

Trichinosis (Trichinellosis) Investigation Guideline

CONTENT:

VERSION DATE:

Investigation Protocol:

- Investigation Guideline 05/2014
- Trichinosis Rapid Assessment Worksheet 09/2011

Supporting Materials found in attachments:

- Fact Sheet 05/2014

Revision History:

Date	Replaced	Comments
05/2014	01/2010	Added notification section
02/2012	-	Removed references to KS-EDSS.

Trichinosis (Trichinellosis)

Disease Management and Investigative Guidelines

CASE DEFINITION (CDC 1996)

Clinical Description for Public Health Surveillance:

- A disease caused by ingestion of *Trichinella* larvae. The disease has variable clinical manifestations. Common signs and symptoms among symptomatic persons include eosinophilia, fever, myalgia, and periorbital edema.

Laboratory Criteria for Case Classification:

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

Case Classification:

- **Confirmed:** A clinically compatible case that is laboratory confirmed.
- **Probable:** Laboratory confirmed only. (KDHE definition for internal data management)

LABORATORY ANALYSIS

Laboratory confirmation is commonly made by detection of *Trichinella* specific antibodies in serum drawn at least 3 weeks after infection or identification of *Trichinella* larvae in a skeletal muscle biopsy specimen taken at least two weeks after infection.

Specimens are not required to be sent to the Kansas Health and Environmental Laboratory (KHEL); but they are equipped to test for *Trichinella* if requested.

- BEFORE sending, contact KHEL at 785-296-3718 (smear) or 785-296-1653 (serology).
- Additional information can be found in an on-line reference guide at www.kdheks.gov/labs/lab_ref_guide.htm

EPIDEMIOLOGY

Trichinellosis occurs worldwide affecting all age groups and is dependent upon the local customs of eating and preparing pork or wild animal meat. Pork and pork products (including ground beef to which pork has been added) are the most likely source. Up to 30% of domestic cases are related to the ingestion of wild game meat. Cases are usually sporadic and outbreaks localized.

DISEASE OVERVIEW

A. Agent:

Caused by the intestinal roundworm, *Trichinella spiralis* (found worldwide in many carnivorous and omnivorous animals). Other species now recognized, including *T. pseudospiralis* (mammals and birds worldwide), *T. nativa* (Arctic bears), *T. nelsoni* (African predators and scavengers), and *T. britovi* (carnivores of Europe and western Asia).

B. Clinical Description:

Light infections may be asymptomatic. Intestinal invasion can be accompanied by gastrointestinal symptoms (diarrhea, abdominal pain, vomiting). Larval

migration into muscle tissues (one week after infection) can cause periorbital and facial edema, conjunctivitis, fever, myalgia, splinter hemorrhages, rashes, and blood eosinophilia. Larval encystment in the muscles causes myalgia and weakness. Occasional life-threatening manifestations include myocarditis, central nervous system involvement, and pneumonitis.

C. Reservoirs:

Swine, dogs, cats, horses, rats and many wild animals, including fox, wolf, bear, polar bear, wild boar and marine mammals in the Arctic.

D. Mode(s) of Transmission:

Infection is acquired by ingesting meat containing cysts (encysted larvae) of *Trichinella*. Rats and rodents are primarily responsible for maintaining the endemicity of this infection. Carnivorous/omnivorous animals, such as pigs or bears, feed on infected rodents or meat from other animals. Humans are accidentally infected when eating improperly processed meat of these carnivorous animals (or eating food contaminated with such meat).

E. Incubation Period:

GI symptoms: 1-2 days after ingestion. Systemic symptoms: 8-15 days, with range 5-45 days depending on the number of cysts ingested.

F. Period of Communicability:

It is not transmissible from person-to-person. Animal hosts may remain infective for months and meat from these animals remains infective until sufficient cooking, freezing or irradiation kills the larvae.

G. Susceptibility and Resistance:

Universal susceptibility. Infection often results in partial immunity.

H. Treatment:

Corticosteroids may be given for severe symptoms plus albendazole or mebendazole. Neither albendazole nor mebendazole is effective for *Trichinella* larvae already in the muscles, and neither drug is approved by the US Food and Drug Administration (FDA) for trichinellosis.

NOTIFICATION TO PUBLIC HEALTH AUTHORITIES

Trichinellosis shall be designated as infectious or contagious in their nature, and cases or suspect cases shall be reported within seven days:

1. Health care providers and hospitals: report to the local public health jurisdiction or KDHE-BEPHI (see below)
2. Local public health jurisdiction: report to KDHE-BEPHI (see below)
3. Laboratories: report to KDHE-BEPHI (see below)

**Kansas Department of Health and Environment (KDHE)
Bureau of Epidemiology and Public Health Informatics (BEPHI)**

Phone: 1-877-427-7317

Fax: 1-877-427-7318

Further responsibilities of state and local health departments to the CDC:

As a nationally notifiable condition, trichinellosis cases require a STANDARD report to the Center of Disease Control and Prevention (CDC).

- **Local public health jurisdiction** will report information requested on the disease reporting forms as soon as possible, completing the forms within 7 days of receiving a notification of a report.
- KDHE-BEPHI will file an electronic case report the next regularly scheduled electronic transmission.
(KDHE-BEPHI files electronic reports weekly with CDC.)

INVESTIGATOR RESPONSIBILITIES

- 1) Use current [case definition](#), to confirm diagnosis with the medical provider.
- 2) Conduct [case investigation](#) to identify potential source of infection.
- 3) Conduct [contact investigation](#) to locate additional cases and/or contacts.
- 4) Identify whether the source of infection is major public health concern.
- 5) Initiate control and prevention measures to prevent spread of disease.
 - Work with proper regulatory authorities for commercial food products.
 - Hold suspected food products for possible laboratory analysis.
 - Prohibit further use of the potentially contaminated product.
- 6) Complete and report all information requested in EpiTrax.
- 7) As appropriate, use notification letter(s) and the disease fact sheet to notify the case, contacts and other individuals or groups.

STANDARD CASE INVESTIGATION AND CONTROL METHODS

The [Rapid Assessment Worksheet](#) helps organize and collect important data.

Case Investigation

- 1) Contact the medical provider who reported or ordered testing of the case to obtain the following from the patient's medical records.
 - Identify if the patient was ill with symptoms of trichinellosis.
 - If yes, record onset date of illness
 - Record symptoms.
 - Examine the laboratory testing that was done and determine if further laboratory testing is needed.
 - Collect case's demographic data and contacting information (birth date, county, sex, race/ethnicity, address, phone number(s))
 - Record hospitalizations: location and duration of stay
 - Note complications.
 - Record outcomes: survived and date of recovery or date of death
- 2) Interview the case to determine source, risk factors and transmission settings:
 - Focus on incubation period 1 to 45 days prior to symptoms.
 - Examine any exposure to pork or pork products, ground beef or wild game meat, including jerky.

- Obtain dates of exposure.
 - Source of product.
 - Method of food preparation.
 - Examine travel history, destinations and dates of exit and entry to Kansas.
 - Determine if the case's occupation or activities may have resulted in contact with any of the at-risk food or animal tissues listed above.
 - Collect information from case for the [Contact Investigation](#). (See below).
 - For suspected food items that are still available for consumption, refer to [Environmental Measures](#) below.
- 3) Investigate epi-links among cases (clusters, household, co-workers, etc).
- For suspected [outbreaks](#) refer to [Managing Special Situations](#).

Contact Investigation

Contacts are those exposed to the source of infection.

- 1) Identify persons who participated with the case in any of the at-risk activities listed above and contact them.
- 2) Evaluate each contact's risk of exposure to the source and determine if they are symptomatic. Symptomatic contacts should be reported as cases.

Isolation, Work and Daycare Restrictions

Trichinellosis is not considered for quarantine or isolation under Kansas Administrative Code. All regulations or statutes pertaining to the distribution or sale of meat products are overseen by the [Kansas Department of Agriculture](#).

Case Management

- 1) Report on any changes in patient status (i.e. dates of recovery or death).
- 2) Provide education on the basic information about the disease and prevention.

Contact Management

- 1) Inform contacts of possible exposure, to aid in proper diagnosis and treatment.
- 2) Investigate symptomatic contacts as suspect cases.

Environmental Measures

If the source of infection is food prepared privately for home use only, it should be disposed of properly, not allowing humans or animals to eat the food.

If the source is suspected to be livestock for slaughter, a licensed or unlicensed wild game meat processor, a processing plant for pork products or a public food distributor or facility (i.e. restaurant):

- 1) Hold any suspected leftover food for possible testing.
- 2) Notify the Kansas Department of Agriculture (KDA) through KDHE (1-877-427-7317) who will assist with the notification and coordination with the KDA.
- 3) Assist the KDA, as needed, on any trace backs, embargoes or product testing.

For a possible [outbreak](#) situation, it may be necessary to test leftover product as part of the epidemiological investigation. Refer to [Managing Special Situations](#).

Education

Consumers should be informed of proper storage and preparation of pork and other meats from animals possible infected with *Trichinella*. Groups whose food preferences include raw or inadequately cooked pork or wildlife are at a higher risk of trichinosis. Non-English materials may need to be prepared for certain groups.

- 1) Provide education that includes basic information about the disease and its complications and ways to treat and prevent transmission of illness.
- 2) Instruct those at risk to:
 - Cook meat products to an internal temperature of 170° F.
 - Freeze pork less than 6 inches thick for 20 days at 5° F to kill any worms.
 - Cook wild game meat thoroughly. Freezing wild game meats, unlike pork products, even for long periods of time, may not effectively kill all worms.
 - Cook all meat fed to pigs or other wild animals.
 - Do not allow hogs to eat uncooked carcasses of other animals, including rats, which may be infected with trichinosis.
 - Clean meat grinders thoroughly if you prepare your own ground meats.
 - Curing (salting), drying, smoking, or microwaving meat does not consistently kill infective worms.
 - Counsel contacts to watch for signs or symptoms occurring within 45 days of exposure. Should symptoms develop, medical care should be sought.

MANAGING SPECIAL SITUATIONS

A. Outbreak Investigation:

- 1) Outbreak: Cases are usually sporadic and outbreaks localized and often result from eating raw or under-cooked pork and/or meat from wild animals. The investigator should consider the possibility of an outbreak when there is an unusual clustering of cases in time and/or space.
- 2) Notify KDHE immediately, 1-877-427-7317.
- 3) Hold suspected food products for possible laboratory analysis as part of the epidemiological investigation.
- 4) Case finding will be an important part of any investigation.

DATA MANAGEMENT AND REPORTING TO THE KDHE

A. Organize and collect data.

B. Report data via the state electronic surveillance system.

- Especially data that collected during the investigation that helps to confirm or classify a case.
- Including the Trichinosis specific data collected on the Rapid Assessment Worksheet.

Note: The [Rapid Assessment Worksheet](#) is a one page data collection tool to aid the local investigator in identifying the essential data that should be collected with every investigation.

ADDITIONAL INFORMATION / REFERENCES

- A. **Treatment / Differential Diagnosis: American Academy of Pediatrics.** 2009 Red Book: Report of the Committee on Infectious Disease, 28th Edition. Illinois, Academy of Pediatrics, 2009.
- B. **Epidemiology, Investigation and Control:** Heymann. D., ed., Control of Communicable Diseases Manual, 19th Edition. Washington, DC, American Public Health Association, 2009.
- C. **Case Definitions:** CDC Division of Public Health Surveillance and Informatics, Available at: wwwn.cdc.gov/NNDSS/
- D. **Kansas Regulations/Statutes Related to Infectious Disease:** www.kdheks.gov/epi/regulations.htm
- E. **Additional Information (CDC):** www.cdc.gov/health/default.htm
 - www.cdc.gov/ncidod/dpd/parasites/trichinosis/default.htm

ATTACHMENTS

- **Factsheet**

To view attachments in the electronic version:

1. Go to <View>; <Navigation Pane>; <Attachments> – OR – Click on the “Paper Clip”  icon at the left.
2. Double click on the document to open.

Trichinosis Rapid Assessment Worksheet for the Local Investigator

(Please refer to the Disease investigation Guideline for additional guidance.)

SYMPTOMS(S)	Unk.	No	Yes	Onset Date	SYMPTOMS(S)	Unk.	No	Yes	Onset Date
Eosinophilia					Diarrhea				
Fever					Abdominal Pain				
Myalgia					Vomiting				
Periorbital edema					List any other symptoms of trichinosis present:				
Facial edema									
If available, record recovery date:									

Record the earliest symptom onset associated to trichinosis on the General Investigation Form. Describe signs and symptoms in NOTES. For GI symptoms, consider at-risk activities 1-2 days before onset. For systematic symptoms, consider at-risk activities 5-45 days before onset.

LABORATORY TESTING	Collection Date	Results	Notes
Serological evidence of trichinosis		Positive / Negative	
Microscopy evidence of trichinosis		Positive / Negative	

Laboratory results are entered into KS-EDSS by KDHE staff. To view go to laboratory tab. If no results are entered attempt to collect any results and fax to the KDHE for entry.

COMPLICATIONS	Unk.	No	Yes	Date(s)	Location(s)
Hospitalized					
Myocarditis					
Central nervous system involvement					
Pneumonitis					
Died					

Record information on hospitalization on the General Investigation Form Hospital Information Section. Record information on other complications in NOTES.

RISK ASSESSMENT	No	Yes	NOTES
Travel outside of the state.			<i>Destination, date of departure, date of return</i>
Handled or ate raw/under-cooked pork or pork products.			<i>Type, date of exposure, brand/source, how food was prepared. and cooked</i>
Handled or ate raw/under-cooked hamburger or wild game meat including jerky.			<i>Type, date of exposure, brand/source, how food was prepared. and cooked</i>
Any of the at-risk foods above eaten or obtained from a commercial source?			<i>Location/description of source and date food obtained.</i>
At-risk occupations or hobbies.			<i>Describe, including date of exposure</i>
Anyone else ill with similar symptoms?			<i>List who, relation to case, contact info and symptoms.</i>