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**DIVISION OF CONTROL OF
TROPICAL DISEASES
(CTD)**

PROGRESS REPORT 1997



WORLD HEALTH ORGANIZATION
CH-1211 GENEVA 27 - SWITZERLAND
<http://www.who.ch/ctd>

The mission of CTD, working closely with the WHO Regional Offices, is to provide support to country activities, to promote, advocate and coordinate tropical diseases control with the aim of improving the health status of individual communities and populations to contribute to social and economic development.

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PREFACE

This year was an eventful and successful one for the Division of Control of Tropical Diseases. It ended with a major initiative that will have significant consequences in the future towards improving the quality of life for one fifth of the planet inhabitants in the next millennium. The signing of a Memorandum of Understanding with SmithKline Beecham, plc paves the way for global elimination of lymphatic filariasis, an ancient disease which has plagued the population in 73 countries around the world. This initiative to eliminate the disease will contribute to accelerated economic growth, improvement of living standards and better education for 1.1 billion people who live in countries where the disease is endemic.

The well-recognised and appreciated work of the Division has been made possible by the extraordinary commitment and dedication of staff members for which I am indebted. A number of new staff have joined the Division this year, bringing a high degree of enthusiasm and creative input. The Division also said farewell to a few individuals who had dedicated a great portion of their lives to help our effort. It is with much sadness that I recall the deaths of Dr Kenneth Mott, chief of SIP and Dr Robert Kouznetsov of the malaria programme. Dr Mott, who headed WHO schistosomiasis activities for the past 14 years, died on 14 June 1997 at the age of 58 after a long illness that he faced with courage and fortitude until the end. His contributions to the development of tropical disease control methods are immense. Dr Kouznetsov, a long-term highly respected malaria expert of the Division, was working on the problem of resurgence of malaria in the Newly Independent States and other countries in Europe. Sadly, on 23 June 1997, Dr Kouznetsov passed away while on duty travel in Tajikistan where he was assisting the national authorities to control the resurgence of malaria in the country. He was 60 years of age.

The magnitude of the problem of tropical diseases remains very high, impeding social and economic progress and imposing considerable physical and mental suffering on people already living in deprived conditions. Most tropical diseases are thus closely linked with poverty and afflict the most disadvantaged and vulnerable groups of a society. The control of tropical diseases remains integral to WHO's role in the health agenda and is one of WHO's priority programmes.

The Division has taken account of the recommendations for global change which were endorsed by WHO's Executive Board and of the reforms proposed by the Secretary-General of the United Nations. An in-depth review of the Division exposed the need to re-examine the disease control strategies, to concentrate upon planning, to define responsibilities for programme delivery and to improve evaluation mechanisms. In this respect much has been accomplished. All disease control strategies have been reviewed and either revised or new strategies developed. A Technical Advisory Group has been established. Based on an audit, a new Divisional structure is being put in place to improve programme management and efficiency. Radical changes have

been made in the way in which the activities of the Division are planned and monitored. Action has been taken to improve the efficiency and effectiveness of the existing staff in all categories. The Division also contributed to organization-wide reform by using the new WHO performance evaluation instrument and Activity Management System (AMS) during its pilot phase. Additionally, collaboration with Member States, WHO Regional Offices, the UN system and the private sector has been enhanced. A major reform has been the exploitation of modern communication technologies and methods to improve effectiveness and visibility of the Division. This streamlining will enable us to provide better support to Member States.

Our priority concern is undoubtedly malaria. In 1997, the Director-General allocated an additional US\$10 million from regular budget funds to implement accelerated malaria control programmes in 24 endemic countries in Africa, where the burden of malaria disease and mortality is highest. Another US\$ 10 million has now supplemented this initial outlay for 1998. This will form a base for an intensified implementation of the Global Strategy in the coming years. With the additional input of 1997, over 90% of the countries affected by malaria have implemented malaria control programmes, thus fulfilling the first objective of the Global Strategy. The Harare declaration on Malaria Prevention and Control in the context of African Economic Recovery and Development by the Heads of State and Government of the OAU Countries demonstrates the political commitment of the African Nations to control this disease.

The continued reduction in reported cases of dracunculiasis and the sustained implementation of surveillance is a major achievement. The global certification of countries free of dracunculiasis transmission started in 1997 by certifying the first 21 countries. Over 90 countries are being prepared for certification in 1998.

As the premier global programme for the control of tropical diseases, the Division collaborates extensively with the WHO Regional Offices, WHO Representatives and other WHO Divisions and with its working partners outside the Organization. In particular, strong ties exist with the TDR, CHD, EMC, LEP and EHA programmes at WHO. The strong collaboration with, and the contribution of the UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (TDR) during the past years is much appreciated. A close working relationship also exists with the World Bank, UNICEF, UNESCO, European Commission, UNAIDS, UNDP, OAU and ECOSOC. More reliance is being placed on WHO Collaborating centres to support the work of CTD and NGOs are becoming increasingly involved in the Division's work.

The Division has promoted the concept of integrated disease control since 1996. With the tools and strategies now available, the integrated approach is being implemented in 5 countries with promising results. Nonetheless, much remains to be learned about this approach, not only in terms of bringing together control activities in the field, but also at the administrative level within the Division itself. The activities in these five countries will yield valuable information that will enable this approach to be progressively extended to other areas.

The Division acknowledges the need for increased public and private sector partnerships in the control of tropical diseases, such as that of the WHOPES programme collaborating with 9 companies resulting in 16 new candidate pesticides in clinical trials. Another long-term

collaboration with Novartis led to the registration in Egypt of a new drug (Triclabendazole) for the treatment of fasciolosis in humans which has since been included in the WHO essential list of drugs. In addition, GlaxoWellcome recently donated a new antimalarial drug (Malarone - Atovaquone and proguanil) for use as a first or second line treatment against resistant *Plasmodium falciparum*. The Division, together with other organizations, is providing advice on the responsible and appropriate use of this drug in endemic areas. As earlier mentioned, a more recent development is the unprecedented cooperation between SmithKline Beecham and WHO. To provide much needed support for the filariasis elimination effort, SmithKline Beecham, plc has generously agreed to donate, through WHO, albendazole and other resources including company personnel sufficient to eliminate the disease globally, estimated to be worth over one billion British pounds. This agreement will not only have an impact on the well-being of one fifth of the world's population, but also represents a new class of global cooperation in health. Hopefully it would set a precedent for many such arrangements in the years to come.

The Division has used the advances in information technology to reduce administrative cost and improve effectiveness. Thus video-conferencing has been used for staff interviews, conferences, negotiating and signing agreements. Through Internet we have connected scientists and control programme managers for free exchange of information and discussions.

Despite the enormous global burden of parasitic diseases, the response of the international donor community to their control has been inadequate for many years. We have been pleased to note that in recent months there has been a renewed interest by the donor community as the economic social and political impact of the disease burden on developing countries became more evident. We are working closely with our partners in the bilateral and multilateral development agencies and we look forward to receiving their increased support.

We are committed to promoting better health of individuals and communities, and the consequent improvement of social and economic development in areas presently afflicted by parasitic diseases. Through common efforts we seek to control, eliminate or even eradicate these diseases. The Division has accomplished the achievements stated in this report despite organization-wide budget and human resources constraints. As a Division we have created a foundation on which to build programmes able to respond to the challenges of the next millennium. By working together and making the best possible use of the tools and resources available, we should be able to achieve most of our goals.



Dr Kazem Behbehani
Director

OUR PARTNERS IN HEALTH

The table below lists the Division's Partners in Health through 1997. Further details regarding specific funding to each activity can be obtained in the Division's Financial Report. We thank our contributors for their continuous support and in-kind donations which have greatly assisted our work, and as a result, achievements over the past years.

GOVERNMENTS, NATIONAL AND INTERNATIONAL AGENCIES	
DONORS	ACTIVITIES
AGFUND	African Trypanosomiasis
Arab Fund for Economic and Social Development, Kuwait	Lymphatic Filariasis / CTD Activities
Australia (AUSAID)	Dengue
Belgium (A.G.C.D.)	Malaria / African Trypanosomiasis
Brunei Darussalam	Malaria
Chamber of Commerce and Industry, Kuwait	Leishmaniasis
Denmark	Onchocerciasis
European Commission	Malaria
France	Leishmaniasis / African Trypanosomiasis
Germany (GTZ)	Schistosomiasis
International Development Association, USA	Malaria
Ireland	Dracunculiasis
Italy (D.G.C.S.)	Intestinal Parasites / Schistosomiasis / Malaria / Leishmaniasis / Training
Japan (MOHW)	Malaria / Dracunculiasis / Lymphatic Filariasis
Korea	Malaria
Kuwait	Malaria / Schistosomiasis
Kuwait Fund for Arab Economic Development	CTD Activities
Kuwait National AIDS Programme	Leishmania / HIV co-infections
Lebanon	Malaria
Micronutrient Initiative, Canada	Intestinal parasites
Netherlands	Malaria / African Trypanosomiasis / Vector-borne diseases
Organization of Petroleum Exporting Countries (OPEC)	Dracunculiasis
Spain	Malaria
Sweden (SIDA)	Malaria
UNAIDS	Leishmania / HIV co-infections
UNICEF	HealthMap
UNDP	Schistosomiasis / Intestinal Parasites
United Kingdom of Great Britain and Northern Ireland (DFID)	Malaria / Dracunculiasis / Leishmaniasis
United States of America (USAID)	Malaria
World Bank	Training / Malaria

COMMERCIAL ENTERPRISES AND INDUSTRY	
Abbott Laboratories, USA	WHOPES
AgrEvo Environmental Health Ltd., UK	WHOPES
Al Ahlia Insurance Company, Kuwait	Dracunculiasis/CTD Activities
Babolna Bioenvironmental Centre Ltd., Hungary	WHOPES
Bank of Kuwait and the Middle East K.S.C., Kuwait	Leishmaniasis/CTD Activities
Bayer AG, Germany	WHOPES/Training
Cheminova Agro A/S, Denmark	WHOPES
Clorox International, USA	WHOPES
Cyanamid International Corporation, Ltd., USA	WHOPES
Dow Elanco Ltd., UK	WHOPES
FMC Corporation, USA	WHOPES
Francome Fabrications Ltd., UK	WHOPES
Fumakilla Malaysia Berhad, Malaysia	WHOPES
Hoechst Schering AgrEvoSA, France	Leishmaniasis
IGEBA Geraetebau GMBH, Germany	WHOPES
Insecticide Resistance Action Committee	WHOPES
Japan Pharmaceutical Manufacturers Association	Malaria
Merck KGAA, Germany	WHOPES
Mitsui Toatsu Chemicals Inc., Japan	WHOPES
Novartis Pharma AG, Switzerland	Schistosomiasis
Pulsfog, Dr Stahl and Son, GMBH, Germany	WHOPES
Reckitt and Coleman Products PTY, Ltd. Australia	WHOPES
Rhône Poulenc Agrochimie SA, France	WHOPES
Rhône Poulenc Rorer, SA, France	Leishmaniasis / African Trypanosomiasis
S. C. Johnson and Son, Inc., USA	WHOPES
SmithKline Beecham, plc, UK	Lymphatic Filariasis / Training
Sumitomo Chemical Co. Ltd., Japan	WHOPES
Takeda Chemical Industries, Ltd., Japan	WHOPES
Tifa (C.I.) Ltd., USA	CTD Activities / Malaria
Zeneca Agrochemicals, UK	WHOPES

FOUNDATIONS, NON-GOVERNMENTAL ORGANIZATIONS AND PRIVATE INDIVIDUALS	
Africa Muslims Agency	Dracunculiasis/Schistosomiasis
Bader Al Mulla and Brothers Co., Kuwait	CTD Activities
Behbehani, Aster & Salman, Kuwait	Leishmaniasis
Behbehani, Mohammed Saleh & Reza Yousef, Kuwait	CTD Activities
Danish Bilharziasis Laboratory, Denmark	Training
Edna McConnell Clark Foundation	HealthMap
Garton G.A.H., Australia	Malaria
German Pharma Health Fund EV, Germany	Intestinal Parasitic Infections / Schistosomiasis / Opisthorchiasis
Global 2000 Inc. of the Carter Center, USA	Dracunculiasis
Health and Development International, USA	CTD Activities
Islamic Organization for Medical Sciences, Kuwait	Dracunculiasis
Nasser Mohammed Nasser Al Sayer	CTD Activities
Sandouq Zakat; Bait Al Tamweel, Kuwait	CTD Activities

MILESTONES

- October 1996** The Director-General made available to the WHO Malaria Programme US\$10 million to implement accelerated malaria control activities in Africa, for use in 1997.
- January 1997** Certification of countries free of dracunculiasis transmission began and twenty-one countries were certified during the second meeting of the International Commission for Certification of Dracunculiasis Eradication (ICCDE).
- Multilateral Initiative on Malaria (MIM) launched in Dakar, Senegal.
- February** The Initiative for the Andean Countries launched (Chagas control).
- May** WHO/UNESCO Memorandum of Understanding on joint collaboration in malaria control.
- World Health Assembly resolutions on elimination of lymphatic filariasis (WHA 50.29), malaria prevention and control (WHA 50.34), eradication of dracunculiasis (WHA 50.35) and African trypanosomiasis (WHA 50.36).
- June** Heads of State and Government of the 53 OAU countries adopt the Harare Declaration on Malaria Prevention and Control in the Context of African Economic Recovery and Development.
- Meeting of Collaborating Partners.
- August** Secunderabad Declaration on Malaria, on the occasion of the Ronald Ross Centennial.
- September** Interruption of transmission of Chagas disease in Uruguay certified.
- October** Second Meeting of the Director-General's Task Force on Malaria in Cairo, Egypt.
- Registration of triclabendazole for human fascioliasis in Egypt.
- The Initiative of the Central American Countries launched (Chagas control).
- Review of CTD programme by WHO's Management Development Committee.
- November** Inter-Agency meeting on malaria.
- An additional US\$10 million is provided by the Director-General to continue the accelerated malaria control activities in Africa, for use in 1998.
- December** WHO/SmithKline Beecham, plc agreement on lymphatic filariasis elimination.
- Hashimoto Initiative for Global Parasitic Diseases Control.
- 90% of affected countries had developed a national malaria control programme.

REVIEW OF THE CONTROL OF TROPICAL DISEASES PROGRAMME (CTD)

In October 1997 the CTD programme was reviewed and evaluated by the Headquarters Management Development Committee (MDC (HQ)) of WHO. The MDC (HQ) noted that in response to concerns expressed regarding work methods, particularly with countries, CTD's interaction with the regional offices has been good, particularly in the area of Malaria in EURO, but also with AFRO (Malaria), WPRO, SEARO, AMRO (Chagas), and EMRO. However, there remains a need to be flexible in setting the modalities for cooperation with each other and with countries, depending on the situation to be addressed and the strengths of the regional offices and CTD. It was also noted that the development of joint plans of action with the regional offices, such as those elaborated with AFRO and EURO for Malaria, should be done for other diseases and regions. Through the development of such plans, the approach to working with countries could be decided upon jointly and the framework for a direct approach to countries by CTD could be agreed upon, if necessary. It was stressed that collaboration and coordination between CTD and the regional offices is also essential in order to assist countries in dealing with crossborder disease issues.

The MDC (HQ) emphasized the importance of further integrating tropical disease control into national public health systems and the use of an integrated approach to disease control. This not only applies to the control of diseases, but also to other activities, such as the rational use of drugs which should be managed through national drug management systems. A second area emphasized related to coordination and collaboration with other programmes, for example, in the use of environmental management measures for the control of tropical diseases and vectors. Some issues were identified as requiring further study, such as the centralization of activities of regional significance outside headquarters, blood safety and the possibility of seconding WHO staff to the corresponding World Bank counterpart programme.

The MDC (HQ) agreed that the issue of increased extrabudgetary funding for CTD is an area which should continue to be actively pursued, and CTD was encouraged to include in its documentation those activities for which funds might be provided to countries on a bilateral basis, especially where the Division has provided substantial technical input.

As follow-up actions, the committee recommended that:

- planning of activities and support to countries, as well as programme evaluation at country level, be done jointly where appropriate by CTD and regional offices;
- there be flexibility regarding country support modalities according to the agreement reached with regional offices;
- the integrated approach to disease control be further promoted both within disease control and within health services infrastructure ensuring attention to environmental health aspects; and that
- there be more WHO involvement in planning with donors and funding institutions for bilateral funding.

THE 1997 TECHNICAL ADVISORY GROUP MEETING

The Technical Advisory Group (TAG) was established in 1996 in order to review technical progress and identify major constraints to CTD's activities, as well as to provide suggestions on how to improve the impact of the CTD programme. The first meeting of TAG to CTD was convened in Geneva from 26-28 February 1997.

TAG noted that the Division has now all the appropriate strategies defined to ensure implementation of control programmes for the diseases under its mandate, given adequate resources at the country level and government commitment. The major challenge to CTD is to identify the most appropriate system for implementation to achieve sustainability both in terms of actions and achievements and to ensure that the support links to Regional Offices are maximized. Implementation will be only possible with government and/or donor commitment, and recognition of both the benefits of control and the essential elements which contribute to successful programmes. These are well defined in the case of onchocerciasis and Chagas disease. CTD recognizes that implementation is not its prime responsibility. It is rather to help plan control programmes, to facilitate, motivate, coordinate, monitor and evaluate and to provide strategic thinking and, thereby, to support Member States optimally.

CTD was commended on the quality, extent and form of the documentation provided. Over the last two years the Division has refocused on key issues within its mandate by a short- to medium-term planning process. During a difficult period, priorities have been identified, targets set and a plan of activities developed with appropriately budgeted components. The Division is undergoing a transition in management and should be commended on the progress achieved despite current constraints. It is providing WHO with value for money in a highly competitive environment. The Group congratulated CTD on several quality products that had been developed for distribution as guidelines and training materials, i.e. manuals and bench aids. These should be more widely disseminated at country level by CTD through Regional Offices, WHO country representatives, collaborating agencies and NGOs, in addition to the government channels.

The Technical Advisory Group considered that the shortcomings identified in progress towards achieving objectives and targets were related to the shortage of financial and experienced human resources at both national and international levels and the priority given by donor agencies to tropical disease control. CTD has successfully initiated a process of active solicitation of external support and has achieved much in this domain over the past two years. However, this effort draws upon the already limited time available for the development of its technical mandate. The Group noted with some concern that human resources in key areas of the Division were depleted for various reasons. It was essential that constraints on these posts were addressed.

Considerable progress has been achieved over the last year in developing the WHO Pesticide Evaluation Scheme (WHOPES), which represents a dynamic interaction with the private industry in ensuring appropriate pesticide development relevant to public health needs.

BURDEN AND TRENDS

THE GLOBAL BURDEN OF TROPICAL DISEASES

	People at Risk (millions)	People Infected (millions)	Annual Mortality	Morbidity Disability	No. of Countries Affected
Malaria	2300	300 - 500	1.5 - 2.7 million	300-500 million clinical cases	100
Dracunculiasis	100	< 0.15	Exceptional	High disability	18
Chagas disease	100	18	>45,000	6 million	21
Leishmaniasis	350	12	Visceral: 100,000 Cutaneous: very low	VL: very high CL: multiple lesions	88
Lymphatic filariasis	1100	120	Excess mortality among those with elephantiasis	44 million with chronic disability	73
Dengue & DHF	2500-3000	>20	20 - 30,000	Millions of cases	>100
African trypanosomiasis	55	>0.3	50,000	>300,000 cases; high disability	36
Onchocerciasis	120	18	Excess mortality among the blind	270,000 blind	34
Foodborne trematode infections	730	40	>10,000	Liver disease or diarrhoea	>100
Intestinal parasites	4000	3500	Helminths: 135,000 Protozoa: 90,000	Helminths: 450 million Protozoa: 48 million	>100 All
Schistosomiasis	600	200	<20,000	20 million	74

Figures are provisional, subject to change as and when current data becomes available; some people may be infected with more than one disease; figures rounded up.

MALARIA

Malaria risk of varying degrees exists in 100 countries

Over 40% of the world's population live in areas at risk

The vast majority of malaria deaths occur among young children in tropical Africa

In 1997, malaria risk of varying degrees existed in 100 countries and territories. In 92 of these, transmission included the malignant (*Plasmodium falciparum*) form of the disease. Over 40% of the world population lived in areas with malaria risk. As reported in 1996, the global malaria situation is serious and becoming worse. Overall, the situation has not changed and global estimates remain the same with the incidence of malaria in the world at 300-500 million clinical cases annually. Some 1.5-2.7 million people die of malaria each year, and approximately one million deaths among children under five years of age are attributed to malaria alone or in combination with other diseases. Countries in tropical Africa account for more than 90% of the total malaria incidence and the great majority of malaria deaths.

Plasmodium falciparum is the predominant malaria parasite in tropical Africa, the Amazon area, Southeast Asia, and Oceania. In the rest of the world it is less common. It is the main cause of severe clinical malaria and mortality, striking young children, non-immune adults, and women during their first pregnancies. Early diagnosis and prompt adequate treatment are paramount in the prevention of mortality. The vast majority of malaria deaths occur among young children in tropical Africa, especially in remote rural areas with poor access to health services. Outside tropical Africa, malaria deaths occur mainly among non-immune newcomers to endemic areas, for example among agricultural workers, gold and gem miners, and settlers in new colonization areas. During epidemics all age groups are affected. Problems may be worse in areas burdened with armed conflicts and mass movements of refugees. Some recent epidemics have been linked to climatic change, and the opening up of previously non-endemic areas to development projects. Insecticide resistance and antimalarial drug resistance also constitute major problems. New antimalarial drugs become increasingly expensive, making them unaffordable for the people who need them.

Several control programmes are achieving a considerable reduction in the burden of malaria. In other areas, the malaria situation is worsening with large-scale epidemics and increasing mortality. In Central Asia and the Caucasus, re-introduction of malaria transmission has followed massive socio-economic degradation and the collapse of health and social services. In some countries, the re-establishment of malaria endemicity is taking place, following large-scale malaria epidemics.

Political commitment on a long-term basis is required to make the changes necessary to implement technical programmes effectively. Recent years have seen a welcome political effort by endemic countries and donor countries alike to make malaria control a priority on the health agenda. In 1997, Heads of State and Government of the 53 countries of the OAU adopted the *Harare Declaration on Malaria Prevention and Control in the Context of African Economic Recovery and Development*, committing their countries to a renewed effort to control malaria.

**Political commitment
on a long term-basis
is required for
programme
implementation**

DRACUNCULIASIS (GUINEA WORM DISEASE)

Almost, but not quite, a thing of the past, dracunculiasis used to be a formidable public health problem; not a cause of mortality, but a real burden in terms of morbidity, incapacity and suffering for those affected. Estimated at several million cases annually at the close of the 1970s, before the international water decade (1981-1990), the global incidence decreased due to efforts made prior to 1996 to less than 153 000 cases, 78% of which were notified in Sudan. The disease is still found among the poorest rural communities in areas without safe water supplies in 17 African countries and in Yemen.

**Global incidence has
decreased
dramatically in the
past decade**

Infection occurs by drinking water from unprotected wells contaminated by minute crustaceans (*Cyclops spp.*) which have been infected by the larvae of the worm *Dracunculus medinensis*. On drinking such water a person swallows the parasitized cyclops which is digested releasing the larva which

penetrates the intestinal wall and develops into a worm which migrates through the tissues. After about a year, the adult worm reaches the surface of the skin, commonly of the lower part of the body, and penetrates it. A blister forms at the site through which the worm emerges. At this point, whenever a female worm comes in contact with water she discharges large numbers of larvae (over a period of 2-3 weeks) into the water. Cyclops ingest the larvae, become infected, and the cycle starts all over again.

Transmission is easily interrupted by simple measures

Although there are no drugs to treat or prevent dracunculiasis, transmission is easily interrupted by simple measures such as behavioural changes, protecting wells, tanks and water sources, filtering water before drinking it, or (when possible) treating water with "temephos" (a biodegradable organophosphorous compound) to kill the cyclops. These have made it possible to eliminate the disease from many affected areas and to aim at total eradication.

CHAGAS DISEASE

Chagas disease is endemic in 21 countries with 100 million people at risk

Chagas disease has a wide distribution in Central and South America, being found only in the Americas. It is endemic in 21 countries, with 16-18 million persons infected and 100 million people at risk. The disease is caused by *Trypanosoma cruzi*, a flagellated protozoan parasite which is transmitted to humans in two ways, either by a blood-sucking reduviid bug which deposits its infective faeces on the skin at the time of biting, or directly by transfusion of infected blood. Humans and a large number of species of domestic and wild animals constitute the reservoir, and the vector bugs infest poor housing and thatched roofs.

The acute stage of the disease is generally seen in children, and is characterized by fever, swelling of lymph glands, enlargement of the liver and spleen, or local inflammation at the site of infection. But, commonly, there are no acute clinical manifestations, and those infected may remain without symptoms. In about one-third of acute cases, a chronic form develops some 10-20 years later, causing irreversible damage to the heart, oesophagus and colon, with dilatation and disorders of nerve conduction of these organs. Patients with severe chronic disease become progressively more

ill and ultimately die, usually from heart failure. There is, at present, no effective treatment for such cases.

Rural migrations to urban areas during the 1970s and 1980s changed the traditional epidemiological pattern of Chagas disease: it became an urban disease, as untested blood transfusion created a second way of transmission. Between 1960 and 1989, the prevalence of infected blood in blood banks in selected cities of South America ranged from 1.7% in Sao Paulo, Brazil to 53.0% in Santa Cruz, Bolivia, a percentage far higher than that of hepatitis or HIV infection.

In 1997, the decreasing trend previously observed in the prevalence of house infestation by the vector bug (*Triatoma infestans*) and the incidence of human infection in children and youngsters continued in the countries of the Initiative of the Southern Cone.

There is a decreasing trend in prevalence of both house infestation and human infection

LEISHMANIASIS

Leishmaniasis currently affects some 12 million people in 88 countries, all but 16 of which are in the developing world. The disease is transmitted by sandflies, small biting insects which breed in moist soil, forest areas, caves or the burrows of rodents, and feed from infected animal reservoir hosts or humans.

Leishmaniasis affects 12 million people in 88 countries

It is estimated that 350 million people are exposed to the risk of infection by different species of *Leishmania* parasite. The disease takes four main forms:

- *Visceral leishmaniasis* (VL) - the most serious form of the disease and fatal if untreated.
- *Cutaneous leishmaniasis* (CL) - the most common infection, causing one or more simple skin lesions which heal after a few weeks or months, but leave unsightly scars.
- *Mucocutaneous leishmaniasis* (MCL) - which begins with simple skin ulcers, and can spread, causing hideous tissue destruction, particularly to the nose and mouth.

- *Diffuse cutaneous leishmaniasis* (DCL) - which produces disseminated and chronic lesions which resemble those of lepromatous leprosy and are the most difficult to treat.

Annual incidence is about 2 million new cases

The annual incidence of new cases is about 2 million (1.5 million of cutaneous leishmaniasis, and 500 000 of visceral leishmaniasis).

Apart from rising figures partially due to better reporting, there is also a clear and disturbing real increase in the number of people infected. Like many other tropical diseases, the leishmaniases are related to economic development and man-made environmental changes which increase exposure to the sandfly vector. Extracting timber, mining, building dams, widening areas under cultivation, new irrigation schemes, road construction in primary forests such as the Amazon, widespread economic migration and fast urbanization worldwide are among the main causes for the increase in incidence.

Incidence of Leishmania/HIV co-infections is increasing

Recently, there has been an increase in overlapping of visceral leishmaniasis (VL) and HIV infection due to the spread of the AIDS pandemic. *Leishmania*/HIV co-infection is considered to be an "emerging disease", especially in southern Europe, where 25-70% of adult VL cases are related to HIV infection, and 1.5-9.5% of AIDS cases suffer from newly acquired or reactivated VL. Intravenous drug users have been identified as the main population at risk.

Deadly epidemics of visceral leishmaniasis still occur, for example in southern and eastern Sudan. Currently, risk of an epidemic exists in the Horn of Africa, at the junction of Eritrea, Ethiopia and Sudan, an area highly endemic for many years where tens of thousands of refugees, returnees and agricultural workers have been resettled.

LYMPHATIC FILARIASIS

Lymphatic filariasis, most commonly recognized by the elephantiasis and male genital damage it causes, results from infection with parasitic worms transmitted by various species of mosquitoes. It is endemic in at least 73 countries where 120 million people are infected (90% with *Wucheria bancrofti* species and most of the remainder by *Brugia malayi* and *B. timori*). The adult filarial worm lives in the lymphatic vessels near the lymph nodes, inducing distortion, dysfunction and inflammation of the lymphatic system. Adult worms are often lodged in the lymphatics of the spermatic cord causing scrotal enlargement and damage. Elephantiasis, a painful and disfiguring swelling of the limbs and genitals is a classic sign of the late stage of the disease. The adult worms live 4-6 years, giving rise to millions of larval forms (microfilariae) which circulate in the lymphatics and blood where they can be taken up by mosquitoes and transmitted to other persons.

In the absence of treatment programmes there are two epidemiological trends in lymphatic filariasis that compete with one another. The dominant trend, found throughout the poorest communities of the tropics, is toward increasing infection and disease, often associated with unplanned urbanization and subsequent increase in mosquito vector populations. Less commonly, where hygiene and environmental improvements predominate, there can be reduction in parasite levels below those necessary to sustain local transmission. It is toward this latter scenario that hopes are focused, and it has become clear that introduction of simple treatment regimens can greatly hasten the interruption of transmission. Indeed, largely because of newly available, dramatically effective treatment and diagnostic tools, the outlook for filariasis control/elimination is now so positive that an International Task Force for Disease Eradication identified filariasis as one of only six diseases currently considered eradicable or potentially eradicable, and, in May 1997, the World Health Assembly adopted Resolution WHA50.29 calling for the elimination of lymphatic filariasis as a public health problem globally.

**The disease is
endemic in at least
73 countries**

**A World Health
Assembly resolution
calling for worldwide
elimination**

**SmithKline Beecham
plc will generously
support the
worldwide
programme on
elimination**

To provide the much needed support for these filariasis elimination efforts, SmithKline Beecham, plc has generously agreed to collaborate with WHO/CTD in the worldwide programme to eliminate lymphatic filarial disease. The Company will donate through WHO quantities of albendazole sufficient to eliminate the disease globally and will, additionally, provide financial support, human and other resources in support of this elimination goal.

DENGUE AND DENGUE HAEMORRHAGIC FEVER

**Dengue is the cause
of an estimated
500 000
hospitalizations
each year**

Dengue, dengue haemorrhagic fever (DHF) and dengue shock syndrome (DSS) are prevalent in over 100 countries and territories and threaten the health of more than 2.5 billion people, living in urban, peri-urban and rural areas of tropical and subtropical regions. Annual incidence is estimated to be in the tens of millions, with an estimated 500 000 hospitalized cases of DHF/DSS, 90% of whom are children under the age of 15 years. The average mortality rate is 5%, with some 24 000 deaths each year.

The incidence of DHF is greater by far in the Asian countries than in the Americas. In the Americas, the emergence of epidemic DHF occurred in 1981, almost 30 years after its appearance in Asia and its incidence is showing a marked upward trend. Rapid expansion of urbanization, inadequate supply of piped water, increased movement of human populations within and between countries, and further development and spread of insecticide resistance in the mosquito vector populations, are some of the reasons for the increase of dengue transmission in recent years.

In light of the increasing significance and continued spread of the disease, the World Health Assembly in May 1993 approved a resolution entitled "Dengue prevention and control", which identifies dengue and its more serious syndromes, as a priority of the Organization. Progress toward the implementation of that resolution is seen with the adoption in 1995 of a global strategy on dengue and DHF.

HUMAN AFRICAN TRYPANOSOMIASIS (SLEEPING SICKNESS)

Sleeping sickness is caused by *Trypanosoma brucei*, a protozoal parasite transmitted by the bite of the tsetse fly (*Glossina* spp.). The disease is found over vast areas of tropical Africa, and exists in two main forms. The East African form (*T. brucei rhodesiense*) runs a rapid course, while in the West and Central African form (*T. brucei gambiense*), the disease runs a much longer course, over several years, before death occurs. Without appropriate treatment both forms are fatal. The chief early clinical sign is enlargement of the lymph glands. Early diagnosis of *T. brucei gambiense* is very difficult because specific clinical signs are absent. Only serological tests can be used in population surveys.

Human African trypanosomiasis (HAT) is rural and focal, with humans as the principal reservoir of infection of *T. brucei gambiense*, and domestic cattle and wild animals as important reservoirs of *T. brucei rhodesiense*. By the 1960s it had been brought under control, but since 1970 the situation has deteriorated and the disease has reappeared, with major flare-ups in countries which have not maintained surveillance activities. Four main levels of endemicity have been identified:

- In Angola, Democratic Republic of Congo, Sudan and Uganda the disease is considered epidemic due to a high prevalence and a significant transmission level;
- Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Guinea and Tanzania have been classified as countries of high endemicity where prevalence is increasing;
- Benin, Burkina-Faso, Equatorial Guinea, Gabon, Ghana, Guinea, Kenya, Mali, Mozambique, Nigeria, Togo and Zambia are considered of low endemicity although the epidemiological situation is poorly known in foci in several countries;
- Countries where the present epidemiological status is poorly or not known, namely Burundi, Botswana, Ethiopia, Liberia, Namibia, Rwanda, Senegal and Sierra Leone.

**Since 1970 the HAT
control situation has
deteriorated**

Sleeping sickness prevalence is over 20% in certain epidemic foci

It is estimated that 55-60 million people are exposed to the risk of becoming infected with trypanosomiasis, but that only four million of them are under active surveillance or have access to health centres where reliable diagnosis is available. In 1996, some 30 000 new cases were reported, however this does not reflect the real epidemiological situation, but simply poor surveillance; the estimated number of infected persons is over 300 000. In countries such as Angola, Democratic Republic of Congo, and Sudan, the operational capacity to respond to the "epidemic situation" is largely surpassed. In certain foci, the observed prevalence is over 20% and in many villages it is even greater than 50%. In some provinces, sleeping sickness has become the leading cause of mortality. To date, the Democratic Republic of Congo has estimated the number of deaths due to human trypanosomiasis as equal or higher than that due to AIDS. In other respects, the epidemiological situation in several other countries is totally unknown.

Human and animal trypanosomiasis both have an important impact on the development of rural areas, by reducing the labour force, cattle production and the availability of animal traction for farming. The socio-economic burden is important as both the human and the animal disease reduce family revenues and slow the economic growth of rural areas through the abandonment of farming of fertile land. Trypanosomiasis remains a major obstacle to the development of whole regions.

SCHISTOSOMIASIS AND INTESTINAL PARASITES

Together, these conditions constitute an immense burden of chronic poor health and diminished physical and intellectual performance in many developing countries. Although specific mortality rates among these infections are not high, indirectly they contribute to mortality attributed to other causes, and their social and economic costs to the affected communities are enormous.

The group covers a wide range of parasites but, in most cases, humans themselves form the principal reservoir of infection, and transmission is maintained through contamination of the environment (soil or water) by urine or faeces. Rural populations engaged in fishing or agriculture are those mainly affected, but urban migration and refugee movements are spreading these diseases to peri-urban and other areas.

The global distribution of schistosomiasis has changed significantly in the past 50 years, with control successes achieved in Asia, the Americas, North Africa and Middle East. Such success has been consistently linked to both political commitment and the implementation of a concerted control strategy. *Schistosoma japonicum* and *Schistosoma haematobium*, the main causes of infection in 1947, have decreased in prevalence and distribution, and *Schistosoma mansoni* has become the most prevalent and widespread of the three species.

As an example, *S. japonicum* which accounted for most of the transmission among the three major schistosome species and was the most difficult to control, due to its zoonotic nature, has now been effectively controlled in many areas. It is presently endemic in only three countries, namely China, Indonesia and the Philippines, and control efforts have significantly reduced transmission.

However, recent environmental changes, closely linked to water resources development and increases in population densities, have led to the spread of the disease to previously low- or non-endemic areas. Despite the progress achieved, schistosomiasis remains endemic in 74 developing countries (600 million people at risk) and infects more than 200 million people, with 120 million symptomatic and 20 million suffering severe consequences from the disease.

The greatest current concern is in Africa where most of the transmission is taking place, despite the availability of effective tools for disease control such as drugs and simplified diagnostic methods developed with the support of WHO.

Intestinal parasitic and protozoan infections are amongst the most common infections worldwide. It is estimated that some 3.5

The global distribution of schistosomiasis has changed in the past 50 years

The greatest current concern is in Africa

billion people are affected, and that 450 million are ill as a result of these infections, the majority being children. Each year, some 65 000 deaths are directly attributable to hookworm infections, and another 60 000 to *Ascaris lumbricoides* (roundworm). *Entoameoba histolytica* which causes amoebiasis is estimated to cause severe disease in 48 million people, killing 70 000 each year. Multiple infections with several different parasites (e.g., hookworms, roundworms and amoebae) are common, and their harmful effects are often aggravated by co-existent malnutrition or micronutrient deficiencies.

About 44 million pregnant women have hookworm infections which cause chronic blood loss from the intestine and predisposes to the development of iron deficiency anaemia, sometimes of great severity, constituting a major public health problem.

The numbers are increasing, with cases occurring in all WHO regions. In 2025, more than half of the population in developing countries will be urbanized and, as a consequence, a large number of people will live in shanty towns where *E. histolytica*, *Giardia intestinalis*, *A. lumbricoides* and *Trichuris trichiura* will find a favourable ground for transmission.

Of the two morphologically identical species, *E. histolytica* and *E. dispar*, only the former is pathogenic

Infection with *E. histolytica*, known as amoebiasis, is responsible for up to 70 000 deaths per year, placing it second only to malaria in mortality due to protozoan parasites. It has long been known that people apparently infected with *E. histolytica* never develop symptoms and spontaneously clear the infection, which led Emile Brumpt in 1925 to suggest that there were in fact two species.

Brumpt's hypothesis was dismissed until recently when biological, immunological and genetic data began to accumulate in its favor. In order to evaluate the implications of this recent work, a WHO/PAHO/UNESCO Expert Consultation on Amoebiasis was held in Mexico on 28-29 January 1997. The consultation concluded that the accumulated data indicate that there are two morphologically identical species, referred to as *E. histolytica* and *E. dispar*, and that only *E. histolytica* is capable of causing invasive disease.

ELEMENTS OF TRANSMISSION CYCLES OF MAJOR TROPICAL DISEASES

Disease	Vector	Major reservoir hosts (wild and domestic)
Malaria	mosquito (certain <i>Anopheles</i> spp.)	none
Dracunculiasis	cyclops (water flea)	none
Chagas disease	Triatomine bugs	rodents, chickens, dogs
Leishmaniasis	phlebotomine sandfly	VL: dogs and foxes CL: rodents, sloths
Lymphatic filariasis	mosquitos (<i>Culex</i> , <i>Anopheles</i> , <i>Aedes</i> , <i>Mansoni</i> spp.)	none for bancroftian and periodic brugian infections; monkeys and felines for sub- periodic <i>Brugia</i> infections*
Dengue & DHF	mosquito (<i>Aedes</i> spp.)	monkeys (in some parts of the world)
African trypanosomiasis	tsetse fly (<i>Glossina</i> spp.)	cattle, sheep, dogs, pigs, bushbuck, hartebeest, warthog
Onchocerciasis	blackfly (<i>Simulium</i> spp.)	none
Food borne trematode infections	snails (<i>Lymnaea</i> spp., <i>Bithynia</i> spp.)	cattle, sheep, goats, pigs, dogs, cats, foxes
Intestinal parasites	none	none**
Schistosomiasis	snails (<i>Bulinus</i> , <i>Biomphalaria</i> , <i>Onchomelania</i> spp.)	cattle & water buffaloes (for <i>S. japonicum</i> only).

* This accounts for 5% of all lymphatic filariasis infections.

** Possibly beavers for *Giardia lamblia*.

THE HASHIMOTO INITIATIVE FOR GLOBAL PARASITIC DISEASES CONTROL

Recent advances in the diagnosis, treatment and surveillance of many of the parasitic diseases have made it possible to have a significant impact on the suffering which they cause worldwide. The time has come to apply an energetic global approach focused on achieving a world in which parasitic infections no longer compromise the survival of children and the health, development and well-being of people in endemic areas.

December 11 and 12 1997 marked the occasion of an important step forward in this regard. On the initiative of Ryutaro Hashimoto, the Prime Minister of Japan, a meeting was convened in Tokyo by WHO and the Ministry of Health and Welfare of Japan and was attended by a number of eminent experts. The meeting discussed prospects for control of parasitic diseases in the near future, targets for global parasitic disease control, the political commitment and the international cooperation needed, and reviewed the technical constraints. This initiative, antecedent to the 1998 Summit of the G8, to be held in Birmingham, U.K., has heightened the level of discussion on parasitic diseases and will mark a significant political commitment to fight major obstacles to health improvement.

Discussion at the meeting highlighted the importance of identifying and focusing on disease of greater public health pertinence, the need to consider an integrated approach to their control, and the benefits of involving private industry as a key partner in control efforts. A network for collaboration of activities ranging from the development of effective control instruments to their application in programmes was considered necessary for a significant worldwide contribution to alleviate the burden of parasitic diseases.

To promote and coordinate such international collaboration, it was proposed by Japan that a Group be established which would serve to ensure a strategic cooperation amongst implementing agencies and to agree on common goals and a framework of action. The meeting also identified two pillars of political commitment necessary in order for the Initiative to be sustainable: a commitment from the G8 as well as other potentially interested countries, and a political commitment from the endemic countries concerned. Malaria emerged as a priority disease on which to focus.

The meeting highlighted several areas of technical constraints which impede current control efforts of parasitic diseases. These include lack of effective tools, lack of control strategies adapted to a reforming health system. Also, weak health systems, and inadequate capacity to deliver parasitic control services and capability to overcome operational constraints were recognized as significant obstacles to be overcome.

GENDER AND THE TROPICAL DISEASES

The magnitude of the problem of tropical diseases is very high; impeding social and economic progress and imposing considerable physical and mental suffering on people already living under deprived conditions. Most tropical diseases are thus closely linked with poverty and afflict the most disadvantaged and vulnerable groups in society. In addition, a large proportion of this affected group are women and children, with high levels of associated morbidity and mortality. Examples include the severity of malaria in children and pregnant women, and the detrimental effect of hookworm infection on the health of women and girls. CTD's activities in disease control therefore invariably address the problems and health issues of these disadvantaged groups. The following examples illustrate this point.

Dracunculiasis is exclusively associated with unsafe drinking water, a common feature in most poor communities, largely affecting women and children. Control activities initiated by WHO have led to spectacular progress which should culminate in the eradication of this disease within the next decade.

The vast majority of malaria deaths occur in remote areas with limited access to drugs and proper health services, and children and pregnant women are at particularly high risk. WHO's multifaceted efforts based on the Global Strategy specifically target these populations and are aimed at reducing the burden of malaria, a preventable and curable disease.

Intestinal parasitic infections are widespread and are associated with retarded growth and iron deficiency anaemia, thus aggravating existing nutritional deficiencies in high risk groups. Important guidelines have been developed by CTD for use by member states for implementing control programmes, and national deworming programmes focusing on school children and women of childbearing age have been initiated.

Lymphatic filariasis leads to elephantiasis, a painful swelling of the limbs, in late-stage disease. This disfiguring ailment is both of social and economic concern to affected individuals, in particular women. Tremendous progress is being made in the control of this disease and through WHO initiatives, control tools and strategies are now available for elimination of lymphatic filariasis as a public health problem in the foreseeable future.

Socio-cultural factors governing use of water influence schistosomiasis infection. In northern Nigeria, boys and young men are more likely to have schistosomiasis than girls and young women because boys are freer to bathe and swim in infested water bodies. On the other hand, in rural Zimbabwe, women had a higher prevalence of schistosomiasis than men because of more contact with infested water for domestic purposes. Pathology due to schistosomiasis results from tissue reaction to trapped parasite eggs. In some situations, particularly with urinary schistosomiasis, heavy infections result in lesions of the genital tract, which are risk factors for HIV infection, as they bleed easily during sexual intercourse. These lesions are difficult to detect in women. Gynaecological complications due to schistosomiasis are an important cause of female morbidity in endemic areas.

