

Burden and control of FBT infections

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**World Health
Organization**

Content

 Introduction to FBT infections

 Recent WHO Expert Consultation on FBT infections – Recommendations

 Roadmap for control of FBT infections

 Ongoing activities

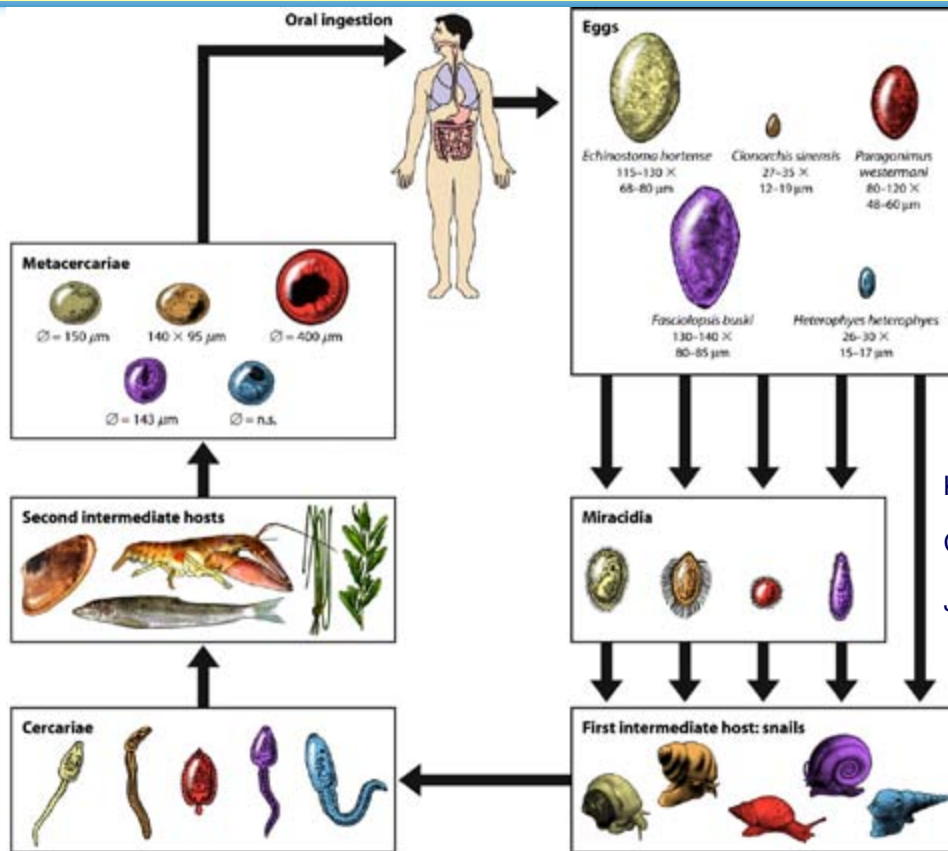
 Opportunities

Overview

- Over 100 species of foodborne trematodes (FBTs) are known to cause infection in humans
- Clonorchiasis, opisthorchiasis, fascioliasis and paragonimiasis are those that pose the most significant public health burden
- Different epidemiological patterns: from local to global
- Strictly linked to human behavioural patterns
- Significant zoonotic reservoir
- N infected: 40-85 million; population at-risk: 750 million
- Burden: unknown (calculations ongoing)



Complex biological cycles



Keiser & Utzinger,
Clinical Microbiology Reviews
July 2009:466-483



- Usually involving a first and a second intermediate host
- Infection is caught by ingesting the larval stages of the worm encysted in the tissues of edible animals or attached to plants

More systemic

Morbidity

More organ-specific

	Main affected organ	Early clinical picture	Chronic clinical picture
Clonorchiasis Opisthorchiasis	Liver	Usually mild or asymptomatic	Cholangitis, cholecystitis, hepatitis, pancreatitis, biliary obstruction, cholangiocarcinoma
Fascioliasis	Liver + ectopic	Can be severe (abdominal pain)	Cholangitis, cholecystitis, biliary obstruction, anaemia
Paragonimiasis	Lung + ectopic	Different patterns have been described	TB-like syndrome: pneumonia with chronic, productive cough with "rusty" sputum, chest pain



Diagnosis

- Clinical diagnosis: elusive
- Imaging: complementary role (US, CT, chest X-ray for *Paragonimus* spp.)
- Parasitological techniques (KK, FECT, MacMaster, direct smear)
 - Identification of eggs in stool samples (all species)
 - Identification of eggs in sputum samples (*Paragonimus* spp.)
 - Poorly sensitive and specific (Cs/Ov and MIF; *Fh/Fg* and *Fb*)
- Immunological techniques
 - Detection of Ag (in serum or stool)
 - Detection of Ab (in serum)
 - More sensitive and specific than parasitology
 - Available for fascioliasis only; poor standardization
- Molecular techniques
 - Still under development



Treatment (clinical practice)

- Clonorchiasis/opisthorchiasis

- PZQ 25mg/kg 3 times/day for 2-3 consecutive days
- PZQ 40mg/kg single-administration

- Fascioliasis

- TCZ 10mg/kg single-administration

- Paragonimiasis

- PZQ 25mg/kg 3 times/day for 2-3+ consecutive days
- TCZ 10mg/kg twice/day for 1 day



Control of FBT infections from a public health perspective

- Generic recommendations on disease control existed since 1995 but were scarcely implemented
- It was widely felt that more practical guidelines on how to address these diseases were needed



*WHO Expert Consultation on Foodborne Trematode Infections & Taeniasis/Cysticercosis,
Vientiane, Lao PDR, 12-16 Oct 2009*

Key question

Can the preventive chemotherapy concept be expanded to FBT infections?

Preventive chemotherapy

- Currently-recommended strategy for the four global helminth infections: **LF, ONCHO, Schistosomiasis, STH infections**
- Large-scale distribution of anthelmintic drugs, at regular intervals, without individual diagnosis
- The objective is to **decrease the worm burden** and keep it low so that morbidity is controlled
 - As helminths cannot replicate in the human host, wormload can increase only through subsequent re-infection episodes
 - Morbidity is proportionate to intensity of infection and is the product of accumulated re-infection episodes
- In some circumstances, reduced worm burden will also entail a lower risk of transmitting infection and will ultimately lead to **interruption of transmission**

Preventive chemotherapy (PC) and FBT infections: rationale

- 1) The biology of FBT is comparable to that of the other helminths responsible for PC-targeted diseases:**
 - Progressive accumulation of wormload through re-infection episodes leading to severe morbidity in the chronic stages of the disease

- 2) Likelihood of detecting early infections is low:**

- Unclear clinical picture
- Poor sensitivity and specificity of the diagnostic tests
- Diseases prevalent in resource-poor settings

The disease is left free to progress into its advanced stages

▶ **A “preventive” approach makes sense**

Proposed disease control process

1. Identification of endemic areas

- Rapid assessment

2. Classification of endemic areas according to level of risk

- Epidemiological surveys

3. Intervention

- Preventive chemotherapy
- Complementary public health interventions

4. M&E

- Morbidity/mortality
- Parasitological indicators

3. Intervention

Clonorchiasis/Opisthorchiasis

➤ Praziquantel (40mg per kg of body weight)

Class	Prevalence in sample pop.	Intervention	Interval of re-treatment
High risk	$\geq 20\%$	MDA	12 months
Low risk	$< 20\%$	MDA	24 months
		Targeted treatment*	12 months

MDA = Mass drug administration; (*) of individuals reporting the habit of eating raw fish

3. Intervention

Fascioliasis

- Triclabendazole (10mg per kg body weight)

Paragonimiasis

- Triclabendazole (20mg/kg in two divided doses)
- Praziquantel (25mg/kg 3 times/day for 3 days) – 2nd choice

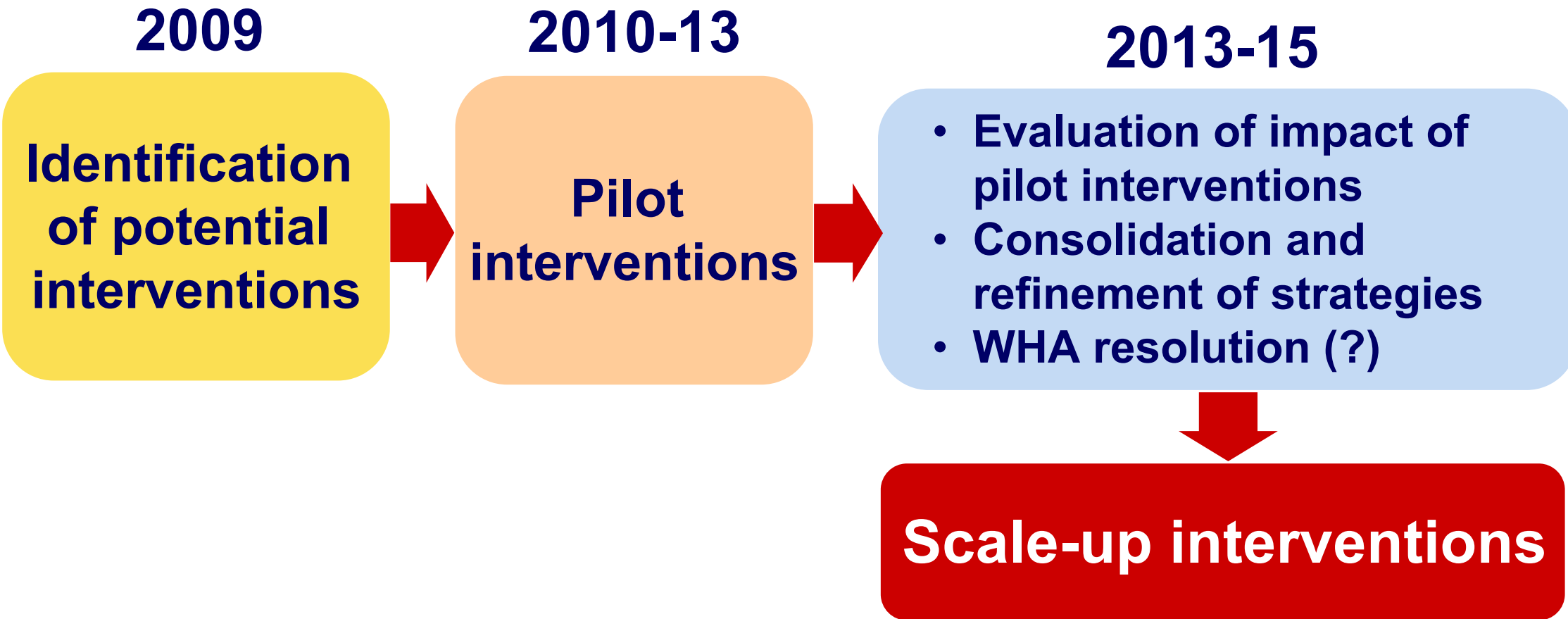
Epidemiological situation	Intervention	Interval of re-treatment
Clusters of cases	MDA	12 months
Otherwise	Decentralization of treatment and individual case management of infected or suspected* cases	N/A

(*) Adoption of simplified diagnostic protocols

Complementary public health interventions

Aquaculture	<ul style="list-style-type: none">• Reduce faecal contamination of aquaculture systems and cultured fish/crustacean ponds• Food-safety measures on aquatic products in the premarketing stage
VPH & Husbandry	<ul style="list-style-type: none">• Treatment of domestic animals• Fencing off or drainage of suspected grazing lands
Sanitation	<ul style="list-style-type: none">• Reduce contamination of freshwater streams with feces & sputum (community-led total sanitation)• Control of snail intermediate hosts
Education	<ul style="list-style-type: none">• Information, education & communication on safe food practices

Roadmap for control of FBT infections



Ongoing activities

Pilot interventions (disease mapping & control intervention)

FBT	Pilot countries
Clonorchiasis/ Opisthorchiasis	Vietnam, Lao PDR, Cambodia
Fascioliasis	Vietnam, Iran, Egypt, Madagascar, Yemen, Georgia, Bolivia, Peru
Paragonimiasis	China, Colombia

Operational research

- Comparison of two **rapid assessment** techniques (classic sampling and Lot-Quality Assurance Sampling)
- Comparison of two PC interventions (**mass drug administration** every 24 months vs. **targeted treatment** every 12 month)
- Impact of community-led total **sanitation** for FBT transmission



Pilot intervention - Peru

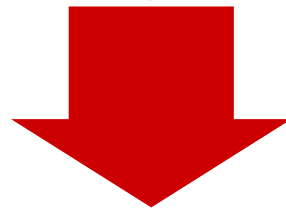


A significant opportunity

Neglected NTD?

Still very much so, but...

triclabendazole (Egaten®) is donated free of charge to MoHs by **Novartis Pharma AG** for control of fascioliasis and paragonimiasis (WHO manages the donation)



12 countries have already applied for donated drugs and are implementing disease control interventions

Thank you

