



POLIOVIRUS INFECTION

1. **Agent:** Poliovirus, an enterovirus with antigenic types 1,2,3. Type 1 is most often the etiologic agent in paralytic illnesses, type 3 less so and type 2 least commonly. Type 1 most frequently causes epidemics. Most vaccine-associated cases are due to type 3 or 2. The last case of poliovirus infection caused by wild poliovirus in the Americas was reported in 1991 from Peru.

2. Identification:

a. **Symptoms:** Acute viral illness, severity ranging from in-apparent infection to paralytic disease. Over ninety percent of cases are asymptomatic or only result in nonspecific fever. Symptoms include fever, headache, nausea and vomiting, stiffness in neck and back, with or without paralysis. Paralysis is typically flaccid, asymmetric, and most commonly affecting the lower extremities. Case fatality (paralytic cases) is 2%-10% in epidemics and increases with age. Non-paralytic poliovirus infection can present as aseptic meningitis, also common in other enterovirus infections.

b. **Differential Diagnosis:** Other types of aseptic meningitis, bacterial meningitis, tuberculous or fungal meningitis, brain abscess, leptospirosis, lymphocytic meningitis, encephalitis due to infectious or toxic agents, tick paralysis. Guillain-Barré syndrome may initially resemble poliovirus infection as can West Nile Virus neurological disease. Other enteroviruses can cause acute flaccid paralysis simulating paralytic poliovirus infection.

c. **Diagnosis:** Isolation of poliovirus from stool or pharynx early in the course of the disease is presumptive evidence of poliovirus infection. At least 2 stool specimens taken 24 hours apart are recommended to increase probability of poliovirus isolation. Recipients of oral live-attenuated polio vaccine (OPV) can excrete virus in feces for several weeks; however, OPV is no longer commercially available in the U.S. Isolation of virus in CSF, when accomplished, is diagnostic of

CNS disease. CSF shows excess cells; lymphocytes predominate. Neutralizing and complement-fixing antibodies appear during the first two weeks of illness.

3. **Incubation:** Range 3-6 days for abortive polio (non-specific febrile illness)—typically 7-21 days for paralytic polio, but occasionally as short as 4 days.

4. **Reservoir:** Humans, most frequently in-apparent cases, especially children.

5. **Source:** Pharyngeal secretions; feces of infected persons.

6. **Transmission:** Intimate contact with infected persons. Where sanitation is good, oral-oral, and respiratory may be more important than fecal-oral spread; it rarely occurs through milk and water where good sanitary conditions prevail. Transmission from mother to newborn has been reported. Immunodeficient patients may excrete virus for prolonged periods. In temperate climates, poliovirus infections are most common in the summer and fall.

7. **Communicability:** Virus demonstrable in pharynx from 36 hours to approximately 1 week after exposure; in feces, from 72 hours to 6 weeks after exposure and occasionally for months. Infectivity is greatest 7-10 days before and after onset of symptoms.

8. **Specific Treatment:** Supportive.

9. **Immunity:** Type-specific of long duration.

REPORTING PROCEDURES

1. **Reportable.** *California Code of Regulations*, Section 2500. **Report case or suspected case within one working day of identification.**

2. **Report Form:** [POLIOVIRUS INFECTION OR POLIOMYELITIS CASE REPORT \(CDPH 8421\)](#).

If vaccine-associated:

[VACCINE ADVERSE EVENT REPORTING SYSTEM \(VAERS\)](#).



3. Epidemiologic Data:

- a. Clinical information: Date of onset of paralysis and weakness; signs, symptoms; sites of paralysis, degree and extent of involvement.
- b. Immunization history on case, household and other close contacts who received oral polio vaccine less than or equal to 75 days before onset of case's symptoms. Record date, type of vaccine, and person or agency that administered each immunization. Include vaccine manufacturer and lot number if available.
- c. Travel history of case and close contacts and information on visitors during incubation period. Consider international travel or foreign visitors in a 30-day period before onset.
- d. History of contact with any known cases of polio and the date of contact, if applicable.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate on the day of report.

CASE: Hospitalization at a facility capable of strict isolation is recommended. For patients suspected of excreting wild poliovirus, enteric precautions are indicated for the duration of hospitalization or until virus can no longer be recovered from the feces. Implement respiratory isolation for 7 days from onset.

CONTACT: Identify family, playmates, relatives, babysitters, day-care center staff and large group contacts.

Restrictions only if symptomatic—then treat as case.

The oral polio virus vaccine (OPV) is no longer commercially available in the United States. However, this vaccine is still recommended for control of polio outbreaks—and the CDC stockpiles the vaccine for that purpose. Any outbreaks of polio (transmission from even one case) must be managed in consultation with the Immunization Program.

Unvaccinated and incompletely immunized children who are contacts to a polio case should receive the number of doses of enhanced potency inactivated polio vaccine (IPV) required to complete the immunization series for their age. School-aged children and adolescents who completed a primary series in the past can be given an additional dose of IPV to further decrease their already very small risk of becoming infected. Unvaccinated adults (including adults without a written record of vaccination) should receive the 3 dose primary series. Incompletely immunized adults who previously received less than a full primary series of OPV or IPV should receive the remaining required doses of IPV regardless of the interval since the last dose and the type of vaccine that was received. Adults who previously completed a primary immunization series against polio can receive a single dose of IPV.

CARRIERS: Long-term carriers have not been found.

PREVENTION-EDUCATION

1. Enhanced potency inactivated polio vaccine (IPV) is recommended for routine use in the USA. All children should receive four doses of IPV at ages 2, 4, and 6-18 months and 4-6 years. Survivors of polio are susceptible to infection by the remaining antigenic types. These individuals should receive the appropriate polio immunization for their age.
2. Routine polio vaccination of adults (persons \geq 18 years of age) living in the United States is not necessary. Most are immune as a result of vaccination during childhood. Adults unvaccinated as children should be vaccinated against polio, however, if they are at greater risk for exposure to polio than the general population. These include travelers to areas or countries where polio is endemic or epidemic.

Before traveling to areas where “wild poliovirus” is still circulating, all travelers should ensure that they have completed the recommended age-appropriate polio vaccine series and received a booster dose, if necessary. Additionally, travelers should be aware that in 2014, the World Health Organization implemented temporary polio vaccination requirements affecting the



following countries: Afghanistan, Cameroon, Equatorial Guinea, Ethiopia, Iraq, Israel, Nigeria,, Pakistan, Somalia, and Syria. Long-term travelers (staying > 4 weeks) to these countries may be required to show proof of polio vaccination when departing these countries between 4 weeks and 12 months before the date of departure.

Additionally, unvaccinated members of population groups affected by high rates of polio disease, unvaccinated laboratory workers who handle specimens that might contain polio virus, and unvaccinated health-care workers who have close contact with patents who might be excreting polio virus, should be vaccinated against polio.

3. California law requires exclusion from school if conditions for admission are not fulfilled or if a pupil who is not completely immunized is exposed to polio case. See *California Code of Regulations*, Title 17.

DIAGNOSTIC PROCEDURES

Clinical and epidemiological histories are required to aid the laboratory in test selections.

1. **Serology:** Paired sera required.

Container: Serum separator tube (SST, a red-gray top vacutainer tube).

Laboratory Form: Test Requisition and Report Form H-3021

Examination Requested: Polio.

Material: Whole clotted blood.

Amount: 8-10 ml.

Storage: Refrigerate.

Remarks: Specimens should be obtained from all patients with paralytic disease suspected to be caused by poliovirus. Collect first blood specimen as early as possible. Collect the second approximately 3 weeks after the first. Send each specimen as it is collected. Do not store.

2. **Culture:** Isolation should always be attempted to identify illness due to other

enteroviruses, mimicking polio. Stool specimen required; throat swab and CSF recommended.

Container: Sterile, 30-oz, wide-mouth, screw-capped bottle; viral culturette; sterile test tube.

Laboratory Form: Test Requisition and Report Form H-3021

Examination Requested: Polio Culture.

Material: 2-3 g of stool (no preservative), throat swab in viral culturette, CSF in sterile tube (no preservative). Collect 2 stool specimens and 2 throat swabs 24 hours apart as early as possible in the course of the disease, ideally within 14 days of onset of paralytic disease.

Storage: Keep chilled and deliver to the Virus Laboratory as soon as possible. Specimens must be delivered to the Virus Laboratory within 48 hours of collection.

Remarks: Specimens for isolation attempts must be collected as soon after onset as possible. Consult with the Virus Laboratory. Laboratories should forward positive isolates to CDC for intratypic differentiation to determine whether the poliovirus isolate is wild or vaccine-derived. CSF, although diagnostic, is rarely of value for the isolation of poliovirus, but is significant for the recovery of other enteroviruses.