
Tetanus: Questions and Answers

Information about the disease and vaccines

What causes tetanus?

Tetanus is caused by a toxin (poison) produced by a bacterium, *Clostridium tetani*. The *C. tetani* bacteria cannot grow in the presence of oxygen. They produce spores that are very difficult to kill as they are resistant to heat and many chemical agents.

How does tetanus spread?

C. tetani spores can be found in the soil and in the intestines and feces of many household and farm animals and humans. The bacteria usually enter the human body through a puncture (in the presence of anaerobic [low oxygen] conditions, the spores will germinate).

Tetanus is not spread from person to person.

How long does it take to show signs of tetanus after being exposed?

The incubation period varies from 3–21 days, with an average of eight days. The further the injury site is from the central nervous system, the longer the incubation period. The shorter the incubation period, the higher the risk of death.

What are the symptoms of tetanus?

The symptoms of tetanus are caused by the tetanus toxin acting on the central nervous system. In the most common form of tetanus, the first sign is spasm of the jaw muscles, followed by stiffness of the neck, difficulty in swallowing, and stiffness of the abdominal muscles.

Other signs include fever, sweating, elevated blood pressure, and rapid heart rate. Spasms often occur, which may last for several minutes and continue for 3–4 weeks. Complete recovery, if it occurs, may take months.

How serious is tetanus?

Tetanus has a high fatality rate. In recent years, tetanus has been fatal in about 11% of reported cases and as high as 18% in persons age 60 years and older, and 22% in unvaccinated persons.

What are possible complications from tetanus?

Laryngospasm (spasm of the vocal cords) is a complication that can lead to interference with breathing. Patients can also break their spine or long bones from convulsions. Other possible complications include hypertension, abnormal heart rhythm, and secondary infections, which are common because

of prolonged hospital stays.

Obviously, the high possibility of death is a major complication.

How is tetanus diagnosed?

The diagnosis of tetanus is based on the clinical signs and symptoms only. Laboratory diagnosis is not useful as the *C. tetani* bacteria often cannot be recovered from the wound of an individual who has tetanus, and conversely, can be isolated from the skin of an individual who does not have tetanus.

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

Tetanus bacilli live in the soil, so the most dangerous kind of injury involves possible contamination with dirt, animal feces, and manure. Although we have traditionally worried about deep puncture wounds, in reality many types of injuries can allow tetanus bacilli to enter the body. In recent years, a higher proportion of cases had minor wounds than had major ones, probably because severe wounds were more likely to be properly managed. 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, self-piercing, and self-tattooing. Injecting drug users are also at risk from tetanus.

I stepped on a nail in our yard. What should I do?

Any wound that may involve contamination with tetanus bacilli should be attended to as soon as possible. Treatment depends on your vaccination status and the nature of the wound. In all cases, the wound should be cleaned. Seek treatment immediately and bring your immunization record with you.

With wounds that involve the possibility of tetanus contamination, a patient with an unknown or incomplete history of tetanus vaccination needs a tetanus- and diphtheria-containing shot (Td or Tdap) and a dose of tetanus immune globulin (TIG) as soon as possible.

A person with a documented series of three tetanus- and diphtheria-containing shots (Td or Tdap) who has received a booster dose within the last ten years should be protected. However, to ensure adequate

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protection, a booster dose of vaccine may still be given if it has been more than five years since the last dose and the wound is other than clean and minor.

Is there a treatment for tetanus?

There is no “cure” for tetanus once a person develops symptoms, just supportive treatment and management of complications. The best “treatment” is prevention through immunization.

How common is tetanus in the United States?

Tetanus first became a reportable disease in the late 1940s. At that time, there were 500–600 cases reported per year. After the introduction of the tetanus vaccine in the mid-1940s, reported cases of tetanus dropped steadily.

During 1990–2001, a total of 534 cases of tetanus were reported. Most (56%) of these cases occurred among adults age 19–64 years and 38% were among persons age 65 years or older. An all-time low of 20 cases were reported in 2003.

Almost all cases of tetanus are in persons who have never been vaccinated, or who completed their childhood series, but did not have a booster dose in the preceding 10 years.

What is neonatal tetanus?

Neonatal tetanus is a form of tetanus that occurs in newborn infants, most often through the use of an unsterile cutting instrument on the unhealed umbilical stump. These babies usually have no temporary immunity passed on from their mother because their mother hasn't been vaccinated and therefore has no immunity.

Neonatal tetanus is very rare in the United States (only two cases have been reported since 1989), but is common in some developing countries. It caused more than 257,000 deaths worldwide each year in the years 2000 to 2003.

Can you get tetanus more than once?

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

When did tetanus vaccine become available?

The first tetanus toxoid (inactivated toxin) was produced in 1924 and was used successfully to prevent tetanus in the armed services during World War II. In the mid-1940s, tetanus vaccine was combined with diphtheria toxoid and inactivated pertussis vaccine to make the combination DTP vaccine for routine childhood immunization.

In 1991, the first DTaP product was licensed. It substituted an acellular form of the pertussis component for the whole-cell pertussis component. The pertussis component of this vaccine is a more purified “acellular” version, which produces fewer side effects.

In 2005, two new tetanus toxoid and diphtheria toxoids with acellular pertussis vaccine (Tdap) products were licensed. These vaccines are the first pertussis-containing vaccines that can be given to persons older than 7 years.

What kind of vaccine is the tetanus toxoid?

The tetanus vaccine is an inactivated toxin (poison) called a toxoid. It is made by growing the bacteria in a liquid medium and purifying and inactivating the toxin. Because it is not a live vaccine, a person's immunity tends to decline with time, which is why booster doses are recommended.

What's the difference between all the vaccines containing tetanus toxoid?

It's like alphabet soup! Tetanus toxoid is available as a single shot (TT) but is rarely given that way as it's best to also provide needed protection against other diseases at the same time. Tetanus toxoid can be combined with diphtheria toxoid as DT (for children younger than age 7 years) or as Td (for persons age 7 years and older). It can also be combined with diphtheria and pertussis as DTaP (for children younger than age 7 years) or as Tdap (for persons ages 10 through 64 years). Lastly, DTaP is also part of four childhood combination vaccines that include other vaccines (e.g., IPV, Hib, HepB).

How is this vaccine given?

The DTaP, DT, Td, and Tdap preparations are all given as an injection in the anterolateral thigh muscle (for infants and young toddlers) or in the deltoid muscle (for older children and adults).

Who should get this vaccine?

All infants and children should receive tetanus toxoid as part of their DTaP/Tdap vaccine series. Adults should be given a routine booster dose of Td every 10 years. Adults without documentation of ever receiving the basic series of tetanus and diphtheria toxoids should first receive a primary series of three doses, properly spaced. A single dose of Tdap is recommended for persons age 11 years and older in place of one of the Td doses, preferably the first one.

How many doses of DTaP vaccine are needed?

The usual schedule for infants is a series of four doses given at two, four, six, and 15–18 months of

age. A fifth shot, or booster dose, is recommended at 4–6 years of age, unless the fourth dose was given late (after the fourth birthday).

When should adolescents and adults get vaccinated against tetanus? Should they get vaccinated with Td or Tdap?

Immunization experts recommend that the first dose of Tdap be given at age 11–12 as a booster during the routine adolescent immunization visit if the adolescent has finished the childhood DTaP schedule and has not already received a dose of Td or Tdap.

Adults should continue to receive a booster dose of Td every ten years. Adults age 19–64 years who have never received Tdap should receive a single dose of Tdap to replace a single dose of Td so they can boost their resistance to pertussis as well. Adults who will be having close contact with an infant should receive Tdap vaccine even if they've recently received Td vaccine (see pertussis vaccine section for more information).

If someone experiences a deep or puncture wound, or a wound contaminated with dirt, an additional booster dose may be given if the last dose was more than five years ago. It is important to keep an up-to-date record of all immunizations so that repeat doses don't become necessary. Although it is vital to be adequately protected against tetanus, receiving more doses than recommended can lead to increased local reactions, such as painful swelling of the arm.

Who recommends this vaccine?

The Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics (AAP), the American Academy of Family Physicians (AAFP), and the American College of Physicians (ACP) all recommend this vaccine.

How safe is this vaccine?

Most children have no serious reactions from the combined DTaP vaccine. The most common reactions are local reactions at the injection site, such as soreness, redness, and swelling, especially after the fifth dose. Other possible reactions may include fussiness, fever, loss of appetite, tiredness, and vomiting. The use of the more purified DTaP instead of DTP has decreased these reactions substantially.

For adults receiving Td vaccine, localized non-serious side effects are common (redness, soreness, etc.) but are generally self-limiting and require no treatment.

What side effects have been reported with this vaccine?

Moderate to serious reactions are uncommon with DTaP vaccine. Such reactions include crying for three hours or more (up to about one child out of 1,000) and high fever (about one child out of 16,000). Most of these side effects are believed to be due to the pertussis component of the vaccine, and a child experiencing such a reaction may still be able to be protected against tetanus and diphtheria with the DT vaccine. More serious reactions, such as seizures, are so rare that it is hard to tell if they are caused by the vaccine.

As mentioned above, adults who received more than the recommended doses of Td vaccine can experience increased local reactions, such as painful swelling of the arm. This is due to the high levels of tetanus antibody in their blood.

The most frequently reported side effects following vaccination with Tdap were headache, generalized body aches, and tiredness.

Some of my patients describe having had a severe reaction to something they were given for tetanus many years ago. What could this be?

The allergic reactions these people experienced may have actually been serum sickness, a reaction to equine antitoxin. Equine antitoxin was the only product available for the prevention of tetanus prior to the mid 1940s. It was used for postexposure prophylaxis until the late 1950s, when tetanus immune globulin was introduced. Tetanus toxoid has never contained any horse protein.

How effective is tetanus-diphtheria toxoid (Td)?

Td is close to 100% effective for persons receiving the correct primary series (as a child or adult) and a routine booster dose every ten years. It is felt that Tdap vaccine will provide the same level of protection.

Who should NOT receive tetanus toxoid?

People who had a serious allergic reaction to a vaccine component or a prior dose of tetanus toxoid should not receive another.

Persons with a moderate or severe acute illness should postpone receiving the vaccine until they are improved. Most reactions to the combined DTaP vaccine are due to the pertussis component. Please see the "Pertussis" section for more information on possible precautions to the use of this vaccine.

Can the vaccine cause tetanus?

No. The vaccine is a toxoid, meaning it is a toxin that has been inactivated, and has demonstrated safety in numerous clinical trials.