Polio:
Questions and Answers

Q&A

INFORMATION ABOUT THE DISEASE AND VACCINES

What causes polio?

Polio is caused by a virus.

How does polio spread?

Polio is usually spread via the fecal-oral route (i.e., the virus is transmitted from the stool of an infected person to the mouth of another person from contaminated hands or objects like eating utensils). Some cases may be spread directly via an oral to oral route.

How long does it take to show signs of polio after being exposed?

The incubation period for polio is commonly 6–20 days, with a range of 3–35 days.

What are the symptoms of polio virus infection?

About 95% of all individuals infected with polio virus have no apparent symptoms.

Another 4%–8% of infected individuals have symptoms of a minor, non-specific nature, such as sore throat and fever, nausea, vomiting, and other common symptoms of any viral illness.

About 1%–2% of infected individuals develop nonparalytic aseptic (viral) meningitis, with temporary stiffness of the neck, back, and/or legs. Less than 1% of all polio infections result in the classic "flaccid paralysis," where the patient is left with permanent weakness or paralysis of legs, arms, or both.

How serious is polio?

Although most cases of polio are mild, the cases resulting in flaccid paralysis have made polio a feared disease for hundreds of years. Of people with paralytic polio, about 2%–5% of children die and up to 15%–30% of adults die.

Are there any long-term concerns for persons who contracted paralytic polio in childhood?

About 25%–40% of people who suffered from paralytic polio as children develop new symptoms in adulthood (usually after an interval of 30–40 years). This problem is called post-polio syndrome (PPS) and symptoms can include new muscle pain, weakness, or paralysis. PPS is not infectious. For more information or for support for people with post-polio syndrome, go to www.post-polio.org.

How is polio diagnosed?

If a person is suspected of being infected, a sample from their stool or throat should be tested for the poliomyelitis virus.

How long is a person with polio contagious?

Patients infected with the polio virus can pass the virus on for 7–10 days before the onset of symptoms. In addition, they can continue to shed the virus in their stool for several weeks after infection.

Is there a treatment for polio?

There is no "cure" for polio. People infected with polio need supportive therapy, such as bed rest and fluids. Standard precautions should be taken to avoid passing on the virus through any contamination from the patient's stool.

How common is polio in the U.S.?

Before a polio vaccine was developed, polio epidemics were common in the United States. For example, in the immediate pre-vaccine era (i.e., early 1950s), between 13,000 and 20,000 paralytic cases were reported each year. After the development of the inactivated (Salk) injectable vaccine in 1955 and the live (Sabin) oral vaccine in 1961, the number of polio cases dropped dramatically. In 1960, there were 2,525 paralytic cases reported, but by 1965 this number had fallen to 61.

Due to high vaccination rates in the U.S., no cases of wild polio have been acquired in the U.S. since 1979 and none in the Western Hemisphere since 1991. However, vaccine-derived community-acquired polio has been detected in the U.S. in Minnesota in 2005

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and in New York in 2022. The 2022 case of paralytic polio was detected in an unvaccinated young adult. Subsequent investigations found polio virus in waste water samples in five counties in New York, suggesting that transmission of the virus was occurring in the community.

Polio symptoms from vaccine-derived polio virus infection may rarely occur when live vaccine virus mutates and becomes capable of causing disease in the vaccinated person or in people exposed to virus from the vaccinated person. Since live polio vaccine has not been used in the U.S. since 2000, these 2005 and 2022 cases of vaccine-derived polio occurred after a traveler infected by vaccine-derived polio virus elsewhere entered or returned to the United States.

How common is polio in the world?

In 1988, the World Health Organization (WHO) adopted the goal of global polio eradication. Although the initial target date of 2000 was not met, substantial progress has been made. In 1988, there were estimated to be 350,000 reported cases of polio in the world; in 2001, just 483 cases were reported.

Despite challenges caused by vaccine rumors and the COVID-19 pandemic, by 2022, there were only 22 cases of wild-type poliovirus in two countries: Afghanistan and Pakistan. Challenges remain from cases of circulating vaccine-derived polioviruses in 36 countries. These cases of vaccine-derived polio highlight the need for high vaccination rates.

The Global Polio Eradication Initiative (GPEI) coordinates polio eradication efforts as a partnership of public and private organizations working together. Since the GPEI was launched in 1988, an estimated 18 million people are able to walk who would otherwise have been paralyzed.

When did the polio vaccine first become available?

The first polio vaccine was an inactivated, or killed, vaccine (IPV) developed by Dr. Jonas Salk and licensed in 1955.

What are the polio vaccines that have followed the first Salk vaccine?

In 1961, a live attenuated (e.g., weakened) vaccine was developed by Dr. Albert Sabin. This vaccine was given as an oral preparation instead of as a shot. By 1963, this oral vaccine had been improved to include protection against all three strains of polio and was licensed as "trivalent oral poliovirus vaccine" (tOPV). OPV was the vaccine of choice for the United States and most other countries of the world from 1963 until changes in U.S. policy in the 1990s.

In 1988, an enhanced-potency trivalent IPV formulation became available and by 1997 had become part of the routine schedule for infants and children, given in a sequential combination with OPV. In 2000, an all-IPV vaccine schedule was adopted in the United States. IPV is also available in combination with other vaccines.

How is the vaccine administered?

IPV is given as a shot in the arm or leg.

Why was the U.S. polio immunization recommendation changed to IPV?

The change to an all-IPV schedule in the United States occurred because the few cases of polio that were occurring (8–10 per year) in the United States. were caused by the trivalent OPV vaccine itself and not the wild virus. The change to IPV protects individuals against paralytic polio, while eliminating the small chance (about once in every 2.4 million doses) of actually contracting polio from the live oral vaccine. Trivalent OPV is better at stopping the spread of the virus to others. For this reason, in other countries, including those where polio is still a threat, OPV is still used. In April 2016, all countries using OPV switched from the traditional trivalent OPV to a bivalent OPV formulation for routine vaccination. Vaccination campaigns may use monovalent oral polio vaccines to contain outbreaks.

Who should get this vaccine?

All infants should get IPV unless they have a medical reason not to. A primary series of IPV consists of three properly spaced doses, usually given at two months, four months, and 6–18 months. A booster dose is given at 4–6 years, unless the primary series was given so late that the third dose was given on or after the fourth birthday.

Does my child need additional doses of polio vaccine if he received a combination of OPV and IPV?

No, any properly spaced combination of IPV or trivalent OPV, is considered a complete poliovirus vaccination series. The last dose in the series must

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be given on or after the 4th birthday and at least 6 months after the previous dose. One exception is for children who received a fourth dose prior to August 7, 2009 for whom 4 doses separated by at least 4 weeks is sufficient, unless the teenager is traveling to a polio-endemic area.

Why should I vaccinate my child against polio if this disease has been eliminated from the Western Hemisphere since 1991?

Polio still exists in parts of the world and can easily be imported. In addition, vaccine-derived polio can also circulate and cause paralytic polio in unvaccinated people, as occurred in New York in 2022. When poliovirus is eliminated from the world, polio vaccine will become part of history. But we are not to that point yet.

Should adults get vaccinated against polio?

In the United States, the rates of childhood vaccination against polio have been extremely high (well over 90%) for decades; however, in 2023, CDC recommended that *all* U.S. adults who are known or suspected to be unvaccinated or incompletely vaccinated against polio should complete a 3-dose primary series. Vaccination is especially important for adults who are at increased risk of infection, including travelers to areas were polio is common, laboratory workers who handle specimens that might contain polioviruses, and healthcare workers in close contact with patients who might be excreting wild polioviruses in their stool (e.g., those caring for recent immigrants from certain parts of Africa and Asia).

If an adult has never been vaccinated against polio, he or she should receive three doses of IPV, the first two doses given 1–2 months apart, and the third 6–12 months after the second. If time will not allow the completion of this schedule before a known risk of exposure (e.g., travel), an accelerated schedule is possible (e.g., each dose separated four weeks from the previous dose).

If an adult previously received only one or two doses of polio vaccine (either trivalent OPV or IPV), he or she should receive the remaining dose(s) of IPV, regardless of the interval since the last dose. If a person did not receive a trivalent OPV (e.g., a routine bivalent OPV dose given in April 2016 or more recently or a monovalent dose given as part of a vaccination campaign), they should get 3 doses of IPV.

Adults who have completed a 3-dose series of trivalent OPV or IPV and who are at increased risk of exposure to polioviruses may receive another dose of IPV as a one-time booster. It is not necessary to receive a booster dose each time a person travels to an area where polio may still occur.

Who recommends this vaccine?

The CDC, the American Academy of Pediatrics (AAP), the American Academy of Family Physicians (AAFP), the American Academy of Physician Associates (AAPA), and the National Association of Pediatric Nurse Practitioners (NAPNAP) have all recommended that children receive IPV.

How safe is this vaccine?

The IPV vaccine is very safe; no serious adverse reactions to IPV have been documented.

What side effects have been reported with this vaccine?

Possible side effects include minor local reactions at the site of injection (e.g., pain, redness).

How effective is this vaccine?

IPV is very effective in preventing both wild and vaccine-derived polio, but only when all recommended doses are completed. A single dose of IPV produces little or no immunity, but 99% of recipients are immune after three doses.

Who should not receive the polio vaccine?

- Anyone who has ever had a life-threatening allergic reaction to neomycin, streptomycin, or polymyxin B should not get the IPV shot because it contains trace amounts of these antibiotics.
- Anyone who has had a severe allergic reaction to a dose of polio vaccine should not get another one.
- Anyone who is moderately or severely ill at the time the shot is scheduled should usually wait until they recover to get vaccination.

Can the IPV vaccine cause polio?

No, the inactivated polio vaccine (IPV) cannot cause paralytic polio because it contains killed virus only.