

INFORMATION PAPER

DHA-IHB
3 May 2016

SUBJECT: Poliomyelitis and Poliovirus Vaccine

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

2. Facts.

a. Microbiology. Poliovirus is a member of the enterovirus subgroup, family Picornaviridae. Enteroviruses are transient inhabitants of the gastrointestinal tract and are stable at acid pH. Picornaviruses are small, ether-insensitive viruses with an RNA genome. There are three poliovirus serotypes (P1, P2, and P3); immunity to one serotype does not produce significant immunity to the other serotypes. The poliovirus is rapidly inactivated by heat, formaldehyde, chlorine, and ultraviolet light.

b. Disease. Polio is an infectious disease caused by a virus that can infect the throat and intestinal tract. Person-to-person spread of poliovirus via the fecal-oral route is the most important means of transmission, although the oral-oral route may account for some cases. Most people infected with poliovirus have no symptoms or very mild symptoms. When symptoms are present, clinical presentation may be characterized by: influenza-like illness, upper respiratory tract infection, and/or gastrointestinal disturbances. Persons infected with poliovirus are most infectious from 7 to 10 days before and after the onset of symptoms, but poliovirus may be present in the stool for 3 to 6 weeks after acute infection. In a small number of patients, 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; however, for the less than 1% who develop paralysis it may result in permanent disability and even death. Weakness or paralysis still present 12 months after onset is usually permanent.

c. Epidemiology. Humans are the only known reservoir of poliovirus, which is transmitted most frequently by persons with unapparent infections. 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. In the pre-vaccine era, infection with poliovirus was common worldwide, with seasonal peaks and epidemics in the summer and fall in temperate areas. In the United States, the incidence of poliomyelitis declined rapidly after the introduction of polio vaccine in 1955 and the last case of indigenously acquired polio in the U.S. was in 1979. The Global Polio Eradication Initiative subsequently eliminated polio in the Americas, where the last wild poliovirus case was detected in 1991. Global Polio Eradication built upon the success in the Americas and made great progress in eradicating wild polio virus, reducing the number of reported polio cases worldwide by more than 99% since the mid-1980s. In spite of progress made in eradicating WPVs

globally, some countries are still at risk for local transmission or imported cases. In May 2014, the World Health Organization declared wild polio virus to be a Public Health Emergency of International Concern, with extra immunization requirements for entering and exiting the most affected countries.

d. Vaccine. The inactivated poliovirus vaccine (IPV) is the only polio vaccine currently available in the United States. The use of the oral poliovirus vaccine (OPV) was discontinued in 2000 in the United States; but OPV is still used as the preferred vaccine in many parts of the world.

(1) IPOL® (IPV), produced by Sanofi Pasteur, is a sterile suspension of all three poliovirus serotypes. IPV is indicated for active immunization of infants (as young as 6 weeks of age), children, and adults for the prevention of poliomyelitis caused by poliovirus Types 1, 2, and 3. A primary series of IPV consists of three doses, with a minimum interval of 4 weeks apart. A booster dose of IPV should be received after age 4 years. Administer each 0.5-mL dose intramuscularly or subcutaneously in the deltoid for adults or the mid-lateral aspect of the thigh for infants and small children. There is no latex in any component of the vial or syringe.

(2) There are three combination pediatric vaccines that contain inactivated polio vaccine:

(a) Pediarix® (DTaP-HepB-IPV) is produced by GlaxoSmithKline and contains DTaP, hepatitis B and IPV vaccines. Administer each 0.5-mL dose intramuscularly. Three doses of Pediarix® constitute a primary immunization series for IPV among children 6 weeks through 6 years of age. Pediarix is not approved for the polio booster dose. The tip caps of the prefilled syringes may contain latex.

(b) Kinrix® (DTaP-IPV) is produced by GlaxoSmithKline and contains DTaP and IPV. Administer each 0.5-mL dose intramuscularly. Kinrix® is licensed only for the booster dose of IPV among children 4 through 6 years of age. The tip caps of the prefilled syringes may contain latex.

(c) Pentacel® (DTaP-IPV/Hib) is produced by Sanofi Pasteur and contains DTaP, Hib, and IPV. Administer each 0.5-mL dose intramuscularly. Pentacel® is licensed for the first four doses of the component vaccines among children 6 weeks through 4 years of age (not licensed for children past 5 years); an additional booster dose of age-appropriate IPV-containing vaccine (IPV or DTaP-IPV [Kinrix]) should be administered at age 4-6 years. This will result in a 5-dose IPV vaccine series, which is considered acceptable by ACIP.

e. Immunizations. The childhood IPV series should be administered at ages 2 months, 4 months, and 6-18 months, with a booster dose at age 4--6 years. The minimum age for dose #1 is age 6 weeks. The minimum interval from dose #1 to dose #2, and from dose #2 to dose #3, is 4 weeks and the minimum interval from dose #3 to the booster dose is 6 months. The final dose in the IPV series should be administered

at age ≥ 4 years regardless of the number of previous doses. ACIP recommends that, when more than 3 doses are given before age 4, the minimum interval between the last dose and the booster dose should be at least 6 months to provide an optimum booster response. 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 (i.e., a total of 3 doses with at least 4 weeks between dose #1 and #2, and at least 6 months between dose #2 and #3). Polio vaccine may be given at the same time as other vaccines.

f. 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 IPV and Guillain-Barré syndrome (GBS) has been established.

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. If there is no documentation of at least one dose of polio vaccine as an adult, then service members must receive one dose of polio vaccine prior to traveling to endemic countries. For other adults and children, DoD follows guidelines of the CDC/ACIP.

i. Special Considerations. Recently the CDC and WHO issued interim guidance for polio vaccination for travel to and from countries affected by wild poliovirus and includes exit requirements for proof of polio vaccination when leaving the country at borders and airports. The polio vaccine requirements apply if persons are traveling to one of the following countries (that has active spread of poliovirus in the past 12 months) for more than 4 weeks, the government of the country may require proof of polio vaccination when exiting that country: Afghanistan, Cameroon, Equatorial Guinea, Ethiopia, Iraq, Israel, Nigeria, Pakistan, Somalia, and Syria. If given the polio vaccine before traveling to one of the countries listed, it should be documented on the International Certificate of Vaccination or Prophylaxis (IVCP), CDC 731 (Yellow shot record). [Official updates to country-specific vaccine requirements are found on CDC, WHO, and DoD resources:](#)

<http://wwwnc.cdc.gov/travel/news-announcements/polio-guidance-new-requirements>

<http://www.who.int/ith/updates/20140612/en/>

http://www.vaccines.mil/documents/2870_IP-PolioVaccinationRecommendations.pdf

3. References.

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

<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5830a3.htm>

b. Centers for Disease Control and Prevention. Poliomyelitis. In: Epidemiology and Prevention of Vaccine-Preventable Diseases, 13th Edition, 2015.

<http://www.cdc.gov/vaccines/pubs/pinkbook/polio.html>

c. Centers for Disease Control and Prevention. Poliomyelitis. In: Health Information for International Travel 2016.

<http://wwwnc.cdc.gov/travel/yellowbook/2016/infectious-diseases-related-to-travel/poliomyelitis>

d. Centers for Disease Control and Prevention. Interim CDC Guidance for Polio Vaccination for Travel to and from Countries Affected by Wild Poliovirus. MMWR 2014;63(27):591-4.

http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6327a4.htm?s_cid=mm6327a4_w and related guidance: wwwnc.cdc.gov/travel/news-announcements/polio-guidance-new-requirements

e. Multiple resources (e.g., package insert, Vaccine Information Statements) assembled by DHA-IHB: www.health.mil/polio.

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