

# Appendix A: Disease-Specific Chapters

**Chapter: Tetanus**

Effective: February 2019

# Tetanus

Communicable

Virulent

**Health Protection and Promotion Act:  
O. Reg. 135/18 (Designation of Diseases)**

## 1.0 Aetiologic Agent

Tetanus (lockjaw) is caused by a neurotoxin produced by the bacterium *Clostridium tetani* (*C. tetani*).<sup>1,2</sup>

## 2.0 Case Definition

### 2.1 Surveillance Case Definition

Refer to [Appendix B](#) for Case Definitions.

### 2.2 Outbreak Case Definition

Not applicable.

## 3.0 Identification

### 3.1 Clinical Presentation

Tetanus is an acute disease that can manifest in four clinical forms based on presentation: local, cephalic, neonatal and generalized tetanus.<sup>3</sup>

Local tetanus is an uncommon condition in which persistent muscle contraction is limited to the area of injury but can most often progress to generalized tetanus.<sup>3,4</sup>

Cephalic tetanus is rare and involves the cranial nerves or can occur with otitis media.<sup>4</sup>

Neonatal tetanus is a form of generalized tetanus in newborn infants who do not have passive protection from maternal antibodies.<sup>3</sup>

Generalized tetanus is the most common manifestation of the disease occurring in approximately 80% of reported cases.<sup>4</sup> Generalized tetanus is characterized by painful muscle spasms, usually in a descending pattern beginning in the masseter muscle (trismus or lockjaw), followed by stiff abdominal muscles.<sup>1,2,4</sup> Abdominal rigidity is a common first presentation of disease in older children and adults.<sup>2</sup> Duration of spasms is generally three to four weeks, though recovery may take months.<sup>4</sup>

With disease progression, generalized prolonged frequent spasms may occur, contributing to serious complications and death unless treatment is provided.<sup>1</sup> Case-fatality ratios vary from 10% to over 80% in unvaccinated individuals; highest rates are found in infants and the elderly.<sup>1</sup>

## 3.2 Diagnosis

See [Appendix B](#) for diagnostic criteria relevant to the Case Definitions.

For further information about human diagnostic testing, contact the Public Health Ontario Laboratories or refer to the Public Health Ontario Laboratory Services webpage: <http://www.publichealthontario.ca/en/ServicesAndTools/LaboratoryServices/Pages/default.aspx>

## 4.0 Epidemiology

### 4.1 Occurrence

Between 2013 and 2017, an average of two cases occurred per year in Ontario.\*

Please refer to Public Health Ontario's (PHO) Reportable Disease Trends in Ontario reporting tool and other reports for the most up-to-date information on infectious disease trends in Ontario.

<http://www.publichealthontario.ca/en/DataAndAnalytics/Pages/DataReports.aspx>

Tetanus occurs worldwide, most commonly in densely populated regions and agricultural regions where contact with animal excreta is more likely and immunization rates are low.<sup>1,2</sup> While eliminated in North America, neonatal tetanus persists globally as a result of inadequate sterile procedures during delivery combined with the lack of protective passive immunity.<sup>1,4</sup>

For additional national and international epidemiological information, please refer to the Public Health Agency of Canada and the World Health Organization.

### 4.2 Reservoir

*C. tetani* spores are widely distributed worldwide in soil or on fomites contaminated with animal or human feces. Spores are also detected in the intestines of animals and humans as normal, harmless inhabitants.<sup>1,2</sup>

### 4.3 Modes of Transmission

Spores are introduced into the body through a break in the skin (e.g. puncture wound, animal bites, burns) or contaminated injectable street drugs, that have been contaminated with soil, street dust, or animal or human feces.<sup>1,2</sup>

### 4.4 Incubation Period

Usually three to 21 days (average eight days), with a range from one day to several months, depending on the character, extent and location of the wound; most cases occur within 14 days of exposure.<sup>2,4</sup> In general, shorter incubation periods are associated with more heavily contaminated wounds, more severe disease and a worse

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\*Data included in the epidemiological summary are from January 1, 2013 to December 31, 2017. Data were extracted from Query on February 7, 2018 and therefore are considered preliminary.

prognosis.<sup>2</sup> Incubation period for neonatal tetanus ranges from four to 14 days (average seven days) after birth.<sup>4</sup>

## 4.5 Period of Communicability

Not applicable; no direct person-to-person transmission.<sup>2</sup>

## 4.6 Host Susceptibility and Resistance

Susceptibility is general in unimmunized or inadequately immunized persons; active immunity is induced by the tetanus toxoid and persists for at least ten years after completion of the immunization series.<sup>1,5</sup> Due to waning immunity, booster doses with a tetanus toxoid-containing vaccine are required every ten years after the 4-6 year old booster immunization to maintain high levels of immunity.<sup>1</sup> Recovery from tetanus does not result in immunity or prevent recurrence, therefore active immunization is indicated after recovery.<sup>1,4</sup>

## 5.0 Reporting Requirements

As per Requirement #3 of the “Reporting of Infectious Diseases” section of the *Infectious Diseases Protocol, 2018* (or as current), the minimum data elements to be reported for each case are specified in the following:

- *Ontario Regulation 569* (Reports) under the *Health Protection and Promotion Act* (HPPA);<sup>6</sup>
- The iPHIS User Guides published by PHO; and
- Bulletins and directives issued by PHO.

## 6.0 Prevention and Control Measures

In the event that publicly funded vaccine doses are needed for case and contact management, the board of health should contact the Ministry of Health and Long-Term Care’s (ministry) immunization program at [vaccine.program@ontario.ca](mailto:vaccine.program@ontario.ca) as soon as possible.

### 6.1 Personal Prevention Measures

Immunize as per the current *Publicly Funded Immunization Schedules for Ontario*.<sup>7</sup>

In Ontario, the *Immunization of School Pupils Act (ISPA)* is the legislation that governs the immunization of school pupils for the designated diseases that are included in the Act. All students without a valid exemption must have documented receipt of tetanus toxoid containing vaccine according to the specified schedule.<sup>8</sup>

Completion of the primary series (at least three doses) induces more than 99% protective antibody levels against tetanus. The primary series is followed by booster doses at 18 months of age and four to six years of age. Booster doses with a tetanus toxoid containing vaccine should be received every ten years thereafter in adolescence and adulthood.<sup>1</sup>

In Ontario, the *Child Care and Early Years Act, 2014* (CCEYA) is the legislation that governs licensed child care settings. Pursuant to *Ontario Regulation 137/15* under the CCEYA, children who are not in school and who are attending licensed child care settings must be immunized as recommended by the local medical officer of health prior to being admitted. Under the CCEYA parents can provide a medical reason as to why the child should not be immunized or object to immunization on religious/conscience grounds.<sup>9</sup>

Tetanus toxoid is only available as a combination vaccine. Immunization with a tetanus toxoid containing vaccine is indicated in susceptible pregnant women, infants born prematurely and immunocompromised persons. However, these individuals should be referred to their health care provider for guidance on dose and type of combination vaccine.<sup>1</sup>

### **Post-exposure prophylaxis**

Post-exposure prophylaxis should follow the Canadian Immunization Guide.<sup>1</sup>

Achieving adequate effective neutralizing antibody concentrations at the time of the injury is only possible through prior completion of the tetanus toxoid-containing vaccine series or immediate administration of tetanus immune globulin (TIG).<sup>1</sup> Individuals who present with more than a minor wound and who are unimmunized or incompletely immunized (unknown or less than three doses) should receive both TIG and tetanus toxoid-containing vaccine as appropriate for age and vaccination history.<sup>1</sup> Previously immunized persons (three or more doses) may require a booster dose of a tetanus toxoid-containing vaccine, depending on the interval since the last booster and the type of wound.<sup>1</sup>

## **6.2 Infection Prevention and Control Strategies**

Routine practices are recommended for hospitalized cases. Isolation is not required.

Refer to PHO's website at [www.publichealthontario.ca](http://www.publichealthontario.ca) to search for the most up-to-date information on Infection Prevention and Control.

## **6.3 Management of Cases**

In addition to the requirements set out in the Requirement #2 of the "Management of Infectious Diseases – Sporadic Cases" and "Investigation and Management of Infectious Diseases Outbreaks" sections of the *Infectious Diseases Protocol, 2018* (or as current), the board of health shall investigate cases to determine the source of infection. Refer to Section 5: Reporting Requirements above for relevant data to be collected during case investigation. The following disease specific information should also be obtained during case management:<sup>5</sup>

- wound location and management, including receipt of tetanus toxoid-containing vaccine or TIG
- treatment – date started, prophylaxis with tetanus toxoid-containing vaccine or TIG

The primary goal in managing cases is to remove the source of toxin production and neutralizing toxin that may have been released by:

1. Timely, thorough cleaning of wound including removal of necrotic tissue and foreign materials;<sup>1,4</sup> and
2. Ensuring high circulating concentrations of tetanus antibody which inactivate the toxin.<sup>1</sup>

Treatment should be administered as per the attending health care provider. For further guidance please refer to the current Canadian Immunization Guide.<sup>1</sup>

Tetanus disease does not confer immunity since illness can be caused by a very small amount of toxin.<sup>4</sup> The case should begin or continue with tetanus toxoid-containing vaccinations after recovery.<sup>4</sup>

## 6.4 Management of Contacts

Not applicable; no direct person-to-person transmission.<sup>2</sup>

## 6.5 Management of Outbreaks

Not applicable.

## 7.0 References

1. National Advisory Committee on Immunization, Public Health Agency of Canada. Part 4- Active Vaccines: Tetanus Toxoid. 2014. In: Canadian Immunization Guide [Internet]. Ottawa, ON: Her Majesty the Queen in Right of Canada, [cited March 13, 2018]. Available from: <https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines.html?page=7>
2. Heymann DL, editor. Control of Communicable Diseases Manual. 20 ed. Washington, D.C: American Public Health Association; 2015.
3. Committee on Infectious Diseases, American Academy of Pediatrics. Section 3: Summaries of Infectious Diseases: Tetanus. In: Kimberlin DW, Brady MT, Jackson MA, Long SS, editors. Red Book: 2018 Report of the Committee on Infectious Diseases. 31 ed. Itasca, IL: American Academy of Pediatrics; 2018.
4. Centers for Disease Control and Prevention. Tetanus. 2015. In: Epidemiology and Prevention of Vaccine-Preventable Diseases [Internet]. 13 ed. Washington, DC: Public Health Foundation, [cited March 13, 2018]. Available from: <https://www.cdc.gov/vaccines/pubs/pinkbook/index.html>
5. Faulkner AE, Tiwari TSP. Tetanus. 2017. In: Manual for the Surveillance of Vaccine-Preventable Diseases [Internet]. Atlanta, GA: Centers for Disease Control and Prevention, [cited March 13, 2018]. Available from: <https://www.cdc.gov/vaccines/pubs/surv-manual/index.html>
6. Health Protection and Promotion Act, R.S.O. 1990, Reg. 569, Reports, (2018). Available from: <https://www.ontario.ca/laws/regulation/900569>

7. Ontario, Ministry of Health and Long-Term Care. Publicly Funded Immunization Schedules for Ontario: December 2016. Toronto, ON: Queen's Printer for Ontario; 2016. Available from:  
<http://www.health.gov.on.ca/en/pro/programs/immunization/schedule.aspx>
8. Immunization of School Pupils Act, R.S.O. 1990, c.I.1, (2018). Available from:  
<https://www.ontario.ca/laws/statute/90i01>
9. Child Care and Early Years Act, 2014, S.O. 2014, c. 11, Sched. 1, (2018). Available from: <https://www.ontario.ca/laws/statute/14c11>

## 8.0 Document History

**Table 1: History of Revisions**

<b>Revision Date</b>	<b>Document Section</b>	<b>Description of Revisions</b>
January 2014	General	New template.  Title of Section 4.6 changed from “Susceptibility and Resistance” to “Host Susceptibility and Resistance”  Title of Section 5.2 changed from “To Public Health Division (PHD)” to “To the Ministry of Health and Long-Term Care (the ministry) or Public Health Ontario (PHO), as specified by the ministry”  Section 9.0 Document History added.
January 2014	3.1 Clinical Presentation	Entire section revised.
January 2014	3.2 Diagnosis	Addition of direction to contact Public Health Ontario Laboratories or PHO website for additional information on human diagnostic testing.
January 2014	4.1 Occurrence	Entire section revised.
January 2014	4.2 Reservoir	Entire section revised.
January 2014	4.3 Modes of Transmission	Entire section revised.
January 2014	4.4 Incubation Period	Final sentence, “Incubation period for neonatal tetanus ranges from four to 14 days (average seven days) after birth”, added.

<b>Revision Date</b>	<b>Document Section</b>	<b>Description of Revisions</b>
January 2014	5.2 To the Ministry of Health and Long-Term Care (the ministry) or Public Health Ontario (PHO), as specified by the ministry	“The board of health shall notify the PHD of the MOHLTC immediately by phone upon receiving report” deleted.  Reporting timeframe changed from five to one business day of receipt of initial notification.
January 2014	6.1 Personal Prevention Measures	Entire section revised.
January 2014	6.2 Infection Prevention and Control Strategies	Entire section revised.  Addition of reference to PIDAC IPAC best practices documents.
January 2014	6.3 Management of Cases	Entire section revised.
January 2014	7.0 References	Updated.
January 2014	8.0 Additional Resources	Updated.
February 2019	General	Minor revisions were made to support the regulation change to Diseases of Public Health Significance. Tetanus is designated a disease of public health significance and is now classified as communicable. Common text included in all Disease Specific chapters: Surveillance Case Definition, Outbreak Case Definition, Diagnosis, Reporting Requirements, Management of Cases, and Management of Outbreaks. The epidemiology section and references were updated and Section 8.0 Additional Resources was deleted.
February 2019	6.0 Prevention and Control Measures	Updates regarding the ordering of publicly funded vaccines for case and contact management.
February 2019	6.1 Personal Prevention Measures	Updates to information on Immunization of School Pupils Act and Child Care and Early Years Act.



<b>Revision Date</b>	<b>Document Section</b>	<b>Description of Revisions</b>
February 2019	6.3 Management of Cases	Minor revisions to section.

