

Tetanus Outbreak Control Guidelines

Infectious agent

Bacteria: *Clostridium tetani* (*C. tetani*)

Clinical manifestations

On the basis of clinical findings, three different forms of tetanus have been described.

Generalized tetanus

- The most common type (about 80%) of reported tetanus. The disease usually presents with a descending pattern.
- The first sign is trismus or lockjaw, followed by stiffness of the neck, difficulty in swallowing, and rigidity of abdominal muscles.
- Other symptoms include elevated temperature, sweating, elevated blood pressure, and episodic rapid heart rate.
- Spasms may occur frequently and last for several minutes. Spasms continue for 3–4 weeks. Complete recovery may take months.
- Neonatal tetanus is a form of generalized tetanus that occurs in newborn infants.
 - Neonatal tetanus occurs in infants born to non-immune mothers without protective passive immunity.
 - It usually occurs through infection of the unhealed umbilical stump, particularly when the stump is cut with an unsterile instrument.
 - Neonatal tetanus is common in some developing countries (more than 257,000 annual deaths were estimated worldwide in 2000-2003), but very rare in the United States.

Local tetanus

- An uncommon form of the disease, in which patients have persistent contraction of muscles in the same anatomic area as the injury. These contractions may persist for many weeks before gradually subsiding.
- Local tetanus may precede the onset of generalized tetanus but is generally milder. Only about 1% of cases are fatal.

Cephalic tetanus

- A rare form of the disease; occasionally occurring with otitis media (ear infections) in which *C. tetani* is present in the flora of the middle ear, or following injuries to the head. There is involvement of the cranial nerves, especially in the facial area characterized by tonic spasms in the face and throat.

Complications

- Laryngospasm (spasm of the vocal cords) and/or spasm of the muscles of respiration lead to interference with breathing.
- Fractures of the spine or long bones may result from sustained contractions and convulsions.
- Hyperactivity of the autonomic nervous system may lead to hypertension and/or an abnormal heart rhythm.

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- Nosocomial secondary infections are common because of prolonged hospitalization.
 - Secondary infections may include sepsis from indwelling catheters, hospital-acquired pneumonias, and decubitus ulcers.
- Pulmonary embolism is particularly a problem in drug users and elderly patients.
- Aspiration pneumonia is a common late complication of tetanus, found in 50%–70% of autopsied cases.
- In recent years, tetanus has been fatal in approximately 11% of reported cases.
 - Cases most likely to be fatal are those occurring in persons 60 years of age and older (18%) and unvaccinated persons (22%).
 - In about 20% of tetanus deaths, no obvious pathology is identified and death is attributed to the direct effects of tetanus toxin.

Incubation period

- Ranges from 3 to 21 days, usually about 8 days.
- In general the further the injury site is from the central nervous system, the longer the incubation period. The shorter the incubation period, the higher the chance of death.
- In neonatal tetanus, symptoms usually appear from 4 to 14 days after birth, averaging about 7 days.

Period of communicability

- Tetanus is not transmitted from person to person.
- It is the only vaccine-preventable disease that is infectious but not contagious.

Transmission

- *C. tetani* usually enters the body through a wound.
- The spores germinate in the presence of anaerobic conditions.
- Toxins are produced and disseminated via blood and lymphatics.

Basic epidemiology

- The spores are widely distributed in soil and in the intestines and feces of horses, sheep, cattle, dogs, cats, rats, guinea pigs, and chickens.
- Manure-treated soil may contain large numbers of spores. In agricultural areas, a significant number of human adults may harbor the organism.
- The spores can also be found on skin surfaces and in contaminated heroin.
- Tetanus occurs worldwide but is most frequently encountered in densely populated regions in hot, damp climates with soil rich in organic matter.

Case definition

Approved by CSTE 1995 and 2010

Clinical case definition

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

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Case classification

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.

Confirmed

There is NO definition for “confirmed” tetanus.

Testing and Diagnosis

- There is no laboratory finding characteristic of tetanus; the diagnosis is entirely clinical.
- *C. tetani* is recovered from wounds in only about 30% of cases, and the organism is sometimes isolated from patients who do not have tetanus.
- Serum anti-tetanus antibody levels obtained before human tetanus immune globulin (TIG) is administered can support susceptibility if the results demonstrate very low or undetectable anti-tetanus antibody levels.
 - However, tetanus can occur in the presence of “protective” levels of antibodies (>0.1 IU by standard ELISA); therefore, serology can never exclude the diagnosis of tetanus.

Case investigation

Demographics

- Name
- Address
- DOB/Age
- Gender
- Race
- Ethnicity
- Country of birth
- Occupation/Setting
- Length of time in the U.S.

Outcome

- Recovered/deceased
- Date of death, postmortem examination results, cause of death

Reporting

- Source
- County
- Date reported

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Clinical information

- Date of symptom onset
- Type of tetanus disease
- Wound location and management, including receipt of tetanus toxoid (TT) or TIG
- Complications and intensive care treatment
- Hospitalizations (dates and duration of stay)
- Pre-existing conditions (e.g. diabetes, chronic otitis media)

Treatment

- Prophylaxis with Td/Tdap and TIG
- Date started

Vaccination history

- Type
- Manufacturer
- Number of doses, dates and lot numbers
- Reason, if not vaccinated
- Maternal vaccination (for neonatal cases)

Epidemiology

- Risk factors for disease (e.g. history of wound or injury, including gardening injuries, recent injection drug use, tattooing, or body piercing).
- For neonatal cases, maternal country of origin and number of years in the U.S.

Control measures

Patient Medical Management

- Wound Management
 - All wounds should be cleaned. Necrotic tissue and foreign material should be removed.
 - Antibiotic prophylaxis against tetanus is neither practical nor useful in managing wounds; proper immunization plays the more important role.
 - The need for active immunization, with or without passive immunization, depends on the condition of the wound and the patient's immunization history.
 - Persons with wounds that are dirty and major and who have had 0-2 prior doses of tetanus toxoid or have an uncertain history of prior doses should receive TIG as well as Td or Tdap regardless of vaccine history.
 - This is because early doses of toxoid may not induce immunity, but only prime the immune system. The TIG provides temporary immunity by directly providing antitoxin.

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Tetanus Wound Management^o				
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.

^oadapted from the CDC Epidemiology and Prevention of Vaccine-Preventable Diseases, a.k.a. the Pink Book, 12th edition

Treatment of Tetanus disease

- TIG is recommended for persons with tetanus. TIG can only help remove unbound tetanus toxin. It cannot affect toxin bound to nerve endings. Please consult the product insert for proper dosing.
- Intravenous immune globulin (IVIG) contains tetanus antitoxin and may be used if TIG is not available.
- If tetanic spasms are occurring, supportive therapy and maintenance of an adequate airway are critical.
- Because of the extreme potency of the toxin, tetanus disease does not result in tetanus immunity.
- Active immunization with tetanus toxoid should begin or continue as soon as the person's condition has stabilized.

TIG is available commercially and a supply should be maintained in facilities providing emergency care.

Vaccination

- Tetanus is almost entirely preventable through immunization. Rarely have cases of tetanus occurred in persons with a documented primary series of tetanus toxoid.
- Because tetanus is preventable, the possibility of failure to vaccinate should be assessed in every case.
- Complete DTaP/Tdap/Td information is available at:
<http://www.cdc.gov/vaccines/pubs/ACIP-list.htm#vacc>

Reporting

- A Confidential Case Report Form (DOH-389) must be submitted.
- The LHD must be notified as soon as a diagnosis of tetanus is suspected.
- The LHD must notify the NYSDOH Bureau of Immunization as soon as the case is reported to them.