



Tetanus: information for health professionals

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1. Scope of this document

The scope of this document is to assist in the diagnosis, treatment and public health management of cases of tetanus. Detailed information on tetanus vaccine, the management of tetanus prone wounds and the national vaccination programme is available elsewhere.^{1,2.}

2. Causative organism²

Tetanus is caused by a neurotoxin produced by *Clostridium tetani*, an anaerobic spore-forming bacillus. Tetanus spores can be present in the gastrointestinal tract and faeces of horses and other animals. The spores are widespread in the environment, including in soil, and can survive hostile conditions for long periods of time. Transmission occurs when spores are introduced into the body, often through a puncture wound but also through trivial, unnoticed wounds, through injecting drug use, and occasionally through abdominal surgery. The incubation period of the disease is usually between 3 and 21 days, although it may range from one day to several months, depending on the character, extent and localisation of the wound.



3. Epidemiology of tetanus in England and Wales

The incidence of tetanus in the UK decreased following the introduction of national tetanus immunisation in 1961.¹ On average, over the last three decades, there have been less than ten cases of tetanus per year reported in England and Wales.⁴ Between 2001-2012, 88 cases of tetanus were reported to the HPA through multiple data sources (range 3-22 cases per year). The incidence of tetanus varied by age-group; the highest incidence was observed among individuals aged over 64 years old with few cases of tetanus reported amongst children. Of the cases with information on immunisations status, few were appropriately immunised for their age. There were six deaths reported from tetanus during this period, all in adults.

However, between July 2003 and September 2004, the first cluster of cases in people who inject drugs (PWID) in the UK was identified. This included 25 clinically diagnosed cases in young adults, of which two patients died (case fatality 8%).⁵ Potential sources of *C. tetani* in PWID include contamination of drugs, adulterants, paraphernalia, and skin. Intramuscular and subcutaneous drug use, in particular, is associated with tetanus infections.⁶ Following this cluster in 2003/4, only seven sporadic cases of tetanus were reported in PWID to the end of 2012.

4. Clinical features²

Tetanus can present with local fixed muscle rigidity and painful spasms confined to the area close to the site of injury or injection. Although localised tetanus can last weeks or months, it is more commonly a prodrome of generalised tetanus. The illness can progress for about two weeks.

Patients with generalised tetanus can present with local tetanus, or with symptoms of generalised tetanus ranging from mild trismus ('lockjaw'), neck stiffness and/or abdominal rigidity to full blown tetanus, including general spasticity, severe dysphagia, respiratory difficulties, severe and painful spasms, opisthotonus and autonomic dysfunction. Generalised tetanus is the most frequently recognised form.



Other forms are cephalic tetanus (a special form of localised tetanus, affecting the cranial nerve musculature) and neonatal tetanus, the latter of which has been eliminated from the UK since decades.

The over-all case-fatality rate among reported cases of tetanus in England and Wales between 1984 and 2000 was 29%.³ The severity of illness may be decreased by partial immunity.

5. Diagnosis

Tetanus is a clinical diagnosis³, defined as trismus with one or more of the following: spasticity, dysphagia, respiratory embarrassment, spasms or autonomic dysfunction. Severity can be graded as below:

Grading of severity	
Grade 1 (mild):	• mild to moderate trismus and general spasticity, little or no dysphagia, no respiratory embarrassment
Grade 2 (moderate):	• moderate trismus and general spasticity, some dysphagia and respiratory embarrassment, and fleeting spasms occur.
Grade 3a (severe):	• severe trismus and general spasticity, severe dysphagia and respiratory difficulties, and severe and prolonged spasms (both spontaneous and on stimulation).
Grade 3b (very severe):	• as for severe tetanus plus autonomic dysfunction, particularly sympathetic overdrive.

Laboratory confirmation of tetanus infection

Laboratory tests are available to support or confirm the diagnosis. Although a serum sample should be taken before administering immunoglobulin, **treatment of tetanus should never be delayed to wait for the laboratory result.** [See Appendix 1: Algorithm for diagnosis of tetanus]



Samples

1. Serum: This should be taken before immunoglobulin is given. At least 3 ml of serum or clotted blood are required.
2. Wound samples: If there is an obvious wound, tissue or a wound swab may be sent in cooked meat broth.
3. Isolates from culture: Suspect clinical isolates should be sent in cooked meat broth.

All samples should be sent together to the Respiratory and Vaccine Preventable Bacteria Reference Unit (RVPBRU), Public Health England, 61 Colindale Avenue London NW9 5EQ. Please notify the laboratory when sending samples (Tel; 0208 327 7289).

Testing

1. **Detection of IgG against tetanus in serum.** If the antibody level is **above** the protective threshold (>0.1 IU/ml) in a sample taken before the administration of immunoglobulin, this excludes current tetanus infection. An antibody level **around or below** the threshold supports, but does not confirm, a diagnosis of tetanus. If in doubt regarding interpretation of the result, please contact the Respiratory and Vaccine Preventable Bacteria Reference Unit (RVPBRU) for advice.
2. **Detection of toxin in serum.** This is a bio-assay and is only performed if the antibody level is below the protective threshold. Absence of toxin does not exclude tetanus. Cases requiring toxin testing should be discussed with the Gastrointestinal Bacteria Reference Unit (GBRU), Tel 0208 327 7539
3. **Detection of *C. tetani*** in wound material or from a pure isolate, by direct PCR and culture methods. A negative result does not exclude tetanus.



6. Clinical management

Clinical management of suspected tetanus includes:

- Wound debridement
- Antimicrobials including agents reliably active against anaerobes such as metronidazole
- Intravenous tetanus immunoglobulin (TIG) or Human Normal Immunoglobulin (Vigam)
- Vaccination with tetanus toxoid following recovery.

In January 2013, the HPA convened an expert working group to review the published evidence on the use of TIG for the treatment of clinically suspected tetanus. Whilst this review is being completed, the working group recommends the use of intravenous products only for the treatment of clinically suspected tetanus and whilst supplies of TIG remains limited, as an interim measure, intravenous HNIG (Vigam) is advised based on weight.

- For individuals less than 50 kg, 5,000 IU or 250mls intravenous HNIG (Vigam)
- For individuals over 50 kg, 10,000IU or 500mls intravenous HNIG (Vigam)

Healthcare Trusts should contact BPL (Bio Products Laboratory Tel: 020 8258 2200 for the supply. (see Health Protection Agency, HPA Tetanus Expert Working Group (2013

[Interim Guidance on the use of Tetanus Immunoglobulin for the treatment of Tetanus](#)

7. Occupational Health

Tetanus is not transmitted from person-to-person, so those caring for patients with tetanus are not at risk of acquiring tetanus from the patient. However, they should be considered for immunisation with tetanus/low dose diphtheria/inactivated polio



vaccine (Td/IPV) if they have not received the recommended five doses of tetanus-containing vaccine or are unsure about their vaccination status.

8. Preventative measures

8.1. Primary prevention

Effective protection against tetanus can be achieved through active immunisation with tetanus vaccine, which is a toxoid preparation. A total of five doses of vaccine at the appropriate intervals are considered to give lifelong immunity.¹ Single antigen tetanus vaccine (T) and combined tetanus/low dose diphtheria vaccine (Td) have been replaced by the combined tetanus/low dose diphtheria/inactivated polio vaccine (Td/IPV) for adults and adolescents for all routine uses in these age groups.¹¹ Recovery from tetanus may not result in immunity and vaccination following tetanus is indicated.

Tetanus prophylaxis in patients with tetanus-prone wounds is covered in the 'Green Book'¹ and in the HPA recommendations on the treatment and prophylaxis of tetanus during periods of shortages of TIG (see http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1210060163478). For tetanus prone wounds requiring TIG, human normal immunoglobulin for subcutaneous use (Subgam) may be given intramuscularly as an alternative if stocks of TIG are not available. The volume of Subgam required to achieve the equivalent of the recommended dose of 250iu of tetanus anti-toxin will be approximately 5mls – equivalent to one vial of 750mg.

Primary prevention of tetanus among PWID is possible through changing drug practises: smoking heroin rather than injecting it, and - where injecting cannot be avoided - to not inject into the muscle or under the skin. Advice for PWID is available

at <http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/Tetanus/Guidelines/>



8.2. Secondary prevention

Early treatment with immunoglobulin (TIG or HNIG) can be lifesaving (see section 6).

9. Reporting and Public Health management

Tetanus (local and generalised) is a notifiable disease by law and all suspected cases should be notified to the proper officer, normally the Consultant in Communicable Disease Control (CCDC), in the local Public Health England (PHE) Centre. Enhanced surveillance of tetanus for England is carried out by Health Protection Directorate within Public Health England. CCDCs are requested to inform Joanne White (Tel: 0208 327 7446, e-mail: joanne.white@phe.gov.uk) or Sarah Collins (Tel: 0208 327 7621, e-mail: sarah.collins@phe.gov.uk) using the enhanced surveillance questionnaire available at

<http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/Tetanus/Surveillance/>

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Appendix 1 : Algorithm for the diagnosis of tetanus



Contact numbers at Colindale 0208 200 4400
Respiratory & Vaccine Preventable Bacterial Reference Unit (RVPBRU) 7289 / 7270
Gastrointestinal Bacterial Reference Unit (GBRU) 77539