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Global polio eradication set back by COVID-19 pandemic

The number of wild poliovirus cases has decreased by more than 99% since 1988 through determined international immunisation and surveillance efforts and, in 2015, type 2 wild poliovirus was declared globally eradicated. However, the ultimate goal of polio eradication has not been reached and poliomyelitis—primarily caused by type 1 wild poliovirus—is still endemic in Afghanistan and Pakistan. Additionally, circulating vaccine-derived poliovirus (cVDPV) is a growing problem and threatens global eradication efforts. cVDPV originates from the oral poliovirus vaccine (OPV) that uses genetically unstable live-attenuated Sabin poliovirus strains; the weakened virus from the vaccine is excreted through faeces and can thus spread in non-sanitary environments. In populations with low immunity, the virus can mutate and evolve during replication, regaining neurovirulence and resulting in paralytic poliomyelitis.

Although the risk of cVDPV can be avoided through the use of inactivated polio vaccine (IPV), outbreaks of cVDPV are often noted in countries with political instability, where IPV immunisation activities are hampered and OPV is used in populations with low immunity. In particular, use of monovalent OPV type 2 carries an increasing risk of emergence of circulating vaccine-derived type 2 poliovirus (cVDPV2) in populations with low mucosal immunity to type 2 poliovirus. Despite the use of OPV2 having ceased globally since 2016, most cases of vaccine-derived poliomyelitis have been caused by cVDPV2. The number of cases of cVDPV2 rose from 366 in 2019 to 1078 in 2020, and more cases of acute flaccid paralysis have been caused globally by cVDPV2 than wild poliovirus every year since 2017.

The problem of cVDPV has increased even further during the COVID-19 pandemic, according to a report from

the US Centers for Disease Control and Prevention. The report noted that globally, between January 2020 and June 2021, 44 outbreaks of cVDPV of all three serotypes (types 1, 2, and 3) occurred in 37 countries, mostly in Africa. In total, there were 1412 detections of cVDPVs noted through environmental surveillance and 1335 detections of cVDPVs noted in stool samples taken from patients with acute flaccid paralysis.

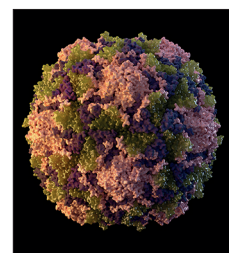
Circulating vaccine-derived type 1 poliovirus (cVDPV1) was detected in three countries: PHL-NCR-2 found in environmental surveillance sewage samples in Malaysia; three new cVDPV1 emergences, MAD-ANO-1, MAD-SUE-1, and MAD-SUO-1 in Madagascar; and YEM-SAD-1, isolated from stool samples from contacts of a patient with acute flaccid paralysis in Yemen. Most cVDPV outbreaks detected during the period were cVDPV2. 38 emergences of cVDPV2 were in active transmission in 34 countries, 28 (82%) in Africa. Half of the 38 emergences had been detected previously during 2017–19, including NIE-JIS-1 that was first detected in Nigeria in 2018, has circulated to 17 west and central African countries since, and was detected in stool specimens from patients with acute flaccid paralysis in Mali during 2020. 16 (42%) of the 38 emergences were newly detected during the reporting period. The most common cVDPV detected in stool specimens from patients with acute flaccid paralysis was PAK-GB-1 cVDPV2, found in Afghanistan in 225 cases. The same virus was noted in 26 cases of acute flaccid paralysis in Tajikistan and in 114 cases in Pakistan. In total, 1293 cases of paralysis were caused by cVDPV2 emergences during the reporting period. CHN-SHA-1 was the only circulating vaccine-derived type 3 poliovirus in transmission from January 2020 to June 2021, noted through environmental surveillance in

2021 in China, but not in any paralytic cases.

The high number of cVDPV outbreaks were at least partly due to disruptions in surveillance and immunisation activities caused by the COVID-19 pandemic. Outbreaks of vaccine-derived poliovirus can usually be brought under control with further immunisation, thus vaccination of as many people as possible should continue; however, the COVID-19 pandemic caused delays of weeks to months in supplementary immunisation activities after confirmation of the outbreak. Zulfiqar A Bhutta (Centre for Global Child Health, The Hospital for Sick Children, Toronto, ON, Canada) was unsurprised by the findings from the report, commenting, “the findings are likely the tip of the iceberg. This pandemic has been particularly hard on children and families with massive interruption and depreciation of services such as routine immunisations and in polio-endemic areas, campaigns, and community outreach programmes.” WHO permits use of novel OPV2 (a more genetically stable strain than Sabin) to be used for cVDPV2 outbreaks; however, the supply of this vaccine is limited because of manufacturing delays resulting from the pandemic. Bhutta commented “the limited supplies of OPV2 vaccine are a cause for much concern; their supply and targeted deployment must receive high priority.” Chris Elias (Bill & Melinda Gates Foundation, Seattle, WA, USA) added “What’s important now is that [polio campaigns] receive the political and financial commitments they need from governments and donors to be implemented fully, and that countries experiencing polio outbreaks protect their communities by responding urgently with the resources and vaccines available.”

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CDC/Sarah Pleser

For **global polio data** see <https://www.who.int/news-room/fact-sheets/detail/ poliomyelitis>

For the **number of cases of circulating vaccine-derived poliovirus** see <https://polioeradication.org/polio-today/polio-now/this-week/circulating-vaccine-derived-poliovirus/>

For **polio case counts** see <https://extranet.who.int/polis/public/CaseCount.aspx>

For the **CDC report on vaccine-derived poliovirus outbreaks** see *MMWR* 2021; **70**: 1691–99