



Pan American
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World Health
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Epidemiological Update

Long-term detection of genetically related cVDPV2 polioviruses: considerations for the Region of the Americas

19 January 2023

The Pan American Health Organization / World Health Organization (PAHO/WHO) reiterates to Member States the importance of achieving and maintaining polio vaccination coverage greater than 95% in each district or municipality to minimize the risk of an outbreak, strengthen epidemiological surveillance of acute flaccid paralysis (AFP) and update national poliovirus outbreak preparedness and response plans to detect and respond promptly and timely to an importation of wild poliovirus or vaccine-derived poliovirus (VDPV), or the emergence of VDPV in any country of the Region.

Situation summary

Following the constant alert of the advisory groups of the Pan American Health Organization/ World Health Organization (PAHO/WHO), specifically those issued by the Technical Advisory Group (GTA per its acronym in Spanish) on Vaccine-Preventable Diseases of the PAHO/WHO¹ and the Regional Commission for the Certification of Polio Eradication in the Region of the Americas (RCC)², on 10 June 2022, PAHO/WHO warned about the risk of post-importation circulation of wild poliovirus or vaccine-derived poliovirus (VDPV), or the emergency of a vaccine-derived poliovirus in the Region, and guided Member States to implement effective measures to reduce the risk of outbreaks while maintaining high and homogeneous coverage while implementing a sensitive epidemiological surveillance to allow the detection and investigation of cases of acute flaccid paralysis in a timely manner.³

The alert was issued a month before the confirmation in the United States of America of a case of poliomyelitis in New York State in an unvaccinated patient, with no recent travel history, who went to an emergency room with limb weakness and fever. The case resided in Rockland County, New York State and was initially confirmed as a type 2 VDPV by the United States Centers for Disease Control and Prevention (US-CDC). However, subsequent investigations on environmental wastewater samples from the county of residence of the case, Rockland County, and nearby counties (Orange and Sullivan) collected between 21

¹ PAHO/WHO. XXVI Meeting of the Technical Advisory Group (GTA as per its acronym in Spanish) on Vaccine-Preventable Diseases. Vaccines bring us closer, from July 14 to 16, 2021. Available at: <https://bit.ly/3QKN3Jt>

² PAHO/WHO 13th Meeting of the Regional Commission for the Certification of Polio Eradication in the Region of the Americas (RCC) - Report of virtual meetings held from 13 October to 30 November 2021. 17 February 2022. Available at: <https://bit.ly/3kvJoDh>

³ PAHO/WHO. Epidemiological Alert: Risk of outbreak by polio virus. 10 June 2022, Washington, D.C.: PAHO/WHO; 2022. Available at: <https://bit.ly/3W9ZYpv>

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April and 26 August 2022 were consistently positive for Sabin virus type 2 with **genetic sequences related to the virus identified in the New York State poliomyelitis case**, and to type 2 polioviruses **detected in wastewater samples from the United Kingdom and Israel in July 2022**.

Initially, the polioviruses identified in the environmental samples did not have the necessary mutations in the VP1 region (6 or more nucleotide changes) to be classified as vaccine-derived poliovirus (VDPV). However, subsequent detections in wastewater collected in August 2022 (specifically in samples collected between August 3 and August 11) resulted in the identification of VDPV2 in two environmental viral sequences with 6 or more nucleotide changes and both linked to the case reported in Rockland County. Environmental samples collected from earlier dates in July 2022 were later tested and also resulted in the identification of VDPV2. The detection of these new VDPV2 that are genetically related, demonstrated community transmission, and therefore was classified as circulating VDPV type 2 (cVDPV2).⁴

In the wake of these findings, the New York State Department of Health (NYSDOH) launched wastewater surveillance, a tool to check for signs of the virus in community wastewater, as people infected with polio shed the virus in their feces. Tests and sequence analyses from the US-CDC has repeatedly detected poliovirus in samples collected in Rockland, Orange and Sullivan counties, as well as in samples collected in New York City and one sample in Nassau County. The investigation is ongoing.

As of 6 January 2023, the US-CDC sequencing analysis confirmed the presence of vaccine-derived poliovirus in a total of 101 positive samples, signaling its continued circulation.⁵

Canada also conducted the search for the virus in wastewater. Sampling sites were determined based on close links with communities in New York. The National Microbiology Laboratory of Canada (NML) retrospectively analyzed the wastewater samples and detected that two samples were positive for **VDPV2**: (i) one environmental sample collected on 27 August 2022, from a wastewater treatment plant, with 8 nucleotides different from the VP1 region of Sabin virus type 2 and (ii) one environmental sample collected on 30 August at a sampling site, with 6 nucleotides of difference to Sabin virus type 2.

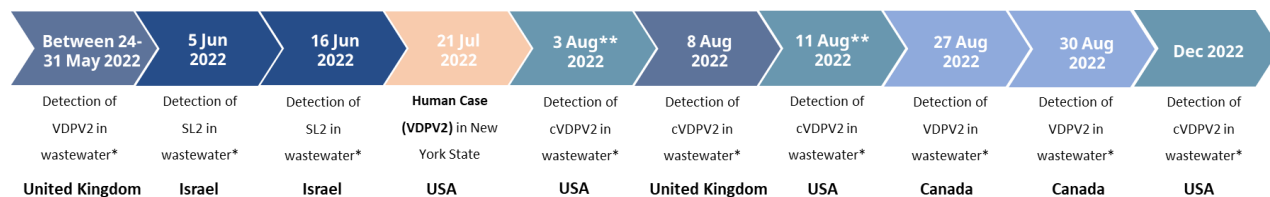
All subsequent samples collected in Canada (n=23) tested negative for poliovirus, including samples collected between 31 October and 9 November 2022 (n=12). To date, no confirmed or suspected cases of polio have been reported in the jurisdiction of Canada where VDPV2 was detected during 2022.

Analysis conducted by the US-CDC on the two VDPV2s isolated from environmental samples collected in Canada on 27 and 30 August 2022, confirmed that they are genetically related to cVDPV2 of the acute flaccid paralysis case from the Rockland County and to polioviruses found in environmental samples collected from several New York State counties between May and December 2022.

⁴ WHO. Diseases Outbreak News: Detection of Circulating Vaccine-Derived Type 2 Poliovirus (cVDPV2) in Environmental Samples – United Kingdom of Great Britain and Northern Ireland and United States of America. 14 September 2022. Available at: <https://bit.ly/3lXG26h>

⁵ New York State Department of Health. Wastewater monitoring. Available at: <https://on.ny.gov/3HattDp>

Figure 1: Timeline of genetically related poliovirus findings in several countries, May – December 2022



* Date of wastewater sampling

** Samples which had been collected on 5 and 7 July were tested later and were subsequently also found to be VDPV2

Sources: Canada: Canada IHR National Focal Point; Israel: The Global Polio Eradication Initiative (<https://bit.ly/3IW4BQW> and <https://bit.ly/3XgJYDv>); United Kingdom: WHO DON (<https://bit.ly/3w8O4le>); United States of America: USA IHR National Focal Point, WHO DON (<https://bit.ly/3w8O4le>) and Rockland County (<https://bit.ly/3IV7f9l>)

The importation and international spread of **cVDPV2** is a reminder that until polio is eradicated, all countries will remain at risk of reinfection or recurrence of cases. The detection of a **cVDPV2** polio case in the United States, as well as subsequent detection of the virus in wastewater from both the United States and Canada, underscores the importance of maintaining high and homogeneous polio vaccination coverage to minimize the risk of poliovirus circulation and the occurrence of polio cases, as well as the need for sensitive surveillance systems for the timely detection of a WPV1/VDPV import or VDPV emergency.

PAHO/WHO is working with the national authorities of the respective countries to monitor and respond to the situation.

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

The PAHO/WHO Technical Advisory Group (GTA as per its acronym in Spanish) on Vaccine-Preventable Diseases in July 2022⁶ urged countries to achieve 95% coverage with three doses of polio vaccine, and strongly recommended that governments invest resources to achieve and sustain this goal. This vaccination coverage target also applies to IPV1 and IPV2.

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 coverage gaps, including the accumulation of those susceptible to type 2 poliovirus mainly due to the late introduction of the IPV2 vaccine.

Countries that have not introduced IPV2 should do so as soon as possible.⁷

⁶ PAHO. IX Ad Hoc Meeting of the PAHO Technical Advisory Group (TAG) On Vaccine-Preventable Diseases, 25 July 2022. Available at: <https://bit.ly/3Hf3wCy>

⁷ The vaccination schedule recommended by the TAG is available on page 65 at: <https://bit.ly/3QKN3Jt>

Surveillance

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

- 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.
- AFP surveillance should include adolescents and adults in whom poliomyelitis is suspected: These cases should be investigated following the same processes defined in AFP surveillance in children under 15 years of age.
- 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 (+2 to +8 degrees Celsius) 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 case stool sample within 14 days of onset of paralysis, or if the sample does not arrive in suitable conditions to the laboratory, 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 typed 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 updated outbreak response plan⁸ aligned with the standard procedures published by WHO in March 2022⁹, to be prepared to respond in a timely manner to a polio event or outbreak.

⁸ PAHO/WHO 14th Meeting of the Regional Commission for the Certification (RCC) of 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>

⁹ Global Polio Eradication Initiative. WHO. Standard operating procedures. Response to a poliovirus event or outbreak. Version 4. March 2022. Available at: <https://bit.ly/3GMOeUc>

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/2m1wqig>
- 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. August 2016. Available at: <https://bit.ly/3QcmUCB>
- WHO - Statement of the Thirty-first Polio IHR Emergency Committee. 11 March 2022. 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. December 2021. Available at: <https://bit.ly/3HakAbj>
- PAHO/WHO - Reports of the Technical Advisory Group (TAG) meetings. Available at: <https://bit.ly/3aKuW5p>