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WORLD HEALTH ORGANIZATION
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DIVISION OF CONTROL OF TROPICAL DISEASES (CTD)

PROGRESS REPORT 1996

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PREFACE

Undoubtedly 1996 has been a year of uncertainty for the Division of Control of Tropical Diseases. During 1995, detailed planned activities were prepared for all staff in the Division, for implementation during 1996, based on the previously approved funding level. However the severe budget cuts, the uncertainty of the extent of the financial resources that were to be made available during the year and the freezing of much needed staff posts, compounded the difficulties already being experienced by the Division. Considerable efforts were made to increase extrabudgetary contributions to the programme and to further this objective a meeting of collaborating partners was held in June, for which positive feedback was received. Many new partnerships were established during 1996 and support from donor agencies, private individuals and industry increased significantly. Thus, despite the acute shortage of regular budget funds, some priority activities featured in the work plans were implemented and evaluated although many were delayed or not carried out in 1996 due to late arrival of financial support.

Faced with the need to move forward rapidly, steps were taken to streamline the activities of the Division. The first priority activities were picked up for thorough implementation. The effectiveness and ability of the staff were carefully examined so that maximum efficiency could be achieved. Certain administrative procedures were eliminated and computer hardware and software upgraded throughout the Division.

Specific countries within WHO regions were targeted for the development of an integrated approach to disease control. Action plans were jointly produced with four countries, and this opportunity will be extended to other countries in 1997.

Closer collaboration with Industry has been developed through the WHO pesticides evaluation scheme (WHOPES) and the MANTEAU (education and training) project. WHOPES, which had lost its edge, was completely revamped and turned around within this year into a very viable and active component of the Division. Collaboration with the European Commission continues with the MANTEAU project and closer ties with the Commission were developed with a specific project to control malaria in Cambodia, Laos PDR and Viet Nam.

Malaria control continued to be the priority for CTD. A meeting was held in Geneva, in October, of the Director-General's Task Force on Malaria Prevention and Control. WHO Special Support has now been made

available for malaria control in Africa and together with regional offices work will be carried out at country level to ensure that results are rapid and cost effective. Many malaria epidemics occurred during the year and outbreaks were reported from countries in the Central Asian Republics where it had previously been under control or eliminated, as well as from several countries in Africa. This gives cause for grave concern for the future prospects of making a significant impact on this disease, particularly if the resource issues are not resolved.

The process of certifying the world free from dracunculiasis moved forward with the establishment, in May 1995, of the International Commission for the Certification of Dracunculiasis Eradication. The criteria for certification were established and a number of countries have been identified for assessment for certification during 1997.

Progress was made in the control of African trypanosomiasis (Sleeping Sickness) by the further expansion of the project for the prevention and control of human trypanosomiasis in central Africa and neighbouring foci to fourteen countries. The main aim of this initiative is to reduce the burden of disease through sustained surveillance and control activities.

Once again, as in 1995, CTD, in close collaboration with bilateral, international and non-governmental agencies, provided technical assistance for the prevention and control of diseases, in particular malaria and African trypanosomiasis, among refugees and displaced persons in Africa and malaria in parts of Europe.

Advances were made during the year in supporting countries in the development of information systems based on mapping and geographical information systems. The mandate of the Joint WHO/UNICEF programme on data management and mapping for public health (HealthMap), which is administered by WHO CTD, was extended beyond the eradication of dracunculiasis to provide support to other programmes within and outside WHO. A network of technical expertise from various sectors and agencies was established and communications facilitated through a bulletin board on Internet (health-gis@who.ch). Progress has been made in the other mandated diseases, especially Chagas disease, and these are highlighted in the body of this report.

In order to improve efficiency within the Division, a proposal for the reorganization of CTD was prepared. Post descriptions for all professional and general service staff were rewritten in line with the proposed reorganization, which is expected to be implemented during 1997. Thus a solid foundation has been established for planning realistic activities, for their prioritization and implementation, and for advancement in the future despite the budgetary uncertainties which may arise. The experience gained during 1996 will contribute significantly to improved staff performance and a more cost effective realisation of programme objectives.

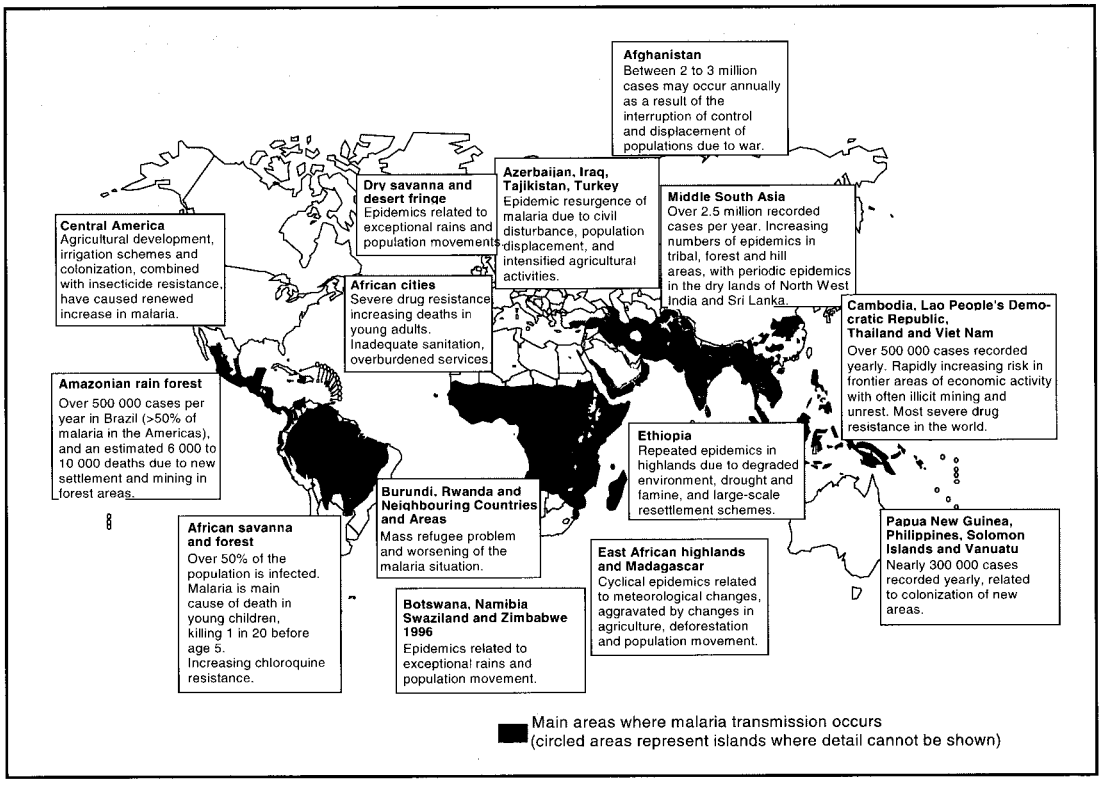
Dr Kazem Behbehani,
Director,
Division of Control of
Tropical Diseases

PARTNERS IN HEALTH

Table 1 lists the Division's Partners in Health through 1996. Further details regarding specific funding to each activity can be obtained in the Division's Financial Report. We should like to 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 year.

DONORS	ACTIVITIES
AGFUND (Arab Gulf Programme for UN Development Organizations)	Trypanosomiasis
Agrevo Environmental Health Ltd, UK	WHOPES
Al Ahlia Insurance Company, Kuwait	Dracunculiasis & CTD Activities
Arab Fund for Social and Economic Development	CTD Activities
Australia	Dengue
Babolna Bioenvironmental Control Centre Ltd., Hungary	WHOPES
Bader Al Mulla and Brothers Co., Kuwait	CTD Activities
Bank of Kuwait and the Middle East K.S.C., Kuwait	Leishmaniasis & CTD Activities
Bayer AG, Germany	WHOPES and Training
Behbehani, Aster & Salman, Kuwait	Leishmaniasis
Behbehani, Mohammed Saleh & Reza Yousef, Kuwait	CTD Actvities
Belgium	Malaria/CTD Activities/ Trypanosomiasis
Brunei Darussalam	Malaria
Chamber of Commerce and Industry, Kuwait	Leishmaniasis
Cheminova Agro A/S, Denmark	WHOPES
Ciba-Geigy AG, Switzerland	Schistosomiasis
Cyanamid International Corporation Ltd., USA.	WHOPES
Danish Bilharziasis Laboratory, Denmark	Training
Denmark	Onchocerciacis
Dow Elanco Ltd, UK	WHOPES
FMC Corporation USA	WHOPES
France	Leishmaniaisis/Trypanosomiasis
Francome Fabrications Ltd., UK	WHOPES

Garton G.A.H., Australia	Malaria
German Pharma Health Fund EV, Germany	Intestinal Parasitic Infections/ Schistosomiasis/Opisthorchiasis
Germany	Schistosomiasis control
Global 2000 Inc. of The Carter Center, USA	Dracunculiasis
Health and Development International, USA	CTD Activities
Hoechst Shering AgrEvo SA, France	Leishmaniasis
Igeba Geraetebau GMBH, Germany	WHOPES
International Development Association, USA	Malaria
Islamic Organization for Medical Sciences, Kuwait	Dracunculiasis
Italy	Training/Int. Parasites/ Schistosomiasis/Malaria
Japan Pharmaceutical Manufacturers Association	Malaria
Japan	Malaria/Dracunculiasis
Kuwait	Malaria/Schistosomiasis
Kuwait Fund for Arab Economic Development	CTD Activities
Mitsui Toatsu Chemicals Inc., Japan	WHOPES
Dr Nasser Mohamed Nasser Al Sayer	CTD Activities
Netherlands	Malaria/Trypanosomiasis/Vector borne diseases
Organization of Petroleum Exporting Countries (OPEC)	Dracunculiasis
Rhone Poulenc Agrochimie SA, France	WHOPES
Sandouq Zakat-Bait Al Tamweel, Kuwait	CTD Activities
Smithkline Beecham Pharmaceuticals, UK	Training
Spain	Malaria
Sumitomo Chemical Co. Ltd., Japan	WHOPES
Sweden	Malaria
Takeda Chemical Industries, Ltd., Japan	WHOPES
UNICEF	HealthMap
UNDP	Schistosomiasis/Intestinal Parasites
United Kingdom of Great Britain & Northern Ireland	Malaria/Dracunculiasis
United States of America	Malaria
Zeneca Agrochemicals, UK	WHOPES



Main areas of malaria transmission worldwide

BURDEN AND TRENDS

PART 1

A general overview of the current burden of the individual diseases included in CTD's mandate follows.

MALARIA

Globally, the malaria situation is serious and worsening, with an increasing number of epidemics, particularly in poorer countries. It is estimated that there are 300 to 500 million clinical cases and 1.5 to 2.7 million deaths due to malaria each year, 90% of which occur in Africa south of the Sahara. Malaria undermines the health and welfare of families, endangers the survival and education of children, debilitates the active population and strains both countries' and people's resources, thereby limiting their ability to contribute to economic and social development.

3-500 million clinical cases

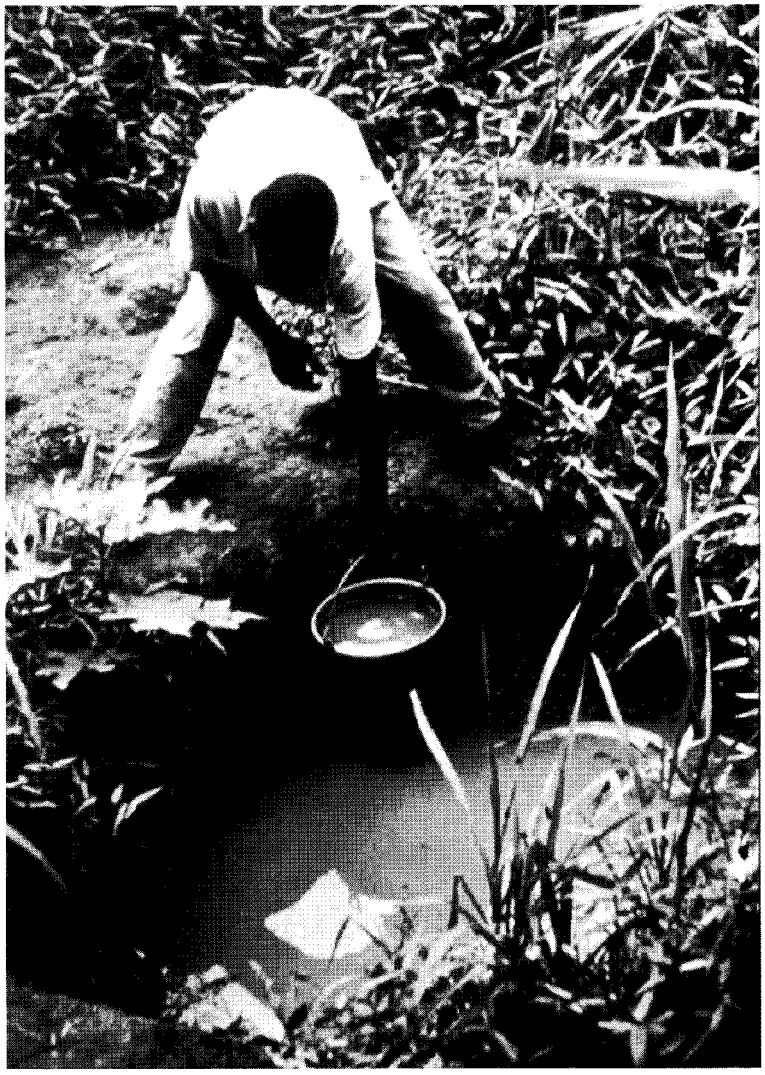
1.5 - 2.7 million deaths annually, of which 90% occur in Africa

The problem is increasing due not only to insufficient financial and human resources for control, but also because of land degradation, deforestation and the expansion of agricultural exploitation and mining as populations migrate and countries strive to improve their economies. Furthermore, war, civil unrest and climatic change contribute dramatically to the malaria burden.

The worsening problems of resistance of the parasite to the limited number of available drugs to treat or prevent the disease has led to increasing difficulties for decision-making on their optimal use. Almost all endemic countries have reported resistance to chloroquine, which is now common in Africa, especially East Africa, where it poses problems for the provision of adequate treatment at the periphery. Resistance to the main alternative to chloroquine, sulfadoxine-pyrimethamine, is spreading in South-East Asia and South America, but focal in other areas. Decreasing efficacy of the combination in certain parts of eastern and southern Africa is reported, where it is increasingly being used. The cost of treating malaria with alternatives to chloroquine and sulfadoxine-pyrimethamine is prohibitive for a large majority of the populations in Africa. Mefloquine resistance is now common in border areas of Thailand/Cambodia and Thailand/Myanmar and quinine is also losing its efficacy in several countries in South-East Asia as well as Brazil. This highlights the need to strengthen national capacities for monitoring therapeutic efficacy of antimalarial drugs, and research for new antimalarial drugs, as well.

Drug and insecticide resistance rising globally

The map below portrays another disquieting fact, namely the resurgence of malaria in Azerbaijan and Tajikistan, from which malaria was previously thought to have been eradicated. Also shown are epidemics in areas where malaria had been well under control, viz. Iraq and Turkey. The current malaria epidemics in these countries are the result of a rapid deterioration in malaria prevention and control operations due to military conflicts, followed by economic crises.



Poor quality drinking water is associated with dracunculiasis.

DRACUNCULIASIS (GUINEA WORM DISEASE)

Dracunculiasis, the only disease exclusively associated with unhealthy drinking water, affects those living in the most rural parts of 18 countries located in south-Saharan Africa, Yemen and the Indian sub-continent. Caused by the largest of the tissue parasites to affect humans, the disease occurs when water fleas containing the infective larvae are ingested. The larvae mature in the body of their human host, and can grow to more than one metre in length. A year after ingestion, the threadlike worm slowly emerges through a blister in the skin causing intense, burning pain, with side affects such as fever, nausea and fatigue. Although the disease does not kill, complicating secondary bacterial infections can occur, crippling not only physically, but socially and economically, trapping underprivileged populations in a vicious circle of poverty and disease.

Only 18 endemic countries remain

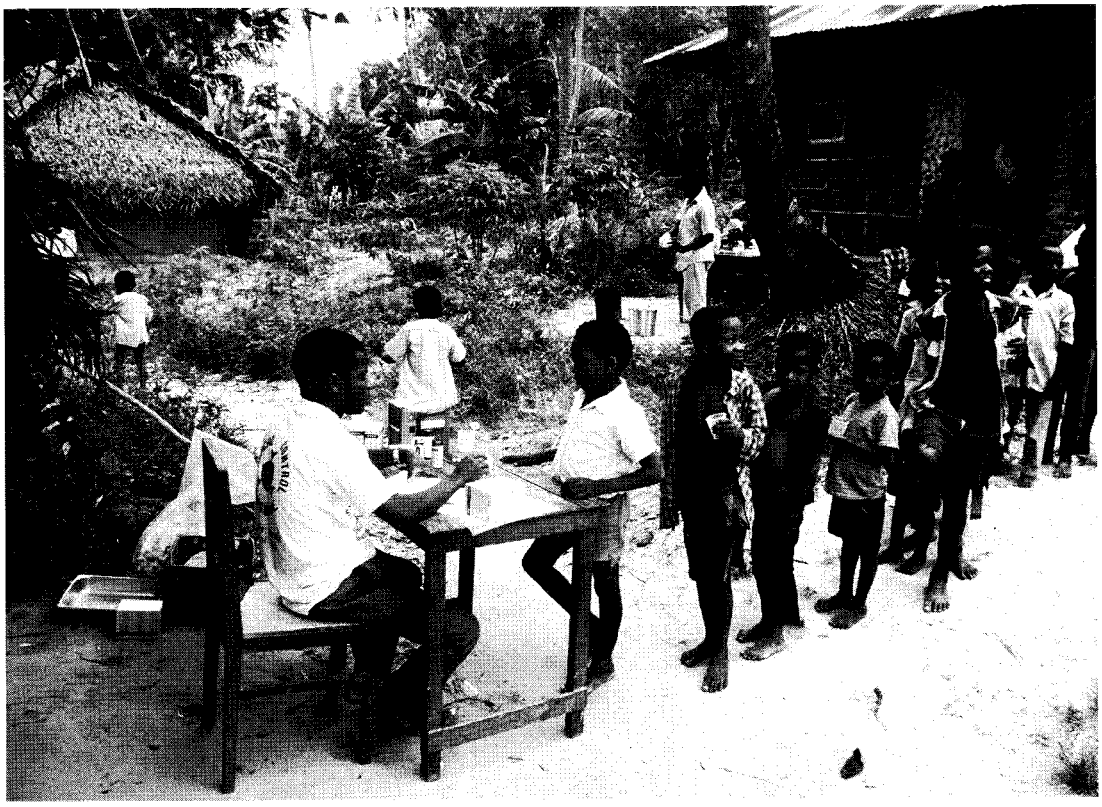
THE ERADICATION CAMPAIGN

Dracunculiasis has been the target of a global campaign that was initiated in 1980, in conjunction with the International Drinking Water Supply and Sanitation Decade (1981-1990). The disease can simply be prevented through the provision of safe water sources, by teaching people to boil or filter drinking water, and by treating contaminated sources with chemicals to destroy the parasite's vector. The progress in the last 10 years has been spectacular, with reported cases dropping from an estimated 3.5 million in 1986 to 146,888 reported cases in 1996 .

In 10 years there has been a reduction of cases from 10 million to less than 147,000 globally

CHAGAS DISEASE

Chagas disease is caused by a flagellate protozoan parasite, *Trypanosoma cruzi*, which is transmitted to humans in two ways - via the blood-sucking triatomine bug or through blood transfusions. The disease is currently endemic in 21 countries in South America, the only area of the world where this disease is present, with an estimated 16 to 18 million persons infected and 100 million people at risk. The acute stage of Chagas disease appears shortly after infection and in one-third of these cases, a chronic form develops some 10-20 years later. The lesions associated with this later stage irreversibly affect the autonomous nervous system of internal organs such as the heart, oesophagus and colon. Patients with severe



Detection of parasitic infection in children

chronic disease become progressively more sick and ultimately die, usually as a result of heart failure. Currently there is no effective drug for treatment of these chronic lesions.

THE INITIATIVE FOR THE SOUTHERN CONE COUNTRIES

In 1991, the Ministers of Health of the Southern Cone countries (Argentina, Brazil, Bolivia, Chile, Paraguay and Uruguay) launched an initiative to eliminate the vectorial and transfusional transmission of Chagas disease. From 1991 to 1996, US$207 million from their national budgets was allocated for control activities based on strategies which combined vector control and blood screening. The Division, in close collaboration with the Pan American Health Organization (PAHO) has promoted control methods such as insecticide spraying, fumigant canisters and insecticidal paint which have been highly effective, not only in reducing vector densities, but in reducing or interrupting vector-transmitted infection. Blood banks now screen donors from endemic countries for *T.cruzi* antibodies, reducing the risk of blood-transmitted infections. The overall strengthening of the health service infrastructures has allowed for multiple blood screening for *T.cruzi,* hepatitis B and HIV.

EPIDEMIOLOGICAL TRENDS

Rural migrations to urban areas during the 1970s and 1980s changed the traditional epidemiological pattern of Chagas disease: it became an urban disease as unscreened 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.

LEISHMANIASIS

Globally up to 2 million clinical cases yearly

Leishmaniasis, transmitted by small, biting insects called sandflies which breed in moist soil, forest areas, caves, or in the burrows of small rodents, feed from infected animal reservoir hosts or humans. Incidence of leishmaniasis in the world is estimated at 1.5 to 2 million clinical cases each year. Twelve million people are infected in 88 countries and it is estimated that 350 million people are exposed to the risk of infection.

In humans, leishmaniasis occurs in four major forms: cutaneous, diffuse cutaneous, muco-cutaneous and visceral. The visceral form has a high

mortality rate, while the others are important in terms of morbidity. In the mammalian host, *Leishmania* parasites invade macrophages, where they multiply, and eventually invade other macrophages. About 20 species of *Leishmania* are known to infect man, each causing different symptoms.

Leishmania/HIV co-infection, a new emerging disease worldwide

- Visceral leishmaniasis (VL) - the most serious form of the disease and is fatal if untreated.
- Cutaneous leishmaniasis (CL) - the most common infection, leads to one or more simple skin lesions which heal after a few weeks or months, but leave unsightly scars.
- Mucocutaneous leishmaniasis (MCL) begins with simple skin ulcers, which can spread, causing hideous tissue destruction, particularly to the nose and mouth.
- Diffuse cutaneous leishmaniasis (DCL) produces disseminated and chronic lesions which resemble those of lepromatous leprosy and are the most difficult to treat.

LEISHMANIA/HIV CO-INFECTIONS

The overlapping of VL and AIDS is increasing due to the spread of the AIDS pandemic. Consequently, *Leishmania*/HIV co-infections are reported more frequently with serious clinical, diagnostic, therapeutic, epidemiological and economic implications.

In S. Europe, between 1.5% - 9% of AIDS cases suffer from newly acquired or reactivated VL, and 25% - 70% of adults with VL are co-infected with HIV(depending on the country: France, Italy or Spain). In mid-1996, the total number of co-infections in S. Europe was estimated at more than 1,500, a sharp increase from 1992, when this data was first collected. It is anticipated that the number *Leishmania*/HIV co-infections will continue to grow.

LYMPHATIC FILARIASIS

Lymphatic filariasis is caused by parasites transmitted by various species of mosquito. It is endemic in 73 countries; 120 million people are infected. The adult filarial worm, lives in the lymphatic vessels, 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 can live for many years, giving rise to large numbers of larval forms (microfilariae) which circulate in the lymphatics and blood, where they can be taken up by mosquitos and transmitted to other persons.

ONCHOCERCIASIS

Onchocerciasis is caused by a filarial parasite, whose larval - stage are transmitted by parasites in the skin (Microfilariae) *Simulium* blackflies. Adult worms develop in subcutaneous nodules, releasing large numbers of microfilariae into the surrounding tissues. Most of the pathology of onchocerciasis results from the microfilariae migrating into the skin and eyes, which leads to intense itching and a disfiguring dermatitis as well as ocular damage, which can result in blindness. Of the 18 million people infected in 24 countries, 270 000 are blind.

DENGUE AND DENGUE HAEMORRHAGIC FEVER (DHF)

Dengue and dengue haemorrhagic fever (DHF) are the most important and rapidly rising arbovirus infections in the world. Dengue ranks high among new and newly emerging infectious diseases. There are four distinct types of dengue virus, with no cross-immunity between them. Poor sanitation and incorrect water storage and hoarding practices facilitate the breeding habits of the main vector, *Aedes aegypti*. Discarded receptacles result in breeding sites around dwellings which collect rain water and greatly aggravate the problem of indiscriminate vector breeding in densely populated areas, often resulting in dengue and DHF epidemics.

The number of dengue and DHF outbreaks and epidemics has increased significantly during the past decade. Dengue has recently caused massive epidemics in Africa, the Americas, Asia, the Pacific islands and some Eastern Mediterranean countries. While only 9 countries reported DHF epidemics from 1955 to 1970, 32 were affected by DHF between 1970 and 1995, bringing the total number of countries experiencing DHF to 43.

SLEEPING SICKNESS (AFRICAN TRYPANOSOMIASIS)

Up to 500,000 clinical cases of Sleeping Sickness may exist

Sleeping Sickness is transmitted by tsetse flies and is fatal if untreated. There are two forms of Sleeping Sickness, each caused by a different species of the parasite:

- *Trypanosoma brucei gambiense*, which causes a chronic infection lasting years and occurs in countries of western and central Africa.
- *Trypanosoma brucei rhodesiense*, which causes acute illness lasting several weeks and occurs in countries of eastern and southern Africa.

EPIDEMIOLOGICAL TRENDS

In recent years there have been important recrudescences of Sleeping Sickness, particularly in central Africa, where the number of reported cases have more than doubled over the past few years with a reduced surveillance coverage. Sleeping Sickness is endemic in 36 countries and it is estimated that 55,000,000 people are exposed to the risk of becoming infected. However, only 4,000,000 persons are currently under surveillance, either regularly examined by medical teams or have access to health centres where reliable diagnosis can be performed.

20 million persons are seriously ill with schistosomiasis infections

The 25,000 cases reported in 1995 do not reflect the reality of the situation, but simply show the absence or shortage of surveys in many active foci. A more realistic estimation of Sleeping Sickness cases is 500,000. The situation in countries such as Angola, Congo, Sudan and Zaire calls for urgent control interventions.

SCHISTOSOMIASIS AND INTESTINAL PARASITES

Among human parasitic diseases, schistosomiasis ranks second behind malaria in terms of socio-economic and public health importance in tropical and subtropical areas. Schistosomes enter the body through contact with infested surface water, mainly among people engaged in agriculture and fishing. However urban migration is introducing the disease into peri-urban areas in north-east Brazil and Africa, and refugee movements are spreading the disease in Somalia and Cambodia.

The WHO International Agency for Research on Cancer has confirmed that in countries where urinary schistosomiasis is endemic, schistosomiasis causes a specific type of bladder cancer. In some areas of Africa the incidence of squamous cell bladder cancer linked with schistosomiasis is 32 times higher than that of simple bladder cancer in the USA. School performance and growth patterns of infected children are retarded, although the effects are 90% reversible on average with treatment. In Egypt, Sudan and north-east Brazil it has been shown that the work capacity of rural inhabitants is severely reduced due to weakness and lethargy caused by the disease.
Intestinal parasitic helminth and protozoan infections are among the most common infections world-wide. In spite of the fact that the mortality rate among these infections is rather low (in the case of *Ascaris lumbricoides*, 2 per 100,000 people), due to the high prevalence, these infections are regarded as a serious public health problem. In the case of *Trichuris trichiura* it has been shown that it is associated with retarded growth and iron deficiency anaemia.

The hallmark of hookworm infection is intestinal blood loss, which contributes to the burden of iron deficiency anaemia in developing countries. Recent research supported by CTD showed the dramatic contribution of hookworm to the burden of iron deficiency anaemia in school-age children. These data have confirmed, in a public health setting, earlier findings showing that the haemoglobin deficit associated with hookworm infection was greater than that of either urinary schistosomiasis or malaria among school children.

EPIDEMIOLOGICAL TRENDS

It is estimated that 600 million people are exposed to risk of schistosomiasis infection. Currently 200 million are estimated to be infected, of which 20 million are seriously ill. They are suffering from hepatosplenic disease, or urinary or bladder pathology, including bladder cancer. These figures are now being revised in a country-by-country review.

It is estimated that as many as 3.5 billion people are infected with intestinal parasites, and that 450 million are ill, the majority of which are children. Furthermore, about 44 million pregnant women have hookworm infections which poses a considerable health burden in developing societies. In 1995, hookworm infections killed approximately 65,000 persons and *Ascaris lumbricoides* another 60,000 persons. *Entamoeba histolytica* is estimated to cause severe disease in 48 million people killing 70,000 individuals world-wide.

These numbers are increasing, with cases occurring in all WHO Regions. In 2025 about 57% of the population in developing countries will be urbanized and, as a consequence, a large number of people will live in shanty towns where transmission of *Entamoeba histolytica*, *Giardia*, *Ascaris lumbricoides* and *Trichuris trichiura* will find a favourable ground for transmission.

About 2.4 million people are infected with *Fasciola*, a liver fluke and over 20 million with *Paragonimus*, a lung fluke; treatment for both infections is currently unsatisfactory. This latter infection is often confused diagnostically with tuberculosis.

TABLE 2: GLOBAL ESTIMATES OF TROPICAL DISEASE INFECTIONS

Disease	People at Risk (millions)	People Infected millions	Annual Mortality	Morbidity/Disability	No. of Countries Affected
Malaria	2 020	Over 500	1.5 - 2.7 million	300-500 million clinical cases	>90
Dracunculiasis	100	146,888 (thousand)	Exceptional	High disability	18
Chagas disease	100	18	>45 000	3 million	21
Schistosomiasis	600	200	<20 000	20 million	74
Foodborne trematode infections	730	40	>10 000	Liver disease or diarrhoea	>100
Intestinal parasites	4 000	3 500	Helminths: 135 000 Protozoa: 90 000	Helminths: 450 million Protozoa: 48 million	>100 All
Lymphatic filariasis	1 100	120	Excess mortality among those with elephantiasis	44 million with chronic disability	73
Onchocerciasis	120	18	Excess mortality among the blind	270 000 blind	34
Leishmaniasis	350	12	VL: 75 - 80 000 CL: very low	VL: very high CL: multiple lesions	88
Dengue & dengue haemorrhagic fever	2 500 - 3 000	>10	20 - 30 000	Millions of cases	>100
Sleeping Sickness	55	>0.3	20 000	>300 000 cases; high disability	36

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

Exposure to Tropical diseases during working time.