

Tetanus

Summary

Tetanus, or 'lockjaw', is caused by a neurotoxin produced by *Clostridium tetani*. Tetanus occurs worldwide but is rare in the U.S. Fewer than 40 cases have been reported annually since 1999. Almost all reported cases of tetanus are in persons who did not have a vaccination history that was up to date (i.e., no booster in the preceding 10 years), had an incomplete vaccination history, or had never been vaccinated at all. Persons who inject heroin are at higher risk for tetanus, particularly if they are diluting the product with quinine, which may support the growth of *C. tetani*. Neonatal tetanus is a common cause of neonatal death in areas where mothers are not immune and where non-sterile umbilical cord-care practices are followed. Neonatal tetanus is common in some developing countries but is rare in the United States.

Agent

Clostridium tetani, a gram-positive, motile, spore-forming, obligate anaerobic bacillus. *C. tetani* spores are ubiquitous in the environment, and if deposited in anaerobic conditions, such as a wound, they may germinate and produce toxins.

Transmission

Reservoir:

Intestines of horses and other animals, including humans, where it does not produce signs/symptoms. Soil can become contaminated by feces. Therefore, tetanus spores are ubiquitous in the environment.

Mode of transmission:

Contact of a wound in the skin with material containing tetanus spores. Contaminated wounds, deep wounds, or wounds with devitalized tissue are at greatest risk.

Period of communicability:

Not communicable from person to person.

Clinical Disease

Incubation period:

Most cases occur within 8-10 days; ranging from 3 to 21 days. In neonatal tetanus, symptoms usually appear from 4-14 days after birth, averaging about seven days.

Illness:

The wound that harbors *C. tetani* may not be apparent and is frequently minor. Evidence of frank wound infection is likely to represent infection by other bacteria. Deep or puncture wounds, crush injuries, and burns are at higher risk for tetanus infection because anaerobic conditions and devitalized tissue are present. Localized tetanus consists of painful tonic muscle spasms in the area of a wound. Cephalic tetanus is cranial nerve dysfunction (especially affecting eye and oropharyngeal muscles) associated with wounds of the head and neck. Either form of localized tetanus can precede generalized tetanus. Older children and adults may first experience abdominal muscle spasm. Muscle spasms often produce trismus (inability to open the mouth fully or at all). Spasms of the neck and back cause stiffness which can progress to opisthotonos (a condition of abnormal posturing that involves rigidity and severe arching of the back, with the head thrown backward.) Tetanospasms are seizure-like episodes

of severely painful rigidity of the neck, trunk and extremities often with laryngeal and glottic spasm. Episodes of spasm may be precipitated by minor sensory stimuli; dysphagia may result in hydrophobia; urinary retention may occur. Laryngeal spasm may cause sudden death.

Laboratory Diagnosis

Culturing of the wound may be done but the yield is often poor (30% recovery rate) and tetanus can be isolated from persons who do not have tetanus. Therefore, treatment should not be based on laboratory evidence.

The diagnosis should be made based on clinical presentation and exclusion of other possibilities, such as hypocalcemia, strychnine poisoning, phenothiazine reaction, and hysteria.

Treatment

Tetanus is a medical emergency requiring hospitalization. All wounds should be properly cleaned and debrided. Tetanus immune globulin (TIG) is recommended for treatment. TIG does not preclude a booster vaccination if needed. Booster vaccine is recommended if needed (see Prevention section below). As appropriate antibiotic treatment (usually metronidazole or penicillin) be provided. Supportive care and pharmacotherapy to control spasms also may be necessary.

Patients should be immunized against tetanus during convalescence from tetanus

Surveillance

Case Definition:

Clinical definition- acute illness with muscle spasms or hypertonia.

Confirmed - There is no definition for "confirmed" tetanus.

Probable - In the absence of a more likely diagnosis, an acute illness with muscle spasms or hypertonia, AND diagnosis of tetanus by a health care provider; OR death, with tetanus listed on the death certificate as the cause of death or a significant condition contributing to death

Reporting:

Report all suspected or confirmed cases of tetanus to the Epidemiology and Response Division (ERD) at 505-827-0006. Information needed includes: patient's name, age, sex, race, ethnicity, home address, home phone number, occupation, health care provider, and vaccination history if available.

Case Investigation:

Complete the CDC Tetanus Surveillance Worksheet and mail to the Epidemiology and Response Division, P.O. Box 26110, Santa Fe, New Mexico 87502-6110, or fax to 505-827-0013. Investigation information should also be entered in NM-EDSS per established procedures.

Control Measures

1. Case management
 - 1.1. Isolation: None required.
 - 1.2. Prophylaxis: Not applicable.
2. Contact management

- 2.1. Isolation: None required.
- 2.2. Prophylaxis: Not applicable.
- 3. Prevention
 - 3.1. Immunization: Active immunization with tetanus toxoid is indicated routinely for all children at 2, 4, 6, and 15-18 months of age, with a booster at 4-6 years of age. The preferred vaccine is DTaP (combined with diphtheria toxoid and acellular pertussis). If there is a contraindication to pertussis vaccination DT vaccine should be used. Active protection should be maintained by administration of Td or Tdap (tetanus toxoid combined with diphtheria toxoid and acellular pertussis) vaccine every 10 years. Additional Tdap information may be found in the Pertussis chapter.
 - 3.2. Wound management should include cleaning and thorough debridement of all wounds.
 - 3.3. Immunization status should be assessed, and intervention as follows:
 - 3.3.a If the person has had fewer than three doses of tetanus toxoid vaccine or an uncertain history of tetanus immunization AND the wound is clean and minor, one dose of appropriate vaccine is given on the day of injury and additional doses at 4-8 week intervals to complete the primary series. If the wound is contaminated or extensive, TIG should also be given. The dose of TIG should be given intramuscularly; separate syringes and sites should be used when TIG and tetanus vaccine are given concurrently.
 - 3.3.b If the person has had at least three doses of tetanus toxoid vaccine, but the last dose was more than five years previously, a booster dose should be given if the wound is contaminated or extensive. If the wound is clean and minor, a booster dose of vaccine is needed only if the last dose was given more than 10 years previously. TIG is not indicated in these circumstances.

Tetanus Wound Management

Vaccination History	Clean, minor wounds		All other wounds	
	Td*	TIG	Td*	TIG
Unknown or less than 3 doses	Yes	No	Yes	Yes
3 or more doses	No+	No	No**	No

* Tdap may be substituted for Td if the person has not previously received Tdap and is 10 years or older

+ Yes, if more than 10 years since last dose

** Yes, if more than 5 years since last dose

3.3.c Determining appropriate vaccine: For persons aged younger than 6 years who require tetanus toxoid vaccination, DTaP vaccine (combined with diphtheria toxoid and acellular pertussis) should be used unless there is a contraindication to pertussis vaccination. In this situation, DT vaccine (combined with higher dose diphtheria toxoid) should be used. For persons aged 7-10 years who require tetanus toxoid vaccination for wound prophylaxis, DT vaccine (combined with diphtheria toxoid) should be used. For persons aged 11-64 years, Tdap vaccine (tetanus toxoid combined with diphtheria

toxoid and acellular pertussis) should be used unless there is a contraindication to pertussis vaccination, in which case Td vaccine should be used.

Managing Tetanus in Child Care Centers

All children should be immunized against tetanus.

References

American Academy of Pediatrics. In: Kimberlin, DW, et al eds. Red Book: 2018 Report of the Committee on Infectious Diseases. 31st ed. Itasca, IL: American Academy of Pediatrics; 2018.

Heymann D, ed. Control of Communicable Diseases Manual. 19th ed. Washington, DC: American Public Health Association; 2008.

Centers for Disease Control and Prevention. *Epidemiology and Prevention of Vaccine-Preventable Diseases*. William Atkinson, MD, MPH; Charles (Skip) Wolfe; Jennifer Hamborsky, MPH, CHES, eds. 12th ed. Washington DC: Public Health Foundation, May 2012.

See Tetanus Fact Sheets ([English](#)) ([Spanish](#)).