

Summary

Working to overcome the global impact of neglected tropical diseases

First WHO report on neglected tropical diseases



World Health
Organization

Working to overcome the global impact of neglected diseases

First WHO report on neglected tropical diseases

Summary



**World Health
Organization**

WHO Library Cataloguing-in-Publication Data

First WHO Report on neglected tropical diseases: working to overcome the global impact of neglected tropical diseases.

1 Tropical medicine - trends. 2 Endemic diseases. 3 Poverty areas. 4. Parasitic diseases. 5 Developing countries. 6. Annual reports.
I. World Health Organization

ISBN 978 92 4 1564090 (NLM Classification: WC 680)

Working to overcome the global impact of neglected tropical diseases was produced under the overall direction and supervision of Dr Lorenzo Savioli (Director, WHO Department of Control of Neglected Tropical Diseases), and Dr Denis Daumerie (Programme Manager, WHO Department of Control of Neglected Tropical Diseases) with contributions from staff serving in the department.

Regional directors and members of their staff provided support and advice.

Valuable inputs in the form of contributions, peer reviews and suggestions were received by members of the Strategic and Technical Advisory Group for Neglected Tropical Diseases.

The report was edited by Professor David W.T. Crompton, assisted by Mrs Patricia Peters.

© World Health Organization 2010

All rights reserved. Publications of the World Health Organization can be obtained from WHO Press, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland (tel.: +41 22 791 3264; fax: +41 22 791 4857; e-mail: bookorders@who.int). Requests for permission to reproduce or translate WHO publications – whether for sale or for noncommercial distribution – should be addressed to WHO Press, at the above address (fax: +41 22 791 4806; e-mail: permissions@who.int).

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

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by the World Health Organization to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall the World Health Organization be liable for damages arising from its use.

Design and cover: Denis Meissner

Layout: Denis Meissner, Claudia Corazzola

Printed by WHO/DUP

WHO/HTM/NTD/2010.1

The logo consists of a large, stylized letter 'C' in blue, with a white outline and a grey shadow effect. The 'C' is positioned to the left of the word 'Contents'.

Director-General's message	iii
What are neglected tropical diseases?	1
What work is being done to overcome neglected tropical diseases?	3
What are the challenges for the future?	4
How did WHO refocus its approach?	6
What are the common features of neglected tropical diseases?	7
What are the new strategic approaches?	9
How does control of neglected tropical diseases contribute to strengthening health systems?	11
Conclusions	13

Director-General's message



Overcoming
neglected tropical
diseases:
a pro-poor
strategy on a
grand scale

Though medically diverse, neglected tropical diseases form a group because all are strongly associated with poverty, all flourish in impoverished environments and all thrive best in tropical areas, where they tend to co-exist. Most are ancient diseases that have plagued humanity for centuries.

Once widely prevalent, many of these diseases gradually disappeared from large parts of the world as societies developed and living conditions and hygiene improved. Today, though neglected tropical diseases impair the lives of an estimated 1 billion people, they are largely hidden, concentrated in remote rural areas or urban slums and shantytowns. They are also largely silent, as the people affected or at risk have little political voice.

Neglected tropical diseases have traditionally ranked low on national and international health agendas. They cause massive but hidden and silent suffering, and frequently kill, but not in numbers comparable to the deaths caused by HIV/AIDS, tuberculosis or malaria. Tied as they are to impoverished tropical settings, they do not spread to distant countries and only rarely affect travellers as, for example, during outbreaks of dengue. Because they are a threat only in

impoverished settings, they have low visibility in the rest of the world. Though greatly feared in affected populations, they are little known and poorly understood elsewhere. While the scale of the need for prevention and treatment is huge, the poverty of those affected limits their access to interventions and the services needed to deliver them. Diseases linked to poverty likewise offer little incentive to industry to invest in developing new or better products for a market that cannot pay.

Today, neglected tropical diseases have their breeding grounds in the places left furthest behind by socioeconomic progress, where substandard housing, lack of access to safe water and sanitation, filthy environments, and abundant insects and other vectors contribute to efficient transmission of infection. Close companions of poverty, these diseases also anchor large populations in poverty. Onchocerciasis and trachoma cause blindness. Leprosy and lymphatic filariasis deform in ways that hinder economic productivity and cancel out chances for a normal social life. Buruli ulcer maims, especially when limbs have to be amputated to save a life. Human African trypanosomiasis (sleeping sickness) severely debilitates before it kills, and mortality approaches 100% in untreated cases. Without post-exposure prophylaxis, rabies causes acute encephalitis and is always fatal. Leishmaniasis, in its various forms, leaves deep and permanent scars or entirely destroys the mucous membranes of the nose, mouth and throat. In its most severe form, it attacks the internal organs and is rapidly fatal if untreated. Chagas disease can cause young adults to develop heart conditions, so that they fill hospital beds instead of the labour force. Severe schistosomiasis disrupts school attendance, contributes to malnutrition and impairs the cognitive development of children. Guinea-worm disease causes excruciating, debilitating pain, sometimes for extended periods and often coinciding with the peak agricultural season. Dengue has emerged as a rapidly spreading vector-borne disease affecting mostly poor, urban populations; it is also the leading cause of hospital admissions in several countries.

The consequences are costly for societies and for health care. Such costs include intensive care for dengue haemorrhagic fever and clinical rabies, surgery and prolonged hospital stays for Chagas disease and Buruli ulcer, and rehabilitation for leprosy and lymphatic filariasis. For some diseases, such as African sleeping sickness and leishmaniasis, treatments are old, cumbersome to administer and toxic. For others, especially the diseases that cause blindness, the damage is permanent. Clinical development of rabies can be prevented through timely immunization after exposure, but access to life-saving biologicals is expensive and is not affordable in many Asian and African countries. For most of these diseases, stigma and social exclusion compound the misery, especially for women.

Fortunately, these problems are now much better documented and much more widely recognized. They are also being addressed. Recent developments on several fronts have radically changed the prospects for controlling these diseases, and new initiatives are enabling the people left behind by socioeconomic progress to catch up. The ambitions for health development have broadened, creating space for neglected tropical diseases. The Millennium Declaration and its Goals recognize the contribution of health to the overarching objective of reducing poverty. Efforts to control neglected tropical diseases constitute a pro-poor strategy on a grand scale. The logic has changed: instead of waiting for these diseases to gradually disappear as countries develop and living conditions improve, a deliberate effort to make them disappear is now viewed as a route to poverty alleviation that can itself spur socioeconomic development.

As this report shows, reaching such an objective is now entirely feasible for the masses of people known to be affected or at risk. Good medicines are available for many of these diseases,

and research continues to document their safety and efficacy when administered individually or in combination. Generous drug donations by pharmaceutical companies have helped relieve some of the financial barriers and allowed programmes to scale up coverage. A strategy of preventive chemotherapy, which mimics the advantages of childhood immunization, is being used to protect entire at-risk populations and reduce the reservoir of infection. The fact that many of these diseases overlap geographically has practical advantages: preventive chemotherapy regimens are being integrated so that several diseases can be tackled together, thus streamlining operational demands and cutting costs. An integrated approach to vector management likewise maximizes the use of resources and tools for controlling vector-borne diseases.

Governments and foundations have contributed substantial funds. Research to develop new tools (such as medicines, diagnostics, vaccines and medical devices) and improve the delivery of existing ones has increased. The momentum continues to grow. As the report shows, nearly 670 million people had been reached with preventive chemotherapy by the end of 2008. For some of these diseases, evidence indicates that, when a certain threshold of population coverage is reached, transmission drops significantly; this raises the possibility that several of these ancient diseases could be eliminated by 2020 if current efforts to scale up interventions for preventive chemotherapy are increased.

While the report highlights a number of remaining challenges, the overall message is overwhelmingly positive. It is entirely possible to control neglected tropical diseases. Aiming at their complete control and even elimination is fully justified, and this report sets out the solid evidence needed to achieve control. Above all, it makes the case for doing more, as an international community, to relieve hidden misery, on a grand scale, among people who would otherwise suffer in silence.



Dr Margaret Chan
Director-General
World Health Organization





What are neglected tropical diseases?

Neglected tropical diseases are a group of communicable diseases which thrive in impoverished settings and blight the lives of around one billion people worldwide, while threatening the health of millions more. Of the world's poorest 2.7 billion people (defined as those who live on less than US\$ 2.00 a day), more than 1 billion are affected by one or more neglected tropical disease. These diseases not only survive and spread in conditions of poverty, they also exacerbate and perpetuate the poverty of affected communities.

Once widely dispersed, many neglected tropical diseases are now concentrated in poor remote rural areas and also in urban slums and conflict zones. Most of these diseases gradually disappeared in many parts of the world as standards of living and hygiene improved. They cause blindness, disability, deformities or otherwise maim those who are affected. Others such as dengue and rabies are widespread and their geographical range is continuously increasing as the infection spreads to new areas.

The report focuses on 17 neglected tropical diseases and disease groups. There are 149 countries and territories where neglected tropical diseases are endemic, at least 100 of which are endemic for 2 or more of these diseases, and 30 countries that are endemic for 6 or more.

These diseases can be seen as promoters of poverty which weaken impoverished populations, frustrate the achievement of the health-related Millennium Development Goals and impede global development outcomes. A more reliable evaluation of their significance for public health and economies has convinced governments, donors, the pharmaceutical industry and other agencies, including nongovernmental organizations, to invest in preventing and controlling this diverse, but connected, group of diseases.



Mass vaccination campaign of dogs, United Republic of Tanzania. Dogs continue to be the main carrier of rabies, particularly in Africa and Asia. Humans most often become infected through the bite or scratch of an infected dog. Mass vaccination of pets helps to prevent occurrence of human rabies.

The neglected tropical diseases include a range of diseases caused by individual pathogens, and groups of conditions caused by related microbial species. The box below lists the 17 conditions considered in this report.

Most of the diseases in this group are parasitic diseases, caused by a variety of protozoan and helminth parasites. Many of them are spread by animal hosts such as dogs, fish and crustaceans or by vectors such as mosquitoes, blackflies, snails, sandflies, tsetse flies, bugs and common house flies. Others such as dracunculiasis and (in part) cysticercosis, echinococcosis and fascioliasis are transmitted by contaminated water, while helminthiasis is transmitted by soil contaminated with the eggs of parasitic worms. Human rabies infection usually occurs following a transdermal bite or scratch by an infected animal, frequently a dog, in developing countries; transmission cycles are perpetuated under conditions of environmental contamination and poor standards of living and hygiene. Important features of the main diseases are summarized in the Appendix.

The main neglected tropical diseases
Dengue
Rabies
Trachoma
Buruli ulcer
Endemic treponematoses (including yaws)
Leprosy
Chagas disease (American trypanosomiasis)
Human African trypanosomiasis (sleeping sickness)
Leishmaniasis
Cysticercosis
Dracunculiasis (guinea-worm disease)
Echinococcosis
Foodborne trematode infections
Lymphatic filariasis (elephantiasis)
Onchocerciasis (river blindness)
Schistosomiasis (bilharziasis)
Soil-transmitted helminthiasis (intestinal parasitic worms)

The World Health Organization (WHO) recommends five public-health strategies for the prevention and control of neglected tropical diseases:

- expansion of preventive chemotherapy;
- intensified case-detection and case-management;
- improved vector control;
- appropriate veterinary public health measures; and
- provision of safe water, sanitation and hygiene.

Although one approach may predominate for control of a specific disease or group of diseases, evidence suggests that more effective control results when all five approaches are combined and delivered locally.

Actions to address the suffering caused by neglected tropical diseases and assess how their impact extends into sectors other than health will:

- promote development by breaking the cycle of poverty and disease;
- foster health security by reducing the vulnerability of human populations and their livestock to infection; and
- strengthen health systems by embedding strategic approaches and locally appropriate interventions in national health programmes.



What work is being done to overcome neglected tropical diseases?

Activities to prevent and control neglected tropical diseases are now included in the policies and budgets of many endemic countries. This has led to the development of interventions that are appropriate to existing health systems, often with the support of implementing partners.

The involvement of the pharmaceutical industry and subsequent donations made to support the control of neglected tropical diseases have increased access to high-quality medicines at low cost or free of charge for hundreds of millions of poor people.

Global efforts to control “hidden” diseases, such as dracunculiasis (guinea-worm disease), leprosy, schistosomiasis, lymphatic filariasis and yaws, have yielded progressive health gains including the imminent eradication of dracunculiasis. Since 1989 (when most endemic countries began reporting monthly from each endemic village), the number of new dracunculiasis cases has fallen from 892 055 in 12 endemic countries to 3190 in 4 countries in 2009, a decrease of more than 99%.

In Africa and Asia, vaccines administered for post-exposure rabies prophylaxis are estimated to prevent approximately 272 000 deaths each year.

Overall, more than 670 million people in 75 countries benefitted from preventive chemotherapy for diseases caused by parasitic helminths during 2008. Lymphatic filariasis, onchocerciasis, schistosomiasis, soil-transmitted helminthiases and trachoma are being controlled mainly through this approach. These are a group of conditions with a high disease burden for which safe and simple treatments are available.

The number of new cases of the chronic form of human African trypanosomiasis (caused by *T. b. gambiense*) has fallen by 62%, from 27 862 in 1999 to 10 372 in 2008, and the number of newly reported cases of the acute form (caused by *T. b. rhodesiense*) has fallen by 58%, from 619 to 259, due largely to intensified case-detection and case-management.



© WHO

Space-spraying activity outside a public building during a chikungunya outbreak in Mauritius, 2006. Timely and proper space-spray application of insecticides is useful in reducing transmission of dengue and chikungunya.

The need for continuing surveillance and sustained response capacity is exemplified by the recent spread of dengue. From 2001 to 2009, a total of 6 626 950 cases were reported to WHO from more than 30 countries in the Region of the Americas, where all four serotypes of the virus circulate. During this period, there were 180 216 cases of dengue haemorrhagic fever and 2498 deaths. Dengue has resurged in the region in part because successful vector surveillance and control measures were not maintained after the campaign to eradicate the mosquito *Aedes aegypti*, the principal vector of dengue, during the 1960s and early 1970s. Explosive outbreaks of dengue now occur every 3–5 years. The South-East Asia Region accounts for most deaths, but a decline in case-fatality rates since 2007 has been attributed mainly to effective training in standardized case-management based on a network of expertise and training materials developed by Member States in the region. Today, dengue cases are reported from five of WHO's six regions, and even developed countries are becoming at risk.

Increasing willingness and commitment of local and global communities of partners to work with endemic countries have brought resources, innovation, expertise and advocacy to efforts to overcome neglected tropical diseases. Intersectoral collaboration, involving education, nutrition and agriculture, including animal health and environmental protection has also reinforced control of neglected tropical diseases.



What are the challenges for the future?

This first WHO report on neglected tropical diseases also identifies challenges that will have to be faced if the achievements in prevention and control are to be sustained and extended.

International support – Despite global economic constraints, bilateral and international support from countries, development agencies and non governmental organizations (NGOs) will need to be sustained. These commitments should encourage others to expand their support for developing the services needed to overcome neglected tropical diseases.

Environmental factors – Planning for the development and control of neglected tropical diseases should take into account the effects of porous borders, population growth and migration, urbanization, the movement of livestock and vectors, and the political and geographical consequences of climate change. Several of these factors help to explain, for example, the rapidly increasing international spread of dengue.

Timely responses – As control interventions reach more people and new technology is embraced, more rapid responses will need to be made to information about the epidemiology, transmission and burden of neglected tropical diseases. Similarly, programme managers will need to react quickly to information about the coverage, compliance, acceptance and impact of interventions.

Professional expertise – Expertise in individual neglected tropical diseases is lacking in some countries, and continues to decline in others. The decline in expertise is particularly marked in the areas of vector control, case-management, pesticide management and veterinary aspects of public health, and should be addressed as a priority. For example, the most effective ways to prevent and control rabies are not well known or well understood in many countries where the disease exists. As expansion of prevention and control activities increases, the need to strengthen health systems, and to train and support staff in technical and management expertise, will become more urgent.

Medicines for prevention and treatment – Targets for coverage set by the World Health Assembly for control of lymphatic filariasis, schistosomiasis, soil-transmitted helminthiases and trachoma will not be met, notably in the WHO African and South-East Asia regions, unless implementation of preventive chemotherapy is substantially increased. In 2008, only 8% of people with schistosomiasis had access to high-quality medicines. Donations of praziquantel from the private sector, and funds for its production, are insufficient to provide the quantities of this essential medicine needed to control schistosomiasis. The provision of medicines to treat the soil-transmitted helminthiases must also be increased significantly. Production of medicines used to treat neglected tropical diseases needs to be made more attractive to companies which manufacture generic pharmaceuticals.

Research – A research strategy is required for the development and implementation of new medicines, particularly for leishmaniasis and trypanosomiasis; new application technologies and products for vector control; vaccines for dengue; and new diagnostics that will be accessible to all who need them.



Children confirming haematuria (blood-urine) by show of hands during a schistosomiasis (bilharziasis) education session at a primary school in Bongo, Ghana. Schistosomiasis causes anaemia, stunted growth and a reduced ability to learn among children.

© Wilson M.

ow did WHO refocus its approach?

In 2003, WHO initiated a paradigm shift in the control and elimination of a group of neglected tropical diseases. This involved an important strategic change, from a traditional approach centred on specific diseases to an integrated response to the health needs of impoverished and marginalized communities. From a public-health perspective, the change translates into preventive measures and the provision of care and delivery of treatment to underserved populations through application

of interventions based on tools for controlling neglected tropical diseases. It ensures a more efficient use of limited resources and the alleviation of poverty and accompanying illness for millions of people living in poverty in rural and urban areas.

This emerging vision was sharpened at a meeting held in Berlin, Germany, in December 2003 at which experts from diverse sectors were convened, including public health, economics, human rights, research, NGOs and the pharmaceutical industry. The meeting set the scene for WHO to move forward in applying the new approach in a strategic policy and to formulate ways of providing poor populations with an effective and comprehensive solution to some of their main health problems. From 2003 to 2007, a framework was developed for a coordinated and integrated mechanism to tackle the neglected tropical diseases.



© WHO *Distribution of mebendazole to school children in Bac Can province in Viet Nam. The use of the school infrastructure to deliver deworming allows a low-cost distribution of medicines and ensures a higher rate of treatment coverage.*

Following the second meeting of partners in Berlin in 2005, WHO proposed that the vaguely defined term “other communicable diseases” be changed to the more sharply focused “neglected tropical diseases.” This change neatly encapsulated the paradigm shift responsible for the new approach to dealing with neglected tropical diseases. The change recognizes that NTD control can be achieved if three requirements are met:

- attention and action are given to the health needs of populations affected by neglected tropical diseases rather than to their individual diseases;
- interventions to deliver treatments are integrated with control measures; and
- evidence-based advocacy is deployed to generate resources for control from the international community.

In April 2007, WHO convened the first meeting of Global Partners on neglected tropical diseases, which was attended by more than 200 participants, including representatives from Member States, United Nations agencies, the World Bank, philanthropic foundations, universities, pharmaceutical companies, international NGOs and other institutions dedicated to contributing their efforts and resources to tackling these diseases.

The participants recognized that a turning point had been reached in the efforts to overcome neglected tropical diseases: the concept of “neglected” will be confined to the history of public health.



What are the common features of neglected tropical diseases?

The 17 neglected tropical diseases profiled in the report share several common features, principally their impact on the lives of populations living in poverty, as set out below.

Common features of neglected tropical diseases

A proxy for poverty and disadvantage

Neglected tropical diseases have an enormous impact on individuals, families and communities in developing countries in terms of disease burden, quality of life, loss of productivity, the high cost of long-term care and the aggravation of poverty. They constitute a serious obstacle to socioeconomic development and quality of life at all levels.

Affect populations with low visibility and little political voice

This group of diseases largely affects low-income and often politically marginalized people living in isolated rural and underserved urban areas. Such people cannot readily influence administrative and governmental decisions that affect their health, and often seem to have no constituency that speaks on their behalf. Diseases associated with rural and urban poverty may have little impact on decision-makers in capital cities and their expanding populations.

Do not travel widely

Unlike influenza, HIV/AIDS, and malaria and, to a lesser extent, tuberculosis, most neglected tropical diseases generally do not spread widely, and so present little threat to the inhabitants of high-income countries. Rather, their distribution is restricted by climate and its effect on the distribution of vectors and reservoir hosts; for most of these diseases, there is little risk of transmission beyond the tropics.

Cause stigma and discrimination, especially affecting girls and women

Many neglected tropical diseases cause disfigurement and disability, leading to stigma and social discrimination. In some cases, their impact disproportionately affects girls and women, whose marriage prospects may diminish or who may be left vulnerable to abuse and abandonment. Some neglected tropical diseases contribute to adverse pregnancy outcomes.

Have an important impact on morbidity and mortality

The former widespread assumptions held by the international community that people at risk of neglected tropical diseases experience relatively little morbidity, and that these diseases have low rates of mortality, have been comprehensively refuted. A large body of evidence, published in peer-reviewed medical and scientific journals, has demonstrated the nature and extent of the adverse effects of neglected tropical diseases.

Are relatively neglected by research

Research is needed to develop high-quality medicines, diagnostic and vector control tools and to make accessible interventions to prevent, cure and manage the complications of all neglected tropical diseases.

Can be controlled, prevented and possibly eliminated using effective and feasible solutions

The five strategic interventions recommended by WHO (preventive chemotherapy; intensified case-management; vector control; the provision of safe water, sanitation and hygiene; and veterinary public health) make feasible the control, prevention and even elimination of several neglected tropical diseases. Costs are relatively low.



Students discussing leprosy at school in India. Access to information, diagnosis and treatment with multidrug therapy remain key elements of WHO's drive to eliminate leprosy.



What are the new strategic approaches?

Implementation of preventive chemotherapy – A strategy first used for delivering anthelmintic medicines by means of a population-based approach – focused on optimizing the use of single-administration medicines targeted simultaneously at more than one form of helminthiasis. Efforts to tackle helminth infections in a coordinated fashion can be traced back to the 2001 World Health Assembly resolution WHA54.19 on schistosomiasis and soil-transmitted helminth infections, which set common objectives and goals for their prevention and control.

Five years later in 2006, this concept was further developed when WHO published a manual on preventive chemotherapy for helminthiasis recommending the integrated implementation of interventions against the four main helminth diseases (lymphatic filariasis, onchocerciasis, schistosomiasis and the soil-transmitted helminthiases) based on the coordinated use of a set of powerful anthelmintic medicines with an impressive safety record. Preventive chemotherapy is now implemented worldwide and is used to treat more than half a billion people every year.

Success of preventive chemotherapy is attributable to a number of factors including:

- the impact of preventive chemotherapy in reducing morbidity and sustaining decreases in transmission;
- demonstration of the association of helminth infections with poverty and disadvantage, and of the geographical overlap of the four main helminth infections targeted;
- the added benefits of controlling a number of parasitic infestations not specifically targeted by the intervention (such as strongyloidiasis, scabies and lice);
- flexibility of treatment that allows the expansion of its target to other helminth infections (such as foodborne trematode infections).

The use of existing mechanisms to deliver anthelmintic medicines provides a platform to target other communicable diseases (such as trachoma), and paves the way for expanding a public-health approach that shares common features with immunization.

Enhanced case management – For protozoan and bacterial diseases, such as human African trypanosomiasis, leishmaniasis, Chagas disease and Buruli ulcer, the new focus on better access to specialized care through improved case detection and decentralized clinical management aims to prevent mortality, reduce morbidity and interrupt transmission.

Better use of existing tools – The development of better, safer, more affordable and simpler-to-use diagnostic methods and medicines must be promoted. But until new methods become available, the focus remains on optimizing the use of existing treatments and expanding their access to a greater number of people, who may immediately benefit from a more coordinated strategic approach, through innovative and intensified interventions.

Integrated vector control – The approach to vector control has also been revisited in light of the new, integrated strategic framework. Vector control now serves as an important cross-cutting activity aimed at enhancing the impact and performance of both preventive chemotherapy and case-management. Integrated vector management is an effective combination of different interventions and forms part of an intersectoral and inter-programmatic collaboration within the health sector and with other sectors, including agriculture and the environment. Its aim is to improve the efficacy, cost-effectiveness, ecological soundness and sustainability of disease control measures against vector-borne neglected tropical diseases.

Coordination of zoonosis control – Several of the important neglected tropical diseases are zoonotic diseases, transmitted via animal hosts (including cysticercosis, echinococcosis, foodborne trematode infections, rabies). There is growing evidence that a joint human and animal health approach with better surveillance and diagnosis will improve the prevention and control of neglected zoonotic diseases in tropical countries.

Boy presenting Romaña sign waiting to be seen by a doctor in Sonsonate, El Salvador, 2007.

Chagas disease is curable if treatment is initiated soon after infection, but cure rates diminish the longer it takes to tackle the infection. Purplish swelling of both lids of one eye, also called the Romaña sign, is a possible visible mark of acute infection.



© Valladares M. Unidad de vectores SIBASI Sonsonate. Ministerio de Salud Pública y Asistencia Social



How does control of neglected tropical diseases contribute to strengthening health systems?

A health system consists of all the organizations, people and actions whose primary intent is to promote, restore or maintain health. The system includes direct health-improving activities and efforts to influence determinants of health. A health system consists of more than the pyramid of publicly owned facilities that deliver personal health services. Mothers caring for sick children, private health providers, vector-control campaigns, health insurance organizations and occupational health and safety legislation all form part of a health system. Intersectoral action by health staff – for example to encourage a Ministry of Education to promote female education – is a well known determinant of better health.

Growing recognition by the global community of the unacceptable scale and severity of morbidity resulting from neglected tropical diseases, coupled with changes in thinking about how to prevent and control them, has provided an opportunity to contribute to strengthening health systems in the countries where these diseases have such detrimental effects on health and productivity.

WHO advocates the prevention and control of neglected tropical diseases using the six components (or core building blocks) that will strengthen the health systems of endemic countries. The components are:

delivery of effective, safe, quality-assured health interventions to the individuals and communities who need them, when and where they need them, with the minimum waste of resources;

health workforce able to perform responsively, fairly and efficiently to achieve the best health outcomes possible, given the available resources and circumstances, with enough trained and competent staff appropriately distributed to meet needs;

health information system to ensure the production, analysis, dissemination and use of reliable and timely information on health determinants, health-system performance and health status;



© Gabrielli A.

Man cleaning fish in Thanh Hóa province, north central Viet Nam. Consumption of traditional dishes containing raw fresh-water fish is linked with transmission of clonorchiasis and opisthorchiasis.

equitable access to essential medicines, vaccines and technologies of assured quality, safety, efficacy and cost-effectiveness, and their scientifically sound and cost-effective delivery;

health financing system to raise adequate funds for health in ways that ensure access to services for all and that people are protected from financial catastrophe or impoverishment by the cost of health care;

leadership and governance to ensure that strategic policy frameworks exist and are combined with effective oversight, coalition-building, regulation, attention to system-design and transparent accountability.



© Gabrielli A.

The human-animal interface in a street market scene in Mbour, Senegal. As many diseases affecting vulnerable populations originate from animals, an integrated human and animal health approach is needed to prevent disease occurrence in humans.

Close collaboration among WHO, countries and partners is beginning to show that the integration of neglected tropical diseases control can help to strengthen health systems. In 2007, with considerable support from the United States Congress, a programme was initiated to expand control of selected neglected tropical diseases in communities in five countries in Africa (Burkina Faso, Ghana, Mali, Niger and Uganda). This programme began just as awareness was increasing that neglected tropical diseases control could be a mechanism for strengthening health systems. In 2007, towards the end of the first year of the programme, an independent evaluation reported that, while the degree of integration of control of neglected tropical diseases into the health systems of the five countries was variable (from partial to fully integrated), there was evidence of strengthening through capacity building in the health workforce and through the introduction of monitoring procedures. For example, the distribution of albendazole, ivermectin, praziquantel and azithromycin, totalling about 37 million doses, to those in need would not have been possible without the training of more than 100 000 people.

The now widely used arrangements for treating children for schistosomiasis and soil-transmitted helminthiases through delivery at primary schools also gives opportunities for health education. Providing instruction to people on how to care for relatives or others in their community suffering from disabling morbidity from dracunculiasis and lymphatic filariasis strengthens health systems, thereby improving delivery and equitable access.



1. The paradigm shift towards an integrated approach to the control of neglected tropical diseases has enabled Member States and partners to find innovative solutions to enable weak health systems to target the people most in need: the poorest sectors of the population with limited or non-existent financial means.

2. Grouping several diseases together under a new conceptual framework presents an opportunity to recalculate the collective burden associated with this set of diverse afflictions as well as their cumulative public-health significance. The framework has also enabled WHO to raise the profile of neglected tropical diseases and to mobilize resources for scaling up implementation of activities for their control and elimination worldwide.

3. This report is the first of its kind to detail the work of WHO and its partners towards overcoming the global impact of neglected tropical diseases, work that began during the early years of WHO. It contains quantitative information and evidence about the situation of neglected tropical diseases in the world today, focusing on progress made in reducing the transmission of widely prevalent pathogens and their associated morbidity and mortality in millions of people.

4. Although neglected tropical diseases are a diverse group of conditions, they share a common impact on populations whose lives are blighted by poverty. During the past decade, the wider international community recognized this situation as unacceptable, and this recognition stimulated the growth of a community of partners committed to bringing resources and expertise to the task of overcoming neglected tropical diseases.

5. WHO will continue to provide technical advice to governments and other organizations, develop strategies for prevention and control, compile quantitative information about the distribution of neglected tropical diseases and the coverage and implementation of activities, and coordinate the work of its community of partners.

“ For the first time, we have a head start on these ancient companions of poverty. For the first time, more than 1 billion people left behind by socioeconomic progress have a chance to catch up. I believe this is our shared ambition. ”

WHO's Director-General Dr Margaret Chan setting out her vision for the future of neglected tropical diseases control in an address to the Global Partners' meeting in 2007 in Geneva, Switzerland.



Classification of neglected tropical diseases

Of the 17 neglected tropical diseases presented in the report, 9 are caused by microparasites and 8 by macroparasites. This arbitrary classification enabled Anderson and May in 1991 to elucidate principles governing the population dynamics, epidemiology and courses of infection of pathogens that severely impair human health.*

Most microparasites have simple life-cycles and a tendency to replicate within the host. Transmission may be (i) direct, through environmental contamination; (ii) direct, through intimate contact, including the transplacental route; (iii) indirect, through a vector that may or may not be an intermediate host; or (iv) through blood transfusions or organ transplants. The infections microparasites cause range from acute (death or recovery), recurrent (repeated growth and decay of organisms in the host) or inapparent (dormant and difficult to detect) to subclinical (symptomless but detectable).

Macroparasites usually have complex life-cycles involving intermediate and reservoir hosts, and a tendency not to replicate in the definitive human host. Some species of soil-transmitted helminths are an exception in that they do not require intermediate hosts. Transmission may be (i) direct, through ingestion from a contaminated environment; (ii) direct, through skin penetration; (iii) indirect, through ingestion of an infected intermediate host or tissues of a reservoir host; or (iv) indirect, through a vector serving as an intermediate host. The infections caused by macroparasites tend to be chronic rather than acute, and mortality rates are considered low, given the millions of people experiencing disease.

Overcoming infections caused by a number of microparasites and macroparasites is made more difficult because their survival and transmission often exploits a zoonotic component. Zoonotic infections are those in which humans – through behaviour, culture or food supply – have become incorporated into the transmission cycle of pathogens responsible for diseases in wild or domesticated animals.

* Anderson RM, May RM. *Infectious diseases of humans: dynamics and control*. Oxford, Oxford University Press, 1991.



The main neglected tropical diseases

Dengue a mosquito-borne viral disease. The most severe forms of the disease are dengue haemorrhagic fever and dengue shock syndrome; these are usually fatal within 12–24 hours.

Rabies a viral zoonotic disease mainly transmitted to humans through the bite of an infected dog. Rabies has a long incubation period and is always fatal within a few days of the onset of symptoms.

Trachoma a bacterial infection of the eye, caused by *Chlamydia trachomatis*. It is spread through contact with eye discharge from an infected person and is also transmitted through eye-seeking flies. Untreated, this condition leads to the formation of irreversible corneal opacities and blindness.

Buruli ulcer a severe skin disorder caused by the bacterium *Mycobacterium ulcerans*, which belongs to the same family of organisms that cause leprosy and tuberculosis. Left untreated, it causes destruction of the skin and, in some cases, of bone, eyes and other tissue.

Endemic treponematoses – yaws, endemic syphilis (bijel) and pinta – are a group of chronic bacterial infections caused by treponemes that principally affect the skin.

Leprosy a chronic bacterial infection caused by the bacillus *Mycobacterium leprae*. The disease mainly affects the skin, peripheral nerves, mucosa of the upper respiratory tract and the eyes. The disease can now be cured easily using multidrug therapy.

Chagas disease (American trypanosomiasis) – a chronic debilitating condition caused by a protozoan parasite transmitted by the infected faeces of blood-sucking bugs, through transfusion of infected blood, by organ transplantation or congenitally from an infected mother to her fetus.

Human African trypanosomiasis (sleeping sickness) – a protozoan parasitic disease spread by the bite of the tsetse fly in impoverished rural areas of sub-Saharan Africa. When symptoms develop, the patient is often approaching the terminal stage of the disease which involves the central nervous system.

Leishmaniasis a protozoan parasitic infection transmitted by the bite of the sandfly. Visceral leishmaniasis, which attacks the internal organs, is the most severe form. Cutaneous leishmaniasis commonly causes ulcers of the face, arms and legs and leaves severe and permanently disfiguring scars and disability.

Cysticercosis, a severe helminth infection responsible for neurological damage, occurring in many resource-poor countries. It is acquired when humans ingest eggs released in the environment by the faeces of carriers of the tapeworm *Taenia solium*.

Dracunculiasis (guinea-worm disease) – a helminth infection transmitted by contaminated drinking-water. It is characterized by the emergence of a one-metre-long worm from a skin ulcer, usually in the leg.

Echinococcosis a helminth infection in which the larval form of the tapeworm *Echinococcus granulosum* gives rise to the formation of cysts in many organs; it occurs in individuals who live in close contact with domestic animals such as dogs and sheep which host the adult tapeworms.

Foodborne trematode infections a group of parasitic worm infections transmitted through consumption of raw fish, crustaceans or vegetables. They are prevalent in a number of tropical countries where they are responsible for severe morbidity, affecting especially in the liver and lungs.

Lymphatic filariasis (elephantiasis) a severely debilitating, disfiguring and stigmatizing disease caused by parasitic worms. It usually causes abnormal enlargement of the limbs and the genitals.

Onchocerciasis (river blindness) – caused by a filarial worm that is transmitted to humans through the bites of infected blackflies. The larvae mature to adult worms, causing a variety of conditions, including blindness.

Schistosomiasis (bilharziasis) – a disease caused by several species of parasitic blood flukes (trematodes) that leads to chronic ill-health. Infection is acquired from contaminated fresh water that contains the larval forms, known as schistosomes.

Soil-transmitted helminthiases – also termed intestinal worm infections – are found worldwide in areas of poor sanitation. They are caused by four species of worms that infect children, leading to anaemia, vitamin A deficiency, stunted growth, malnutrition, intestinal obstruction and impaired development.



Child receiving treatment at Agogo hospital, Ghana. Early detection of Buruli ulcer disease is crucial to prevent complications and surgery.

© National Buruli Ulcer Control Programme, Ghana

WHO regional offices

Regional Office for Africa

Cite du Djoue, P.O.Box 06
Brazzaville, Congo
Telephone: + 242 839 100 / +47 241 39100
Facsimile: + 242 839 501 / +47 241 395018
E-mail: regafro@afro.who.int

Regional Office for the Americas

525, 23rd Street, N.W.
Washington, DC 20037, USA
Telephone: +1 202 974 3000
Facsimile: +1 202 974 3663
E-mail: postmaster@paho.org

Regional Office for South-East Asia

World Health House
Indraprastha Estate
Mahatama Gandhi Marg
New Delhi 110 002, India
Telephone: + 91-11-2337 0804
Facsimile: + 91-11-2337 9507
E-mail: guptasmithv@searo.who.int

Regional Office for Europe

8, Scherfigsvej
DK-2100 Copenhagen 0, Denmark
Telephone: + 45 39 171 717
Facsimile: + 45 39 171 818
E-mail: postmaster@euro.who.int

Regional Office for the Eastern Mediterranean

Abdul Razzak Al Sanhoury Street,
P.O. Box 7608,
Nasr City, Cairo 11371, Egypt
Telephone: + 202 2276 50 00
Facsimile: + 202 2670 24 92 or 2670 24 94
E-mail: postmaster@emro.who.int

Regional Office for the Western Pacific

P.O. Box 2932
1000 Manila, Philippines
Telephone: + 63 2 528 8001
E-mail: postmaster@wpro.who.int

Neglected tropical diseases blight the lives of a billion people worldwide and threaten the health of millions more. These close companions of poverty weaken impoverished populations, frustrate the achievement of health in the Millennium Development Goals and impede global public health outcomes.

Wider recognition of the public health significance of neglected tropical diseases and better knowledge of their epidemiology have stimulated necessary changes in public health thinking to approach and achieve control. The World Health Organization (WHO) recommends five public-health strategies for the prevention and control of these diseases: preventive chemotherapy, intensified case management, vector control, veterinary public health, and safe water, sanitation and hygiene. Although one approach may predominate for control of a specific disease or group of diseases, evidence suggests that more effective control results when all five approaches are combined and delivered locally.

This report presents evidence to demonstrate that activities undertaken to prevent and control neglected tropical diseases are producing results – and that achievements are being recognized. By 2008, preventive chemotherapy had reached more than 670 million people in 75 countries.

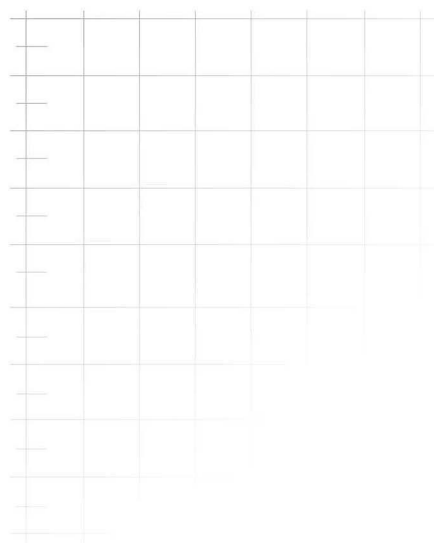
Leadership from WHO has catalysed the formation of a community of partners committed to supporting the governments of countries where these diseases are endemic with a shared purpose: working to overcome the global impact of neglected tropical diseases, and reducing the burden of morbidity and mortality that they impose on the health of their citizens and the economic productivity of their states. These diverse partners include bilateral and philanthropic donors, pharmaceutical companies, nongovernmental organizations, universities and charitable agencies; their dedicated resources are essential to deliver interventions and expand control of neglected tropical diseases to the millions of people in need.

**Department of
Control of Neglected
Tropical Diseases**

http://www.who.int/neglected_diseases

World Health Organization

20, avenue Appia
CH-1211 Geneva 27
tel: +41 22 791 2111
fax: +41 22 791 3111
visit WHO at: www.who.int



ISBN 978 92 4 156409 0



9 789241 564090