

Trichinosis

(Also known as Trichinellosis)



Section 1:

ABOUT THE DISEASE

A. Etiologic Agent

Trichinosis is caused by *Trichinella spiralis*, a parasitic intestinal roundworm. There are multiple species of *Trichinella* capable of causing infection in mammals, but *T. spiralis* is the most common cause of human infection.

B. Clinical Description

Trichinosis in humans can range from asymptomatic to fatal, depending on the infective dose. Most infections in the U.S. are asymptomatic. In the week following ingestion of infected meat, a patient may experience nausea, vomiting, diarrhea, and abdominal discomfort as the larvae attach to and invade the intestinal mucosa. In symptomatic infection, muscle soreness and pain, fever, edema of the upper eyelid, and urticarial rash (hives) follow at 2–8 weeks after ingestion as larvae migrate into muscle tissue. Eye pain, photophobia, thirst, profuse sweating, chills, weakness, and a rapid increase in eosinophilic granulocytes on blood exam may also occur. Recurring high fever (as high as 104°F) occurs, but usually stops after 1–6 weeks. In the most severe infections, cardiac and neurologic complications may be life-threatening.

C. Vectors and Reservoirs

Pigs, dogs, cats, horses, rats, and many wild animals such as bear, wolf, wild boar, fox, and Arctic marine mammals can serve as reservoirs for *Trichinella*.

D. Modes of Transmission

Transmission occurs by ingestion of raw or undercooked meats containing *Trichinella* cysts. Historically, pork and pork products were the most likely source. Beef products, which may become inadvertently adulterated with raw pork during processing, can also be a source. However, since the discontinuation of feeding raw-meat garbage to hogs, the adoption of commercial and home freezing of pork, and public awareness of the danger of eating raw or undercooked pork products, cases in the U.S. are less commonly associated with pork products and are more often associated with eating raw or undercooked wild game meats. There is no person-to-person spread of trichinosis.

E. Incubation Period

Gastrointestinal symptoms may appear within a few days of exposure. Onset of systemic symptoms ranges from 5–45 days; the usual incubation period is 8–15 days. If large numbers of cysts are ingested, symptoms may occur earlier.

F. Period of Communicability or Infectious Period

Trichinosis is not transmitted directly from person to person. Animal hosts may remain infective for months, and meat from these animals remains infective until the larvae are killed by sufficient cooking, freezing, or irradiation.

G. Epidemiology

Trichinosis occurs worldwide and affects people of all ages. Depending on local customs regarding eating pork or undercooked meats, the incidence of disease is variable.

H. Bioterrorist Potential

This pathogen is not considered to be of risk for use in bioterrorism.



Section 2:

REPORTING CRITERIA AND LABORATORY TESTING

A. What to Report to the Massachusetts Department of Public Health (MDPH)

Report any of the following:

- ◆ Demonstration of *Trichinella* larvae in tissue obtained by muscle biopsy;
- ◆ A positive serologic test for *Trichinella*; or
- ◆ Clinical presentation consistent with trichinosis associated with high peripheral eosinophilic granulocyte count and lack of an alternative, more likely, diagnosis.

Note: See Section 3C for information on how to report a case.

B. Laboratory Testing Services Available

The MDPH State Laboratory Institute (SLI) does not provide testing services for *Trichinella* identification in clinical specimens or implicated food samples. The SLI Reference Laboratory will process sera for serologic testing at the Centers for Disease Control and Prevention (CDC).

For more information on submitting specimens, contact the SLI Reference Laboratory at (617) 983-6607.



Section 3:

REPORTING RESPONSIBILITIES AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- ◆ To identify sources of public health concern (e.g., undercooked *Trichinella*-infected pork being served at a restaurant, commercial sources of contaminated meat or meat products), and to stop transmission from such sources.
- ◆ To identify and control outbreaks.

B. Laboratory and Health care Provider Reporting Requirements

Trichinosis is reportable to the local board of health (LBOH). The MDPH requests that health care providers immediately report to the LBOH in the community where the case is diagnosed, all confirmed or suspect cases of trichinosis, as defined by the reporting criteria in Section 2A.

Laboratories performing examinations on any specimens derived from Massachusetts residents that yield evidence of *Trichinella* infection shall report such evidence of infection directly to the MDPH within 24 hours.

C. Local Board of Health (LBOH) Reporting and Follow-Up Responsibilities

Reporting Requirements

MDPH regulations (*105 CMR 300.000*) stipulate that trichinosis is reportable to the LBOH and that each LBOH must report any confirmed case of trichinosis or suspect case of trichinosis, as defined by the reporting criteria in Section 2A. Cases should be reported to the MDPH Bureau of Communicable Disease Control, Office of Integrated Surveillance and Informatics Services (ISIS) using a MDPH *Trichinosis Case Report Form* (found at the end of this chapter). Refer to the *Local Board of Health Timeline* at the end of this manual's *Introduction* section for information on prioritization and timeliness requirements of reporting and case investigation.

Case Investigation

1. It is the responsibility of the LBOH to complete the MDPH *Trichinosis Case Report Form* (found at the end of this chapter) by interviewing the case and others who may be able to provide pertinent information. Much of the information required on the case report form can be obtained from the health care provider or from the medical record.
2. Use the following guidelines to assist in completing the form:
 - a. Accurately record the demographic information, as well as the physician contact information. Please include a full name and address for the case.
 - b. Complete the diagnostic data section, including onset date, all symptoms, outcome, and serologic findings if available.
 - c. Complete the epidemiologic data section. When asking about exposure history, use the incubation period range for *Trichinella* (5–45 days). Specifically, focus on the period beginning a minimum of 5 days prior to the case's onset date back to no more than 45 days before onset for the following exposures:
 - i. Food(s) derived from pork.
 - ii. Non-pork food(s), including beef, wild game, dried jerky, and other food(s).
 - iii. The case's occupation.
 - d. Use the MDPH *Foodborne Illness Complaint Worksheet* (found at the end of the chapter) to facilitate recording additional information. It is requested that the LBOH fax or send this worksheet to the MDPH Center for Environmental Health, Food Protection Program (FPP); see top of worksheet for fax number and address. This information is entered into a database to link complaints and to help identify foodborne illness outbreaks. *Note: This worksheet does not replace the MDPH Trichinosis Case Report Form.*
 - e. Record any additional information in the "Comments" section.

- f. If you have made several attempts to obtain case information but have been unsuccessful (e.g., the case or health care provider does not return your calls or respond to a letter, or the case refuses to divulge information or is too ill to be interviewed), please fill out the case report form with as much information as you have gathered. Please note on the form the reason(s) why it could not be filled out completely.
3. After completing the form, attach laboratory report(s) and fax or mail (in an envelope marked "Confidential") to ISIS. The confidential fax number is (617) 983-6813. Call ISIS at (617) 983-6801 to confirm receipt of your fax. The mailing address is:

MDPH, Office of Integrated Surveillance and Informatics Services (ISIS)
305 South Street, 5th Floor
Jamaica Plain, MA 02130
Fax: (617) 983-6813

4. Institution of disease control measures is an integral part of case investigation. It is the responsibility of the LBOH to understand, and if necessary, institute the control guidelines listed in Section 4.



Section 4:

CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements (*105 CMR 300.200*)

None.

B. Protection of Contacts of a Case

None.

C. Managing Special Situations

Reported Incidence Is Higher Than Usual/Outbreak Suspected

If the number of cases of trichinosis reported in your city/town is higher than usual or if you suspect an outbreak, investigate to determine the source of infection and the mode of transmission. A common vehicle (such as food) should be sought, and applicable preventive or control measures should be instituted (e.g., removing an implicated food item from the environment). Consult with the epidemiologist on-call at the MDPH Division of Epidemiology and Immunization at (617) 983-6800 or (888) 658-2850. The Division can help determine a course of action to prevent further cases and can perform surveillance for cases across town lines, which would otherwise be difficult to identify at the local level.

Note: Refer to the MDPH's Foodborne Illness Investigation and Control Reference Manual for comprehensive information on investigating foodborne illness complaints and outbreaks. Copies of this manual have been made available to the LBOH. It can also be located on the MDPH website in PDF format at www.mass.gov/dph/fpp/refman.htm. For the most recent changes to the Massachusetts Food Code, contact the FPP at (617) 983-6712 or through the MDPH website at www.mass.gov/dph/fpp.

D. Preventive Measures

Personal Preventive Measures/Education

To avoid exposures, individuals should be made aware of the following:

- ◆ Thoroughly cook pork, pork products, and all wild game until the meat is no longer pink. This can be achieved by allowing sufficient cooking time so that all parts of the meat reach an internal temperature of at least 160°F (71°C). Freezing pork less than 6 inches thick for 20 days at 5°F will kill the larvae but freezing wild game meats may leave some larvae alive.
- ◆ Grind pork in a separate grinder, and thoroughly disinfect the grinder between uses.
- ◆ Meat products should be processed by heating, freezing, or irradiating prior to drying or smoking for jerky.
- ◆ Cook any meat fed to pigs or to other animals.
- ◆ Pigs should not be allowed to eat uncooked carcasses of other animals, including rats, which may be infected with trichinosis.
- ◆ Be aware that curing (salting), drying, smoking, or microwaving meat does not consistently kill infective larvae.
- ◆ Individuals known to have recently ingested the same product as the case being investigated should consult with their health care providers regarding treatment options.



ADDITIONAL INFORMATION

The formal CDC surveillance case definition for trichinosis is the same as the laboratory criteria outlined in Section 2A of this chapter. For reporting to the MDPH, always use the criteria outlined in Section 2A.

Note: The most up-to-date CDC case definitions are available on the CDC website at www.cdc.gov/epo/dphsi/casedef/case_definitions.htm.



REFERENCES

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FORMS & WORKSHEETS

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LBOH Action Steps

This form does not need to be submitted to MDPH with the case report form. It is for LBOH use and is meant as a quick-reference guide to trichinosis case investigation activities.

LBOH staff should follow these steps when trichinosis is suspected or confirmed in the community. For more detailed information, including disease epidemiology, reporting, case investigation, and follow-up, refer to the preceding chapter.

- Notify the MDPH Division of Epidemiology and Immunization, at (617) 983-6800 or (888) 658-2850, to report any suspect or confirmed case(s) of trichinosis.
- Obtain laboratory confirmation.
- For trichinosis suspected to be the result of food consumption, complete a MDPH *Foodborne Illness Complaint Worksheet* and forward to the MDPH Center for Environmental Health, Food Protection Program (FPP).
- Identify suspect foods and remove from the environment.
- Identify other potentially exposed persons.
- Fill out the case report form (attach laboratory results).
- Send the completed case report form (with laboratory results) to the MDPH Bureau of Communicable Disease Control, Office of Integrated Surveillance and Informatics Services (ISIS).