



Pan American
Health
Organization



World Health
Organization
REGIONAL OFFICE FOR THE
Americas

Epidemiological Update

Detection of poliovirus in wastewater: Considerations for the Region of the Americas

30 December 2022

On 23 December 2022, the Canada IHR National Focal Point reported a detection of a vaccine derived polio virus type 2 (VDPV2) in two wastewater samples collected in August 2022 from Canada. The United States' CDC is examining the positive wastewater sample sequence data to assess any genetic linkages to VDPV2 samples collected from New York State. In light of this, the Pan American Health Organization/World Health Organization (PAHO/WHO) reiterates to Member States the need to have an updated response plan for polio outbreaks or events, join efforts to achieve vaccination coverage against poliomyelitis >95%, strengthen and maintain epidemiological surveillance of acute flaccid paralysis for the rapid detection of cases.

Situation summary

Canada

On 23 December 2022, the Canada IHR National Focal Point reported a detection of a vaccine derived polio virus type 2 (VDPV2) in two wastewater samples collected in August 2022 from Canada. According to the report, the specimens were collected between 20 and 30 August 2022, from a wastewater treatment plant and targeted sites in the affected area after the report of the case of VDPV2 in New York State. The target sampling sites were determined based on close connections with communities in New York and the surrounding areas where VDPV2 was detected.

The Canadian National Microbiology Laboratory (NML), retrospectively tested wastewater samples and found that 3 of 26 samples tested positive for polio by real-time PCR. On 23 December 2022, two of the three samples were confirmed to be VDPV2. The environmental sample collected on 27 August, from a large wastewater treatment plant, is VDPV2, with 8 nucleotide differences from the Sabin 2 VP1. The environmental sample collected on 30 August, from a targeted site, is a VDPV2, with 6 nucleotide differences from the Sabin 2 VP1. The environmental sample collected on 20 August is pending confirmation by virus isolation.

All other samples (n=23) tested negative for poliovirus detection, including samples collected from targeted sites and wastewater treatment plant of the affected area between 31 October and 9 November 2022 (n=12). The NML will test archived samples collected between September and December from wastewater treatment plant in the affected area for poliovirus.

Suggested citation: Pan American Health Organization / World Health Organization. Epidemiological Update Detection of poliovirus in wastewater: Considerations for the Region of the Americas. 30 December 2022, Washington, D.C.: PAHO/WHO; 2022

The United States' CDC is examining the positive wastewater sample sequence data to assess any genetic linkages to VDPV2 samples collected from New York State. The NML and the affected jurisdiction plan to continue sampling the wastewater sites (one collection per month) until the end of February 2023.

There have been no confirmed or suspected cases of acute flaccid paralysis (AFP) being investigated in the affected jurisdiction in 2022.

PAHO/WHO is working together with the Public Health Agency of Canada to follow up on this event.

United States of America

In the United States of America, since the September 2022 detection of VDPV2 in New York State, the US-CDC confirmed the presence of 94 positive samples, of which 87 are genetically linked to the Rockland County polio case. Of the 87 samples, 44 were collected in Rockland County, 28 in Orange County, 13 in Sullivan County, 1 in Nassau, and 1 in New York City from Brooklyn and a small part of Queens County. Sequencing analysis of the remaining 7 samples (6 collected in New York City and 1 in Orange County) were characterized as vaccine-derived poliovirus or Sabin poliovirus variants type 2. All samples were collected between April and October 2022.¹

¹ New York State Department of Health. Wastewater Surveillance. Accessed 28 December 2022. Available at: <https://on.ny.gov/3BvG6FQ>

Guidance for national authorities

PAHO/WHO reiterates to Member States the need to continue efforts to achieve optimal levels of population immunity through high and homogeneous vaccination coverage, and through sensitive epidemiological surveillance that allows the timely detection and investigation of all acute flaccid paralysis (AFP) cases.

Following is a reminder of the considerations on vaccination, surveillance, and outbreak response plans.

Vaccination

PAHO/WHO recommends all countries achieve and maintain high levels of polio vaccine coverage ($\geq 95\%$), both nationally and sub nationally. Countries that have not introduced the second dose of polio vaccine (IPV2) should do so as soon as possible.

In municipalities where vaccination coverage is less than 80%, the routine program should be strengthened and catch-up vaccination activities should be carried out to close the immunity gaps, including the accumulation of those susceptible to type 2 poliovirus due to the late introduction of the IPV2 vaccine.

Surveillance

It is important that all countries/territories in the region strengthen surveillance of AFP cases to facilitate a timely response to the detection of an import or emergence of vaccine-derived poliovirus:

- Detection and reporting of cases of AFP in children under 15 years of age: Train health personnel at all levels in the detection and notification of AFP. The number of AFP cases reported each year is used as an indicator of a country's ability to detect polio, even in countries where the disease no longer occurs. A country's surveillance system must be sensitive enough to detect at least one case of AFP for every 100,000 children under the age of 15 years.
- Expand AFP surveillance to adolescents and adults with symptoms consistent with poliomyelitis: These cases should be investigated following the same processes defined for AFP surveillance in children under the age of 15 years.
- Collection and transport of stool samples for analysis: At the onset of paralysis, poliomyelitis may be difficult to differentiate from other forms of AFP such as Guillain-Barré syndrome (GBS), transverse myelitis, or traumatic neuritis. All cases of AFP in children under 15 years of age, or in persons over 15 years of age with suspected polio, should be investigated within 48 hours of notification and a stool sample must be obtained within 14 days of onset of paralysis for the detection of the presence of poliovirus. Samples must be kept refrigerated to preserve them in good condition and must arrive at the laboratory within 72 hours of collection. Otherwise, they must be frozen (at -20 degrees Celsius) and then shipped frozen. When it is not possible to collect the stool sample within 14 days of paralysis onset, it is recommended to collect stool samples from 3-5 close contacts of the AFP case. These contacts must be under 5 years of age and without recent vaccination history (within the last 30 days) with oral polio vaccine.

- Laboratory confirmation: The sample is inoculated into cell cultures where the virus can infect and replicate. The isolated virus is subsequently typified by molecular assays, starting with RT-PCR to determine the serotype and whether it is a wild virus or a vaccine virus, then genetic sequencing tests are performed to confirm the genotype. The genetic sequence obtained is compared with a reference bank of known polioviruses, making it possible to identify whether the virus is genetically related to other previously reported polioviruses. Genetic sequence information allows inferences to be made about the geographic origin of the virus isolated from the sample.

Outbreak response plan

Countries/territories are urged to have an up-to-date outbreak response plan in place² in line with the standard operating procedures published by WHO in July 2022³, in order to be prepared to respond in a timely manner the occurrence of an imported WPV1 or vaccine-derived poliovirus case or to the emergence of vaccine-derived poliovirus.

² PAHO/WHO. 14th Meeting of the Regional Certification Commission (RCC) for the Polio Endgame in the Region of the Americas - Meeting report 6-8 July 2022. Mexico City, Mexico. 8 September 2022. Available at: <https://bit.ly/3ex8xdH>

³ Polio Global Eradication Initiative. WHO. Standard Operating Procedures. Responding to a Poliovirus Event or Outbreak. Version 4. March 2022. Available at: <https://polioeradication.org/wp-content/uploads/2022/09/Standard-Operating-Procedures-For-Responding-to-a-Poliovirus-Event-Or-Outbreak-20220905-V4-EN.pdf>

Additional information

- Global Polio Eradication Initiative. Available at: <https://bit.ly/3NFEPQD>
- WHO - Global eradication of wild poliovirus type 3. Available at: <https://bit.ly/33YW8EK>
- WHO - Polio Factsheet. Available at: <https://bit.ly/2m1wajg>
- Global Polio Eradication Initiative - WHO Global Circulating Vaccine-derived Poliovirus (cVDPV) as of 22 March 2022. Available at: <https://bit.ly/39gVSJR>
- WHO - GPEI guidelines on Classification and reporting of VDPV. Available at: <https://bit.ly/3QcmUCB>
- WHO - Statement of the Thirty-first Polio IHR Emergency Committee. Available at: <https://bit.ly/3xoMkEo>
- WHO - Statement of the Thirty-second Polio IHR Emergency Committee. Geneva. 24 June 2022. Available at: <https://bit.ly/3B4ILX6>
- Global Polio Eradication Initiative - GPEI: Outbreak Countries. Available at: <https://bit.ly/3xmb4gz>
- Global Polio Eradication Initiative - GPEI: Surveillance. Available at: <https://bit.ly/3zvoucM>
- PAHO/WHO - 13th Meeting of the Regional Certification Commission for the Polio Endgame in the Region of the Americas Report. Available at: <https://bit.ly/3HakAbj>
- PAHO/WHO - Reports of the Technical Advisory Group (TAG) meetings. Available at: <https://bit.ly/3aKuW5p>