

Trichinosis Investigation Guideline

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Trichinosis

Disease Management and Investigative Guidelines

CASE DEFINITION

A. 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.

B. Laboratory Criteria for Diagnosis:

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

C. Case Classification:

Confirmed: A clinically compatible case that is laboratory confirmed.

D. Laboratory Tests:

Isolates are not required to be sent to the State Public Health Laboratory; however, they are equipped to test for trichinosis if requested.

- Laboratory Kit: Parasitology.
- Specimen: Serum.
- Amount: 3-5 ml.
- Remarks: For additional information and/or questions concerning isolate collection, sample transport and laboratory kits call (785) 296-1620. An online manual of laboratory tests is available at <http://www.kdhe.state.ks.us/labs/links.html>

E. Bioterrorism Potential:

None.

F. Outbreak Definition:

Cases are usually sporadic and outbreaks localized and often result from eating raw or under-cooked pork and/or meat from Arctic mammals. The investigator should consider the possibility of an outbreak when there is an unusual clustering of cases in time and/or space.

INVESTIGATOR RESPONSIBILITIES

A. Investigation Tasks and Activities:

- Conduct an epidemiological investigation to identify the possible source of infection and to locate additional cases and/or contacts in the community.
- Identify the source of infection (e.g., pork, wild game, etc.) and prevent further transmission.

- Hold any suspected food products (e.g., pork, wild game, etc.) for possible laboratory analysis; prohibit further use of the potentially contaminated product.
- Identify contacts that may have been exposed to the source of infection and refer them for proper therapy.
- Report all confirmed cases to the Bureau of Epidemiology & Disease Prevention, using established methods.

B. Notifications:

- There are no special notifications or additional reporting requirements.
- Mail or deliver notification letter and/or disease fact sheet to case, contacts and other appropriate individuals or groups (if appropriate and/or requested).

EPIDEMIOLOGY

Trichinosis occurs worldwide affecting all age groups and is dependent upon the local customs of eating and preparing pork or wild animal meat. Cases are usually sporadic and outbreaks localized.

DISEASE OVERVIEW

A. Agent:

Trichinosis is caused by the intestinal roundworm, *Trichinella spiralis*, whose larvae migrate to and become encapsulated in muscles.

B. Clinical Description:

Trichinosis symptoms can range from asymptomatic to fulminating fatal disease and is dependent upon the infective dose. Symptoms become apparent when the *T. spiralis* larvae attach themselves to the intestinal mucosa and again when they migrate from the intestinal tract and become encapsulated in the muscles. Symptoms include: edema of upper eyelids, gastrointestinal symptoms (diarrhea), muscle soreness and weakness, fever, respiratory and neurological abnormalities, and myocardial failure.

- **Differential Diagnosis:** Other illnesses including collagen disorders and systemic illnesses with varied manifestations.

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:

Ingesting raw or insufficiently cooked meat containing encysted larvae of *T. spiralis*. Pork and pork products are the most likely source. Up to 30% of domestic cases are related to the ingestion of meat from wild game animals.

E. Incubation Period:

Average 10-14 days; range 1- 45 days.

F. Period of Communicability:

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

G. Susceptibility and Resistance:

Universal susceptibility. Infection often results in partial immunity.

H. Treatment:

Treatment of choice is mebendazole or albendazole. Corticosteroids may be given in severe cases of cardiac or central nervous system disease, but may delay the elimination of the adult worms from the intestine.

STANDARD CASE INVESTIGATION AND CONTROL METHODS

Standard investigation activities include the following: 1) Confirmation of the diagnoses (*i.e.*, case definition), 2) Collection of relevant demographic and clinical data (*e.g.*, age, sex, disease syndromes and/or symptoms), 3) Determination of the setting (*e.g.*, community, hospital, daycare or other facility), and 4) Investigation of possible epidemiologic links among cases (*e.g.*, cluster, household, co-workers, etc). This can be accomplished by completing the appropriate sections of the Trichinosis investigation form. Most of the information can be obtained from the case person, healthcare provider and/or the medical record. The investigator may want to also review previously reported cases in the region and/or state. Additional investigation activities include:

A. Identify Potential Source of Infection:

To help identify the source of the infection, the investigator should focus their investigation within the incubation period and on the following potential source(s) of infection.

- Identify meats eaten by the case during month prior to onset, including: pork or pork products and/or wild game. Include dates, places and preparation of home or commercial food.
- Identify others eating suspected foods. Include names, addresses and phone numbers.
- Investigate the possibility of an unlicensed meat source and/or slaughterhouse.
- Investigate any ethnic foods purchased and/or consumed.

B. Identify Potential Exposed Individuals / Populations (Contacts):

Contacts are defined as those that may have eaten the implicated meat(s) identified during the investigation. Contacts are not individuals in close contact with the case, as trichinosis is not transmitted person-to-person.

C. Isolation, Work and Daycare Restrictions:

None.

D. Follow-up of Cases:

None.

E. Protection of Contacts:

Contacts should be encouraged to visit their health care provider for a medical examination and to discuss treatment options.

F. Environmental Measures:

Determine if commercial food is implicated or if suspected noncommercial source is still available for consumption. Hold any suspected food products for possible laboratory analysis. Prohibit further use of the contaminated product.

G. Education:

- Thoroughly cook pork, pork products and wild game until the meat is no longer pink and all parts of the meat reach an internal temperature of at least 160°F (71°C).
- Freezing pork for 10 days at -10°F (-23°C) will kill the larvae, but freezing wild game meats may leave some larvae alive.
- Hunters should thoroughly cook all meats from wild animals. Curing (salting), drying, smoking, or microwaving meat does not consistently kill infective larvae. Meat products should be processed by heating, freezing or irradiation prior to drying or smoking for jerky.
- Cook any meat fed to pigs and/or other animals. Hogs should not be allowed to eat uncooked carcasses of other animals.
- Grind pork in a separate grinder and thoroughly disinfect the grinder between different products.

MANAGING SPECIAL SITUATIONS

A. Suspected Outbreak:

If you suspect an outbreak, investigate to determine the source of infection and possible mode of transmission. Common vehicles (*e.g.*, pork, wild game, etc.) should be sought and applicable preventive or control measures instituted (*i.e.*, removing the implicated food from the environment). Consult with the KDHE epidemiologist on-call at 877-427-7317 as they can perform surveillance for cases across county lines and assist in the identification of additional cases.

ADDITIONAL INFORMATION / REFERENCES

- American Academy of Pediatrics. 2003 Red Book: Report of the Committee on Infectious Disease, 26th Edition. Illinois, Academy of Pediatrics, 2003.
- Heymann. D., ed., Control of Communicable Diseases Manual, 18th Edition. Washington, DC, American Public Health Association, 2004.

- Case definitions for Infectious Conditions Under Public Health Surveillance, Division of Public Health Surveillance and Informatics, Nationally Notifiable Infectious Diseases, United States 2005. Available at: <http://www.cdc.gov/epo/dphsi/PHS/infdis2005.htm>
- Kansas Department of Health and Environment, Bureau of Epidemiology. Disease Protocols, 2001.
- County of Los Angeles, Department of Health, Public Health Programs and Services, Communicable Diseases Manual, June 2003.
- Oklahoma State Department of Health, Communicable Diseases Division. The Epidemiologic Follow-up of Communicable Diseases in Oklahoma, 2001.
- Missouri Department of Health and Senior Services, Section of Communicable Disease Control & Veterinary Public Health, Communicable Disease Investigation Reference Manual. 2001.
- Oregon Health Services Website. Available at <http://www.ohd.hr.state.or.us>
- Commonwealth of Massachusetts, Department of Public Health Website. Available at <http://www.state.ma.us/dph/>
- CDC Website. Available at <http://www.cdc.gov/health/default.htm>

Trichinosis

Case # _____

- Confirmed
 Probable
 Suspect

Report Source

Lab Hospital Physician / HCP Other _____

Reporter Name _____

Primary M.D. / HCP _____

County _____

Report Date / / Phone () - Phone () -

Case Identification

Name: _____
Last First InitialAddress: _____
Street CityZip: - Phone: () - Alternative Contact: Parent Spouse Other _____Name: _____
Last First InitialPhone: () -

Workplace / School / Daycare: _____

Occupation / Grade: _____

Demographics

Gender: Male FemaleBirth Date: / / Or if unknown, Age:

Race:

- White Black Asian
 American Indian / Alaska Native
 Native Hawaiian / Pacific Islander

Hispanic / Latino: Yes No

Clinical Information

Clinical Data Onset date / / Diagnosis date / / Illness duration: days

Signs and Symptoms

Y N UNK N/A

- Eosinophilia
 Periorbital edema
 Myalgia
 Fever Temperature . F / C
 Other, Specify _____
 Other, Specify _____

Hospitalization

Y N UNK N/A

- Hospitalized for this illness

Hospital name _____

Admit date / / Discharge date / /

Y N UNK N/A

- Died from illness Death date / /
 Autopsy

Laboratory Data

Collection date / /

Y N UNK N/A

- Muscle Biopsy Results _____
 Larve in suspect food
 Serologic Findings Date / / Test Type _____ Serum Titer _____
Date / / Test Type _____ Serum Titer _____

Notes: _____

Medication, Treatment, and/or Medical Procedures

Infection Timeline

EXPOSURE PERIOD

Enter onset date in heavy box.
Count forward and backward to
calculate probable exposure
and contagious periods.



Exposure

Suspect Food

- Pork Type _____
- Non Pork Type _____
- Unknown

Y N UNK N/A

- Meat obtained from
 - Supermarket-Grocery Store
 - Butcher Shop
 - Direct from Farm
 - Hunted or Trapped
 - Restaurant
 - Other specify _____
 - Unknown

Y N UNK N/A

- Preparation after purchase
 - No further processing
 - Ground
 - Smoked
 - Dried jerky
 - Marinated
 - Other specify _____
 - Unknown
- Method of Cooking
 - Uncooked
 - Fried
 - Open-Fire Roasting
 - Other specify _____
 - Unknown

Notes: _____

Epi-Linkage

During the exposure period, was the case...

Y N UNK N/A

- Associated with a known outbreak?
- A close contact of a confirmed or probable case?

Has the initial case been reported? Yes No

Specify nature of contact: Household Sexual

Daycare Other _____

If yes to any question, specify relevant names days, places, etc:

Notes: _____

- Case could not be interviewed
- No risk factors or exposures could be identified

Most likely exposure/site: _____ Site name/address: _____

Where did exposure probably occur? In State, County: _____ Out of state Not in US UNK

Contact Management and Follow-up

Name: _____
Last First Initial

Address: _____
Street City
Zip: - Phone: ()-

Date of Birth //

Exhibiting Signs/Symptoms: Yes No

Contact Type: Household Sexual

Daycare Other _____

Call Back Date: // N/A

Name: _____
Last First Initial

Address: _____
Street City
Zip: - Phone: ()-

Date of Birth //

Exhibiting Signs/Symptoms: Yes No

Contact Type: Household Sexual

Daycare Other _____

Call Back Date: // N/A

Name: _____
Last First Initial

Date of Birth [][] / [][] / [][][][]

Exhibiting Signs/Symptoms: Yes No

Address: _____

Contact Type: Household Sexual

Street City
Zip: [][][][] - [][][][] Phone: ([][][]) [][][] - [][][][]

Daycare Other _____

Call Back Date: [][] / [][] / [][][] N/A

Name: _____
Last First Initial

Date of Birth [][] / [][] / [][][][]

Exhibiting Signs/Symptoms: Yes No

Address: _____

Contact Type: Household Sexual

Street City
Zip: [][][][] - [][][][] Phone: ([][][]) [][][] - [][][][]

Daycare Other _____

Call Back Date: [][] / [][] / [][][] N/A

Name: _____
Last First Initial

Date of Birth [][] / [][] / [][][][]

Exhibiting Signs/Symptoms: Yes No

Address: _____

Contact Type: Household Sexual

Street City
Zip: [][][][] - [][][][] Phone: ([][][]) [][][] - [][][][]

Daycare Other _____

Call Back Date: [][] / [][] / [][][] N/A

Notes: _____

Public Health Issues

- Y N UNK N/A
- Identified food eaten at public gathering
 - Unlicensed meat source / slaughterhouse
 - Outbreak related
 - Other, specify: _____

Public Health Actions

- Risk education provided
- Meat source / Slaughterhouse inspection
- Initiate contact investigation
- Other, specify: _____
- Other, specify: _____

Additional Comments

Administration

Estimated investigation time (hrs) [][] . [][]

Investigator name _____ Phone ([][][]) [][][] - [][][][]

Signature _____ Investigation complete date [][] / [][] / [][][][]

Trichinosis Investigation and Documentation Checklist

TASK	DATE	INITIALS
Report Received:	___/___/___	_____
Assigned to Investigator:	___/___/___	_____
Reported to State Surveillance System:	___/___/___	_____
Met Case Definition: <input type="checkbox"/> Yes <input type="checkbox"/> No	___/___/___	_____
Biologic Sample to State Laboratory: <input type="checkbox"/> Yes <input type="checkbox"/> No	___/___/___	_____
Case Interviewed: MOGE: <input type="checkbox"/> Yes <input type="checkbox"/> No Reason: _____	___/___/___	_____
Contacts Identified and/or Interviewed: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> None If Yes, Name(s): _____	___/___/___	_____
<hr/>		
Food Source Identified and/or Impounded: <input type="checkbox"/> Yes <input type="checkbox"/> No	___/___/___	_____
Letter and Information Sheet Sent:	___/___/___	_____
Completed Investigation Worksheet:	___/___/___	_____
Case Closed and Filed:	___/___/___	_____
Comments: _____		

Case Name: _____ **Number:** _____

Principal Investigator: _____ **Date:** ___/___/___

Case Reviewed By: _____ **Date:** ___/___/___

KANSAS NOTIFIABLE DISEASE FORM

Today's Date: ___ / ___ / ___

Patient's Name: _____
Last First Middle

Day Phone: _____ Evening Phone: _____

Residential Address: _____

City: _____ Zip: _____ County: _____

Ethnicity: Hispanic or Latino Not Hispanic or Latino Unknown

Race: American Indian/Alaska Native Asian Black or African American
Native Hawaiian or Other Pacific Islander White Unknown
(Circle all that apply)

Sex: M F Date of Birth: ___ / ___ / ___ Age if DOB unknown: _____

Disease Name: _____

Symptoms:
Onset: ___ / ___ / ___ State the 3 most prominent symptoms:

Symptom 1: _____ Symptom 2: _____ Symptom 3: _____

Outbreak associated? Y N Died? Y N

Institutional Residence? None Nursing Home Correctional Residential Hospital Psych

Physician Name: _____ Physician Phone: _____

Laboratory Information:

Specimen Collection Date: ___ / ___ / ___ Date Reported To You: ___ / ___ / ___

Name of Test Performed: _____ Results of Test: _____

Name of Laboratory: _____ Laboratory Results Attached? Y N

Treatment Information:

Date of Treatment: ___ / ___ / ___ Treatment Type and Dosage: _____
Treatment Status: Complete On-going Discontinued

Name of person reporting: _____ Phone: _____

Comments: _____

Mail reports to your local health department or to: BEDP – Disease Surveillance, 1000 SW Jackson, Suite 210, Topeka, KS 66612-1274. Reports can also be *faxed toll free* to: 1-877-427-7318. (Rev. 04/2004)

Date: _____

Dear: _____,

I am writing in regards to some recent laboratory test results that you should have received. I work with the Local Health Department and as part of my job I provide information and answer questions about certain diseases that are reported to us.* I would like to speak to you about your laboratory tests and provide information to you as well as to obtain some additional information about your results. Everything we receive from you or your healthcare provider is **STRICTLY CONFIDENTIAL**. The purpose for collecting this information is to educate patients and to collect information for public health planning and support our disease prevention activities.

Please contact me at your earliest convenience so that we may discuss this matter further. If your healthcare provider has not yet discussed this with you, I would encourage you to make an appointment or call them as soon as possible.

I look forward to discussing this matter with you and will be happy to answer any questions that you may have regarding this investigation at that time. My telephone number is _____. Thank you in advance for your assistance.

Sincerely,

Investigator Name, Title

Phone #

Address Line 1

Address Line 2

City, State Zip Code

*The Kansas Department of Health and Environment (KDHE) has the authority to define what diseases are of public health importance and to require the reporting of such diseases. Under this authority KDHE has established regulations making certain diseases reportable (K.S.A. 65-118 and K.S.A. 65-128, and amendments thereto). These regulations outline reporting requirements and control measures that apply to both confirmed cases of such diseases and contacts of confirmed cases. Local health departments are required to collect information for the KDHE and implement control measures.

Date: _____

Dr: _____,

I am writing to you in regards to your patient, _____. The Health Department recently received notice that this patient may have been diagnosed with _____, which is a reportable disease under State rules and regulations. The Health Department routinely contacts patients with reportable diseases to gain more information, provide education, and make necessary referrals and support. In order to do this, I would like to speak to you regarding the laboratory results and risk history of this patient.

Please contact me at your earliest convenience so that we may obtain the information required for this report. If it is more convenient for you to fill out the report form on your own and mail or fax it to me, please feel free to do so. I have enclosed a copy of it with this letter. I would also like to remind you that during our investigation we may be contacting your patient directly, it is strongly recommended that you contact your patient to discuss this diagnosis and inform them of our investigation. All of the information that we obtain from either you or your patient is **STRICTLY CONFIDENTIAL**.

I look forward to discussing this matter with you and will be happy to answer any questions that you may have regarding this investigation at that time. My telephone number is _____. Thank you in advance for your assistance.

Sincerely,

Investigator Name, Title
Phone #
Fax #
Address Line 1
Address Line 2
City, State Zip Code

*The Kansas Department of Health and Environment (KDHE) has the authority to define what diseases are of public health importance and to require the reporting of such diseases. Under this authority KDHE has established regulations making certain diseases reportable (K.S.A. 65-118 and K.S.A. 65-128, and amendments thereto). These regulations outline reporting requirements and control measures that apply to both confirmed cases of such diseases and contacts of confirmed cases. Local health departments are required to collect information for the KDHE and implement control measures.

	Public Health Fact Sheet Trichinosis
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What is trichinosis?

Trichinosis is a foodborne disease caused by eating raw or undercooked meat of animals infected with the larvae of a roundworm called *Trichinella*. Infection occurs commonly in certain wild carnivorous (meat-eating) animals but may also occur in domestic pigs.

What are the symptoms?

Fever, muscle soreness, and pain and swelling around the eyes are usually the first symptoms, followed by thirst, chills, heavy sweating, and weakness. Chest pain may develop if the parasite becomes imbedded in the muscle separating the lungs from the abdominal organs. In severe cases, death may occur.

How is trichinosis spread?

Trichinosis is not spread from person-to-person. Meat-eating animals such as pigs, dogs and cats, and wild animals, such as rats, foxes, wolves, and bears may be infected with *Trichinella*. Animals or humans may become ill after eating meat from infected animals.

Who gets trichinosis?

People who eat the undercooked meat of infected animals. Infection occurs worldwide, but is most common in areas where raw or undercooked pork, such as ham or sausage, is eaten.

How is it diagnosed?

Trichinosis is diagnosed by a blood test or muscle biopsy.

How is trichinosis treated?

Several effective prescription drugs are available. Treatment should begin as soon as possible and the decision to treat is based upon symptoms, exposure to raw or undercooked meat, and laboratory test results.

How can you prevent trichinosis?

The following suggestions should be followed to help avoid potential infection:

- Thoroughly cook pork, pork products and wild game until the meat is no longer pink and all parts of the meat reach an internal temperature of at least 160°F (71°C).
- Freezing pork for 10 days at -10°F (-23°C) will kill the larvae, but freezing wild game meats may leave some larvae alive.
- Hunters should thoroughly cook all meats from wild animals. Curing (salting), drying, smoking, or microwaving meat does not consistently kill infective

larvae. Meat products should be processed by heating, freezing or irradiation prior to drying or smoking for jerky.

- Cook any meat fed to pigs and/or other animals. Hogs should not be allowed to eat uncooked carcasses of other animals, including rats, which may be infected with trichinosis.
- Grind pork in a separate grinder and thoroughly disinfect the grinder between different products.

Where can I get more information?

- Your Local Health Department
- Kansas Department of Health and Environment, Epidemiologic Services Section (877) 427-7317
- <http://www.cdc.gov/health/default.htm>
- Your doctor, nurse, or local health center

This fact sheet is for information only and is not intended for self-diagnosis or as a substitute for consultation with a healthcare provider. If you have any questions about the disease described above or think that you may have an infection, consult with your healthcare provider. This information is based on the Centers for Disease Control and Prevention's Health and Safety topic fact sheets.