Poliomyelitis!

Report immediately 24/7 by phone upon initial suspicion or laboratory test order

PROTOCOL CHECKLIST

- ☐ Immediately notify the Bureau of Epidemiology (BOE) following the initial receipt of a report of a possible case
- ☐ Initiate case investigation within one hour of receipt of the initial report
- ☐ Enter available information into Merlin upon receipt of initial report
- ☐ Review background information on the disease (see page 3), case definition (see page 6), laboratory testing (see page 8), reporting requirements (see page 2), and control measures (see page 9)
- ☐ Contact provider (see page 8)
- ☐ Interview patient
  - ☐ Review disease facts (see page 3)
    - ☐ Immunization recommendations
    - ☐ Modes of transmission
    - ☐ Incubation period
    - ☐ Period of infectiousness
    - ☐ Symptoms and signs
  - ☐ Ask about exposure to relevant risk factors (see page 8)
    - ☐ International travel
    - ☐ Attendance at public gatherings
    - ☐ Contact with symptomatic individuals
    - ☐ Occupational exposure
  - ☐ Identify close personal contacts (see page 4)
  - ☐ Determine whether patient or symptomatic contact is in a sensitive situation
    - ☐ Recommend exclusions for patients or symptomatic contacts (see page 4)
  - ☐ Provide education on prevention and transmission (see page 4)
    - ☐ Educate on importance of routine immunization
    - ☐ Educate on avoiding direct or indirect contact during infectious period
    - ☐ Educate on proper practices of respiratory etiquette and hand hygiene
    - ☐ Educate on safe eating and drinking habits, especially during international travel
  - ☐ Address questions or concerns of patients and close contacts/parents
- ☐ Follow-up on special situations, including outbreaks or patients in sensitive situations (see page 9)
- ☐ Enter additional data obtained from interview into Merlin (see page 9)

Poliomyelitis

1. DISEASE REPORTING

A. Purpose of surveillance, reporting and investigation

1. To contribute to the global eradication of poliomyelitis by detecting individual people infected with the poliovirus so that public health, medical, or behavioral action can prevent spread from the reported patient, investigate the source of exposure and identify any breaks in the public health system that contributed to spread.

2. To detect and investigate outbreaks of illnesses due to poliovirus early enough to prevent an outbreak.

3. To allow a better understanding of the descriptive epidemiology of poliomyelitis cases in order to be able to focus primary case prevention efforts, and formulate better prevention strategies that might include improvements in vaccines or vaccination schedules.

4. To detect outbreaks of illnesses due to poliovirus in order to better understand the events that lead to such outbreaks, and thus, be able to focus efforts for disease eradication and prevention of future outbreaks.

B. Legal reporting requirements

Laboratories and physicians are required to report persons with any suspicion of infection with poliovirus to the county health department (CHD) **immediately (24/7) by phone (850-245-4401) upon initial suspicion or laboratory test order. Reports should not be delayed for serotyping or final laboratory confirmation.**

C. County health department (CHD) investigation responsibilities

1. Report suspected cases of polio to the Bureau of Epidemiology (BOE) immediately. The occurrence of a single case of poliomyelitis due to wild poliovirus or a vaccine-derived poliovirus (cVDPV) in the U.S. is considered a public health emergency prompting immediate investigation and response planning. In such a case, under the International Health Regulations (IHR), the World Health Organization (WHO) recommends that a thorough search be carried out for additional cases of acute flaccid paralysis (AFP) in the geographic and social area around the patient in order to assure early detection, facilitate control, and permit appropriate measures for unrecognized and unreported cases.

2. Follow up with suspected patients immediately and administer appropriate measures to control further spread. **See paragraph G in Section 2 and Section 6 for recommendations on controlling further spread.**

3. Report all probable and confirmed cases in Merlin.

2. THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic agent

Poliovirus (genus *Enterovirus*) types 1, 2, and 3 all cause paralysis. Wild poliovirus type 1 is most commonly isolated from patients with paralytic disease and type 3 less so. Circulating wild type 2 poliovirus has not been detected since October 1999. Type 1 most frequently causes epidemics. Paralytic polio also occurs in persons who receive the live attenuated oral poliovirus vaccine (vaccine-associated paralytic poliomyelitis or VAPP), or their contacts, at a rate of approximately 1 in every 2.5 million doses administered, or 1 in 800,000 first vaccinations. Oral polio vaccine is not routinely used in the U.S.

B. Description of illness

Poliomyelitis is a contagious disease caused by three serotypes of poliovirus. Infection with poliovirus results in a spectrum of clinical manifestations from inapparent infection to nonspecific febrile illness, aseptic meningitis, paralytic disease, or death. Two phases of acute poliomyelitis can be distinguished: a nonspecific febrile illness (minor illness) followed, in a small proportion of patients, by aseptic meningitis and/or paralytic disease (major illness). The ratio of cases of inapparent infection to paralytic disease among susceptible individuals ranges from 100:1 to 1000:1 or more.

Following the acute episode, many patients recover muscle function (at least partially) and prognosis for recovery can usually be established within six months after onset of paralytic manifestations.

C. Reservoirs

Humans are the only reservoir. Most infections are asymptomatic. No long-term carriers of wild type poliovirus have been detected. Chronic carriage of vaccine-derived poliovirus has been reported, but is rare.

D. Modes of transmission

Transmission is primarily person-to-person, principally through the oral-fecal route. Substances (e.g., milk, foodstuffs, water) contaminated with feces have been implicated as vehicles. There is no reliable evidence of spread by insects. Type-specific immunity, apparently of lifelong duration, follows both clinically recognizable and inapparent infections. Second attacks of polio are rare and result from infection with a poliovirus of a different type.

E. Incubation period

The period of incubation is commonly 7–14 days for paralytic cases. The reported range is from 3 to as much as 35 days.

F. Period of communicability

Transmission is possible as long as the virus is excreted. This virus typically persists in the throat for approximately one week and in feces for 3–6 weeks. Patients are most infectious during the days immediately before and after onset of symptoms.

G. Management of patients, contacts and the immediate environment

Contact and standard precautions are essential in the hospital for management of patients. In a household where few, if any, members have received full immunization, many household contacts may become infected before poliomyelitis has been diagnosed. Items that have been contaminated by throat discharges or feces should be properly disinfected to decrease disease transmission.

There is no treatment for poliomyelitis; however, during acute illness, attention to complications of paralysis requires expert knowledge and equipment, especially for patients in need of respiratory assistance. Physical therapy is used to attain maximum function after paralytic poliomyelitis and can prevent some deformities that are late manifestations of the illness.

Immunization of familial and other close contacts is recommended but may not contribute to immediate control because the virus has often infected susceptible close contacts by the time the initial case is recognized. Immunization of previously vaccinated contacts will need to be discussed.

H. Reporting (see Sections 3, 4, 5, and paragraphs G, H, and I in Section 7)

Report immediately (24/7) by phone to BOE (850-245-4401) upon initial suspicion or laboratory test order. Reports should not be delayed for serotyping or final laboratory confirmation.

Because poliomyelitis has been eliminated from the Americas, each reported case of suspected poliomyelitis should be followed up by FL DOH in close collaboration with the Centers for Disease Control and Prevention (CDC). Paralytic polio has been classified as “Immediately notifiable, Extremely Urgent”, which requires the Florida State Epidemiologist to contact the CDC within four hours. Reports of non-paralytic polio are designated as “Immediately notifiable, Urgent”, which requires notification of the CDC within 24 hours (CDC Emergency Operations Center: 770-488-7100).

I. Prevention

Recommendations for routine and supplementary childhood immunization in the United States are as follows:

All children should receive four doses of IPV given at 2 months, 4 months, 6–18 months, and 4–6 years of age. In addition, because of potential confusion in using different vaccine products for routine and catch-up immunization, recommendations for poliovirus vaccination were updated in 2009. The Advisory Committee on Immunization Practices (ACIP) recommends the following:

- The four-dose IPV series should continue to be administered at ages 2 months, 4 months, 6–18 months, and 4–6 years.
- The final dose in the IPV series should be administered at age ≥ 4 years, regardless of the number of previous doses.

- The minimum interval from dose three to dose four is extended from 4 weeks to 6 months.
- The minimum interval from dose one to dose two, and from dose two to dose three, remains four weeks.
- The minimum age for dose one, remains 6 weeks old.

ACIP also updated its recommendation concerning the use of minimum age and minimum intervals for children in the first 6 months of life. Use of the minimum age and minimum intervals for vaccine administration in the first 6 months of life are recommended only if the vaccine recipient is at risk for imminent exposure to circulating poliovirus (e.g., during an outbreak or because of travel to a polio-endemic region). ACIP made this precaution because shorter intervals and earlier start dates lead to lower seroconversion rates.

In addition, ACIP is clarifying the poliovirus vaccination schedule to be used for specific combination vaccines. When DTaP-IPV/Hib (Pentacel) is used to provide four doses at ages 2, 4, 6, and 15–18 months, an additional booster dose of age-appropriate IPV-containing vaccine (IPV [Ipol] or DTaP-IPV [Kinrix]) should be administered at age 4–6 years. This will result in a 5-dose IPV vaccine series, which is considered acceptable by ACIP. DTaP-IPV/Hib is not indicated for the booster dose at age 4–6 years. ACIP recommends that the minimum interval from dose four to dose five should be at least six months to provide an optimum booster response. In accordance with existing recommendations, if a child misses an IPV dose at age 4–6 years, the child should receive a booster dose as soon as feasible.

For the most recent ACIP recommendations, visit http://www.cdc.gov/vaccines/acip/index.html.

J. Poliomyelitis in Florida

No cases of polio have been reported in Florida for more than 20 years. Although polio immunization levels in Florida are high, continued vigilance is highly recommended because Florida has many popular international tourist destinations and there are a substantial number of Floridians who refuse full immunization for their children.

Following the successful implementation of the polio eradication initiative in the Americas beginning in 1985, the last case of wild poliovirus-associated disease was detected in Peru in 1991. The hemisphere was certified as free of indigenous wild poliovirus in 1994. In 1988, the World Health Assembly adopted the goal of worldwide eradication of poliomyelitis by the year 2000. By 2001, substantial progress toward eradication had been reported: a more than 99% decrease in the number of reported cases of poliomyelitis was achieved. Wild poliovirus remains endemic in just three countries: Afghanistan and Pakistan in Asia, and Nigeria in Africa. Cases are sporadically reported in other countries. Due to the successful implementation of the global poliomyelitis eradication initiative, the risk of importation of wild poliovirus into the U.S. decreased substantially over the last decade. Nevertheless, the potential for importation of wild poliovirus into the U.S. remains until worldwide poliomyelitis eradication is achieved. More information on the status of poliomyelitis eradication can be found at: http://www.polioeradication.org/.

K. International spread: A public health emergency of international concern

On May 5, 2014, the Director-General of the WHO accepted the recommendations of an Emergency Committee, declaring the international spread of polio to be a public health emergency of international concern (PHEIC) under the authority of the IHR (2005) and issued vaccination requirements for travelers in order to prevent further spread of the disease. IHR is an international agreement among countries to prevent, protect or control the international spread of disease. All countries have agreed to be bound by recommended activities under IHR. The burden for enforcement of the polio vaccination requirements under this PHEIC declaration lies with polio-affected countries (termed "polio-infected" by WHO). At this time, the United States government is not expected to implement requirements for entry into the United States.

Clinicians should be aware of possible new vaccination requirements for patients planning travel for greater than four weeks to countries with ongoing poliovirus transmission. Consult the Yellow Book for current polio vaccination recommendations for travelers, available at http://wwwnc.cdc.gov/travel/page/yellowbook-home-2014. U.S. citizens who plan to travel to any of the polio-infected countries should have documentation of a polio booster in their yellow International Certificate of Vaccination in order to avoid delays in transit.

3. CASE DEFINITION

Poliomyelitis, Paralytic

A. Clinical description

Acute onset of a flaccid paralysis of one or more limbs with decreased or absent tendon reflexes in the affected limbs, without other apparent cause, and without sensory or cognitive loss.

B. Case classification

Confirmed: A case that meets the clinical case definition; AND in which the patient has a neurologic deficit 60 days after onset of initial symptoms; OR has died; OR has unknown follow-up status
Probable: A case that meets the clinical case definition

C. Comment

Specimens from all cases must be sent to the Bureau of Public Health Laboratories (BPHL) for confirmation.

Poliomyelitis, Non-paralytic

A. Clinical description

Most poliovirus infections are asymptomatic or cause mild febrile disease. Poliovirus infections occasionally cause aseptic meningitis and one out of 200 infections from poliovirus type 1 results in paralytic poliomyelitis, characterized by acute onset of flaccid

paralysis that is typically asymmetric and associated with a prodromal fever. Poliovirus is spread through fecal material, oral secretions, some aerosols, and fomites.

B. Case classification

Confirmed: Poliovirus isolate identified in an appropriate clinical specimen (e.g., stool, cerebrospinal fluid, oropharyngeal secretions), with confirmatory typing and sequencing performed by the CDC poliovirus laboratory, as needed.

C. Comments

This case definition applies only to poliovirus infections found in asymptomatic persons or those with mild, non-paralytic disease (e.g., those with a nonspecific febrile illness, diarrhea, or aseptic meningitis). Isolation of polioviruses from persons with acute paralytic poliomyelitis should continue to be reported as "paralytic poliomyelitis 04590."

In 2005, a vaccine-derived poliovirus (VDPV) type 1 was identified in a stool specimen obtained from an immune-deficient Amish infant and, subsequently, from four other children in two other families in the infant's central Minnesota community. Epidemiological and laboratory investigations determined that the VDPV had been introduced into the community about three months before the infant was identified and that there had been virus circulation in the community. Investigations in other communities in Minnesota and nearby states and Canada did not identify any additional infections or any cases of paralytic poliomyelitis.

Although oral poliovirus vaccine (OPV) is still widely used in most countries, inactivated poliovirus vaccine (IPV) replaced OPV in the U.S. in 2002. Therefore, the Minnesota poliovirus infections were the result of importation of a vaccine-derived poliovirus into the U.S. and the first time a VDPV has been shown to circulate in a community in a developed country. Circulating VDPVs commonly revert to a wild poliovirus phenotype and have increased transmissibility and high risk for paralytic disease; they have recently caused polio infections and outbreaks of paralytic poliomyelitis in several countries. Contacts between persons in communities with low polio vaccination coverage pose the potential for transmission of polioviruses and outbreaks of paralytic poliomyelitis.

Because of the success of the routine childhood immunization program in the U.S. and the Global Polio Eradication Initiative, polio has been eliminated in the Americas since 1991. Because the U.S. has used IPV exclusively since 2000, the occurrence of any poliovirus infections in the U.S. is a cause for concern. Reflecting the global concern for poliovirus importations into previously polio-free countries, the World Health Assembly of WHO has added circulating poliovirus to the notifiable events in the IHR.

Specimens from all cases must be sent to BPHL for confirmation.

4. LABORATORY TESTING

A. Criteria for diagnosis

Laboratory studies, especially attempted poliovirus isolation, are critical for confirming whether a case of paralytic poliomyelitis is the result of wild or vaccine-related virus

infection. Specimens from all suspect patients must be sent to BPHL in Jacksonville (904-791-1541) or Tampa (813-974-8300) for primary isolation on appropriate cell lines (See Section 7A and 7G).

Because virus shedding can be intermittent, and to increase the probability of poliovirus isolation, at least two stool specimens and two throat swabs should be obtained 24 hours apart from patients with suspected poliomyelitis. Obtain specimens as early in the course of the disease as possible (i.e., immediately after poliomyelitis is considered as a possible differential diagnosis); ideally, within the first 14 days after onset of paralytic disease. Acute and convalescent serum specimens should be collected for serologic testing.

B. Services available at the BPHL

BPHL should be notified prior to specimen collection and shipping. Specimens should be sent to the BPHL for primary isolation on appropriate cell lines. BPHL will forward virus isolates to the CDC for typing and sequencing to determine whether the poliovirus isolate is wild or vaccine-related.

C. Serologic testing and interpretation of results

Serology may be helpful in supporting the diagnosis of paralytic poliomyelitis. An acute serum specimen should be obtained as early in the course of disease as possible. A convalescent specimen should be obtained at least three weeks later. A four-fold neutralizing antibody titer rise between the acute and convalescent specimens suggests poliovirus infection. Serologic assays to detect anti-poliovirus antibodies are available at CDC (see Section 7A) and in some commercial laboratories, but not at BPHL.

5. CASE INVESTIGATION

A. Contact the physician or hospital

The existence of a polio case constitutes a public health emergency and appropriate control efforts must be initiated immediately in consultation with health care providers. The evaluation of the likelihood that the disease may be caused by wild poliovirus requires consultation with BOE and CDC. The compilation of medical records and collection of appropriate clinical specimens will facilitate virus isolation and serology and procedures to rule out or confirm poliomyelitis.

B. Interview the patient

Use the Suspected Polio Case Worksheet to interview/ investigate a suspect patient with polio: http://www.cdc.gov/vaccines/pubs/surv-manual/appx/appendix14-2-polio-wrsht.pdf. Demographic, clinical, and epidemiologic information are collected to:

- Determine whether the patient meets the case definition for paralytic poliomyelitis.
- Determine whether the disease may be caused by wild poliovirus.

C. Special populations

The last two outbreaks of poliomyelitis in the U.S. were reported among Christian Scientists in 1972 and the Amish in 1979, groups objecting to vaccination. Religious/philosophical groups objecting to vaccination and travelers from polio-active regions should be assigned the highest urgency for follow-up and collection of specimens. VDPVs also pose a risk of poliomyelitis in communities with low vaccination coverage.

D. Merlin data entry

Create a case in Merlin under disease code **POLIOMYELITIS–non-paralytic 04520 or paralytic 04590**. Enter the data collected into Merlin, being sure to include all required fields on the Basic Data screen, complete the Case Symptoms screen, and attach all relevant labs. Please attach **ALL** labs received via electronic laboratory reporting (ELR) to the case.

6. CONTROLLING FURTHER SPREAD

A. Education and communication on prevention, surveillance and response

Due to the severity of poliomyelitis disease, clinicians are often the first to suspect the diagnosis of poliomyelitis and they are the key to timely reporting of suspected cases. However, disease reporting by clinicians is often delayed because it is only after other differential diagnoses are ruled out that the diagnosis of poliomyelitis is considered. Efforts should be made to promote physicians' awareness of the importance of vigilance, taking a travel and immunization history, prompt reporting of suspected cases to DOH and the CDC, and the need to obtain appropriate specimens early in the disease course.

B. Management of cases and contacts

See Section 2, paragraph G.

7. IMPORTANT LINKS

A. Chapter 12: Poliomyelitis by Wallace, G.S. and Oberste, M.S., in the *Manual for Surveillance of Vaccine-Preventable Diseases*, 5th ed. (April 2013); Centers for Disease Control and Prevention; accessed September 4, 2013 at http://www.cdc.gov/vaccines/pubs/surv-manual/chpt12-polio.html; and Chapter 22: Roush, S.W., et al., Laboratory Support for the Surveillance of Vaccine-Preventable Diseases; accessed September 4, 2013 at http://www.cdc.gov/vaccines/pubs/surv-manual/chpt23-natl-surv-vpd.html.

B. Chapter 3: Polio & Other Infectious Diseases Related to Travel by Wallace, G.S., Alexander, J.P., and Wassilak, G.F., in the Guide to Travelers' Health. Centers for Disease Control and Prevention; accessed September 4, 2013 at http://wwwnc.cdc.gov/travel/yellowbook/2014/chapter-3-infectious-diseases-related-to-travel/poliomyelitis.

C. CDC. Polio infection & vaccination–Q&A Centers for Disease Control and Prevention http://www.cdc.gov/polio/. Tracking progress toward global polio eradication—Worldwide, 2009–2010. MMWR 2011; 60 (14): 441–5. Progress toward interruption of wild poliovirus transmission—Worldwide, January 2010–March 2011. MMWR 2011; 60 (18): 582–6.

D. World Health Organization (WHO). International Health Regulations and Q&A regarding Polio infection, eradication, and vaccination–see the following web sites: http://www.who.int/topics/poliomyelitis/en/; http://www.who.int/ihr/alert_and_response/en/; and http://www.who.int/immunization_monitoring/diseases/poliomyelitis_surveillance/en/.

E. CDC-ACIP. Recommended childhood immunization schedules for persons aged 0 through 18 years–United States, 2010. MMWR QuickGuide 2010; 58 (51 & 52): 1–4: http://www.cdc.gov/mmwr/PDF/wk/mm5851.pdf. Updated recommendations of the Advisory Committee on Immunization Practices (ACIP) regarding routine poliovirus vaccinaton. MMWR 2009; 58 (30): 829–30. Poliomyelitis prevention in the U.S. Recommendations from the Advisory Committee on Immunization Practices. MMWR 2000; 49 (No. RR-5).

F. Pan American Health Organization (PAHO): Polio Eradication Field Guide, 2005. Accessed September 4, 2013 at http://www1.paho.org/english/ad/fch/im/FieldGuide_Polio.pdf.

G. DOH Bureau of Public Health Laboratories–lab testing services, available at: http://dohiws/divisions/laboratories/AnalyticalServices/Alphabet.htm, and specifically for Enterovirus/Poliovirus: http://dohiws/divisions/laboratories/PDF_Files/Virology_Laboratory_Services.pdf.

H. Surveillance Case Definitions for Paralytic and Non-Paralytic Poliomyelitis. Available at: http://www.floridahealth.gov/diseases-and-conditions/disease-reporting-and-management/disease-reporting-and-surveillance/case-def-archive.html.

I. Poliomyelitis Case Report Forms–the CDC Polio Case Worksheet is available at the following website http://www.cdc.gov/vaccines/pubs/surv-manual/appx/appendix14-2-polio-wrsht.pdf

8. REFERENCES

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B. Chapter 12: Poliomyelitis by Wallace, G.S. and Oberste, M.S., in the Manual for Surveillance of Vaccine-Preventable Diseases, 5th ed. (April 2013); Centers for Disease Control and Prevention; accessed September 4, 2013 at http://www.cdc.gov/vaccines/pubs/surv-manual/chpt12-polio.html.

C. American Academy of Pediatrics. (2012). *Red Book: 2012 Report of the Committee on Infectious Diseases* (29th ed.). Grove Village, IL: American Academy of Pediatrics.

D. Chapter 3: Polio & Other Infectious Diseases Related to Travel by Wallace, G.S., Alexander, J.P., and Wassilak, G.F., in the Guide to Travelers' Health. Centers for Disease Control and Prevention; accessed September 4, 2013 at http://wwwnc.cdc.gov/travel/yellowbook/2014/chapter-3-infectious-diseases-related-to-travel/poliomyelitis.

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F. Chapter 168: Poliomyelitis by Modlin, J.F., in *Mandell, Douglas and Bennett's Principles and Practice of Infectious Disease*, Mandell, G.L., Bennett, J.E., and Dolin, R. (Eds.). Volume 2, 2005, (6th ed.); pages 2141-2148. Elsevier, Churchill, Livingstone, Philadelphia.

G. Chapter 246, 2007: Polioviruses by Simoes, E.A.F., in *Nelson Textbook of Pediatrics*, Kliegman, R.M., Behrman, R.E., Jenson, H.B., and Stanton, B.F. (Eds.), 18th ed.; pages 1344-1350. Saunders, Elsevier, Philadelphia.

H. Poliovirus infections in four unvaccinated children–Minnesota, August-October 2005. MMWR; 54 (41); 1053–1055; accessed September 4, 2013 at http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5441a6.htm.

I. Conclusions and recommendations of the Advisory Committee on Poliomyelitis Eradication—Geneva, Switzerland, October 2005. MMWR; 54 (46); 1186-1188; accessed September 4, 2013 at http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5446a5.htm.