

Tetanus (Lockjaw) Investigation Guideline

CONTENTS

Investigation Protocol:

- **Investigation Guideline**

Investigation Forms / Documentation Worksheets:

- **General Investigation Form(s)**
- **Tetanus Supplemental Form**

Supporting Material:

- **Fact Sheet**

Tetanus (Lockjaw)

Disease Management and Investigative Guidelines

CASE DEFINITION (CDC 1996)

A. Clinical Description for Public Health Surveillance:

- Acute onset of hypertonia and/or painful muscular contractions, usually of the muscles of the jaw and neck and generalized muscle spasms without other apparent medical cause.

B. Laboratory Criteria for Case Classification: None.

C. Case Classification:

- Confirmed: A clinically compatible case, as reported by a healthcare professional.

D. Laboratory Testing:

- This organism must be grown under anaerobic conditions and is rarely cultured. The State Public Health Laboratory does not perform this testing.

E. Bioterrorism Potential: None.

F. Outbreak Definition:

- There are no formal outbreak definitions as outbreaks are rare; however, they may occur among injecting drug users.

INVESTIGATOR RESPONSIBILITIES

A. Investigation Related Tasks and Activities:

- 1) Confirm diagnosis with appropriate medical provider.
 - Before contacting the patient or family, first determine what information has been released about the patient's diagnosis and identify if the needed epidemiologic data can be found in the clinical record alone.
 - Obtain information that supports clinical findings in the case definition and information on the onset date of the symptoms.
 - For hospitalization, obtain medical records, including admission notes, progress notes, lab report(s), and discharge summary.
- 2) Conduct case investigation to determine status of case (alive or dead) and to identify potential source of infection.
- 3) Initiate control and prevention measures to prevent spread of disease.
 - Since tetanus is preventable, each case should be considered a failure to vaccinate and must be used to determine how to prevent further failures from occurring.
- 4) Within 7 days of receiving the initial notification, report all confirmed, probable and suspect cases to the KDHE Office of Surveillance and Epidemiology at KDHE using established methods.

B. Notifications:

- 1) The CDC requests a provisional report be filed by the state within 2 weeks of the initial report of disease to the state or local health department.

EPIDEMIOLOGY

Tetanus occurs worldwide. Cases are uncommon in the United States because of the common use of tetanus toxoid and improved methods of wound management. Between 50 - 100 cases are reported annually and most occur to individuals who had never been vaccinated or are without a booster dose in the preceding 10 years. Two-thirds of all tetanus cases occur in persons 50 years of age or older. Neonatal tetanus cases are extremely rare. Injection of illicit drugs has been identified in individual cases and sporadic outbreaks.

DISEASE OVERVIEW

A. Agent:

Tetanus is caused by an exotoxin produced by the gram-positive bacillus, *Clostridium tetani*.

B. Clinical Description:

Tetanus is an acute paralytic disease caused by tetanus toxin produced by *C. tetani*. It is characterized by painful muscular contractions primarily of the masseter, neck muscles and muscles of the trunk. A common first sign is abdominal rigidity, though rigidity is sometimes confined to the region of injury. Generalized spasms may occur and are frequently induced by sensory stimuli. The case-fatality rate ranges from 10-90%; highest in infants and the elderly.

C. Reservoirs:

C. tetani is a normal member of intestinal flora of animals and man. It is ubiquitous in the environment, especially in areas contaminated with animal and human feces.

D. Mode(s) of Transmission:

There is no person-to-person transmission. Tetanus spores usually enter the body through a wound and/or occasionally from parenteral injections. Neonatal tetanus occurs through an infection of the umbilical stump.

E. Incubation Period:

Usually 3-21 days but can range 1 day to several months. In neonates the incubation period ranges between 5-14 days. Shorter incubation periods are generally associated with severe disease and a poor prognosis.

F. Period of Communicability:

There is no infectious period as tetanus is not transmitted person-to-person.

G. Susceptibility and Resistance:

Susceptibility is universal; infection does not result in immunity. Tetanus toxoid immunization induces active immunity that lasts for at least 10 years; tetanus immune globulin (TIG) or tetanus antitoxin injection induces temporary passive immunity. Infants of immunized mothers acquire passive immunity that protects them from neonatal tetanus.

H. Treatment:

For tetanus, a single dose of human TIG given is recommended. All wounds should be cleaned and debrided properly, especially if extensive necrosis is present. Supportive care and pharmacotherapy to control spasms and antibiotics

(e.g., metronidazole and/or penicillin G) to decrease the vegetative forms of *C. tetani* is recommended. In neonatal tetanus, wide excision of the umbilical stump is not indicated. See Contact Management for treatment to prevent tetanus.

STANDARD CASE INVESTIGATION AND CONTROL METHODS

Note date investigation started. Standard activities include the following:

- 1) Confirmation of diagnosis using case definition.
- 2) Collection of demographic data (birth date, county, sex, race/ethnicity)
 - For neonatal, maternal country of origin and number of years in U.S.
- 3) Collection of clinical and vaccine status data:
 - Hospitalization and duration of stay
 - Onset of symptoms
 - Type of tetanus disease
 - Wound location and any management
 - Treatment: Td or TIG prophylaxis, dosage and date started
 - Complication and intensive care treatment
 - Pre-existing conditions
 - Outcome: survived or date of death
 - Tetanus toxoid-containing vaccine: dates of vaccination, type, manufacturer, number of doses or why not vaccinated
 - For neonatal cases: Collect maternal vaccination information
- 4) Determination of risk factors

Standard investigation **includes** completion of the General Investigation Form and Tetanus Supplemental Form. Further activity should include:

A. Case Investigation - Identify Potential Source of Infection:

Focus within the incubation period prior to symptom onset for:

- History of injury: nature of wound: type, size and location; date occurred; environment and circumstances.
- If no history of acute injury, note any associated conditions.
 - Note: History of injury may be absent, particularly in diabetics.
- Recent surgical procedures and/or childbirth.
- Recent injection drug use, tattooing or body piercing
- In neonatal tetanus:
 - Maternal country or origin and number of years of residence in U.S.
 - Inquire into delivery technique and methods of umbilical cord care.
- Occupation and hobbies.
- History of military service.

B. Contact Investigation – Identify Exposed Individuals / Populations:

- Tetanus cannot be transmitted person-to-person, but individuals among the case's social group may not be adequately immunized against tetanus and are potentially at risk from exposure. Evaluate the situation for risks.
- Exposure is defined as contact to a potential source of *C. tetani* in the environment in a manner that increases the risk for infection. (i.e., wounds including animal bites, parental injections).

C. Isolation, Work and Daycare Restrictions

- None.

D. Case Management, Including Follow-up of cases:

- The case's status (alive or dead) should be determined 1 month after onset.

E. Contact Management; Protection from Environmental Exposure:

- No human-to-human transmission. Use standard precautions.
- Post-exposure wound management includes the appropriate use of tetanus toxoid and TIG (Table 1).

History of adsorbed tetanus toxoid (doses)	Clean minor wounds		All other wounds*	
	Tdap or Td†	TIG§	Tdap or Td†	TIG§
<3 or unknown	Yes	No	Yes	Yes
≥ 3 doses¶	No**	No	No††	No

* Such as (but not limited to) wounds contaminated with dirt, feces, soil, and saliva; puncture wounds; avulsions; and wounds resulting from missiles, crushing, burns, and frostbite.

† For children younger than 7 years of age, DTaP is recommended; if pertussis vaccine is contraindicated, DT is given. For persons 7–9 years of age or 65 years or older, Td is recommended. For persons 10–64 years, Tdap is preferred to Td if the patient has never received Tdap and has no contraindication to pertussis vaccine. For persons 7 years of age or older, if Tdap is not available or not indicated because of age, Td is preferred to TT.

§ TIG is human tetanus immune globulin. Equine tetanus antitoxin should be used when TIG is not available.

¶ If only three doses of fluid toxoid have been received, a fourth dose of toxoid, preferably an adsorbed toxoid, should be given. Although licensed, fluid tetanus toxoid is rarely used.

** Yes, if it has been 10 years or longer since the last dose.

†† Yes, if it has been 5 years or longer since the last dose. More frequent boosters are not needed and can accentuate side effects.

Source: Manual for the Surveillance of Vaccine-Preventable Diseases. (CDC, 2008)

- Tetanus vaccine recommendations for those not fully immunized:
 - Five doses of pediatric diphtheria-tetanus-pertussis or diphtheria-tetanus (DTaP or DT) vaccine are recommended for children <7 years of age.
 - A routine tetanus booster vaccination with tetanus-diphtheria or tetanus-diphtheria-pertussis (Td or Tdap) vaccine is recommended every 10 years for those 7 years and older.
 - Tdap is recommended for the booster in adolescents age 11–18 and adults through 64 years if they have not previously received Tdap.

F. Environmental Measures:

- None.

G. Education:

- Educate mothers, relatives, and attendants in the practice of strict asepsis of the umbilical stump of newborn infants.
- Recommend immunization with pediatric diphtheria-tetanus-pertussis or diphtheria-tetanus (DTaP or DT) vaccine for children under 7 and tetanus-diphtheria or tetanus-diphtheria-pertussis (Td or Tdap) vaccine for those 7 years and older.

MANAGING SPECIAL SITUATIONS

A. Outbreak Investigation:

- Notify KDHE immediately, 1-877-427-7317.
- Active case finding will be an important part of any investigation.

DATA MANAGEMENT AND REPORTING TO THE KDHE

A. Organize, collect and report data with the General Investigation Form(s) and Tetanus Supplemental Form.

B. Report data electronically via KS-EDSS or by fax, include:

- At a minimum all essential data collected during the investigation that helps to confirm or classify a case.
- All information collected on the General Investigation and supplemental forms.

ADDITIONAL INFORMATION / REFERENCES

- A. **Treatment / Differential Diagnosis:** American Academy of Pediatrics. 2006 Red Book: Report of the Committee on Infectious Disease, 27th Edition. Illinois, Academy of Pediatrics, 2006.
- B. **Epidemiology, Investigation and Control:** Heymann. D., ed., Control of Communicable Diseases Manual, 18th Edition. Washington, DC, American Public Health Association, 2004.
- C. **Case Definitions:** CDC Division of Public Health Surveillance and Informatics, Available at: http://www.cdc.gov/ncphi/diss/nndss/casedef/case_definitions.htm
- D. **Quarantine and Isolation:** Kansas Community Containment Isolation/ Quarantine Toolbox Section III, Guidelines and Sample Legal Orders <http://www.waldcenter.org/Quarantine%20and%20Isolation%20Information%20for%20Health%20Officers.pdf>
- E. **Kansas Regulations/Statutes Related to Infectious Disease:** <http://www.kdheks.gov/epi/regulations.htm>
- F. **Pink Book:** Epidemiology and Prevention of Vaccine-Preventable Diseases. Available at: <http://www.cdc.gov/vaccines/pubs/pinkbook/default.htm>
- G. **Manual for the Surveillance of Vaccine-Preventable Diseases:** Available at: <http://www.cdc.gov/vaccines/pubs/surv-manual/default.htm> .
- H. **Additional Information (CDC):** <http://www.cdc.gov/health/default.htm>

Kansas Disease Investigation Guidelines

General Investigation Form

Investigation Information		
Case Type: <input type="checkbox"/> Human Case <input type="checkbox"/> Non-human Case	Disease Name: _____	
Classification: <input type="checkbox"/> Suspect <input type="checkbox"/> Probable <input type="checkbox"/> Confirmed	KS-EDSS Investigation ID: _____	
Outbreak: <input type="checkbox"/> Yes <input type="checkbox"/> No	Outbreak Name: _____	Outbreak #: _____
Onset Date: _____	Diagnosis Date: _____	Report Date: _____
Assigned to (Investigator): _____	Patient Died: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	
Patient Information		
Name Type: <input type="checkbox"/> Default/Common <input type="checkbox"/> Legal <input type="checkbox"/> Maiden <input type="checkbox"/> Nickname		
Last: _____	First: _____	Middle: _____
Street: _____	City/State: _____	Zip: _____
Evening Phone #: _____	Daytime Phone #: _____	
Sex: <input type="checkbox"/> Failure to Report <input type="checkbox"/> Female <input type="checkbox"/> Male <input type="checkbox"/> Other <input type="checkbox"/> Transexual <input type="checkbox"/> Unknown		
Race: <input type="checkbox"/> American Indian or Alaska Native <input type="checkbox"/> Asian <input type="checkbox"/> Black or African American <input type="checkbox"/> Native Hawaiian or Other Pacific Islander <input type="checkbox"/> White <input type="checkbox"/> Unknown		
Hispanic / Latino Ethnicity: <input type="checkbox"/> Yes <input type="checkbox"/> No		
Date of Birth: _____	Age: _____	Age Unit: <input type="checkbox"/> Days <input type="checkbox"/> Weeks <input type="checkbox"/> Months <input type="checkbox"/> Years
Parent Information (if under 18)		
Last: _____	First: _____	Middle: _____
Street: _____	City/State: _____	Zip: _____
Evening Phone #: _____	Daytime Phone #: _____	
Work / Occupation or School / Grade		
Worksites / School: _____		
Occupations / Grade: _____		
Travel History		
1st	Destination: _____	Depart Date: _____ Return Date: _____
2nd	Destination: _____	Depart Date: _____ Return Date: _____
3rd	Destination: _____	Depart Date: _____ Return Date: _____
4th	Destination: _____	Depart Date: _____ Return Date: _____

Supplemental Laboratory Report Form

Lab Reports

Laboratory Name: _____

Lab Report Date: _____

Ordering Provider Name: _____

Phone: _____

Facility: _____

Specimen Accession Number: _____

Specimen Collection Date: _____

Organism Name: _____

Organism Species: _____

Organism Serogroup: _____

Organism Serotype: _____

PFGE Results

Pattern 1 KS: _____

Other State: _____

CDC: _____

Pattern 2 KS: _____

Other State: _____

CDC: _____

Pattern 3 KS: _____

Other State: _____

CDC: _____

Additional Results Information

Reported Test Name:

Coded Result:

Text Result:

Numeric Result:

Comments:

Supplemental Contact Form

Contacts

Last: _____ **First:** _____ **Middle:** _____

Street: _____ **City/State:** _____ **Zip:** _____

Evening Phone #: _____ **Daytime Phone #:** _____ **E-mail:** _____

Sex: Failure to Report Female Male Other Transexual Unknown

Race: American Indian or Alaska Native Asian Black or African American Native Hawaiian or Other Pacific Islander White Unknown

Hispanic / Latino Ethnicity: Yes No

Date of Birth: _____ **Age:** _____ **Age Unit:** Days Weeks Months Years

Worksites / School: _____

Occupations / Grade: _____

Exposure Information

Contact Type: Household Sexual Other: _____ **Partner / Cluster Code:** _____

Date of First Exposure: _____ **Date of Last Exposure:** _____ **Frequency:** _____

Nature of Exposure: _____ **Comments:** _____

Testing and Treatment Information

Clinic Code: _____ **Examination Date:** _____

Examination Test: _____ **Examination Result:** _____

Prophylaxis/empiric treatment date: _____ **Drug / Dosage:** _____

Provider (Name / Facility): _____

Disposition and Diagnosis Information

Initiation Date: _____ **Disposition Date:** _____ **Disposition:** _____

Diagnosis: _____ **Referral Type:** Patient Provider **Post-test Counseled :** Yes No

Currently Assigned To: _____ **Follow-up Date:** _____

Risk Factors

Pregnant: Yes No **If Yes, # of Weeks:** _____

Risk factors for complications in contact: None Pregnant Woman HIV Seropositive Unimmunized Index case is a super-spreader

Child younger than 5 Age > 65 Otherwise immunosuppressed (s/p transplant, high dose steroids, etc)

Tetanus Supplemental Form

Kansas Department of Health and Environment

Epidemiologic Case History

* indicates required fields

Case Type* <i>Human Case Non Human Case</i>	Classification* <i>Confirmed Not a Case Probable Suspect Deleted Unknown</i>
----------------------------------------------------------	-------------------------------------------------------------------------------------------------------

Supplemental Form Status <i>Not Done Form Complete Form in Progress Form Approved Form Sent to CDC</i>

Report Date* <small>mm/dd/yyyy</small>

Date Investigation Started <small>mm/dd/yyyy</small>

Patient Demographic Information

* indicates required fields

Last Name*	First Name*	Middle Name	Name Type*	Age
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Age Unit <i>Days Weeks Months Years</i>	Date of Birth <small>mm/dd/yyyy</small>
------------------------------------------------------------	---------------------------------------------------

Race* <small>(Check all that apply)</small>				
<i>American Indian or Alaska Native</i>	<i>Asian</i>	<i>Black or African American</i>		
<i>Native Hawaiian or Other Pacific Islander</i>	<i>White</i>	<i>Unknown</i>		

Ethnicity* <i>Hispanic or Latino Not Hispanic or Latino Unknown</i>

Sex* <i>Failure to Report Female Male Other Transexual Unknown</i>

Street Address

City	County	State	Zip
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Evening Phone <small>###-###-####</small>	Daytime Phone <small>###-###-####</small>
-----------------------------------------------------	-----------------------------------------------------

Occupation

Person Providing Report

Name of Reporting Facility*

Clinical Course

Type of Tetanus Disease				TIG Therapy Given?		
<i>Generalized Localized Cephalic Unknown</i>				<i>Yes No Unknown</i>		
If Yes, How Soon After Illness Onset?						Dosage (Units) <small>(0-998; 999=Unknown)</small>
<i>< 6 Hours 7-23 Hours 1-4 Days 5-9 Days 10-14 Days 15+ Days Unknown</i>						
Days Hospitalized <small>(0-998; 999=Unknown)</small>		Days in ICU <small>(0-998; 999=Unknown)</small>		Days Received Mechanical Ventilation <small>(0-998; 999=Unknown)</small>		
Outcome One Month After Onset				If Death, Date <small>mm/dd/yyyy</small>		
<i>Recovered Convalescing Died</i>						

Neonatal (less than 28 Days Old)

Mother's Age in Years <small>(99=Unknown)</small>		Mother's Birthdate <small>mm/dd/yyyy</small>		Date of Mother's Arrival in U.S. <small>mm/dd/yyyy</small>	
Mother's Tetanus Toxoid (TT) History PRIOR to Child's Disease <small>(Known Doses Only)</small>				Years Since Mother's Last Dose <small>(99=Unknown)</small>	
<i>Never 1 dose 2 doses 3 doses 4+ doses Unknown</i>					
Child's Birthplace					
<i>Hospital Home Other _____ Unknown</i>					
Birth Attendant(s)					
<i>Physician Nurse Licensed Midwife Unlicensed Midwife Other _____ Unknown</i>					
Other Birth Attendant(s) <small>(If Not Previously Listed)</small>					

Case Definition

Clinical Case Definition:

Acute onset of hypertonia and/or painful muscular contractions (usually of the muscles of the jaw and neck) and generalized muscle spasms without other apparent medical cause.

Public Health Fact Sheet

Tetanus

What is Tetanus?

Tetanus, commonly called lockjaw, is a disease that affects the nervous system and is caused by a toxin produced by bacteria known as *Clostridium tetani*. This disease can result in death.

What are the symptoms?

Early symptoms include lockjaw, stiffness in the neck and abdomen, and difficulty swallowing. Later symptoms include severe muscle spasms, generalized tonic seizure-like activity and severe autonomic nervous system disorders.

Who gets Tetanus?

Tetanus can occur in anyone who has not received the proper vaccines. Due to widespread immunization, tetanus is now a rare disease in the United States.

How does someone get Tetanus?

Tetanus can happen when a wound becomes contaminated with the bacteria or the bacteria get into the body through a break in the skin. The bacteria that cause tetanus are found in soil and animal or human feces. It is not passed from person-to-person.

What kind of injuries might allow tetanus to enter the body?

The most dangerous kind of injury involves possible contamination with dirt, animal feces, and manure. Even minor wounds can allow tetanus to enter the body. People have become infected with tetanus following surgery, burns, lacerations, abrasions, crush wounds, ear infections, dental infections, animal bites, abortion, pregnancy, body piercing and tattooing, and injection drug use. People can also get tetanus from splinters.

Can you get tetanus more than once?

Yes. Tetanus disease does not cause immunity because so little of the potent toxin is required to cause the disease. Persons recovering from tetanus should begin or complete a tetanus vaccine series.

How is tetanus diagnosed?

The diagnosis of tetanus is based on the clinical signs and symptoms.

Is there a treatment for tetanus?

Once a person develops symptoms there is only supportive treatment with the control of complications. The best thing to do is to prevent tetanus through immunization and to seek proper wound care after injury.

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

What vaccines are needed to prevent Tetanus?

Tetanus vaccine, (usually given in combination with diphtheria and acellular pertussis vaccines and called DTaP), is given at two, four, six and twelve to fifteen months of age, and between four and six years of age. Persons who are seven years of age or older should receive either Tdap (tetanus, diphtheria and acellular pertussis vaccine) or Td (tetanus and diphtheria) every ten years. Ask your healthcare provider or local health department which vaccine is appropriate for you.

How should a wound be treated to prevent tetanus?

Wounds should be thoroughly cleaned. If you have not had a tetanus toxoid booster in the previous 10 years, a single booster injection should be administered on the day of injury. For severe wounds, a booster may be given if more than 5 years have elapsed since the last dose. Tetanus immune globulin (TIG), antitoxin and antibiotics may be given if you have not been previously immunized with at least 3 doses of tetanus vaccine.

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

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