Poliovirus Vaccine Inactivated

AHFS Class: 80:12 — Vaccines (tofc-80)

Poliovirus Vaccine Inactivated *(AHFS DI)*

Alert:

On January 5, 2026, the US Department of Health and Human Services (HHS) announced the approval of a revised US childhood and adolescent immunization schedule (https://www.cdc.gov/vaccines/hcp/imz-schedules/child-adolescent-age.html (https://www.cdc.gov/vaccines/hcp/imz-schedules/child-adolescent-age.html)). Under the revised recommendations, CDC continues to organize the childhood immunization schedule in three distinct categories (Immunizations Recommended for All Children, Immunizations Recommended for Certain High-Risk Groups or Populations, and Immunizations Based on Shared Clinical Decision-Making) but changes individual vaccine placement within those categories. For additional information, see https://www.hhs.gov/press-room/cdc-acts-presidential-memorandum-update-childhood-immunization-schedule.html (https://www.hhs.gov/press-room/cdc-acts-presidential-memorandum-update-childhood-immunization-schedule.html) .

Introduction

Poliovirus vaccine inactivated (IPV) is an inactivated virus vaccine.[1,] IPV contains 3 strains of inactivated poliovirus (types 1, 2, and 3) and is used to stimulate active immunity to poliovirus.[1,]

Uses

▪ Prevention of Poliomyelitis Infection

Poliovirus vaccine inactivated (IPV) is used to prevent poliomyelitis by stimulating active immunity to poliovirus types 1, 2, and 3.[1,] IPV is the only poliovirus vaccine commercially available in the US.[1,105,115,166,] IPV also is commercially available in fixed-combination vaccines containing diphtheria, tetanus, pertussis, and poliovirus antigens (DTaP-IPV; Kinrix®, Quadracel®);[221,223,] a fixed-combination vaccine containing diphtheria, tetanus, pertussis, hepatitis B (HepB), and poliovirus antigens (DTaP-HepB-IPV; Pediarix®);[106,] a fixed-combination vaccine containing diphtheria, tetanus, pertussis, poliovirus and *Haemophilus influenzae* type b (Hib) antigens (DTaP-IPV/Hib; Pentacel®);[224,] and a fixed-combination vaccine containing diphtheria, tetanus, pertussis, poliovirus, Hib, and HepB antigens (DTaP-IPV/Hib/HepB; Vaxelis®).[236,] Other poliovirus vaccines (e.g., poliovirus vaccine live oral [OPV]; no longer commercially available in the US) may be available in other countries.[9,115,166,]

Poliomyelitis (also called polio) is a serious, disabling disease caused by the poliovirus, an *Enterovirus* in the family *Picornaviridae*.[237,] Polio is a highly contagious virus that is primarily spread via the fecal-oral route.[1,237,] While most people infected with poliovirus have no symptoms, up to 25% of infected people may experience flu-like symptoms such as sore throat, fever, fatigue, nausea, headache, or abdominal pain.[166,237,] A small proportion of patients infected with poliovirus will develop serious CNS symptoms, including meningitis or paralysis.[166,237,] Paralysis from the poliovirus can cause permanent disability and death due to impairment of the ability to breathe.[166,237,] Patients with a previous paralytic polio infection can also develop a post-polio syndrome with recurrent symptoms of irreversible muscle weakness occurring decades after recovery from their initial infection.[166,237,]

The most effective method of protecting against polio is vaccination with the polio vaccine.[237,] Following vaccination with 2 doses of IPV, the vaccine is approximately 90% effective; vaccine efficacy increases to approximately 99% following 3 doses.[166,] While the duration of protection following vaccination with IPV is not known, patients are likely to be protected for many years following a complete series of IPV.[238,] Although immunization regimens that used poliovirus vaccine live oral (OPV; no longer commercially available in the US) or sequential IPV/OPV regimens that used both types of vaccines were previously used for primary immunization against poliomyelitis in the US, recommendations changed in 2000 to support use of an all-IPV regimen to eliminate the risk of vaccine-associated paralytic polio (VAPP) associated with the OPV.[1,9,166,]

Since the introduction of vaccines for prevention of poliomyelitis, the virus is no longer endemic in the US.[238,] The last case of wild polio in the US occurred in 1979 and the last case of VAPP occurred in 1999 (before the switch to an all-IPV vaccination regimen in the year 2000).[166,237,] Outside of the US, wild poliovirus types 2 and 3 have been eradicated (in 2015 and 2019, respectively), and wild poliovirus type 1 remains endemic only in Pakistan and Afghanistan.[166,239,] Although it is no longer available in the US, the OPV is still used in many countries outside of the US.[240,] In non-US communities with very low immunity against the poliovirus, strains of the virus used in the OPV can circulate amongst unvaccinated people and mutate over time to a form of the virus that can cause illness and paralysis (termed circulating vaccine-derived polioviruses [VDPVs]).[184,] Most people in the US are protected from polio since the IPV series is included as part of routine childhood immunizations; however, unvaccinated individuals in the US are still at risk of infection with polio when traveling outside of the US to endemic regions or countries that use the OPV (via VAPP or circulating VDPVs).[240,241,242,]

Primary Vaccination

The US Centers for Disease Control and Prevention (CDC)'s Advisory Committee on Immunization Practices (ACIP) and other organizations (e.g., American Academy of Pediatrics [AAP]) recommend that all infants and children receive primary immunization against poliomyelitis with 4 doses of IPV, usually initiated at 2 months of age.[1,9,105,199,246,] The remaining 3 doses are typically administered at 4 months of age, 6–18 months of age, and 4–6 years of age, respectively.[1,9,105,199,246,]

ACIP, AAP, and other organizations also recommend catch-up vaccination for all children and adolescents 17 years of age or younger who are unvaccinated or incompletely vaccinated against poliomyelitis.[105,199,246,] As of June 2023, ACIP also recommends primary immunization against poliomyelitis with IPV, administered as a 3-dose series, in adults 18 years of age or older who are known or suspected to be unvaccinated or incompletely vaccinated against poliomyelitis.[2,200,]

Primary immunization against poliomyelitis can be integrated with age-appropriate primary immunization against diphtheria, tetanus, pertussis, hepatitis A, HepB, Hib, human papillomavirus (HPV), influenza, pneumococcal disease, meningococcal disease, measles, mumps, rubella, rotavirus, and varicella.[9,105,199,243,]

ACIP and the Hospital Infection Control Practices Advisory Committee of the US Public Health Service (HICPAC) state that primary immunization with IPV is recommended for previously unvaccinated healthcare personnel who are at greater risk for exposure to polioviruses than the general population.[235,] This includes laboratory workers who handle specimens that might contain polioviruses and health-care personnel who have close contact with patients who may be excreting wild-type poliovirus, including those who travel to work in areas where polioviruses are circulating.[235,]

Unvaccinated healthcare and laboratory personnel at increased risk of exposure to polioviruses should receive primary immunization with a complete 3-dose series of IPV.[235,] Those who previously received routine immunization against poliomyelitis in childhood should receive a single supplemental (booster) dose of IPV if they remain at increased risk for exposure.[235,] Available data to date do not indicate a need for more than a single lifetime booster dose of IPV in adults.[235,]

The ACIP states that IPV can be administered to pregnant women who are at risk for exposure to wild-type poliovirus (i.e., travelers to areas where polio is epidemic or endemic; members of communities or specific population groups with disease caused by wild polioviruses; laboratory workers who handle specimens that could contain polioviruses; healthcare personnel with close contact to patients who could be excreting wild polioviruses; and unvaccinated people whose children will be receiving the oral poliovirus vaccine).[245,]

The ACIP makes recommendations regarding vaccination of internationally adopted children and other immigrants.[245,] In such patients, when the immunogenicity of vaccines previously received or the completeness of vaccine series is in question, healthcare providers can repeat the vaccinations or utilize serologic testing to determine which vaccines may be needed (if serologic tests are available to document protection against infection).[245,] For the poliovirus vaccine, the ACIP recommends revaccination with IPV for patients vaccinated outside the US who have no (or questionable) vaccination records.[245,]

ACIP, AAP, CDC, and other experts state that recommendations regarding use of inactivated vaccines in HIV-infected adults, adolescents, and children are the same as those for individuals who are not infected with HIV.[3,105,155,156,] The possibility that inactivated vaccines, including IPV, may be less immunogenic in immunocompromised individuals should be considered.[105,]

Because there is evidence that antibody titers to vaccine-preventable diseases decrease 1–4 years after autologous or allogeneic hematopoietic stem cell transplants, ACIP recommends that these patients be routinely revaccinated after hematopoietic stem cell transplant, regardless of the source of the transplant.[3,] These experts state that revaccination with inactivated vaccines (e.g., IPV) should generally be initiated 6 months after the procedure.[3,]

The CDC recommends completion of the recommended age-appropriate polio vaccine series prior to travel to areas where wild-type poliovirus or VDPV is circulating.[115] Adults traveling to such areas who have completed a primary series may receive a single lifetime IPV booster dose.[115,] Travelers to countries that border areas with wild-type poliovirus or VDPV circulation and who have a high risk for exposure to someone with imported infection may also receive a single lifetime IPV booster.[115,] The CDC Travelers' Health website (https://wwwnc.cdc.gov/travel (https://wwwnc.cdc.gov/travel)) should be consulted for specific information regarding countries or areas where wild-type poliovirus is circulating and the most current information regarding vaccination requirements for travelers.[115,]

Combination Vaccines Containing IPV and Other Antigens

When indicated based on the age and vaccination status of the child and when there are no contraindications to any of the individual components, combination vaccines containing IPV and other antigens can be used instead of separate injections.[105,166,] ACIP, AAP, and other experts state that a combination vaccine generally is preferred over separate injections of the equivalent component vaccines; considerations include provider assessment (e.g., number of injections, vaccine availability, likelihood of improved coverage, likelihood of patient return, storage requirements, cost), patient preference, and potential for adverse effects.[105,243,]

When there are no contraindications to any of the individual components, the commercially available fixed-combination vaccine containing diphtheria, tetanus, pertussis, and poliovirus antigens (DTaP-IPV; Kinrix®) can be used in children 4 through 6 years of age to provide the fifth dose of the DTaP vaccination series and the fourth dose of the IPV vaccination series in those receiving primary immunization with Infanrix® (DTaP) and/or Pediarix® (DTaP-HepB-IPV).[223,] Alternatively, the commercially available fixed-combination vaccine containing diphtheria, tetanus, pertussis, and poliovirus antigens (DTaP-IPV; Quadracel®) can be used in children 4 through 6 years of age to provide the fifth dose of the DTaP vaccination series and the fourth or fifth dose of the IPV vaccination series in those receiving primary immunization with Daptacel® (DTaP), Pentacel® (DTaP-IPV/Hib) , and/or Vaxelis® (DTaP-IPV-Hib-HepB).[221,]

The commercially available fixed-combination vaccine containing diphtheria, tetanus, pertussis, HepB, and poliovirus antigens (DTaP-HepB-IPV; Pediarix®) can be used for a 3-dose immunization series in infants and children 6 weeks through 6 years of age when there are no contraindications to any of the individual components.[106,] Pediarix® should not be used for the initial dose of HepB vaccine that is indicated in neonates.[166,] For prevention of poliomyelitis in infants and children 6 weeks through 6 years of age, Pediarix® may be used for the initial 3 doses in the IPV series or may be used to complete the first 3 doses of the IPV series in those who have received 1 or 2 doses of another IPV vaccine.[106,]

When doses of DTaP, IPV, and Hib vaccine are indicated in infants and children 6 weeks through 4 years of age and there are no contraindications to any of the individual components, a kit (DTaP-IPV/Hib; Pentacel®) containing a fixed-combination DTaP-IPV vaccine and Hib vaccine (ActHIB®) can be used as a 4-dose vaccination series.[224,] For prevention of poliomyelitis, children who receive the 4-dose series of Pentacel® at 2, 4, 6, and 15–18 months of age should receive a fifth dose of IPV vaccine at 4–6 years of age.[224,] Although Pentacel® may be used in infants and children 6 weeks through 4 years of age who previously received 1 or more doses of another IPV vaccine, data are not available on safety and immunogenicity in such infants and children.[224,]

The commercially available fixed-combination vaccine containing diphtheria, tetanus, pertussis, Hib, HepB, and poliovirus antigens (DTaP-IPV-Hib-HepB; Vaxelis®) can be used for a 3-dose immunization series in infants and children 6 weeks through 4 years of age when there are no contraindications to any of the individual components.[236,] Vaxelis® should not be used for the initial dose of hepatitis B vaccine that is indicated in neonates.[166,] Although Vaxelis® may be used in infants and children who previously received 1 or 2 doses of another IPV vaccine, data are not available on safety and effectiveness in such infants and children.[236,]

Outbreak Control

National surveillance for poliomyelitis and investigation of suspected cases is conducted by CDC in collaboration with local and state health departments.[244,] A suspected case of poliomyelitis or nonparalytic poliovirus infection, regardless of whether wild-type or vaccine-derived poliovirus is involved, should be considered a public health emergency and requires immediate epidemiologic investigation.[244,] If a suspected case occurs, the CDC Emergency Operation Center at 770-488-7100 should be consulted regarding collection of appropriate clinical specimens for virus isolation and serology, procedures to rule out or confirm poliomyelitis, and evaluation of the likelihood that the disease may be caused by wild-type or vaccine-derived poliovirus.[244,]

Dosage and Administration

▪ General

Pretreatment Screening

All known precautions to prevent adverse reactions, including a review of the patient's history with respect to possible hypersensitivity to the vaccine or similar vaccines, should be considered.[1,]

Other General Considerations

Syncope (vasovagal or vasodepressor reaction; fainting) may occur following vaccination.[1,] Procedures should be in place to avoid injury from fainting.[1,]

Epinephrine and other appropriate agents should be available in case an immediate allergic reaction occurs following administration of IPV.[1,]

Additional vaccine doses should not be administered to individuals who developed anaphylaxis or anaphylactic shock within 24 hours after a previous dose.[1,]

▪ Administration

Poliovirus vaccine inactivated (IPV; IPOL®) is administered by IM or subcutaneous injection.[1,] IPV should not be administered IV.[1,]

Fixed-combination vaccines containing IPV and diphtheria, tetanus, and pertussis antigens (DTaP-IPV; Kinrix®, Quadracel®),[221,223,] the fixed-combination vaccine containing IPV and diphtheria, tetanus, pertussis, and hepatitis B antigens (DTaP-HepB-IPV; Pediarix®),[106,] the fixed-combination vaccine containing IPV and diphtheria, tetanus, pertussis, and *Haemophilus influenzae* type b (Hib) antigens (DTaP-IPV/Hib; Pentacel®),[224,] and the fixed-combination vaccine containing IPV and diphtheria, tetanus, pertussis, hepatitis B (HepB) antigens, and Hib antigens (DTaP-HepB-IPV/Hib; Vaxelis®)[236,] are also commercially available for use when such vaccines are indicated; consult the prescribing information for these fixed-combination vaccines for additional details.[106,221,223,224,236,]

When multiple vaccines are administered during a single health-care visit, each vaccine should be given with a different syringe and at a different injection site.[134,] Injection sites should be separated by at least 1 inch (if anatomically feasible) to allow appropriate attribution of any local adverse effects that may occur.[134,]

IPV is administered in 0.5-mL doses.[1,] Each 0.5-mL dose of IPV commercially available for use in the US contains 40 D antigen units (DU) of poliovirus type 1 (Mahoney strain), 8 DU of poliovirus type 2 (MEF-1 strain), and 32 DU of poliovirus type 3 (Saukett strain).[1,]

Prior to administration, IPV should be inspected visually for particulate matter and discoloration.[1,] The vaccine should be shaken well immediately prior to administration and should appear as a clear and colorless suspension.[1,]

IPV should not be mixed with any other vaccine or solution.[1,]

IPV should be refrigerated at 2–8°C, protected from light, and should not be frozen.[1,]

IM Injection

Depending on patient age, IM injections of IPV should be made into the anterolateral muscles of the thigh or deltoid muscle of the arm.[1,134,] In infants and children 6 weeks though 2 years of age, IM injections should preferably be made into the anterolateral thigh;[1,134,] alternatively, the deltoid muscle can be used in those 1 through 2 years of age if muscle mass is adequate.[134,] In adults, adolescents, and children 3 years of age or older, IM injections should preferably be given in the deltoid muscle.[1,134,] For infants and children receiving >2 vaccines in a single limb, the thigh is the preferred site due to greater mass.[134,] For older children and adults, more than one IM injection can be administered into the deltoid muscle.[134,]

If the gluteal muscle is chosen for infants younger than 12 months of age because of special circumstances (e.g., physical obstruction of other sites), it is essential that the clinician identify anatomic landmarks prior to injection.[134,]

To ensure delivery into muscle, IM injections should be made at a 90° angle to the skin using a needle length appropriate for the individual's age and body mass, thickness of adipose tissue and muscle at the injection site, and injection technique.[134,]

Subcutaneous Injection

Subcutaneous injections of IPV should be made into the upper-outer triceps area or anterolateral thigh.[134,] For infants younger than 1 year of age, subcutaneous injections should preferably be administered into the anterolateral thigh; subcutaneous injections can also be administered into the upper-outer triceps of an infant, if necessary.[134,] In adults, adolescents, and children, the upper-outer triceps area is preferred.[134,]

To ensure appropriate delivery, subcutaneous injections should be made at a 45° angle using a 5/8-inch, 23- to 25-gauge needle.[134,]

▪ Dosage

IPV is administered in 0.5-mL doses.[1,]

The poliovirus vaccine dosing schedule varies according to the individual's age and immunization status.[1,199,246,]

A history of clinical poliomyelitis (usually caused by only a single poliovirus type) or a history of incomplete immunization with poliovirus live oral vaccine (OPV) does not contraindicate use of IPV; therefore, the vaccine may be used to complete primary immunization in such individuals.[1,]

Interruption of the recommended immunization schedule, regardless of the length of time between doses, does not interfere with the final immunity achieved and does not necessitate additional doses or starting the series over.[1,]

Primary Immunization

Infants and Children 6 Weeks Through 6 Years of Age.

For primary immunization against poliomyelitis in infants and children 6 weeks through 6 years of age, a 4-dose IPV regimen is recommended.[1,199,246,]

The US Centers for Disease Control and Prevention (CDC)'s Advisory Committee on Immunization Practices (ACIP), the American Academy of Pediatrics (AAP), and the manufacturer recommend that IPV doses be administered at 2 months, 4 months, 6 through 18 months, and 4 through 6 years of age.[1,199,246,] Under no circumstances should IPV doses be administered more frequently than 4 weeks apart.[1,]

The initial IPV dose may be given as early as 6 weeks of age,[1,199,246,] but only if considered necessary because of imminent exposure to circulating poliovirus (e.g., during an outbreak, travel to a region where poliovirus is endemic).[199,246,]

For catch-up vaccination in previously unvaccinated children 4 months through 6 years of age who did not receive IPV at the usually recommended time in early infancy, a 4-dose regimen is recommended.[199,246,] During catch-up vaccination, the ACIP and AAP recommend that at least 4 weeks elapse between the first and second dose, and at least 4 weeks if the child is younger than 4 years of age before the third dose.[199,246,] The fourth dose should be administered at 4 through 6 years of age.[199,246,] However, a fourth dose is not necessary if the third dose was given at 4 years of age or older and at least 6 months after the previous dose.[199,246,]

Children and Adolescents 7 Through 17 Years of Age.

For primary immunization against poliomyelitis in children and adolescents 7 through 17 years of age, a 4-dose series of IPV is recommended.[1,199,246,]

To complete the vaccination series in children 7 through 17 years of age who are incompletely vaccinated, a fourth dose is not necessary in those who received the third dose at 4 years of age or older and at least 6 months after the previous dose.[199,246,]

Regardless of current age, a fourth dose is necessary in those who received a vaccination series that included both IPV and OPV.[199,]

The minimum interval between the first and second IPV dose and between the second and third IPV dose is 4 weeks; the minimum interval between the third and fourth IPV dose is 6 months.[199,]

Adults.

The ACIP recommends that all adults known or suspected to be unvaccinated complete a primary series with IPV, which consists of 3 doses.[1,2,] The recommended schedule for adults is two 0.5 mL doses given 4–8 weeks apart and a third 0.5 mL dose given 6–12 months after the second dose.[1,]

Adults who have not received the complete primary series of IPV and who are at increased risk of exposure to poliovirus, including those who have received at least one dose of OPV, fewer than 3 doses of any IPV vaccine, or fewer than 3 doses of a combination of OPV and IPV, should receive at least one 0.5 mL dose of IPV; additional doses should be given to complete a primary series if able.[1,]

When an accelerated immunization schedule is required to provide protection against poliomyelitis (e.g., for international travel to areas where poliomyelitis is endemic or epidemic), adults should receive 3 doses of IPV given at least 4 weeks apart.[1,] If only 1 or 2 months are available before protection is needed, 2 doses of IPV should be given at least 4 weeks apart.[1,] If less than 1 month is available before protection is needed, a single dose of IPV should be administered.[1,]

Adults who previously received a complete 3-dose primary series of IPV or OPV or a combination of IPV and OPV in childhood and who are at an increased risk of exposure to poliovirus should receive a single supplemental (booster) dose of IPV.[1,2,] Available data indicate that adults do not require more than 1 lifetime booster dose of IPV.[2,]

▪ Special Populations

Hepatic Impairment

The manufacturer makes no specific dosage recommendations for patients with hepatic impairment.[1,]

Renal Impairment

The manufacturer makes no specific dosage recommendations for patients with renal impairment.[1,]

Geriatric Patients

The manufacturer makes no specific dosage recommendations for geriatric patients.[1,]

Cautions

▪ Contraindications

Hypersensitivity to any ingredient in the vaccine (including phenoxyethanol, formaldehyde, neomycin, streptomycin, polymyxin B).[1]

Anaphylaxis or anaphylactic shock within 24 hours after a previous dose of IPV.[1]

▪ Warnings/Precautions

Hypersensitivity Reactions

Neomycin, streptomycin, polymyxin B, 2-phenoxyethanol, and formaldehyde are used in the production of the IPV vaccine; therefore, allergic reactions may occur in patients sensitive to these substances.[1] While purification methods are used to eliminate significant amounts, it is possible that trace amounts of these substances are still present in the vaccine.[1] IPV is contraindicated in patients with a history of hypersensitivity to any ingredient in the vaccine, including phenoxyethanol, formaldehyde, neomycin, streptomycin, and polymyxin B.[1]

Hypersensitivity reactions, including anaphylactic reactions and anaphylactic shock, have been reported during postmarketing experience following IPV administration.[1] Rash and urticaria also have been reported.[1]

Take all known precautions to prevent adverse reactions, including a review of the patient's history with respect to possible hypersensitivity to the vaccine or similar vaccines.[1] Epinephrine and other appropriate agents should be readily available in case an immediate allergic reaction occurs.[1] Do not administer additional vaccine doses to individuals who developed anaphylaxis or anaphylactic shock temporally associated with a previous dose.[1]

Systemic Effects

In a study in children who received IM doses of the IPV formulation available for use in the US concurrently with a dose of diphtheria and tetanus toxoids and whole-cell pertussis vaccine adsorbed (DTP; no longer available in the US) or a dose of diphtheria and tetanus toxoids and acellular pertussis vaccine adsorbed (DTaP) at a separate site at 2, 4, and 18 months of age, fever (exceeding 38°C), irritability, tiredness, anorexia, or vomiting occurred in 0.5–4.2, 6.7–64.5, 4–60.7, 1.3–16.6, or 1.3–2.8%, respectively, of children within 48 hours after vaccination; persistent crying occurred in up to 1.4% of children within 72 hours after vaccination.[1] In another study evaluating use of a similar IPV formulation (propagated in primary monkey kidney cells rather than VERO cells) administered concurrently with DTP at a different site, fever (39°C or greater) occurred in up to 38% of vaccine recipients and irritability, sleepiness, fussiness, and crying also occurred.[1] Although the incidence of fever and other systemic effects in both studies was similar to that reported when DTP or DTaP was administered alone (without IPV), it was not possible to attribute adverse effects to a particular vaccine.[1]

Guillain-Barré syndrome (GBS)

Although a causal relationship has not been established between administration of IPV and GBS, GBS was temporally related to administration of an IPV formulation that differs from the formulation commercially available for use in the US.[1]

Mortality

Although a causal relationship was not established, deaths have been reported in temporal association with administration of IPV to infants.[1]

Individuals with Altered Immunocompetence

Because IPV is an inactivated vaccine, it may be used when indicated in individuals with altered immunocompetence or in those with close contact with others who are immunocompromised;[2] however, the possibility that immunocompromised individuals may not have an adequate antibody response to the vaccine should be considered.[1] If possible, IPV should be administered prior to initiation of immunosuppressive therapy,[2] or deferred until immunosuppressive therapy is discontinued.[3] If a non-live vaccine is administered during a period of immunosuppression, it may need to be repeated after immune function has improved.[3]

The manufacturer states that administration of IPV is not contraindicated in patients infected with human immunodeficiency virus (HIV).[1]

Concomitant Illness

The manufacturer states that vaccination of individuals with any acute, febrile illness should be deferred until after recovery.[1] In the presence of minor illness, such as mild upper respiratory tract infection with or without concomitant low-grade fever, vaccine administration does not need to be postponed.[1]

Limitations of Vaccine Efficacy

IPV and combination vaccines containing IPV may not protect all vaccine recipients against poliomyelitis.[1]

Specific Populations

Pregnancy.

Animal reproduction studies have not been performed to date with IPV.[1] It is not known if the vaccine can cause fetal harm when administered to pregnant women.[1] IPV should be administered during pregnancy only when clearly needed.[1] According to the US Centers for Disease Control and Prevention (CDC)'s Advisory Committee on Immunization Practices (ACIP), if a pregnant patient is at increased risk for exposure to polio and requires immediate protection, IPV can be administered according to the recommended adult schedule.[2]

Lactation.

It is not known whether antigens contained in IPV are distributed into human milk.[1] The manufacturer states that IPV should be used with caution in breast-feeding women.[1]

Females and Males of Reproductive Potential.

It is not known if IPV can affect fertility.[1]

Pediatric Use.

Safety and efficacy of IPV in children <6 weeks of age have not been established.[1] Although 4 doses are recommended for a complete series, in US infants, administration of 2 doses of IPV at 2 and 4 months of age resulted in seroconversion in 95–100% to all 3 types of poliovirus.[1]

▪ Common Adverse Effects

Common local adverse effects reported in infants receiving IPV include swelling and tenderness.[1]

Common systemic adverse effects reported in infants receiving DTaP and IPV concurrently (to different sites) include irritability, tiredness, and, less commonly, fever, anorexia, vomiting, or persistent crying.[1]

Drug Interactions

▪ Immune Globulin

The manufacturer states that immunogenicity of IPV in individuals receiving immune globulin products may be impaired, and a protective response against paralytic poliomyelitis may not develop.[1]

▪ Immunosuppressive Agents

Individuals receiving immunosuppressive therapy (e.g., corticotropin, corticosteroids, alkylating agents, antimetabolites, radiation therapy) may have a diminished immunologic response to vaccines, including IPV.[1] Administration of the vaccine generally should be deferred until immunosuppressive therapy is discontinued.[3] If a non-live vaccine is administered during a period of immunosuppression, it may need to be repeated after immune function has improved.[3]

▪ Vaccines

Although specific studies may not be available evaluating concurrent administration of IPV with each antigen, simultaneous administration with other age-appropriate vaccines, including live virus vaccines, toxoids, or inactivated or recombinant vaccines, during the same health-care visit is not expected to affect immunologic responses or adverse reactions to any of the preparations.[1] Concomitant administration of other vaccines at separate sites using different syringes is not considered a contraindication.[1]

Diphtheria and Tetanus Toxoids and Pertussis Vaccines

IPV may be administered concomitantly with diphtheria and tetanus toxoids and acellular pertussis vaccine adsorbed (DTaP) or with diphtheria and tetanus toxoids adsorbed at separate sites using different syringes.[1]

Haemophilus b Vaccines

IPV may be administered concomitantly with Hib vaccines using separate syringes and different injection sites.[1]

Hepatitis B Vaccine

IPV may be administered concomitantly with hepatitis B vaccine using different syringes and different injection sites.[1]

Description

Poliovirus vaccine inactivated (IPV) stimulates active immunity to poliovirus infection.[1] IPV contains inactivated poliovirus type 1 (Mahoney strain), poliovirus type 2 (MEF-1 strain), and poliovirus type 3 (Saukett strain) and produces neutralizing antibodies against each type of virus.[1]

The 3 strains of poliovirus are grown individually using VERO cells, which are a continuous line of monkey kidney cells cultivated on microcarriers.[1] Eagle MEM modified medium is used during propagation, and cells are supplemented with previously tested newborn calf bovine serum.[1] Culture techniques and improvements in purification, standardization, and concentration of poliovirus antigen provide more consistent immunogenic effects than the prior IPV vaccine available in the US before 1988.[1] Less than 5 ng of neomycin, 200 ng of streptomycin, and 25 ng of polymyxin B per dose, which are used in vaccine production, may be present after final purification.[1] Residual calf bovine serum albumin is <50 ng/dose in the final vaccine.[1] Also present in the final vaccine formulation are 0.5% of 2-phenoxyethanol and a maximum of 0.02% of formaldehyde per dose as preservatives.[1]

Results of studies using IPV vaccines with potencies similar to the vaccine available for use in the US indicate that administration of 2 doses (at 2 and 4 months of age) or 3 doses (at 2, 4, and 12 or 18 months of age) results in seroconversion and high titers of specific serum antibodies against poliovirus types 1, 2, and 3 in 99–100% of healthy infants and children.[1]

IPV induces the production of neutralizing antibodies and reduces pharyngeal shedding of poliovirus Type 1.[1] Evidence also suggests that IPV induces herd immunity, which is sufficiently maintained in a population vaccinated with IPV.[1] Vaccine associated paralytic poliomyelitis has not been reported in association with IPV.[1]

Advice to Patients

The following information contains important points for the clinician to discuss with patients during counseling. For more comprehensive monographs suitable for distribution to the patient, please refer to the *AHFS Patient Medication Information* monographs available from MedlinePlus (https://vsearch.nlm.nih.gov/vivisimo/cgi-bin/query-meta?v:project=medlineplus) (in English and Spanish; written at a 6th- to 8th-grade reading level).

Prior to administration of each vaccine dose, provide a copy of the appropriate CDC Vaccine Information Statement (VIS) to the patient or patient's legal representative as required by the National Childhood Vaccine Injury Act (VISs are available at https://www.cdc.gov/vaccines/hcp/current-vis/index.html (https://www.cdc.gov/vaccines/hcp/current-vis/index.html)).[1,]

Advise patient and/or patient's parent or guardian of the risks and benefits of vaccination with IPV.[1,]

Advise patients about the importance of receiving the complete primary immunization series to ensure the highest level of protection, unless contraindicated.[1,]

Advise patients to inform clinicians if any adverse reactions occur.[1,] Clinicians or individuals can report any adverse reactions that occur following vaccination to the Vaccine Adverse Event Reporting System (VAERS) at 800-822-7967 or https://vaers.hhs.gov/index.html (https://vaers.hhs.gov/index.html) .[2,]

Advise patients to inform their clinician of existing or contemplated concomitant therapy, including prescription and OTC drugs and dietary and herbal supplements, as well as any concomitant illnesses.[1,]

Advise patients to inform their clinician if they are or plan to become pregnant or plan to breast-feed.[1,]

Advise patients of other important precautionary information.[1,]

Additional Information

The American Society of Health-System Pharmacists, Inc. represents that the information provided in the accompanying monograph was formulated with a reasonable standard of care, and in conformity with professional standards in the field. Readers are advised that decisions regarding use of drugs are complex medical decisions requiring the independent, informed decision of an appropriate health care professional, and that the information contained in the monograph is provided for informational purposes only. The manufacturer's labeling should be consulted for more detailed information. The American Society of Health-System Pharmacists, Inc. does not endorse or recommend the use of any drug. The information contained in the monograph is not a substitute for medical care.

Photos

Disclaimer (https://pillbox.nlm.nih.gov/about.html)

Preparations

Excipients in commercially available drug preparations may have clinically important effects in some individuals; consult specific product labeling for details.

Poliovirus Vaccine Inactivated (IPV) (https://www.accessdata.fda.gov/scripts/cder/ndc/default.cfm?sugg=NonProprietaryName&ApptName=Poliovirus+Vaccine+Inactivated+%28IPV%29&collapse=1)

Parenteral

Injectable suspension, for IM or subcutaneous use

Each 0.5 mL contains inactivated polioviruses 80 D antigen units (DU)

IPOL®, Sanofi Pasteur (https://www.accessdata.fda.gov/scripts/cder/ndc/default.cfm?sugg=LabelerName&ApptName=Sanofi+Pasteur&collapse=1)

Diphtheria and Tetanus Toxoids and Acellular Pertussis Adsorbed and Inactivated Poliovirus Vaccine (DTaP-IPV) (https://www.accessdata.fda.gov/scripts/cder/ndc/default.cfm?sugg=NonProprietaryName&ApptName=Diphtheria+and+Tetanus+Toxoids+and+Acellular+Pertussis+Adsorbed+and+Inactivated+Poliovirus+Vaccine+%IPV%29&collapse=1)

Parenteral

Injectable suspension, for IM use

Each 0.5 mL contains diphtheria toxoid 15 Lf units, tetanus toxoid 5 Lf units, acellular pertussis antigens 48 mcg and inactivated polioviruses 62 DU

Quadracel®, Sanofi Pasteur (https://www.accessdata.fda.gov/scripts/cder/ndc/default.cfm?sugg=LabelerName&ApptName=Sanofi+Pasteur&collapse=1)

Each 0.5 mL contains diphtheria toxoid 25 Lf units, tetanus toxoid 10 Lf units, acellular pertussis antigens 58 mcg and inactivated polioviruses 80 DU

Kinrix®, GlaxoSmithKline (https://www.accessdata.fda.gov/scripts/cder/ndc/default.cfm?sugg=LabelerName&ApptName=GlaxoSmithKline&collapse=1)

Diphtheria and Tetanus Toxoids and Acellular Pertussis Adsorbed, Hepatitis B (Recombinant) and Inactivated Poliovirus Vaccine Combined (DTaP-HepB-IPV) (https://www.accessdata.fda.gov/scripts/cder/ndc/default.cfm?sugg=NonProprietaryName&ApptName=Diphtheria+and+Tetanus+Toxoids+and+Acellular+Pertussis+Adsorbed%2C+Hepatitis+B+%28Recombinant%29HepB-IPV%29&collapse=1)

Parenteral

Injectable suspension, for IM use

Each 0.5 mL contains diphtheria toxoid 25 Lf units, tetanus toxoid 10 Lf units, acellular pertussis antigens 58 mcg, Hepatitis B surface antigen 10 mcg, and inactivated polioviruses 80 DU

Pediarix®, GlaxoSmithKline (https://www.accessdata.fda.gov/scripts/cder/ndc/default.cfm?sugg=LabelerName&ApptName=GlaxoSmithKline&collapse=1)

Diphtheria and Tetanus Toxoids and Acellular Pertussis Adsorbed, Inactivated Poliovirus and Haemophilus b Conjugate (Tetanus Toxoid Conjugate) Vaccine (DTaP-IPV/Hib) (https://www.accessdata.fda.gov/scripts/cder/ndc/default.cfm?sugg=NonProprietaryName&ApptName=Diphtheria+and+Tetanus+Toxoids+and+Acellular+Pertussis+Adsorbed%2C+Inactivated+Poliovirus+and+Haem IPV%2FHib%29&collapse=1)

Parenteral

Suspension, for IM use

DTaP-IPV component contains diphtheria toxoid 15 Lf units, tetanus toxoid 5 Lf units, acellular pertussis antigens 48 mcg, and inactivated polioviruses 62 DU per 0.5 mL

ActHIB component contains H. influenzae type b capsular polysaccharide 10 mcg covalently bound to tetanus toxoid 24 mcg per 0.5 mL®

Pentacel®, Sanofi Pasteur (https://www.accessdata.fda.gov/scripts/cder/ndc/default.cfm?sugg=LabelerName&ApptName=Sanofi+Pasteur&collapse=1)

Diphtheria and Tetanus Toxoids and Acellular Pertussis, Inactivated Poliovirus and Haemophilus b Conjugate and Hepatitis B Vaccine (DTaP-HepB-IPV/Hib) (https://www.accessdata.fda.gov/scripts/cder/ndc/default.cfm?sugg=NonProprietaryName&ApptName=Diphtheria+and+Tetanus+Toxoids+and+Acellular+Pertussis%2C+Inactivated+Poliovirus+and+Haemophilus+b+ HepB-IPV%2FHib%29&collapse=1)

Parenteral

Injectable suspension, for IM use

Each 0.5 mL contains diphtheria toxoid 15 Lf units, tetanus toxoid 5 Lf units, acellular pertussis antigens 48 mcg, inactivated polioviruses 62 DU, Haemophilus influenzae type B 3 mcg covalently bound to 50 mcg of Neisseria meningitidis OMPC protein carrier, and hepatitis B surface antigen 10 mcg

Vaxelis®, Sanofi Pasteur (https://www.accessdata.fda.gov/scripts/cder/ndc/default.cfm?sugg=LabelerName&ApptName=Sanofi+Pasteur&collapse=1)

Related Resources

AHFS Patient Medication Information (https://vsearch.nlm.nih.gov/vivisimo/cgi-bin/query-meta?v:project=medlineplus&query=Poliovirus%20Vaccine%20Inactivated) and other related patient health topics (MedlinePlus)
ASHP Drug Shortages Resource Center (https://www.ashp.org/Drug-Shortages)
CCRIS (https://toxnet.nlm.nih.gov/cgi-bin/sis/search2/r?dbs+ccris:%%22Poliovirus%20Vaccine%20Inactivated%%22) (Chemical Carcinogenesis Research Information System)
ChemID*plus* (https://chem.nlm.nih.gov/chemidplus/name/Poliovirus%20Vaccine%20Inactivated)
Biochemical Data Summary (http://www.drugbank.ca/unearth/q?utf8=%%E2%%9C%%93&query=Poliovirus%20Vaccine%20Inactivated&searcher=drugs&approved=1&vet_approved=1&nutraceutical=1&illicit=1&withdrawn= (US and Canada)
Clinical Trials (https://www.clinicaltrials.gov/ct/search?submit=Search&term=Poliovirus%20Vaccine%20Inactivated)
DailyMed (https://dailymed.nlm.nih.gov/dailymed/search.cfm?query=Poliovirus%20Vaccine%20Inactivated) (drug labels)
DART (https://toxnet.nlm.nih.gov/cgi-bin/sis/search2/r?dbs+dart:%%22Poliovirus%20Vaccine%20Inactivated%%22) (Developmental and Reproductive Toxicology Database)
Drugs@FDA (https://www.accessdata.fda.gov/scripts/cder/drugsatfda/index.cfm?fuseaction=Search.SearchAction&SearchType=BasicSearch&SearchTerm=Poliovirus%20Vaccine%20Inactivated) (approval information)
European Medicines Agency (https://www.ema.europa.eu/en/search/search?search_api_views_fulltext=Poliovirus%20Vaccine%20Inactivated)
FDA National Drug Code Directory (https://www.accessdata.fda.gov/scripts/cder/ndc/default.cfm?sugg=NonProprietaryName&ApptName=Poliovirus%20Vaccine%20Inactivated&collapse=1)
FDA Recalls, Market Withdrawals, and Safety Alerts (https://www.fda.gov/Safety/Recalls/default.htm)
HSDB (https://toxnet.nlm.nih.gov/cgi-bin/sis/search2/r?dbs+hsdb:%%22Poliovirus%20Vaccine%20Inactivated%%22) (Hazardous Substances Data Bank)
Inxight Drugs (https://drugs.ncats.io/substances?q=%%22Poliovirus%20Vaccine%20Inactivated%%22) (National Center for Advancing Translational Sciences)
LactMed (drug effects on breastfeeding) (https://toxnet.nlm.nih.gov/cgi-bin/sis/search2/r?dbs+lactmed:@or+%%28@na+%%22Poliovirus%20Vaccine%20Inactivated%%22+%%29)
New Drug Approvals (https://ahfs.ashp.org/drug-assignments.aspx)
Orange Book (https://www.accessdata.fda.gov/scripts/cder/ob/default.cfm?panel=0&drugname=Poliovirus%20Vaccine%20Inactivated) (therapeutic equivalence)
PharmGKB (https://www.pharmgkb.org/search?connections&gaSearch=Poliovirus%20Vaccine%20Inactivated&query=Poliovirus%20Vaccine%20Inactivated&type=chemical) (Pharmacogenomic data from PharmGKB)
Pillbox (*beta*) (https://pillbox.nlm.nih.gov/pillimage/search_results.php?submit=Search&splid=&getingredient=Poliovirus%20Vaccine%20Inactivated) (drug identification and images)
PubMed (https://www.ncbi.nlm.nih.gov/pubmed?DB=pubmed&term=Poliovirus%20Vaccine%20Inactivated%%5BAll+Fields%%5D) (scientific journals)

Safety-related Labeling Changes (https://www.accessdata.fda.gov/scripts/cder/safetylabelingchanges) (FDA/CDER)
ToxLine (https://toxnet.nlm.nih.gov/cgi-bin/sis/search2/r?dbs+toxline:%%22Poliovirus%20Vaccine%20Inactivated%%22) (Toxicology Literature Online)

† Use is not currently included in the labeling approved by the US Food and Drug Administration.

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About ASHP
ASHP represents pharmacists who serve as patient care providers in acute and ambulatory settings. The organization's nearly 55,000 members include pharmacists, student pharmacists, and pharmacy technicians. For more than 75 years, ASHP has been at the forefront of efforts to improve medication use and enhance patient safety. For more information about the wide array of ASHP activities and the many ways in which pharmacists advance healthcare, visit ASHP's website (https://www.ashp.org), or its consumer website (https://www.safemedication.com).

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