Protocol for the investigation of acute flaccid paralysis and suspected paralytic poliomyelitis

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Despite the elimination of indigenous wild poliovirus in Canada, ongoing surveillance for poliomyelitis is important because of the risk of wild virus importation from endemic regions. Most recently, importation of wild poliovirus into Canada occurred in 1993 and 1996, in both instances with no associated clinical illness. Since 1991, the active surveillance of acute flaccid paralysis (AFP) in children less than 15 years old has been carried out in Canada to monitor for suspected cases of paralytic poliomyelitis. AFP surveillance is currently implemented through the Canadian Paediatric Surveillance Program. All suspected cases of paralytic poliomyelitis reported to the Laboratory Centre for Disease Control are evaluated by the national Working Group on Polio Eradication. The proper laboratory and neurological investigation of all AFP cases younger than 15 years old and suspected cases of poliomyelitis of any age is essential for the rapid detection of paralytic poliomyelitis, the most important clinical specimen for laboratory investigation being a stool sample collected within two weeks after the onset of paralysis for viral studies. This paper provides guidelines for investigating all suspected cases of paralytic poliomyelitis, including AFP cases less than 15 years old. Guidelines are also provided for reporting confirmed or suspected cases of paralytic poliomyelitis as well as the incidental finding of wild strain poliovirus, with or without any clinical symptoms.

Key Words: *Acute flaccid paralysis, Poliomyelitis, Surveillance*

Groupe de travail sur l'éradication de la polio. Un protocole pour l'investigation de la paralysie flasque aiguë et la poliomyélite paralytique présomptive

RÉSUMÉ : Malgré l'élimination du poliovirus sauvage indigène au Canada, la surveillance constante de la poliomyélite revêt de l'importance en raison du risque d'importer le virus sauvage des régions endémiques. Une importation du poliovirus sauvage au Canada s'est d'ailleurs produite en 1993 et en 1996, n'ayant toutefois suscité dans les deux cas aucune maladie clinique associée. Depuis 1991, la surveillance active de la paralysie flasque aiguë (PFA) chez les enfants de moins de 15 ans s'effectue à l'extérieur du Canada pour surveiller les cas présomptifs de poliomyélite paralytique. La surveillance de la PFA est maintenant implantée par l'entremise du Programme canadien de surveillance pédiatrique. Tous les cas présomptifs de poliomyélite paralytique déclarés au Laboratoire de lutte contre la maladie sont évalués par le groupe de travail national sur l'éradication de la polio. Les investigations neurologiques et de laboratoire pertinentes de tous les cas de PFA chez les enfants de moins de 15 ans et des cas présomptifs de poliomyélite à tout âge sont essentielles à la détection rapide de la poliomyélite paralytique, le prélèvement clinique le plus important pour les recherches de laboratoire étant constitué d'un échantillon de selles recueilli dans les deux semaines suivant l'apparition de la paralysie, en vue des études virales. Cet article fournit des directives pour étudier tous les cas présomptifs de poliomyélite paralytique, y compris les cas de PFA chez les moins de 15 ans. Des directives sont également fournies pour déclarer les cas confirmés ou présomptifs de poliomyélite paralytique ainsi que les observations fortuites de poliovirus de souche sauvage, accompagné ou non de symptômes cliniques.

Paralytic poliomyelitis has been nationally notifiable in Canada since 1924. The last case of indigenous wild paralytic poliomyelitis in Canada occurred in 1977, and Canada, along with the rest of the American Region, was formally certified as polio-free by the International Commission for the Certification of Poliomyelitis Eradication in September 1994 (1). Despite the elimination of indigenous wild poliovirus transmission, however, it remains essential that surveillance be maintained until global eradication is achieved because of the risk of wild virus importation from endemic regions. Paralytic poliomyelitis cases resulting from wild virus importations were reported in Canada in 1978 and 1988 (2,3). Two other recognized instances of wild virus importation in

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1993 and 1996 were not associated with paralytic (or nonparalytic) illness (4,5). The sensitivity of the previous passive surveillance system for poliomyelitis in Canada has been limited in recent years by the low index of diagnostic suspicion and the false sense of security that often occurs when a disease becomes rare. Thus, active surveillance of acute flaccid paralysis (AFP) in children less than 15 years old was initiated in 1991 to screen for potential cases of poliomyelitis. AFP surveillance formed a critical component of the polio eradication campaign in the Americas and continues to play an essential role in the World Health Organisation global polio eradication campaign (6). By using an expected annual background incidence of approximately one case of AFP per 100,000 population less than 15 years in the absence of wild poliovirus transmission (1), AFP surveillance serves as a good indicator of the level of monitoring for potential cases of paralytic poliomyelitis from imported virus into polio-free regions. Further, with the proper laboratory and neurological investigation of cases, AFP surveillance greatly improves the sensitivity for rapid detection of paralytic poliomyelitis. AFP surveillance in Canada is being implemented through a collaborative effort between the Laboratory Centre for Disease Control (LCDC) and the Canadian Paediatric Surveillance Program. Surveillance is based on reporting through the Immunization Monitoring Program Active system, a network of 11 paediatric tertiary care centres across the country, as well as reporting by paediatricians. All suspected cases of paralytic poliomyelitis reported to LCDC are evaluated by the national Working Group on Polio Eradication to rule out or confirm the diagnosis.

This protocol provides guidelines for investigating all suspected cases of paralytic poliomyelitis of any age, as well as AFP cases in patients younger than 15 years. All suspected cases of paralytic poliomyelitis that meet the reporting criteria in this protocol (or additional local reporting criteria) should be reported according to the procedures outlined (see the section on Investigation and reporting of cases) to provincial or territorial public health authorities for notification to LCDC. Guidelines are also provided for reporting the incidental finding of wild strain poliovirus, with or without any clinical symptoms (see section on Reporting of incidental finding of wild poliovirus).

All acute flaccid paralysis cases aged younger than 15 years should be investigated to rule out poliomyelitis. Refer to case definition below.

All suspected cases of paralytic poliomyelitis, regardless of age, should be reported to public health authorities as outlined in the section on Investigation and reporting of cases. Refer to surveillance case definition below.

The incidental finding of wild strain poliovirus, with or without clinical symptoms, should be reported as outlined in the section on Reporting of incidental finding of wild poliovirus.

SURVEILLANCE CASE DEFINITIONS

AFP: For surveillance purposes, AFP is defined as acute onset of focal weakness or paralysis characterized as flaccid (reduced tone), without other obvious cause (eg, trauma) in children younger than 15 years. Transient weakness (eg, post-ictal weakness) should not be reported.

Paralytic poliomyelitis: The following case definitions are based on national surveillance case definitions, published by the Advisory Committee on Epidemiology (ACE) and LCDC in 1991 (7), which were in use when the protocol was published. However, these case definitions are under review by ACE; therefore, the most recent definition available should always be used and inserted in the protocol.

Confirmed case: A confirmed case is identified by clinically compatible signs and symptoms of paralytic poliomyelitis (acute flaccid paralysis of one or more limbs; decreased or absent tendon reflexes on affected limbs; no persistent sensory or cognitive loss; no other apparent cause; and neurological deficit present 60 days after onset of initial symptoms unless the patient has died), associated with the isolation of vaccine or wild poliovirus from a clinical specimen.

Possible case: A possible case is indicated by clinically compatible signs and symptoms of paralytic poliomyelitis (as listed above), without isolation of poliovirus from clinical specimens, with serological evidence of recent poliovirus infection, without evidence for infection with other neurotropic viruses.

Serological evidence of recent poliovirus infection is provided by *a fourfold or greater rise in poliovirus antibody titre in paired sera and/or the presence of poliovirus-specific immunoglobulin (Ig) M antibody.*

INVESTIGATION AND REPORTING OF CASES

The following describes the protocol to follow during the investigation of suspected cases. These steps are outlined in Figure 1.

Step A: Is the case clinically compatible with paralytic poliomyelitis or AFP as defined above?

- **If no –** No further investigation or report is required.
- **If yes –** Alert the appropriate provincial or territorial public health authorities that a suspected case of paralytic poliomyelitis (or AFP case) is under investigation. Proceed to Step B.

Step B:

- Ensure collection of one stool sample within two weeks after the onset of paralysis for viral studies. (The sample may be collected up to six weeks after onset of paralysis.) **Note: An adequately timed**

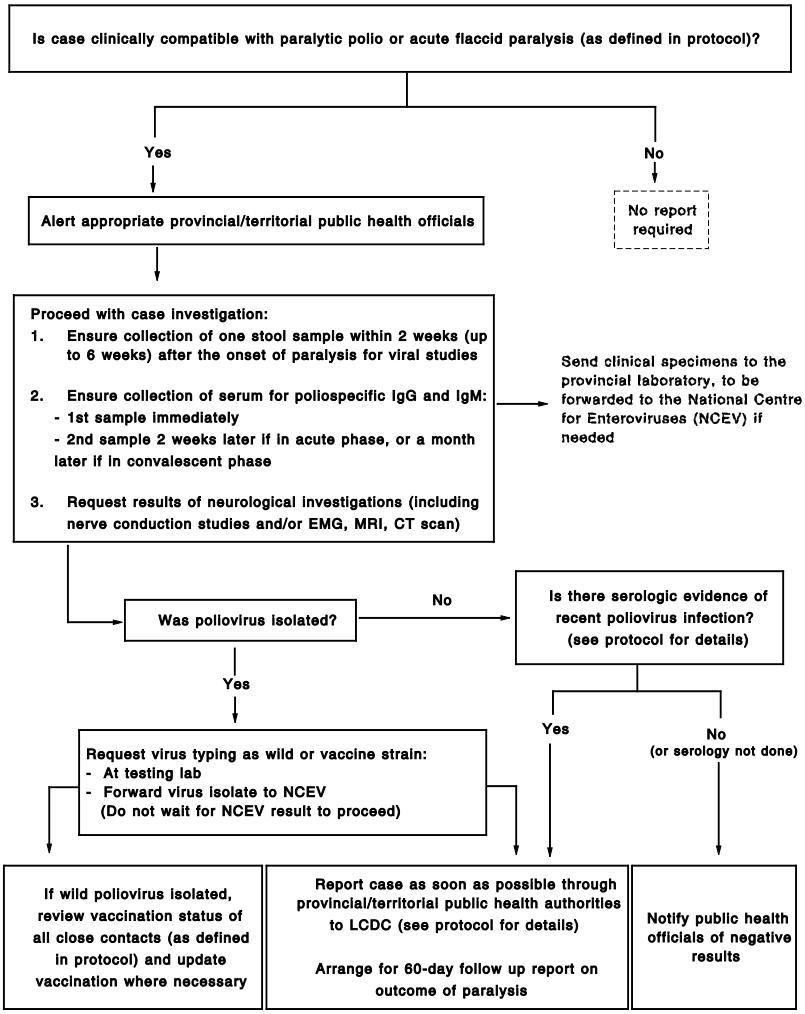

Figure 1) *Steps for investigating and reporting suspected cases of paralytic polio or acute flaccid paralysis. CT Computed tomography; EMG Electromyography; Ig Immunoglobulin; LCDC Laboratory Centre for Disease Control; MRI Magnetic resonance imaging*

stool sample (as specified above) is the most important clinical specimen for the laboratory investigation and diagnosis of poliomyelitis. A stool sample is preferred to a rectal swab because the laboratory diagnosis of poliovirus is more reliable. However, in the absence of a stool sample, fecal material obtained by a rectal swab (or similar rectal examination) is acceptable.

- Ensure that a serum specimen is taken immediately for polio serology. A second specimen should be taken two weeks later if the patient presents in the acute phase of the illness or one month later if the patient presents in the convalescent phase. Samples should be tested in parallel for poliovirus antibody titres, and polio-specific IgG and IgM evaluations. **Note:** Stool and serum specimens should be forwarded to the provincial laboratory to avoid unnecessary cost to specific health institutions and ensure that all the appropriate investigations for poliovirus (or other enteroviruses) are done. Specimens should be forwarded by provincial laboratories to the National Centre for Enteroviruses for further investigation when needed.
- Request results of neurological investigations including nerve conduction studies and/or electromyography, magnetic resonance imaging and computed tomography scan.

Step C: Evaluate the results of the laboratory investigations outlined above, and proceed as appropriate.

- **If poliovirus is isolated**, request results of typing (as vaccine strain or wild strain) from the testing laboratory. **The reporting health unit in liaison with the testing laboratory should ensure that all polio virus isolates are forwarded to the National Centre for Enteroviruses for further typing and strain differentiation.**
  Proceed to Step D without waiting for results from the National Centre for Enteroviruses.
- If poliovirus is not isolated but there is **serological evidence of recent poliovirus infection** (ie, a

fourfold or greater rise in poliovirus antibody titre in paired sera and/or the presence of poliovirus-specific IgM antibody), proceed to Step D. **Note:** If poliovirus is not isolated and there is no serological evidence of recent poliovirus infection (including tests not done, specimens inadequate or negative results) proceed to Step D and inform appropriate provincial or territorial public health authorities of the outcome of investigations. Cases clinically compatible with paralytic poliomyelitis should be reported as "suspected cases".

Step D: Report case as soon as possible to provincial or territorial public health authorities. Indicate case as confirmed or possible polio if the respective case definitions reported here are met. A clinically compatible case with no laboratory evidence of poliovirus infection (or incomplete laboratory investigations) should be reported as a suspected case. The following information should be sought and included in the report for each case.

Patient information collected should include

- date of birth and gender;
- polio immunization status (total number of doses of oral and/or injection polio vaccine received);
- receipt of **oral polio vaccine** within 30 days before the onset of illness;
- travel history within 30 days before the onset of illness;
- summary of the clinical presentation, course of illness and final clinical diagnosis;
- results of stool culture and serological tests (**if any of the required clinical specimens were not available for testing, this should be indicated in the report**); and
- results of electromyography and/or nerve conduction studies, if available (**indicate if tests were not done**).

Information relating to household contacts should include

- receipt of **oral polio vaccine** within 90 days before the onset of illness in the case and
- travel history within 30 days before the onset of illness in the case.

Health Canada reporting forms, *Common Case Report Form A (HPB 5130A)* and *Poliomyelitis Case Report Form E (HPB 5130E)*, provide the full details of the information required and should be used for reporting.

Make arrangements for follow-up assessment of the outcome of paralysis 60 days after its onset. A follow-up report should be submitted when the information is available.

Note: The initial report should not be delayed because of incomplete information; however, all relevant information should be sent in a follow-up report as soon as it is available.

MANAGEMENT OF CLOSE CONTACTS

If wild poliovirus is isolated from a clinical specimen, the polio immunization status of close contacts of the case should be reviewed and their immunization updated, if needed.

Close contacts of a case are defined as:

- household contacts – persons living in the same house or having close contact with the case (eg, sharing sleeping arrangements or playing together for 4 h or more) within 30 days before the case's onset of illness;
- day care attendees; and
- persons having contact with stools or fecal matter of the case within 30 days before the patient's onset of illness, without using infection control precautions.

These guidelines apply to isolated cases of suspected or confirmed paralytic poliomyelitis or the incidental finding of wild poliovirus with paralysis.
The investigation of a cluster of cases as part of an outbreak should be reviewed by local or provincial/territorial public health authorities to determine the extent of contact investigation.

REPORTING OF INCIDENTAL FINDING OF WILD POLIOVIRUS

The incidental finding of wild strain poliovirus in a clinical specimen, with or without clinical signs and symptoms of poliomyelitis, should be reported to local and provincial/territorial public health authorities, according to the procedures outlined in Step D above.

The polio immunization status of close contacts should be reviewed and their immunization updated, if needed.

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