoma. At a low cost – between US\$ 0.30 and US\$ 0.50 per person treated in most settings – preventive chemotherapy remains the most affordable, cost-effective strategy for controlling and eliminating these diseases. To be fully sustainable and to maximize impact, the strategy should be combined and delivered with other interventions, including improving access to safe drinking-water, hygiene, disease management and vector control.

More recently, food-borne trematodiasis and yaws have been added to the list of NTDs that are amenable to preventive chemotherapy. These diseases are not reviewed in this report.

<sup>1</sup> “Billion” is defined as a thousand million (10<sup>9</sup>)

# THE PROBLEM

Five NTDs are amenable to preventive chemotherapy. They are chronic, disabling, disfiguring conditions that occur most commonly in settings of extreme poverty, especially among the rural poor and some disadvantaged urban populations.



**Schistosomiasis**, also known as “snail fever” because it is transmitted through freshwater snails, is caused by the larvae of worms that penetrate the skin and genital organs. In its chronic form, it can damage the liver, kidneys and spleen, cause bladder cancer, and stunt growth and learning in children.

**Lymphatic filariasis**, also known as “elephantiasis”, is a parasitic disease caused by worms that affect the lymphatic system and is transmitted from person to person by mosquitoes. It results in severe swelling of the arms, legs and genitals, and leads to physical impairment, lost economic productivity and social discrimination. It is a leading cause of permanent disability globally.

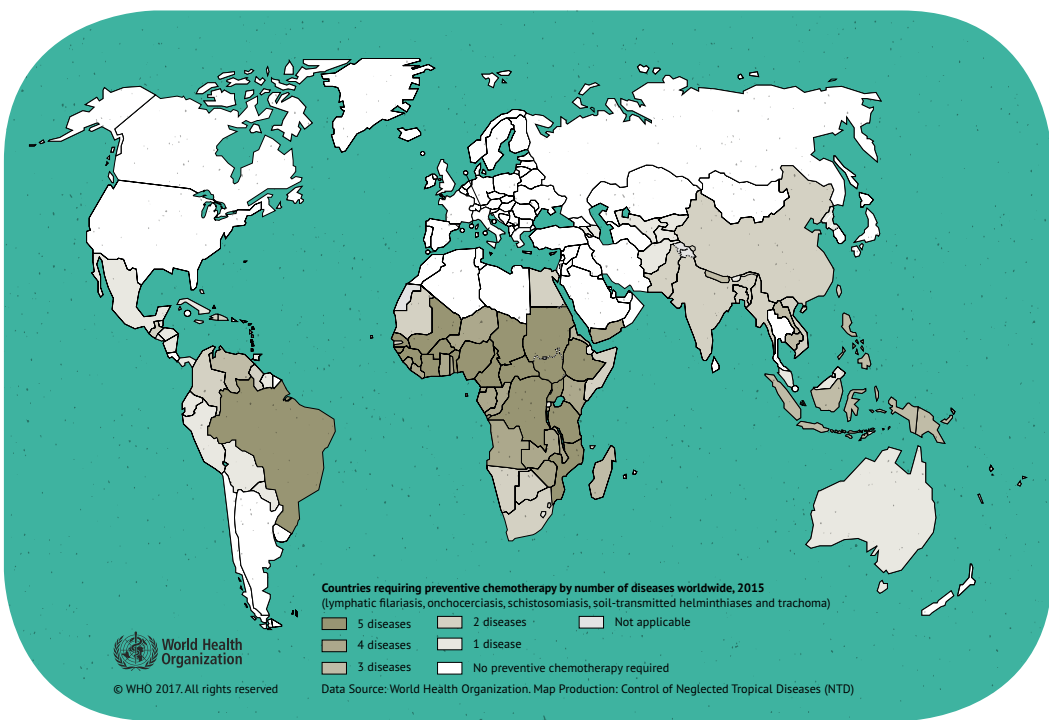
**Onchocerciasis**, or “river blindness”, is transmitted by repeated bites from black flies infected with a parasitic worm. After infection, the larvae of the worm spread and cause severe itching, fibrous nodules under the skin and blindness. It is the second commonest preventable form of blindness due to infection.

**Soil-transmitted helminthiases** are infections caused by various intestinal worms, which are transmitted through human faeces in soil. Infections of moderate to heavy intensity cause various health problems, including abdominal pain, blood and protein loss, and growth retardation.

**Trachoma** is caused by bacteria spread by direct or indirect contact with secretions from an infected eye or nose. Repeated infections over many years can cause scarring of the eyelids, which can drag the eyelashes backwards so that they rub on the eye, scratching the cornea and irreversibly impairing vision. Trachoma is the world’s most common infectious cause of blindness.

# THE SCOPE

In total, 111 countries and territories are endemic for at least one NTD that can be treated with preventive chemotherapy. These diseases thrive among deprived communities where access to sanitation or hygiene is inadequate. The presence of multiple diseases in large populations presents a formidable challenge.



The global scale of the five NTDs that can be treated by preventive chemotherapy and the widespread geographical settings in which they thrive pose an unparalleled public health problem. Although the problem is global, it is important to recognize the broad distribution of the diseases among and within countries.

Some 1.587 billion individuals globally require some form of preventive chemotherapy for at least one of the five diseases. It was therefore essential to develop an integrated approach in order to maximize resources for elimination and control. It was also necessary to take into account the co-endemicity of these diseases across regions, as this is the starting-point for designing and tailoring strategies for delivering preventive chemotherapy.

ONE DISEASE
39 COUNTRIES
50.4M PEOPLE
TWO DISEASES
27 COUNTRIES
692.4M PEOPLE*
THREE DISEASES
12 COUNTRIES
217.7M PEOPLE*
FOUR DISEASES
14 COUNTRIES
123.7M PEOPLE*
FIVE DISEASES
19 COUNTRIES
520.3M PEOPLE*

\* NUMBER OF INDIVIDUALS REQUIRING PREVENTIVE CHEMOTHERAPY FOR AT LEAST ONE DISEASE AND LIVING IN COUNTRIES WITH NUMBER OF DISEASES.

# THE SOLUTION

Six medications are available, which are safe, effective for controlling or eliminating the infections, can be administered orally annually or semi-annually and can be used in seven possible combinations against the five diseases. Some of the medicines are effective against several diseases and some against only one. All the medications are donated.

<b>ALBENDAZOLE (ALB)</b> <b>Company:</b> GlaxoSmithKline <b>Donation start date:</b> 2000 (lymphatic filariasis), 2012 (soil-transmitted helminthiasis) <b>Diseases treated:</b> Lymphatic filariasis: up to 600 million tablets annually committed until elimination of disease; soil-transmitted helminthiasis: limited to 400 million tablets per year <b>Sites of production:</b> Nashik, India, and Cape Town, South Africa	<b>IVERMECTIN (IVM)</b> <b>Company:</b> Merck Sharp & Dohme (MSD) <b>Donation start date:</b> 1987 (onchocerciasis), 1998 (lymphatic filariasis) <b>Diseases treated:</b> Lymphatic filariasis: as much as needed for as long as needed, currently 395 million tablets per year; onchocerciasis: as much as needed for as long as needed, currently 178 million tablets per year and in areas co-endemic for lymphatic filariasis and onchocerciasis, 218 million tablets <b>Site of production:</b> Haarlem, Netherlands	<b>AZITHROMYCIN (ZTH)</b> <b>Company:</b> Pfizer <b>Donation start date:</b> 1999 <b>Disease treated:</b> Trachoma; in 2016, 120 million doses were donated <b>Site of production:</b> Puerto Rico (tablets); Italy (paediatric oral suspension)
<b>DIETHYLCARBAMAZINE (DEC)</b> <b>Company:</b> Eisai Pharmaceuticals India Pvt Ltd <b>Donation start date:</b> 2014 <b>Disease treated:</b> Lymphatic filariasis, commitment for 2.2 billion tablets until 2020 <b>Site of production:</b> India	<b>MEBENDAZOLE (MBD)</b> <b>Company:</b> Johnson & Johnson <b>Donation start date:</b> 2010 <b>Disease treated:</b> Soil-transmitted helminthiasis, commitment for up to 200 million tablets per year until 2020 for school-age children <b>Site of production:</b> Portugal	<b>PRAZIQUANTEL (PZQ)</b> <b>Company:</b> Merck <b>Donation start date:</b> 2008 <b>Disease treated:</b> Schistosomiasis, donation increasing progressively to up to 250 million tablets per year for an unlimited period <b>Site of production:</b> Mexico

# THE STRATEGY

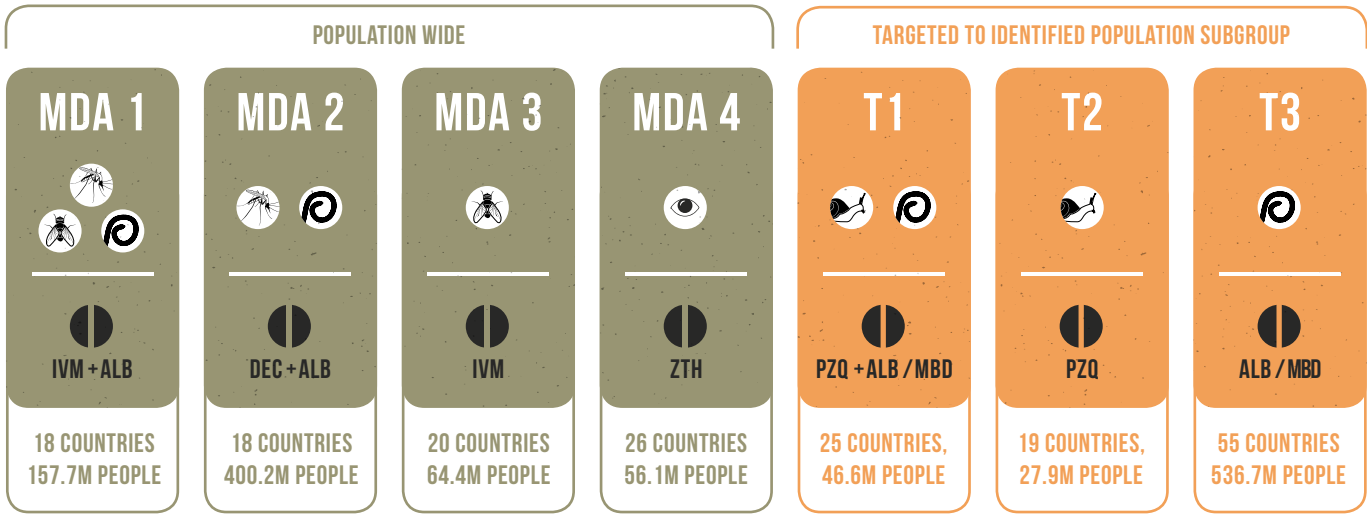
Preventive chemotherapy is an efficient, cost-effective way to control or eliminate some of the most common diseases on earth.

In 2003,WHO changed its approach to controlling and eliminating a group of NTDs, from the traditional one of targeting individual diseases to a more comprehensive approach to the health needs of the marginalized communities often affected by multiple diseases. In the new approach, interventions are integrated and coordinated to provide care and treatment to underserved populations.

The goal of this strategic shift was to ensure more efficient use of resources for the alleviation of poverty and the accompanying illnesses for millions of people.

The success of preventive chemotherapy is manifested as a reduction in the effects of the diseases, sustained decreases in transmission and removal of the association between NTDs, poverty and disadvantage.

PACKAGES FOR MASS DRUG ADMINISTRATION AND TARGETED TREATMENT ARE GROUPS OF MEDICINES, FOR MORE EFFICIENT TREATMENT OF DISEASES THAT AFFECT THE SAME POPULATION GROUPS.



The numbers presented above are for 2015 implementation. For T3 type, this is the total number of treatments given. MDA, mass drug administration; T, targeted treatment.

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