

Safer indigenous pork and healthier ethnic minorities
in Vietnam through better management of
parasitic pig-borne diseases

Handbook

Prevention of parasitic pig-borne diseases and improvement
of hygiene practices in the pork value chain

(with emphasis on indigenous pigs)

Hanoi, December 2020



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Abbreviations

A4NH	CGIAR Research Program on Agriculture for Nutrition and Health
ACIAR	Australian Centre for International Agricultural Research
BMZ	German Federal Ministry for Economic Cooperation and Development
FIA	Fund for International Agricultural Research
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
PPBDs	Parasitic pig-borne diseases

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Project background

Pig production plays an important role in generating livelihoods for ethnic people in Vietnam. Both indigenous breeds and wild pigs are traditionally kept under extensive management systems. Indigenous pig production enables ethnic minorities to produce and consume more animal-sourced foods which improves nutrition status and contributes to their livelihoods. However, parasitic pig-borne diseases (PPBDs), including taeniasis, cysticercosis and trichinellosis, pose potential human health risks and lead to considerable economic and nutrition impacts.

The project's goal is to assess and reduce both PPBDs—taeniasis, cysticercosis and trichinellosis—in ethnic minorities of selected areas in Vietnam. One specific objective is to improve awareness and knowledge on PPBD's of Ban pig value chain actors including farmers, butchers, retailers and consumers.

Purpose and audience of this handbook

The purpose of this handbook is to increase awareness and knowledge on PPBD's of pork value chain actors including farmers, butchers, retailers and consumers with emphasis on Ban or indigenous pigs' production in local communities as well as to advise on good hygiene practices to reduce the risk of food-borne diseases. The handbook is seen as an additional practical guide for safer Ban pig production but does not replace existing regulations.

Format and how to use the handbook

This handbook includes general life cycles of the two PPBDs —taeniasis, cysticercosis and trichinellosis, and their causes, transmission and symptoms. Key messages on control and prevention of these diseases are provided for specific value chain actors including farmers, butchers, retailers and consumers and supported by illustrations and narratives for good practice and poor practice.

Taeniasis and cysticercosis facts

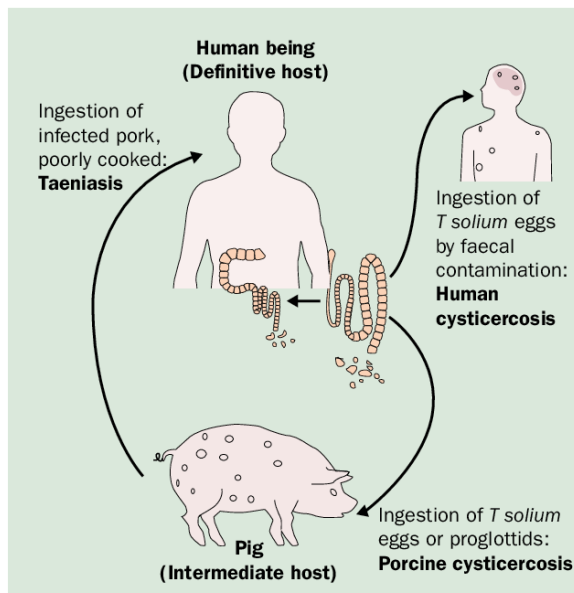
Taeniasis refers to intestinal infection with tapeworms, while cysticercosis is an infection by the larvae of the parasite *Taenia solium*.

Routes of transmission

T. solium tapeworm (human taeniasis) occurs when a person eats raw or undercooked pork containing cysts (a larvae of the parasite in pork).

Cysticercosis occurs when a person ingests tapeworm eggs through contaminated food (e.g. vegetables) or water. This can lead to cysts in human tissues. Infections in pigs occur through eating tapeworm eggs (pig cysticercosis) contaminating faeces of a human (e.g. through the farm environment).

Life cycle of taeniasis, human and pig cysticercosis (adapted from García et al)¹:



¹ García HH, Gonzalez AE, Evans CA, Gilman RH; Cysticercosis Working Group in Peru. *Taenia solium* cysticercosis. Lancet. 2003 Aug 16;362(9383):547-56. doi: 10.1016/S0140-6736(03)14117-7. PMID: 12932389; PMCID: PMC3103219;

Symptoms in humans and pigs

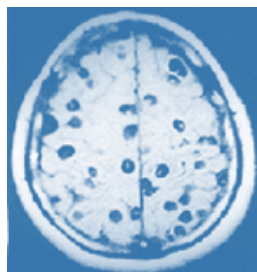
Taeniasis (in humans): often symptomless but visible proglottids of tapeworm around anus or in faeces.

Cysticercosis (in humans): Reduced vision/blindness; seizures, dementia, headache, paralysis of legs or half of the body and epilepsy, among others.

Cysticercosis (in pigs): Mostly asymptomatic but rice grain-like cysts appear in meat and tissue during slaughter.



Pig cysticercosis (cyst in pork)².



Human cysticercosis (cyst in human brain)².

Trichinellosis facts

Trichinellosis is caused by eating raw or undercooked meat of animals infected with the larvae of a worm called *Trichinella* spp.²

Routes of transmission

Humans get infected from consuming raw or undercooked meat from pigs (domestic and wild) and wildlife (bear or cougar), which contains *Trichinella* larvae. The larvae develop to a mature worm in human muscle tissue causing trichinellas.



Trichinella spiralis collected from muscle digestion (Magnification 120x)³.

² Pictures source-above (<https://cysticercosisgroup.weebly.com/3-about-cysticercosis.html>) and below (<https://en.wikipedia.org/wiki/File:Neurocysticercosis.gif>)

³ <https://www.sciencephoto.com/media/709335/view/trichinella-spiralis>;

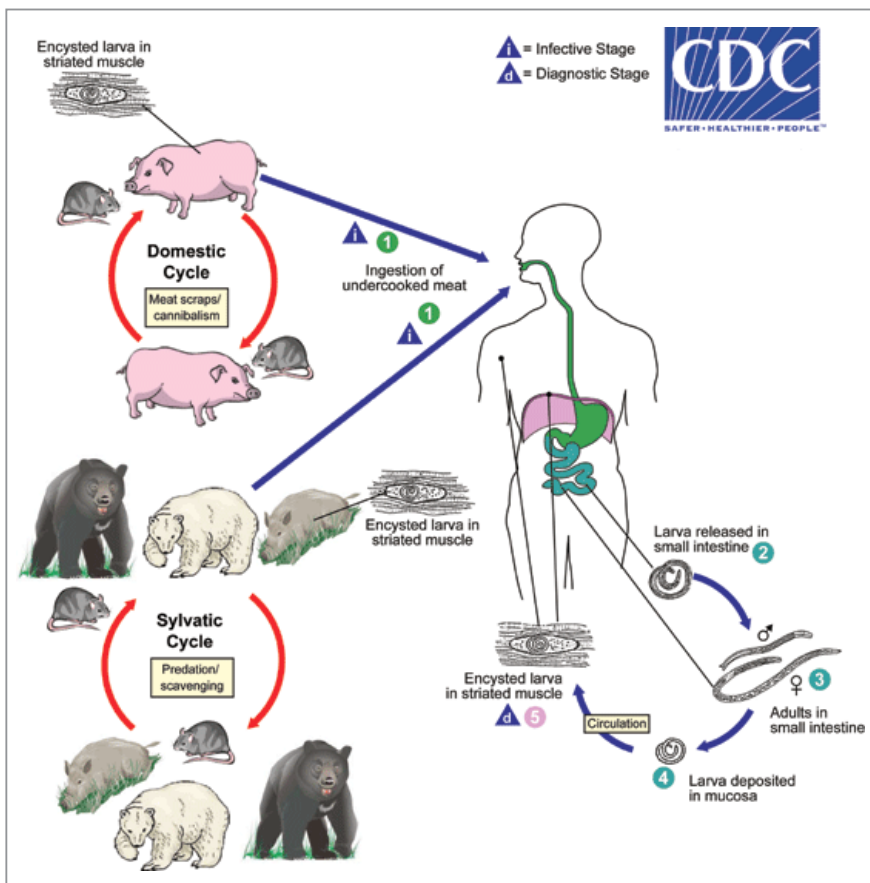
Symptoms in humans

First symptoms: Nausea and vomiting, diarrhoea, fatigue and abdominal pain. Muscle pain, tenderness, swelling of the eyelids or face, headache, sensitivity to light and pink eye (conjunctivitis) may follow. In severe cases, death can occur.

Symptoms in pigs

No clinical signs, larvae in muscle can be only detected by laboratory.

Life cycle of human and pig trichinellosis⁴



⁴ <https://www.cdc.gov/parasites/trichinellosis/biology.html>

Guide to prevent PPBDs for indigenous pig producers



Always keep pigs inside the pen or a fenced area, this also reduces the risk of other pig diseases



Good practices



Properly treat pig faeces, for example make compost or collect and store, with no access by other livestock



Bad practices

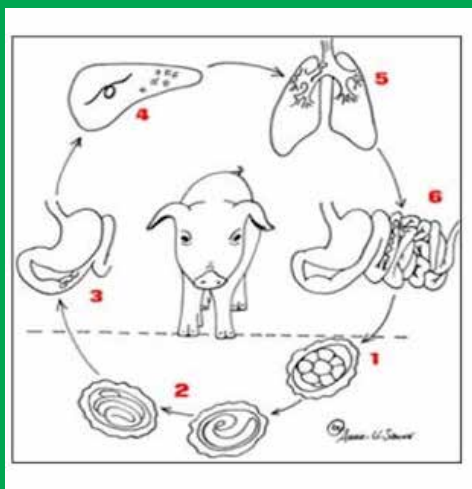
Do not allow pigs to roam outside the pen or a fenced area, this also increases the risk of other pig diseases, for example African swine fever.

Guide to prevent PPBDs for indigenous pig producers



Good practices

Encourage people to use closed toilets or pit latrines



Frequently deworm your pigs (seek advice from your vet on recommended drugs)

Guide to prevent PPBDs for traditional pig butchers

Select healthy looking pigs and know the origin of pigs

Only accept pigs from confined systems



Good practices



Each pig and carcass should be subjected to meat inspection



Pork which contains cysticercosis larvae (like rice grains). In case of any suspected signs, report to authorities.



Bad practices



Do not slaughter apparently sick pigs

(Photos: carcass, pig with symptoms of an infectious disease)

Guide to prevent PPBDs for traditional pig butchers



Clean and disinfect hands and slaughtering equipment



Good practices

Slaughter pigs on clean surfaces such as grid or table



Do not slaughter or place carcass on dirty surfaces or floors



Bad practices

Do not place carcass next to internal organs

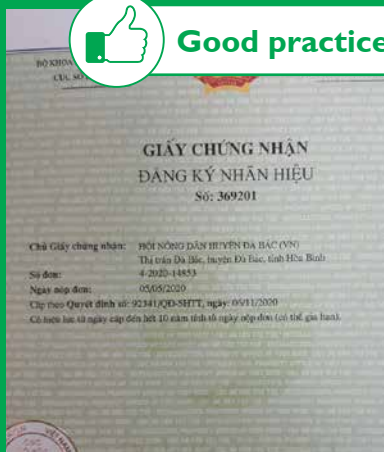
Guide to prevent PPBDs for traditional pig retailers



Only accept pork from pig farms with confined systems.



Good practices



Only accept pork of known origin, for example, from certified cooperatives



Do not accept pork which appears to be abnormal
Photo (from left): pork with abscess⁵ and pig cysticercosis



Bad practices



⁵ <https://vietnamnet.vn/vn/doi-song/kinh-hoang-voi-thit-lon-mung-mu-boc-mui-hoi-thoi-o-ha-noi-204711.html>

Guide to prevent PPBDs for traditional pig retailers



**Clean and disinfect tables/
surfaces and equipment
frequently**



Good practices

**Separate pork, intestines, and
cooked pork**



Do not place meat on dirty surface or close to intestines



Bad practices

Guide to prevent PPBDs for pork consumers



Good practices



Wash hands, kitchen utensils and vegetable properly.



Purchase pork of known origin or from trusted retailers.



Bad practices

Do not eat raw or undercooked pork or pork products

Guide to prevent PPBDs for pork consumers



All family members should take deworming medication periodically (every 6 -12 months).



Good practices

Always cook pork thoroughly (no pink or reddish part visible when cutting).



Seek medical advice from healthcare centre if you have any of the symptoms or signs below

Cysticercosis

Reduced vision/ blindness; seizures, dementia, headache, paralysis of legs or half of the body, epilepsy.

Taeniasis

Abdominal discomfort or visible segments of the tapeworm around anus or in human faeces.

Trichinellosis

Nausea and vomiting, diarrhoea, fatigue. Muscle pain, swelling of the eyelids or face, headache, sensitivity to light and pink eye (conjunctivitis)

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