

The Even More Neglected Tropical Diseases



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2008

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In today's presentation

- Protozoan Infections

- Human African Trypanosomiasis (HAT)
- Chagas Disease
- Leishmaniasis

- Bacterial Infections

- Buruli Ulcer
- Leprosy

+ Podoconiosis

- Viral

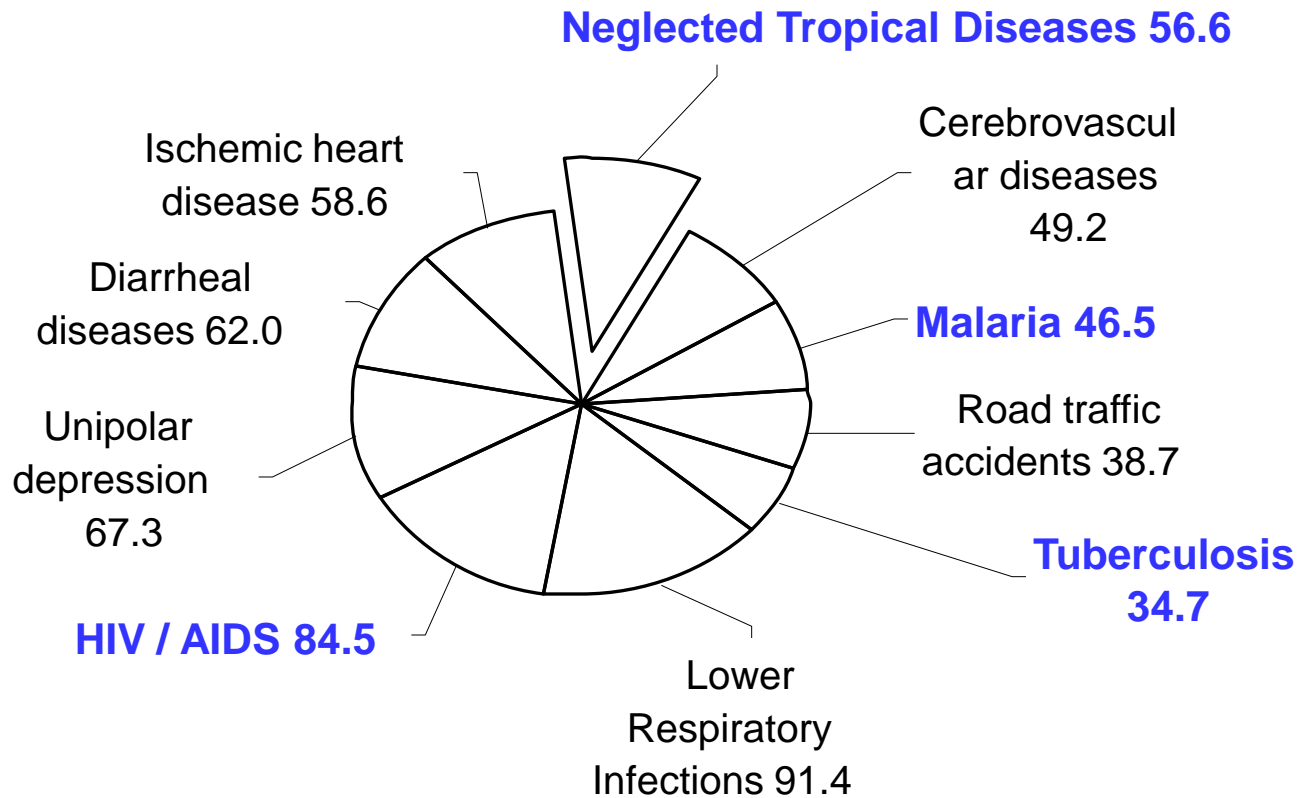
Dengue
Rabies

- Helminths

Echinococcus
Taeniasis –
cysticercosis
Loa loa

Estimated DALYs lost from NTDs compared to other conditions

DALYs (in millions)

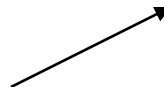


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The United Nations Millennium Development Goals (MDGs) – we could speed progress towards most of the MDG's

1. Eradicate extreme poverty and hunger.
2. Achieve universal primary education.
3. Promote gender equality and empower women.
4. Reduce child mortality.
5. Improve maternal health.
6. Combat HIV/AIDS, malaria and other diseases.
7. Ensure environmental sustainability.
8. Develop a global partnership for development.

NTDs are included
in “other diseases”



Dengue

A mosquito borne (*Aedes aegypti*) viral disease with a global tropical distribution.

It is spreading – in 1955 there were 3 and in 1959 there were 9 countries reported having Dengue

Today over 125 countries have Dengue

There are 4 known viral serotypes

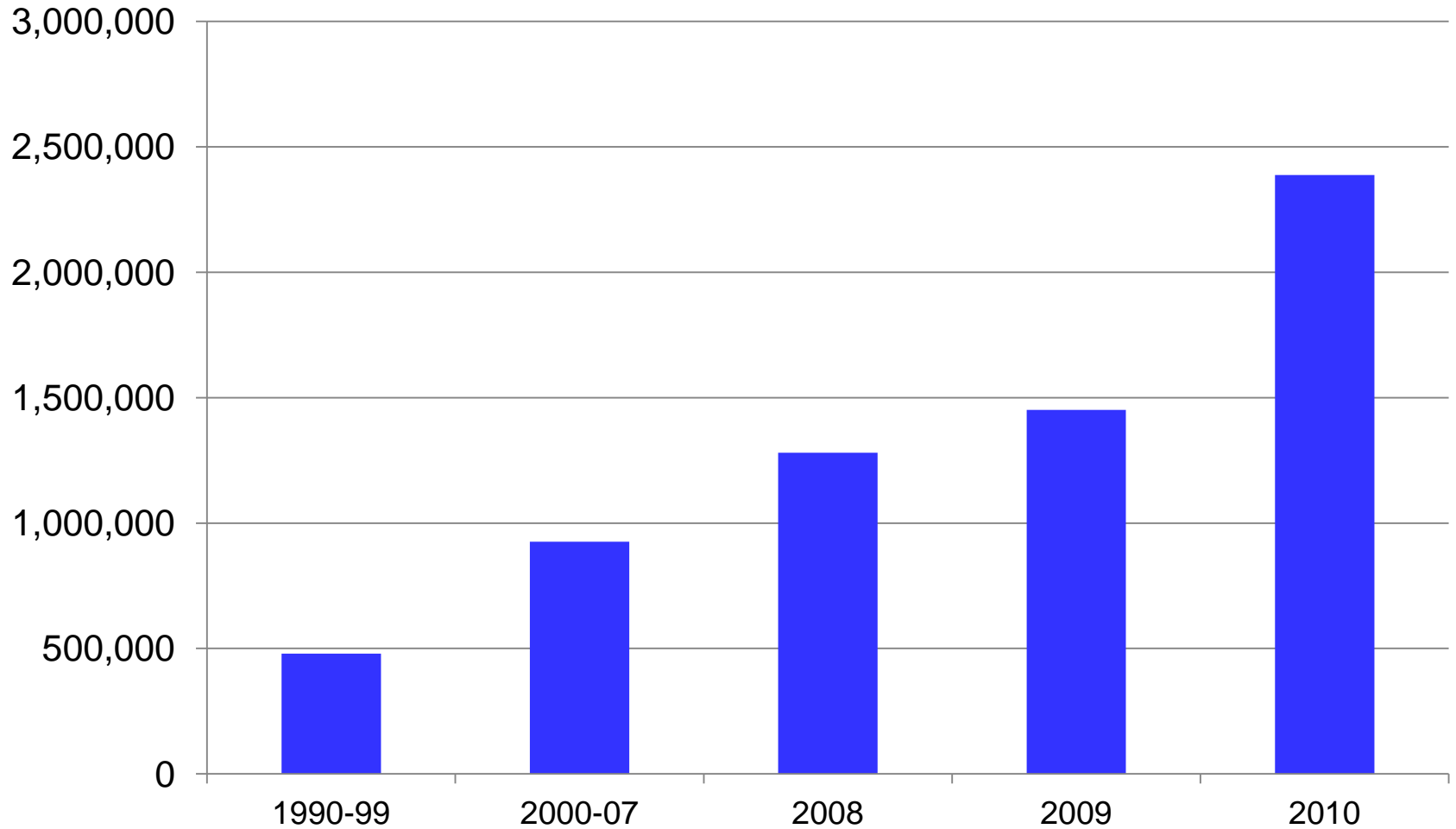
Major countries

Saudi Arabia, Pakistan and Yemen in
Middle East

India, Indonesia, Sri Lanka in SE Asia

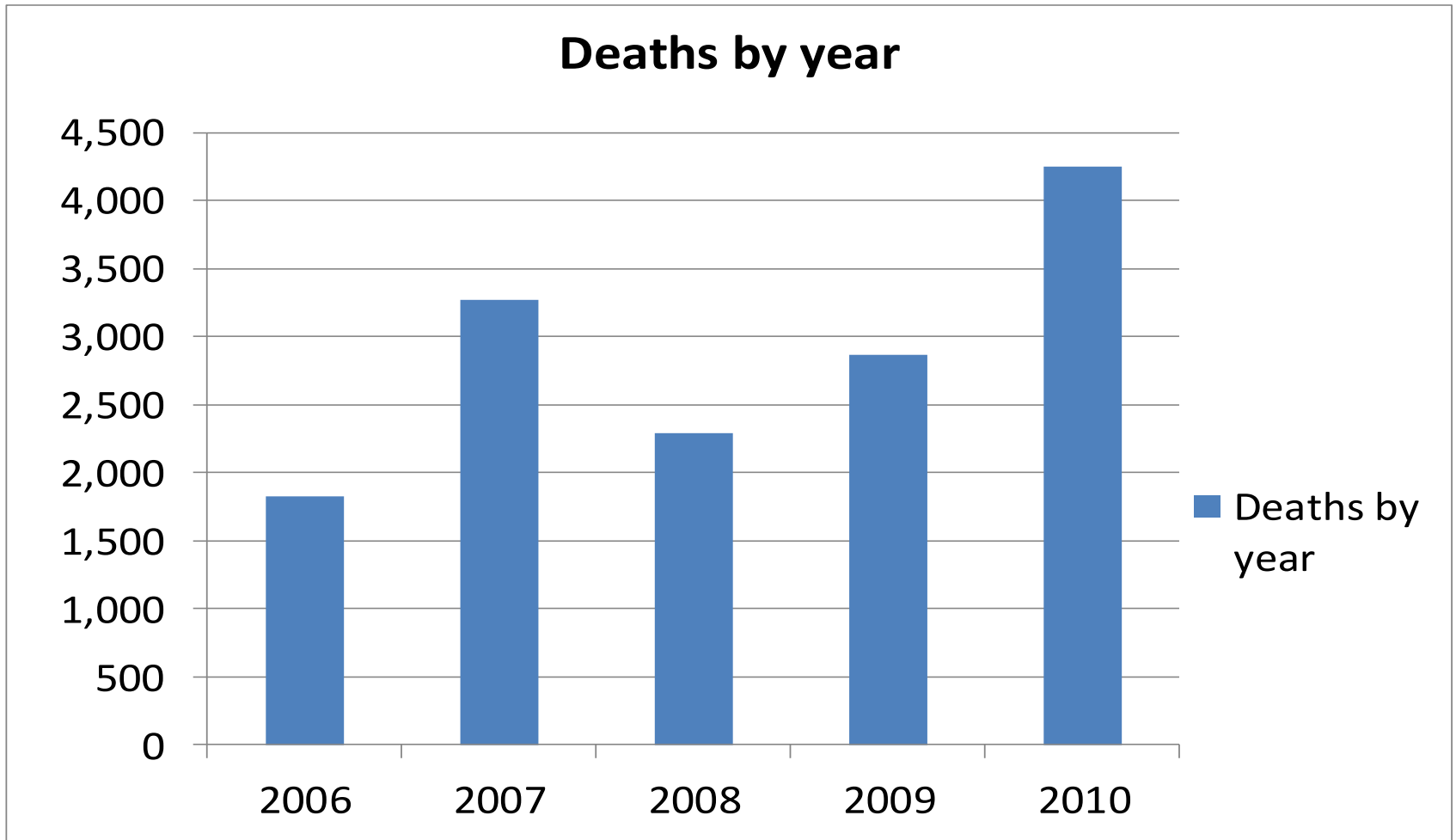
Phillipines Lao Singapore and Malaysia in
Western region of WHO

Dengue Infections



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Deaths from Dengue



Control Strategy

1. Diagnosis and case management
2. Integrated surveillance and outbreak response
3. Sustainable vector control
4. Possible vaccine in the future
5. Operational research

Rabies

A viral disease causing an estimated 55,000 human deaths per year in Asia and Africa

Once symptoms develop death rate is 100%

There are several animal reservoirs (bats) but dog bites are by far the most common way humans get infected

Control successes

1. Canine vaccination
2. Humane management of dogs
3. Vaccination of people immediately after exposure
4. Elimination target is 2015 in Latin America and 2020 in China, Japan and Korea

Buruli Ulcer

A chronic skin disease caused by *Mycobacterium ulcerans* endemic in 33 countries but highest in Ghana, Gabon and Australia

About 5,000 cases per year are reported from half of the 33 countries

Poor knowledge and reporting may hide the true prevalence

Buruli control strategy

1. Training of health workers
2. early case detection
3. treatment with antibiotics
4. Case management – surgery if necessary

Treponematoses

Treponema infection causes yaws, syphilis and pinta.

Yaws affects children 2-14 years old (in fact mostly boys)

The Yaws target is eradication by 2020

Using azithromycin treatment (Mass Drug Administration or targetted treatment)

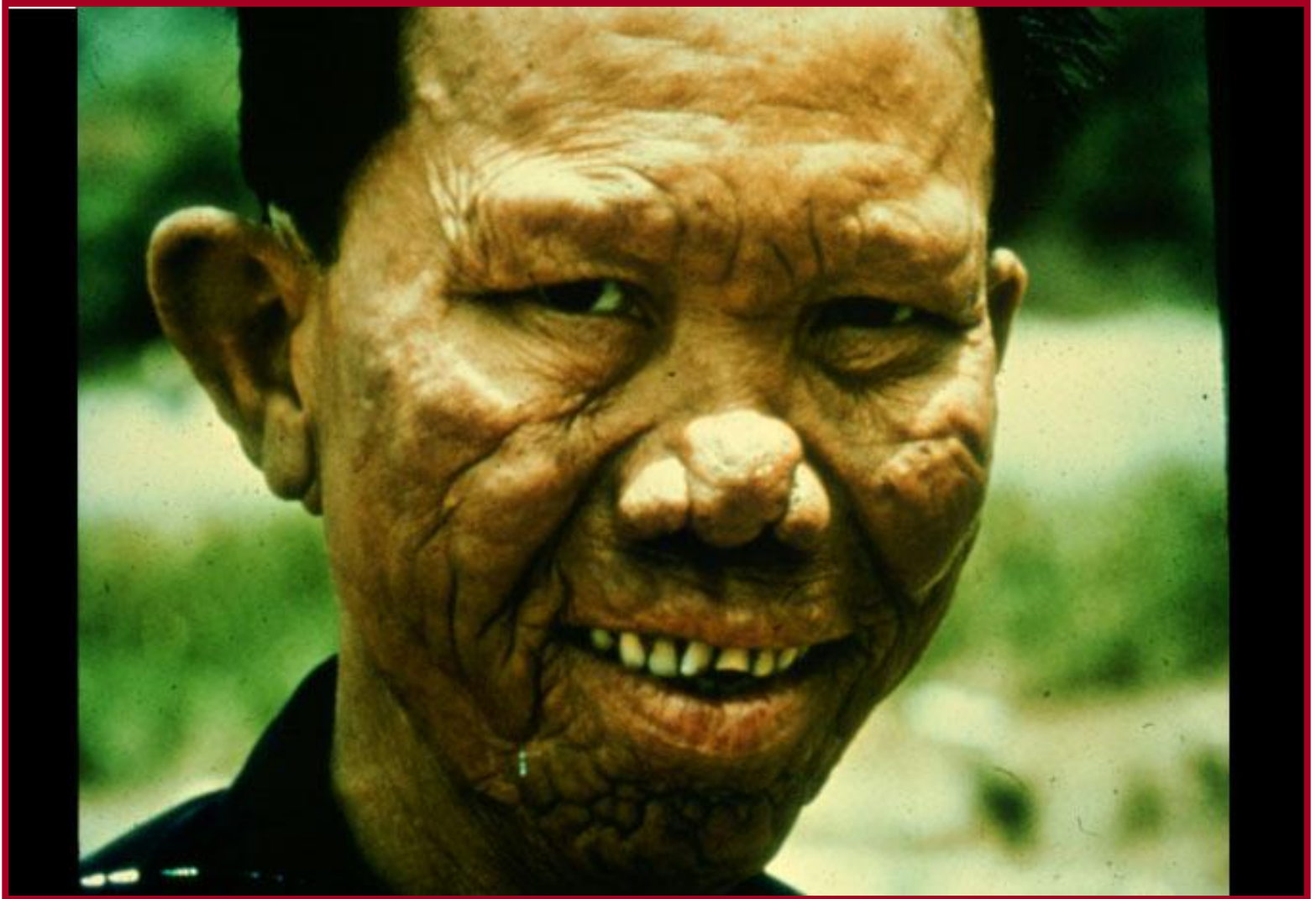
Treponematoses

From 1952 – 1964 a campaign reduced infections from 50 million to less than 2.5 million, but it was not followed through to elimination

Ghana has the most cases in Africa (over 20,000)

PNG (34,000) and Solomon Islands (over 20,000) are the other high prevalence countries

Leprosy (Hansen disease)



Leprosy

Leprosy is a chronic disease caused by a bacillus, *Mycobacterium leprae*

M. leprae multiplies very slowly and the incubation period of the disease is considered to be about five years.

Can you believe that over 95% of the population have natural immunity

Since 1981, WHO Study Group recommended multi-drug therapy (MDT), a combination of three drugs which effectively kills the pathogen and cures the patient. This is donated by Novartis

Leprosy

In 1991 World Health Assembly passed a resolution to eliminate leprosy as a public health problem by the year 2000 - defined as a prevalence rate of less than one case per 10,000 population.

The global disease burden was reduced from **5.2 million** in 1985 to **805,000** in 1995 to **753,000** by 1999 to **220,000** cases by 2005.

The South-East Asia Region, including India, achieved the elimination goal in December 2005.

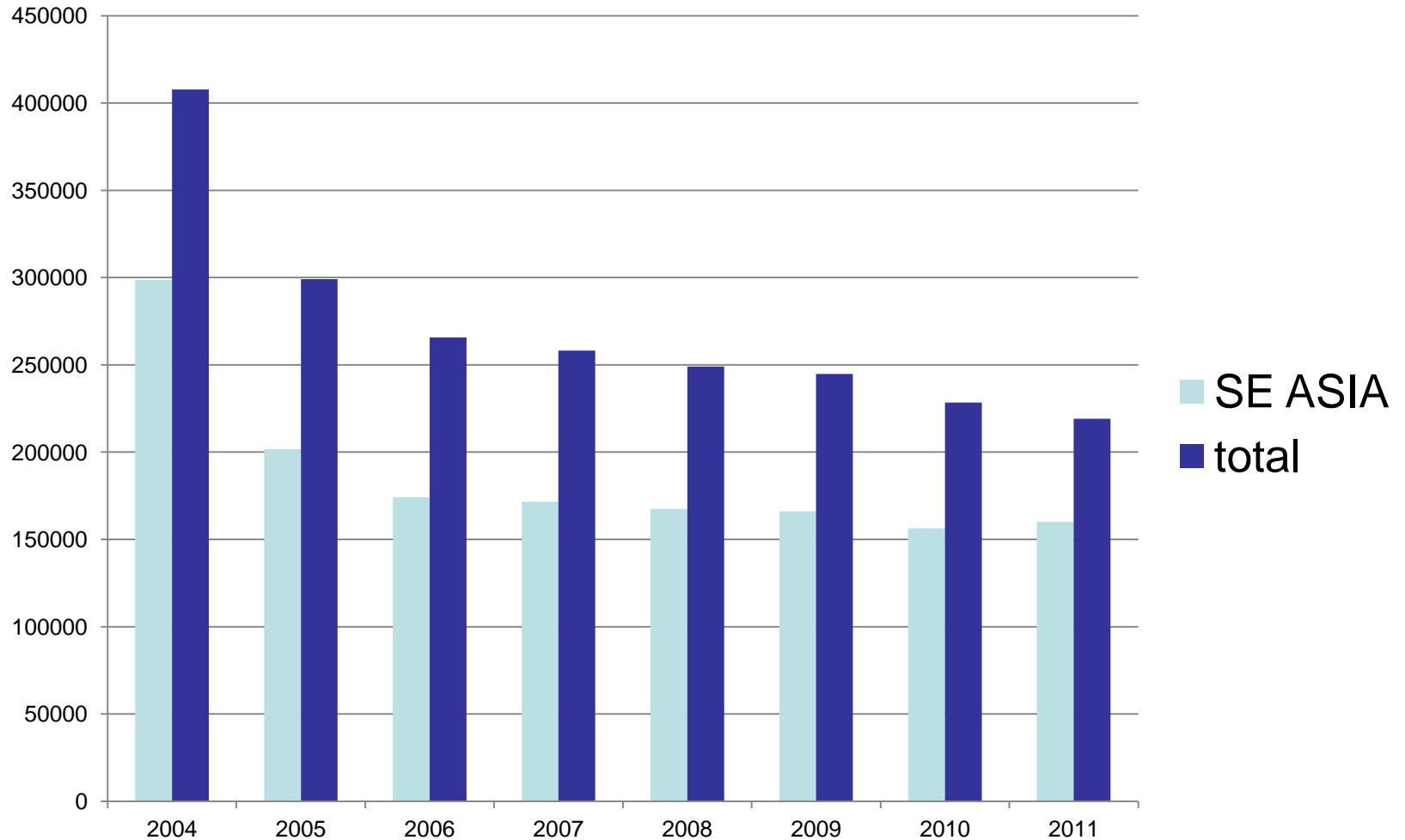
The last six major countries to achieve the target were: DR Congo, Madagascar, Mozambique, Nepal, Tanzania and the last to do so was BRAZIL

Leprosy cases

	Registered cases in 2012 PER 100,000
Africa	15,006
Americas	34,801
South East Asia	117,147
East Mediterranean	7,368
Western Pacific	7,619
TOTAL	181,941

Leprosy new cases trends

Source WHO data



Leprosy strategy for prevention and control

- Target 1 implementation of strategy of early detection and MDT
- Target 2 reduce new cases by 50% by 2015
- Target 3 Capacity building to sustain control
- Target 4 Reduce stigma and discrimination
- Target 5 Intensify research

Chaga's Disease

– the South American form of
Trypanosomiasis

Trypanosoma cruzi is found in parts of South America, with 10 million infected, and can cause major heart problems in up to 30% of these

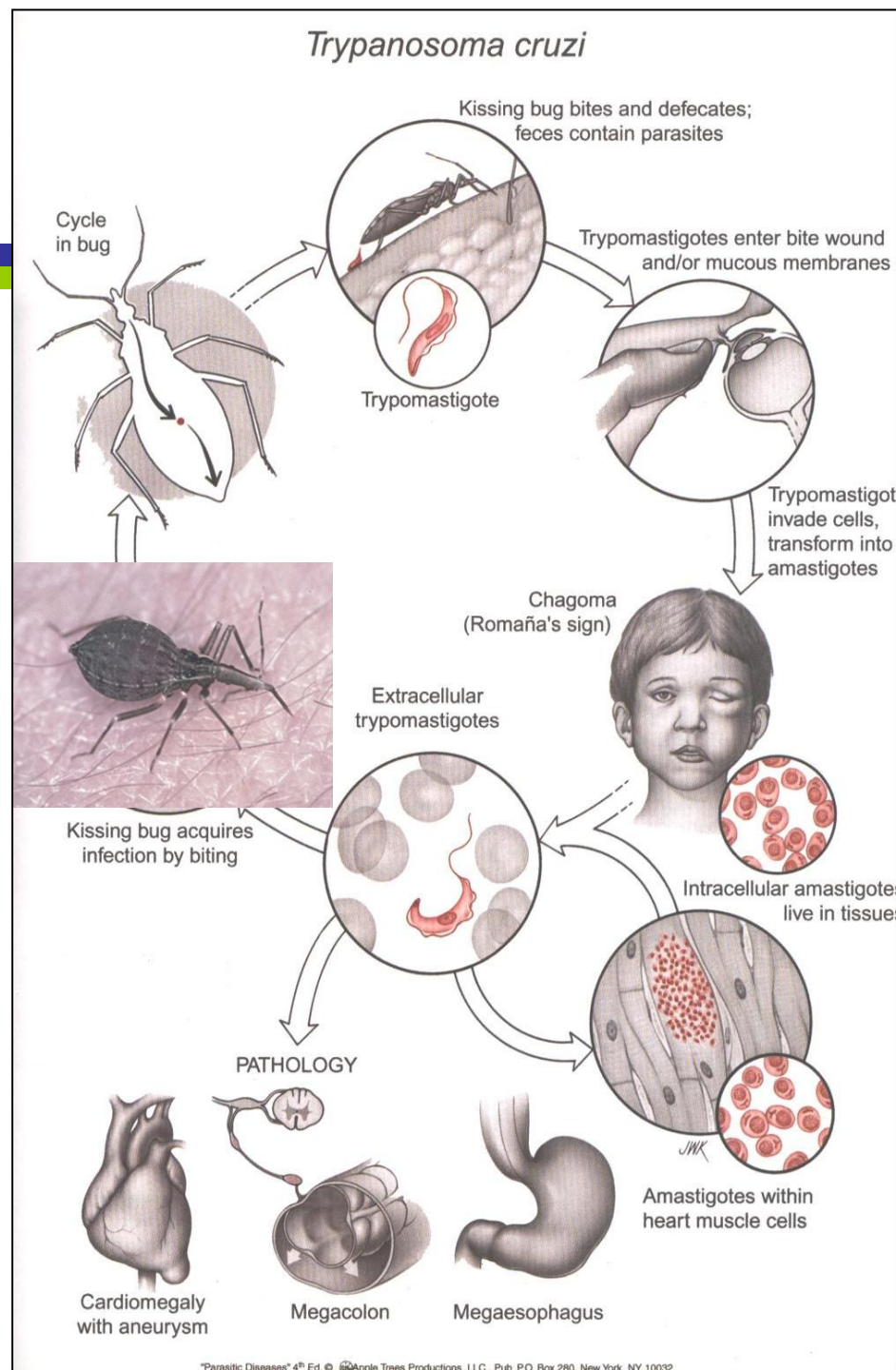
It is transmitted by bed bugs and therefore is confined to people with poor quality housing

Recently it has spread into Europe via immigrants who sell blood

Chagas disease

(*American Trypanosomiasis*)

- Transmission documented in Louisiana and Texas
- Treatment cost up to \$1,000 per year
- Diagnosis and access to care are major constraints
- Vector control for breaking transmission



Trypanosomiasis – sleeping sickness

sometimes chronic and sometimes an acute
killer

In humans

- *Trypanosoma brucei gambiense* (*T.b.g.*) is found in west and central Africa. This form represents more than 90% of reported cases of sleeping sickness and causes a chronic infection. A person can be infected for years without symptoms of the disease. When symptoms do emerge, the patient is often already in an advanced disease stage when the central nervous system is affected.

Trypanosomiasis rhodesiense – sleeping sickness an acute killer

Trypanosoma brucei rhodesiense (*T.b.r.*) is found in eastern and southern Africa. This form represents less than 10% of reported cases and causes an acute infection. First signs and symptoms are observed after a few months or weeks. The disease develops rapidly and invades the central nervous system

Transmitted by the Tsetse fly which has a sharp bite but fortunately a very limited distribution

Control

Early diagnosis (less than 10,000 cases diagnosed in 2010)

Therapy to infected persons (Sanofi and Bayer donate the drugs)

Tsetse control

New therapy using systemic insecticides in cattle

Loa Loa

Distributed around west and central Africa not important as far as pathology in itself

A filarial worm transmitted by Tabanids – horseflies

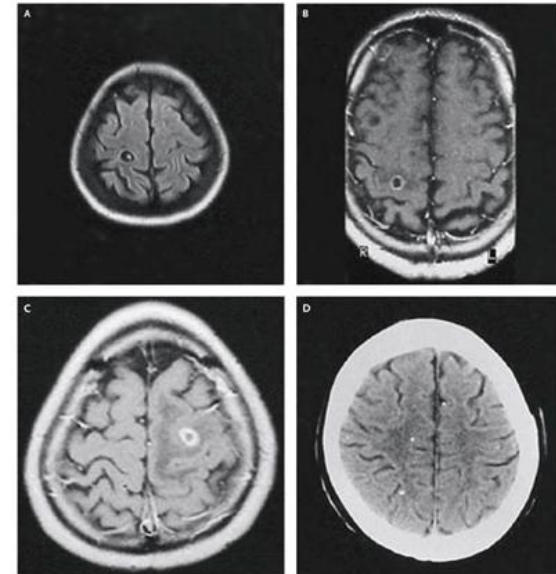
Important because mass treatment of LF and onchocerciasis with albendazole and ivermectin can cause serious side effects in people infected with *Loa Loa* in certain areas of west and central Africa, especially in patients who have high *Loa loa* microfilarial densities. This fact necessitates the development of more specific diagnostics tests for *Loa loa* to identify high risk areas prior to treatment.

Cysticercosis (*Taenia solium*)

- Leading cause of epilepsy among Hispanic Americans

41,400-169,000 cases

- 10% of seizures presenting to ED in Los Angeles



Taenia solium the pork tapeworm

The adult worm lives in the human gut

The eggs of the worm are excreted in the stool

If consumed by a pig, cysts are formed in the pig meat which if eaten undercooked develop into a new tapeworm

The problem is that poor hygiene can lead to humans consuming eggs and then cysts develop in the brain causing epilepsy

Taenia solium the pork tapeworm

The adult worm in man is susceptible to treatment with praziquantel

This also kills the cyst in the brain which might change the cyst from asymptomatic to symptomatic (hence vigilance when treating for schistosomiasis)

Treating pigs is also possible but better hygiene is the ultimate answer

Echinococcus granulosus

the dog tapeworm

The adult worm lives in the dog and eggs are passed out in the faeces

The eggs are consumed by sheep and develop into cysts in the sheep brain and liver and body cavities. When sheep are slaughtered, the offal is often thrown to the dogs which of course leads to new worm infections.

Humans are involved when they have intimate closeness with dogs and somehow the eggs get into humans mouth – then cysts can develop in human livers (Turkana in Kenya)

Podoconiosis (non LF elephantiasis)

- Podoconiosis ('dust in the feet') presents as bilateral asymmetrical swelling of the feet and lower legs. It is seen in susceptible families of bare-footed farmers in well-defined fertile volcanic highland zones of Africa, Central and South America, and Indonesia, and also in the lowlands irrigated by rivers from these highlands.
- It is due to the absorption of silica particles from the soil, through the feet of someone from a susceptible family.
- This causes the patient's lymphatics to
- fibrose, and obstruct, and his femoral
- nodes to enlarge. This in turn makes
- the legs and feet swell, and progress
- through stages which are described as
- "water bag", "rubbery", and "wooden".
- Treatment – choose another occupation !!!



The sandfly and dermal leishmaniasis



Leishmaniasis – two distinct diseases

- Dermal – nasty superating wound at the site of the bite which self heals in 6 months – it can become “mucocutaneous” form causing gross mutilation by destroying soft tissues in nose mouth and throat
- Visceral – leads to fever, weight loss, and an enlarged spleen and liver. P will have low red blood cell count (anemia), low white blood cell count, and low platelet count.

Transmitted by sandflies – small enough to go through a mosquito net – pin prick bite

Leishmaniasis – two distinct diseases

- Over 90 percent of the cases of **cutaneous leishmaniasis** occur in parts of Afghanistan, Algeria, Iran, Iraq, Saudi Arabia, and Syria (in the Old World) and in Brazil and Peru (in the New World);
- Over 90 percent of the cases of **visceral leishmaniasis** occur in parts of India, Bangladesh, Nepal, Sudan, and Brazil.
- AmBisome as first line of treatment against VL

The UK Coalition against Neglected Tropical Diseases (NTDs)

is a

collaborative partnership between UK organisations actively engaged in the implementation, capacity building and research of neglected tropical disease control at scale



Partnerships

Just a word on the various
partnerships working to control
NTDs



Trachoma and Onchocerciasis



Schistosomiasis and STHs

**Imperial College
London**



STHs and Schistosomiasis



Lymphatic Filariasis (LF)

**THE
CARTER CENTER**



**Trachoma ,Onchocerciasis, LF,
Schistosomiasis**

Integrated control

www.50pence.org

Our partnership with Developing World Health





GNNTDC

GLOBAL NETWORK
FOR NEGLECTED TROPICAL
DISEASE CONTROL

The Partnership: Who were the founders



THE GEORGE
WASHINGTON
UNIVERSITY
WASHINGTON DC



Liverpool School of
Tropical Medicine -
Lymphatic Filariasis
Support Centre



Sabin Vaccine Institute-George Washington University

George Washington University

Liverpool School of Tropical Medicine-LF Support Centre

Schistosomiasis Control Initiative

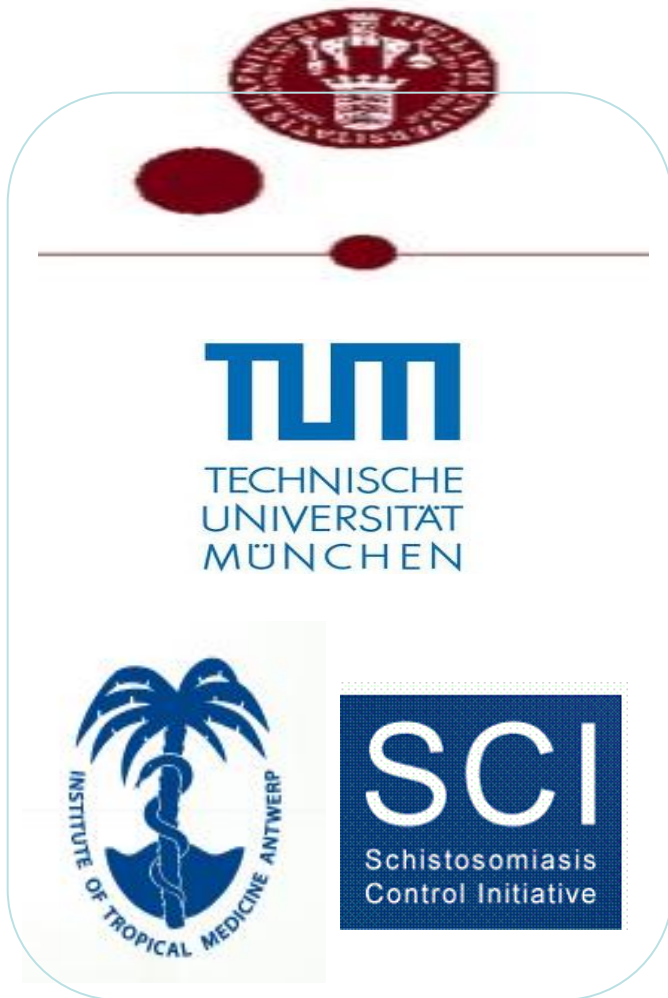
International Trachoma Initiative

Earth Institute – Columbia University

HKI

Taskforce for Child Development (Atlanta)

Partnerships with DBL, ITM Antwerp TU Munich Plus Tanzania, DRC and Malawi



Zone de Sante de
Kimpese Democratic
Republic of Congo

Water and Sanitation

- Working with Faculty of Engineering to try and develop proposals for a holistic approach
- Wellcome Trust Ph.D. student

Multi sector approach

- | | |
|------------------------|-------------------|
| • <i>Water quality</i> | <i>Sanitation</i> |
| • Dr M Templeton | Prof J Mumford |



Please visit

www.schisto.org

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Thank you