

POLIOMYELITIS

Disease Overview

Poliomyelitis is a vaccine-preventable disease caused by poliovirus (genus Enterovirus) types 1, 2 and 3. Historically, wild poliovirus (WPV) existed worldwide. However, as a result of immunization and the global initiative to eradicate polio, wild-type poliovirus remains endemic in some countries. Other than occurring due to wild type, poliomyelitis can be observed from vaccine-derived poliovirus (VDPV) and vaccine-associated paralytic poliomyelitis (VAPP). Vaccine-derived poliovirus (VDPV) can develop in communities with low vaccination coverage when the live oral polio vaccine (OPV) virus mutates by spreading from one under-vaccinated individual to another over a long period of time. When there is evidence of person-to-person transmission of VDPV in a community, VDPVs are defined as circulating (cVDPV). Though rare, there are pockets of cVDPV across the globe. Vaccine-associated paralytic poliomyelitis (VAPP) is a potential complication of live OPV.

Symptoms

In most people (about 75%), polio causes no symptoms. However, in about 25% of cases, fever, sore throat, headache, malaise, and gastrointestinal symptoms such as abdominal pain, nausea, and vomiting may be present. The polio virus can infect the nervous system, including the brain, spine and nerves. This can lead to paralysis, which can be partial or full, and can occur in about 1 in 200 cases. Weakness or paralysis still present 60 days after onset is likely to persist. Paralysis can result in permanent disability or death.

Reservoir

Humans are the only known reservoir of poliovirus, especially children.

Mode of Transmission

Primarily person-to-person transmission; most commonly secondary fecal-oral transmission from infected cases. Polio has been spread through secretions from an infected person's mouth (respiratory), but this is very uncommon.

Incubation Period

Commonly 7-14 days for paralytic cases, range 3 – 35 days.

For vaccine-associated cases, the incubation period may be up to 60 days.

Period of Communicability

Not precisely defined, but transmission is possible as long as the virus is excreted.

While cases are considered most infectious during the days before and after onset of symptoms (when the virus is present in high concentrations in the throat and feces), communicability starts very soon after acquisition of the poliovirus. Poliovirus is shed in throat secretions as early as 36 hours and in the stool 72 hours after exposure to infection in both clinical and inapparent cases. The virus usually persists in the throat for 1-2 weeks and in stool for 3-6 weeks.

Immuno-deficient patients with either vaccine-associated or wild polio may excrete the virus for many months or even years.

Persons who receive OPV can have poliovirus present in the throat for 1 to 2 weeks and excreted in stool for several weeks following immunization.

Risk Factors

Polio infections are more common in children under 5 years of age. However, regardless of age, anyone who is not immune to poliovirus can become infected. Unvaccinated or under vaccinated persons who travel to endemic or outbreak countries are at high risk. Likewise, using OPV or travelling to areas where it is used is a risk for vaccine-derived polio.

Risk factors for paralytic disease include larger inocula of poliovirus, increasing age, pregnancy, strenuous exercise, tonsillectomy, and intramuscular injections administered while the patient is infected with poliovirus.

Surveillance Case Definition

Case Classification

A **confirmed case** is a clinical illness characterized by all of the following:

Case Classification	Confirmed case
Paralytic poliomyelitis	<ul style="list-style-type: none">• Clinical features* compatible with paralytic poliomyelitis with laboratory confirmation of wild-type, vaccine-derived or Sabin/Sabin-like poliovirus detected in a clinical specimen or• Clinical features* compatible with paralytic poliomyelitis in a person who is epidemiologically linked to a laboratory-confirmed case.
Nonparalytic poliovirus infection	<ul style="list-style-type: none">• Any person without symptoms of paralytic poliomyelitis with laboratory confirmation of wild-type, vaccine-derived or Sabin/Sabin-like poliovirus detected in a clinical specimen and• Has not been vaccinated with OPV within 6 weeks prior to specimen collection date.

* **Clinical features.** The presence of some or all of these clinical features may suggest paralytic poliomyelitis:

- acute flaccid paralysis of one or more limbs
- decreased or absent deep tendon reflexes in the affected limb(s)
- weakness of facial, oropharyngeal or respiratory muscles
- no sensory or cognitive loss accompanies the paralysis
- no other apparent cause (including laboratory investigation to rule out other causes of a similar syndrome)

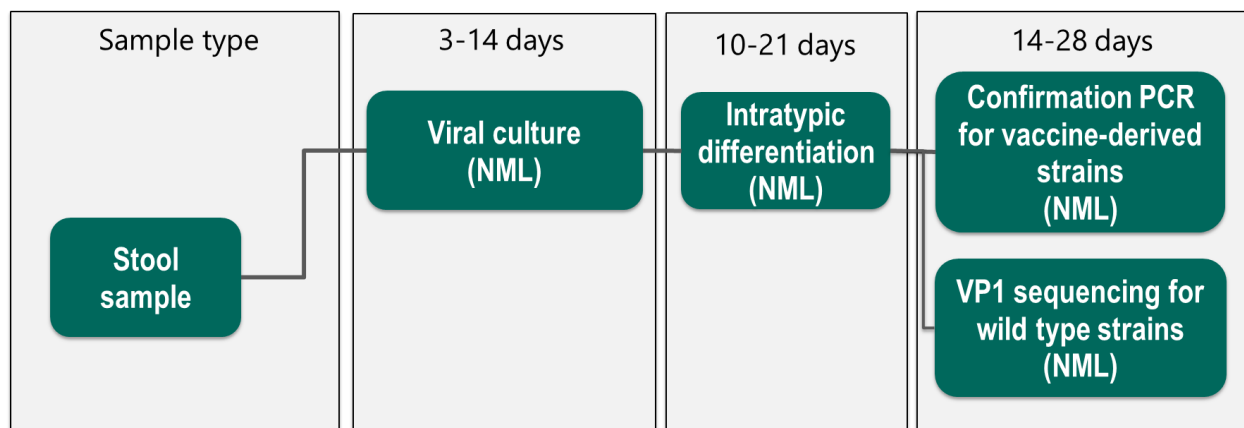
A **probable case** is clinical illness without detection of poliovirus from an appropriate clinical specimen and without evidence of infection with other neurotropic viruses but with one of the following laboratory confirmations of infection:

- significant rise (e.g., fourfold or greater) in polio IgG titre by any standard serologic assay between acute and convalescent sera.
- OR**
- positive serologic test for polio IgM antibody in the absence of recent immunization with polio virus-containing vaccine.

A **suspected case** is clinical illness and no laboratory confirmation of infection (no polio virus detection or serologic evidence), including negative test results and inadequate or no investigation.

Diagnosis and Laboratory Guidelines

Poliomyelitis must be distinguished from other paralytic conditions by isolation of virus from stool samples, cerebrospinal fluid, or throat secretions. A stool sample remains the best specimen if poliovirus is suspected. All the testing is handled at the National Microbiology Laboratory (NML) in Winnipeg. Testing includes viral isolation for detection purposes, and intratypic differentiation for wild-type or vaccine strains. Suspected vaccine strains are then confirmed by PCR, and wild-type strains are sequenced for further identification. Consult Regional Health Authority (RHA) policies and procedures for sample collection and transportation.



Reporting

Per Policy 2.2, Disease and Event notification to PHNB and Disease and Event Reporting section

- CD Urgent Notification for all probable, suspect and confirmed cases of poliomyelitis.
- Routine surveillance (RDSS) for all confirmed cases.
- National polio case investigation to be completed for all confirmed cases of poliomyelitis and sent to CDC inbox within 24 hours of detection.

Case Management

The following applies to confirmed cases. Some aspects may also apply to suspect cases while awaiting laboratory results, depending on the level of suspicion that the case has poliomyelitis (such as if the case has paralysis and received OPV within the previous 35 days or is a member of a community with an ongoing outbreak).

Some of the following possible recommendations/considerations are relevant until the case is deemed to be no longer infectious. Collect stool samples weekly until the first negative result and then collect every day (at least 24 hours apart) until no longer considered infectious. A case can be considered no longer infectious based on three consecutive negative stool samples each collected at least 24 hours apart. All stool sample testing must be conducted by the NML. The turnaround time for poliovirus isolation in cell culture at the NML is 14 days. For individuals with sustained positive stool samples, stool testing frequency can be determined on a case-by-case basis

Investigation

If poliovirus is detected, public health authorities should :

- Initiate an investigation within **24 hours** after Provincial/Territorial(P/T) or NML detection (do not wait for sequencing or final classification of the virus by the NML).
- Determine if there is a history of recent travel to an endemic area or exposure to someone with a travel history (up to 6 weeks after the traveller returned home).
- Obtain symptom and vaccination history.
- Assess medical history for immunocompromising or abnormal neurological factors.
- Consider vaccine-associated poliomyelitis if the individual was recently vaccinated with OPV (live attenuated oral polio vaccine), particularly after the first dose or exposure to someone who received the OPV (up to 6 weeks after receipt of OPV).

The occurrence of an indigenous case is a public health emergency requiring an extensive immunization response over a large geographic area.

Education

The case or relevant caregiver should be informed about:

- Nature of infection, length of communicable period and mode of transmission
- Transmission within the household may already have occurred before the case was recognized; however, the following steps should be taken to limit any further transmission:
 - Close contact with others in the household should be avoided as much as possible, including sleeping in a separate bedroom if possible.
 - The case should use a separate bathroom that is not used by anyone else, if possible. If the bathroom must be used by others, it should be cleaned and disinfected after the case has a bowel movement. Use household bleach or 0.5% accelerated hydrogen peroxide for disinfection.
 - In addition, clean and disinfect all bathrooms at least daily. Use household bleach or 0.5% accelerated hydrogen peroxide for disinfection.

- Reinforce proper hand hygiene with all household members, including after using the bathroom, after changing diapers, after cleaning the bathroom, and before preparing, serving or eating food.
 - The case should not share personal items with household members, such as towels, bed linen, or unwashed eating utensils, dishes, or drinking glasses.
 - Restrict contact with household members who are immunocompromised, unvaccinated, or under-vaccinated (such as young children). If the case must provide care or have direct contact with these individuals, the case should perform proper hand hygiene before any contact.
- Visitors to the case's house or room at their health care facility should be restricted to only those who are essential. Children who may be unable to appropriately wash their hands (typically children younger than 8 years of age), visitors who are immunocompromised, and visitors who are unvaccinated or under-vaccinated should not visit the case.
 - Essential visitors should avoid the use of the bathrooms in use by the case and the bathrooms in the case's house. They should not be served food or drinks. They should avoid any close contact with the case and minimize close contact with other household members.

Monitoring

- Public health officials should be in touch with the case on a regular basis, as appropriate, to ensure compliance with recommended measures and help to problem solve issues that arise.
- Conduct a follow-up assessment of outcome of paralysis 60 days after its onset, where applicable.

Exclusion/Social Distancing

The case should isolate at their residence until they are no longer infectious. They may leave their residence to go outside, if they are going to a location that will not put them in close contact with others, nor involves touching common surfaces. If they are unwell, they should call before going to see their primary care provider or presenting at the emergency department. They should not use any bathrooms except in their house.

Special allowances may be required for those who do not clear the infection after six weeks and will be determined on a case-by-case basis in consultation with public health and infectious disease specialists. In these instances, the following should still be avoided:

- Attendance or work in group childcare settings while the case remains infectious.
- Preparation of food for others outside of the household (and therefore, must not work

- as a food handler).
- Working as a health care provider.
- Contact with people who are immunocompromised, unvaccinated or undervaccinated outside the household.

Treatment

- At this time, there are no specific pharmaceutical therapeutics/antiviral medications against polio, although there may be some investigational therapeutic options available.
- Clinical case management is at the direction of attending clinicians and includes supportive care directed towards addressing symptoms and complications of acute illness and paralysis. Consultation with an infectious disease specialist and neurologist is recommended, as is early rehabilitation therapy.

Immunization

As infection only provides type-specific immunity, unvaccinated or under-vaccinated cases should be offered polio vaccination (IPV) and other outstanding vaccinations once no longer infectious as per the eligibility criteria in the New Brunswick [Immunization Program Guide \(gnb.ca\)](#) and the [Canadian Immunization Guide - Canada.ca](#)

Contact Management

A risk assessment should be conducted to determine whether the contact (s) are at higher or lower risk. To conduct this assessment, and for assessment details, use the PHAC document, [Table 2: Potential contacts of a case infected with poliovirus and the possible acquisition and/or transmission risk](#), in Section 8.1.4 Contact Tracing. Once contact risk has been determined, continue to follow the NB guidance document as outlined below for investigation, and other public health measures.

Follow-up of contacts is important to identify a potential source of infection if it is not readily apparent (acquisition source) and also to determine those who may have been infected by the case (transmission risk) to prevent further onward spread.

Higher risk Contacts are:

- Persons living in the same household or having close contact with the case (e.g., sexual contact, sharing sleeping arrangements, or playing together for > four hours) within 30 days before the case's onset of illness;
- Children attending the same child care setting as the case and child care workers;
- Persons having contact with stool or fecal matter of the case within 30 days before the case's onset of illness, without using appropriate infection control precautions; and
- Contacts in group living settings who shared a bathroom with the case or had close interactions with the case (such as dormitories, shelters, detention centres, group homes, settlement houses);

Investigation

Members of the household and other higher risk contacts should be assessed for travel history within 30 days of cases' onset and immunization history (including receipt of oral polio vaccine within 30 days of cases' onset or presence in an area where there has been mass immunization with OPV.

Education

The following recommendations/considerations are relevant until the higher risk contact is determined not to be infected, based on two consecutive negative stool samples taken at least 48 hours apart, with the first collected at least 4 days after the contact's last exposure to the case before adequate infection prevention and control measures were initiated.

If the higher risk contact lives in the same household as the case, the higher risk contact should:

- Avoid sharing personal items with household members such as towels, or unwashed eating utensils, dishes, or drinking glasses.
- Clean and disinfect the bathrooms at least daily. Use household bleach or 0.5% accelerated hydrogen peroxide for disinfection. Ideally, the case would have a separate bathroom that is not used by contacts. If contacts are using the same bathroom, see "Education" under "Case Management" for additional measures the case(s) should take.
- Employ proper hand hygiene. Public health should reinforce the need for proper hand hygiene with the contact and all household members especially after using the bathroom, after changing diapers, after cleaning the bathroom, and before preparing, serving or eating food.

If the higher risk contact lives in a separate household from the case (meaning others in the contact's household are not also contacts), the higher risk contact should:

- Minimize contact with others in their household, including sleeping in a separate bedroom if possible.
- Use a separate bathroom that is not used by anyone else, if possible and clean and disinfect that bathroom at least daily. If the bathroom must be used by others, it should be cleaned and disinfected after the contact has a bowel movement as well as on a daily basis. Use household bleach or 0.5% accelerated hydrogen peroxide for disinfection.
- Avoid, if possible, contact with household members who are immunocompromised, unvaccinated or under-vaccinated (such as young children). If the higher risk contact must provide care or have direct contact with these individuals, the contact should perform proper hand hygiene before any contact.

Exclusion/Social Distancing

The higher risk contact should not work as a food handler. The contact should also avoid preparing food for others who have not been identified as close contacts of the case. The higher risk contact should perform proper hand hygiene before any food preparation.

The higher risk contact should not use a bathroom outside of the house or be in close contact with others outside of the household and therefore should not attend childcare, school or work outside of the home, or other indoor public settings.

Visitors to the higher risk contact's house should be restricted to only those who are essential.

Essential visitors should avoid use of the bathrooms in the house. If that is not possible, they should avoid the use of the bathroom used by the contact, perform good hand hygiene afterwards, and not use shared towels. They should not be served food or drinks. They should minimize any close contact with the contact and other household members.

Children who may be unable to appropriately wash their hands (typically children younger than 8 years of age), visitors who are immunocompromised and visitors who are unvaccinated or under-vaccinated should not visit the higher risk contact's house.

Lower Risk Contacts

Lower risk contacts include those who shared toilets with the case; ate food prepared by the case; health care workers who provided care for the case or laboratory workers who handle specimens from the case (unless they are classified as higher risk or no risk as per Table 2).

Health care workers / laboratory workers determined to have used adequate personal protective equipment and infection prevention and control practices could be considered not a contact.

Recommendations:

- Reinforce proper hand hygiene with the lower risk contact and all household members including after using the bathroom, after changing diapers, after cleaning the bathroom and before preparing, serving or eating food.
- Lower risk contacts should be advised to monitor for symptoms and contact PH **immediately** if any symptoms develop. Ensure that all healthcare providers caring for symptomatic low risk contacts are fully vaccinated against polio virus and are not immunocompromised.
- Unvaccinated or under-vaccinated contacts should be offered polio vaccination (IPV) and other outstanding vaccinations as per the Canadian Immunization Guide.

Prophylaxis

Not applicable

Immunization

- Once determined not to be infected with poliovirus, unvaccinated or under-vaccinated contacts should be offered polio vaccination (IPV) and other outstanding vaccinations as per the eligibility criteria in the New Brunswick [Immunization Program Guide \(gnb.ca\)](#) and the [Canadian Immunization Guide - Canada.ca](#).
- Offer a single lifetime adult booster dose of IPV-containing vaccine for adult contacts who have not had one at or after age 18 years of age.
- If the contact lives in a household that is different than the case, ensure that the contact's household members are fully vaccinated and consider offering a single lifetime adult booster dose of IPV-containing vaccine for adults who have not had one at or after age 18 years of age.

Note: Vaccination is recommended to protect an individual against ongoing exposure and is not intended as post-exposure immunoprophylaxis for contacts.

Outbreak Management

Activate the local outbreak plan when an outbreak is declared.

Resource:

[Guidance for the response and management of a poliovirus event or outbreak in Canada - Canada.ca: last updated: 2023-08-04.](#)

[Polio: For health professionals: last updated: 2023-08-04.](#)