

## Poliomyelitis in the Region of the Americas

23 September 2022

### Summary

Date of assessment: 15 September 2022

#### Overall risk and confidence in the Region of the Americas (based on information available at the time of assessment)

Level of confidence in the available information: **Moderate**

Level of overall risk: **High**

### Risk Assessment

On 21 July 2022, the New York State Department of Health, in the United States of America, reported the identification of a case of paralytic polio in a 20-year-old, immunocompetent, unvaccinated man in Rockland County in the State of New York. Initial sequencing confirmed by the United States Centers for Disease Control and Prevention (US-CDC) indicated that it was a vaccine-derived poliovirus type 2 (VDPV2).

On 13 September 2022, the US-CDC reported the detection of VDPV2 in wastewater samples collected in Rockland County, and nearby counties (Orange and Sullivan) on 3 August and 11 August that were genetically related to the case previously reported in Rockland County. This situation evidences the circulation of the virus and meets the criteria to be classified as circulating vaccine-derived poliovirus type 2 (cVDPV2).<sup>1</sup> The detection of the case in Rockland County, as well as of VDPV2 in wastewater samples, was only possible thanks to a sensitive and robust surveillance system in this country.

In the Region of the Americas, with more than 2 years of the COVID-19 pandemic and the current monkeypox emergency, health systems face significant challenges, mainly at the level of primary health care where activities such as vaccination services have been affected. The decrease in vaccination coverage observed in several countries of the Region has accentuated with the pandemic and accordingly increased the population susceptible to vaccine-preventable diseases (VPD). Therefore, in the Region of the Americas cannot be ruled out the occurrence of new cases and/or outbreaks of VPDs, including poliomyelitis, added to a limited capacity for a timely response, leading to the conclusion that the regional risk remains assessed as **High**.

### Risk Assessment Questions

Risk Question	Assessment		Risk	Rationale	
	Likelihood	Consequences			
Potential risk for human health?	Regional	Likely	Major	High	<i>Poliomyelitis</i> is caused by a human enterovirus; approximately 90% of infections are asymptomatic or present with nonspecific fever. If the disease progresses to major illness, severe muscle pain and stiffness of the neck and back, including flaccid paralysis may occur. Irreversible paralysis occurs in one of every 200 infections (generally of the lower limbs) and 5% to 10% of these cases die from paralysis of the respiratory muscles. <i>Poliomyelitis</i> mainly affects children under the age of five, but anyone who is not vaccinated can get the disease, regardless of their age. The current context at the global and regional levels, shows that the probability of occurrence, as well as the late detection of cases and outbreaks of <i>poliomyelitis</i> , and accompanying impact on public health, shows that the potential risk to human health is <b>High</b> .
Risk of event spreading?	Regional	Likely	Major	High	The increase of susceptible population as a result of <i>low vaccination coverage</i> translates into a higher risk of the occurrence of poliovirus cases and its spread in the Region of the Americas. In 2021, vaccination coverage of $\geq 95\%$ with the third dose of the poliovirus vaccine either OPV or IPV (Polio3) had not been achieved in 32 countries/territories in the Region of the Americas, and 15 countries had $<80\%$ coverage. The detection of cVDPV2 in the United States is an event with a moderate risk of spreading since this country has a sensitive and robust surveillance system. However, in the Region of the Americas there are countries and territories with a weak surveillance of VPDs, including polio, which increases the risk of not detecting cases or outbreaks in a timely manner, particularly in vulnerable populations (indigenous, migrants, among others) which is a challenge for the vaccination field teams. Accordingly, the risk of occurrence of cases or outbreaks of <i>poliomyelitis</i> and its subsequent spread at regional level is <b>High</b> .

<sup>1</sup> United States CDC. United States confirmed as country with circulating vaccine-derived poliovirus. Media Statement. 13 September 2022. Available at: <https://bit.ly/3RLqZ0R>

Risk of insufficient prevention and control capacities with available resources?	Regional	Unlikely	Moderate	Moderate	In the last 2 years, the impact of the simultaneous occurrence and response to two public health emergencies of international concern (PHEIC) has been observed in most of the countries and territories of the Region of the Americas and has limited the capacity of those Member States to implement prevention activities such as vaccination and overstretched health services. Accordingly, the risk that the heterogeneous capacities in Member States might be limited to prevent and control polio outbreaks in most of the countries and territories of the Region of the Americas is <b>Moderate</b>
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## Supporting Information

### Hazard assessment

#### Poliovirus

Poliovirus is a human enterovirus and there are three serotypes of poliovirus: type 1, type 2, and type 3. Wild poliovirus (WPV) was the cause of thousands of cases of acute flaccid paralysis (AFP) and deaths for many years; however, after the introduction of the polio vaccines, only serotype 1 of wild poliovirus (WPV1) continues to circulate. The last WPV2 was isolated in 1999 and declared eradicated in 2015; meanwhile, the last WPV3 was isolated in 2012 and declared eradicated in 2019. Immunity to one serotype does not confer immunity to the other two. Polio is spread through the fecal-oral route, entering the body through the mouth and multiplying in the intestine. Infected individuals shed poliovirus into the environment for several weeks, leading to rapid spread in areas of poor sanitation (1-4).

The incubation period is usually 7–21 days (range 4–40 days). Infection with poliovirus can cause minor illness with mild symptoms to infections that include the central nervous system and may lead to paralysis. Approximately 90% of infections are asymptomatic or present with nonspecific fever. Other symptoms could include aseptic meningitis, fever, malaise, headache, nausea, and vomiting. If disease progresses to more severe illness, muscle pain and stiffness of the neck and back with flaccid paralysis may occur. The paralysis usually presents asymmetrically, with fever present at onset. Paralysis of respiratory muscles can be life-threatening. Although some improvements in paralysis may occur during convalescence, paralysis still present after 60 days is likely to be permanent (1-4).

All cases of AFP among children under 15 years of age must be reported and stool specimens should be collected within 14 days of paralysis onset and tested for viral isolation in cell culture. When there is any positive isolation, intratypic differentiation for RT-qPCR assays is performed. The assays permit an initial characterization of either Sabin-like or non-Sabin-like poliovirus. If vaccine-derived poliovirus (VDPV) is suspected, sequencing of the VP1 region of the viral genome allows genetic characterization of the virus and is the final confirmatory test (1-4).

The diagnosis of paralytic poliomyelitis is supported by: (i) clinical course, (ii) virological testing, and (iii) residual neurologic deficit 60 days after onset of symptoms (1-4).

Two types of vaccines are commercially available for routine immunization: a live, attenuated oral poliovirus vaccine (OPV) and an injectable inactivated poliovirus vaccine (IPV). In rare circumstances adverse events associated with OPV could result in a case of vaccine-associated paralytic poliomyelitis (VAPP), which can occur in vaccinated individuals or their contacts, and the emergence of vaccine-derived polioviruses. The incidence of VAPP has been estimated at 2–4 cases/million births per year in countries using OPV (1).

When vaccination coverage is very low, live attenuated OPV vaccine viruses (Sabin viruses) may, through prolonged replication in an individual or community, reacquire the characteristics of neurovirulence and transmissibility of wild poliovirus (WPV). Through genetic mutations, they may become VDPV causing isolated cases or outbreaks of paralytic poliomyelitis. VDPVs are genetically divergent forms of the original Sabin vaccine virus conventionally defined by >1% genetic divergence (or >10 nucleotide [nt] changes) for PV1 and PV3 and >0.6% (or >6 nt changes) for PV2, in the VP1 region of the viral genome (1).

Vaccine-derived polioviruses (VDPVs) are further classified into 3 categories: **(1) circulating VDPVs (cVDPV)**, is a VDPV demonstrating person-to-person transmission in the community, based on evidence from human and/or environmental detections of genetically linked viruses; **(2) immunodeficiency-associated VDPVs (iVDPV)**, is a VDPV from individuals that have evidence of primary immunodeficiency (PID). Unlike immunocompetent persons, who excrete the vaccine virus for a limited period, in rare cases individuals with primary immunodeficiency may excrete a genetically diverged vaccine virus for an extended period after receiving OPV; and **(3) ambiguous VDPVs (aVDPV)**, is a VDPV for which the VP1 sequence is not

genetically linked to other previously identified VDPV sequences and there is no evidence of PID if the virus is from an individual. A VDPV sequence will be classified as ambiguous based on laboratory results and epidemiological investigation and in communication with field teams, and technical experts and laboratory staff at WHO HQ and the WHO Regional Office. Isolates may be from persons with no known immunodeficiency or from an environmental sample, without evidence of circulation. (5).

## Exposure assessment

On 21 July 2022, the New York State Department of Health, of the United States, reported the identification of a case of paralytic polio in a 20-year-old, immunocompetent, unvaccinated man in Rockland County, New York. Initial sequencing confirmed by the US-CDC indicated that it was a vaccine-derived poliovirus type 2 (VDPV2).<sup>2</sup>

On 13 September 2022, the US-CDC reported the detection of VDPV2 in wastewater samples collected on 3 August and 11 August that were genetically related to the case reported in Rockland County. This situation evidences the circulation of the virus and meets the criteria to be classified as circulating vaccine-derived poliovirus type 2 (cVDPV2).<sup>3</sup>

In 2019, PAHO/WHO was notified of the detection of three VDPVs in environmental samples in Guatemala. A VDPV3 and a VDPV1 were identified in samples collected in January and December 2019, respectively, in Aldea Cruz Blanca, Municipality of San Juan Sacatepéquez, Department of Guatemala. In addition, a VDPV1 was isolated in Rio Platanitos, municipality of Villa Nueva, which is also in the department of Guatemala. The two VDPV1s were not genetically related to each other. In July-August 2021, a Poliovirus Outbreak Response Assessment (OBRA) was conducted and no evidence of VDPV circulation was found, which provided additional information to confirm that the three VDPVs could be classified as aVDPV (Ambiguous VDPV) (6).

In 2021, the Regional Certification Commission (RCC) had certified that the Region of the Americas has been free of WPV for almost 30 years, with the last endemic case of WPV3 in October 1990 in Mexico and the last case of wild poliovirus type 1 (WPV1) in August 1991 in Peru.

Preliminary regional immunization coverage for the third dose of vaccine against polio (Polio3) in 2021 rests at 79%. The decline in Polio3 coverage started before the COVID-19 pandemic; when the Polio3 coverage for 2018 and 2019 is compared, 17 of the 44 countries/territories that reported had a reduction in coverage. According to the information available as of 20 September 2022, when we compare the coverage of 2021 with that of 2018, a decrease in coverage is observed in 32 countries/territories (of the 41 countries that reported to PAHO/WHO through the Joint PAHO/WHO and UNICEF Immunization Reporting Form (JRF). According to the available data for 2021, at least 5.7 million children under age 1 - which is 46% of the regional birth cohort - reside in areas where immunization coverage is below 80%, and 1.3 million of these infants live in districts with coverage below 50% (7).

Considering the national and subnational vaccination coverage, the RCC concluded that 13 countries are at very high risk, 3 countries and the Caribbean Subregion are at high risk, 2 countries are at medium risk, 4 are at low risk, and 2 are at very low risk in the event of an importation of WPV1 or cVDPV or the emergence of a VDPV (7).

Regarding the risk of not detecting rapidly and reliably an imported WPV1/VDPV or VDPV should it emerge; 6 countries were classified as very high risk, 1 country and the Caribbean Subregion as high to very high risk, 7 as high risk, 3 as medium risk, 4 as low risk, and 3 as very low risk. (7).

## Context assessment

### Vaccination coverage

In 2021, according to WHO and UNICEF estimates of national immunization coverage (WUENIC)<sup>4</sup>, vaccination coverage for VPDs has been low within the Region of the Americas.

<sup>2</sup> Polio Global Eradication Initiative. Report of polio detection in the US. Statement. 21 July 2022. Available at: <https://bit.ly/3BtTHhi>; Rockland County. Press Release. Case of Polio in Rockland County. 21 July 2022. Available at: <https://bit.ly/3DdodNJ>; New York State, Department of Health. New York State Department of Health and Rockland County Department of Health Alert the Public to A Case of Polio In the County. 21 July 2022. Available at: <https://on.ny.gov/3U1AaMu>

<sup>3</sup> United States CDC. United States confirmed as country with circulating vaccine-derived poliovirus. Media Statement. 13 September 2022. Available at: <https://bit.ly/3RLqZ0R>

<sup>4</sup> WHO/UNICEF Estimates of National Immunization Coverage. Available at: <https://data.unicef.org/topic/child-health/immunization/>

In 2021<sup>5</sup>, vaccination coverage of  $\geq 95\%$  with the third dose of the poliovirus vaccine either OPV or IPV (Polio3) had not been achieved in 32 countries/territories in the Region of the Americas, and 15 countries (Anguilla, Argentina, the Bahamas, Bolivia, Brazil, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Paraguay, Peru, Saint Lucia and Venezuela) had  $< 80\%$  coverage (8).

As of September 2022, the 2021 data received indicates the following: 33 of the 41 countries/territories in the Region that reported data through the JRF, use two or more doses of the bivalent oral poliovirus vaccine (bOPV) as part of primary immunization schedules or as booster doses, while 11 countries/territories use only IPV in their immunization schedules: Argentina, Aruba, Bermuda, Canada, Cayman Islands, Chile, Costa Rica, Mexico, Sint Maarten, Uruguay, and the United States. During the same period, there were 7 countries/territories that had not yet introduced IPV2 into their routine immunization schedules: Curaçao, the Dominican Republic, Haiti, Nicaragua, Saint Kitts and Nevis, Saint Lucia, and Suriname (9, 10).

In 2016, the serotype 2 component of the OPV vaccine was withdrawn when, in a coordinated manner around the world, the switch was made from the trivalent OPV vaccine (containing serotypes 1, 2, and 3) to the bivalent OPV vaccine (containing serotypes 1 and 3), recognized as the switch from tOPV to bOPV. To ensure children's immunity against serotype 2, the Global Polio Eradication Initiative (GPEI) recommended the introduction of at least one dose of IPV (containing serotypes 1, 2 and 3) in all countries and territories. However, the limited availability of IPV vaccine worldwide made it difficult to implement this recommendation. In the Region of the Americas, all countries introduced at least one dose of IPV before the switch, but several countries delayed the introduction of the second dose of IPV (IPV2) in accordance with the recommendations of the Technical Advisory Group (TAG, acronym in English). The delay in the introduction of IPV2 and low vaccination coverage in many countries and territories of the Region have resulted in a significant accumulation of children susceptible to poliovirus, mainly serotype 2. In 2021, in the Region of the Americas, only 8 countries/territories achieved greater than 95% coverage with 2 doses of IPV (1, 8, 10).

Some countries have repeatedly presented with vaccination coverage of  $< 80\%$  in some areas at the subnational level, thereby increasing the risk of transmission of VDPV.

### *AFP reporting rates*

Between 2020 and 2022, there was a significant reduction in the number of reported AFP cases compared to the pre-pandemic period. As of epidemiological week (EW) 34 of 2022, Uruguay and Caribbean countries have not reported a single case of AFP. Additionally, during the last 52 weeks (EW 35 of 2021 - EW 34 of 2022) only 3 countries met the goals for all three main indicators (AFP rate, percentage of cases investigated within 48 hours, and percentage of cases with an adequate sample) (10, 11).

Accordingly, there is a risk that a cVDPV event or outbreak will occur and that it will not be detected in timely manner. In 2022, the expected number of reported AFP cases is 2,212; however, as of EW 34 of 2022, only 1,044 AFP cases have been reported (10, 11).

A major concern is that countries are not conducting the 60-day follow-up of AFP cases, particularly for cases for which an adequate stool sample was not obtained.

## **Healthcare systems and services in the Region of the Americas**

The negative social and economic impact of the COVID-19 pandemic in the short, medium, and long term, at the local, national, and global levels, is unprecedented. In addition to the morbidity and mortality directly attributed to COVID-19 in the Region of the Americas, the pandemic, in general, also affected the provision of healthcare services, healthcare seeking behaviors, resources, and outbreak response capacity, and in addition there is the current monkeypox emergency.

Currently, this situation coexists with chronic health systems' challenges such as disconnectedness, inequitable access to comprehensive health services, resource limitations in general, including human resources among others, while attempts are being made to maintain other essential services, which is a challenge at all levels of the healthcare system in the countries and territories of the Region.

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<sup>5</sup> Countries report their annual vaccination coverage and other immunization data through the Joint PAHO/WHO and UNICEF Immunization Reporting Form (JRF). For the 2022 data reporting cycle of 2021, as of September 2022, 41 country reports had been received, out of 44 reports published on the platform. It is worth noting that the French territories and the Netherlands do not report, as well as associate members such as Puerto Rico.

Vaccination as an essential health service has also been affected, with a decrease in the demand of vaccination services and the postponement of vaccination campaigns due to the pandemic.

## Vulnerable populations in the Region of the Americas

In recent years, migration within the Region of the Americas and from other Regions has increased, due to the social, political, and economic crises in the countries/territories of the Region of the Americas and other Regions. This migratory phenomena during the last few years, constitutes a challenge in vaccination operational activities considering the increase of vulnerable mobile populations.

Special attention should be paid to ethnic minorities. Populations from indigenous communities are especially susceptible to developing diseases due to limited access to medical care and vaccinations, and therefore are at higher risk of developing complications that could result in death. Additionally, cultural and language barriers create a challenge in administering vaccines and medical treatments.

**Table 1: Strengths and vulnerabilities related to polio outbreak of countries/territories of the Region of the Americas, by subregion. September 2022.**

Southern Cone Subregion <sup>6</sup>
<b>Strengths</b>
<ul style="list-style-type: none"> <li>• Polio3 vaccination coverage for 2021 was &gt; 80% in 2 of the 5 countries (9).</li> </ul>
<b>Vulnerabilities</b>
<ul style="list-style-type: none"> <li>• Between 2020 and 2021, Polio3 vaccination coverage decreased in 3 of 5 countries. In 2021, Polio3 ≥95% vaccination coverage was only achieved in 1 of 5 countries (9).</li> <li>• In 4 of the 5 countries, the number of AFP cases notified as of EW 34 of 2022 was below the expected estimate (10).</li> <li>• Health system and epidemiological surveillance system overwhelmed by simultaneous PHEIC (COVID-19 and monkeypox) and other public health events occurring simultaneously (e.g., dengue, malaria, among others).</li> <li>• Migratory movements and challenges to reach unvaccinated migrants.</li> <li>• Vulnerable and susceptible populations: unvaccinated migrant children and indigenous populations.</li> <li>• Overcrowding with inadequate sanitation and waste management in temporary and residential shelters and rural and peri-urban areas.</li> <li>• Challenges to maintain the cold chain in rural and peri-urban areas.</li> </ul>
Andean Subregion <sup>7</sup>
<b>Strengths</b>
<ul style="list-style-type: none"> <li>• In 2021, Polio3 vaccination coverage increased in 2 countries compared to the same period in 2020 (9).</li> </ul>
<b>Vulnerabilities</b>
<ul style="list-style-type: none"> <li>• Between 2020 and 2021, Polio3 vaccination coverage decreased in 3 of 5 countries. In 2021, Polio3 ≥95% vaccination coverage was not achieved in all 5 countries (9).</li> <li>• For all 5 countries, the number of AFP cases reported as of EW 34 of 2022 was below the expected estimate (10).</li> <li>• Indigenous communities move along the border between Brazil, Venezuela, and Colombia.</li> <li>• Health system and epidemiological surveillance system overwhelmed by COVID-19, monkeypox, and other public health events occurring simultaneously (e.g., dengue, malaria, malnutrition, amongst others).</li> <li>• Migratory movements and challenges to reach unvaccinated migrants.</li> <li>• Vulnerable and susceptible populations: unvaccinated migrant children and indigenous populations.</li> <li>• Overcrowding with inadequate sanitation and waste management in temporary and residential shelters and rural and peri-urban areas.</li> <li>• Challenges to maintain the cold chain in rural and peri-urban areas.</li> </ul>
North America Subregion <sup>8</sup>
<b>Strengths</b>
<ul style="list-style-type: none"> <li>• Polio3 vaccination coverage for 2021 was ≥90% in the 2 countries (9).</li> </ul>
<b>Vulnerabilities</b>
<ul style="list-style-type: none"> <li>• Health system and epidemiological surveillance system overloaded by COVID-19 and monkeypox.</li> </ul>

<sup>6</sup> Argentina, Brazil, Chile, Paraguay, and Uruguay.

<sup>7</sup> Bolivia, Colombia, Ecuador, Peru, and Venezuela.

<sup>8</sup> Canada and the United States of America.

<ul style="list-style-type: none"> <li>• Registration of a case of cVDPV2 in one of the countries of the subregion.</li> <li>• The number of AFP cases reported as of EW34 of 2022, is below the expected estimate in one of the countries in the subregion and the other country does not report this indicator to PAHO/WHO (10).</li> <li>• Migratory movements.</li> </ul>
<b>Latin Caribbean Subregion<sup>9</sup></b>
<b>Strengths</b>
<ul style="list-style-type: none"> <li>• Polio3 vaccination coverage for 2021 was &gt;95% for one of countries/territories (9).</li> </ul>
<b>Vulnerabilities</b>
<ul style="list-style-type: none"> <li>• For all countries, the number of AFP cases notified as of EW 34 of 2022 was below the expected estimate (10).</li> <li>• Health system and epidemiological surveillance system overloaded by the COVID-19, monkeypox, and other events occurring simultaneously (e.g., dengue).</li> <li>• Socio-political and economic crisis is ongoing in a bordering country.</li> <li>• Migratory movements to one of the countries of this subregion has increased.</li> </ul>
<b>Non-Latin Caribbean<sup>10</sup></b>
<b>Strengths</b>
<ul style="list-style-type: none"> <li>• Polio3 vaccination coverage for 2021 was &gt;90% in 10 countries/territories of this subregion (9).</li> </ul>
<b>Vulnerabilities</b>
<ul style="list-style-type: none"> <li>• Between 2020 and 2021, Polio3 vaccination coverage decreased in 11 countries/territories. Polio3 ≥95% vaccination coverage for 2020 was achieved in 5 countries (9).</li> <li>• Very low reporting of AFP cases. In 2021, the reporting rate was 0.16 (3 of 18 cases estimated for AFP).</li> <li>• Health system and epidemiological surveillance system overloaded by the COVID-19, monkeypox, and other public health events occurring simultaneously (e.g., dengue).</li> <li>• Socio-political and economic crisis is ongoing in one country.</li> </ul>
<b>Central American Isthmus and Mexico<sup>11</sup></b>
<b>Strengths</b>
<ul style="list-style-type: none"> <li>• Between 2020 and 2021, Polio3 vaccination coverage increased in 4 of 8 countries. Polio3 ≥95% vaccination coverage for 2020 was achieved 2 of the 8 countries (9).</li> <li>• In 2 of the countries, the number of AFP cases reported as of EW34 of 2022 was above the expected estimate (10).</li> </ul>
<b>Vulnerabilities</b>
<ul style="list-style-type: none"> <li>• Between 2020 and 2021, Polio3 vaccination coverage decreased 4 of 8 countries (9).</li> <li>• In 4 of the countries, the number of AFP cases reported as of EW 34 of 2022 was below the expected estimate (10).</li> </ul>

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<sup>9</sup> Cuba and the Dominican Republic.

<sup>10</sup> Anguilla, Antigua and Barbuda, Aruba, Bahamas, Barbados, Bermuda, British Virgin Islands, Cayman Islands, Curacao, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Sint Maarten, Suriname, Trinidad and Tobago, Turks and Caicos, United States Virgin Islands. **Note:** there is no available information on vaccination coverage for the following territories: Bonaire, Sint Eustatius, and Saba, French Guiana, Guadeloupe, Saint Martin, Martinique, and Saint Barthélemy.

<sup>11</sup> Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, and Panama.

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