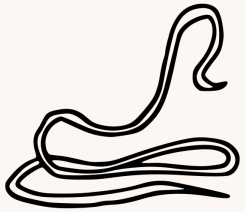
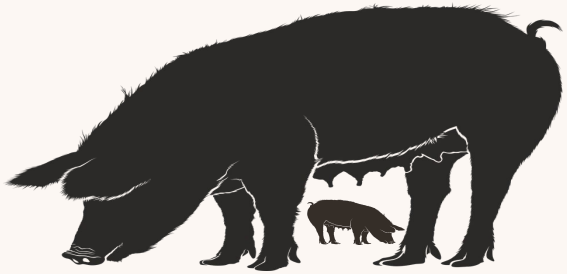




Taeniasis and Cysticercosis:

a substantial public health and economic challenge

Marisa Wong & Angela Shen

Taeniasis? Cysticercosis?

Taeniasis

Refers to intestinal infection with adult tapeworms

3 parasite species cause taeniasis

- ***Taenia solium* (pork tapeworm)**
- *Taenia saginata* (beef tapeworm)
- *Taenia asiatica* (Asian tapeworm)

Humans are the only definitive hosts for these adult Taenia tapeworms

Only T. solium causes major health problems

Cysticercosis

Infection caused by the larva form (cysticerci) of *T. solium*

Humans and pigs can act as intermediary hosts: harbor the larval stage

Human cysticercosis can result in devastating health effects

- Nodules can develop across the body
- **Neurocysticercosis (NCC): cysticerci lodge/develop in the brain or CNS**

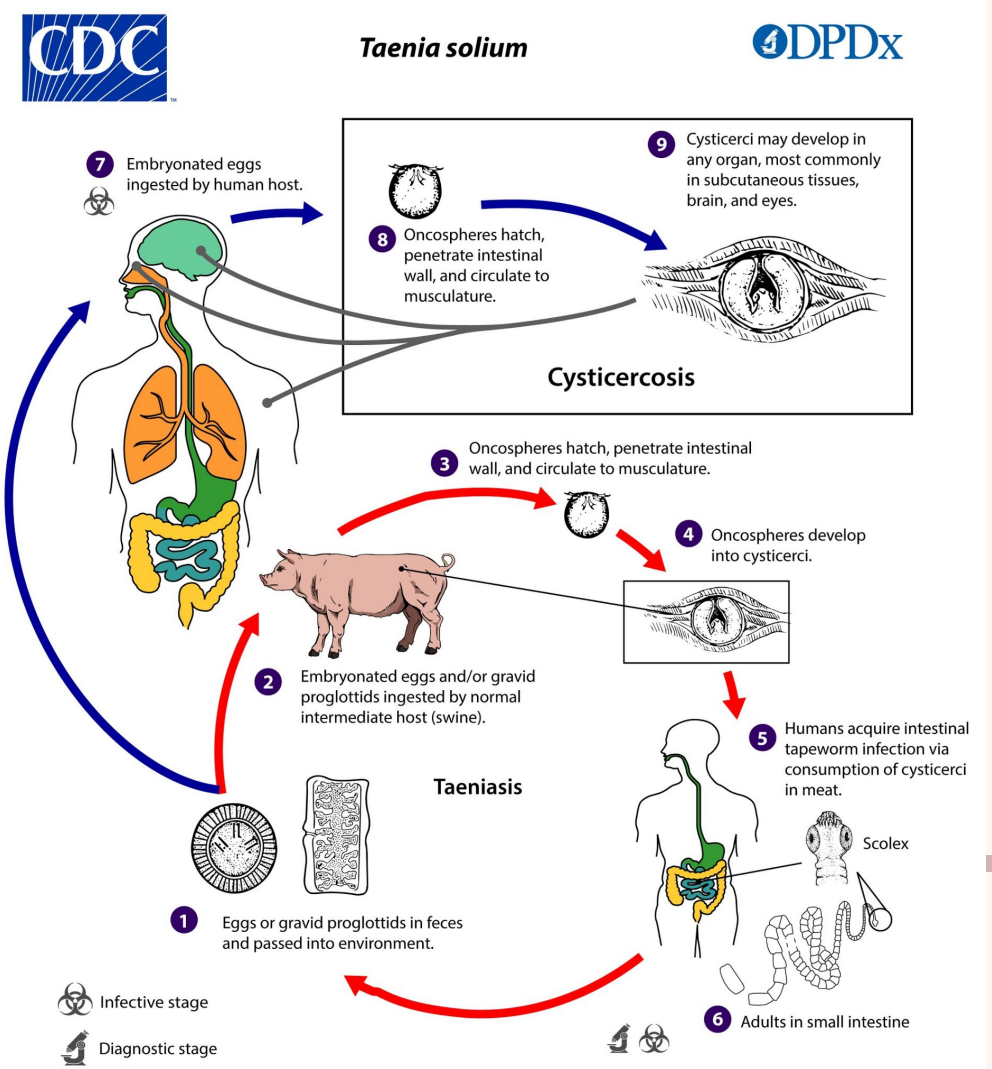
Life Cycle

Swine are the usual intermediate host for T. solium

- Humans, the usual definitive host, can serve as accidental intermediate hosts following ingestion of infectious eggs

Cysticercosis acquired only from the **fecal-oral route (ingestion of eggs)**, not via the **ingestion of cysticerci in undercooked pork**, which is associated with intestinal **taeniasis**

Tapeworm carrier can infect him-or herself with tapeworm eggs: autoinfection



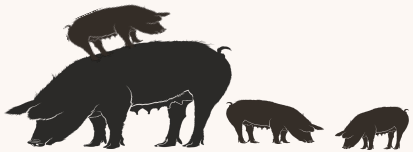
Symptoms & Health Effects

Taeniasis is usually characterized by **mild and non-specific** symptoms:

- Abdominal pain
- Nausea
- Diarrhoea or constipation

Symptoms present when tapeworms become fully developed in the intestine, ~ 8 weeks after ingestion of meat containing cysticerci

Continue until the tapeworm dies, ~2-3 years without intervention



Symptoms of Cysticercosis depend on the location of cysticerci

Extraneural cysticercosis

- No major symptoms
- Visible, palpable nodules under the skin, which can become tender

Ophthalmic cysticercosis

- Rarest form, cysts in retro-ocular space can cause proptosis or vision loss

Neurocysticercosis symptoms depend on the number, size, and topography of cysts

- **Epileptic seizures (50–80% of patients)**
- Chronic headaches, Hydrocephalus, Meningitis, Blindness

Most frequent preventable cause of epilepsy worldwide

- 30% of all epilepsy cases in endemic settings
- Specific communities 70% of all epilepsy cases

Global Burden of Disease

Acquisition

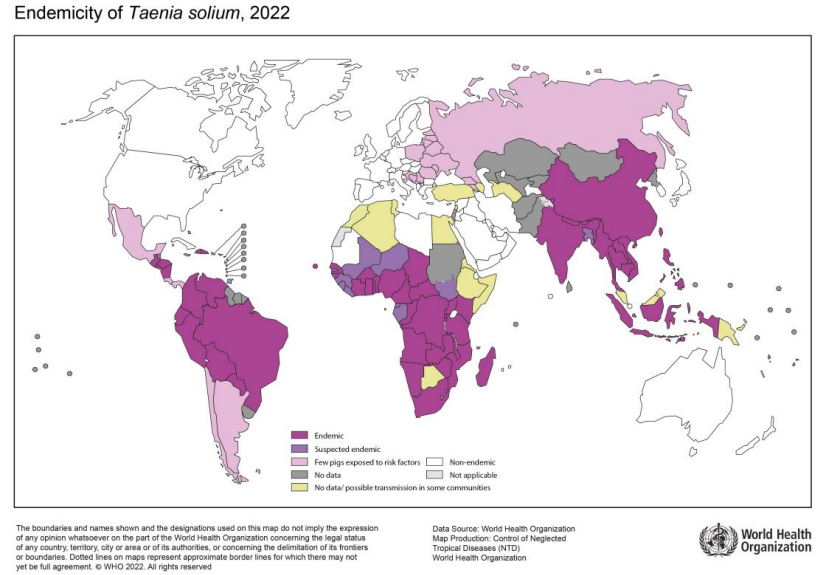
- *T. saginata or T. asiatica:* consume undercooked infected beef meat or pig liver [Taeniasis]
- ***T. solium:*** consume raw or undercooked, infected pork [Taeniasis]
  - T.solium eggs: consume contaminated food or water (fecal-oral route) [Cysticercosis]

Disproportionately found in **rural areas of developing countries:** poor sanitation, pigs roam freely and eat human feces

- *Subsistence farmers*

Rare among persons who live in countries where pigs are not raised and where pigs do not have contact with human feces.

T. solium: ~ 2.8 million DALYs in 2015



NCC: ~2.56–8.30 million people

- Massive economic burden
  - Treatment and productivity losses consume 54% of the annual minimum wage
  - Symptoms (seizure and epilepsy) cause two thirds of employees to lose their jobs

Treatment

Stop Parasite Transmission Cycle & Treat Mild Symptoms

- Single dose of 10 mg/kg praziquantel, single dose of 1-2g niclosamide, or 400 mg of albendazole for 3 days
  - Preventive Chemotherapy for *T. solium*
  - Individual basis

Neurocysticercosis

- Specialized treatment with high doses of praziquantel or albendazole for long durations
- Dosage and duration of treatment varies based on number, size, location, development stage of cysts, and severity of symptoms

Prevention

160 F

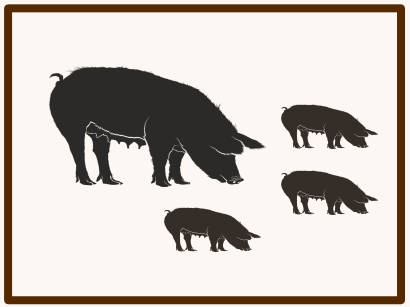
145 F

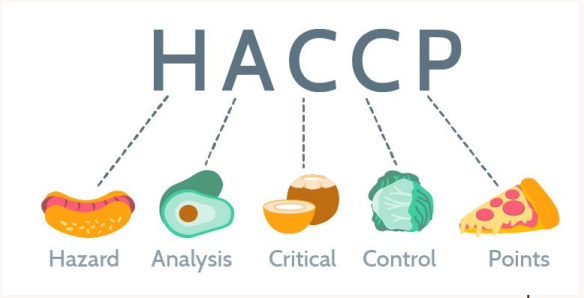
Control

Core “rapid impact” Interventions

Supporting measures

Societal Changes





Impact of Climate Change

Humidity

High humidity improving egg survival

Temperature

Moderate temperature (5-25 C) favors egg survival

Rural Animal Husbandry

Increased zoonotic potential & cross-species jump of the parasite

References

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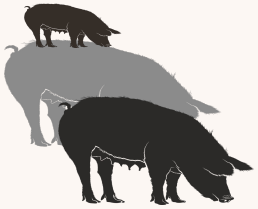
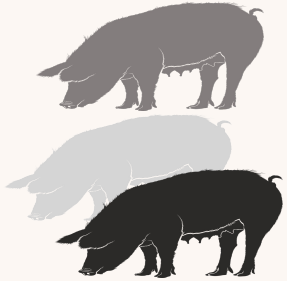


Thanks

Any Questions?



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