



**COUNTY OF ORANGE
HEALTH CARE AGENCY**

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**PUBLIC HEALTH
EPIDEMIOLOGY & ASSESSMENT**

TO: To Orange County Physicians and Other Health Care Providers
RE: Recent cases of paragonimiasis (lung flukes) associated with live freshwater crab consumption

In the past few weeks, we have received two reports of paragonimiasis associated with live freshwater crab consumption in Orange County. At this time, we do not know how widely crabs contaminated with this parasite may have been distributed to restaurants in the county, or if this practice of consuming freshwater crabs raw or live is common. Given the insidious nature of this infection, we would like to make you aware of this potential problem so that you can appropriately test symptomatic patients who have consumed raw, undercooked, pickled or salted freshwater crabs or crayfish and provide treatment if testing is positive.

Paragonimiasis is a parasitic infection caused by lung flukes, most commonly *Paragonimus westermani*. Human infection can occur by consumption of contaminated raw or undercooked freshwater crabs or crayfish. *Paragonimus* most commonly migrate to the lungs, but can also affect other sites including the brain or abdomen. Infection can last for years; many infected people do not appear to be ill. Pulmonary symptoms include chronic cough, dyspnea, chest pain, and brownish or blood-tinged sputum. Pulmonary complications include pleural effusion, pneumothorax, bronchiectasis, and pulmonary fibrosis. The lifecycle of *Paragonimus* involves snails and crabs; there is no person-to-person transmission. Diagnosis is by microscopic examination of the sputum or stool for *Paragonimus* eggs or by serology; occasionally the fluke or eggs are visualized in tissue. Cases may be initially misdiagnosed as tuberculosis or tumors based on the radiographic findings and symptoms.

In some parts of the world, raw, salted or pickled freshwater crabs raw are considered a delicacy, so patients could have been exposed overseas as well.

Medication is available for treatment of patients. Please see the attached sheet for more information about paragonimiasis for health care providers. For a fact sheet for patients, please see the Orange County Epidemiology website at <http://www.ochealthinfo.com/epi/paragonimus.htm>. In addition, patients may call the Health Referral Line at 1-800-564-8448 for more information.

We are currently investigating the situation in conjunction with the California Department of Health Services and the Centers for Disease Control & Prevention (CDC). Please report any suspect cases of paragonimiasis to Orange County Epidemiology within one (1) working day by phone (714-834-8180) or fax (714-834-8196). Please also question suspect cases about restaurants where live or raw freshwater crab was/is being served. Testing will be available on a case-by-case basis through Public Health for patients with a history of exposure and symptoms consistent with paragonimiasis. Updated information about testing and reporting will be posted on <http://www.ochealthinfo.com/epi/paragonimus.htm>. If you have any questions about this investigation, please call us at 714-834-8180.

Paragonimiasis Fact Sheet for Health Care Providers

The Organism, Transmission and Epidemiology

Paragonimiasis is a parasitic disease caused by lung flukes, most commonly *Paragonimus westermani*. *P. westermani* is found in the Far East and the Philippines. Other *Paragonimus* species causing disease in humans can be found in Asia, Central and West Africa, Central and South America, and rarely in North America.

These parasites have a complicated life cycle with many stages involving freshwater snails, freshwater crustaceans (crabs or crayfish), and humans or other mammals. For more information about the life cycle of the organism, see

<http://www.dpd.cdc.gov/dpdx/HTML/Paragonimiasis.htm>.

The only stage that is infectious to humans is found in freshwater crustaceans. Humans most commonly become infected by eating raw or undercooked freshwater crabs or crayfish that contain the metacercariae. From the intestine, the metacercariae excyst and the larvae penetrate the intestinal wall and migrate through the diaphragm into the lungs. In the lungs, a fibrous cyst forms and then egg deposition occurs approximately 6 weeks after infection. Larvae can also lodge in the abdomen, central nervous system, or skin. Adult worms usually die within 10 years, but may live for 20 years.

Clinical Manifestations

Initial symptoms, in the first three weeks after ingestion, may include diarrhea, abdominal pain, cough, fever, and urticaria while the worms are migrating from the intestines to the lungs. The chronic symptoms of paragonimiasis are caused by the host's inflammatory reaction to the worms and eggs and thus the incubation period varies. The major forms of disease are pulmonary and extrapulmonary. **The pulmonary form** most commonly has no or mild symptoms. Chronic cough, chest pain, and dyspnea can be present. Heavy infestations can lead to paroxysms of coughing with blood-tinged sputum; hemoptysis can be severe. Sputum may appear brown due to the presence of *Paragonimus* eggs. Complications include pleural effusion (exudative with eosinophils), pneumothorax, bronchiectasis, and pulmonary fibrosis. The infection can also affect the liver, spleen, abdomen, skin, and brain. **The extrapulmonary form** is associated with migratory allergic skin nodules caused by immature worms.

Diagnosis and Management

Microscopic examination of sputum or feces 2-3 months after initial infection may show characteristic eggs of this parasite that have been expectorated or swallowed, respectively. Eggs may also be seen in other affected fluids and tissues. *Paragonimus* serology is also available. Early on, complete blood counts (CBCs) may show eosinophilia, as does pleural fluid, if effusion is present. Praziquantel is the treatment of choice, given for two (2) days [75 mg/kg per day divided into three doses]. Bithionol is an alternative treatment but has more side effects. In cerebral paragonimiasis, steroids are added.

Prevention

Cooking of freshwater crabs and crayfish until the flesh is pearly and opaque will kill the infectious form of the parasite.