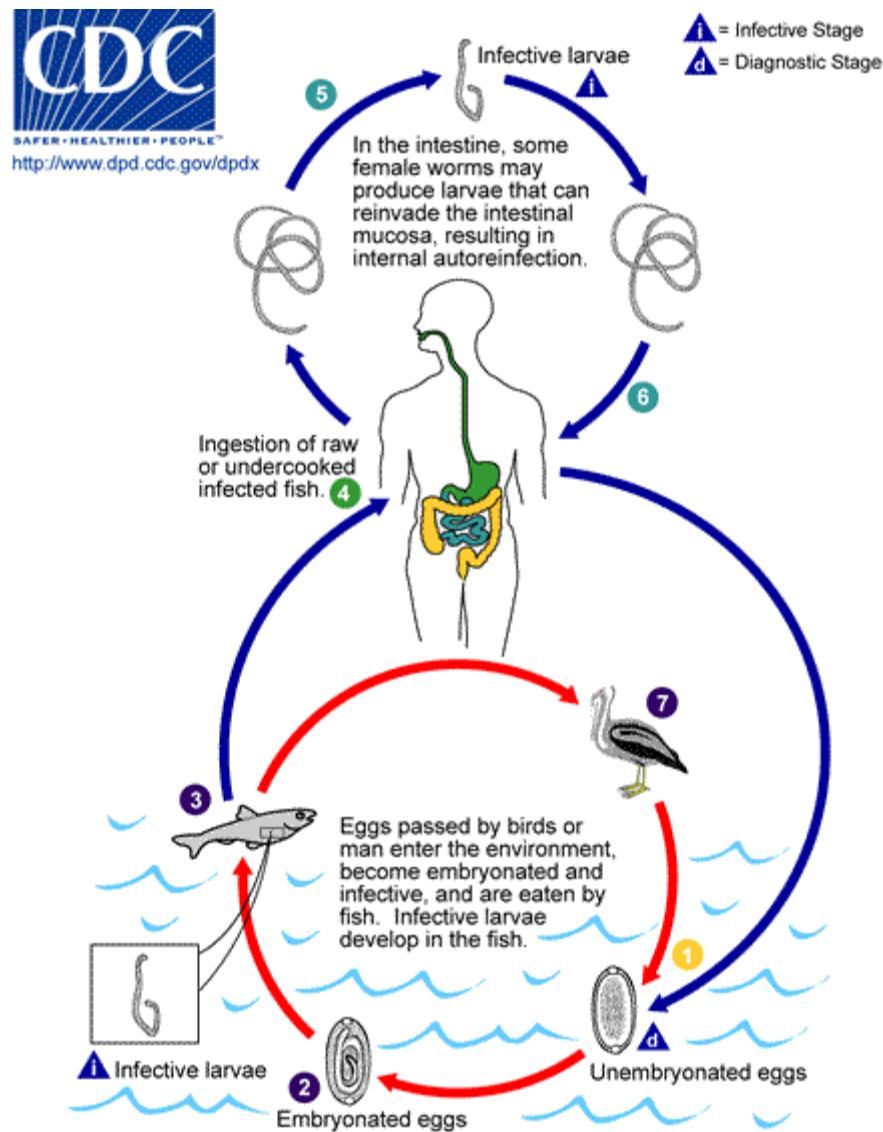


Capillariasis

Causal Agents:

The nematode (roundworm) *Capillaria philippinensis* causes human intestinal capillariasis. Two other *Capillaria* species parasitize animals, with rare reported instances of human infections. They are *C. hepatica*, which causes in humans hepatic capillariasis, and *C. aerophila*, which causes in humans pulmonary capillariasis.

Life Cycle:



Typically, unembryonated eggs are passed in the human stool **1** and become embryonated in the external environment **2**; after ingestion by freshwater fish, larvae hatch, penetrate the intestine,

and migrate to the tissues ³. Ingestion of raw or undercooked fish results in infection of the human host ⁴. The adults of *Capillaria philippinensis* (males: 2.3 to 3.2 mm; females: 2.5 to 4.3 mm) reside in the human small intestine, where they burrow in the mucosa ⁵. The females deposit unembryonated eggs. Some of these become embryonated in the intestine, and release larvae that can cause autoinfection. This leads to hyperinfection (a massive number of adult worms) ⁶. *Capillaria philippinensis* is currently considered a parasite of fish eating birds, which seem to be the natural definitive host ⁷.

Capillaria hepatica adult worms reside in the liver of various animals, especially rats. The females produce eggs that are retained in the liver parenchyma. When the infected animal is eaten by another animal, the eggs are released by digestion, excreted in the feces of the second animal, and become embryonated in the soil. Alternately, the eggs can be released following the death and decomposition of the first animal, and mature in the soil. Following ingestion by a subsequent host, these infective eggs release larvae in the intestine that migrate through the portal circulation to the liver, where they develop into adults.

Capillaria aerophila adult worms reside in the epithelium of the tracheo-bronchial tract of various animals. Eggs are produced, coughed up, swallowed by the animal, and excreted in its feces. The eggs become embryonated in the soil. Ingestion of infective eggs completes the cycle. Transport or paratenic hosts may also intervene in the cycle.

Geographic Distribution:

Capillaria philippinensis is endemic in the Philippines and also occurs in Thailand. Rare cases have been reported from other Asian countries, the Middle East, and Colombia. Rare cases of human infections with *C. hepatica* and *C. aerophila* have been reported worldwide.

Clinical Features:

Intestinal capillariasis (caused by *C. philippinensis*) manifests as abdominal pain and diarrhea, which, if untreated, may become severe because of autoinfection. A protein-losing enteropathy can develop which may result in cachexia and death. Hepatic capillariasis (*C. hepatica*) manifests as an acute or subacute hepatitis with eosinophilia, with possible dissemination to other organs. It may be fatal. Pulmonary capillariasis (*C. aerophila*) may present with fever, cough, asthma, and pneumonia, and also may be fatal.

Laboratory Diagnosis:

The specific diagnosis of *C. philippinensis* is established by finding eggs, larvae and/or adult worms in the stool, or in intestinal biopsies. Unembryonated eggs are the typical stage found in the feces. In severe infections, embryonated eggs, larvae, and even adult worms can be found in the feces.

The specific diagnosis of *C. hepatica* infection is based on demonstrating the adult worms and/or eggs in liver tissue at biopsy or necropsy. (Note: identification of *C. hepatica* eggs in the stool is a spurious finding, which does not result from infection of the human host, but from ingestion by that host of livers from infected animals.)

The specific diagnosis of *C. aerophila* is based on demonstrating eggs in stool or in lung biopsy.

Diagnostic findings

- Microscopy
- Morphologic comparison with other intestinal parasites

Treatment:

The drug of choice is mebendazole*, and albendazole* is an alternative.

* This drug is approved by the FDA, but considered investigational for this purpose.