INFORMATION PAPER

Military Vaccine Agency 24 February 2006

SUBJECT: Tetanus and Tetanus Toxoid

1. Purpose. To describe tetanus and the vaccine to prevent it.

2. Facts.

a. Microbiology. Tetanus is an acute, often fatal disease caused by a toxin produced by *Clostridium tetani* bacteria. Tetanus involves generalized rigidity and painful convulsive spasms of skeletal muscles, occurring 3 to 21 days after infection. The muscle stiffness usually involves the jaw (lockjaw) and neck muscles, and then becomes generalized.

b. Epidemiology. Tetanus occurs globally. Cases occur more often in densely populated regions in hot, damp climates with soil rich in organic matter. The bacteria are found in the soil and in intestinal tracts of animals and humans. Transmission is primarily by contaminated wounds, which may be obvious wounds or minor breaks in the skin. In recent years, a higher proportion of cases involved minor injuries, especially puncture wounds, probably because severe wounds are more likely to be medically treated. Tetanus may occasionally follow elective surgical procedures, burns, crush wounds, ear infections, dental infections, and animal bites. It is the only vaccine-preventable disease that is not contagious from person to person. In the United States, tetanus is primarily a disease of older adults, with 11% of infected people dying despite intensive care.

c. Vaccine.

1. The vaccine against tetanus is a toxoid. Toxoids are a subset of vaccines. Toxoids are modified bacterial toxins, rendered nontoxic themselves which retain the ability to stimulate antitoxin formation (i.e., specific antibodies against the natural toxin). Toxoids cannot cause natural disease. Tetanus toxoid is one of the two components in tetanus and diphtheria toxoids adsorbed (Td) and tetanus toxoid, reduced dose diphtheria toxoid and acellular pertussis vaccine (Tdap). The lower case ’d’ in these two products reflects a reduced quantity of diphtheria toxoid than the vaccine (DT or DTaP) administered to children younger than 7 years old. Td is licensed for use in people 7 years or older and the Adacel™ brand of Tdap (manufactured by Aventis Pasteur) is licensed for use in people 19 to 64 years old. Boostrix® (manufactured by GlaxoSmithKline), another Tdap product, is licensed for use in people 10 to 18 years old only.

2. Tetanus toxoid was first produced in 1924 and was used extensively during World War II. Tetanus cases among American troops dropped from 70 in World War I (13.4 per 100,000 wounds and injuries) to 12 in World War II (0.44 per 100,000). Of the 12 cases, half had received no tetanus toxoid doses and the others received an incomplete series of doses. Tetanus toxoid is highly effective. A complete primary series induces antibodies that neutralize tetanus toxin for more than 10 years. Monovalent tetanus toxoid (TT) is not recommended, because people also need to maintain immunity to diphtheria

and pertussis. Increases in pertussis infections in adolescents and adults (probably due to waning immunity following primary immunization) resulted in recent licensing of Tdap for adolescents and adults to protect against pertussis.

d. Immunization.

1. Children: The primary DTaP vaccinating series (which protects against tetanus, diphtheria, and pertussis) consists of four doses, the first three doses given at 4- to 8-week intervals, beginning at 6 weeks to 2 months of age. The standard schedule is 2, 4, and 6 months of age, followed by a fourth dose given 6 to 12 months after the third dose, to maintain adequate immunity for the ensuing preschool years. Inject DTaP simultaneously with other indicated vaccines.

2. Adolescents: Administer a single dose of Tdap to 11 to 18 years old should receive one dose of Tdap instead of Td for booster immunization if they have completed the recommended childhood DTP/DTaP immunization series and have not received Td or Tdap. The preferred age for Tdap immunization is at 11 to 12 years of age to reduce the morbidity associated with pertussis in adolescents. For adolescents ages 11 to 18 years old who received Td, but not Tdap, are encouraged to receive a single dose of Tdap if they completed their childhood DTP/DTaP immunizations. An interval of 5 years between Td and Tdap is recommended to reduce the risk for local and systemic reactions after Tdap.

3. Adults: Administer a single dose of Tdap to replace a single dose of Td for booster immunization in adults who received their most recent tetanus-toxoid containing vaccine ≥ 10 years earlier. Tdap may be given at an interval as short as 2 years following most recent tetanus-toxoid containing immunization to protect against pertussis.

e. Cautions. The following people should not receive Td or Tdap vaccines: people with a history of serious allergic or neurologic reactions after a previous dose of tetanus toxoid, Tdap or any vaccine component. Some packages of the vaccine may contain thimerosal as a preservative. Defer vaccination of people with moderate to severe acute illnesses until they have recovered. However, the presence of minor illnesses, such as upper respiratory infections with or without fever, should not delay immunization.

f. Adverse Events. The most common adverse reactions after tetanus toxoid occur at the injection site (e.g., redness, warmth, edema, tenderness, urticaria, rash). Malaise, transient fever, pain, hypotension, nausea, and arthralgia may develop. Arthus-type hypersensitivity reactions may occur. They generally start 2 to 8 hours after injection and involve severe localized symptoms, mostly in people who received multiple booster doses.

g. DoD Policy.

1. Basic trainees and other accessions. Individuals with previous history of Td immunization receive a booster dose of Td or Tdap upon accession. For those individuals lacking a reliable history of prior immunization, initiate a primary series of Td

toxoid IAW ACIP guidelines. Unless there is reason to suspect otherwise (for example, childhood spent in a developing country, childhood immunizations not administered), receipt of the basic immunizing series may be assumed.

2. Military and civilian personnel. Administer booster doses of Td or Tdap to all personnel every 10 years.

3. All personnel. Following ACIP wound-management guidelines, in the treatment of contaminated wounds, administer a booster of Td or Tdap if more than 5 years have elapsed since the last dose of Td or Tdap. Tetanus immune globulin is warranted in treating contaminated wounds if the patient received fewer than three doses of a vaccine containing tetanus toxoid at any time, or if receipt of a prior basic immunizing series is unlikely.

3. References.

a. Advisory Committee on Immunization Practices. Preventing tetanus, diphtheria, and pertussis among adolescents: Use of tetanus toxoid, reduced diphtheria toxoid and acellular pertussis vaccines. MMWR 2006;55:1-43.

b. CDC disease information. www.cdc.gov/nip/diseases/tetanus/default.htm

c. Multiple resources (e.g., product insert, Vaccine Information Statements) assembled by Military Vaccine Agency: www.vaccines.mil/tetanus

LTC Stephen Ford/ 703-681-5101

Approved by COL Grabenstein