Trichinosis (Trichinellosis)

Organism: *Trichinella nativa*, an arctic (cold-resistant) nematode.

Incubation period: Larvae become adults in 1-3 days in the small intestine and may evoke gastrointestinal symptoms. Adults shed eggs that grow to larvae, which migrate throughout striated muscle over the following 6+ weeks and will evoke intense myalgias, fever, and marked eosinophilia.

Infectious period: Persons are not infectious. Uncooked meat with larvae should be considered contaminated and can remain infectious for very long periods of times. Freezing does not kill this species of parasite.

Transmission routes: Ingestion.

Treatment: Mainly symptomatic treatment. Providers may want to give an anthelminthic (albendazole or mebendazole); this may or may not help patient. If there is larval migration in vessels or CNS, corticosteroids are indicated.

Dosages for both adult and pediatric patients

Mebendazole	200-400 mg three times a day PO for 3 days; then 400-500 mg three times a day PO for 10 days
Albendazole	400 mg twice a day PO for 8 – 14 days

Reference: http://www.cdc.gov/parasites/trichinellosis/health_professionals/index.html#tx. Consult reference for specific recommendations for pregnant women and children <2 years.

Information Needed for the Investigation

Verify the Diagnosis

- Is there a history of eating raw, dried, or undercooked meat (usually bear, walrus, or other carnivorous mammal)?
- Does patient have a clinically compatible history?

Determine the Extent of Illness

- Determine all other persons that may have shared the meat; get the details of food preparation if meat was consumed at different times.
- Refer symptomatic persons to their healthcare providers. We do not routinely recommend serologies on asymptomatic persons.
- Obtain a sample of the suspected meat if possible.
- Involve other agencies as appropriate, i.e., DEC, if product was in commerce

Laboratory Specimens

- Serum from patients can be sent to CDC via ASPHL for total trichinella antibody. Testing is also available at commercial labs.
- Marked eosinophilia on a CBC (along with exposure history) is highly suggestive of acute trichinellosis. During outbreak investigation, we may wish to do eosinophil counts on others exposed.
- There is no in-state capacity to test meat for larvae, and in general, cases can be confirmed without testing the meat. On a case-by-case basis, CDC Division of Parasitic Diseases is willing to test meat. SOE staff can contact dpdx@cdc.gov for details.

Contact and Control Measures

- Goal is to identify other persons who may have consumed raw meat and educate them about the risks of consuming inadequately cooked infected meat.
- Because most meat is not commercially produced, there is no requirement to inform USDA or DEC for individual cases. However, if meat was ground or processed at a local meat market, alert DEC to the potential for other product that could have been contaminated if equipment was not properly sanitized.

Hospital Considerations

- Use Standard Precautions.
- Siegel JD, Rhinehart E, Jackson M, Chiarello L, and the Healthcare Infection Control Practices Advisory Committee. 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings. Available at http://www.cdc.gov/hicpac/pdf/isolation/isolation2007.pdf

Reporting Requirements

- FTR: write up confirmed or probable cases that are part of a larger outbreak. (Not necessary to write an FTR for each individual case.)
- AK-STARS: enter all *confirmed* and *probable* cases.
- Fill out trichinellosis form and fax to CDC, available at: http://www.cdc.gov/parasites/trichinellosis/resources/pdf/trichinellosis_case_report_form.pdf

Trichinellosis or Trichinosis *(Trichinella spp.)*

2014 Case Definition

Clinical Description

A disease caused by ingestion of *Trichinella* larvae, usually through consumption of *Trichinella*-containing meat—or food contaminated with such meat—that has been inadequately cooked prior to consumption. The disease has variable clinical manifestations. Common signs and symptoms among symptomatic persons include eosinophilia, fever, myalgia, and periorbital edema.

Laboratory Criteria for Diagnosis

Human Specimens

- Demonstration of *Trichinella* larvae in tissue obtained by biopsy, OR
- Positive serologic test for *Trichinella*

Food Specimens

- Demonstration of *Trichinella* larvae in the food item (probable)

Epidemiologic Linkage

Persons who shared the implicated meat/meal should be investigated and considered for case status as described above.

Criteria to Distinguish a New Case from an Existing Case

Serial or subsequent cases of trichinellosis experienced by one individual should only be counted if there is an additional epidemiologically compatible exposure. Because the duration of antibodies to *Trichinella* spp. is not known, mere presence of antibodies without a clinically-compatible illness AND an epidemiologically compatible exposure may not indicate a new infection especially among persons with frequent consumption of wild game that is known to harbor the parasite.

Case Classification

Suspected

Instances where there is no clinically compatible illness should be reported as suspect if the person shared an epidemiologically implicated meal, or ate an epidemiologically implicated meat product, and has a positive serologic test for trichinellosis (and no known prior history of *Trichinella* infection).

Probable

A clinically compatible illness in a person who shared an epidemiologically implicated meal or ate an epidemiologically implicated meat product.

OR

A clinically compatible illness in a person who consumed a meat product in which the parasite was demonstrated.

Confirmed

A clinically compatible illness that is laboratory confirmed in the patient.

Comment(s)

Epidemiologically implicated meals or meat products are defined as a meal or meat product that was consumed by a person who subsequently developed a clinically compatible illness that was laboratory confirmed.

Negative serologic results may not accurately reflect disease status if blood was drawn less than 3-4 weeks from symptom onset (Wilson et. al, 2006[1]).

Reference(s)

1. Wilson M, Schantz P, Nutman T, 2006. Molecular and immunological approaches to the diagnosis of parasitic infection. Detrick B, Hamilton RG, Folds JD, eds. Manual of Molecular and Clinical Laboratory Immunology. Washington, DC: American Society for Microbiology, 557-568.

Trichinosis

Alaska

☐ Outbreak
☐ Cluster

AK STARS # _____

Date first received by SOE _____ / _____ / _____

OUTREACH/CONTACT LOG (for contact with and/or outreach to the client)

	Method (phone call, letter, home-visit, clinic visit)	**Date** (mm/dd/yyyy)	**Outcome** (Left msg., interviewed, refused, unable to locate, etc.)
1st Outreach/Contact		_____ / _____ / _____	
2nd Outreach/Contact		_____ / _____ / _____	
3rd Outreach/Contact		_____ / _____ / _____	

CASE IDENTIFICATION

Name: _____
last *first* *MI*

Phone(s) Home: _____ Cell: _____

Address: _____
Street *City* *State* *Zip*

Alternate Contact: ☐ Parent/Guardian ☐ Spouse/Partner ☐ Household Member ☐ Other _____

Name: _____
last *first* *MI*

Phone(s) Home: _____ Cell: _____

Address: _____
Street *City* *State* *Zip*

DEMOGRAPHICS

Sex: ☐ Male ☐ Female ☐ _____

Hispanic: ☐ Yes ☐ No ☐ Unknown

DOB: _____ / _____ / _____
mm dd yyyy
Or, if unknown, Age _____

Race:
☐ AI/AN
☐ Asian/Pacific Islander
☐ Black
☐ White
☐ Unknown
☐ Refused to answer
☐ Other _____

CLINICAL DATA

Symptomatic? ☐ Yes ☐ No ☐ Unk

If yes, onset date _____ / _____ / _____
mm dd yyyy
onset time _____ ☐ am ☐ pm

Duration of Illness _____ ☐ hours ☐ days
-OR- ☐ Ongoing

Symptoms:
Eosinophilia ☐ Yes ☐ No ☐ Unk
If yes, specify absolute number or percentage
(#)_____ K/uL or (%)_____
Fever ☐ Yes ☐ No ☐ Unk
Periorbital edema ☐ Yes ☐ No ☐ Unk
Myalgia ☐ Yes ☐ No ☐ Unk

ER Visit? ☐ Yes ☐ No ☐ Unk

Hospitalized? ☐ Yes ☐ No ☐ Unk
If yes, Hospital name: _____
Admit date _____ / _____ / _____
mm dd yyyy
Discharge date _____ / _____ / _____
mm dd yyyy
-OR- ☐ Still inpatient ☐ Unknown

Outcome: ☐ Survived ☐ Died (Date: ___ / ___ / ____) ☐ Unk

Does the case know others with similar illness? ☐ Yes ☐ No ☐ Unk

If yes, indicate name of individual, relationship to case, onset of illness, and relevant symptoms: _____
_____
_____
_____
attach a second sheet if needed

CASE NAME: _____ AK STARS # _____

INTERVIEW

Interview questions are asked for the 60 days prior to interview.
Symptoms often occur within 2 weeks after eating contaminated meat, and can last up to 8 weeks.

All yes answers require additional details.
If you have a yes answer to any exposure/consumption question, please provide relevant details in the comments section.

High Risk Foods

Yes	No	Unk		Yes	No	Unk	
☐	☐	☐	Bear	☐	☐	☐	Pork/wild boar
☐	☐	☐	Fox	☐	☐	☐	Walrus
☐	☐	☐	Lynx	☐	☐	☐	Seal
☐	☐	☐	Moose	☐	☐	☐	Other game (specify: _____)
				☐	☐	☐	Raw/undercooked meat of any type

Date consumed _____ / _____ / _____
mm dd yyyy

* If more than 1 type of game meat was consumed, indicate dates of consumption for each type in details section.

Are there leftovers available for testing? ☐ Yes ☐ No ☐ Unk

*Contact SOE for details on food specimen testing

Where did the meat(s) come from and when? _____

Were the game meat products shared with others? ☐ Yes ☐ No ☐ Unk

Travel Exposure

Yes	No	Unk	
☐	☐	☐	Outside the U.S.
☐	☐	☐	Outside Alaska
☐	☐	☐	Within Alaska

If yes to any of the above,
Include dates and location of travel(s):

_____
_____
_____
_____
_____
_____
_____

If **yes** to any of the above questions, provide details here:
(e.g. "Bear ✓ Yes ☐ No ☐ Unk," relevant details: black bear, case shot, ate while hunting, cooked over fire, ate with 3 hunting partners)

_____
_____
_____
_____
_____
_____
attach a second sheet if needed

Restaurants/takeout during exposure period?	**Social events (parties, weddings, etc.) during exposure period?**
☐ Yes ☐ No ☐ Unk	☐ Yes ☐ No ☐ Unk

If yes to either restaurants or social events, indicate the following:
name of restaurant/event, when, where, foods eaten, if others in attendance became ill.

_____
_____
_____
_____
_____
attach a second sheet if needed

Where were the groceries eaten during the exposure period bought? If unknown, where does client normally buy groceries?
Store name(s) and location(s):_____
_____
_____
attach a second sheet if needed

SUMMARY

Intervention(s): ☐ Hygiene education provided ☐ Health education provided ☐ Child care restriction
☐ Work or school restriction ☐ Other: _____

Completed by _____ Phone _____ Completed Case Report ___ / ___ / ___

Alaska Division of Public Health

Prevention Promotion Protection

Trichinellosis (Trichinosis) Fact Sheet

(Source: CDC: http://www.cdc.gov/parasites/trichinellosis/gen_info/faqs.html)

What is Trichinellosis, also called trichinosis?

Trichinellosis, also called trichinosis, is caused by eating raw or undercooked pork and wild game products infected with the larvae of a species of worm called *Trichinella*. Infection occurs worldwide. In Alaska, trichinellosis is mainly associated with eating undercooked meat from bears, walruses, or seals.

What are the symptoms of a trichinellosis infection?

Nausea, diarrhea, vomiting, fatigue, fever, and abdominal discomfort are the first symptoms of trichinellosis. Headaches, fevers, chills, cough, eye swelling, aching joints and muscle pains, itchy skin, diarrhea, or constipation follow the first symptoms. If the infection is heavy, patients may experience difficulty coordinating movements, and have heart and breathing problems. In severe cases, death can occur. For mild to moderate infections, most symptoms subside within a few months. Fatigue, weakness, and diarrhea may last for months.

How soon after infection will symptoms appear?

Abdominal symptoms can occur 1-2 days after infection. Further symptoms usually start 2-8 weeks after eating contaminated meat. Symptoms may range from very mild to severe and relate to the number of infectious worms consumed in meat. Often, mild cases of trichinellosis are never specifically diagnosed and are assumed to be common illnesses.

How does infection occur in humans and animals?

When a human or animal eats meat that contains infective *Trichinella* cysts, the acid in the stomach dissolves the hard covering of the cyst and releases the worms. The worms pass into the small intestine and, in 1-2 days, become mature. After mating, adult females lay eggs. Eggs develop into immature worms, travel through the arteries, and are transported to muscles. Within the muscles, the worms curl into a ball and encyst (become enclosed in a capsule). Infection occurs when these encysted worms are consumed in meat.

Am I at risk for trichinellosis?

If you eat raw or undercooked meats, particularly pork, bear, wild feline (such as a cougar), fox, dog, wolf, horse, seal, or walrus, you are at risk for trichinellosis. It's also important to ensure that items, i.e., cutting boards, knives, etc. that come into contact with the raw meats are thoroughly cleaned so they cannot contaminate other foods.

Can I spread trichinellosis to others?
No. Infection can only occur by eating raw or undercooked meat containing *Trichinella* worms.

What should I do if I think I have trichinellosis?
See your healthcare provider who can order tests and treat symptoms of trichinellosis infection. You should tell your health care provider if you have eaten raw or undercooked meat.

How is trichinellosis infection diagnosed?
Most commonly a blood test can show if you have trichinellosis.

How is trichinellosis infection treated?
Persons should discuss treatment decisions with their health care provider.

Is trichinellosis common?
Infection used to be more common and was usually caused by ingestion of undercooked pork. However, infection is now relatively rare. During 2008–2010, 20 cases were reported per year on average. The number of cases decreased beginning in the mid-20th century because of legislation prohibiting the feeding of raw-meat garbage to hogs, commercial and home freezing of pork, and the public awareness of the danger of eating raw or undercooked pork products. Cases are less commonly associated with pork products and more often associated with eating raw or undercooked wild game meats. In Alaska, there has been a yearly average of less than two cases for the past 10 years.

How can I prevent trichinellosis?
- Cook meats until the juices run clear or to an internal temperature of 170^{o} F.
- Freeze pork less than 6 inches thick for 20 days at 5^{o} F to kill any worms.
- Cook wild game meat thoroughly. *Freezing wild game meats, unlike freezing pork products, even for long periods of time, will not effectively kill all worms.*
- Cook all meat fed to pigs or other wild animals.
- Clean meat grinders thoroughly if you prepare your own ground meats.
- Curing (salting), drying, smoking, or microwaving meat does not consistently kill infective worms.

For more information:
See the U.S. Centers for Disease Control and Prevention's (CDC) website:
http://www.cdc.gov/parasites/trichinellosis/index.html