GLOBAL PLAN TO COMBAT NEGLECTED TROPICAL DISEASES

2008–2015

World Health Organization

WHO/CDS/NTD/2007.3

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ACKNOWLEDGEMENTS

This Global Plan was developed in consultation with technical staff at World Health Organization (WHO) regional offices and headquarters, external experts, WHO country representatives and country office staff. WHO wishes to thank the many governments, institutions and individuals who assisted in preparing the plan.

Special thanks are extended to the following WHO staff for their valuable contribution to the Global Plan:

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EXECUTIVE SUMMARY

Vision

Neglected tropical diseases (NTDs) and zoonoses are a devastating obstacle to human settlement and socioeconomic development of already impoverished communities.

A growing body of evidence demonstrates that control of these diseases can contribute directly to achievement of several Millennium Development Goals.

Interventions against NTDs and zoonoses have already benefited millions of people, protecting them from physical pain, disability and poverty.

Over the past decades, the World Health Organization (WHO), together with its partners, has formulated an innovative strategy to ensure cost-effective, ethical and sustainable control towards elimination or eradication of several NTDs. The strategy encompasses the following components:

- a multi-pronged approach;
- focus on populations and interventions rather than specific diseases;
- use of a quasi-immunization model for preventive chemotherapy;
- introduction of innovative tools for disease control;
- a multi-disease, intersectoral and interprogrammatic approach.

The "tool-ready" category of diseases is those for which powerful and inexpensive control tools are currently available and for which well-developed implementation strategies are immediately feasible. Large-scale use of safe and single-dose medicines (preventive chemotherapy) makes their control, prevention and possible elimination more feasible than ever before.

The major tasks for control of the tool-ready diseases are to expand coverage of packaged preventive chemotherapy interventions in order to access hard-to-reach populations at risk with innovative delivery systems and to continue regular treatment.

Current control strategies for the "tool-deficient" diseases rely on costly and difficult-to-manage tools. For most of those diseases, early detection and treatment are vital to avoid irreversible disability or death. There is urgent need to develop simple, safe and cost-effective tools and to make them accessible. Such innovative tools will drastically alter the existing control strategies.

The opportunities presented by an intersectoral and interprogrammatic approach and its successful use in many settings show that such a synergistic approach improves cost-effectiveness and ensures that all necessary treatments are simultaneously delivered to

neglected populations who nearly always suffer from several overlapping diseases linked to poverty.

The Global Plan aims to translate this strategy into reality.

Principles for action

The Global Plan has been formulated according to the following key principles:

- the right to health;
- existing health systems as a setting for interventions;
- a coordinated response by the health system;
- integration and equity;
- intensified control of diseases alongside pro-poor policies.

Challenges

The major challenges for controlling NTDs and zoonoses are:

- procurement and supply of anthelminthic medicines;
- quantification of the burden of NTDs among neglected populations;
- provision of treatment and other interventions free of charge to communities in need;
- a system for delivery of medicines to cover the entire at-risk population;
- delivery of multi-intervention packages;
- urgent development of diagnostic tools, medicines and pesticides;
- production of more effective medicines and insecticides;
- promotion of integrated vector management;
- advocating an intersectoral, interprogrammatic approach to control of NTDs;
- early protection of children;
- post-implementation surveillance and monitoring.

Goal and targets, 2008–2015

The goal of the Global Plan is to prevent, control, eliminate or eradicate NTDs.

The targets for the plan period 2008–2015 are:

- To eliminate or eradicate those diseases targeted in resolutions of the World Health Assembly and regional committees.
- To reduce significantly the burden of other tool-ready diseases through current interventions.
- To ensure that interventions using novel approaches are available, promoted and accessible for tool-deficient diseases.

Strategic areas for action

The Global Plan has nine strategic areas, each of which proposes a series of actions to meet specific targets during 2008–2015. The strategic areas are:

1. Assessment of the burden of NTDs and zoonoses
2. Integrated approach and multi-intervention packages for disease control
3. Strengthening health care systems and capacity building
4. Evidence for advocacy
5. Ensuring free and timely access to high-quality medicines and diagnostic and preventive tools
6. Access to innovation
7. Strengthening integrated vector management and capacity building
8. Partnerships and resource mobilization
9. Promoting an intersectoral, interprogrammatic approach to NTD control

Framework for implementation, monitoring and evaluation

Prior to 2008, a committee will be set up for successful implementation and operationalization of the Global Plan.

Member States, WHO collaborating centres for NTDs, other relevant international partners and the WHO secretariat will be part of a steering committee that monitors implementation and reviews progress.

I. INTRODUCTION

The World Health Organization (WHO) aims to achieve a substantial and sustainable reduction in the health, social and economic burdens of communicable diseases. This is in line with the Global Health Agenda articulated in WHO's own 11th General Programme of Work,[1] which includes investing in health to reduce poverty; building individual, community and global health security; harnessing knowledge, science and technology; and strengthening health systems and universal access to treatment for communicable diseases.

Communicable diseases represent one of the greatest potential barriers to achievement of the global health agenda because they[2] collectively account for 20% of mortality in all age groups (33% in the least developed countries) and 50% of child mortality. Without a significant reduction in the burden of communicable disease, the achievement of other health-related goals as well as those in education, gender equality, poverty reduction and economic growth will be jeopardized. Reducing the burden of communicable diseases is therefore key to achieving the Millennium Development Goals. WHO's major strategies are as follows:

- To implement health interventions that respond to diverse and evolving needs of endemic countries by promoting cost-effective approaches, particularly for diseases that account for the greatest share of the burden of neglected tropical diseases (NTDs) and zoonoses.
- To develop integrated surveillance systems that are essential to improve the quality of health data and thus allow for informed decisions by policy-makers.

Infectious and parasitic diseases – most of which are preventable and/or treatable – remain the primary cause of death worldwide. Although international attention is currently focused on HIV/AIDS, malaria and tuberculosis, and on global health security, many other chronically endemic and epidemic-prone tropical diseases, which have a very significant negative impact on the lives of poor populations, remain critically neglected in the global public health agenda.

Epidemic-prone diarrhoeal diseases, which include *Vibrio cholerae* (01/0139/parahaemoliticus), *Shigella dysenteriae* type 1, typhoid fever, enterotoxigenic and enterohaemorrhagic strains of *Escherichia coli*, rotavirus, as well as other enteric

[1] *Engaging for health. 11th general programme of work 2006–2015: a global health agenda.* Geneva, World Health Organization, 2006 (available at: http://www.who.int/gpw/en/). The 11th General Programme of Work 2006–2015 provides a global health agenda for WHO, its Member States and the international community that stems from an analysis of the current global health situation.

[2] Communicable diseases excluding human immunodeficiency virus, malaria and tuberculosis.

pathogens, remain in the third cause of mortality and morbidity among communicable diseases in developing countries. These diseases claim about 1.8 million lives each year, and the socioeconomic burden they impose on affected populations and health care services is enormous. Furthermore, epidemiological trends show that the number of cases is rising globally, affecting inhabitants of poverty-stricken areas where needs for clean water and proper sanitation are unmet. WHO is concerned by this alarming situation, up to now grossly neglected, and is currently working on ways to address the specific challenges of prevention and control of epidemic-prone diarrhoeal diseases.

Box 1. Selected neglected tropical diseases and zoonoses to be addressed within the Global Plan

Tool-ready diseases targeted for elimination or eradication by resolutions of the World Health Assembly and regional committees	Dracunculiasis Leprosy Lymphatic filariasis
Other tool-ready diseases	Anthroponotic leishmaniasis Blinding trachoma Cysticercosis Echinococcosis Onchocerciasis Rabies Schistosomiases Soil-transmitted helminthiasis Yaws
Tool-deficient diseases	Anthrax Brucellosis Buruli ulcer Chagas disease Dengue Human African trypanosomiasis Japanese encephalitis Leishmaniases

While the list of NTDs is not exhaustive and has regional and national variations, intensified efforts by WHO will initially focus on the following diseases: Blinding trachoma, Buruli ulcer, Chagas disease, dengue, dracunculiasis, human African trypanosomiasis, Japanese encephalitis, leishmaniases, leprosy, lymphatic filariasis, onchocerciasis, schistosomiasis, soil-transmitted helminthiasis and yaws as well as other zoonoses. A number of zoonoses are among the oldest known diseases, and many are entrenched, particularly in rural agricultural communities. Increasingly, they are found also in urban areas where people keep livestock and live in close contact with their animals.

Each WHO region will develop its own complementary list of additional NTDs of epidemiological significance (Box 2).

Box 2. Specificities and priorities by WHO region

Africa	Blinding trachoma Buruli ulcer Cysticercosis Dracunculiasis Echinococcosis Human African trypanosomiasis Leishmaniases Leprosy Lymphatic filariasis Onchocerciasis Rabies Schistosomiases Soil-transmitted helminthiasis Yaws
The Americas	***First tier*** Blinding trachoma Chagas disease Leprosy Lymphatic filariasis Onchocerciasis Schistosomiasis Soil-transmitted helminthiasis ***Second tier*** Fungal and ectoparasitic skin diseases Leishmaniasis Parasitic zoonoses
The Eastern Mediterranean	Leishmaniases Schistosomiases Soil-transmitted helminthiasis Rabies Other zoonotic diseases
European	Anthrax Brucellosis Rabies Soil-transmitted helminthiasis Tularaemia
South-East Asia	***Diseases targeted for elimination*** Anthroponotic leishmaniasis (Kala azar) Leprosy Lymphatic filariasis Yaws
The Western Pacific	Dengue Lymphatic filariasis Schistosomiasis Soil-transmitted helminthiasis

II. VISION

A world free of neglected tropical diseases and zoonoses

Most of the NTDs affect almost exclusively poor and marginalized populations living in settings where poverty is widespread and where resources, or access to livelihood opportunities, are scarce. These diseases have an enormous impact on individuals, families and entire communities in developing countries in terms of the burden of disease, loss of productivity, aggravation of poverty and the high cost of long-term care. They hinder socioeconomic development in endemic countries and affect the quality of life at all levels. Improved control and prevention of such diseases would be a major contribution to poverty alleviation and in reaching the health-related Millennium Development Goals. The significance of zoonotic diseases is expanding, and their health and socioeconomic impacts are increasingly being experienced by many countries, particularly the developing ones. In these countries, the establishment and implementation of adequate measures for animals and human health protection against zoonoses, especially those that are new and emerging, have proven to be very difficult. Thus zoonotic diseases continue to further burden public health systems as well as to undermine efforts to boost livestock production and exports. Although many low-cost and effective interventions are already available to control most of these diseases, the majority of affected populations do not have access to them.

Deforming and debilitating diseases are given high priority by affected populations, but impoverished communities cannot be expected to manage disease control on their own, nor are their voices always heard by politicians or policy-makers. Support from both national and international levels is essential, and every effort should be made to make all interventions available in a package at no cost to the beneficiaries, as is done for childhood immunizations.

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 concrete results. Diseases that benefit from rapid impact interventions have the greatest prospects for immediate success. Interventions have a direct impact on transmission, and – like childhood immunization – have prevention of infection and/or morbidity as their goal. The principal challenges are to increase population coverage and ensure sustainability. “Packages” of interventions are a logical way to streamline logistic and operational requirements and simplify work at the district level, where the burden of control activities resides. The diseases and infections for which flexible packages should be implemented are ascariasis, hookworm, loa loa, lymphatic filariasis, onchocerciasis, schistosomiasis, trachoma and trichuriasis. Whenever needed, these packages should also include antimalarial treatment and micronutrient supplements and always be accompanied by community health information and education. Furthermore, NTDs and zoonoses are diseases of poverty, and their control or elimination will be predicated on the implementation of sustainable development activities within affected communities.

Populations affected by these diseases have a fundamental human right to receive appropriate care, and governments have the responsibility to ensure this happens. Even though the challenges of providing adequate clinical management are admittedly great in the peripheral areas where most patients reside, diseases such as Buruli ulcer, human African trypanosomiasis and leishmaniasis are not easily amenable to treatment at health centre level, given the complexity and risk of administering the currently available treatments. To intensify the control of these diseases, better use of existing tools and urgent work to move new tools from the research stage through clinical trials and field evaluation through to early implementation should be actively promoted. Only then can more ambitious control objectives, aimed at reducing the burden of these diseases down to locally sustainable levels, be realistically set.

Vector control, although currently underutilized, can reduce or interrupt transmission when coverage is sufficiently high. It thus has an important role to play in initiatives that seek to reduce transmission and make prevention of infection a high priority. Methods of vector control are well suited to integrated approaches (known as IVM), as some vectors are responsible for multiple diseases, and some interventions are effective against several vectors. In communities where malaria is a high priority, inclusion of tools for vector control, particularly long-lasting insecticidal nets, has been advised. As in other interventions, tools for vector control have the greatest likelihood of sustainable use when initiatives are demand-led.

WHO achievements to date

In recent years, WHO and its partners have led several initiatives to fight such diseases. Some of these programmes have pioneered new global and national partnerships involving the private sector to deliver specific interventions. The basic aims of such programmes have been:

- to provide access to treatment for poor and marginalized populations;
- to strengthen existing health systems and build their long-term capacity for preventing, screening, diagnosing and treating diseases;
- to introduce innovative delivery channels extending the health system's capacity in packaging and providing a series of simple health interventions to those most in need;
- to develop community-based surveillance systems;
- to contribute to development and dissemination of new tools that support surveillance and national programme management, and intersectoral and interprogrammatic actions.

Three international meetings organized by WHO in 2003, 2004 and 2005 have secured strategic and technical guidance on specific options for intensified control of NTDs using a three-pronged approach:

- ensuring broader coverage with rapid impact interventions;
- strengthening vector control to reduce the transmission of several diseases; and

- improving surveillance and quality of care for diseases with limited control tools.

Research and development, including operational research, would underpin activities in all three areas.

WHO, together with its partners, has also carried out the crucial groundwork for implementation of an integrated approach to NTD control and prevention by harmonizing technical norms for management of individual diseases. Some WHO regions, such as the Region of the Americas, are also actively developing new interventions using an intersectoral, interprogrammatic and multi-disease approach to management of selected NTDs.

WHO milestone in control of neglected tropical diseases

In October 2006, WHO published a set of comprehensive guidelines on the integrated use of anthelminthic medicines for large-scale preventive chemotherapy.[1] WHO will ensure successful integration of the control strategies in national health systems and international development policies. In particular, WHO will:

- **develop technical guidance** on integrated delivery systems for ministries of health at both national and district levels. Stepwise approaches to overcome common operational and managerial problems need to be devised. Technical expertise and closer links to the field, tools for rapid assessment and the mapping of epidemiological conditions should also be made available. When NTDs are approached as a group, interventions can be simplified and streamlined through integrated treatment regimens. When multiple treatment protocols are consolidated into a single schedule, including medicines, target population and delivery channel, the structure as well as the drug administration for patients are greatly simplified. A streamlined schedule of preventive and curative interventions for multiple diseases also facilitates management of control activities at the district level, and hence can result in greater efficiencies in the use of available human and financial resources. This is equally true for the application of vector control measures for transmission control.
- **enhance collaboration between individual disease initiatives**. A network coordinating existing control initiatives will support endemic countries in their efforts to scale up the combined delivery of interventions for overlapping diseases. As endemic countries drive individual project design and implementation, their active involvement in extracting lessons, establishing generally applicable guidelines and identifying approaches will be crucial. WHO needs to take the leading role in giving these experiences a place on the international health agenda. Advocacy for a group of diseases, and the collective burden they impose, carries more weight and can help raise the profile of NTDs at both national and international levels.

[1] *Preventive chemotherapy in human helminthiasis. Coordinated use of anthelminthic drugs for control interventions: a manual for health professionals and programme managers*. Geneva, World Health Organization, 2006 (available at: http://whqlibdoc.who.int/publications/2006/9241547103_eng.pdf).

III. PRINCIPLES FOR ACTION

This Global Plan is based on several principles that underpin the actions needed in the different priority areas. These principles are intended to guide the formulation, implementation and evaluation of specific programmes and activities in the area of NTD control.

The right to health

The WHO Constitution proclaims that the enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being. Furthermore, the Universal Declaration on Human Rights stipulates that everybody should have the right to just and favourable working conditions. Many Member States are also party to regional human rights treaties and have included health-related human rights in their national constitutions or national legislation.

Existing health systems as a setting for interventions

The control strategies are well suited to the reality of conditions in endemic communities and can be implemented within existing health infrastructures. The opportunity to improve efficiency and effectiveness arises when additional interventions – to meet hitherto unmet health needs in a target population – can be easily and logically combined with existing programmes. This will depend on similarities in the timing and frequency of interventions, the target population and existing delivery systems. To guide such decisions, a clear identification of health needs in the target population is the requisite starting point.

A coordinated response by the health system

There is an urgent need to strengthen the preventive component of all control initiatives. Interventions that are currently available have their greatest power when delivered early – before the development of permanent deformities or irreversible organ damage has occurred, or to prevent infection. Ideally, a complete range of preventive interventions should be delivered during childhood, as for immunizations.

Integration and equity

Operational and technical difficulties remain in persuading international health programme managers and partnerships to cooperate on disease control and development efforts, and thereby to fully integrate their activities, especially in order to address equity problems and the needs of the poorest of the poor. An intersectoral and interprogrammatic approach to health appears to be an important development strategy in response to current development trends, which include a decline in international health and development funding and a growing interest in corporate responsibility towards social issues. Local health services will be greatly relieved when this materializes, as they are totally overwhelmed, overburdened and under-resourced to cope with the conflicting operational demands of individual programmes. These approaches represent new modalities in technical cooperation for WHO, and also present rich opportunities to work closely with multiple ministries, United Nations agencies, nongovernmental organizations, academic and research institutes and other new partners.

Intensified control of neglected tropical diseases alongside pro-poor policies

The fight against NTDs should form an integral part of pro-poor policies. The introduction of basic public health measures, such as access to clean water and sanitation as well as health education, would significantly reduce the burden of a number of NTDs and other infectious diseases.

IV. KEY CHALLENGES

Over the past decades, international efforts against some NTDs have produced impressive results. Although these diseases are medically diverse, the key to fighting them successfully is the same, namely,

- to scale up access to existing effective tools;
- to develop new tools where currently available tools are inadequate or limited;
- to improve cost effectiveness through delivery of integrated strategies;
- to implement multi-disease, intersectoral and interprogrammatic development projects as an integral part of NTD control and elimination.

The main challenges for achieving these tasks are summarized below.

Procurement and supply of anthelminthic medicines

A fundamental component for combating helminthiasis is the prompt and adequate supply of quality-assured, affordable medicines. Since NTDs disproportionately affect the poorest and most marginalized communities, medicines need to be provided free of charge. Anti-NTD medicines fail to satisfy a traditional market mechanism. As a result, there is a huge gap between demand and supply in terms of the quantity and variety of medicines. Several essential anthelminthic medicines such as diethylcarbamazine (citrate), praziquantel and mebendazole are still not accessible or affordable for poor populations, whereas albendazole and ivermectin are only selectively donated.
WHO has identified five medicines (albendazole, diethylcarbamazine (citrate), ivermectin, mebendazole and praziquantel) as the anti-NTD medicines because they most likely have the greatest and most immediate impact on public health against a group of helminthiasis. WHO will therefore actively promote the widest access to these key medicines by ensuring affordability and increasing coverage of interventions. In addition to this "first-line" set of medicines, there is another group of "second-line" medicines (for example levamisole and pyrantel) that may be used in special situations. Investment in research and development should continue in order to identify new anthelminthic medicines that may be used to prevent the possible emergence of drug resistance.

Quantification of the burden of neglected tropical diseases among neglected populations

Within developing countries, NTDs are often restricted to marginalized sections of the population, including the rural poor, residents of urban and semi-urban settlements such as shanty towns, migrant workers, refugees, women and indigenous people who cannot access formal health services for geographical, social or cultural reasons. The burden of disease among these groups must be quantified and control programmes developed that are culturally appropriate to address their particular needs. Mapping of disease distribution and populations at risk will allow for better targeting of mass drug administrations (MDAs) and ensure the efficient use of available resources.

Providing treatment and other interventions free of charge to communities in need

Although the treatment costs per patient for some diseases may be minimal, they are still unaffordable to the poor communities affected by NTDs. Moreover, the total costs of successful delivery can be significant given the large numbers affected by NTDs. 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. In addition, many NTDs may not be given high priority by countries since they remain silent for a long time after infection and the affected populations often do not have political voice. External support and advocacy are needed to provide the required interventions in a package to communities at risk at no cost, along the lines of childhood immunization.

Medicine delivery system for covering the entire at-risk population

The interruption of transmission through MDA requires high coverage. Often, however, populations at risk are not reached as they live in remote areas or their children do not attend schools. Therefore, in addition to school-based campaigns, specific strategies need to be developed to cover the hard-to-reach populations at risk.

Multi-intervention packages

WHO has developed a conceptual framework for control that moves from a purely disease centred approach to an integrated one, with NTDs grouped together based on similar intervention strategies. This approach reduces distribution costs and brings all necessary treatments at the same time to neglected populations, who nearly always suffer from several overlapping diseases – all linked to poverty. The cost effectiveness of packaged interventions increases exponentially. Multi-disease packages should be offered as part of a flexible menu of options that can be tailored to the local disease situation and adapted to community priorities.

Urgent need for diagnostic tools, medicines and pesticides

Current control strategies for some NTDs that belong to the tool-deficient category rely on imperfect tools. Diagnostic tools, medicines and pesticides are costly and difficult to manage. Using the currently available tools, sustainable control or elimination of the diseases remains an unattainable objective. This reality points to an urgent need to develop simple and safe control tools that can be integrated into health systems in resource-limited settings.

The development of new tools is being addressed within the framework of public–private partnerships. WHO should play a leadership role in the introduction of innovative tools and in making them available and accessible to populations in need.

Development of more effective medicines and insecticides

For many vector-borne diseases there are no vaccines, and regular MDA programmes alone may not be sufficient to curb transmission. In such circumstances, vector control often plays a vital role. However, the increasing problem of insecticide resistance with the environmental and health concerns over persistent organic pollutants emphasizes the need for safe insecticides and more effective medicines.

Promoting integrated vector management

Integrated vector management entails the use of a range of interventions of proven efficacy as well as collaboration within the health sector and with various other sectors such as agriculture, irrigation and the environment. Such an intersectoral and interprogrammatic approach improves the efficacy, cost-effectiveness, ecological soundness and sustainability of disease control.

Promoting an intersectoral, interprogrammatic approach to NTD control

Prevention, control and treatment of NTDs require social and development tools that also address poverty – and these are often found outside of the health sector. In addition to multi-disease packages, there is also a need for an intersectoral and interprogrammatic approach.

Early protection of children

Many of the NTDs 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 their human 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 adult age, and make use of routine systems and services to ensure sustainability.

Post-implementation surveillance and monitoring

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

V. GOAL AND GLOBAL TARGETS, 2008–2015

Goal of the Global Plan

The Global Plan aims to prevent, control, eliminate and eradicate NTDs and zoonoses. It provides measures for the prevention, early detection, diagnosis, treatment, control, elimination and eradication of NTDs and zoonoses that disproportionately affect poor and marginalized populations, taking into account regional and national variations.

The disease control issues to be addressed within the Global Plan include, but are not limited to, diseases targeted for elimination and eradication in resolutions of the World Health Assembly and regional committees; "tool-ready" diseases targeted for increasing coverage through current interventions; high-priority diseases by WHO region; and diseases lacking cost-effective control tools, the so-called "tool-deficient" diseases.

Intensified efforts by WHO will initially focus on 14 diseases: blinding trachoma, Buruli ulcer, Chagas disease, dengue, dracunculiasis, human African trypanosomiasis, Japanese encephalitis, leishmaniases, leprosy, lymphatic filariasis, onchocerciasis, schistosomiasis, soil-transmitted helminthiasis and yaws as well as zoonoses such as anthrax, brucellosis, cysticercosis, echinococcosis and rabies (Box 1).

Each WHO region will, however, develop its own list of additional NTDs and zoonoses of epidemiological significance (Box 2). For most of these diseases, effective tools and proven public health strategies exist; others are already near elimination or eradication.

Global targets 2008–2015

Over the plan period 2008–2015, the following targets should be met:

- To eliminate or eradicate diseases targeted in resolutions of the World Health Assembly and regional committees.
- To reduce significantly the burden of "tool-ready" diseases through current interventions and achieve optimal coverage.
- To ensure that interventions with novel approaches are available, promoted and accessible for "tool-deficient" diseases.

VI. STRATEGIC AREAS FOR ACTION

6.1. ASSESSMENT OF THE BURDEN OF NTDs AND ZOONOSES

Lack of reliable statistics on the burden of NTDs has hampered raising awareness of decision-makers on NTDs and zoonoses. Accurate assessment of the disease burden is crucial to prioritize use of limited resources, provide timely treatments and prevent diseases.

Strategic area: Assessment of the burden of NTDs and zoonoses	
Expected result: Accurate statistics on the burden of NTDs and zoonoses, their overlap and geographical distribution.	**Action1.** Provide support to the Member States in designing their own national tools and programmes for integrated management of NTDs including: ▪ criteria, tools and guidance on assessment of NTD disease burden and overlap, geographical distribution and management of evidence-based interventions ▪ good practice in development of comprehensive health programmes ▪ early warning information for emerging or re-emerging NTDs ▪ guidelines for NTD surveillance and monitoring, including indicators.
	Action2. Develop training materials, practical tools and methods for improving knowledge, attitudes and skills.
	Action3. Improve the assessment and prevention of health risks and associated environmental risks.
	Action4. Streamline global, regional and country communication systems for updating the burden of NTDs.

6.2. INTEGRATED APPROACH AND MULTI-INTERVENTION PACKAGES FOR DISEASE CONTROL

Most of the tropical diseases share many features that make integrated interventions and technical guidance both feasible and advantageous, in particular:

- concentrated in under-served communities;
- frequently overlapping;
- use of same staff, delivery systems and opportunities for contact with populations.

A synergistic approach will streamline operational activities, improve efficiencies and cost effectiveness and ensure that the priority health needs of communities are comprehensively met. WHO will ensure successful integration of the control strategies in national health systems and international development policies.

Strategic area: Integrated approach and multi-intervention packages for disease control	
Expected result 1: Scaling up of existing cost-effective, multi-disease intervention packages to prevent, control or eliminate NTDs and zoonoses.	**Action1.** Provide guidance to Member States in designing multi-disease and multi-intervention packages for NTDs, in line with regional and country priorities: • technical "best practice" guidance for implementation, monitoring and evaluation; • document and disseminate successful country experiences.
	Action2. Encourage exchange of information across regions and countries.
	Action3. Facilitate coordination of various partners in implementation.
	Action4. Advocate for political and financial commitment to ensure that interventions are part of national public health policies and agendas, including sustainable funding.
Expected result 2: Member States adopt integrated approach and design, develop and implement multi-intervention strategies feasible to local contexts and opportunities.	**Action1.** Design, finance, manage and implement five-year small-scale action plans (pilot projects).
	Action2. Document achievements of multi-disease and multi-intervention approach on NTDs.
	Action3. Develop a step-by-step action plan for expanding coverage with multi-disease and multi-intervention packages to all populations in need.
	Action4. Adapt available strategies to national and local contexts.
	Action5. Mobilize financial, human and logistic resources for implementation.

6.3. STRENGTHENING HEALTH CARE SYSTEMS AND CAPACITY BUILDING

For disease control to be sustainable, it must be feasible in endemic countries and integrated into local health systems. As the optimal strategies and opportunities for delivery rest on combining with existing health care systems, it is fundamental to build the capacity of endemic countries to improve their health care systems for controlling NTDs. WHO is therefore supporting country efforts to lead NTD control programmes.

Strategic area: Strengthening health care systems and capacity building	
Expected result 1: Strengthened capacity of Member States to plan, implement and monitor the control, elimination or eradication of NTDs.	**Action1.** Provide guidance to Member States for development of NTD action plans.
	Action2. Develop standards and guidelines on integrated programme management
	Action3. Provide technical assistance to Member States for planning, implementation and monitoring of the programmes
Expected result 2: Capacity for diagnosis, treatment, case management and surveillance of NTDs increased in all countries.	**Action1.** Assist Member States in development of training materials and capacity building of human resources.
	Action2. Encourage the establishment of national and regional centres of excellence for training.
	Action3. Support countries to guarantee adequate number of treatment/diagnostic reference centres.

6.4. EVIDENCE FOR ADVOCACY

The following actions will be undertaken in order to provide relevant and sufficient information and an evidence base for action (successful strategies and packages of interventions to be adopted) on NTDs and to ensure timely and relevant communication of risks and benefits.

Strategic area: Evidence for advocacy	
Expected result 1: Increased awareness of the impact of NTDs at global, regional and country levels.	**Action1**. Develop global and regional communication strategies and tools for raising public awareness on NTDs.
	Action2. Review data collected and publish them; encourage countries to translate them into national languages.
	Action3. Disseminate impact of NTDs in terms of human rights, poverty, economies and global public good.
Expected result 2: Evidence for integrated and multi-intervention strategies established.	**Action1.** Monitor pilot project with multi-intervention and document success stories
	Action2. Demonstrate proof of feasibility, cost effectiveness and sustainability of multi-disease, interprogrammatic and intersectoral approach and disseminate it.
Expected result 3: Socioeconomic impact analysis of NTDs carried out and the results disseminated.	**Action1**. Conduct socioeconomic studies that address the economic burden of NTDs carried out in selected countries.
	Action2. Advocate documents and reports to important donors and stakeholders.

6.5. ENSURING FREE AND TIMELY ACCESS TO HIGH-QUALITY MEDICINES AND DIAGNOSTIC AND PREVENTIVE TOOLS

Many NTDs can be cured and prevented by safe and easy-to-administer medicines. Simple diagnostic tools play a fundamental role in identifying patients and populations at risk who can benefit from such medicines. For diseases for which easy and safe tools are not available, it is crucial to ensure the best use of currently available tools and to guarantee their liability for intensifying control activities.

WHO has an acknowledged comparative advantage in procurement of medicines and has in recent years been at the forefront in establishing public–private partnerships in the pharmaceutical sector. The Organization has an extensive operational network in those endemic countries where these medicines would be used. WHO and countries will take the following actions to improve access to diagnostic tools and existing medicines.

Strategic area: Ensuring free and timely access to high-quality medicines and diagnostic and preventive tools	
Expected result : Affected individuals and populations have timely access to high-quality medicines and diagnostic and preventive tools free of charge.	**Action1.** Improve affordability of diagnostic and preventive tools and medicines: ▪ encourage pharmaceutical companies to donate NTD tools and medicines to WHO; ▪ establish preferential prices of tools and medicines through agreement with manufacturers; ▪ provide endemic countries with funds and special account for purchasing non-donated tools and medicines with preferential prices offered to WHO.
	Action2. Ensure availability of existing tools and medicines against NTDs: ▪ guarantee the supply of adequate quantity of tools and medicines through sustainable production; ▪ ensure emergency supplies to non-endemic countries; ▪ set up mechanisms for prequalification of manufacturers in endemic countries; ▪ deal with pharmaceutical/pesticide manufacturers and maintain close links with partners.
	Action3. Enhance distribution system: ▪ establish central/regional diagnostic/drug facility and medicine forecasting system; ▪ use existing delivery system alongside other interventions; ▪ national campaign on NTD control programmes with donated medicines; ▪ encourage countries to adopt tax exemption on importation of NTD medicines.
	Action4. Guarantee quality of tools and medicines: ▪ set up tools and medicine quality control system; ▪ manage quality assurance through independent laboratories; ▪ establish treatment failure and drug resistance surveillance system; ▪ ensure reporting on adverse events of donated medicines.

6.6. ACCESS TO INNOVATION

Access to innovation is an integral part of control activities because it allows adaptation of NTD control strategies. "Access to innovation" refers to a process that facilitates and expedites the development of new key tools, and ensures their quick implementation at field level.

Access to innovation will help:

- to define the profile of key new tools enabling implementation of new strategies for NTD control (for either diagnosis or treatment or prevention or all of them);
- to facilitate the implementation of clinical trials at field level by involving and mobilizing national control programme capacities;
- to ensure strong coordination between national authorities and groups in charge of research and development;
- to ensure rapid dissemination of the new tools as soon as the registration process is completed.

Strategic area: Access to innovation	
Expected result 1: Development of new tools.	**Action1.** Identify needs for new or better diagnostic tools and medicines.
	Action2. Promote development of tools/procedures enabling integrated control strategies to be applied.
	Action3. Stimulate experts to develop diagnostic tools and medicines currently lacking.
	Action4. Ensure coordination between control programmes and research and development groups.
Expected result 2: Implementation of innovative approaches for prevention and control.	**Action1.** Establish ad hoc committees and coordination networks for clinical trials.
	Action2. Implement, coordinate and promote platforms for clinical trials.
	Action3. Provide technical support to Member States for rapid implementation as a national plan of action.
	Action4. Encourage countries to facilitate the registration of new tools in line with national policies.
Expected result 3: Newly developed tools are accessible to affected populations through national programmes.	**Action1.** Ensure the availability and affordability of new tools.
	Action2. Advocate the development of key new tools for funding.
	Action3. Ensure the most efficient distribution system for new tools.

6.7. STRENGTHENING INTEGRATED VECTOR MANAGEMENT AND CAPACITY BUILDING

Efforts are needed to strengthen the infrastructure for integrated vector management (IVM), embed it in existing health services and link it with other sectors (agriculture, irrigation, environment, public works, information and education). Among other aspects, this will contribute to the safe and effective management of public health pesticides. Strengthening national capacities of endemic countries for vector-borne disease prevention and control requires that they apply the principles and approaches of IVM and the sound management of pesticides – essential components of NTD prevention and control.

Strategic area: Strengthening integrated vector management and capacity building	
Expected result 1: Capacity increased for vector control based on principles of IVM at national, regional and global levels	**Action1.** Support development of national infrastructure and career opportunities, and strengthening human resources for planning, implementation and evaluation of IVM and sound management of public health pesticides.
	Action2. Develop guidelines and training documents for implementation and evaluation of IVM and sound management of pesticides.
	Action3. Support resource mobilization for IVM, including community participation, for effective and sustainable delivery of vector control interventions.
Expected result 2: Advocacy, social mobilization and legislation framework established in support of IVM within the health sector and other sectors	**Action1.** Develop advocacy plans and promote IVM principles in health policy for NTDs with partners
	Action2. Support the establishment and/or strengthening of policy and legal frameworks for IVM and sound management of public health pesticides
	Action3. Establish or strengthen global and regional collaboration and coordination, exchange of information and rational use of resources and expertise for IVM and sound management of pesticides.
Expected result 3: Evidence-base established and utilized for rational decision making for NTDs and other vector-borne diseases	**Action1.** Develop and use mechanisms for monitoring implementation of IVM and sound management of pesticides by Member States
	Action2. Identify operational research needs and develop safe and cost-effective tools and approaches.
	Action3. Formulate evidence-based policies, strategies and promote guidelines for IVM with multi-intervention and multi-disease control approach.

6.8. PARTNERSHIPS AND RESOURCE MOBILIZATION

WHO will help coordinate the efforts of all partners to integrate approaches for the control of NTDs among the various disease-specific global programmes and country initiatives and facilitate their large-scale implementation, monitoring and evaluation. It will organize a global forum for international and national programme managers, various international agencies, experts, the private sector and civil society to share experiences, generate political commitment and help design international and national health policies for NTDs. WHO will continue to advocate for and mobilize the necessary resources at local, national, regional and global levels for implementation of the Global Plan.

Strategic area: Partnerships and resource mobilization	
Expected result 1: Stronger collaboration with existing partners (Member States, pharmaceutical companies, foundations, nongovernmental organizations, relevant United Nations agencies and collaborating centres) on programme support, programme monitoring and final impact assessments.	**Action1.** Use existing mechanisms such as the Global Forum for NTD to exchange information and coordinate efforts.
	Action2. Set up and engage in regional forum to exchange information and coordinate.
	Action3. Set up informal working groups and consultations with partners to exchange information and coordinate.
	Action4. Set up a communication mechanism to produce and disseminate the NTD annual progress report.
Expected result 2: Partnerships with new international, national, subregional and local partners in the development and implementation of the Global Plan.	**Action1.** Advocate for a World Health Assembly resolution in 2008 on an NTD day.
	Action2. Engage WHO in an active search of new partners and establish an internally accessible, comprehensive database.
	Action3. Capitalize on the network of partners and establish an internal NTD database.
	Action4. Plan and conduct promotional events in close coordination with headquarters and regional external relations divisions.
Expected result 3: Resources mobilized.	**Action1.** Coordinate with the internal resource mobilization team at headquarters and within each region to identify and attract potential donors
	Action2. Develop campaigns and promotional materials targeting specific donors, for example by preference of causes or population groups.
	Action3. Develop a mechanism to maintain donors' interest in the global initiative

6.9. PROMOTE AN INTERSECTORAL, INTERPROGRAMMATIC APPROACH TO NTD CONTROL

An intersectoral and interprogrammatic approach takes advantage of the geographical overlap of some NTDs, their common risk factors and protective factors, and the presence of disease prevention and control programmes at the local level. It provides innovative and cost-effective opportunities for one disease control intervention as it is combined with another. These programmes may incorporate diverse approaches, including advocacy, communication for behavioural impact, income generation through micro-enterprises, and ecosystem development and protection. WHO has a key role to play in the implementation of intersectoral and interprogrammatic community development programmes and in putting together technically sound options.

Strategic area: Promote an intersectoral, interprogrammatic approach to NTD control	
Expected result : A shift in the paradigm from vertical single-disease to an interprogrammatic and intersectoral approach in the prevention, control and/or elimination of NTDs by 2015.	**Action1.** Identify, develop (development of indicators through workshops and consultancies) and use of indicators (component specific and intersectoral, regular or proxy) to capture meaningful impacts of multiple interventions and intersectoral approaches in small-scale action plans (e.g. increased labour productivity, improved well-being, improved school attendance, reduced anaemia and malnutrition, increased household employment).Monitor the use of the indicators in the small-scale action plans. Types of indicators: ▪ epidemiological ▪ economic/social ▪ environmental/ecological.
	Action2. Design and incorporate costing and/or cost-effectiveness analysis in the life-cycle of each small-scale action plan, and monitor its application in each of these (consultancies).
	Action3. Socialize and finalize the small-scale draft action plans with national and local authorities and participating communities, in up to 10 national stakeholder workshops per region.

VII. FRAMEWORK FOR IMPLEMENTATION, MONITORING AND EVALUATION

This Global Plan will be implemented by WHO Member States, either individually or through intercountry cooperation, and by WHO, through its Secretariat and network of collaborating centres, in partnership with other relevant intergovernmental, public private, and international organizations. It will be launched in 2008; implementation will be monitored and reviewed from 2010 to 2015, the final year in which all agreed objectives should be accomplished.

OBJECTIVE	COOUNTRIES TASK	WHO SECRETARIAT
Guarantee successful implementation of the Global Plan and efficient and effective management	Appoint focal points for the implementation of action on NTDs. Report on the progress made in implementing the Global Plan of Action. Share good practice and experience in improving NTD control. Consider NTD control under the programmes and frameworks for bilateral and multilateral international collaboration.	Establish appropriate mechanisms to ensure concerted action on NTDs by all relevant WHO programmes. Take measures to stimulate intersectoral collaboration and coordination of activities in the area of NTD in countries. Give priority to the implementation of World Health Assembly recommendations for elimination and eradication of specific NTDs. Ensure integrity and continuity with adoption and implementation of other global strategies and plans of action relevant to health. Advocate for incorporating projects on NTDs in the programmes of major global donors and promote twinning projects and other forms of north–south and south–south partnerships on NTDs. Establish and sustain partnerships with representatives of countries, industry, nongovernmental organizations, professional organizations and other major stakeholders in the area of NTDs.
Indicators of achievements		
Regional committee resolutions Network of WHO collaborating centres for the Global Plan Periodic report to Global Steering Committee		

Implementation will be steered by a committee that includes representatives of Member States, the WHO Secretariat, WHO collaborating centres for NTDs and other relevant international partners. In order to monitor progress, the steering committee will develop recommendations for setting up regional and global indicators of achievement upon a baseline study organized by the Secretariat. Regional committees will update and adapt as necessary the regional policy documents in light of this plan of action and will ensure their implementation, monitoring and evaluation. Box 3 lists the possible indicators for monitoring and evaluation of the Global Plan.

WHO collaborating centres will review and update where necessary their workplans in the light of this plan of action and will report periodically to the Global Steering Committee. This Committee will monitor progress of the Global Plan and carry out a mid-term review in 2011 and a final evaluation in 2015 upon completion of the Global Plan.

Box 3. Indicators for monitoring and evaluation of the Global Plan

INDICATORS FOR PERFORMANCE MEASUREMENT	
STRATEGIC AREA	**INDICATORS**
1. ASSESSMENT OF THE BURDEN OF NTDS AND ZOONOSES	Establishment of disease monitoring system and of database at country, regional and global levels;
	Accurate estimation of population currently affected and those at-risk, translating in how many people to target for interventions;
	Annual report with the complete NTD burden.
2. INTEGRATED APPROACH AND MULTI-INTERVENTION PACKAGES FOR DISEASE CONTROL	Number of existing cost-effective, multi-disease intervention packages developed to prevent, control or eliminate NTDs and zoonoses;
	Number of Member States adopting an integrated approach including the design, development and implementation of multi-intervention strategies feasible to local contexts and opportunities.
3. STRENGTHENING HEALTH-CARE SYSTEM AND CAPACITY BUILDING	General indicators for assessing health care system;
	Number of laboratory and screening programmes for NTD control;
	Coverage rate of mass drug administration in countries included for Programme on preventive chemotherapy and transmission control;
	National NTD prevalence and incidence rate;
	Amount of financial resources available for national action.
4. EVIDENCE FOR ADVOCACY	Number of countries having in place information systems for NTD;
	Introduction by all countries of systems for notification, reporting and registering of NTDs;
	Number of pilot projects (mini plans of action) for evaluating integrated, intersectoral, interprogrammatic and multi-disease based NTD prevention and control programme;
	Increased media coverage of NTD issues;
	Societal awareness about NTDs.

INDICATORS FOR PERFORMANCE MEASUREMENT	
STRATEGIC AREA	**INDICATORS**
5. ENSURING FREE AND TIMELY ACCESS TO HIGH-QUALITY MEDICINES AND DIAGNOSTIC AND PREVENTIVE TOOLS	Number of donated medicines;
	Number of price agreement obtained;
	Coverage rate of treatment with donated medicines;
	Effective implementation of medicine forecasting system;
	Number of diagnostic tools available and effective use in terms of distribution;
	Number of medicine quality control system at country level;
	Annual report on performance (WHO database);
	Number of coverage of population with donated medicines;
	Number of countries producing locally NTD medicines of good quality.
6. ACCESS TO INNOVATION	Number of research programmes for developing tools against NTDs;
	Number of newly developed tools (diagnostic tools, medicines, insecticides, pesticides etc.);
	Performance of delivery of new treatments;
	Number of countries adopting new tools for their national programme for controlling NTDs;
	Number of people benefiting from interventions with new tools.
7. STRENGTHENING INTEGRATED VECTOR MANAGEMENT AND CAPACITY BUILDING	Number of countries with national integrated vector management policies;
	Number of endemic countries implementing, monitoring and evaluating integrated vector management;
	Number of partnerships/agreements with private sector.
8. PARTNERSHIPS AND RESOURCE MOBILIZATION	Number of funding proposal submitted;
	Publication and dissemination of advocacy materials for donors and their distribution;
	Number of special events for resource mobilization at national, regional and global levels.

INDICATORS FOR PERFORMANCE MEASUREMENT	
STRATEGIC AREA	**INDICATORS**
9. PROMOTE AN INTERSECTORAL, INTERPROGRAMMATIC APPROACH TO NTD CONTROL	Number of countries that have formally endorsed intersectoral plans of action;
	Number of reports and papers published on impacts of interventions with intersectoral, interprogrammatic approach on epidemiology and socioeconomic development;
	Number of workshops for promoting intersectoral, interprogrammatic approach;
	Proportion of countries having intersectoral mechanisms for formulation, monitoring and evaluation.

ANNEXES

Annex 1. List of selected neglected tropical diseases and zoonoses: definition and global burden

Anthrax
Blinding trachoma
Brucellosis
Buruli ulcer
Chagas disease (American trypanosomiasis)
Cysticercosis
Dengue
Dracunculiasis (guinea-worm disease)
Echinococcosis
Human African trypanosomiasis (sleeping sickness)
Japanese encephalitis
Leishmaniases
Leprosy
Lymphatic filariasis (elephantiasis)
Onchocerciasis (river blindness)
Rabies
Schistosomiases
Soil-transmitted helminthiasis
Yaws

Anthrax

Anthrax is primarily a disease of herbivorous mammals, although other mammals and some birds have been known to contract it. In its most common natural form, anthrax creates dark sores on the skin, from which it derives its name. Anthrax is Greek for coal. Until the introduction and widespread use of effective veterinary vaccines, it was a major cause of fatal disease in cattle, sheep, goats, camels, horses and pigs throughout the world. Humans generally acquire the disease directly or indirectly from infected animals, or occupational exposure to infected or contaminated animal products. Control in livestock is therefore the key to reduced incidence. The disease is generally regarded as being non-contagious. Records of person-to-person spread exist but are rare.

Blinding trachoma

Trachoma is an infection of the eyes that may result in blindness after repeated re-infections. Trachoma is caused by an organism called *Chlamydia trachomatis*. Through the discharge from an infected child's eyes, trachoma is passed on by hands, on clothing, or by flies that land on the face of the infected individual. It is the world's leading cause of preventable blindness and occurs where people live in overcrowded conditions with limited access to water and health care. Trachoma spreads easily from person to person and is frequently passed from child to child and from child to mother within the family. Infection usually first occurs in childhood, but people do not became blind until adulthood. The disease progresses over years as repeated infections cause scarring on the inside of the eyelid, earning it the name of the "quiet disease". WHO estimates that six million people worldwide are blind due to trachoma and more than 150 million people are in need of treatment.

Brucellosis

Brucellosis is a disease mainly of cattle, swine, goats, sheep and dogs. The infection is transmitted to humans by animals through direct contact with infected materials such as afterbirth or indirectly through ingestion of animal products and by inhalation of airborne agents. Consumption of raw milk and cheese made from raw milk (fresh cheese) is the major source of infection in humans. Most of the fresh cheeses are sheep and goat cheese. It is considered to be an occupational disease for people who work in the livestock sector. Human-to-human transmission is very rare. The most rational approach for preventing human brucellosis is the control and elimination of the infection in animals. Pasteurization of milk is another protective mechanism.

Buruli ulcer

Buruli ulcer is a severe skin disease caused by a bacterium. The disease is poorly understood and the exact mode of transmission is still unknown. Nonetheless, a good progress has been made: two common anti-TB medicines (streptomycin, rifampicin) have been confirmed as effective treatment of the disease and WHO aims to reach the affected populations for early detection and treatment.

Buruli ulcer has been reported in over 30 countries mainly with tropical and subtropical climates but it may also occur in some countries where it has not yet been recognized. It is difficult

establish the exact number of people affected due to variability in the clinical presentation, insufficient knowledge of the disease among health workers, and geographical barriers to access to remote endemic areas.
When left untreated, the disease progresses to massive destruction of the skin and, in some cases, of bone, eyes, and other tissues. Permanent disabilities occur in an estimated 25% of cases. Limb amputations may be needed to save a patient's life. Even when skin lesions heal, scarring can permanently restrict the movement of limbs.

Chagas disease

Chagas disease is a parasitic disease resulting from the bite and subsequent defecation with faeces containing the infective stage of this protozoan parasite of the triatomine bug, or "kissing bug", which resides in crevices in the mud walls and thatched roofs of poorly constructed houses, usually in rural areas and periurban slums throughout Latin America. Transfusion of infected blood is a second significant mode of transmission. Chronic infection, which usually begins in childhood, irreversibly damages the heart, oesophagus, colon and peripheral nervous system in later life. Patients with severe chronic disease become progressively ill and ultimately die, usually from heart failure and often early in adult life. It is endemic in 21 countries, with 16–18 million persons infected and 100 million people at risk.

Cysticercosis

Human cysticercosis is caused by the development of *Taenia solium* cysticerci in human tissues. Humans acquire the infection by ingestion of raw pork containing cysticercus. Frequency of the disease has decreased in developed countries owing to stricter meat inspection, improved hygiene and better sanitary facilities.
Symptoms include epileptiform attacks, headaches, learning difficulties and convulsions. The location that most often prompts a medical consultation is the central nervous system, followed by the eye and its surrounding tissues.
Treatment of cysticercosis is very difficult with varying success. Prevention is based on strict meat inspection, health education, thorough cooking of pork and beef, sound hygiene and widespread sanitary installations.

Dengue and dengue haemorrhagic fever

Dengue is a mosquito-borne viral infection that has become a major international public health concern in recent years. Dengue is found in tropical and subtropical regions around the world, predominantly in urban and semi-urban areas. A rapid rise in urban populations is bringing ever greater numbers of people into contact with the predominantly urban species *Aedes aegypti*, especially in areas that are favourable for mosquito breeding, e.g. where household water storage is common and where solid waste disposal services are inadequate. Some 2500 million people – two fifths of the world's population – are now at risk from dengue. WHO currently estimates there may be 50 million cases of dengue infection worldwide every year.
Dengue haemorrhagic fever is a potentially deadly complication. It is characterized by high fever, haemorrhagic phenomena – often with enlargement of the liver – and, in severe cases, circulatory failure. Today, dengue haemorrhagic fever affects most Asian

countries and has become a leading cause of hospitalization and death among children in several of these countries. Dengue is also widespread in several parts of Latin America and the Caribbean.

Dracunculiasis

Dracunculiasis (guinea-worm disease) is an eradicable disease caused by the parasitic worm *Dracunculus medinensis* or "guinea-worm". This worm is the largest of the tissue parasites affecting humans. When a person drinks contaminated water from ponds or shallow open wells, the *Cyclops* intermediate host is dissolved by the gastric acid of the stomach and the larvae are released and migrate through the intestinal wall. After about one year of the infection, the female worm with its uterus filled with larvae, emerges usually from the feet repeating the life cycle.

No medicines are currently available to prevent or heal this parasitic disease – the only disease exclusively associated with unsafe drinking-water.

During 2004 the total number of dracunculiasis cases reported to WHO worldwide was 16 026. An effective preventive measure being used to eliminate the disease is to filter suspected contaminated water through a simple gauze filter to eliminate swallowing the *Cyclops*.

Echinococcosis

Cystic echinococcosis is principally maintained in the dog–sheep–dog cycle. The infection is transmitted to dogs when they are fed infected viscera of sheep during the home-slaughter of sheep. Direct contact with dogs is an important mode of transmission to humans, as is consumption of vegetables and water contaminated with infected dog faeces. Humans are accidental intermediate hosts and are not able to transmit the disease.

There are areas of high endemicity in southern South America, the Mediterranean coast, the southern part of the former Soviet Union, the Middle East, south-western Asia, northern Africa, Australia, Kenya, New Zealand and Uganda.

Human African trypanosomiasis

Human African trypanosomiasis, or sleeping sickness, is one of the most complex of the endemic tropical diseases. Spread by the bite of the tsetse fly, the disease flourishes in impoverished rural parts of Africa. In 2006, WHO estimated that the disease affects some 70 000 people.

Sleeping sickness is one of the few diseases where effective treatment depends on active screening for the early detection of cases. Symptoms in the initial phase of the illness, when treatment has the greatest chance of success, are often mild or nonspecific. However, patients frequently present for treatment when the disease is already far advanced, more complex treatment is needed and the chances of success are jeopardized. Untreated, sleeping sickness is invariably fatal. Death follows prolonged agony.

Japanese encephalitis

Japanese encephalitis is a mosquito-borne arbovirus infection, with seasonal distribution. The disease, which is transmitted by *Culex* mosquitoes, is endemic in most parts of Asia with temperate and subtropical or tropical climate, including Cambodia, China, India, Indonesia, Japan, Lao People's Democratic Republic, Malaysia, Nepal, Philippines, Republic of Korea, Russian Federation, Sri Lanka, Thailand, Torres Strait Islands and Viet Nam.

The disease affects mostly infants and children, but all age groups can develop the disease. Most infections result in mild symptoms or no symptoms at all. On average, 1 in 300 infections results in symptomatic illness, which is characterized by a flu-like illness with sudden onset of fever, chills, headache, tiredness, nausea and vomiting.

The illness can progress to encephalitis (infection of the brain) and can be fatal in 30% of these cases.

Leishmaniases

Leishmaniasis is a parasitic protozoal disease transmitted by the bite of the sand fly and threatens 350 million men, women and children in 88 countries around the world.

This disease has a wide range of clinical symptoms. Visceral leishmaniasis, which attacks the internal organs, is the most severe form. Left untreated, it is usually fatal within two years. Furthermore, a percentage of cases can evolve to skin dissemination of parasites. The cutaneous form is the most common. It usually causes ulcers on the face, arms and legs. Although the ulcers heal spontaneously, they cause serious disability and leave severe and permanently disfiguring scars. Far more devastating is the mucocutaneous form, which invades the mucous membranes of the upper respiratory tract, causing gross mutilation as it destroys the soft tissues of the nose, mouth and throat. Diffuse cutaneous leishmaniasis produces chronic skin lesions that never heal spontaneously. The sixth form, recidivans cutaneous leishmaniasis, is a relapsing form that appears after treatment. WHO estimates that 12 million people are currently infected, and around 1.5 million to 2 million new infections occur each year.

Leprosy

Leprosy is a chronic disease caused by the bacillus *Mycobacterium leprae*. *M. leprae* multiplies very slowly and the incubation period of the disease is about five years. Symptoms can take as long as 20 years to appear.

Leprosy mainly affects the skin and nerves; if untreated, there can be progressive and permanent damage to the skin, nerves, limbs and eyes. Throughout history, the afflicted have often been ostracized by their communities and families. However, leprosy is not highly infectious and is readily curable. The availability of a highly effective cure – multidrug therapy – led to the vision of a world without leprosy. Today, 116 out of 122 endemic countries have eliminated leprosy as a public health problem. The global registered prevalence of leprosy at the beginning of 2006 was 219 826 cases.

Lymphatic filariasis

Lymphatic filariasis, or elephantiasis, remains silent for a long time after infection that is mostly acquired in childhood. The disease is transmitted by mosquitoes that bite infected humans. The thread-like, parasitic filarial worms *Wuchereria bancrofti* and *Brugia malayi* that cause lymphatic filariasis live almost exclusively in humans. These worms lodge in the lymphatic system, the network of nodes and vessels that maintain the delicate fluid balance between the tissues and blood, and are an essential component for the body's immune defence system. The worst symptoms of the chronic disease generally appear in adults, and in men more often than in women: damage to the lymphatic system, kidneys, arms, legs or (especially in men) genitals causes significant pain, lost productivity on a huge scale and discrimination.
Over 120 million people are currently infected and around 1.3 billion people in more than 80 countries are at risk of infection.

Onchocerciasis

Onchocerciasis, or river blindness, is a parasitic disease caused by a filarial worm that is transmitted to humans through the bites of black flies 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. Other devastating effects of onchocerciasis are skin nodules and onchocercal skin disease characterized by skin lesions (severe itching, dermatitis, depigmentation, etc.). Severe itching alone is estimated to account for 60% of the disease burden.
More than 100 million people are at risk of infection and some 37 million people are estimated to be infected. Over 99% of those affected live in Africa.

Rabies

Rabies is a zoonotic viral disease that infects domestic and wild animals. It is transmitted to other animals and humans through close contact with saliva from infected animals (i.e. bites, scratches, licks on broken skin and mucous membranes). Once symptoms of the disease develop, rabies is fatal in both animals and humans.
The first symptoms of rabies are usually nonspecific and suggest involvement of the respiratory, gastrointestinal and/or central nervous systems. In the acute stage, signs of hyperactivity (furious rabies) or paralysis (dumb rabies) predominate. In both furious and dumb rabies, paralysis eventually progresses to complete paralysis followed by coma and death in all cases, usually due to respiratory failure.
Without intensive care, death occurs during the first seven days of illness.

Schistosomiases

Schistosomiasis, one form of which is also known as bilharziasis, is a parasitic disease that leads to chronic ill health. People infected with schistosomiasis expel parasite eggs in their faeces or urine. In villages or communities where there is no proper latrine system or sanitation, freshwater sources around the village or community can easily become

contaminated with faeces or urine containing the eggs. On contact with water, the eggs hatch and release larvae called miracidia. If the miracidia find the right type of snail, they use it to multiply in several cycles, eventually producing thousands of new parasites, called cercariae, which the snail then releases into the surrounding water.

Humans become infected when they come into contact with contaminated water. A child who has suffered persistent and heavy infections is likely to have chronic, irreversible diseases such as liver fibrosis, cancer of the bladder or kidney failure, later in life.

An estimated 70 million people with urinary schistosomiasis in Africa currently suffer from bloody urine, indicating damage of the bladder and urinary tract. Forms of schistosomiasis also occur in parts of South-East Asia and Latin America and the Caribbean.

Soil-transmitted helminthiasis

"Helminth" is the technical word for a worm. Soil-transmitted helminths are also known in many places simply as common intestinal worms. Approximately 1.6 billion – one sixth of the world's population – is at risk of infection.

A person infected with soil-transmitted helminths has parasite eggs in his or her faeces. In areas where there is no latrine system, the soil (and water) around the village or community becomes contaminated with faeces containing worm eggs. The symptoms of soil-transmitted helminth infections, which are nonspecific and become evident only when the infection is particularly severe, include nausea, tiredness, abdominal pain and loss of appetite. Worm infections aggravate malnutrition and amplify rates of anaemia. They impede children's physical growth and cognitive development, contributing significantly to school absenteeism.

Yaws

Yaws is a contagious, nonvenereal, treponemal infection in humans that presents mainly in children younger than 15 years. Peak incidence occurs in children aged 6–10 years. It occurs primarily in warm, humid, tropical areas among poor rural populations where conditions of overcrowding, poor sanitation and inadequate water supply prevail. The major route of infection is through direct person-to-person contact. In the majority of patients, yaws remains limited to the skin, but early bone and joint involvement can occur. Although yaws lesions disappear spontaneously, secondary bacterial infections and scarring are common complications.

After 5–10 years, 10% of untreated patients develop destructive lesions involving bone, cartilage, skin, and soft tissue, similar to those seen in tertiary syphilis. In contrast to venereal syphilis, cardiovascular and neurological abnormalities almost never occur in patients with yaws.

Yaws is a significant public health problem in two countries of South-East Asia, and some countries in the African and Western Pacific regions. In South-East Asia, about 5000 cases are reported annually; 4000 in Indonesia and 1000 in Timor-Leste. India has recently eliminated the disease.

Annex 2. WHO regions

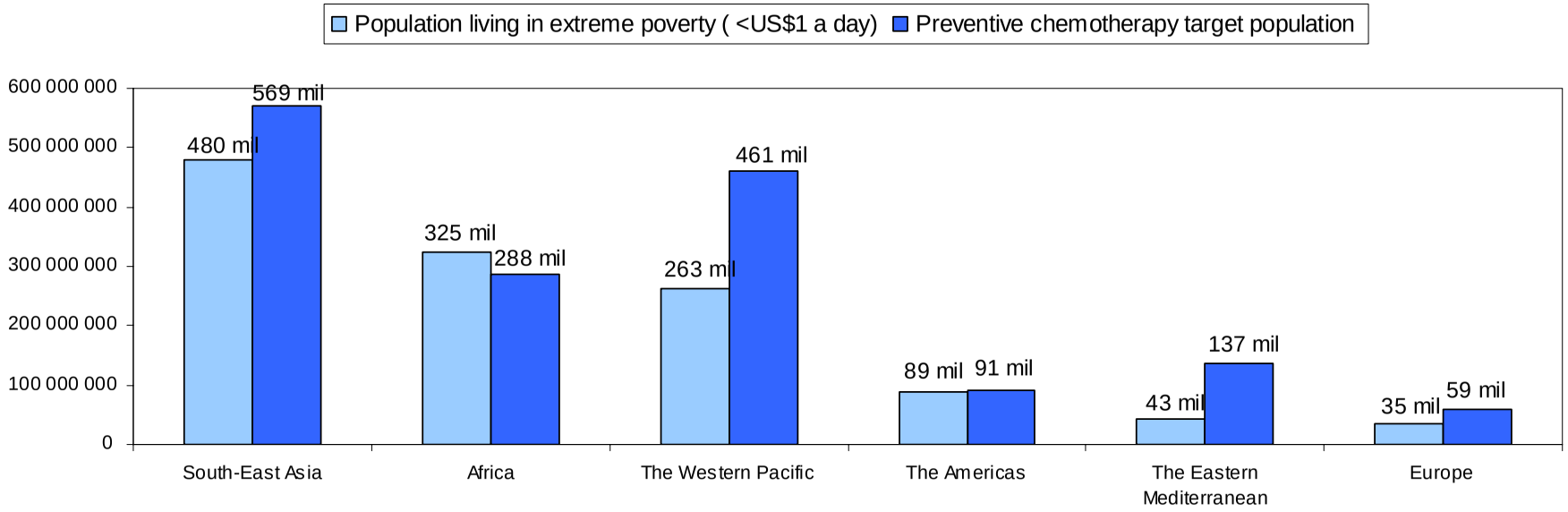
Africa	The Americas	South-East Asia	Europe	The Eastern Mediterranean	The Western Pacific
Algeria	Antigua and Barbuda	Bangladesh	Albania	Afghanistan	Australia
Angola	Argentina	Bhutan	Andorra	Bahrain	Brunei Darussalam
Benin	Bahamas	Democratic People's Republic of Korea	Armenia	Djibouti	Cambodia
Botswana	Barbados	India	Austria	Egypt	China
Burkina Faso	Belize	Indonesia	Azerbaijan	Iran (Islamic Republic of)	Cook Islands
Burundi	Bolivia	Maldives	Belarus	Iraq	Fiji
Cameroon	Brazil	Myanmar	Belgium	Jordan	Japan
Cape Verde	Canada	Nepal	Bosnia and Herzegovina	Kuwait	Kiribati
Central African Republic	Chile	Sri Lanka	Bulgaria	Lebanon	Lao People's Democratic Republic
Chad	Colombia	Thailand	Croatia	Libyan Arab Jamahiriya	Malaysia
Comoros	Costa Rica	Timor-Leste	Cyprus	Morocco	Marshall Islands
Congo	Cuba		Czech Republic	Oman	Micronesia (Federated States of)
Côte d'Ivoire	Dominica		Denmark	Pakistan	Mongolia
Democratic Republic of the Congo	Dominican Republic		Estonia	Qatar	Nauru
Equatorial Guinea	Ecuador		Finland	Saudi Arabia	New Zealand
Eritrea	El Salvador		France	Somalia	Niue
Ethiopia	Grenada		Georgia	Sudan	Palau
Gabon	Guatemala		Germany	Syrian Arab Republic	Papua New Guinea
Gambia	Guyana		Greece	Tunisia	Philippines
Ghana	Haiti		Hungary	United Arab Emirates	Republic of Korea
Guinea	Honduras		Iceland	Yemen	Samoa
Guinea-Bissau	Jamaica		Ireland		Singapore
Kenya	Mexico		Israel		Solomon Islands
Lesotho	Nicaragua		Italy		Tonga
Liberia	Panama		Kazakhstan		Tuvalu

Africa	The Americas
Madagascar	Paraguay
Malawi	Peru
Mali	Saint Kitts and Nevis
Mauritania	Saint Lucia
Mauritius	Saint Vincent and the Grenadines
Mozambique	Suriname
Namibia	Trinidad and Tobago
Niger	United States of America
Nigeria	Uruguay
Rwanda	Venezuela
Sao Tome and Principe	
Senegal	
Seychelles	
Sierra Leone	
South Africa	
Swaziland	
Togo	
Uganda	
United Republic of Tanzania	
Zambia	
Zimbabwe	

Europe
Latvia
Lithuania
Luxembourg
Malta
Monaco
Montenegro
Netherlands
Norway
Poland
Portugal
Republic of Moldova
Romania
Russian Federation
San Marino
Serbia
Slovakia
Slovenia
Spain
Sweden
Switzerland
Tajikistan
The former Yugoslav Republic of Macedonia
Turkmenistan
Ukraine
United Kingdom
Uzbekistan

The Western Pacific
Vanuatu
Viet Nam

Annex 3. Population living in extreme poverty and target population for preventive chemotherapy, by WHO region



WHO region	Total population (2005)	Population living in extreme poverty (<US$ 1 a day)	Preventive chemotherapy target population
South-East Asia	1 656 528 818	480 393 357	569 236 297
Africa	738 083 274	324 756 641	287 837 472
The Western Pacific	1 751 457 245	262 718 587	460 911 544
The Americas	886 334 010	88 633 401	91 186 767
The Eastern Mediterranean	538 001 455	43 040 116	137 096 885
European	882 729 278	35 309 171	59 479 398
WORLD TOTAL	**6 453 134 080**	**1 234 851 273**	**1 605 748 363**

Annex 4. WHO-recommended anthelminthic medicines for use in preventive chemotherapy

	Disease	ALB	MBD	DEC	IVM	PZQ	LEV[c]	PYR[c]
Target diseases for which a well-defined strategy is available	Ascariasis	✓	✓	–	(✓)	–	✓	✓
	Hookworm disease	✓	✓	–	–	–	✓	✓
	Lymphatic filariasis	✓	–	✓	✓	–	–	–
	Onchocerciasis	–	–	–	✓	–	–	–
	Schistosomiasis	–	–	–	–	✓	–	–
	Trichuriasis	✓	✓	–	(✓)	–	(✓)[d]	(✓)[d]
Target diseases for which a strategy is being developed	Clonorchiasis	–	–	–	–	✓	–	–
	Opisthorchiasis	–	–	–	–	✓	–	–
	Paragonimiasis	–	–	–	–	✓	–	–
	Strongyloidiasis	✓	(✓)	–	✓	–	–	–
	Taeniasis	–	–	–	–	✓ (up to 10 mg/kg)	–	–
Additional benefits	Cutaneous larva migrans (zoonotic ancylostomiasis)	✓	(✓)	–	(✓)	–	(✓)	(✓)
	Ectoparasitic infections (scabies and lice)	–	–	–	✓	–	–	–
	Enterobiasis	✓	✓	–	(✓)	–	(✓)	✓
	Intestinal trematodiases	–	–	–	–	✓	–	–
	Visceral larva migrans (toxocariasis)	–	–	✓	(✓)	–	–	–

ALB = albendazole; MBD = mebendazole; DEC = diethylcarbamazine (citrate); IVM = ivermectin; PZQ = praziquantel; LEV = levamisole; PYR = pyrantel

[a] Prescribing information and contraindications are given in the *WHO Model Formulary 2004*.
[b] In this table, √ indicates medicines recommended by WHO for treatment of the relevant disease, and (√) indicates medicines that are not recommended for treatment but that have a (suboptimal) effect against the disease.
[c] At present, LEV and PYR do not have a prominent role in preventive chemotherapy. However, they remain useful medicines for the treatment of soil-transmitted helminthiasis, and since – unlike ALB and MBD – they do not belong to the benzimidazole group, they will be expected to contribute to the management of drug-resistant soil-transmitted helminth infections should that problem emerge.
[d] LEV and PYR have only a limited effect on trichuriasis but, when used in combination with oxantel, PYR has an efficacy against trichuriasis comparable to that observed with MBD.

Adapted from: *Preventive chemotherapy in human helminthiasis. Coordinated use of anthelminthic drugs in control interventions: a manual for health professionals and programme managers.* Geneva, World Health Organization, 2006.

Annex 5. List of donated medicines and contact points for obtaining medicines

Medicine	Donation	Contact point for obtaining
Albendazole	Unlimited quantity from GlaxoSmithKline for lymphatic filariasis only (not for soil-transmitted helminthiasis)	For medicines, please contact the WHO Representative. For information and technical assistance, please contact: Dr Gautam Biswas Department of Neglected Tropical Diseases World Health Organization CH-1211 Geneva 27, Switzerland E-mail: biswasg@who.int Tel: +41 22 791 3850
Eflornithine	Unlimited quantity by 2012 from sanofi-aventis for human African trypanosomiasis	Dr Jean Jannin/Dr Perez Simarro Department of Neglected Tropical Diseases World Health Organization CH-1211 Geneva 27, Switzerland E-mail: janninj@who.int; simarrop@who.int Tel: + 41 22 791 3779/1345
Ivermectin	Directly to countries from Merck & Co Inc. for lymphatic filariasis and onchocerciasis	Mectizan® Donation Program 750 Commerce Drive, Suite 400 Decatur, GA 30030, USA E-mail: mectizan@taskforce.org Tel: +1 404 371 1460 Fax: +1 404 371 1138
MDT and Clofazimine	Unlimited quantity for Leprosy and its complications from Novartis	Dr Denis Daumerie Department of Neglected Tropical Diseases World Health Organization CH-1211 Geneva 27, Switzerland E-mail: daumeried@who.int Tel: +41 22 791 3919
Mebendazole	50 million tablets in 2007 from Johnson & Johnson for Soil-transmitted helminths control programmes for children	Nana A.Y. Twum-Danso Mebendazole Donation Program & Associate Director Mectizan Donation Program 750 Commerce Drive, Suite 400 Decatur, GA 30030, USA E-mail: ntwumdanso@taskforce.org Tel: +1 404 687 5623 Child Survival Task Force
Melarsoprol	Unlimited quantity by 2012 from sanofi-aventis for human African trypanosomiasis	Dr Jean Jannin/Dr Perez Simarro Department of Neglected Tropical Diseases World Health Organization CH-1211 Geneva 27, Switzerland E-mail: janninj@who.int; simarrop@who.int Tel: +41 22 791 3779/1345
Nifurtimox	500 000 tablets (120 mg) per year by 2012 from Bayer for treatment of Chagas disease	Dr Jean Jannin Department of Neglected Tropical Diseases World Health Organization CH 1211 Geneva 27, Switzerland E-mail: janninj@who.int Tel: +41 22 791 3779

Medicine	Donation	Contact point for obtaining
Pentamidine	Unlimited quantity by 2012 from sanofi-aventis for human African trypanosomiasis	Dr Jean Jannin/Dr Perez Simarro Department of Neglected Tropical Diseases World Health Organization CH-1211 Geneva 27, Switzerland E-mail: janninj@who.int; simarrop@who.int Tel: +41 22 791 3779/1345
Praziquantel	200 million tablets 2008-2017 from Merck KGaA for Schistosomiasis	Dr Dirk Engels Department of Neglected Tropical Diseases World Health Organization CH-1211 Geneva 27, Switzerland E-mail: engelsd@who.int
Suramine	Unlimited quantity by 2012 from Bayer for human African trypanosomiasis	Dr Jean Jannin/Dr Perez Simarro Department of Neglected Tropical Diseases World Health Organization CH-1211 Geneva 27, Switzerland E-mail: janninj@who.int; simarrop@who.int Tel: +41 22 791 3779/1345
Triclabendazole	600 000 tablets 2007-2009 from Novartis for fascioliasis	Dr Dirk Engels Department of Neglected Tropical Diseases World Health Organization CH-1211 Geneva 27, Switzerland E-mail: engelsd@who.int