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The global and regional epidemiological situation summary of poliovirus circulation is presented in this epidemiological update, as well as information on a confirmed vaccine derived poliovirus case recently reported by Peru. 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 a poliomyelitis 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 a VDPV in any country of the Region.

Global situation summary

According to the Polio Global Eradication Initiative, there are 35 countries with poliovirus outbreaks, and two endemic countries globally (1). Countries with outbreaks are those that have eliminated indigenous wild poliovirus but are experiencing reinfection either through importation of wild or vaccine-derived poliovirus from another country, or the emergence and circulation of vaccine-derived poliovirus.

During the last meeting on 2 February 2023 of the Polio Emergency Committee under the International Health Regulations (IHR), the Emergency Committee assigned countries under the following categories: States infected with wild poliovirus type 1 (WPV1), circulating vaccine-derived poliovirus type 1 (cVDPV1), or circulating vaccine-derived poliovirus type 3 (cVDPV3); States infected with circulating vaccine-derived poliovirus type 2 (cVDPV2), with or without evidence of local transmission; States no longer infected by WPV1 or cVDPV, but which remain vulnerable to re-infection by WPV or cVDPV. The list of all the States found in each of these categories is provided in the Statement of the thirty-fourth Polio IHR Emergency Committee, available from: <https://bit.ly/3IJETWu> (2).

As of 14 March 2023, four countries have cases with WPV1 (Afghanistan, Malawi, Mozambique, and Pakistan), four countries have cases with cVDPV1 (Madagascar, Mozambique, Malawi, and the Democratic Republic of the Congo), one country with cases of cVDPV3 (Israel), and 29 countries with cases of cVDPV2 (1).

Situation summary in the Region of the Americas

Since the last PAHO/WHO Epidemiological Update on polio, published 19 January 2023 (3), the Peru IHR National Focal Point (NFP) notified Pan American Health Organization/ World Health Organization (PAHO/WHO), on 21 March 2023 of a confirmed case of vaccine-derived poliovirus type 1 (VDPV1) (4). The case is a 16-month-old male, belonging to an indigenous community in the Manseriche district in the Datem del Marañón province of the Loreto department, with no history of vaccination or travel history before the onset of symptoms (5).

On 27 December 2022, the case went to a district health center due to persistent fever, on 28 December was referred to the Loreto Regional Hospital, and on 29 December presented with paralysis in the lower limbs for which fecal samples were collected that were sent to the regional reference laboratory for polio, the Oswaldo Cruz Foundation – Fiocruz in Brazil (5).

On 21 March 2023, the Peru National Institute of Health received results from the Oswaldo Cruz Foundation - Fiocruz in Brazil confirming the detection of VDPV serotype 1 (VDPV type 1) by real-time PCR. These results were confirmed by nucleotide sequencing of the VP1 region of the viral genome. Additional virological studies are being carried out. The case was in stable condition although continuing to present paralysis in the lower limbs and following the parents' request for voluntary discharge, traveled to the Nuevo Belén community in the Manseriche district, Datem del Marañón province in the Loreto department. The coverage rates of the third dose of polio vaccine (Polio3) in the Manseriche district in the last 5 years was: 87.4% in 2018, 96.5% in 2019 with, 66.6% in 2020, 33.8% in 2021, and 43.6% in 2022. In 2022, there were no cases of acute flaccid paralysis (AFP) in the Manseriche district, Datem del Marañón province, in the Loreto department; however, 8 cases of Guillain Barre Syndrome (GBS) were reported in people in the 18-60 age group. In 2023, one GBS case has been reported in a 50-year-old adult (5).

In the last 4 years Polio3 vaccination coverage in Peru has been <95%, with coverage below 80% reported in: 2020 (71.58%) and 2021 (78.77%). Of the 1,874 districts of the country, 840 (45%) report coverage with Polio3 <80%.

With regard to the situation in other countries of the Region of the Americas and as reported in the previous PAHO/WHO epidemiological alerts and updates, in July 2022, the United States of America detected a case of poliomyelitis in the state of New York in an unvaccinated patient with no recent travel history (3). 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 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 (3, 6).

In the wake of these findings, wastewater surveillance was launched, and 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. 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 (3, 7).

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 (3).

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 (3).

Additional 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 (AFP) case from the Rockland County and to polioviruses found in environmental samples collected from several New York State counties between May and December 2022 (3).

PAHO/WHO reminds Member States that the risk of the emergence of a circulating vaccine-derived poliovirus type 1 (cVDPV1) or circulating vaccine-derived poliovirus type 3 has increased (cVDPV3) due to low vaccination coverage. In addition, there is a continuing risk of importation of a circulating wild poliovirus type 1 (WPV1) or vaccine-derived poliovirus (VDPV), particularly circulating vaccine-derived poliovirus type 2 (cVDPV2). It is important to mention that the countries and territories of the Region of the Americas have the conditions that would allow transmission to be maintained, mainly due to low vaccination coverage and poorly performing surveillance systems; this situation has been aggravated by the COVID-19 pandemic (8).

Regional vaccination coverage for the third dose of polio vaccine (Polio3) in 2021 was 80%. The decline in coverage began before the pandemic; comparing to the coverage of 2018 and 2019, a decrease was observed in 20 of the 39 countries and territories of the Region. When comparing coverage between 2018 and 2021, coverage decreases in 33 of the 39 countries/territories. According to the information available for 2021, approximately 5.7 million children under 1 year of age (corresponding to 46% of the regional birth cohort) live in areas where coverage is <80% and 1.3 million of these children live in municipalities with coverage <50% (**Figure 1**) (9).

Declining mucosal immunity to type 2 virus among young children born after the switch (from tOPV to bOPV + IPV), added to low immunization coverage with IPV are contributing to the risk of an outbreak of cVDPV2 (9).

Some countries have repeatedly presented coverage of less than 80% in some subnational level areas, with which the risk of a resurgence of a VDPV is increasing.

Figure 1. Vaccination coverage with the third dose of polio vaccine OPV or IPV (Polio3). Countries and territories of the Region of the Americas, 2012-2021.

Country/territory	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012
Antigua and Barbuda	92	95	95	94	94	87	86	96	98	97
Argentina	74	74	83	84	84	87	93	92	90	90
Bahamas	75	83	89	90	94	94	95	96	97	99
Barbados	84	85	91	94	91	97	97	95	91	88
Belize	83	79	98	96	88	96	94	95	95	98
Bolivia (Plurinational State of)	70	68	75	83	83	87	88	85	88	93
Brazil	68	74	85	85	75	72	98	96	96	96
Chile	95	93	96	95	93	95	96	95	90	90
Colombia	86	88	94	92	92	91	91	90	91	91
Costa Rica	99	97	96	94	96	97	92	91	95	90
Cuba	98	98	99	99	98	98	99	99	99	98
Dominica	92	96	99	94	91	99	98	97	96	97
Dominican Republic	83	80	92	86	80	82	87	90	82	85
Ecuador	62	72	85	85	83	79	84	84	87	85
El Salvador	79	69	81	83	89	95	92	93	92	93
Grenada	72	72	94	96	91	98	99	81	98	98
Guatemala	67	72	73	74	79	73	69	55	83	94
Guyana	80	91	97	94	94	94	92	97	98	97
Haiti	51	51	51	64	64	64	64	63	64	66
Honduras	77	80	88	91	90	95	98	99	99	98
Jamaica	90	95	96	98	93	99	91	93	86	96
Mexico	78	72	82	88	85	93	87	87	83	99
Nicaragua	88	93	99	99	99	99	99	99	99	99
Panama	74	74	88	88	81	86	72	80	81	87
Paraguay	66	78	84	88	92	93	93	93	89	89
Peru	79	72	87	83	83	88	88	78	71	94
Saint Kitts and Nevis	96	99	97	98	97	99	91	96	97	98
Saint Lucia	75	88	91	95	80	95	99	99	99	98
Saint Vincent and the Grenadines	99	99	99	99	99	99	99	97	97	96
Suriname	72	51	76	81	51	77	78	76	78	79
Trinidad and Tobago	94	93	93	99	94	84	88	94	94	91
Uruguay	89	91	93	91	93	95	95	95	94	95
Venezuela (Bolivarian Republic of)	50	62	62	53	79	82	87	79	82	73

Source: Adapted from United Nations Children’s Fund. Immunizations – Last update: July 2022. New York: UNICEF; 2022 [cited 28 February 2023]. Available from: <https://bit.ly/3c2ZAEr>.

The recent detection of a case of polio due to VDPV1 in Peru, a case due to cVDPV2 in the United States, as well as the subsequent detection of the virus in wastewater both in the United States and Canada, underscore the importance of maintaining coverage of high and homogeneous vaccination against polio to minimize the risk of poliovirus circulation and the appearance of cases of poliomyelitis, and also highlights the need for sensitive surveillance systems for the timely detection of an importation of WPV1/VDPV or the emergency of a VDPV.

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 2022 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 (10). 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.¹

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. 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 followed by another RT-PCR assay to determine whether it is a wild virus or resembles a vaccine virus, then genetic sequencing tests are performed to

¹ The vaccination schedule recommended by the TAG is available on page 65. Pan American Health Organization. XXVI Meeting of the Technical Advisory Group (GTA) on Vaccine-Preventable Diseases. Vaccines bring us closer, from July 14 to 16, 2021. Washington, DC: PAHO; 2021. Available in Spanish from: <https://bit.ly/3QKN3Jt>.

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 plan² aligned with the standard procedures published by WHO in March 2022³, to be prepared to respond in a timely manner to a polio event or outbreak.

² Pan American Health Organization. 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: PAHO; 2022. Available from: <https://bit.ly/3ex8xdH>.

³ World Health Organization, Global Polio Eradication Initiative. Standard operating procedures. Response to a poliovirus event or outbreak. Version 4. March 2022. Geneva: WHO; 2022. Available from: <https://bit.ly/3GMOeUc>.

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Additional information

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- WHO - Global eradication of wild poliovirus type 3. Available from: <https://bit.ly/33YW8EK>
- WHO - Polio Factsheet. Available from: <https://bit.ly/2m1wqig>
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- WHO - GPEI guidelines on Classification and reporting of VDPV. August 2016. Available from: <https://bit.ly/3QcmUCB>
- WHO - Statement of the Thirty-first Polio IHR Emergency Committee. 11 March 2022. Available from: <https://bit.ly/3xoMkEo>
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