

Tetanus

PROTOCOL CHECKLIST

- Enter available information into Merlin upon receipt of initial report.
 - Complete extended data screen in Merlin. The case report form (CRF) can be used as a guide and is located at: [FloridaHealth.gov/diseases-and-conditions/disease-reporting-and-management/disease-reporting-and-surveillance/_documents/crf-tetanus.pdf](https://www.floridahealth.gov/diseases-and-conditions/disease-reporting-and-management/disease-reporting-and-surveillance/_documents/crf-tetanus.pdf)
 - Contact the Bureau of Epidemiology (BOE) for assistance as needed (850-245-4401).
 - Review background on disease and case definition. No definitive laboratory testing is available ([section 2](#) and [section 3](#)).
 - Contact provider.
 - Interview patient or proxy.
 - Review disease facts.
 - Modes of transmission
 - Incubation period
 - Symptoms
 - Ask about exposure to relevant risk factors ([section 5](#)).
 - Recent out of state or international travel history or born outside the US
 - Recent puncture wounds, lacerations, abrasions, bites, abortion or pregnancy, and burns
 - Exposure to soil or manure through gardening or farming
 - Injection or parenteral drug use (including insulin injections for diabetes)
 - Immunization for tetanus not up-to-date
 - If a newborn was born in unsanitary conditions or with possible contamination of umbilical birth stump
 - Determine vaccination history.
 - Determine if patient was hospitalized and document care received for wound and for tetanus treatment (e.g., tetanus toxoid, tetanus immune globulin [TIG], etc.).
 - While outbreaks are extremely rare, ascertain that others do not have similar symptoms.
 - Provide education on transmission and prevention ([section 7](#)).
 - Effective prevention through up-to-date tetanus vaccinations as recommended
 - In the event of natural disasters, general notification is appropriate to encourage up-to-date tetanus vaccination for populations at risk.
 - In rare outbreak situations where the source of infection is identified (e.g., contaminated heroin), provide education to risk groups and to health care providers caring for them.
 - Address patient and family's questions or concerns.
- Enter additional data obtained from interview into Merlin.

Tetanus

1. DISEASE REPORTING

A. Purpose of reporting and surveillance

1. To assist in the diagnosis of potential cases and facilitate prompt administration of TIG.
2. To identify groups at risk for tetanus (due to under-immunization, occupation, drug use, etc.) and focus prevention efforts.

B. Legal reporting requirements

Physicians are required to report persons infected with tetanus to the county health department (CHD) within one working day of identification/diagnosis.

C. County health department investigation responsibilities

1. CHDs should notify BOE at 850-245-4401 for assistance as needed.
2. Report all probable cases (there are no confirmed cases, see case definition below) within one business day to BOE. Begin investigation. Complete the tetanus CRF and enter the data into the extended data screen in Merlin. CRF available at: FloridaHealth.gov/diseases-and-conditions/disease-reporting-and-management/disease-reporting-and-surveillance/_documents/crf-tetanus.pdf

2. THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic agent

Tetanus is caused by a toxin produced by the gram-positive bacillus *Clostridium tetani*, which is ubiquitous in the environment. *C. tetani* are obligate anaerobic bacteria that form spores that can survive under a wide range of environmental conditions, including boiling temperatures. Spore germination and bacterial growth occur only under anaerobic conditions, such as those found in damaged tissue. Tetanus toxin is produced as the bacteria multiply.

B. Description of illness

Tetanus is a neurological disease caused by tetanus toxin. Three different clinical forms have been described—generalized (on average 80% of cases), local, and cephalic tetanus. Symptoms of generalized tetanus include rigidity and painful spasms of skeletal muscles. Initial muscles affected are often in the jaw and neck (leading to the common name for the disease, “lockjaw”) followed by involvement of larger muscles in a descending pattern. Seizures may occur. Less common forms of tetanus are local tetanus, which is localized to the anatomic area of injury, and cephalic tetanus, which involves the cranial nerves. Neonatal tetanus causes significant mortality when infants born to unimmunized women have infection of the umbilical stump that was contaminated with soil or alternative medical treatment.

Complications of tetanus include fractures, difficulty breathing (due to spasms of the respiratory muscles), and abnormal heart rhythms. In addition, nosocomial infections related to prolonged hospitalization can occur. In the US, death results in approximately 10–20% of affected persons. From a 2001–2008 study, the case fatality rate overall was 13.2%, and for persons 65 and older, the case fatality rate was 31.3%.⁷ Previous studies indicate that tetanus is less severe in those who have received at least the primary series of tetanus vaccinations, compared with those inadequately vaccinated or not vaccinated at all.⁸

C. Reservoir

Spores are found in soil and in the intestines and feces of many domestic animals and fowl. Heroin may be contaminated with spores.

D. Modes of transmission

Growth of the organism occurs in anaerobic devitalized tissue. Predisposing wounds include puncture wounds, lacerations, abrasions, bites, abortion or pregnancy, skin ulcers, and burns. The injury may be minor. Injection drug use has also been associated with tetanus. Most cases in the U.S. occur among adults and follow injuries. Unsanitary birth conditions result in contamination of umbilical stumps and neonatal tetanus.

E. Incubation period

Three to 21 days.

F. Period of communicability

Not communicable person to person.

G. Treatment

Tetanus is treated with human TIG administered intramuscularly with part of the dose infiltrated around the wound, if it can be detected. TIG is available in most hospitals in Florida. If TIG is not available, intravenous immune globulin can be considered.

Additional treatment measures include supportive care, administration of tetanus vaccine (at a different anatomic site than the TIG), cleaning and debriding wounds, and administering antibiotics.

A brief summary of treatment for tetanus can be found at:

www.cdc.gov/tetanus/clinicians.html OR
wwwnc.cdc.gov/travel/yellowbook/2018/infectious-diseases-related-to-travel/tetanus

Any pharmacy distributor should be able to order it for delivery.

For detailed information regarding treatment of generalized tetanus, see:
Bleck TP. *Clostridium tetani* (Tetanus). In: Mandell GL, Bennett JE, Dolin R, eds. *Mandell, Douglas, and Bennett's Principles of Practice of Infectious Diseases Eighth Edition*. Philadelphia: Elsevier Churchill Livingstone; 2015:2817–2822.

H. Immunity

Vaccination with tetanus toxoid provides active immunity, which lasts for at least ten years after full immunization. Neither TIG nor intravenous immune globulin provides long-term immunity. Disease may not result in immunity.

I. Tetanus in Florida

Since 2010, there have been 32 cases, with an average of three cases per year (range 1 to 6). All cases since 2010, with the exception of one in 2010, have been acquired in the U.S. and are sporadic. The case that was the exception was considered “outbreak associated” in 2010 (a Haitian patient who was transported to the U.S. after the January 2010 earthquake). Typically, cases in Florida are classified as generalized tetanus (53%) and have at least one dose of vaccine for tetanus (41%).

3. CASE DEFINITION

A. Clinical criteria for case classification

Either of the following:

- Acute onset of hypertonia or painful muscular contractions (usually of the muscles of the jaw and neck) and generalized muscle spasms diagnosed as tetanus by a health care provider in the absence of a more likely diagnosis
- **Or** death with tetanus listed on the death certificate as the cause of death or a significant condition contributing to death.

B. Laboratory criteria for case classification

Not applicable

C. Epidemiological criteria for case classification

Not applicable

D. Case classification

Probable:

A clinically compatible illness or death.

E. Criteria to distinguish a new case from previous reports

Not applicable

F. Comments

There is no definition for “confirmed” tetanus.

Questions regarding tetanus case definition follow up should be directed to BOE at 850-245-4401.

4. LABORATORY TESTING**A. Criteria for diagnosis**

Diagnosis of tetanus is based on the clinical presentation.

B. Services available at the Florida Bureau of Public Health Laboratories (BPHL)

There are no laboratory tests for tetanus.

5. CASE INVESTIGATION**A. Contact the physician or hospital**

1. Confirm that tetanus disease has been diagnosed in the reported patient.
2. Obtain as much information as possible about the case, such as:
 - a. Contact information of the case and the case's proxy
 - b. Demographic information (e.g., date of birth [DOB], gender, race, ethnicity)
 - c. Date of onset
 - d. Signs and symptoms
 - e. Treatments already prescribed for the case (e.g., tetanus toxoid, TIG, etc.)
 - f. Vaccine history
 - g. Possible exposures and risk factors (e.g., gardening, farm work, injection drug use, human or animal bites) and timeline for exposures
 - h. Pre-existing conditions (e.g., immunosuppression and diabetes)
 - i. Travel history
3. Request medical records.
4. Determine if the patient or proxy is aware of the tetanus disease diagnosis.
5. Notify the physician that you will be contacting the case, or proxy, as DOH follows up on all cases of tetanus disease infections to assess risk factors to better characterize the occurrence of tetanus disease in Florida and to target education to prevent additional cases. Address any concerns about the CHD contacting the case.
6. Inform provider about Red Book and CDC recommendations for TIG
www.cdc.gov/tetanus/clinicians.html.

B. Interview the case, or proxy, and others who may be able to provide pertinent information

1. Contact the case, or proxy, for an interview as soon as possible after the case is reported to optimize recall.
2. Complete the extended data screen in Merlin which can help guide the interview.
3. Identify source of infection.
 - a. Ask about the following exposures in the three to 21 days prior to onset:
 - Minor or major injury, particularly if contaminated with soil or manure
 - Wounds contaminated with dirt, feces, or spit (saliva)
 - Wounds caused by an object puncturing the skin (puncture wounds), like a nail or needle
 - Burns
 - Crush injuries
 - Injuries with dead tissue
 - Chronic skin ulcers and wounds

- Exposures to soil or manure
 - Recent tattooing or body piercing
 - Injection drug use
 - Medical-related injury
 - Surgical procedures
 - Dental infections
 - Chronic sores and infections
 - Intramuscular injections
 - Use of alternative medicine treatments for newborn umbilical stump
- b. Ask about the patient's occupation and hobbies. Examples of occupations and hobbies that increase risk of injury or exposure include:
- Farm worker
 - Workers in contact with soil, sewage, or domestic animals
 - Police officers
 - Military personnel
 - Gardening
4. Identify potentially exposed persons.
Outbreaks are extremely rare. Collect name, age, onset date, and contact information of anyone reported to have a similar illness.

C. Environmental evaluation

An environmental evaluation is usually not needed since tetanus spores are ubiquitous in the environment, and the source of the infection is rarely determined with certainty. Contact BOE if you have high suspicion for a particular source of infection, such as potentially contaminated heroin.

D. Merlin data entry

Create a case in Merlin under **Tetanus (Merlin disease code=03700)** upon receipt of initial report. Enter the data collected into Merlin, being sure to include all required fields on the Basic Data screen, complete the Case Symptoms screen and the Extended Data screen, and attach all relevant medical records and completed CRF.

6. CONTROLLING FURTHER SPREAD

A. Infection control recommendations/case management

Hospitalized patients should be cared for using standard precautions.

B. Contact management

No contact follow-up is needed since tetanus is not transmitted from person to person.

C. Environmental measures

Typically no environmental measures are appropriate.

7. MANAGING SENSITIVE SITUATIONS

A. Natural disasters

Following natural disasters, increased risk for injury may be present due to damaged structures, flooding, and clean-up activities. A general notification during such situations is appropriate to encourage up-to-date tetanus vaccination for populations at risk.

B. Outbreaks

In rare outbreak situations where the source of infection is identified (i.e., contaminated heroin), provide education to risk groups and to health care providers serving them regarding typical symptoms of tetanus, the importance of rapid diagnosis and treatment, and the importance of vaccination against tetanus.

8. ROUTINE PREVENTION

A. Immunization Recommendations

Types of vaccines that protect against tetanus:

- Diphtheria, tetanus, and acellular pertussis (DTaP)
- Diphtheria and tetanus (DT)
- Tetanus, diphtheria, and acellular pertussis (Tdap)
- Tetanus and diphtheria (Td)

Children younger than seven years of age receive DTaP and DT. Older children and adults receive Tdap and Td.

Immunization with DTaP is recommended for all children younger than seven years of age according to the below schedule.

Table 1: Routine Childhood DTaP Vaccination Schedule

Dose	Age	Minimal Interval
Primary 1	2 months	N/A
Primary 2	4 months	4 weeks
Primary 3	6 months	4 weeks
Primary 4	15–18 months	6 months
Booster*	4–6 years	

* The booster dose is not required if the fourth dose is given on or after the fourth birthday. In addition to the primary series given in childhood, booster doses of tetanus toxoid are recommended every ten years. The first booster dose may be given at 11 to 12 years if at least five years have passed since the last dose of DTaP or DT. The Advisory Committee on Immunization Practices recommends that this dose be given as Tdap. In addition, all adults less than 65 years of age should receive a single dose of Tdap instead of Td for booster immunization against tetanus, diphtheria, and pertussis.

For additional information regarding use of the tetanus vaccines, adverse reactions, and contraindications, see the most recent *Red Book* and the *Pink Book* ([page 7](#)).

B. Wound Management

All wounds should be cleaned and properly debrided, if necessary. The need for tetanus vaccine and/or TIG depends on the condition of the wound and immunization status of the patient and is summarized in Table 2. Providers make the determination for distribution of TIG and amount based upon their resources. If requested, direct provider to Red Book for questions regarding TIG dosage and administration. Antibiotic prophylaxis against *C. tetani* is not recommended.

Table 2: Tetanus Wound Management

Vaccination History	Clean, minor wounds		All other wounds [§]	
	Td*	TIG	Td*	TIG
Unknown or fewer than 3 doses	Yes	No	Yes	Yes
3 or more 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.

*Tdap may be substituted for Td if the person has not previously received Tdap and is ten years of age or older. Tdap is preferred to Td for adults who have never received Tdap.

[†]Yes, if more than ten years since last tetanus toxoid-containing dose.

**Yes, if more than five years since last tetanus toxoid-containing dose.

(Source: Centers for Disease Control and Prevention. *Epidemiology and Prevention of Vaccine-Preventable Diseases*. Atkinson W, Hamborsky J, McIntyre L, Wolfe S, eds. 10th ed. Washington DC: Public Health Foundation, 2008.)

9. IMPORTANT LINKS

A. **The Pink Book:** www.cdc.gov/vaccines/pubs/pinkbook/index.html

B. **The Red Book:** <http://aapredbook.aappublications.org/>

10. REFERENCES

1. American Academy of Pediatrics. In Hepatitis A: Pickering LK, Baker CJ, Kimberlin DW, Long SS, eds. Red Book: 2009 Report of the Committee on Infectious Diseases. 31st ed. 2018: 329-337.
2. American Public Health Association (APHA). In Tetanus: Heymann DL, ed. Control of Communicable Diseases Manual (CCDM). 20th ed. 2015: 607–613.
3. Centers for Disease Control and Prevention (CDC). Epidemiology and Prevention of Vaccine-Preventable Diseases. Hamborsky J, Kroger A, Wolfe S, eds. 13th ed. Washington D.C. Public Health Foundation, 2015. Accessed at www.cdc.gov/vaccines/pubs/pinkbook/tetanus.html.
4. CDC. Tetanus for Clinicians accessed at www.cdc.gov/tetanus/clinicians.html.
5. CDC. Updated Recommendations for Use of Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis (Tdap) Vaccine from the Advisory Committee on Immunization Practices, 2011. MMWR 2011;60(No.1):13–15.

6. CDC. Manual for the Surveillance of Vaccine-Preventable Diseases. Faulkener A, Tiwari T. Centers for Disease Control and Prevention, Atlanta, GA, 2008. Accessed at www.cdc.gov/vaccines/pubs/surv-manual/chpt16-tetanus.html.
7. CDC. Tetanus Surveillance --- United States, 2001-2008. MMWR 2011;60(12) 265-369. Accessed at www.cdc.gov/mmwr/preview/mmwrhtml/mm6012a1.htm
8. CDC. Tetanus Surveillance --- United States, 1998 – 2000. MMWR 2003(52); 1-8. Accessed at www.cdc.gov/mmWr/preview/mmwrhtml/ss5203a1.htm