Neglected Zoonoses in Public Health Perspectives

Neglected Tropical Diseases
Towards control and elimination of Neglected Tropical Diseases

FAO-APHCA/OIE/USDA Regional Workshop on Prevention and Control of Neglected Zoonoses in Asia
Obihiro, Japan
Kazuyo Ichimori
15-16 July 2015
Neglected zoonotic diseases were added by WHO to the list of neglected tropical diseases in 2010.
1. What is NTD?
2. Approaches to overcome NTDs - NZD
3. An Example - *Global Programme to Eliminate Lymphatic Filariasis* (GPELF)
4. Key to Success
1. What is NTD ?
The list of Neglected Tropical Diseases

Helminth Infections
- Soil-transmitted helminth infections
  (Ascariasis, Trichuriasis, Hookworm infection)
- Lymphatic filariasis
- Onchocerciasis
- Schistosomiasis
- Dracunculiasis (guinea-worm disease)
- Cysticercosis
- Echinococcosis
- Foodborne trematodes infections

Protozoan Infections
- Leishmaniasis
- Human African trypanosomiasis
- Chagas disease

Bacterial Infections
- Leprosy
- Trachoma
- Buruli ulcer
- Endemic treponematoses

Viral Infections
- Dengue
- Rabies
What are Neglected Tropical Diseases?

- 17 tropical diseases that are prevalent in tropical and sub-tropical areas in Africa, Asia and South-America.

- The affected population is predominantly those who live with poverty, in areas where sanitation is lacking and disease vectors are in close contact.

- R&D for treatment is lagging behind, because the affected people cannot afford anyway.

- NTDs reduce productivity of the affected population due to morbidity, disability and social stigma.
NTDs prevail where poverty is...

All low-income countries are affected by at least 1 NTDs!
Vicious cycle of NTDs and Poverty

Living environment with:
- poor sanitation & water source
- numerous disease vectors
- limited access to health care

NTDs

Poverty

Poor growth
(cognitive, physical)
Morbidity & Disability
Social stigma

Lack of work force
Reduced productivity
Once NTDs are controlled & eliminated...

Living environment with:
• proper sanitation
• clean water supply
• no disease vectors

Healthy population

Poverty eradication

Increased work force
Improved productivity
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>HASHIMOTO Initiative – Denver Summit (G8)</td>
</tr>
<tr>
<td>1998</td>
<td>Birmingham Summit (G8)</td>
</tr>
<tr>
<td>2000</td>
<td>Okinawa Summit (G8)</td>
</tr>
<tr>
<td></td>
<td>Millenniums Development Goals (MDGs) – UN General Assembly</td>
</tr>
<tr>
<td>2003</td>
<td>1st Berlin meeting on Intensified Control of Neglected Diseases</td>
</tr>
<tr>
<td>2005</td>
<td>Launching Dept. Control of NTDs – WHO</td>
</tr>
<tr>
<td>2006</td>
<td>Commitment to combat NTDs – St Petersburg summit (G8)</td>
</tr>
<tr>
<td>2007</td>
<td>1st NTD Global Partnership Meeting – WHO</td>
</tr>
<tr>
<td>2008</td>
<td>Continued commitment to combat NTDs - Toyako Summit (G8)</td>
</tr>
<tr>
<td>2010</td>
<td>1st NTD Report – WHO</td>
</tr>
<tr>
<td>2012</td>
<td>London Declaration</td>
</tr>
<tr>
<td></td>
<td>NTD Road Map – WHO</td>
</tr>
<tr>
<td>2013</td>
<td>2nd NTD Report &amp; WHA Resolution – WHO</td>
</tr>
<tr>
<td>2014</td>
<td>2nd Progress Report – Uniting to Combat NTDs</td>
</tr>
<tr>
<td>2015</td>
<td>3rd NTD Report – WHO, Elmau Summit (G8)</td>
</tr>
</tbody>
</table>
2005
WHO NTD Department launching

Our mission is…

To prevent, control, eliminate or eradicate neglected tropical diseases towards achievement of health in the Millennium Development Goals (MDG)

"WHO Global Plan to Combat Neglected Tropical Diseases 2008-2015"
"To build on our commitments made on **neglected tropical diseases** at St Petersburg, we will work to support the control or elimination of diseases listed by the WHO through such measures as research, diagnostics and treatment, prevention, awareness-raising and enhancing access to safe water and sanitation. In this regard, by expanding health system coverage, alleviating poverty and social exclusion as well as promoting adequate integrated public health approaches, including through the mass administration of drugs, we will be able to reach at least 75% of the people affected by certain major neglected tropical diseases in the most affected countries in Africa, Asia, Latin America, bearing in mind the WHO Plan. With sustained action for 3-5 years, this would enable a very significant reduction of the current Burden with the elimination of some of these diseases."
Inspired by the World Health Organization’s 2020 Roadmap on NTDs, we believe there is a tremendous opportunity to control or eliminate at least 10 of these devastating diseases by the end of the decade. But no one company, organization or government can do it alone.
Sustaining the drive to overcome the global impact of neglected tropical diseases

Second WHO report on neglected tropical diseases

Neglected tropical diseases

The Sixty-sixth World Health Assembly,

Having considered the report on neglected tropical diseases,1 and recalling the previous World Health Assembly resolutions cited therein;

Recognizing that increased national and international investments in prevention and control of neglected tropical diseases have succeeded in improving health and social well-being in many countries;

Recognizing also the importance of the Global Plan to Combat Neglected Tropical Diseases 2008–2015;

Noting WHO’s roadmap to accelerate the work to overcome the global impact of neglected tropical diseases;

Acknowledging the lack of neglected tropical diseases as a public health priority;

Acknowledging also that neglected tropical diseases will need adequate education and other specific quality-assured commodities;

Recognizing that current health systems are being strengthened and may contribute to stronger health systems that can contribute to the United Nations Development Goals, but that greater efforts are needed;

Appreciating the great potential of quality-assured treatments and diagnostics, while acknowledging the constraints on procurement of these tools;

Recognizing the continuing need for action by international, national, and nongovernmental organizations;

“We commit ourselves to the fight against **neglected tropical diseases (NTDs)**. We are convinced that research plays a vital role in the development and implementation of new means of tackling NTDs. We will work collaboratively with key partners, including the WHO Global Observatory on Health Research and Development … … … … …

… … … … … We support community based response mechanisms to distribute therapies and otherwise prevent, control and ultimately eliminate these diseases. We will invest in the prevention and control of NTDs in order to achieve 2020 elimination goals.”
2. Approaches to overcome NTDs - NZD
Preventive chemotherapy
Intensified case-management
Vector control
Integrated Vector Management
Safe water, sanitation and hygiene
Veterinary public health
Approaches to overcome NTDs
Preventive chemotherapy

"Tool-ready“ diseases

... Simple, cheap & safe **drugs** and **field diagnosis** tools are available

- Lymphatic filariasis
- Schistosomiasis
- Soil-transmitted helminthiasis
- Onchocerciasis
- Trachoma
- (Dracunculiasis)

**Approach**

Reaching everyone who needs with regular & sustained **preventive chemotherapy**

**Aim**

Controlled morbidity & transmission interruption
Innovative and intensified disease management

"Tool-deficient“ diseases

Diagnosis: difficult, non sensitive, costly
Treatment: costly, complicated to administer, dangerous, increasing drug resistance

Approach
R&D for novel field-applicable tools
- Simple, sensitive and cheap diagnostics
- Safe, oral and cheap drugs

Integrated management by local health capacities

Aim
Sustained disease management & elimination

- Leishmaniasis
- Chagas disease
- Human African Trypanosomiasis
- Buruli ulcer
- Dengue
- Rabies ... etc
“Neglected zoonotic” diseases

- Neglected zoonotic diseases are a subset of the neglected tropical diseases,
- Zoonoses are diseases naturally transmitted from vertebrate animals to humans and vice-versa.

Approach
Collaboration covering the three areas of interest involved in the cycle: human health, veterinary health and environmental health.

Aim
break the human–animal–environmental cycle of transmission
### Epidemiology
- The disease is globally endemic.
- The highest case incidence occurs in Asia and Africa.
- Rabies potentially threatens over 3 billion people at risk.
- The disease disproportionately affects poor.
- 4 out of every 10 human deaths by rabies occurring in children younger than 15 years.
- Japan has been free of rabies since 1958.

### WHO plan
- WHO supports targets for elimination of human and dog rabies in all **Latin American countries by 2015 and in South-East Asia by 2020.**
- The Organization continues to promote human rabies prevention through the elimination of rabies in dogs.

---

© Tomas Stargardter

---

**Fact Sheet No. 99, Updated September 2014**

---

The main route of rabies transmission is the bite of rabid dogs. Rabies is a 100% vaccine-preventable disease.
Epidemiology

- Taeniasis is an intestinal infection caused by adult tapeworms.
- *Taenia solium* is endemic in major parts of Latin America, Asia and sub-Saharan Africa.

WHO plan

- WHO is piloting a strategy for the intensified control of *T. solium* taeniasis and (neuro) cysticercosis (by 2015) and scaling it up in selected endemic countries (by 2020).

Fact sheet No.376 Updated May 2015
### Echinococcosis

Humans are infected through ingestion of parasite eggs in contaminated food, water or soil, or through direct contact with animal hosts.

**Epidemiology**

- Cystic echinococcosis is globally distributed.
- Alveolar echinococcosis is confined to the northern hemisphere, in particular to regions of China, the Russian Federation and countries in continental Europe and North America.
- Human incidence rates for cystic echinococcosis can reach greater than 50 per 100,000 person-years, and prevalence levels as high as 5%–10% may occur in parts of Argentina, Peru, East Africa, Central Asia and China.

**WHO plan**

- WHO assists countries to develop and implement pilot projects leading to the validation of effective cystic echinococcosis control strategies by 2020.

Fact sheet No. 377 Updated May 2015
Transmission is linked to human behaviour patterns related to methods of producing, processing and preparing foods. (in particular, dishes containing raw fish)

| Epidemiology | In 2005, more than 56 million people worldwide were estimated to be infected with foodborne trematodes, and over 7000 people died from infection.  
| | Foodborne trematodiases are most prevalent in East Asia and South America. |
| WHO plan | WHO promotes the inclusion of foodborne trematodiases among the targets of preventive chemotherapy interventions  
| | Morbidity reduced and associated mortality prevented.  
| | Risk population reduced |
### WHO Roadmap

**Set up the targets by disease:** *Eradication, Elimination, Control*

<table>
<thead>
<tr>
<th>2015</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dracunculiasis (guinea worm disease)</td>
<td>• Yaws</td>
</tr>
<tr>
<td><strong>Eradication</strong></td>
<td><strong>Elimination</strong></td>
</tr>
<tr>
<td>Lymphatic filariasis</td>
<td>Lymphatic filariasis</td>
</tr>
<tr>
<td>• Lymphatic filariasis</td>
<td>• Lymphatic filariasis</td>
</tr>
<tr>
<td>• Lymphatic filariasis</td>
<td>• Leprosy</td>
</tr>
<tr>
<td>• Lymphatic filariasis</td>
<td>• Human African trypanosomiasis</td>
</tr>
<tr>
<td>• Lymphatic filariasis</td>
<td>• Blinding trachoma</td>
</tr>
<tr>
<td>Onchocerciasis in Latin America</td>
<td>• Human rabies transmitted by dogs in the South-East Asia and Western Pacific Regions</td>
</tr>
<tr>
<td>• Human rabies transmitted by dogs in Latin America</td>
<td>• Schistosomiasis in the American and the Western Pacific Regions</td>
</tr>
<tr>
<td>• Schistosomiasis in the Eastern Mediterranean, Caribbean, Indonesia and Mekong River basin</td>
<td>• Visceral leishmaniasis in the Indian subcontinent</td>
</tr>
<tr>
<td>• Chagas disease transmission through blood transfusion interrupted</td>
<td>• Chagas disease intra-domiciliary transmission in the Region of the Americas</td>
</tr>
<tr>
<td><strong>Country elimination</strong></td>
<td><strong>Country elimination</strong></td>
</tr>
<tr>
<td>• Human African Trypanosomiasis in 80% of foci</td>
<td>• Onchocerciasis in selected countries in Africa</td>
</tr>
<tr>
<td>• Onchocerciasis in Yemen</td>
<td>• Schistosomiasis in selected countries in Africa</td>
</tr>
</tbody>
</table>
## 17 Neglected Tropical Diseases

<table>
<thead>
<tr>
<th>Disease</th>
<th>2015</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dengue</td>
<td>Sustainable dengue vector control interventions established in 10 endemic priority countries</td>
<td>Dengue control and surveillance systems established in all regions. Number of cases reduced by more than 25% (2009–2010 as base line) and deaths by 50%</td>
</tr>
<tr>
<td>Buruli ulcer</td>
<td>Study completed and oral antibiotic therapy incorporated into control and treatment</td>
<td>70% of all cases detected early and cured with antibiotics in all endemic countries</td>
</tr>
<tr>
<td>Cutaneous leishmaniasis</td>
<td>70% of all cases detected and at least 90% of all detected cases treated in the Eastern Mediterranean Region</td>
<td></td>
</tr>
<tr>
<td>Taeniasis/cysticercosis and echinococcosis/hydatidosis</td>
<td>Validated strategy for control and elimination of <em>T. solium</em> taeniasis/cysticercosis available. Pilot projects to validate effective echinococcosis/hydatidosis control strategies implemented in selected countries as a public-health problem.</td>
<td>Interventions scaled up in selected countries for <em>T. solium</em> taeniasis/cysticercosis control and elimination. Validated strategy available for echinococcosis/hydatidosis and interventions scaled up in selected countries for their control and elimination.</td>
</tr>
<tr>
<td>Foodborne trematode infections</td>
<td>Foodborne trematode infections included in mainstream preventive chemotherapy strategy. Morbidity due to foodborne trematode infections controlled where feasible.</td>
<td>75% of population at risk reached by preventive chemotherapy. Morbidity due to foodborne trematode infections controlled in all endemic countries.</td>
</tr>
<tr>
<td>Soil-transmitted helminthiasis (intestinal worms)</td>
<td>50% of preschool and school-aged children in need of treatment are regularly treated. 100% of countries have a plan of action.</td>
<td>75% of preschool and school-aged children in need of treatment are regularly treated. 75% coverage achieved in preschool and school-aged children in 100% of countries.</td>
</tr>
<tr>
<td>DISEASE</td>
<td>2015</td>
<td>2020</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>-------------------------------------------</td>
<td>-------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Eradication</td>
<td>Global elimination</td>
</tr>
<tr>
<td>Rabies</td>
<td>✓</td>
<td>✓ Latin America</td>
</tr>
<tr>
<td>Blinding trachoma</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Endemic treponematoses (yaws)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Leprosy</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Chagas disease</td>
<td>✓</td>
<td>✓ Transmission through blood transfusion interrupted</td>
</tr>
<tr>
<td>Human African trypanosomiasis</td>
<td>✓</td>
<td>✓ In 80% of foci</td>
</tr>
<tr>
<td>Visceral leishmaniasis</td>
<td>✓</td>
<td>✓ Indian subcontinent</td>
</tr>
<tr>
<td>Dracunculiasis</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Lymphatic filariasis</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Onchocerciasis</td>
<td>✓</td>
<td>✓ Latin America</td>
</tr>
<tr>
<td>Schistosomiasis</td>
<td>✓</td>
<td>✓ Eastern Mediterranean Region, Caribbean, Indonesia and the Mekong River basin</td>
</tr>
</tbody>
</table>
Next step

To develop a programme to reach the goal

<table>
<thead>
<tr>
<th>Elimination Area</th>
<th>Targets</th>
</tr>
</thead>
</table>
| Global eradication | • Lymphatic filariasis  
• Leprosy  
• Human African trypanosomiasis  
• Blinding trachoma |
| Regional elimination | • Onchocerciasis in Latin America  
• Human rabies transmitted by dogs in Latin America  
• Schistosomiasis in the Eastern Mediterranean, Caribbean, Indonesia and Mekong River basin  
• Chagas disease transmission through blood transfusion interrupted  
| Country elimination | • Onchocerciasis in selected countries in Africa  
• Schistosomiasis in selected countries in Africa  
| Human African Trypanosomiasis in 80% of foci  
• Onchocerciasis in Yemen  |
# 17 Neglected Tropical Diseases

<table>
<thead>
<tr>
<th>DISEASE</th>
<th>2015</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Eradication</td>
<td>Global elimination</td>
</tr>
<tr>
<td>Rabies*</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Blinding trachoma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Endemic treponematosis (yaws)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leprosy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chagas disease</td>
<td>✓</td>
<td>✓ Transmission through blood transfusion interrupted</td>
</tr>
<tr>
<td>Human African trypanosomiasis</td>
<td></td>
<td>✓ ✓ In 80% of foci</td>
</tr>
<tr>
<td>Visceral leishmaniasis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trachoma</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Lymphatic filariasis</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Onchocerciasis</td>
<td>✓</td>
<td>✓ Latin America</td>
</tr>
<tr>
<td>Schistosomiasis</td>
<td>✓ Eastern Mediterranean Region, Caribbean, Indonesia and the Mekong River basin</td>
<td>✓ Region of the Americas and Western Pacific Region</td>
</tr>
</tbody>
</table>
## 17 Neglected Tropical Diseases

<table>
<thead>
<tr>
<th>DISEASE</th>
<th><strong>2015</strong></th>
<th><strong>2020</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rabies</td>
<td>✓ Latin America</td>
<td>✓ South-East Asia and Western Pacific regions</td>
</tr>
<tr>
<td>Blinding trachoma</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Endemic treponematoses (yaws)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Leprosy</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Chagas disease</td>
<td>✓ Transmission</td>
<td>✓ Intra-domiciliary transmission interrupted in the Region of the Americas</td>
</tr>
<tr>
<td>Human African trypanosomiasis</td>
<td>✓ 90%</td>
<td>✓</td>
</tr>
<tr>
<td>Visceral leishmaniasis</td>
<td>✓</td>
<td>✓ Indian subcontinent</td>
</tr>
<tr>
<td>Dracunculiasis</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Lymphatic filariasis</td>
<td>✓</td>
<td>✓ Selected countries in Africa</td>
</tr>
<tr>
<td>Onchocerciasis</td>
<td>✓ Region of the Americas and Western Pacific Region</td>
<td>✓ Selected countries in Africa</td>
</tr>
<tr>
<td>Schistosomiasis</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
3. An example-NTD programme:

*Global Programme to Eliminate Lymphatic Filaraissis (GPELF)*
"GPELF is the most rapidly up-scaling global health programme in history of public health."

GPELF Progress Report 2000-2009 and Strategic Plan 2010-2020, WHO
Cycle of the parasite

**HUMAN HOST**
- Mosquito bites
- L3 infective larvae (1200 µm) in the mosquito thorax
- 9-10 days
- Maturation into adult worm 45 days
- Adult worms (2-10 cm) in the human lymphatic system
- Release of mf (300 µm) in blood stream
- 3-4 days

**VECTOR**
- L2 Larvae (sausage shape) in the mosquito thorax
- 9-10 days
Lymphatic Filariasis
Lymphatic Filariasis: Japan as a predecessor of LF elimination

- Science
- Government
- People
Element 1: COMMITMENT towards elimination of LF

Prediction

“This disease may be eradicable......”

Int. Task Force for Disease Eradication (1993)

Commitment

World Health Assembly Resolution 50.29 (May 1997)

✓ “Urges Member States......to strengthen activities toward eliminating lymphatic filariasis as a public health problem........”

✓ “Requests the Director-General......to mobilize support for global and national elimination activities.”
GOAL: Global Elimination as a Public Health Problem by 2020

TARGET 1. To stop the spread of infection: Interruption of transmission through mass drug administration (MDA)

TARGET 2. To reduce suffering caused by the disease: morbidity management and disability prevention (MMDP)
Element 3: STEPWISE PROGRAMME PLAN
GPELF overall framework

1. MDA
   Mapping
   MDA
   Post-MDA surveillance

2. MMDP
   Situation analysis
   Plan
   Minimum package of MMDP care

Vector control

Dossier development

Verification

MMDP and rehabilitation integrated into health services
Element 4: TOOLS/POLICY/GUIDELINES
Mass drug administration (MDA)

- Combination of drugs:
  - albendazole + DEC (in countries not co-endemic with onchocerciasis)
  - albendazole + Ivermectin (in countries co-endemic with onchocerciasis)
- Single-dose annual treatment for 5 years
- All eligible individuals in the entire endemic area
Element 5: COORDINATION
Regional Programme Review Meetings

SEARO, Sri Lanka, 26-29 April
AMRO, Guyana, 2-6 May
WPRO, Fiji, 30 May-3 June

AFRO, Zambia, 6-10 June
EMRO, Egypt, 28-29 June
Element 6: PARTNERSHIP

GPELF Alliance meeting
**Past- LF global status**

- **73 countries are endemic**
- **1.39 billion people are at risk**
- **120 million people are infected**
- **40 million people are affected by morbidities**
Now- GPELF Progress

60 countries are implementing MDA (2013)
1 billion people were treated in 2000 - 2013
15 countries are under post-MDA surveillance (2013)
Future Projection 2011-2021

Maps showing lymphatic filariasis MDA and TiSA forecast for different years from 2011 to 2021.
4. Key to Success
Programme process and actions

**MAINTENANCE**
- to sustain programme's outcomes
- GH Framework opportunities; in PHC/UHC, and in PPP

**OPERATION**
- Operational action plan; Implementation
- Support system & actions; M&E; Progress & outcomes; Challenges

**POLICY**
- Commitment; Strategy; Strategic plan, policy/guideline; Partnership

**SCIENCE**
- Problem identification; Evidence; Success cases
Working together!

Integration – into primary health care for universal health coverage

Partnership – Collaboration to support one GPELF in PPP

NTD-PPP

WHO Policy and guidelines

GAELF Advocacy and fundraising

Academia Operational research and evidence

NGOs Assistance to MoHs

MoHs Coordination & implementation

GPELF

MDA TRA ONCHO

SCH STH

Dengue VC/IVM

Malaria

GPELF

MMDP

Leprosy Diabetes Buruli ulcer

Working together!
Assuring the physical, mental and social well-being of future generations

Thank you