INFORMATION PAPER

Military Vaccine Agency
17 February 2011

SUBJECT: Poliomyelitis and Poliovirus Vaccine

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

2. Facts.

a. Microbiology. Poliomyelitis is a viral disease caused by the poliovirus, a member of the enterovirus subgroup. Enteroviruses are inhabitants of the intestinal tract and are stable at acid pH. There are three poliovirus subgroups, types P1, P2, or P3, but immunity to one serotype will not produce significant immunity to the other subgroups.

b. Disease. The virus enters through the mouth and replication occurs in the pharynx and gastrointestinal tract. The virus invades the lymphoid tissue, enters the bloodstream and may infect the cells of the central nervous system. Up to 95% of all polio infections are inapparent or asymptomatic, but persons may still shed the virus in the stool and transmit the virus to others.

Clinical presentation includes three syndromes, an upper respiratory tract infection, gastrointestinal disturbances, and an influenza-like illness. Less than 1% of poliovirus infections result in flaccid paralysis. Symptoms will develop for 2-3 days and progress to asymmetrical paralysis with diminished deep tendon reflexes. Many persons with paralytic poliomyelitis will recover completely and, in most, muscle function returns to some degree. Weakness or paralysis still present 12 months after onset is usually permanent.

c. Epidemiology. At one time poliovirus infection occurred throughout the world. Cases in the United States decreased rapidly after the introduction of the polio vaccine in 1955 and the last transmission of wild virus in the United States was in 1979. In 2008, only 1,655 confirmed cases of polio were reported globally and polio was endemic in four countries.

Humans are the only known reservoir of poliovirus, which is transmitted most frequently by persons with inapparent infections. Person-to-person spread of poliovirus via the fecal-oral route is the most important route of transmission, although the oral-oral route may account for some cases. Poliovirus is highly infectious, with seroconversion rates among susceptible household contacts of children nearly 100%, and greater than 90% among susceptible household contacts of adults.

d. Vaccine. The inactivated poliovirus vaccine is the only polio vaccine currently available in the United States. Sanofi Pasteur’s Poliovirus (IPOL) vaccine is a sterile

suspension of all three polioviruses serotypes. The vaccine is grown in vero cells and contains a preservative and trace amounts of antibiotics. Several combination vaccines contain IPV for use in the pediatric population. Use of the oral poliovirus vaccine (OPV) was discontinued in 2000 and is no longer available in the United States.

e. Cautions. IPV is contraindicated in persons with a history of hypersensitivity to a previous polio vaccine or any component of the vaccine including 2-phenoxyethanol, formaldehyde, neomycin, streptomycin, and polymyxin B. Defer vaccination of people with a moderate to severe acute, febrile illness until after recovery. No causal relationship between IPOL and Guillain-Barré syndrome (GBS) has been established.

f. Immunizations. IPOL is administered as a three dose primary series. Each 0.5-mL dose is administered intramuscularly or subcutaneously in the deltoid for adults or the mid-lateral aspect of the thigh for infants and small children.

All children should receive three doses of IPV at ages 2 months, 4 months, 6-18 months, and a booster dose at 4-6 years of age.

Adults who have previously completed a primary series of 3 or more doses and who are at increased risk of exposure to poliomyelitis should be given one dose of IPV. Adults, who have previously received less than a full primary series of OPV or IPV, regardless of the interval since the last dose, should receive the remaining doses of IPV.

g. Adverse Events. The most common adverse reactions after IPV are injection-site complaints, such as pain, swelling and redness. Because IPV contains trace amounts of streptomycin, polymyxin B, and neomycin, a spectrum of allergic reactions may occur among people sensitive to these antibiotics.

h. DoD Policy. All military accessions and officer candidates receive a single dose of IPV. This adult booster dose meets the readiness requirement for potential travel to areas where poliomyelitis remains endemic. For other adults and children, DoD follows guidelines of the Advisory Committee on Immunization Practices (ACIP).

3. References.

a. Centers for Disease Control and Prevention Updated Recommendations of the Advisory Committee on Immunization Practices (ACIP) Regarding Routine Poliovirus Vaccination. MMWR Weekly, August 7, 2009;58(30):829-830.

b. Centers for Disease Control and Prevention. Poliomyelitis Prevention in the United States: Updated Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 2000;49(No. RR-5):[1-22].

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

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