



Department of Health and Social Services  
Valerie J. Davidson, Commissioner

3601 C Street, Suite 540  
Anchorage, Alaska 99503

<http://www.epi.Alaska.gov>

Division of Public Health  
Jay C. Butler, MD, Chief Medical Officer  
and Director  
Local (907) 269-8000  
24 Hour Emergency (800) 478-0084

Editors:  
Joe McLaughlin, MD, MPH  
Louisa Castrodale, DVM, MPH  
Bulletin No. 6 March 18, 2015

## Trichinellosis Cases — Alaska, 2005–2014

### Background

Trichinellosis is a parasitic disease that occurs following consumption of raw or undercooked meat infected with *Trichinella* larvae. In the Arctic, *Trichinella* is found in carnivores such as bears, wolves, foxes, lynx, coyotes, walrus, and seals. Herbivores also occasionally become infected after accidentally ingesting meat. *Trichinella* infection in humans is divided into an intestinal (enteral) phase and a muscular (parenteral) phase (Table). Clinical outcomes are variable, ranging from asymptomatic infection to a rarely fatal disease, depending on host factors and the number of larvae ingested. This *Bulletin* summarizes trichinellosis cases reported to the Alaska Section of Epidemiology (SOE) during 2005–2014, reviews clinical and laboratory findings associated with infection, and provides guidance for cooking game to prevent trichinellosis.

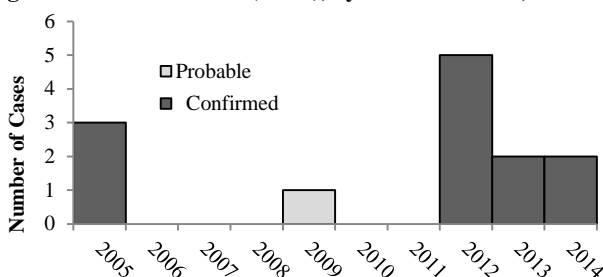
### Methods

A confirmed case of trichinellosis was defined as a clinically compatible illness in a person who reported consuming a likely meat source in conjunction with a positive laboratory test from either a human or implicated meat specimen. A probable case was a clinically compatible illness in a person who ate an epidemiologically-implicated meat product without any positive laboratory results.

### Results

During 2005–2014, SOE received reports of 17 trichinellosis cases from nine outbreaks. One of the outbreaks involved four hunters who consumed bear meat cooked over an open fire. Because the hunters were not Alaskans, by national convention, these cases were not included in Alaska's national case counts.<sup>1</sup> The remaining 13 cases were from eight outbreaks (Figure). Patients' ages ranged from 22–65 years (median: 42 years); 10 (77%) were male. Seven (54%) cases occurred in whites, three (23%) in Asians, and one (8%) in an Alaska Native person. Race was unknown for two (15%) cases. Three of the infected persons were hospitalized; none died. Meats suspected or confirmed to have caused one or more of the outbreaks included: bear, wild boar, pork, and moose. One outbreak involved intentional consumption of raw pork, one outbreak involved exposure to the parasite while processing wild boar meat (obtained from outside of Alaska), and the other six outbreaks involved consumption of game meat that was inadequately cooked in a home setting.

Figure. *Trichinella* Cases (N=13), by Year — Alaska, 2005–2014



### Discussion

Trichinellosis is an ongoing public health threat in Alaska. In a recent review, during 2008–2012, the incidence of trichinellosis was >40 times higher in Alaska than in the U.S. overall (4.1 versus 0.1 cases per 1 million population, respectively).<sup>2</sup> Alaska's contribution to the national burden would be even higher if cases were counted by state of meat source. Although one outbreak involved persons who were infected after intentionally eating raw meat, most consumers were unaware that the meat they consumed was undercooked.

Trichinellosis can be prevented by cooking pork and wild game thoroughly to an internal temperature of at least 160°F (71°C), as verified by a food thermometer.<sup>3</sup> Digital thermometers are recommended because they register the temperature in the very tip of the probes for accurate monitoring, and they are sufficiently portable for use while camping.<sup>3</sup> Heating in microwave ovens, curing, drying, and smoking are not effective in inactivating *Trichinella* larvae. *Trichinella nativa* in Alaska bear and walrus meat is cold-resistant; unlike the *T. spiralis* larval cysts found in pork, freezing will NOT kill *T. nativa* larval cysts found in arctic meats. All meat handlers should follow good hygienic practices, i.e., wash their hands thoroughly with soap and warm water after handling raw meat and clean meat grinders carefully after use.

Table. Phases of *Trichinella* Infection

Phase	Onset	Parasite Action	Symptoms
Intestinal	1–2 days after ingestion	Larvae from ingested meat mature into adults in intestinal mucosa	Abdominal pain, nausea, vomiting, diarrhea
Muscular	Usually 2–8 weeks after ingestion	Adult worms mate, produce new larvae that migrate to skeletal muscle throughout the body	Fever, ocular pain, myalgia, weakness, periorbital edema

### Recommendations

1. Health care providers should consider trichinellosis in any patient with the classic constitutional symptoms following gastrointestinal illness and a history of recent wild game consumption. Suspected cases of trichinellosis should be reported promptly to SOE by calling 907-269-8000 Mon-Fri 8AM–5PM, or 800-478-0084 after-hours. Many trichinellosis cases are part of a larger outbreak; therefore, prompt reporting can hasten interventions.
2. *Trichinella* antibodies in sera can be detected 12–60 days post-infection; however, sera may be initially negative if drawn early in the illness course. Most cases are diagnosed by serologic testing available at commercial laboratories. During outbreaks, contact SOE to facilitate testing of sera for *Trichinella* antibodies and/or meat for *Trichinella* larvae. Marked eosinophilia in a person who consumed game meat is highly suggestive of trichinellosis. Other supportive laboratory findings include hypergammaglobulinemia and elevated muscle enzymes. Muscle biopsies are not commonly performed.
3. Prompt treatment with antiparasitic drugs can help prevent the progression of trichinellosis by killing the adult worms and preventing release of larvae. Once the larvae have become established in skeletal muscle cells, treatment may not completely eliminate the infection and associated symptoms. Treatment with either mebendazole or albendazole is recommended.<sup>4</sup>

### References

1. ADF&G. Alaska Fish and Wildlife News. "Parasite Reminds Hunters Bear Meat Must Be Thoroughly Cooked." September 2014. Available at: [http://www.adfg.alaska.gov/index.cfm?adfg=wildlifeneews.view\\_article&articles\\_id=682](http://www.adfg.alaska.gov/index.cfm?adfg=wildlifeneews.view_article&articles_id=682)
2. CDC. Trichinellosis Surveillance — United States, 2008–2012. *MMWR* 2015;64(SS01):1-8.
3. U. S. Dept of Agriculture, Food Safety and Inspection Service. "Food Safety While Hiking, Camping and Boating". May 2011. Available at: [http://www.fsis.usda.gov/shared/PDF/Food\\_Safety\\_While\\_Hiking\\_Camping\\_Boating.pdf](http://www.fsis.usda.gov/shared/PDF/Food_Safety_While_Hiking_Camping_Boating.pdf)
4. DPDx - Laboratory Identification of Parasitic Diseases of Public Health Concern. Available at: <http://www.cdc.gov/dpdx/trichinellosis/dx.html>