# Tetanus Prevention, Prophylaxis and Wound/Injury Management Standard

Alberta Health Services
Communicable Disease Control

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| **Section 8** | Immunization of Specific Populations | **Standard # 08.400** | |
| **Created and approved by** | Provincial Immunization Program Standards and Quality | | |
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## Preamble

Alberta Health Services (AHS) Provincial Immunization Program Standards and Quality, Provincial, Population and Public Health Division provides Public Health and other partners who administer provincially funded vaccines, with ongoing and timely information relating to provincial immunization program standards and quality. These standards are based on current evidence based information, Alberta Health (AH) policy, and provincial and national guidelines. Immunizers must be knowledgeable about the specific vaccines they administer.

## Background

Tetanus is caused by tetanus bacilli, Clostridium tetani. They exist in two forms: anaerobic bacteria which live in the bowels of humans and animals, and spores which are produced by the bacteria in the intestines and are excreted in feces. The spores are in a protective pod; they do not multiply outside the body but are hardy and survive for many years in soil and dust. The organism occurs freely in nature.

Tetanus is an acute neurologic disease induced by an exotoxin of the tetanus bacillus which grows anaerobically at the site of an injury. The process begins with the introduction of spores into the tissue. The spores change into bacteria in the absence of oxygen. As the bacteria multiply and die, they produce a toxin that is released into the tissue. The toxin may enter the central nervous system along peripheral motor nerves or may be bloodborne traveling to the nervous tissue. History of an injury or apparent portal of entry is not always present. The clinical manifestations of tetanus are divided into four types: generalized, localized, cephalic and neonatal. The type reflects host factors and site of inoculation. See the Alberta public health disease management guidelines: Tetanus for further detail.

Tetanus is not transmitted person to person, and therefore herd immunity plays no role in its prevention.

The incubation period for tetanus disease is generally 3 to 21 days, but can range from one day to several months, with an average of 10 days. Symptoms include acute onset of severe, painful muscle spasms usually beginning in the jaw (lockjaw) and neck muscles. As the disease progresses, generalized rigidity and spasms can cause serious complications such as difficulty breathing due to spasms of the respiratory muscles, fractures, aspiration and pneumonia. The diagnosis is usually a clinical one, as laboratory confirmation of tetanus from culture of wounds is rare. The case fatality rate in individuals who are not immunized varies from 10% to over 80% and is highest in infants and the elderly. Recovery from disease may not result in protection.

Worldwide, tetanus disease causes 50,000 deaths annually, but disease is relatively uncommon in industrialized countries. It is more common in agricultural regions and in underdeveloped areas where immunization may not be adequate and there is increased contact with animal feces. Neonatal tetanus, arising from contamination of the umbilical cord, accounts for approximately 50% of all tetanus deaths in developing countries. The worldwide tetanus mortality rate is 50% with the highest rates in young and old patients and in people who use injection drugs.

Immunization with tetanus vaccine began in Alberta in 1947. Tetanus is rare in industrial countries now that tetanus immunization is widespread. Between 1990 and 2000, the average number of cases in Canada was five per year. In Alberta ten cases were reported from 1983 to 2003, the most recent in 2000 (one case) and 2001 (one case).

## Purpose

The purpose of this standard is to promote tetanus prevention following a tetanus-prone wound/injury through proper initial wound care, accurate identification of tetanus-prone wounds, assessment of immunization history and recommendations for tetanus post-exposure prophylaxis.

## Applicability

This standard applies to all health care providers assessing wounds (acute or chronic) for risk of tetanus disease and to those providing or recommending provincially funded tetanus-containing vaccines and/or tetanus immune globulin (TIG).

## Definitions:

**Tetanus disease:** Tetanus disease is commonly referred to as "lockjaw". It is characterized by muscle spasms, usually in a descending pattern beginning in the jaw muscles. As the disease progresses, prolonged frequent spasms may occur contributing to serious complications and death unless treatment is provided.

**Tetanus-prone wound/injury**: Any wound that is significantly contaminated with material likely to contain tetanus spores, for example soil, animal or human feces; or an injury with the presence of necrotic tissue.

**Tetanus Immune Globulin (TIG)**: A blood product for IM administration prepared from pooled human plasma of screened donors immunized with tetanus-containing vaccine. TIG provides immediate passive protection against tetanus until an exposed person mounts an immune response to the tetanus-containing vaccine administered concurrently with the TIG.

## Competency

In November 2008 the Public Health Agency of Canada published Immunization Competencies for Health Professionals with a goal of promoting safe and competent practices for immunization providers. The following competency is applicable to this standard:

- Administration of Immunizing Agents: Names the resources that are used to guide the immunization administration process and decision making.
- Populations Requiring Special Considerations: Appropriately refer to expert professionals/resources when required to address the immunization needs of certain populations.

## Section 1: Pre-Exposure Tetanus Prevention

Opportunities should be taken to educate the public about tetanus and that the disease is vaccine preventable. It is also important to emphasize proper wound care.

After a primary series, which is three doses of appropriately spaced tetanus-containing vaccine, more than 99% of immunized individuals develop protective antibodies against the effects of the neurotoxin. Immunization with tetanus-containing vaccine is the key to preventing tetanus disease. It is strongly recommended for all individuals in whom there is no contraindication to the vaccine. Complete protection consists of a primary series along with booster doses every 10 years, or earlier if a tetanus-prone wound has occurred (see section 3). The number of doses and type of tetanus-containing vaccine varies according to age. Recommendations are outlined in the Standard For Recommended Immunization Schedules and tetanus-containing vaccine biological pages.

**Important Immunization Opportunities**

Although opportunities should be taken to assess immunization status during each contact with a healthcare provider, special mention is warranted with the following groups due to an increased risk of unassessed or unrecognized tetanus-prone wounds, and/or an increased risk of incomplete immunization. Health programs targeting these groups should offer immunization with tetanus-containing vaccine and promote and facilitate access to provincial immunization programs.

- Individuals born before immunization programs were implemented
  - Includes, but is not limited to, patients and/or residents in health care institutions, including home care clients, especially those with abscesses, cellulitis, chronic ulcers, and other wounds
  - Information about the history of biologicals can be found in the Standard on History of Biologicals Administered in Alberta.
- Individuals with inadequate immunization documentation
  - Refer to the Standard for Individuals Presenting with Inadequate Immunization Documentation.
- People who inject illicit drugs.

## Section 2: Identification of a Tetanus-Prone Wound/Injury

A tetanus-prone wound/injury includes, but is not limited to:

- Wounds contaminated with dirt/dust, feces, soil and saliva (animal bites); puncture wounds; avulsions; and wounds resulting from missiles (gunshots), crushing, burns and frostbite
- Wounds with devitalized tissue
- Abscesses, cellulitis, chronic ulcers and other wounds in patients with diabetes mellitus or illicit injection drug use
- Wounds or burns that require surgical intervention that is delayed for more than six hours
- Clinical evidence of sepsis.

  **Note:**

  Tick or other insect bites would typically be regarded as clean, minor wounds. No TIG is required, even if an individual has not previously completed a vaccine series of three or more doses of tetanus containing vaccine.

  If the bite is very deep, for example the tick is embedded in tissue, or the wound is contaminated with dirt or soil, TIG may be considered at MOH discretion for individuals who have not completed a vaccine series of three or more doses of tetanus containing vaccine.

## Section 3: Guide To Tetanus Post-Exposure Prophylaxis

Once a tetanus-prone wound has been identified, the most important goals of tetanus post-exposure prophylaxis are:

- Remove the source of toxin production by timely, thorough injury/wound cleaning
- Neutralize any toxin which may have been released through high circulating concentrations of tetanus antibody
  - Effective levels of neutralizing antibody concentrations are achieved by either prior completion of a tetanus-containing vaccine series or the immediate administration of TIG.

### 3.1 Wound Cleaning

- Appropriate cleaning and where required, debridement of the wound
- Referral to a physician as necessary if further assessment or wound care is needed
- Appropriate use of antibiotics.

### 3.2 Assess History of Tetanus-Containing Vaccine

When a tetanus-prone wound occurs, it is important that an adequate assessment of the individual's immunization history is completed. This is to determine:

- Whether the individual has received an appropriately spaced primary series of at least three doses of tetanus-containing vaccine
- Date of last dose of tetanus-containing vaccine
- Previous reactions to tetanus-containing vaccines and/or TIG.

Assessment of immunization documentation, if available, is done at the time of client presentation to healthcare, with a tetanus-prone wound. Do not delay tetanus post-exposure prophylaxis if documentation of immunization is not immediately available. For example, when requesting and waiting for immunization records from another zone/province/country.

Adequate documentation is the only way to be certain of immunization history. For more information refer to the Standard for Individuals Presenting with Inadequate Immunization Documentation.

In the absence of adequate documentation, the decision to consider if immunizations are up to date, or not, is made together with the client. Counselling should include a discussion about:

- Risk of disease
- Factors that are associated with lack of immunity to tetanus, including but not limited to:
  - Increasing age
  - Birth outside Canada
  - Absence of immunization records
  - Awareness that parents refused immunizations
  - No recall of having received previous immunizations.

Based on the above discussion:

- If the client is not certain they have received at least three previous doses of tetanus-containing vaccine, and have inadequate documentation, they should be considered unimmunized or inadequately immunized:
  - Offer TIG and tetanus-containing vaccine as per Table 1 and Table 2, and
  - Refer to Public Health for completion of the primary series.
- If the client is certain at least three previous doses of tetanus-containing vaccine were received:
  - Document the discussion, and
  - Offer a booster dose, if indicated as per Table 1 and Table 2.
- For infants younger than six months, who have not received a full three dose primary series of tetanus-containing vaccine:
  - Determine the need for TIG with wound care based on the birth mother's documented tetanus-containing immunization history at the time of delivery.
  - Apply the guidelines in Table 1 based on the birth mother's immunization history.
- For infants six months of age and older:
  - Follow the guidelines in Table 1 based on the infant's immunization history.

## 3.3 Administration of Immunizing Agents

Offer TIG and/or tetanus-containing vaccine based on the immunization history as summarized in Table 1:

**Table 1: Guide to Tetanus Prophylaxis in Wound Management**

| History of Tetanus-containing vaccine | Clean minor wounds | | All other wounds | |
|---|---|---|---|---|
| | Tetanus-containing vaccine[1] | TIG[2] | Tetanus-containing vaccine[1] | TIG[2] |
| Unknown or less than 3 doses in vaccine series | Yes | No | Yes[1,3] | Yes[3] |
| 3 or more doses in a vaccine series and less than 5 years since last booster dose | No | No | No[1,4] | No[4] |
| 3 or more doses in a vaccine series and more than 5 years but less than 10 years since last booster dose | No | No | Yes[1] | No[4] |
| 3 or more doses in a vaccine series and 10 years or more since last booster dose | Yes[1] | No | Yes[1] | No[4] |

[1] See Table 2: Age Appropriate Tetanus-containing Vaccine. If the age appropriate vaccine is not available at the location where the client presents (emergency department), the client should be referred to Public Health as soon as practical, ideally within 24 hours. If it will be more than 72 hours before the client will be seen by Public Health, Tdap vaccine should be given, or contact with Public Health made after hours as per zone-specific processes

[2] Follow zone specific processes for accessing TIG.

[3] Administer at different anatomical sites using separate needles/syringes.

[4] Yes, if known to have an immune compromising condition, especially a humoral immune deficiency (HIV infection, agammaglobulinemia or hypogammaglobulinemia). Vaccine should be administered as well, regardless of the time elapsed since the last dose of tetanus-containing vaccine.

**Table 2: Age Appropriate Tetanus-containing Vaccine**

| Age | Age Appropriate Tetanus-containing Vaccine* |
|---|---|
| 2 months up to and including 6 years of age | DTaP-IPV-Hib-HB, DTaP-IPV-Hib, or Tdap-IPV |
| 7 years up to and including 17 years of age | Tdap or Tdap-IPV |
| 18 years of age and older | Tdap |
| *Refer to Standard For Recommended Immunization Schedules for complete recommendations. | |

- Give TIG as soon as possible after a tetanus-prone wound.
- If the individual is completely unimmunized, TIG can be considered up to 21 days post injury, with age appropriate tetanus-containing vaccine administered at the same time.
- There is minimal benefit in giving TIG more than one week after injury if:
  - the individual received a dose of tetanus-containing vaccine for the injury, and
  - TIG was delayed, and
  - the individual has a history of prior tetanus-containing vaccine.
- Give age-appropriate tetanus-containing vaccine at the same time as TIG.
  - Use a separate syringe/needle and a different anatomical site.
  - Complete the primary series of tetanus-containing vaccine in persons never immunized or partially immunized.

## Section 4: Referrals between Emergency Departments and Public Health

The provincially funded tetanus-containing vaccine supplied to Emergency Departments (ED) is tetanus, diphtheria and acellular pertussis (Tdap). TIG may be available in ED, depending on the zone, or in consultation with zone Public Health.

- Children up to and including six years of age have specific recommended vaccines and schedules. Refer to Public Health for tetanus-containing vaccine if indicated.
- For anyone needing follow-up doses of vaccine to complete a primary series, refer to Public Health.
- Inform client in ED, if a referral is being made to Public Health.

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