

Vaccine-derived poliovirus outbreak

Factsheet and news

UPDATE OF 18 NOVEMBER 2022

This document is composed of 3 different tabs: **General information**, **Relevant news**, and **Scientific articles**
*The content and presentation of this document are subject to change as the situation evolves.
Every information presented comes from a valid and credible source.*

Preparation of this document is coordinated by:

Erica Telford, Nicolas Pulik, Guia Carrara and Mario Delgado-Ortega (ANRS | Emerging Infectious Diseases)

The "General information" tab presents an overview, case definitions, guidelines, reported cases

Overview

https://www.who.int/health-topics/poliomyelitis#tab=tab_1

Timeline

- On 22 June 2022, the UK Health Security Agency announced detection of poliovirus in sewage samples from **London, UK** (a country declared polio-free in 2003). Several closely-related viruses were found in sewage samples taken between February and May. The virus has continued to evolve and is now classified as a 'vaccine-derived' poliovirus type 2 (VDPV2).

The detection of a VDPV2 suggests it is likely there has been some spread between closely-linked individuals that are now shedding the type 2 poliovirus strain in their faeces. The virus has only been detected in sewage samples and no associated cases of paralysis have been reported.

- On July 18, 2022, the New York State Department of Health (NYSDOH) notified CDC of detection of poliovirus type 2 in stool specimens from an unvaccinated immunocompetent young adult from New York State, who was experiencing acute flaccid weakness. Since the discovery of this case, local wastewater surveillance has revealed evidence of cVDPV-2 in local counties, as well as in New York City (NYC), representing community transmission.

- VDPV2 was also detected recently in sewage samples in Jerusalem, Israel. Although outbreaks of polio in Israel have occurred in Israel in recent years, they were not of the VDPV of type 2, which is not included in the oral polio vaccine used by the country, suggesting the current detection derives from another country.

Epidemiology

- Poliomyelitis (polio) is a highly infectious viral disease that largely affects children under 5 years of age. It has an incubation period of 7-10 days but can range from 4-35 days. The virus is transmitted by person-to-person spread mainly through the faecal-oral route or, less frequently, by a common vehicle (e.g. contaminated water or food) and multiplies in the intestine, from where it can invade the nervous system and cause paralysis. Up to 90% of those infected experience no or mild symptoms and the disease usually goes unrecognized. In others, initial symptoms include fever, fatigue, headache, vomiting, stiffness in the neck, and pain in the limbs. These symptoms usually last for 2–10 days and most recovery is complete in almost all cases. However, in the remaining proportion of cases the virus causes paralysis, usually of the legs, which is most often permanent. Paralysis can occur as rapidly as within a few hours of infection. Of those paralysed, 5-10% die when their breathing muscles become immobilized.

- In 1988, the World Health Assembly adopted a resolution for the worldwide eradication of polio, marking the launch of the Global Polio Eradication Initiative. Wild poliovirus cases have decreased by over 99% since 1988, from an estimated 350 000 cases in more than 125 endemic countries then to 175 reported cases in 2019. Of the 3 strains of wild poliovirus (type 1, type 2 and type 3), wild poliovirus type 2 was eradicated in 1999 and no case of wild poliovirus type 3 has been found since the last reported case in Nigeria in November 2012. Both strains have officially been certified as globally eradicated. As at 2020, wild poliovirus type 1 affects two countries: Pakistan and Afghanistan.

- Two vaccines are available against polio, the oral polio vaccine (OPV) and the inactivated polio vaccine (IPV). OPV is more broadly used because it is cheaper and easier to administer. It protects both the individual and the community against infection thanks to excretion of the virus through faeces and exposure of a larger portion of the population. However, the vaccine contains the attenuated virus that can still replicate and, in extremely rare events, its enhanced transmission in undervaccinated populations can lead to accumulation of mutations that render the virus pathogenic again (vaccine-derived polio virus).

- There is no cure for polio; it can only be prevented by immunization. The polio vaccine, given multiple times, can protect a child for life. Treatments for polio focus on limiting and alleviating symptoms.

European Commission case definition of poliomyelitis (2008)

Source: <https://www.ecdc.europa.eu/en/poliomyelitis/facts>

Clinical Criteria	Any person <15 years of age with Acute flaccid paralysis (AFP) OR Any person in whom polio is suspected by a physician
Laboratory Criteria	At least one of the following three: – Isolation of a polio virus and intratypic differentiation– Wild polio virus (WPV) – Vaccine derived poliovirus (VDPV) (for the VDPV at least 85% similarity with vaccine virus in the nucleotide sequences in the VP1 section) – Sabin-like poliovirus: intratypic differentiation performed by a WHO-accredited polio laboratory (for the VDPV a >1% up to 15% VP1 sequence difference compared with vaccine virus of the same serotype)
Epidemiological Criteria	At least one of the following two epidemiological links: – Human to human transmission – An history of travel to a polio-endemic area or an area with suspected or confirmed circulation of poliovirus

Background information on Polio

Santé publique France	Page Poliomyélite	https://www.santepubliquefrance.fr/maladies-et-traumatismes/maladies-a-prevention-vaccinale/poliomyelite
Santé publique France	Couverture vaccinale	https://www.santepubliquefrance.fr/determinants-de-sante/vaccination/articles/donnees-de-couverture-vaccinale-diphtherie-tetanos-poliomyelite-coqueluche-par-groupe-d-age
ECDC	Page Poliomyélite	https://www.ecdc.europa.eu/en/poliomyelitis/facts
CDC	Page Poliomyélite	https://www.cdc.gov/polio/what-is-polio/index.htm

WHO	Page Poliomyélite	https://www.who.int/news-room/factsheets/detail/poliomyelitis
GPEI	Fact Sheet on vaccine-derived polio	https://polioeradication.org/wp-content/uploads/2018/07/GPEI-cVDPV-Fact-Sheet-20191115.pdf
WHO	Page on polio vaccine	https://www.who.int/teams/health-product-policy-and-standards/standards-and-specifications/vaccines-quality/poliomyelitis

Protocol and guidelines from health authorities, ECDC, and WHO

WHO	WHO Global Action Plan for Poliovirus Containment, 4th edition (GAPIV)	https://polioeradication.org/wp-content/uploads/2022/07/WHO-Global-Action-Plan-for-Poliovirus-Containment-GAPIV.pdf	July 2022
GPEI	Tools, Protocols and Guidelines	https://polioeradication.org/tools-and-library/resources-for-polio-eradicators/gpei-tools-protocols-and-guidelines/	
HAS	Vaccination Guidelines	https://www.has-sante.fr/jcms/p_3122554/fr/strategie-vaccinale-autour-d-un-cas-de-poliomyelite-ou-en-cas-de-detection-environnementale-de-poliovirus	2019
CDC	Guidelines Diagnostic Assay Development for Poliovirus	https://journals.asm.org/doi/10.1128/JCM.01624-17?url_ver=Z39.88-2003&rfr_id=ori:rid:crossref.org&rfr_dat=cr_pub%20%20pubmed	2018
WHO	Guidelines for environmental surveillance of poliovirus circulation	https://apps.who.int/iris/handle/10665/67854	2003

Vaccine-derived poliovirus outbreak

Factsheet and news

UPDATE OF 18 NOVEMBER 2022

This document is composed of 3 different tabs: General information, Relevant news, and Scientific articles
 The content and presentation of this document are subject to change as the situation evolves.
 Every information presented comes from a valid and credible source.

Preparation of this document is coordinated by:

Erica Telford, Nicolas Pulik, Guia Carrara and Mario Delgado-Ortega (ANRS | Emerging Infectious Diseases)

The "Relevant news" tab presents official reports from health agencies and rapidly reported information from reliable news sources

Date	Source	Type of publication	Title	Key facts	Link
16/11/2022	WHO	News	European Region's 20th year of polio-free status confirmed – but there is no room for complacency	The European Regional Commission for Certification of Poliomyelitis Eradication (RCC) confirmed during its 36th meeting on 19–20 October 2022 that the WHO European Region continues to be free of any endemic spread of wild poliovirus.	https://www.who.int/europe/news/item/16-11-2022-european-region-s-20th-year-of-polio-free-status-confirmed--but-there-is-no-room-for-complacency
16/11/2022	BBC	News	London polio vaccine take-up rate reaches 23%, figures show	The take-up rate of extra polio vaccinations for young children in London, offered after the virus was found in the waste water system, has risen to 23%, NHS figures show. NHS data: https://www.england.nhs.uk/statistics/wp-content/uploads/sites/2/2022/11/Polio-vaccinations-17-November-2022.xlsx	https://www.bbc.com/news/uk-england-london-63642669
03/11/2022	WHO	News	Focus on immunization and surveillance in the in-mid-term evaluation of polio transition	A significant changes in the polio eradication and broader global health landscape is the Mid-term evaluation of the implementation of the Strategic Action Plan on Polio Transition (2018 - 2023).	https://www.who.int/news/item/03-11-2022-focus-on-immunization-and-surveillance-in-the-in-mid-term-evaluation-of-polio-transition
02/11/2022	GEPI	News	Polio this week as of 02 November	-Pakistan: one positive environmental sample -Mozambique: one WPV1 case and five cVDPV1 cases -Botswana: one cVDPV2 environmental sample -Central African Republic: one cVDPV2 environmental sample -DR Congo: seven cVDPV1 cases and three cVDPV2 cases -Madagascar: two cVDPV1 cases -Nigeria: one cVDPV2 case	https://polioeradication.org/polio-today/polio-now/this-week/
01/11/2022	WHO	Statement	Statement of the Thirty-third Polio IHR Emergency Committee	The Emergency Committee reviewed the data on wild poliovirus (WPV1) and circulating vaccine derived polioviruses (cVDPV) in the context of global eradication of WPV and cessation of outbreaks of cVDPV2 by end of 2023.	https://www.who.int/news/item/01-11-2022-statement-of-the-thirty-third-polio-ih-er-emergency-committee
28/10/2022	WHO	News	World Polio Day in Ukraine: focus on urgent need to vaccinate against polio to prevent further spread	WHO and the health authorities of Ukraine conducted a joint field mission to the Zakarpattia region. The aim of the mission was to raise awareness among the public of the importance of continuing to vaccinate against polio and other vaccine-preventable diseases, despite the difficulties caused by the ongoing war in the country.	https://www.who.int/europe/news/item/28-10-2022-world-polio-day-in-ukraine-focus-on-urgent-need-to-vaccinate-against-polio-to-prevent-further-spread
26/10/2022	GEPI	News	Polio this week as of 26 October	-Afghanistan: one WPV1 positive environmental sample -Algeria: two cVDPV2 positive environmental samples -DR Congo: one cVDPV1 case and six cVDPV2 cases -Niger: one cVDPV2 case -Nigeria: one cVDPV2 case	https://www.who.int/europe/news/item/24-10-2022-statement---european-region-20-years-polio-free--a-celebratory-moment-but-a-fragile-legacy
24/10/2022	PAHO/WHO	News	Q&A with PAHO Chief of Immunization for World Polio Day	For World Polio Day, Q&A with Dr Daniel Salas, Chief of Immunization at PAHO, about the situation and what the recent reported case implies for the Americas.	https://www.paho.org/en/news/24-10-2022-qa-paho-chief-immunization-world-polio-day
24/10/2022	WHO Africa	News	World Polio Day 2022	Message of WHO Regional Director for Africa, Dr Matshidiso Moeti	https://www.afro.who.int/regional-director/speeches-messages/world-polio-day-2022
24/10/2022	WHO Europe	News	Statement – European Region 20 years polio-free: a celebratory moment but a fragile legacy	Opening remarks by Dr Hans Henri P. Kluge, WHO Regional Director for Europe, at the media briefing on World Polio Day	https://www.who.int/europe/news/item/24-10-2022-statement---european-region-20-years-polio-free--a-celebratory-moment-but-a-fragile-legacy
23/10/2022	ECDC	News	World Polio Day 2022: Joint statement by Commissioners Stella Kyriakides, Jutta Urpilainen, and Director of ECDC Dr Andrea Ammon	World Polio Day is commemorated on 24 October. Thanks to vaccination the EU has been polio-free for the past 20 years, but recent developments show that it remains an international health threat.	https://www.ecdc.europa.eu/en/news-events/world-polio-day-2022

Poliomyelitis - Factsheet and news

19/10/2022	UKHSA	Guidance	Inactivated polio vaccine (IPV) booster: information for healthcare practitioners	Inactivated polio vaccine (IPV) booster campaign information for healthcare practitioners.	https://www.gov.uk/government/publications/inactivated-polio-vaccine-ipv-booster-information-for-healthcare-practitioners
19/10/2022	UKHSA	Guidance	Immunisation update webinars for primary care immunisers 2022	Series of webinars to help immunisers update their knowledge.	https://www.gov.uk/government/publications/immunisation-update-webinars-for-primary-care-immunisers
19/10/2022	GEPI	News	Polio this week as of 19 October	-Pakistan: two WPV1 positive environmental samples -Benin: One cVDPV2 case -DR Congo: 18 cVDPV1 cases and 17 cVDPV2 cases -Malawi: one cVDPV1 case -Niger: two cVDPV2 positive environmental samples -Senegal : one cVDPV2 positive environmental sample -Togo: one cVDPV2 positive environmental sample -Yemen: five cVDPV2 cases	https://polioeradication.org/polio-today/polio-now/this-week/
18/10/2022	WHO	News	Global leaders commit US\$ 2.6 billion at World Health Summit to end polio	Global leaders confirmed US\$ 2.6 billion in funding toward the Global Polio Eradication Initiative's (GPEI) 2022-2026 Strategy to end polio at the World Health Summit in Berlin. The funding will support global efforts to overcome the final hurdles to polio eradication, vaccinate 370 million children annually over the next five years and continue disease surveillance across 50 countries.	https://www.who.int/news/item/18-10-2022-global-leaders-commit-usd-2.6-billion-at-world-health-summit-to-end-polio
16/10/2022	Gates Foundation	News	With New Commitment, Gates Foundation Joins Call to Help End Polio	At the World Health Summit, the Bill & Melinda Gates Foundation announced it will commit \$1.2 billion to support efforts to end all forms of polio globally.	https://www.gatesfoundation.org/ideas/media-center/press-releases/2022/10/world-health-summit-gates-foundation-commits-over-one-billion-to-end-polio
12/10/2022	GEPI	News	Polio this week as of 12 October	– DR Congo: four cVDPV2 cases and one cVDPV2 positive environmental sample – Nigeria: three cVDPV2 cases	https://polioeradication.org/polio-today/polio-now/this-week/
12/10/2022	WHO	News	En visite en RDC, une délégation de l'USAID se joint aux efforts de l'OMS et des autres partenaires pour accélérer l'éradication de la polio et la lutte contre les maladies évitables par la vaccination	The USAID delegation arrived Wednesday, October 12, in Kinshasa for a seven-day visit, including the country's second largest city, Lubumbashi, to meet with stakeholders and community actors to discuss sustainable ways to eradicate polio	https://www.afro.who.int/fr/countries/democratic-republic-of-congo/news/en-visite-en-rdc-une-delegation-de-lusaid-se-joint-aux-efforts-de-loms-et-des-autres-partenaires
10/10/2022	WHO	Report	Highlights from the Meeting of the Strategic Advisory Group of Experts (SAGE) on Immunization – 3-6 October 2022	SAGE recommendations on the current Monkeypox, Poliomyelitis, Respiratory Syncytial Virus, COVID-19, and the Sudan ebolavirus outbreak	https://cdn.who.int/media/docs/default-source/immunization/sage/2022/october/highlights_sage_0ct_2022.pdf?sfvrsn=69f947c4_5
05/10/2022	WHO	News	Zimbabwe intensifies polio surveillance	Health authorities in Zimbabwe with support of partners including Bill and Melinda Gates Foundation, UNICEF and WHO are implementing polio surveillance strengthening activities. Zimbabwe is currently using the AFP surveillance system to detect any potential Polio outbreaks.	https://www.afro.who.int/countries/zimbabwe/news/zimbabwe-intensifies-polio-surveillance
30/09/2022	UKHSA	Promotional material	Polio booster campaign resources	Information leaflet to support the polio booster campaign.	https://www.gov.uk/government/publications/polio-booster-campaign-resources
29/09/2022	PAHO/WHO	News	Health authorities commit to step up efforts to keep the Americas free of polio	Following declining levels of polio vaccination and surveillance across the region, and the recent confirmation of circulation of the poliovirus in the state of New York, health authorities in the Americas passed a resolution today to prioritize polio mitigation plans, including actions to increase vaccination and surveillance and to ensure adequate preparedness for a possible outbreak.	https://www.paho.org/en/news/29-9-2022-health-authorities-commit-step-efforts-keep-americas-free-polio
28/09/2022	Santé publique France	News	Virus de la polio détectés dans les eaux usées en Angleterre et aux Etats-Unis : Santé publique France maintient sa vigilance	Epidemiological and vaccination coverage update regarding the UK, USA, France and internationally, in particular regarding caes associated with VDPV2	https://www.santepubliquefrance.fr/les-actualites/2022/virus-de-la-polio-detectes-dans-les-eaux-usees-en-angleterre-et-aux-etats-unis-sante-publique-france-maintient-sa-vigilance
28/09/2022	GEPI	News	Polio this week as of 28 September	– Afghanistan: one WPV1 positive environmental sample – Pakistan: four positive environmental samples – Algeria: five cVDPV2 positive environmental samples – DR Congo: nine cVDPV2 cases – Egypt: one cVDPV2 positive environmental sample – Mozambique : one cVDPV1 case – Nigeria : six cVDPV2 positive environmental sample – Yemen: 12 cVDPV2 cases	https://polioeradication.org/polio-today/polio-now/this-week/
25/09/2022	WHO	News	What it took to close a polio outbreak in Sudan	Sudan's circulating vaccine-derived poliovirus (cVDPV) type 2 outbreak began with the importation of the virus from neighbouring Chad. Confirmed in August 2020, the outbreak affected and paralyzed 58 children in 42 districts of 15 states.	https://www.emro.who.int/polio-eradication/news/what-it-took-to-close-a-polio-outbreak-in-sudan.html

Poliomyelitis - Factsheet and news

23/09/2022	ECDC	Report	Communicable disease threats report, 18-24 September 2022, week 38	Since the previous update on 16 August 2022, and as of 23 September 2022, 115 new cases of AFP caused by WPV1 or cVDPVs have been reported. In the US, the risk of additional cases related to the reported event persists, especially in areas with low polio vaccine coverage and in population groups with low polio vaccine uptake.	https://www.ecdc.europa.eu/en/publications-data/communicable-disease-threats-report-18-24-september-2022-week-38
21/09/2022	GEPI	News	Polio this week as of 21 September	Six countries reported new polio cases this week; Afghanistan, Pakistan, Mozambique, Benin, DR Congo, Ghana, Madagascar, Malawi and Nigeria.	https://polioeradication.org/polio-today/polio-now/this-week/
16/09/2022	ECDC	Report	Communicable disease threats report, 11-17 September 2022, week 37	This issue of the ECDC Communicable Disease Threats Report (CDTR) covers the period 11-17 September 2022 and includes updates on COVID-19, monkeypox, West Nile virus infection, dengue, and poliovirus.	https://www.ecdc.europa.eu/en/publications-data/communicable-disease-threats-report-11-17-september-2022-week-37
15/09/2022	GEPI	News	Polio this week as of 14 September	- Virological and epidemiological analysis confirms circulation of VDPV2 in New York, USA. Ongoing response continues. - A WPV1-positive environmental sample reported from greater Karachi, Sindh, with collection date on 23 August, linked to WPV1 from southern Khyber Pakhtunkhwa. - In the DRC, circulating cVDPV1 has been confirmed. The country is also co-infected with cVDPV2 and is continuing to conduct response to urgently stop both strains.	https://polioeradication.org/polio-today/polio-now/this-week/
14/09/2022	WHO	News	Detection of circulating vaccine derived polio virus 2 (cVDPV2) in environmental samples– the United Kingdom of Great Britain and Northern Ireland and the United States of America	Situation at a glance : as of 5 September, no human case associated with VDPV2 has been reported in the United Kingdom.	https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON408
13/09/2022	US CDC	News	United States confirmed as country with circulating vaccine-derived poliovirus	CDC today announced that polioviruses found in New York, both from the case of paralytic polio in an unvaccinated adult in Rockland County and in several wastewater samples from communities near the patient's residence, meet the World Health Organization (WHO)'s criteria for circulating vaccine-derived poliovirus (cVDPV) – meaning that poliovirus continues to be transmitted in Rockland County, NY, and surrounding areas.	https://www.cdc.gov/media/releases/2022/s0913-polio.html
13/09/2022	PAHO/WHO	Epidemiological Update	Detection of a circulating vaccine-derived poliovirus type 2 (VDPV2) in the United States: Considerations for the Region of the Americas	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 of all acute flaccid paralysis (AFP) cases.	https://www.paho.org/en/documents/epidemiological-update-detection-circulating-vaccine-derived-poliovirus-type-2-vdpv2
09/09/2022	NY State	News	Protecting New Yorkers Through Immunization: State Department of Health Updates New Yorkers On Polio In New York State	With evidence of circulating poliovirus, Governor Kathy Hochul today issued an Executive Order declaring a State Disaster Emergency, increasing the availability of resources to protect New Yorkers against paralytic disease.	https://health.ny.gov/press/releases/2022/2022-09-09_polio_immunization.htm
02/09/2022	ECDC	Report	Communicable disease threats report, 28 August-3 September 2022, week 35	The ECDC Communicable Disease Threats Report (CDTR) is a weekly bulletin for epidemiologists and health professionals on active public health threats. This issue covers the period 28 August-3 September 2022 and includes updates on COVID-19, monkeypox, West Nile virus, increase in hepatitis cases of unknown aetiology in children, Vibrio, and poliomyelitis.	https://www.ecdc.europa.eu/en/publications-data/communicable-disease-threats-report-28-august-3-september-2022-week-35
02/09/2022	UKHSA	News	Expansion of polio sewage surveillance to areas outside London	UKHSA and MHRA are expanding polio sewage surveillance to a range of areas outside of the capital.	https://www.gov.uk/government/news/expansion-of-polio-sewage-surveillance-to-areas-outside-london
30/08/2022	GPEI	Report	Circulating vaccine-derived poliovirus	Global Circulating Vaccine-derived Poliovirus (cVDPV) as of 30 August 2022	https://polioeradication.org/polio-today/polio-now/this-week/circulating-vaccine-derived-poliovirus/
30/06/2022	Santé publique France	News	Détection du virus de la polio dans les eaux usées en Angleterre : analyse de Santé publique France	Suite à la détection de poliovirus dans des échantillons d'eaux usées d'une station d'épuration à Londres, Santé publique France reste en veille sur le sujet.	https://www.santepubliquefrance.fr/les-actualites/2022/detection-du-virus-de-la-polio-dans-les-eaux-usees-en-angleterre-analyse-de-sante-publique-france
22/06/2022	WHO	News	Vaccine-derived poliovirus type 2 (VDPV2) detected in environmental samples in London, UK	The Global Polio Laboratory Network (GPLN) has confirmed the isolation of type 2 vaccine-derived poliovirus (VDPV2) from environmental samples in London, United Kingdom (UK), as part of ongoing disease surveillance. Initially, vaccine-like type 2 poliovirus (SL2) had been isolated from samples taken from the same site between February and May 2022. Genetic analysis suggests that the new VDPV2 and previous SL2 isolates have a common origin, still to be identified, but the technical definition and criteria for 'circulation' of VDPV2 are not met at this time.	https://www.who.int/news/item/22-06-2022-vaccine-derived-poliovirus-type-2-(vdpv2)-detected-in-environmental-samples-in-london--uk

Poliomyelitis - Factsheet and news

22/06/2022	UKHSA	News	Poliovirus detected in sewage from North and East London	<p>The UKHSA and MHRA found vaccine-derived poliovirus type 2 (VDPV2) in sewage samples collected from the London as part of routine surveillance. This detection suggests it is likely there has been some spread between closely-linked individuals in North and East London and that they are now shedding the type 2 poliovirus strain in their faeces. The virus has only been detected in sewage samples and no associated cases of paralysis have been reported. Investigations will aim to establish if any community transmission is occurring.</p>	<p>https://www.gov.uk/government/news/poliovirus-detected-in-sewage-from-north-and-east-london</p>
------------	-------	------	--	--	--

Vaccine-derived poliovirus outbreak

Factsheet and news

UPDATE OF 18 NOVEMBER 2022

This document is composed of 3 different tabs: General information, Relevant news, and Scientific articles
 The content and presentation of this document are subject to change as the situation evolves.
 Every information presented comes from a valid and credible source.

Preparation of this document is coordinated by:

Erica Telford, Nicolas Pulik, Guia Carrara and Mario Delgado-Ortega (ANRS | Emerging Infectious Diseases)

The "Scientific articles" tab presents relevant articles published on peer-reviewed scientific journals or pre-print platforms since June 2022

Date	Source	Type of publication	Title	Key facts	Link
18/11/2022	Am J Nurs	Editorial	New Challenges in the Global Eradication of Polio	War, vaccine hesitancy, and disruptions to local health systems undermine progress.	https://doi.org/10.1097/01.naj.0000904044.67667.53
04/11/2022	MMWR	Report	Wastewater Testing and Detection of Poliovirus Type 2 Genetically Linked to Virus Isolated from a Paralytic Polio Case — New York, March 9–October 11, 2022	Wastewater testing has identified circulating polioviruses genetically related to virus isolated from the Rockland County patient in at least five New York counties.	https://doi.org/10.15585/mmwr.mm7144e2
01/11/2022	Lancet	Research article	Genetic and phenotypic stability of poliovirus shed from infants who received novel type 2 or Sabin type 2 oral poliovirus vaccines in Panama: an analysis of two clinical trials	In this study, the authors evaluated the genetic and phenotypic stability of shed poliovirus following administration of one dose of monovalent OPV2 (mOPV2) or nOPV2 to infants aged 18–22 weeks.	https://doi.org/10.1016/S2666-5247(22)00254-3
01/11/2022	BMJ	Feature	Polio in New York: will it just go away?	Report concerning the alarming new case of vaccine derived polio in New York, the risks and the uneasy choices around which vaccines are used in the still elusive goal of eradicating polio.	https://doi.org/10.1136/bmj.o2450
28/10/2022	Front Microbiol	Research article	Oral polio revaccination is associated with changes in gut and upper respiratory microbiomes of infants	OPV revaccination was associated with a healthier microbiome composition 2 months after revaccination, based on a more abundant and diversified bacterial community of Prevotellaceae and fewer pathogenic/opportunistic organisms.	https://doi.org/10.3389/fmicb.2022.1016220
19/10/2022	Geroscience	Review	Poliomyelitis is a current challenge: long-term sequelae and circulating vaccine-derived poliovirus	Two current challenges are still polio-related. First, around half of poliomyelitis elderly survivors suffer late poliomyelitis sequelae. Second, the recent reappearance of strains of vaccine-derived poliovirus (VDPV) circulating in the environment is worrisome and able to persistent person-to-person transmission.	https://doi.org/10.1007/s11357-022-00672-7
16/10/2022	Vaccines	Research article	Poliovirus Immunity among Children Aged 6–11 and 36–48 Months in 14 Polio High-Risk Provinces of Afghanistan: A Health-Facility-Based Study	Afghanistan is one of two countries where wild poliovirus (WPV) type 1 remains endemic. The authors conducted a facility-based cross-sectional survey of antipoliovirus antibodies in children in 14 provinces of Afghanistan.	https://doi.org/10.3390/vaccines10101726
13/10/2022	Am J Epidemiol.	Review	Wastewater Surveillance for Infectious Disease: A Systematic Review.	Infectious diseases and pathogens were identified in 100 studies of wastewater surveillance across 38 countries. 25 separate pathogen families were identified in the included studies, with the majority of studies examining pathogens from the family Picornaviridae, including polio and non-polio enteroviruses. Wastewater surveillance studies can be improved by incorporating other measures of disease transmission at the population-level including disease incidence and hospitalizations.	https://doi-org.proxy.insermbiblio.inist.fr/10.1093/aje/kwac175
12/10/2022	The Lancet	Research article	Sustained detection of type 2 poliovirus in London sewage between February and July, 2022, by enhanced environmental surveillance	Environmental surveillance in London, UK, testing sewage samples using WHO recommended methods that include concentration, virus isolation in cell culture, and molecular characterisation. Whole-genome sequences generated through nanopore sequencing established linkage of isolates and confirmed transmission of a unique recombinant poliovirus lineage that has now been detected in Israel and the USA. 118 genetically linked poliovirus isolates related to the serotype 2 Sabin vaccine strain were detected in 21 of 52 sequential sewage samples collected in London between Feb 8 and July 4, 2022.	https://doi.org/10.1016/S0140-6736(22)01804-9
10/10/2022	Nat. Comm.	Research article	Membrane-assisted assembly and selective secretory autophagy of enteroviruses	By using cryo-electron tomography of infected cells the authors show that poliovirus assembles directly on replication membranes. this data directly visualize a membrane-bound half-capsid as a prominent virion assembly intermediate. These findings provide an integrated structural framework for multiple stages of the poliovirus life cycle.	https://doi.org/10.1038/s41467-022-33483-7

Poliomyelitis - Factsheet and news

07/10/2022	bioRxiv	Preprint	Development of Enterovirus anti-viral agents that target the viral 2C protein	The authors describe a novel broad spectrum anti-viral compounds targeting the conserved non-structural viral protein 2C that have low micro-molar to nanomolar IC50 values. The selection of resistant mutants resulted in amino acid substitutions in the viral capsid protein, implying a role for 2C in capsid assembly, as has been seen in polioviruses.	https://doi.org/10.1101/2022.10.06.511132
05/10/2022	NEJM	Editorial	Circulating Poliovirus in New York — New Instance of an Old Problem	The United States and the United Kingdom are experiencing outbreaks of imported poliovirus similar to those that have occurred elsewhere in recent years, and for the same reason: undervaccination.	https://www.nejm.org/doi/full/10.1056/NEJMp2212115
04/10/2022	BMJ	Opinion	The US needs to prepare to introduce the novel oral polio vaccine	The US was added to a WHO list of countries with circulating poliovirus, including Somalia, Democratic Republic of Congo, and Yemen. It may need to revise its polio vaccine programme and consider introducing the novel oral polio vaccine (nOPV) to its arsenal in order to gain control of transmission and prepare.	https://doi.org/10.1136/bmj.o2388
01/10/2022	Ann Med Surg (Lond)	Comment	Detection of vaccine-derived poliovirus type 2 amid the burden of infectious diseases in the UK: A cause for alarm	The re-emergence of polio in the UK reminds us that the global threat of polio remains. Viruses know no bounds or borders. COVID-19, Monkeypox, and polio are evidence of this.	https://doi.org/10.1016/j.amsu.2022.104773
01/10/2022	Lancet	Editorial	Polio eradication: falling at the final hurdle?	COVID-19 temporarily halted the Global Polio Eradication Initiative (GPEI)'s immunisation campaigns. Consequently, outbreaks of circulating vaccine-derived poliovirus (cVDPV) tripled from 2019 to 2020, with over 1100 children paralysed. PAHO has warned that Brazil, Dominican Republic, Haiti, and Peru are at high risk for reintroduction of polio, following dwindling vaccination rates. Global polio immunisation rates fell to 80% in 2021, the lowest rate in 14 years.	https://doi.org/10.1016/S0140-6736(22)01875-X
01/10/2022	Emerg Infect Dis	Research article	Importation and Circulation of Vaccine-Derived Poliovirus Serotype 2, Senegal, 2020–2021	Phylogenetic analysis revealed the circulation of 2 clusters and provided evidence on the virus introduction from Guinea. Because novel oral polio vaccine serotype 2 was used for response activities throughout Senegal, we recommend expanding environmental surveillance into other regions.	https://doi.org/10.3201/eid2810.220847
01/10/2022	Lancet Infect Dis.	Comment	The growing threat of wild poliovirus 1 and vaccine-derived cases in the COVID-19 era	The detection of people with paralytic cases of WPV1 in two African countries (ie, Malawi in February, 2022, and Mozambique in May, 2022) outside endemic areas of WPV1 transmission (ie, Pakistan and Afghanistan) will become a serious setback if low vaccination coverage and decreased surveillance of acute flaccid paralysis are not addressed with alacrity. Detection of VDPV outbreaks in new settings, including circulating vaccine-derived type 2 poliovirus (cVDPV2) in Ukraine in October, 2021, cVDPV3 in Israel in March, 2022, and cVDPV2 in the USA in July, 2022, and the environmental detection of VDPV in sewage systems in London, UK, in June, 2022, show the serious threat of polio re-emergence in settings that had previously interrupted polio transmission.	https://doi.org/10.1016/S1473-3099(22)00548-5
01/10/2022	Ann Med Surg (Lond)	Comment	Detection of vaccine-derived poliovirus type 2 amid the burden of infectious diseases in the UK: A cause for alarm	To prevent further epidemics in the UK, wastewater sampling remains crucial in evaluating, searching, and eradicating the spread of poliovirus. Further epidemiological surveillance in adjacent areas to the Beckton plant is crucial to filling any gaps in understanding the outbreak's extent and guiding the initiation of appropriate and timely public health measures.	https://doi.org/10.1016/j.amsu.2022.104773
29/09/2022	Lancet	Correspondence	Overcoming challenges en route to polio eradication	The Global Polio Eradication Initiative's 2022–2026 strategy has sharpened its approach to overcoming the remaining hurdles to eradication in the highest risk communities around the world.	https://doi.org/10.1016/S0140-6736(22)01880-3
27/09/2022	Int J Infect Dis	Research article	Vaccine associated paralytic poliomyelitis in a child: fast transformation from Sabin-like virus to VDPV triggered epidemiological response in two countries of European region	repeated stool sampling from an immunocompetent, vaccinated against poliomyelitis child with acute flaccid paralysis (AFP), a case of extremely rapid evolution of Sabin-like poliovirus type 3 in the body of this child was traced.	https://doi.org/10.1016/j.ijid.2022.09.034
27/09/2022	Nature Sci. Rep.	Research article	High-throughput analysis of anti-poliovirus neutralization antibody titre in human serum by the pseudovirus neutralization test	In the present study, the authors established a high-throughput pPNT (HTpPNT) for a large-scale serosurveillance. The HTpPNT system was evaluated with 600 human serum samples obtained from a broad range of age groups of healthy volunteers (ages of 0–89 years).	https://doi.org/10.1038/s41598-022-20544-6
23/09/2022	Lancet Infect Dis.	Comment	A novel tool to eradicate an ancient scourge: the novel oral polio vaccine type 2 story	The successful development of nOPV2 has led to the deployment of approximately 450 million doses of nOPV2 for outbreak control in 21 countries. Monitoring the use of nOPV2 has confirmed it is more genetically stable and less likely to result in VDPV than the Sabin strain, suggesting that the target of the global eradication of poliomyelitis might be a little more attainable than previously believed.	https://doi-org.proxy.insermbiblio.inist.fr/10.1016/s1473-3099(22)00582-5
22/09/2022	Clin. Infect. Dis.	Research article	Co-administration of Oral Cholera Vaccine with Oral Polio Vaccine among Bangladeshi Young Children: A Randomized Controlled Open Label Trial to Assess Interference	Vaccine co-administration has numerous advantages such as reduction in delivery costs and likely reduction in the numbers of visits in routine immunization schedule. Although immunological interference from co-administration of live and non-live vaccines is thought to be generally low. This study evaluated the safety and immunogenicity of bOPV and OCV administered simultaneously.	https://doi.org/10.1093/cid/ciac782

Poliomyelitis - Factsheet and news

19/09/2022	Postgrad Med J.	Editorial	Poliovirus returns to the UK after nearly 40 years: current efforts and future recommendations	This article discusses the epidemiology of poliovirus by examining the aetiology of the disease and current mitigation policies implemented to prevent the spread of type 2 vaccine-derived poliovirus in the UK. It also offers advice on particular therapies and tactics to avoid future poliovirus outbreaks.	https://doi.org/10.1136/pmj-2022-142103
19/09/2022	Ann Neurol.	Review	Re-emergence of Poliovirus in the United States: Considerations and Implications.	Since the discovery of a case of paralytic polio in a 20-year-old unvaccinated male in New York, in July 2022, local wastewater surveillance has revealed evidence of cVDPV-2 in local counties, as well as in New York City (NYC), representing community transmission. Here is reviewed the epidemiological origin of this discovered strain of poliovirus, national and international methods of surveillance for poliovirus, and neurological features of poliovirus.	https://doi.org/10.1002/ana.26504
16/09/2022	J Comput Biol	Research article	Novel Network Method Major Minor Variation Clustering Enables Identification of Poliovirus Clusters with High-Resolution Linkages	To identify type 2 Sabin or Sabin-like sources and improve our ability to map viral sources to campaigns during the polio endgame, they investigated the feasibility of a new method for genetic sequence analysis (MMVC), as a complement to current phylogenetic tree approaches .	https://doi.org/10.1089/cmb.2022.0292
16/09/2022	JAMA	Patient page	What Is Polio?	This JAMA Patient Page discusses #polio, including the epidemiology, prevention, and symptoms.	https://doi.org/10.1001/jama.2022.17159
15/09/2022	EuroSurveillance	Research article	Emergence of genetically linked vaccine-originated poliovirus type 2 in the absence of oral polio vaccine, Jerusalem, April to July 2022	A genetic and epidemiological study of polio in Jerusalem, highlighting the importance of routine environmental/AFP surveillance as a means for outbreak control and rapid immunisation campaigns, not only in LICs, but also in HIC with high vaccination coverage.	https://doi.org/10.2807/1560-7917.ES.2022.27.37.2200694
13/09/2022	Science	News	Polio is back rich countries, but it poses a far bigger threat to developing world	New York state has declared an emergency, yet scientists say a big U.S. outbreak is unlikely	https://www.science.org/content/article/polio-back-rich-countries-it-poses-far-bigger-threat-developing-world
12/09/2022	BMJ	News	Polio emergency declared in New York State over virus found in wastewater	New York State governor Kathy Hochul has declared a disaster in the state following the recent detection of poliovirus in wastewater samples from areas in and around New York City.	https://doi.org/10.1136/bmj.o2211
09/09/2022	MMWR	Report	Detection of a Highly Divergent Type 3 Vaccine-Derived Poliovirus in a Child with a Severe Primary Immunodeficiency Disorder — Chongqing, China, 2022	In March 2022, a type 3 VDPV was detected in stool specimens from an infant with primary immunodeficiency disorder (PID) who was hospitalized in Children's Hospital of Chongqing Medical University, China. Surveillance for poliovirus in PID patients has increased detection of immunodeficiency-related (iVDPV) cases.	https://doi-org.proxy.insermbiblio.inist.fr/10.15585/mmwr.mm7136a2
08/09/2022	bioRxiv	Preprint	A conserved glutathione binding site in poliovirus is a target for antivirals and vaccine stabilisation	Report of cryo-EM structures of Slutathione (GSH) bound to poliovirus serotype 3 VLPs showing that it can enhance particle stability. This suggests GSH or an analogous tight-binding antiviral offers the potential for stabilizing VLP vaccines.	https://www.biorxiv.org/content/10.1101/2022.09.08.507136v1
06/09/2022	Pediatr Infect Dis J	Article	Public Health Response to a Case of Paralytic Poliomyelitis in an Unvaccinated Person and Detection of Poliovirus in Wastewater—New York, June–August 2022	This report describes the second identification of community transmission of poliovirus in the U.S. since 1979. The previous instance, in 2005, was a type 1 VDPV. The occurrence of this case, combined with the identification of poliovirus in wastewater in neighboring Orange County, underscores the importance of maintaining high vaccination coverage to prevent paralytic polio in persons of all ages.	https://doi.org/10.1097/INF.0000000000003696
06/09/2022	Ann Med Surg.	Short communication	Polio returns to the USA: An epidemiological alert	In light of the above-mentioned findings, this research further details future recommendations like cessation of the OPV, encouragement of inactivated polio vaccine (IPV) in vaccination schedules, sensitive epidemiological surveillance system and appropriate training for healthcare providers.	https://www.sciencedirect.com/science/article/pii/S2049080122013231
06/09/2022	Lancet Microbe	Comment	Rare recurrences of poliomyelitis in non-endemic countries after eradication: a call for global action	A comment on global action aiming to counteract growing anti-vaccine attitudes or hesitancy to vaccination, to reduce the spread of polio.	https://doi.org/10.1016/S2666-5247(22)00253-1
01/09/2022	Lancet Infect Dis	News	Linked global cases of poliovirus a cause of concern	Genetically linked vaccine-derived poliovirus type 2 has been detected in environmental samples in three countries and in a case of paralytic poliomyelitis.	https://www.sciencedirect.com.proxy.insermbiblio.inist.fr/science/article/pii/S1473309922005369?via%3Dihub
25/08/2022	JAMA	News	What All Physicians Need to Know About the Polio Resurgence in New York State	Regarding the case of paralytic polio in a young adult in New York : Genomic sequencing suggests that the virus has been circulating locally under the radar for up to a year, according to the Centers for Disease Control and Prevention (CDC).	https://doi-org.proxy.insermbiblio.inist.fr/10.1001/jama.2022.15171
22/08/2022	Nature	News	Spate of polio outbreaks worldwide puts scientists on alert	The discovery of poliovirus in New York state, London and Jerusalem this year has taken many by surprise — but public-health researchers say it was only a matter of time. Cases of paralysis in the US and Israel suggest vaccine-derived poliovirus has infected many people	https://www.nature.com/articles/d41586-022-02233-6
18/08/2022	Lancet	Comment	Emergence of vaccine-derived poliovirus in high-income settings in the absence of oral polio vaccine use	A comment on vaccine-derived poliovirus type 2 (VDPV2) detection in the UK, US, and Israel	https://doi.org/10.1016/S0140-6736(22)01582-3
23/06/2022	BMJ	News	Poliovirus is detected in sewage from north and east London	Vaccine derived poliovirus has been detected from several sewage samples in north and east London, and officials warn that the virus may be circulating in the community.	https://doi.org/10.1136/bmj.o1546

Poliomyelitis - Factsheet and news

16/06/2022	MMWR	Report	Public Health Response to a Case of Paralytic Poliomyelitis in an Unvaccinated Person and Detection of Poliovirus in Wastewater — New York, June–August 2022	In June 2022, poliovirus was confirmed in an unvaccinated immunocompetent adult resident of New York hospitalized with flaccid lower limb weakness. Vaccine-derived poliovirus type 2 was isolated from the patient and identified from wastewater samples in two neighboring New York counties.	https://www.cdc.gov/mmwr/volumes/71/wr/mm7133e2.htm?s_cid=mm7133e2_w
------------	------	--------	--	--	---