NEGLECTED TROPICAL DISEASES

“Neglected tropical diseases, Hidden successes, Emerging opportunities”
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Letter from the Director

Control of neglected tropical diseases has taken on a new dimension.

Large-scale drug distribution and preventive chemotherapy now provide an opportunity to simultaneously control and eliminate selected neglected tropical diseases that have afflicted humanity for centuries.

More than 1 billion people – a sixth of the world’s population – suffer from one or more neglected tropical diseases. Success in tackling the situation resides in our ability to create global awareness of these diseases, and the world is increasingly becoming responsive to the plight of the people who live with them.

In 2007 alone, a total of 546 million people around the globe were treated to prevent transmission of lymphatic filariasis, commonly known as elephantiasis. In August 2007, the People’s Republic of China became the first country declared to have successfully eliminated lymphatic filariasis as a public health problem, followed by the Republic of Korea in March 2008.

Treatment for schistosomiasis (bilharziasis) is ongoing for 27 million schoolchildren in Africa, with the distribution of praziquantel tablets over a period of 10 years. The disease has a serious impact on school attendance rates and can impair cognitive and growth development. Untreated in its early reversible stages, schistosomiasis can cause serious and permanent pathology, fatally reducing the life-span of an individual.

Dracunculiasis, commonly known as guinea-worm disease, which was prevalent in 20 nations in Africa and Asia two decades ago, is now endemic in only 6 sub-Saharan countries. If social and political conditions stay favourable, guinea-worm disease will soon be the second disease to be eradicated.

The number of reported cases of human African trypanosomiasis, also known as sleeping sickness, decreased to 10,486 in 2008 from 16,378 in 2005 as a result of effective surveillance. Renewed efforts are being made to eliminate yaws, a chronic but easily treatable infection that affects the skin, bone and cartilage. Better coordination is also being made to lessen the burden of zoonotic viral diseases, particularly dog rabies; this preventable disease kills an estimated 55,000 people annually, almost 50% of whom are children under 15 years of age.
Parasitic and bacterial diseases, known to be neglected, are among some of the most common infections that affect an estimated 2.7 billion people who live on less than US$ 2 per day. Disparity between the haves and the have-nots has continued, and global climate change – besides unleashing natural calamities – is also creating conditions for diseases to thrive and for vectors to re-emerge in regions where they were previously thought to have been eliminated. The resurgence of dengue fever over the past few years is testimony to this phenomenon.

WHO initiatives on integrated vector management and the management of public health pesticides demonstrate the importance of, and need for, investment in vector control as an important component of controlling transmission of vector-borne diseases. These diseases represent about 17% of the global burden of parasitic and infectious diseases. Most neglected tropical diseases are endemic in rural areas of sub-Saharan Africa and in poor urban settings of low-income countries in Asia and Latin America. They lead to long-term disability, disfigurement, impaired childhood growth, adverse pregnancy outcomes and reduced economic productivity.

Neglected tropical diseases kill an estimated 534,000 people worldwide every year. Their impact on worker productivity adds up to billions of dollars lost annually and maintains low-income countries in poverty. A WHO report on Social Determinants of Health found that those living in poverty, even those inhabiting large affluent cities, remain the most vulnerable and die younger. How much more severe must be the plight of millions who live in deprived rural communities where basic facilities are non-existent.

During the last five years we have come a long way in convincing the world and particularly political leaders in endemic and non-endemic countries to invest in the control of neglected tropical diseases as a means to boost human and economic development towards achieving the Millennium Development Goals. WHO, its international partners, donor agencies and NGOs have set up better channels to support endemic countries to distribute both donated and purchased drugs to needy areas. Convergence of technology is now providing better possibilities of communication and exchange of data with field staff in remote areas. Such collaborative efforts have made interventions against neglected diseases more viable and cost effective.

In addition to efforts made by endemic countries, funds have been pledged by the world community for the promotion of global health. Substantial contribution has come from the United States Government, the United Kingdom Department for International Development (DFID), the Bill & Melinda Gates Foundation, The Carter Center, the United States Agency for International
Disparity between the haves and the have-nots has continued, and climate change is also creating conditions for diseases to thrive.

Development (USAID) and the private sector. Donation of drugs such as praziquantel and triclabendazole has added to an existing list of donated drugs for better distribution in endemic areas. Some of these drugs are being administered as part of an integrated campaign involving malaria and HIV/AIDS, helping us to create a broader awareness about neglected tropical diseases.

As the world slowly recovers from one of the worst financial crises, we intend to keep-up the momentum and further motivate the international community to support endemic countries to strengthen existing health infrastructure and service delivery. Investing in the human and social capital of poor people is essential as it enables them to develop the fundamentals they need to renew their own communities through prevention programmes.

For a very long time, neglected tropical diseases received little or no attention at all, despite their magnitude and their impact on both economic development and quality of life. Our actions are aimed to promote the common good of every individual and are based on a human rights approach, which requires that interventions and processes are guided by human rights principles of participation, non-discrimination and accountability.

Everyone aspires to live a life free of disease. Our task is to create the conditions to make this happen. Although the task ahead is arduous, we will persevere: this is the only way to go forward.

Dr Lorenzo Savioli
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Key features of neglected tropical diseases

Neglected tropical diseases affect more than 1 billion people, primarily poor populations living in tropical and subtropical climates.

They frequently cluster geographically and overlap; individuals are often afflicted with more than one parasite or infection.

100% of low-income countries are affected by at least five neglected tropical diseases simultaneously.

More than 70% of countries and territories that report the presence of neglected tropical diseases are low-income and lower middle-income economies.

Infections are attributable to unsafe water, poor housing conditions and poor sanitation. Children are most vulnerable to infections of most neglected tropical diseases.

Neglected tropical diseases kill, impair or permanently disable millions of people every year, often resulting in life-long physical pain, social stigmatization and abuse.

Many can be prevented, eliminated or even eradicated with improved access to existing safe and cost-effective tools.

WHO is currently focusing on:
- Buruli ulcer
- Chagas disease
- Dengue/dengue haemorrhagic fever
- Dracunculiasis (guinea-worm disease)
- Human African trypanosomiasis
- Leishmaniasis
- Leprosy
- Lymphatic filariasis
- Onchocerciasis
- Schistosomiasis
- Soil-transmitted helminthiasis (ascariasis, hookworm infections, trichuriasis)
- Trachoma
- Zoonotic diseases

An expanded list could include the treponematoses, leptospirosis, strongyloidiasis, foodborne trematodiases, cysticercosis and scabies, as well as other tropical infections.
Successes at a glance

To prevent transmission of lymphatic filariasis, treatment was delivered at an increased rate in 48 out of the 81 endemic countries. Since 2000, more than a billion treatments have been delivered, significantly reducing the prevalence and intensity of the disease and preventing infection in millions of children. In 2007 alone, 546 million people were treated. In August 2007, China became the first country declared to have eliminated lymphatic filariasis as a public health problem, followed by the Republic of Korea in March 2008.

Leprosy is on the verge of elimination as a public health problem from almost all the countries in the world. Once regarded as an incurable and disabling disease, leprosy has receded thanks to the availability of a highly effective cure. According to data received from 121 countries, the global prevalence of leprosy at the beginning of 2009 stood at 213 036, while the number of new cases detected during 2008 was 249 007. The number of new cases detected globally has fallen by 9126, representing a decrease of 4% during 2008 compared with 2007.

In 2008, only 4619 cases of guinea-worm disease were reported, compared with an estimated 3.5 million in 1986. Between 2007 and 2008, the number of cases fell from 9585, representing a reduction of 52% in just one year. The total number of countries with guinea-worm disease transmission since the 1980s dropped from 20 to only six in 2008.

More than 1 million school-aged children were treated for schistosomiasis in Madagascar between June and October 2008, compared with just over 110 000 between 1999 and 2006. A similar campaign in the Nigerian states of Nasarawa and Plateau treated 846 696 out of 926 913 schoolchildren.

Transmission of Chagas disease has successfully been reduced in many Latin American countries. However, the need for control and surveillance is important, as the disease has surfaced in regions previously considered to be free and in non-endemic countries because of population mobility.
Onchocerciasis has been eliminated as a public health problem and as a disease of socioeconomic importance from 10 West African countries. About 50 million people are currently being treated annually and this number is expected to reach 65 million by 2010.

Morocco eliminated trachoma as a public health problem in 2007 after implementing a coordinated WHO control programme for seven years. A surveillance programme is now in place; if no cases are reported, Morocco can be certified as trachoma free by 2010.
Neglected tropical diseases
Neglected tropical diseases debilitate, deform, blind and kill ...
More than 1 billion people are affected with one or more neglected tropical diseases, yet these diseases remain neglected at all levels.
A symptom of poverty and disadvantage

Neglected tropical diseases persist under conditions of poverty and are concentrated almost exclusively in impoverished populations in the developing world.

Unsafe water, lack of access to health services, inadequate housing, malnutrition and poor sanitation all increase vulnerability to infection.

More than 1 billion people are affected with one or more neglected tropical diseases, yet these diseases remain neglected at all levels.

Neglect at community level
Neglected tropical diseases such as leprosy, lymphatic filariasis and leishmaniasis are feared and are the source of strong social stigma and prejudice. As a result, these diseases are often hidden – out of sight, poorly documented and unmentioned.

Neglect at national level
Neglected tropical diseases tend to be hidden below the radar screens of health services and politicians because they afflict populations that are marginalized, with little political voice. Although frequently causing severe pain and life-long disabilities, these diseases are generally not major killers. Under resource-limited conditions, high mortality diseases such as HIV/AIDS or tuberculosis are prioritized to the detriment of neglected tropical diseases.

Neglect at international level
Neglected tropical diseases do not travel easily and thus do not pose an immediate threat to Western society. Moreover, they are tied to specific geographical and environmental conditions. The development of new diagnostic tools has been underfunded largely because neglected tropical diseases do not represent a significant market.

Less than 1% of the 1393 new drugs registered during 1975–1999 were for tropical diseases. Less than 0.001% of the US$ 60–70 billion spent on new drugs went towards developing new and urgently needed treatments for tropical diseases.
**Overlapping threats to neglected populations**

Neglected tropical diseases tend to cluster geographically and overlap because they share some common features.

For instance, insect vectors spread Chagas disease, dengue, leishmaniasis, lymphatic filariasis and onchocerciasis. Schistosomiasis, soil-transmitted helminthiasis, yaws and trachoma are closely associated with poor environmental hygiene and sanitation.

- 149 countries and territories are affected by at least one neglected tropical disease.
- More than 70% of them are affected by two or more diseases.
- 28 countries are afflicted by more than six diseases simultaneously; most of them are low-income economies experiencing humanitarian emergencies.

**Figure 1. Overlapping neglected tropical diseases**
Neglected tropical diseases and children
The poorest of the poor: the victims of neglected tropical diseases

Neglected tropical diseases typically affect the poorest people in communities, usually the most marginalized and those least able to demand services.

Concentrated almost exclusively in impoverished populations, neglected tropical diseases form a group, with more than 70% of affected countries in low-income or lower middle-income economies.

Many of the neglected tropical diseases can be cured with drugs that cost as little as US$ 0.02–1.50. This figure is cheap for OECD countries with an average GDP per capita of US$ 28,500 but unaffordable for people earning less than US$ 1 per day. An estimated

Figure 2. Countries affected by neglected tropical diseases, by income group
1.1 billion people live on less than US$ 1 a day and more than 2.7 billion live on less than US$ 2 a day: they are at higher risk of neglected tropical diseases.

Furthermore, most countries are affected by more than one disease at the same time. International support is essential for scaling up control programmes against neglected tropical diseases.

**Women and children are more vulnerable**

Women, children and ethnic minorities, especially those living in remote areas with restricted access to services, are most at risk of infection.

In general, women are more exposed to communicable diseases than are men – and suffer more in terms of both illness and death. Women also face additional barriers to seeking, and often to receiving, treatment. The consequences of stigma attached to many neglected tropical diseases are often more severe for women within their families and wider society.

Nearly 70% of all deaths and 75% of all disability-adjusted life years (DALYs) from communicable diseases globally occur in children under 14 years of age. This also applies to neglected tropical diseases as children are much more exposed to infections.

![Figure 3. Children are more infected by soil-transmitted helminthiasis than adults](image-url)
The high price of neglect

Most neglected tropical diseases cause severe and permanent disabilities but rarely kill.

Their low mortality despite high morbidity places them near the bottom of mortality tables and, in the past, they have received low priority.

However, the price of neglect is too high: neglected tropical diseases have consequences for affected individuals, families and entire communities in terms of burden of disease, quality of life, loss of productivity and aggravation of poverty.

Neglected tropical diseases are a devastating obstacle to human settlement and socioeconomic development of already impoverished countries.

Neglected tropical diseases debilitate, deform, blind and kill ...

Debilitate
Neglected tropical diseases can help guarantee that the next generation remains anchored in poverty. Guinea-worm disease and schistosomiasis have a serious impact on school attendance rates. Sleeping sickness can permanently impair mental function and may cause mental retardation, even in children who have been cured. Impaired childhood growth and cognitive development are associated with schistosomiasis and soil-transmitted helminthiasis.

Deform
Deformities associated with neglected tropical diseases such as leprosy, leishmaniasis and lymphatic filariasis can become so severe that patients are banished from their communities as well as the workforce. Such deformities include the severely enlarged limbs of elephantiasis (lymphatic filariasis), the faces eroded by mucocutaneous leishmaniasis or leprosy, and the limbs of small children that are amputated to save their lives from aggressive Buruli ulcer infection.
Blind
Occurring as it does in rural areas, blindness caused by onchocerciasis and trachoma can jeopardize food security and cause dramatic changes in patterns of land use.

On the river Koni, in the Beni basin of Mali, a staff member spent the morning with a blind couple who had been brought to a field by a child and who spent the long day slowly picking out the unwanted grass from between the millet, differentiating the two by the feel of their leaves. These images, multiplied by a hundred thousand, are the human face of onchocerciasis.

Kill
Untreated, some neglected tropical diseases such as human African trypanosomiasis (sleeping sickness), leishmaniasis, dengue, dengue haemorrhagic fever, Buruli ulcer, Chagas disease and zoonoses (e.g. rabies, anthrax and brucellosis) can kill within months, weeks or even days once an advanced stage of the disease is reached.
Zoonotic diseases and human health: the need for integrated control

Endemic zoonotic diseases such as anthrax, bovine tuberculosis, brucellosis, cysticercosis, echinococcosis (hydatid disease), rabies and zoonotic trypanosomiasis occur throughout the African continent where conditions for their maintenance and spread exist.

These diseases perpetuate poverty by attacking not only people’s health but also their livelihood. They remain neglected in most endemic African countries because of lack of information and awareness about the extent of the problem. An absence of suitable diagnostic tools and sustainable strategies for prevention and control worsens the problem.

The result is a false perception that the burden of these diseases and their impact on society are low, such that they neither attract the health resources nor the research needed for their control – effectively putting them in the category of neglected zoonotic diseases (NZDs).

Control of NZDs offers a highly cost-effective opportunity for alleviating the widespread poverty that exists in remote rural areas and marginalized periurban communities. In many African countries, veterinary public health infrastructure is poor or non-existent, generating indecision as to which sector should take responsibility for investigating and controlling NZDs.

This situation has led to overlapping situations regarding control between veterinary responsibilities and medical needs. As NZDs affect both humans and animals, interventions require concerted action between veterinary, livestock and human health sectors.
A comprehensive, interdisciplinary approach is therefore needed to address the major obstacles in the control of these diseases. It is recommended that an appropriate plan of action for implementing integrated control should:

- Provide global and regional leadership to promote and coordinate the “One Health” integrated approach to NZDs and a model for how such an approach can be applied in relation to NZDs in the context of those eco-systems that facilitate their transmission.

- Formulate guidelines on how national veterinary public health units should be established and structured, and clarify the role of national veterinary public health structures in the context of their contribution to health care, recognizing that the responsibilities of veterinary public health extend beyond NZDs.

- Promote advocacy efforts to inform about the societal burden of NZDs to create demand at all levels of society for their control.

- Develop guidelines for implementing integrated surveillance, prevention and control activities for NZDs and conduct, maintain and report inventories of control activities and tools.
Coinfection with visceral leishmaniasis and HIV

A deadly synergy: visceral leishmaniasis and HIV coinfection

Coinfection with visceral leishmaniasis and HIV is an ominous global trend.

Leishmaniasis is transmitted by the bite of the sandfly infected with *Leishmania* protozoa. The parasite can reside for decades in asymptomatic individuals. However, cases quickly evolve to severe visceral leishmaniasis among persons who are immunosuppressed.

In persons infected with HIV, leishmaniasis accelerates the onset of AIDS by cumulative immunosuppression and by stimulating replication of the virus.

Sharing of needles by injecting drug users spreads leishmaniasis as well as HIV. AIDS increases the risk of visceral leishmaniasis by 100–1000 times in endemic areas.

Leishmaniases are endemic in 88 countries on four continents – Africa, Asia, Europe and America.

WHO estimates that 350 million people are at risk of leishmaniasis, 12 million are currently infected and around 1.5–2 million new infections occur each year.

Due to coinfection, visceral leishmaniasis is no longer restricted to endemic areas, and the number of cases of visceral leishmaniasis and HIV coinfection will continue to rise.

In southern Europe, for example, up to 70% of adult cases of visceral leishmaniasis are associated with HIV infection. In some areas of Ethiopia, 35% of all leishmaniasis patients are coinfectd with HIV, and the trend is spreading to neighbouring countries such as Sudan.

A surveillance network is urgently required in order to monitor the evolution of leishmaniasis/HIV coinfection. Mapping of coinfection and analysis of epidemiological trends will enable the development of a tool on which to base a strategy for disease control.
Sound reasons for being optimistic

Most neglected tropical diseases can be prevented and even eliminated if affected communities have timely access to existing effective tools. The challenge at hand is to scale up coverage and access to these tools on a proactive, preventive basis.

High pay-off, low-cost tools
In several cases, population-wide interventions, such as vector control and mass drug administration, are powerful enough to interrupt transmission. For most neglected tropical diseases, safe, effective low-cost technologies are currently available. A dramatic reduction in communicable diseases could be achieved at a minimal cost of about US$ 0.40 per person per year. Community or school-based deworming through mass drug administration is another highly cost-effective intervention at US$ 6–33 per disability adjusted life year (DALY) gained.

Cost-effectiveness of treatment for neglected tropical diseases

<table>
<thead>
<tr>
<th>Neglected tropical disease</th>
<th>Drugs</th>
<th>Unit cost per treatment (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onchocerciasis</td>
<td>ivermectin</td>
<td>Donated</td>
</tr>
<tr>
<td>Lymphatic filariasis</td>
<td>albendazole</td>
<td>Donated</td>
</tr>
<tr>
<td></td>
<td>ivermectin</td>
<td>Donated</td>
</tr>
<tr>
<td></td>
<td>diethylcarbamazine citrate</td>
<td>0.005–0.02</td>
</tr>
<tr>
<td>Soil-transmitted helminthias</td>
<td>mebendazole</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>albendazole (alternative)</td>
<td>0.02</td>
</tr>
<tr>
<td>Trachoma</td>
<td>azithromycin</td>
<td>Donated</td>
</tr>
<tr>
<td>Schistosomiasis</td>
<td>praziquantel</td>
<td>0.20–0.30a</td>
</tr>
<tr>
<td>Vitamin A deficiency</td>
<td>vitamin A</td>
<td>0.20–0.30a</td>
</tr>
</tbody>
</table>

*Donated but inadequate to cover overall requirement.

Population-wide interventions do not discriminate among the poor or further marginalize excluded groups, and thus have ethical appeal as a poverty reduction strategy.
Integrated vector management (IVM)

Integrated vector management (IVM) is a “rational decision-making process for the optimal use of resources for vector control”. Its goal is to make a significant contribution to the prevention and control of vector-borne diseases, which are responsible for 17% of the global burden of parasitic and infectious diseases. Implementation of IVM requires decision-making criteria, institutional arrangements and regulatory frameworks. It also requires decision-making skills that support intersectoral action and are able to establish vector control and health-based targets.

WHO promotes these management principles as set out in the Global Strategic Framework for Integrated Vector Management (2004). In 2007, a global consultation identified a number of areas that needed to be addressed for the implementation of IVM. These were in line with the Global Plan to Combat Neglected Tropical Diseases (2008–2015) through delivery of multi-intervention packages that include the promotion of IVM. WHO produced a position statement in 2008 to support the advancement of IVM.
Judicious use of pesticides

Global leadership in standard setting and evaluation of public health pesticides

As a cross-cutting programme based in the Vector Ecology and Management team, the WHO Pesticide Evaluation Scheme (WHOPES) supports United Nations agencies, WHO programmes and Member States in the safe and judicious use of pesticides and the development of international standards for quality control and trade.

WHOPES functions through the participation of representatives of governments, manufacturers of pesticides and pesticide application equipment, WHO Collaborating Centres and other research institutions, as well as other WHO programmes, notably the Programme on Chemical Safety. Supporting Member States in the sound management of pesticides is a high priority for the scheme, given the reliance of most vector control activities on the use of insecticides in an integrated approach to vector management.

Recent establishment with the Food and Agriculture Organization of the United Nations (FAO) of collaboration on the sound management of pesticides will ensure complementary, harmonized and coordinated guidance to responsible bodies at national level and to all stakeholders in dealing with these chemicals. WHOPES seeks guidance from different expert panels and advisory groups and through a unique public–private partnership, the Global Collaboration for Development of Pesticides for Public Health.
Hidden

Successes
Part I

Local successes and the need to scale up

Ambitious targets have been set for many tropical diseases, and impressive progress is being made. The last decades of the 20th century saw the start of positive trends, and these trends are continuing in unprecedented ways.

Never before have such large numbers of people been cured of these devastating diseases or protected from them.

Country experiences clearly demonstrate the decisive power of commitment and determination to bring victory, even under circumstances that are far from ideal.
**Chagas disease elimination: raising the stakes**

Chagas disease (American trypanosomiasis) is largely a chronic condition that affects millions of people in the Americas, caused by a protozoan parasite called *Trypanosoma cruzi*. It is named after Carlos Chagas who first described the disease in 1909.

Parasites are transmitted to humans predominantly in three ways: by the infected faeces of blood-sucking beetle-like bugs that typically hide in the cracks of walls during the day and emerge at night to feed on human blood; through transfusion with infected blood; or congenitally from an infected mother to her fetus. In some hot and humid regions, it can also be transmitted orally.

The symptoms in the acute phase of the disease can include fever, fatigue, skin rash, chest pain and enlarged glands. In later years during the chronic phase, the infection can lead to debilitation caused by the progressive destruction of the heart muscle or more frequently, sudden death. Currently an estimated 10 million people remain infected. Cases have also been identified in the USA, Canada, some European and western Pacific countries.

There is no available vaccine, but the drugs in current use are almost 100% effective if treatment is initiated at the very early stage of the disease. Drug efficacy decreases with longer duration of the infection, which may create irreversible damage.

Depending on the region, the key control measures include vector management, judicious use of pesticides, blood bank screening, public education and awareness programmes to help prevent the spread of the disease. Domestic triatomine bugs can transmit up to 80% of human disease.

Transmission of Chagas disease has successfully been reduced in many Latin American countries. New global challenges have emerged, however, including:

- The need to consolidate advances made in controlling the disease, while maintaining a strong political will to reinforce surveillance and control programmes and to adapt to new epidemiological trends.
- Emergence of Chagas disease in regions previously considered to be free, such as the Amazon basin, where transmission can be mainly through non-domestic vectors.
• Re-emergence in regions where control had been in progress, such as Chaco region of Argentina and Bolivia, where control is complicated, among other things, by wildlife and resistant vectors.
• Spread of the disease to areas previously considered non-endemic, such as the USA, Canada, European and Western Pacific countries, attributable to population mobility.
• Undiagnosed and untreated cases in endemic and non-endemic countries, due to active or accidental transmission.

WHO Global Network for Chagas Disease Elimination

WHO launched the Global Network for Chagas Disease Elimination (GNChE) in July 2007 to coordinate worldwide efforts towards the prevention of disease transmission.

The network promotes the use of effective tests for screening and diagnosis of Chagas disease; aims to improve systems to prevent transmission through vectors, blood transfusion and organ transplantation; and will help to strengthen existing epidemiological systems. It will also focus on congenital transmission (from mother to newborn child) by putting together universal case management methods.

The network’s strategy also involves:
• diagnosis of acute Chagas cases through malaria films and the promotion of rapid diagnostic tests at primary health-care level;
• building a database and mapping Trypanosoma cruzi infection and the disease burden;
• publishing a manual and an interactive course for Chagas disease management;
• free distribution of 2.5 million tablets of the donated drug nifurtimox.

Map 1. Areas infested by Triatoma infestans, 2009
Schistosomiasis control: significant scale-up in Madagascar and Nigeria

More than 1 million school-aged children were treated for schistosomiasis in Madagascar in 2008, compared with just over 110,000 who received treatment between 1999 and 2006.

The main reason for this scale-up is the shipment of more than 2.5 million donated praziquantel tablets.

A total of 912,568 school-aged children (82% of the 1,074,000 eligible population) received treatment in 21 districts between June and September 2008. The campaign resumed at the beginning of October 2008 with the start of a new school year, this time aiming to provide treatment to an additional 340,000 children in three districts with 844,000 additional tablets of praziquantel. The drug is distributed by WHO in collaboration with the Malagasy Ministries of Education and Health and other development partners.

In Nigeria, 846,696 out of 926,913 children of school age received schistosomiasis treatment by the end of August 2008 in the states of Nasarawa and Plateau. More than 1.5 million donated praziquantel tablets were shipped to Nigeria in April 2008. In 2007, only 136,000 children had been treated in the two states.

These activities are part of an integrated programme funded by The Carter Center, working with the Nigerian Ministry of Health in Nasarawa and Plateau, which targets lymphatic filariasis, onchocerciasis and soil-transmitted helminthiasis as well as schistosomiasis.
SCHISTOSOMIASIS (BILHARZIASIS) LIFE-CYCLE

Parasites mature in the liver and migrate to the blood vessels

Paired adult worms migrate to the mesenteric venules of the human bowel (S. mansoni) and to the vesical plexus surrounding the bladder (S. haematobium) and lay eggs that are shed in stools and urine

Eggs hatch releasing miracidia

Miracidia penetrate snail tissue

Sporocysts in snail (successive generations)

Penetrate skin

Cercariae lose tails during penetration and become schistosomulae

Snail releases free-swimming larval forms (cercariae) into water

S Schistosoma mansoni egg in faeces

Schistosoma haematobium egg in urine

Eggs hatch releasing miracidia

Miracidia penetrate snail tissue

Sporocysts in snail (successive generations)
Soil-transmitted helminthiasis: Cambodia reaches 2010 global target ahead of time

Five years ago, more than 70% of Cambodian children were infected with soil-transmitted helminthiasis, also called intestinal worms. Today, 100% of schoolchildren are protected from soil-transmitted helminths thanks to regular anthelminthic treatment.

Political commitment and financial support
A child needs only one tablet of mebendazole or albendazole for soil-transmitted helminths; praziquantel for schistosomiasis requires an average of two and a half tablets per year. The cost of treatment with either mebendazole or albendazole is only US$ 0.02; treatment with praziquantel costs US$ 0.20. Nevertheless, setting up a comprehensive control programme is a financial challenge for many developing countries.

The strong commitment of the Government of Cambodia supported by international partners and donors has made its deworming programme a remarkable success story.

Distribution of drugs and health education
1. The deworming programme is carried out by trained teachers through the school system.
2. Two rounds of treatment take place every year in all 24 provinces.
3. Mebendazole is used – thus the dose is simply one tablet per child in each round.
4. A school kit is provided for educating children.
In 2008, Cambodia treated 2,678,417 children out of a school population of 3,358,443. This represented 80% of the overall school age population in the country.

**Keeping future generations healthy**

The deworming programme focuses on the distribution of drugs and education through the school system in order to benefit future generations of children.

Cambodia’s control programme is a national triumph as well as a model for other countries.
Eliminating lymphatic filariasis: exemplary performance in Sri Lanka

The national Programme for the Elimination of Lymphatic Filariasis (PELF) was set up in Sri Lanka in 1999, based on WHO protocols. Around 9.8 million people in eight of the country’s 25 districts were at risk of contracting lymphatic filariasis.

In July 2002, an intense and systematic social mobilization programme to support mass drug administration (MDA) efforts with the combination of diethylcarbamazine citrate plus albendazole was launched. Its success is attributed to strong political will, dedicated health personnel and targeted advocacy efforts. An annual “filaria day” was also launched to help mobilize the population and facilitate the five-year annual drug distribution campaign.

The initial MDA covered an estimated 80% of the population, while the second and third treatment rounds were held in 2003 and 2004. In 2005, despite the after-effects of the devastating tsunami, the country stayed focused in delivering drugs to everyone, even to those living in makeshift camps.

The last MDA was completed in highly endemic areas in 2006, targeting some 10 million people. The country is now in the process of evaluating whether the criteria for stopping MDA have been met.

The impact of the MDA programme is also seen in the reduction of new patients attending the filarial clinics in Sri Lanka. In 2005, a total of 536 patients were registered, compared with 419 in 2006.

In 2004, the Anti-Filariasis Campaign launched a community home-based care initiative to alleviate the suffering of lymphoedema patients. Up to the end of 2007, a total of 671 patients had been
registered and trained under this programme in all eight districts. This initiative has dramatically improved their health status by preventing recurrent attacks of cellulitis.

Recent data show that districts in the endemic areas of the Southern Province, which includes Hambantota, Matara and Galle, have the highest and lowest microfilaria rates and that these rates have been reduced from 0.25–0.38 in 1981 to 0.05 in 2004, reducing the number of filarial cases by 84% since the initiation of MDA.

In 2007 a filarial antigen test was carried out in 4831 first-grade schoolchildren, using a cluster sampling method in eight districts: none of them tested positive. This is an indication that since the implementation of MDA, the transmission of lymphatic filariasis in Sri Lanka has been effectively reduced below the threshold level.

Lymphatic filariasis causes gross disfigurement of the lower limbs.
Leprosy: Sri Lanka triumphs through social marketing

Discriminatory attitudes and prejudices contribute to the spread of neglected tropical diseases and worsen their impact on the people affected by them.

Mass public awareness campaign for eliminating stigma attached to leprosy
For a long time, leprosy was considered shameful, and people hid their symptoms for fear of ostracism despite free and effective multidrug therapy. The disease was therefore detected only at a late stage after irreversible disabilities had set in.

In 1990, the Ministry of Health of Sri Lanka, assisted by international support, launched a powerful and broad-based advertising campaign to change the public image of leprosy. By portraying leprosy as just another treatable disease, the campaign hoped to encourage people with suspicious lesions to come forward for early diagnosis and cure free of charge.

Hope and cure: towards a treatable disease
The campaign was so successful that it virtually eliminated the stigma attached to leprosy: the image of leprosy moved from one of fear and loathing to one of hope and cure. Since the start of the campaign, more than 20 000 patients have been detected and treated.

In less than a year, case detection had increased by 150%. In the year before the campaign, only 9% of new cases were self-reported; that figure rose to 50% by 1991 and has remained high in subsequent years.

Leprosy has been eliminated at a national level since 1996
In 1995, the national prevalence rate dropped below 1 per 10 000 population. Leprosy has been eliminated in Sri Lanka since 1996. Since 2002, leprosy control activities are now fully integrated into general health services to maintain the country’s triumph over leprosy.
Coordinated use of anthelminthic drugs

WHO recommends coordinated use of anthelminthic drugs in control interventions

The public health agenda now deals with helminthiasis and other neglected tropical diseases by means of broad-based interventions that are no longer concerned with just one disease. Preventive chemotherapy aims at using anthelminthic drugs either alone or in combination as a public health tool for preventing morbidity due to more than one form of helminthiasis.

The greatest challenge is to expand regular anthelminthic drug coverage as a public health intervention to reach everyone at risk of illness caused by helminth-induced diseases. Preventive chemotherapy should therefore begin early in life and take every opportunity to reach at-risk populations. WHO is advocating the use of a coordinated approach using chemotherapy to tackle what is now recognized to be a significant public health problem as well as a major impediment to poverty reduction. At the same time, because the numbers of affected people are so large and are often difficult to reach, innovative ways to expand coverage must be found. The result will be gains in the health, education, economic and social well-being of entire populations. Such advances will help to provide a solid foundation for improvements in maternal health and the development of children into adults free of the burden of disabling disease.

Reducing the burden of morbidity and impaired development that characterizes human helminthiasis depends on policy decisions taken by ministers of health, ministers of education and their advisers. Efforts to reduce morbidity will depend upon the dedication of health professionals as well as the support of partners who have committed resources to helminth control.

WHO has developed a manual to guide the coordinated implementation of regular, systematic, large-scale anthelminthic drug treatment as a core component of interventions to control helminthic diseases such as lymphatic filariasis, onchocerciasis, schistosomiasis and soil-transmitted helminthiasis. The preventive chemotherapy component needs to be built into comprehensive control or elimination strategies according to the prevailing regional, national and local contexts and the resources available.
Successes
Part. II

Dramatic achievements and tremendous potential

Enormous progress has been made towards the control and elimination of several neglected tropical diseases. Never before have so many of these diseases been targeted for action with time-limited goals, typically through the creation of public–private partnerships. This mobilization has changed the health landscape dramatically. Provision of drugs free of charge is a striking feature of such partnerships, with the release of additional resources for country-level activities to make treatment more accessible to patients.
Buruli ulcer: from mystery to visibility

Buruli ulcer has been reported in about 30 countries, mainly with tropical and subtropical climates. Its name is derived from the former Buruli county in Uganda, now called Nakasongola District, where outbreaks were reported in the 1960s. Since then, there have been outbreaks of the disease in many parts of the world. It also occurs in temperate areas of south-eastern Australia, where it is known as Bainsdale ulcer.

Buruli ulcer starts as a painless, mobile swelling in the skin called a nodule. If patients seek treatment at this stage, antibiotics can prove to be successful. Unfortunately, most people do not seek treatment until the disease is far advanced and starts to cause irreversible deformity and sometimes life-threatening infections.

In the face of on-going research and the absence of a complete understanding of the mode of transmission or the availability of a vaccine, the main objective is to reduce the morbidity and disabilities associated with the disease. Early detection and treatment now involve the use of a combination of antibiotics and physiotherapy, depending on the degree of infection.

In July 1998, WHO and the Government of Côte d’Ivoire organized the first international conference on Buruli ulcer control and research, held in Yamoussoukro. The Yamoussoukro Declaration was an important outcome of this high-level conference, which was a significant step in putting Buruli ulcer on the international health agenda.

In 1998 WHO launched the Global Buruli Ulcer Initiative to help improve research, and in 2004 the World Health Assembly adopted a resolution to improve the surveillance and control of Buruli ulcer. In March 2009, a meeting grouping together heads of state and high-level officials of endemic countries in Africa met in Cotonou, Benin, where the Cotonou Declaration calling for improved surveillance and enhanced research was adopted.

Buruli ulcer remained a mystery for a long time, but research in the past four years has unfolded more information about the intricacies of the disease. We now know that the agent that triggers the disease, *Mycobacterium ulcerans*, belongs to the same family of organisms as those that cause leprosy and tuberculosis, though it is different. Lately, scientists successfully cultivated this causative organism from an aquatic insect collected in Benin. This experiment further supported
the hypothesis that *Mycobacterium ulcerans* is an environmental pathogen, transmitted through exposure to an infected environment.

In 2007, WHO introduced two new classification standards for Buruli ulcer, based on the size of the lesion. Under this classification, small and medium-sized ulcers may benefit from continued antibiotic treatment, whereas bigger ulcers may require a combination of antibiotics and surgery.

Today, more than 30–50% of patients, mainly children, are treated exclusively with antibiotics. During the past four years, this treatment has helped to prevent the onset of disability and has improved case management of the disease.

To give a new dimension to better control of the disease, the Global Buruli Ulcer Initiative, at its meeting in Geneva from 31 March to 2 April 2008, made specific recommendations:

- endemic countries should be supported by governments and partners to implement control strategies;
- surveillance needs to be maintained and reporting of cases needs to be improved;
- further research should be made into the progress achieved so far by the use of antibiotics;
- future research should focus on understanding transmission, developing rapid diagnostic tests and simplifying antibiotic treatment;
- further use should be made of advocacy, and efforts to mobilize resources should be increased.

The main components of WHO’s strategy for the control of Buruli ulcer are:

- strengthening of the health system;
- infrastructure development, equipment and logistics;
- training of health workers;
- standardized recording and reporting of cases;
- information, education and communication campaigns in communities and schools;
- training of village health workers and strengthening of community-based health surveillance systems;
- standardized case management;
- laboratory confirmation of cases, use of antibiotics, surgery and wound care;
- prevention of disability.
Dengue and dengue haemorrhagic fever: cause for major public health concern

Dengue is a mosquito-borne infection that in recent decades has emerged as a major international public health concern. The disease occurs in tropical and sub-tropical regions around the world, predominantly in urban and semi-urban areas.

Dengue fever is a severe, flu-like illness that affects infants, young children and adults, but seldom causes death. Its clinical features vary according to the age of the patient. Infants and young children may have a fever with rash. Older children and adults may have either a mild fever or the classical incapacitating disease with abrupt onset of high fever, severe headache, pain behind the eyes, muscle and joint pains, and rash.

Dengue haemorrhagic fever is another severe manifestation of the disease that has potentially lethal complications. In such cases, patients may die within 12 to 24 hours after suffering circulatory failure and a state of shock. First recognized in the 1950s during dengue epidemics in the Philippines and Thailand, dengue haemorrhagic fever today affects most Asian countries and is a leading cause of hospitalization and death among children in the region.

There are four distinct, but closely related, viruses that cause dengue. Recovery from infection by one provides lifelong immunity against that virus but confers only partial and transient protection against subsequent infection by the other three viruses. There is good evidence that sequential infection increases the risk of developing dengue haemorrhagic fever.

Some 2.5 billion people – two fifths of the world’s population – are now at risk from dengue. WHO currently estimates there may be 50 million dengue infections worldwide every year.

In 2007 alone, there were more than 890 000 reported cases of dengue in the Americas, 26 000 of which were dengue haemorrhagic fever. In early 2009, major outbreaks occurred in Argentina, Bolivia, Sri Lanka and Viet Nam. The disease is now endemic in more than 100 countries in Africa, the Americas, the Eastern Mediterranean, South-East Asia and the Western Pacific. South-East Asia and the Western Pacific are the most seriously affected. Before 1970, only nine countries had experienced epidemics of dengue haemorrhagic fever, a number that had increased more than four-fold by 1995.
There is no vaccine to protect against dengue. Although progress is under way, developing a vaccine against the disease – in either its mild or severe form – is challenging.

At present, the only method of controlling or preventing dengue virus transmission is to combat the vector mosquitoes. Integrated vector management – a rational decision-making process for the optimal use of resources for vector control – has been instrumental in controlling dengue in several countries.

Map 3. Countries/areas at risk of dengue transmission, 2008
Dracunculiasis (guinea-worm disease): the last lap

The global campaign to eradicate dracunculiasis (guinea-worm disease) has achieved remarkable success. The number of cases fell from 25,217 in 2006 to 9,585 in 2007, representing a reduction of 62% in just one year. In 2008, this number fell further to 4,619 cases, representing a drop of 52%.

Dracunculiasis is now endemic in only six African countries. In 2008, 78% of reported indigenous cases were from Sudan, 11% from Ghana and about 9% from Mali. Ethiopia, Niger and Nigeria reported less than 2%.

No vaccines and no drug treatment, but eradication is possible

Guinea-worm disease is transmitted exclusively by drinking infested water and thus typically affects poor people in rural areas who rely on unsafe water for drinking. The disease was widespread at the start of the 20th century. Today it is close to eradication.

The main strategy involves behavioural change, namely that of filtering drinking-water before use.

The WHO approach is based on:

- interrupting transmission through health education, provision of safe drinking-water (including filtering and applying chemicals) and early detection and containment of cases;
- surveillance.

Map 2. Dracunculiasis endemic countries, 2009
The battle to eradicate dracunculiasis is being waged through a strong partnership between endemic countries and a number of partners, donor agencies and organizations. The initiative for the elimination of the disease started in 1982. In 1991, the 44th World Health Assembly resolved to eradicate guinea-worm disease by 1995. Although this was not achieved, a further World Health Assembly resolution in 2004 urged countries to step up efforts and complete eradication by 2009. During the past 20 years, the number of cases has fallen by 99% and 180 countries or territories are now free of transmission.

Remarkable progress
Guinea-worm disease, one of the most ancient known tropical diseases, is likely to be the first disease to be eradicated without a vaccine or specific drug treatment.

- There has been a 99% reduction in cases, from 892,055 in 1989 to 4,619 in 2008.
- As of January 2009, 180 countries and territories were certified free of guinea-worm transmission.
- Transmission is now confined to just six African countries out of the 20 countries that were endemic at the beginning of the initiative.
- The burden is concentrated mainly in three countries (Sudan, Ghana and Mali).

Continuous efforts in providing clean water, strengthening the health system for surveillance and ensuring adequate funding will accelerate completion of guinea-worm disease eradication.

Identifying the last patients in an endemic area is increasingly difficult. Reward systems can be introduced to encourage infected individuals to report their infection.
**Fascioliasis: triumphing through donated triclabendazole**

Fascioliasis is a zoonotic disease of the liver that can be transmitted to humans. Animals that serve as reservoirs include sheep, pigs, buffalo, goats, camels and llamas, as well as other domestic and sylvatic creatures.

Fascioliasis is caused by large worms (up to 7 cm in length) belonging to the genus Fasciola. Distribution is widespread, with well-known hot spots in South America and East Asia.

Humans become infected by ingesting the worm's encysted larvae, which are usually attached to aquatic or semi-aquatic plants, particularly watercress. Clinical manifestations, which include abdominal pain, fever, vomiting, diarrhoea, can last for months.

Triclabendazole is the only WHO-recommended drug for treatment of fascioliasis, with a 10 mg/kg body weight single-dose as the regimen of choice. Triclabendazole is active against both immature and adult parasites and produces high cure rates; adverse reactions following treatment are usually temporary and mild.

Triclabendazole is available free of charge to endemic countries.

Donation of triclabendazole has enabled the implementation of disease control interventions for the first time in a number of affected countries worldwide, including Bolivia, Egypt, Georgia, the Islamic Republic of Iran, Peru, Viet Nam and Yemen. Indigenous communities in Bolivia and Peru are the world's most affected by this zoonotic infection.
Patients in endemic communities in Peru receiving donated drugs.
Human African trypanosomiasis: better hope for disease management

Resurgence of sleeping sickness
Human African trypanosomiasis, or sleeping sickness, is transmitted by the bite of tsetse flies, causing death, abortion and perinatal death through mother-to-child infection.

The disease was brought under control between 1960 and 1965, thanks to mobile teams systematically screening millions of people at risk and vector control in some foci, but reappeared during the 1980s to threaten the lives of millions of people in Africa once again. In 1995 around 300,000 people were estimated to be infected.

Strong commitment and major events to defeat the disease
The WHO Expert Committee on Control and Surveillance of Human African Trypanosomiasis, held in 1995, emphasized both the recrudescence of the disease and the dramatic lack of awareness about the transmission and treatment of sleeping sickness.

Since 1995, the following major events have had a positive impact on control activities, leading to a new epidemiological situation:

- the interruption of social upheavals and civil strife in Angola, the Central African Republic, the Congo, the Democratic Republic of the Congo, Sudan and Uganda, permitting access to endemic areas;
- a WHO-facilitated private partnership providing long-term supply of pentamidine, melarsoprol, eflornithine and suramin;
- dedicated projects;
- strong advocacy for sleeping sickness control by WHO;
- WHO’ s leadership and implementation of a reinforced network such as the WHO Programme to Eliminate Human African Trypanosomiasis, established in 2001;
- Memorandum of Understanding signed in December 2008 with the African Union in support of a Pan African Tsetse and Trypanosomiasis Eradication Campaign (PATTEC).

As a result, surveillance activities have increased, raising the total number of people screened through surveys of active case-finding. This has led to a substantial and regular decline in the number of new cases.
The number of people screened during the period 2002–2007 increased by 62% compared with the period 1996–2001. The subsequent increase of active case-finding surveys produced a decrease in the human reservoir of the parasite and therefore a decrease in transmission of the disease. Consequently, the number of reported cases of sleeping sickness in 2008 was 10 486, representing a decrease of 84% during the period 2002–2007 compared with 1996–2001.

Given the achievements made in the control of sleeping sickness, elimination of the disease as a public health problem can be envisaged. Continuous and strenuous efforts are required to fight the disease and avoid its resurgence as experienced in the 1980s.

Past resurgence of the disease provides a valuable lesson:

- surveillance and monitoring activities are crucial to maintain a hard-won victory.
- sustainable surveillance and monitoring are possible if cost-effective methodologies are adapted to each particular epidemiological situation;
- participation of existing health systems is not only desirable but essential for surveillance and control to be sustainable;
- development and final adjustments of new diagnostic tools and of simple and adapted drugs are crucial to guarantee the effective participation of existing health structures;
- maintenance of a specialized central structure at national level is required to ensure the coordination and overall technical assistance necessary for the effective participation of the health systems;
- ministries should play a leading role in mobilizing financial, material and human resources and promoting ownership.

The main challenge today is to maintain awareness, strengthen surveillance and sustain coordinated efforts to achieve elimination. WHO initiatives in developing more specific and sensitive tools for diagnosis and treatment will be key issues in efforts to sustain the prospect of elimination.

The 17th Expert Committee on the Selection and Use of Essential Medicines, at its meeting in Geneva in April 2009, approved the combination of eflornithine and nifurtimox to improve case management of the disease. Clinical tests have proved that a combination of both drugs reduces the duration of drug treatment and is easier to administer, while maintaining the same level of efficacy as treatment with eflornithine alone.
Leprosy: poised for elimination

Leprosy, once one of the most feared and disabling diseases of humankind, is on the verge of elimination as a public health problem from all countries in the world. The availability of a highly effective cure – multidrug therapy – has led to the vision of a world without leprosy.

**Multidrug therapy**
Multidrug therapy (MDT) which consists of 3 drugs - dapsone, rifampicin and clofazamine - yields unprecedented achievements.

As of 2008, 116 of 122 endemic countries have eliminated leprosy as a public health problem.

According to official reports received from 121 countries and territories, the global registered prevalence of leprosy at the beginning of 2009 stood at 213,036 cases, while the number of new cases detected during 2008 was 249,007.

The number of new cases detected globally fell by 9,126 (a 4% decrease) during 2008 compared with 2007. Most previously highly endemic countries have now reached elimination.

**A winning strategy: easy access to diagnosis and highly effective treatment**
The leprosy elimination strategy has two components: improved access to diagnosis and provision of effective drugs free of charge.

- Access to diagnosis and treatment through integration of leprosy services into existing public health services.
- Simplified diagnostic and treatment guidelines (clinical diagnosis, standardized and fixed duration of treatment).
- High-quality treatment: drugs available in blister packs free of charge to all patients globally since 1995.

High-level political support and social marketing campaigns to change the image of leprosy have also significantly contributed towards elimination of the disease.
A continuous fight
The global disease burden has decreased dramatically from 5.2 million cases in 1985 to 213,036 cases at the beginning of 2009.

The number of new cases detected annually is declining gradually in many countries. The majority of leprosy endemic countries are still detecting new cases even though the numbers may be low. This reinforces the importance of the need to sustain leprosy control activities to ensure that all new cases are properly diagnosed and treated.

WHO continues to provide technical support, especially in capacity building, monitoring and evaluation, as well as in implementing key activities to ensure that every new case of leprosy is properly diagnosed, treated and ultimately cured by multidrug therapy.
Lymphatic filariasis: towards defeat through rapid-impact interventions

A silent scourge

Lymphatic filariasis, or elephantiasis, remains silent for a long time after infection, which is usually acquired in childhood. Once the outward signs of the disease are visible, patients become gradually disfigured and disabled. Damage to the lymphatic systems, kidneys, arms, legs or genitals, especially in men, causes a huge amount of pain and discrimination.

- lymphatic filariasis puts at risk 1.3 billion people in more than 80 countries;
- over 120 million have already been affected;
- over 40 million patients are seriously incapacitated and disfigured by the disease;
- one third of the people infected with the disease live in India, one third in Africa and the remainder in South Asia, the Pacific and the Americas.

Map 4. Lymphatic filariasis endemic countries and territories, 2008
Global Programme to Eliminate Lymphatic Filariasis

Launched in 2000, the Global Programme to Eliminate Lymphatic Filariasis (GPELF) aims to eliminate the disease as a public health problem by 2020 by protecting the whole at-risk population. The number of people exposed to infection is currently 1.3 billion.

The strategy to achieve this objective is twofold:
- primary prevention of new cases: delivery of once-yearly, single-dose, two-drug treatment or diethylcarbamazine citrate (DEC) fortified salt to all individuals in at-risk populations;
- secondary and tertiary prevention of patients’ morbidity associated with the disease:
  - access to effective surgery for hydrocele and education of hygiene and self-care to prevent attacks of acute inflammatory adenolymphangitis.

The strategy: preventive mass drug administration

Mass drug administration (MDA) involves treating the entire at-risk population once a year with two drug combinations: diethylcarbamazine citrate (DEC) plus donated albendazole, or albendazole plus donated ivermectin. This should keep the levels of microfilariae in the blood below those necessary to sustain transmission. Alternatively, regular use of DEC fortified salt has been made.

Progress to date
- 1013 billion doses of albendazole tablets donated to WHO, supplied to 48 countries. In 2008 alone, 266 million were distributed to 30 out of 48 countries;
- 788 million ivermectin tablets supplied to 16 out of the 29 countries in the African Region and the Eastern Mediterranean Region where lymphatic filariasis is co-endemic with onchocerciasis, enabling 304 million treatments;
- 499 million diethylcarbamazine citrate (DEC) tablets procured by WHO from prequalified manufacturers and supplied to 13 countries;
- 610 million people protected through mass drug administration in 42 countries, representing 50% of the at-risk population;
- efforts are also under way to provide increased access to hydrocele surgery at district level and lymphoedema management training for community home-based self-care.

1.3 billion people are at risk in more than 80 countries.
Onchocerciasis: control is an ongoing success story

Onchocerciasis, or river blindness, is a parasitic disease caused by a worm that is transmitted to humans through the bites of blackflies that breed in fast flowing rivers. The disease causes severe visual impairment including permanent blindness, and can shorten the life expectancy of its victims by up to 15 years. Another devastating effect of onchocerciasis is the skin lesions (itching, nodules, dermatitis, depigmentation, etc.). Severe itching alone is estimated to account for 60% of the disease burden.

Vector control activities against river blindness
In 1975, the Onchocerciasis Control Programme in West Africa (OCP) started large-scale vector control operations using helicopters for weekly spraying of larvicides over the vector breeding sites in river rapids. In 1989, large-scale treatment with donated ivermectin was introduced for eligible populations at risk. At the closure of OCP in December 2002, onchocerciasis had been eliminated as a public health problem and as a disease of socioeconomic importance from 10 out of the 11 countries covered, although some residual and localized control activities continued in four countries by a restricted team until December 2007. All 11 countries continue to administer yearly community-directed treatment with ivermectin and maintain active surveillance of the disease themselves.

Current status
Onchocerciasis is still endemic in 30 countries in Africa, six countries in the Americas, and in Yemen. Some 120 million people are at risk of infection and some 37 million people are estimated to be infected; over 99% of them live in Africa. The principal strategy for the control of onchocerciasis in Africa is by annual community-directed treatment with ivermectin of eligible populations in the endemic areas.

600,000 cases of blindness have been prevented.
African Programme for Onchocerciasis Control ensures ongoing success

Building on the knowledge and experience gained from OCP, the African Programme for Onchocerciasis Control (APOC) was launched in December 1995 to set up structures and define strategies to combat the disease in 19 other African countries within a period of 15 years (up to 2010). Onchocerciasis control operations in APOC countries are almost exclusively based on annual community-directed treatment with ivermectin, with time-limited vector control operations in localized foci.

About 50 million people are currently being treated annually and it is expected that 65 million people will be reached by 2010. APOC activities have already relieved intolerable itching in severely infected individuals and prevented an estimated 20,000 cases of blindness per year.

Studies are continuing to develop a macrofilaricide (a drug that will sterilize or kill the Onchocerca adult worm). It is hoped that the availability of a safe and effective field usable macrofilaricidal drug would add more value to the control of the disease.

Onchocerciasis control demonstrates the value of the synergy derived from working together in a sustained partnership, and the economic return and social development that result from investments made in a disease control programme.
Rabies: prevention in animals saves human lives

Rabies is a viral disease that infects domestic and wild animals. It is usually transmitted to humans through a dog bite. Once symptoms develop, rabies is fatal to both animals and humans, with incubation periods ranging from a few days to over a year.

More than 55,000 people die from rabies every year. Most of the victims are bitten by dogs and almost 50% of them are children under 15 years of age.

Dog rabies is a preventable disease, and the best means to ensure a rabies-free environment is mass vaccination of the dog population. In 1992, WHO recommended mass vaccination campaigns, legislation and responsible pet ownership, including dog movement and reproduction control.
Rabies is essentially a neglected disease of poverty in both Africa and Asia, where over 95% of human rabies deaths occur and millions of treatments and vaccinations are delivered annually. An estimated 3.2 billion people live in areas where dog rabies is reported and are at risk of infection: it is the most common and widely distributed of the neglected endemic zoonotic diseases found throughout the developing world. Other such neglected zoonoses include anthrax, brucellosis, bovine tuberculosis, cysticercosis, echinococcosis and zoonotic trypanosomiasis, which have been present for centuries and are usually associated with populations in rural areas that live in close proximity to their animals.

In recent years, bat rabies has emerged as a public health issue in Europe and the Americas. Bat rabies poses a serious problem as bat bites frequently go undetected.
Trachoma: aggressive campaign in Morocco promises elimination of the disease

Following an aggressive national programme to control trachoma over the past decade, prevalence of the disease in Morocco has fallen dramatically, from 58% in 1997 to 2% in 2007. Since Morocco joined the SAFE strategy in 1999, progression of blindness through surgery has been prevented in more than 80,000 people, and more than 700,000 have been treated with antibiotics.

The WHO SAFE strategy for elimination of trachoma involves a combination of interventions:

- **S** – Surgery of the eyelids for those at immediate risk of blindness
- **A** – Antibiotics to treat individual cases and to reduce infection in a community
- **F** – Facial cleanliness and hygiene promotion to reduce transmission
- **E** – Environmental improvements such as provision of water and household sanitation

Through SAFE, Morocco has implemented advocacy and awareness campaigns, particularly among women and girls, because of their critical role in family and community health. These measures have helped to speed up changes and, during the past 10 years, more than 40,000 sessions per year have been organized to educate rural communities about primary prevention.

Furthermore, 80% of rural villages in Morocco now have access to water points, up from 14% in 1990.

Trachoma, one of the oldest infectious diseases known to humankind, is caused by *Chlamydia trachomatis*. The disease is transmitted through direct contact with infectious eye discharge (on towels, handkerchiefs, fingers, etc.) and by eye-seeking flies.

After years of repeated infection, the inside of the eyelid (conjunctiva) may get so severely scarred that the eyelid turns inward and the lashes rub on the eyeball, scarring the cornea (the
front of the eye). Left untreated, this condition leads to the formation of irreversible corneal opacities and blindness.

WHO estimates that 120 million people in 45 countries are at risk of the disease and nearly 40 million are infected. Trachoma is endemic in many of the poorest and most remote rural areas of Africa, Asia, Central and South America, Australia and the Middle East.
Emerging Opportunities
opportunities

For empowering neglected populations to take charge of their own health, to promote economic productivity and to improve their lives ...
Empowering people: key challenges

Over the past few decades, international efforts against some neglected tropical diseases have produced impressive results. The key challenges now are scaling up access to existing effective tools, where they exist, and developing new tools for conditions for which existing ones are inadequate.

1. Providing treatment free of charge

Although the treatment costs per patient for some diseases may be minimal, the total costs can be significant given the large numbers affected by neglected tropical diseases. Deforming and debilitating diseases may be given high priority by affected populations, but impoverished communities cannot afford to cover the costs and their voices are often unheard by politicians or policy-makers. External support is needed to provide the required interventions in a package to communities at risk at no cost, along the lines of childhood immunization.

2. Drug delivery system for covering the whole at-risk population

Interruption of transmission through mass drug administration (MDA) requires high coverage. Often, however, at-risk populations are not reached as they live in remote areas or do not attend schools and are thus missed during school-based campaigns. Specific strategies need to be developed to reach these groups and to cover the whole at-risk population.

3. Multi-intervention packages

Innovative approaches should be developed to add preventive chemotherapy to existing health services. A synergistic approach will streamline operational activities, improve efficiency and ensure that the priority health needs of communities are comprehensively met. Packages would need to be offered as a flexible menu of options that can be tailored to the local disease situation and adapted to community priorities. WHO has a key role to play in putting together technically sound options.

4. Urgent need for diagnostic tools and drugs

The development of new tools for some neglected tropical diseases belonging to the tool-deficient category is being handled within the framework of public–private partnerships. However, there is an urgent need for these tools to be made available and accessible to populations in need.
5. **Developing more effective drugs**
There remains a need to develop new drugs, even for the tool-ready category of diseases, in the event of development of drug resistance in large-scale MDA programmes.

6. **Promoting integrated vector management**
Efforts are needed to strengthen the infrastructure for integrated vector management, embed it in existing health services and link it with other sectors (agriculture, irrigation, environment, public works, information and education).

7. **Collecting information at local level**
Mapping of disease distribution and populations at risk will allow better targeting of MDA and other interventions and thus ensure the efficient use of resources.

8. **Early protection of children**
Many of the neglected tropical diseases start early in life, placing children at risk during a period of intense physical and intellectual development and further increasing their vulnerability to permanent impairment of achieving their potential. Similar to the principle of immunization – whereby children receive early protection against a set of common infections according to a schedule of vaccinations and boosters – children can also be protected against a set of tropical diseases and their severe manifestations through a schedule of early systematic treatments that continue into adulthood and make use of routine systems and services to ensure sustainability.

9. **Post-implementation surveillance and monitoring**
Surveillance and monitoring of diseases are fundamental for preserving hard-won successes against neglected tropical diseases. Post-implementation surveillance and constant monitoring activities should be carried out. Interventions need to be sustained over a sufficient time to produce long-term impact and protect new generations from infection.

10. **Intensifying control of diseases alongside pro-poor policies**
The fight against neglected tropical diseases should form an integral part of pro-poor policies. The introduction of basic public health measures, such as primary health-care services, health education and improved access to clean water and sanitation, would significantly reduce the burden of a number of diseases.
Vicious cycle of poverty: 
the need to act now

Neglected tropical diseases thrive under conditions of poverty, poor sanitation, unsafe water and malnutrition. However, a growing body of evidence clearly demonstrates that, even under these conditions, significant and sustainable gains can be made against neglected tropical diseases in immediate and visible ways. The control of these diseases brings a number of collateral benefits in terms of improved health status of populations, increased worker productivity and long-term increases in the domestic pool of resources, thus contributing to educational improvement and economic growth.

The control of neglected tropical diseases will clearly involve tackling social, environmental, economic and psychological factors. The drive to control these diseases has often brought essential interventions and services into remote areas for the first time. In some instances, these initiatives have played a pioneering role, making the first inroads into problems long considered insurmountable. These diseases are central to human rights as they deal with issues related to poverty, discrimination and stigma as well as the right to health.

Large-scale and highly effective strategies are immediately feasible

Exceptionally high returns on investment from both a clinical aspect and an economic perspective have been proved by many interventions. Intensified control of tropical diseases can move forward immediately: no technical barriers stand in the way. Even the weakness of health systems in most endemic areas is not an absolute impediment to intensified control, especially when expansion is incremental, district by district and with additional logical interventions added as the package evolves to meet comprehensive health needs for a given locality and epidemiological setting.

For one group of these diseases, the impetus to act immediately takes added force from the availability of powerful and cost-effective control tools, well-developed implementation strategies and abundant evidence that they bring results. Annual preventive chemotherapy packages with safe, simple drugs represent some of the best buys in public health presently available, particularly as involvement of local communities develops favourable circumstances for sustainability. These successes provide opportunities to achieve several of the Millennium Development Goals and development targets.
International commitment for poverty reduction is stronger than ever

Today, extreme poverty reduction remains high on the agenda of international agencies, bilateral donors and non-governmental organizations.

Poverty reduction is feasible if resources are allocated as a package for the control or elimination of neglected tropical diseases, which prevent poor people from earning their livelihood.

A reduction in the communicable disease burden will enable communities to become more economically active, thereby narrowing the gap between poor and rich.

Great strides forward can be made now, even in very poor and largely illiterate populations, pending longer-term improvements in living conditions, service infrastructures and income status.

Sweeping away neglected tropical diseases from the developing world means providing affected populations with a vehicle for other interventions to bring prosperity to local economies: to access education, eradicate poverty and, finally, build sustainable development.

Defeating neglected tropical diseases will bring benefit to millions of people and protect them from disability, ill-health and poverty.

Unprecedented momentum against neglected tropical diseases has received further impetus from the precise targets and systematic approaches embodied in the Millennium Development Goals. In agreeing on these ambitious goals, world leaders committed the international community to a common set of development objectives for improving health, reducing poverty and protecting the physical environment. Viewed against these objectives, the control of tropical diseases is a pro-poor initiative with benefits well beyond health that contribute directly to some goals and indirectly to several others.

Control of these diseases will invigorate neglected populations to take charge of their own health, promote economic productivity and improve their lives.

Defeating neglected tropical diseases is synonymous with sustainable and permanent improvements in underdeveloped countries.
WHO Department of Control

WHO has further developed its conceptual framework, moving from a purely disease-centred approach to an integrat
neglected tropical diseases as a group.
The NTD department uses a three-pronged approach for reducing the negative impacts of neglected tropical diseas:

1. Broader and sustained coverage with rapid-impact interventions.
2. Enhanced vector control to simultaneously reduce the transmission of several diseases.
3. Improved surveillance and high-quality care in resource-limited settings for all tropical diseases,
reducing deaths.

Director

Department of Control Diseases (NTD)

Communications and Capacity Building (CCB)

Preventive Chemotherapy and Transmission Control (PCT)
PCT focuses on tool-ready diseases and the availability of safe and effective drugs to implement large-scale preventive chemotherapy

Vector Ecology and Management (VEM)
VEM helps to promote strategies and guidelines based on principles and approaches of integrated vector management, including sound management of pesticides
of Neglected Tropical Diseases

Innovative and Intensified Disease Management (IDM)

IDM focuses on tool-deficient diseases to enable them to be easily managed within the primary health care system

Neglected Zoonotic Diseases (NZD)

NZD helps prevent occurrence of zoonotic diseases in humans by controlling and eliminating them in their animal reservoirs
Special thanks

On behalf of the millions of people who have benefited free of charge from treatment and prevention programmes, the WHO Department of Control of Neglected Tropical Diseases thanks the donors, partners, foundations, pharmaceutical companies donating drugs, nongovernmental organizations, health ministries and colleagues in WHO regions. The progress made thus far would not have been possible without their generosity, support and hard work.

Given the large numbers of contributors and space constraints, we have omitted to list their names. However, their involvement and commitment are not omissible from both past and future successes against neglected tropical diseases.
“A future free of neglected tropical diseases”