

## WEBINAR

# UPDATE ON SURVEILLANCE, CLINICAL MANAGEMENT AND NEUROLOGICAL EVALUATION OF ACUTE FLACCID PARALYSIS CASES



DATE

25 May, 2023



TIME

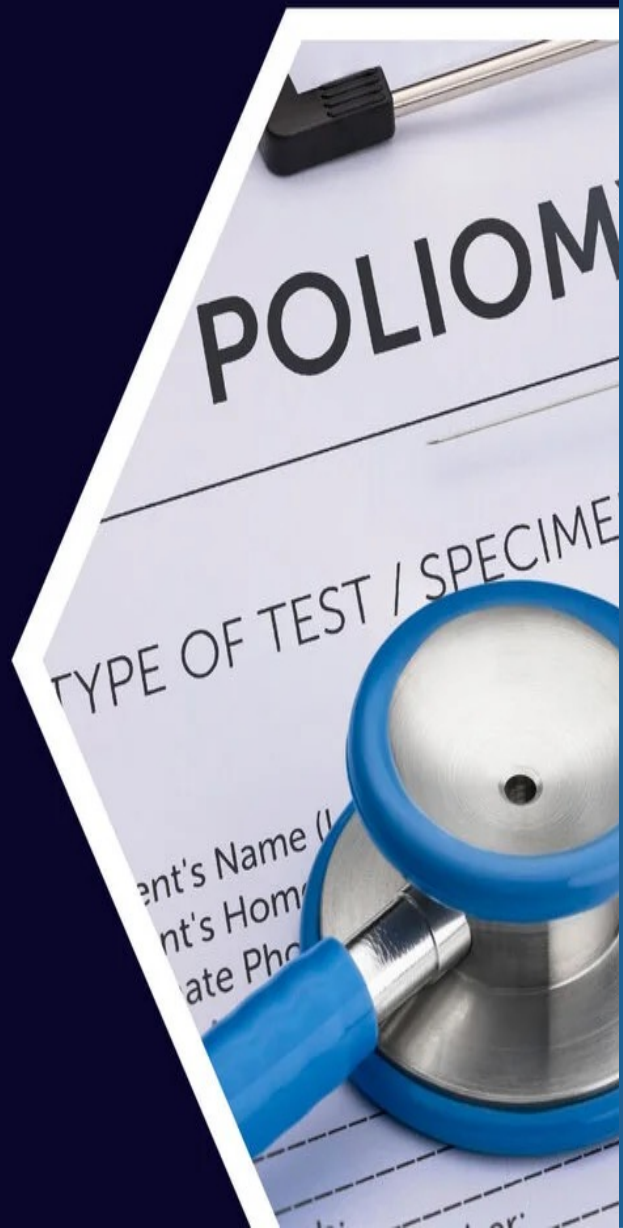
11:00 AM (EDT)



LINK

[bit.ly/webinar-PFA-2023](https://bit.ly/webinar-PFA-2023)

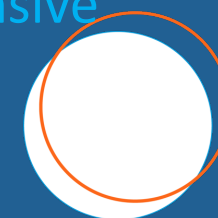
**PAHO**



# AFP Surveillance in the 21st Century

Gloria Rey, Regional Advisor,  
Special Program Comprehensive  
Immunization(CIM)

May 25, 2023



# Content

- The virus and disease
- Progress on polio eradication
- Acute flaccid paralysis surveillance
- Polio situation in the Region of the Americas



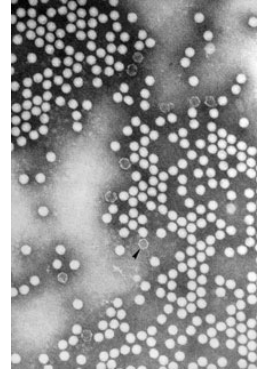
# Polio

## Poliovirus (the agent)

- **Poliovirus** is an RNA virus, member of the genus Enterovirus, *Picornaviridae* family.
- There are three poliovirus serotypes (1, 2 and 3) with minimal immunity between them (heterotypic).
- Poliovirus only infects people.
- Person-to-person transmission: fecal - oral and pharyngeal secretions.

## Poliomyelitis (the disease)

- **Poliomyelitis** is an infectious disease caused by the poliovirus.
- The virus invades the nervous system and can cause permanent paralysis.
- Most people infected (72%) have no symptoms.
- One in 200 infections results in permanent paralysis and can cause death.



# Poliomyelitis

Wild poliovirus  
WPV

Viruses originally present in nature.  
WPV2 and WPV3 have been eradicated.  
WPV1 is endemic in AFG and PAK.  
They are highly transmissible.

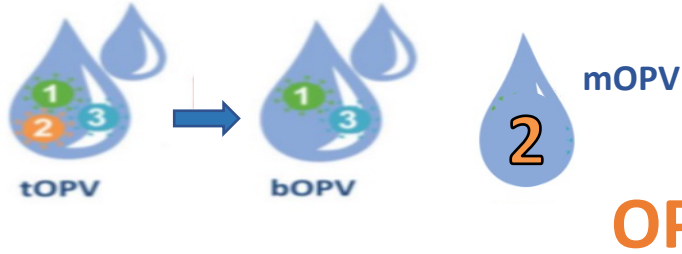
Vaccine-derived poliovirus or VDPV\*.

In communities with low vaccination coverage, the virus mutates and recovers the neurovirulence => VDPV.  
There is a risk of transmission.  
Can be generated in immunodeficient individuals (PID).

## Final classification of VDPV

- **cVDPV** circulating, evidence of H – H transmission.
- **iVDPV** associated with immunodeficiency.
- **aVDPV** ambiguous, the case is immunocompetent and the virus is not genetically related.

# Poliomyelitis vaccines



## IPV



- Licensed in 1963, created by Albert Sabin.
- **Live attenuated** virus vaccine that may contain one, two or three serotypes.
- It is administered orally.
- Provides **humoral immunity and long-term intestinal immunity; effective in stopping transmission.**
- In communities with low vaccination coverage, the virus can mutate and revert to neurovirulent (VDPV) and in rare cases, can cause vaccine-associated paralytic poliomyelitis (VAPP).

- Introduced in 1955, created by Jonas Salk.
- Inactivated vaccine containing the three PV serotypes (1, 2 and 3).
- Administered by intramuscular or intradermal injection (for fIPV).
- No risk of VAPP or VDPV.
- Generates **good humoral immunity** but induces very low levels of antibodies in the intestinal mucosa.
- Protects against paralytic disease but **does not stop intestinal viral replication.**

# Polio Eradication



*Eradiation: permanent decrease to zero of the worldwide incidence of infection caused by a specific agent as a result of deliberate efforts.*

POLIO TYPE 1

A world map where the landmasses are colored in shades of blue, yellow, and orange, representing the geographical distribution of Polio Type 1. The map shows a high concentration of yellow and orange in the tropical and subtropical regions, with blue in the temperate zones.

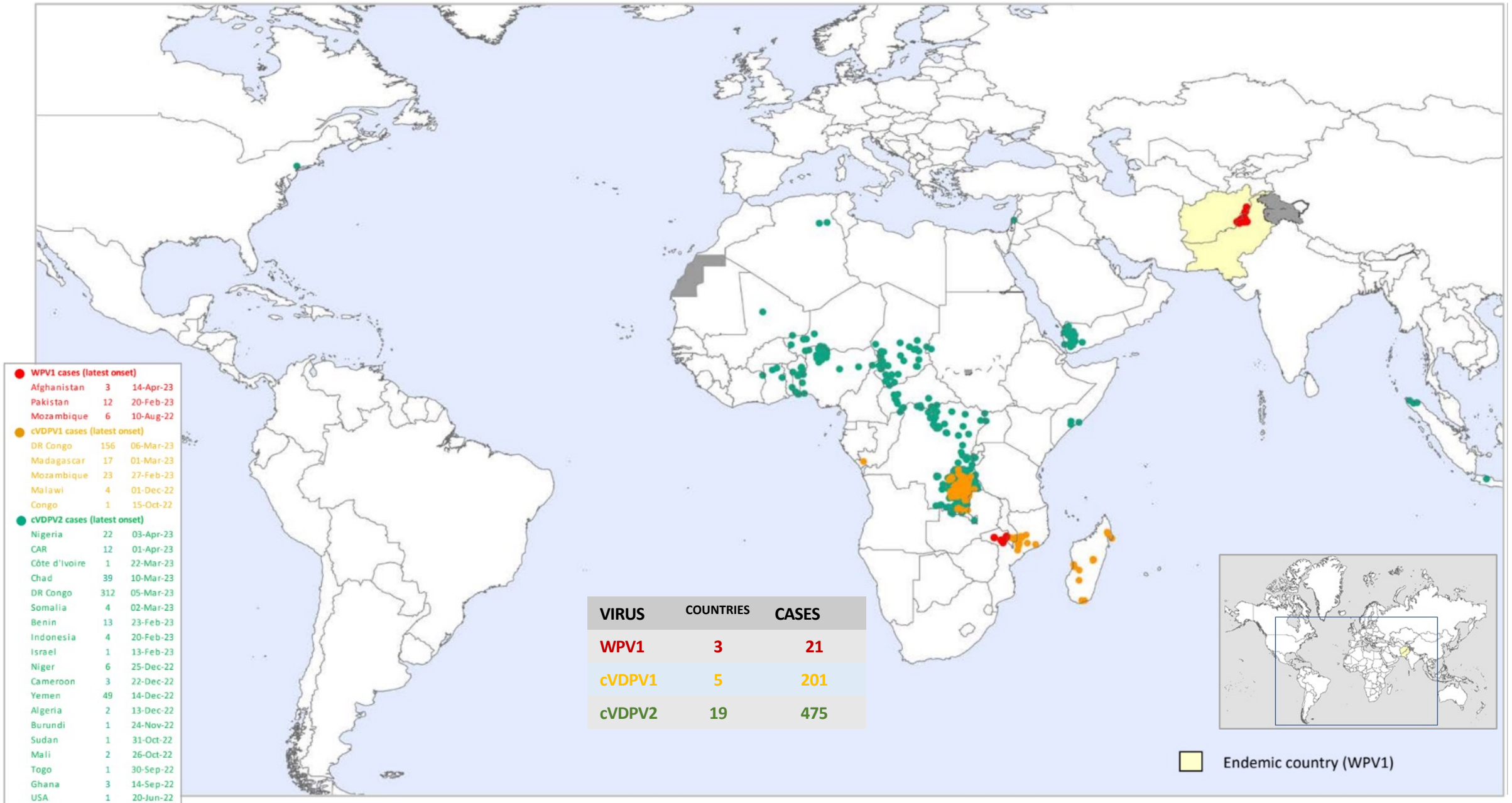
POLIO TYPE 2  
Last case of polio by WPV2 in 1999  
Declared eradicated in September 2015

A world map where the landmasses are colored in shades of blue, yellow, and orange, representing the geographical distribution of Polio Type 2. The map shows a high concentration of yellow and orange in the tropical and subtropical regions, with blue in the temperate zones.

POLIO TYPE 3  
Last case of polio by WPV3 in 2012  
Declared eradicated in October 2019

A world map where the landmasses are colored in shades of blue, yellow, and orange, representing the geographical distribution of Polio Type 3. The map shows a high concentration of yellow and orange in the tropical and subtropical regions, with blue in the temperate zones.

# WPV1 & cVDPV1 polio cases, previous 12 months<sup>2</sup>



<sup>1</sup>Excludes viruses detected from environmental surveillance; <sup>2</sup>Onset of paralysis: 24 May 2022 to 23 May 2023

# Milestones in the eradication of Polio in the Americas

Figure 2. Polio cases in the Americas, 1985



Polio cases, 1985



## EPI Newsletter

Expanded Program on Immunization  
in the Americas

Volume XVI, Number 4 IMMUNIZE AND PROTECT YOUR CHILDREN September 29, 1994

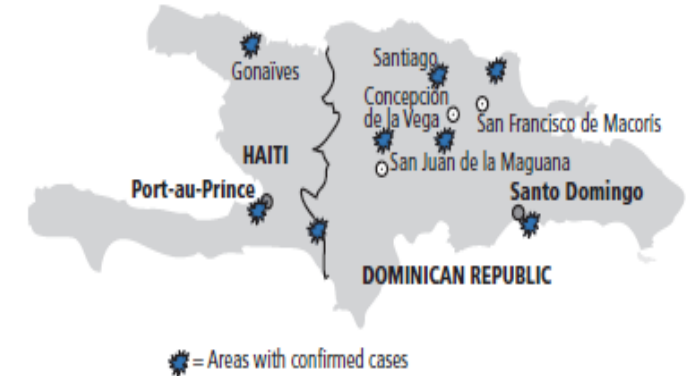
The Americas conquer Polio!



On August 23, 1991, Luis Fermin Tenorio was the last person to suffer from poliomyelitis in the Americas when at the age of two he was infected by the wild polio virus in his town Pichinaki, Peru.

Certified polio-free 1994

Figure 3. Areas in Haiti and the Dominican Republic with confirmed cases of polio, 2000–2001



Source: PAHO, Family and Community Health, Immunization Unit, PESS/HVP. Data through 30 May 2001.

Outbreak of cVDPV1, 2000 - 2001



# Polio Surveillance



**Polio surveillance** is conducted through the acute flaccid paralysis syndrome (AFP).

**Paralysis:** weakness, loss or decrease of movement.

**Flaccid:** loss of muscle tone.

**Acute:** rapid progression of paralysis.

All cases in **children under 15** years of age presenting AFP for any reason except severe trauma, or any person of **any age** in whom poliomyelitis is suspected, should be investigated.

The syndromic definition allows the **surveillance** system to be **sensitive** as it captures polio cases, but also other diseases present in similar ways.

All cases should be thoroughly **investigated** including stool sample collection for laboratory diagnosis.

# Differential diagnoses of poliomyelitis

There are many infectious and non-infectious diseases that can cause paralysis, and therefore be confused with poliomyelitis.

Diagnóstico	Código CIE-10	Código CIE-11
Botulismo	A05.1	8D83 Trastorno del sistema nervioso autónomo por infección ó 1A11.Z Botulismo, sin
Poliomielitis	A80	1C81
Encefalitis (meningoencefalitis viral)	A86.x	8E48 Encefalitis, no clasificada en otra parte
Enfermedad enteroviral del SNC	A88.8	1D91 Infección por enterovirus de localización no especificada
Meningitis aséptica/linfocítica	G03.0	1D01.Y Otro(a)(s) meningitis infecciosa no clasificada en otra parte especificado
Mielitis transversa	G37.3	8A41.0
Síndrome de Guillain Barré	G61.0	8C01.0
Polineuropatía inflamatoria no especificada	G61.9	8C01 Polineuropatía inflamatoria ó 8C01.0 Polineuropatía desmielinizante inflamatoria aguda
Polineuritis no especificada	G62.9	8C0Z Polineuropatía, sin especificación
Otros trastornos del sistema nervioso	G64	
Parálisis flácida muscular	G72.8	4A51 miopatía inflamatoria
Paraplejía flácida	G82.0	MB56 Paraplejía
Paraplejía no especificada	G82.2	
Cuadriplejía flácida	G82.3	
Otros síndromes paralíticos	G83	
Parálisis Flácida Aguda	G83.9	MB5Z
Neuropatía autónoma periférica idiopática	G90	
Osteomielitis	M86.1	
Dificultad para caminar no clasificada en otra parte	R 26.2	
Neuropatía periférica		8C0Z Polineuropatía, sin especificación

# Acute Flaccid Paralysis (AFP) Surveillance in the Americas



## POLIO ERADICATION FIELD GUIDE

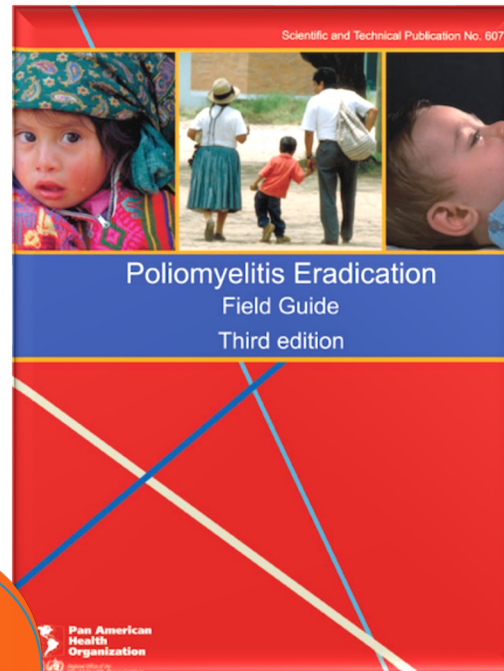
Second Edition

Technical Paper No. 40

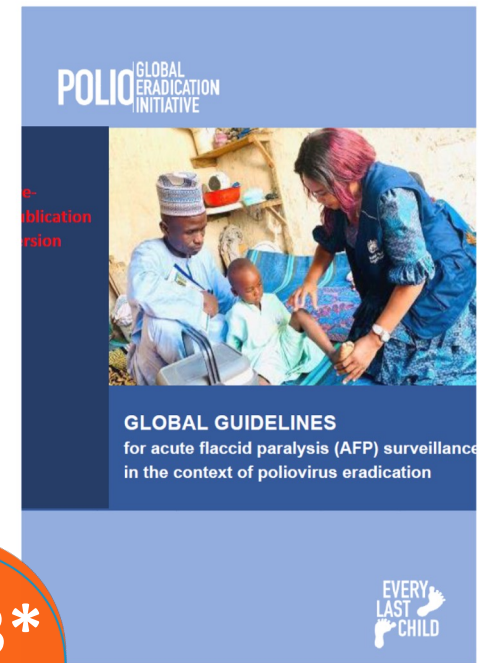


PAN AMERICAN HEALTH ORGANIZATION  
Pan American Sanitary Bureau, Regional Office of the  
WORLD HEALTH ORGANIZATION  
525 Twenty-third Street, N.W.  
Washington, D.C. 20037, U.S.A.

1995

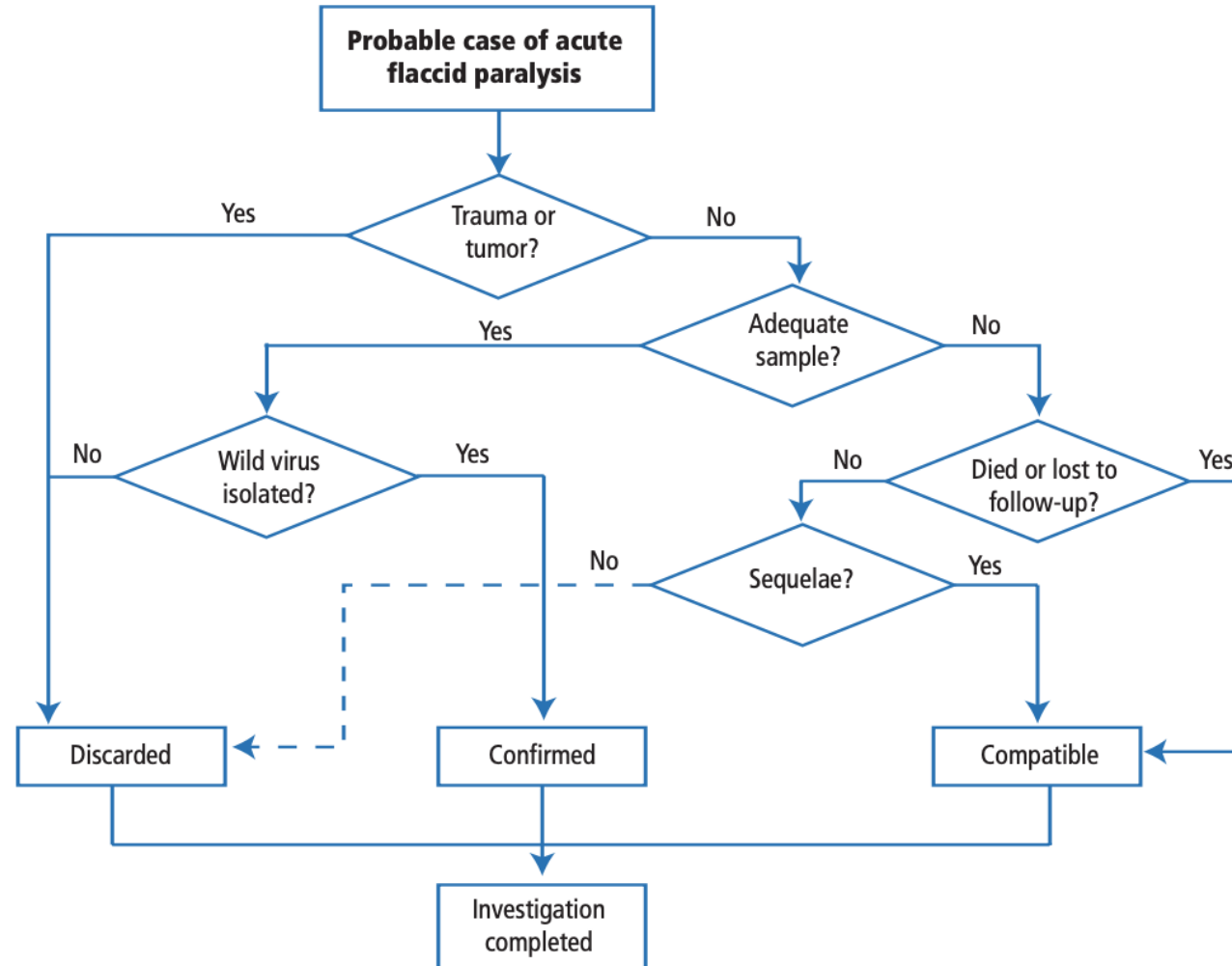
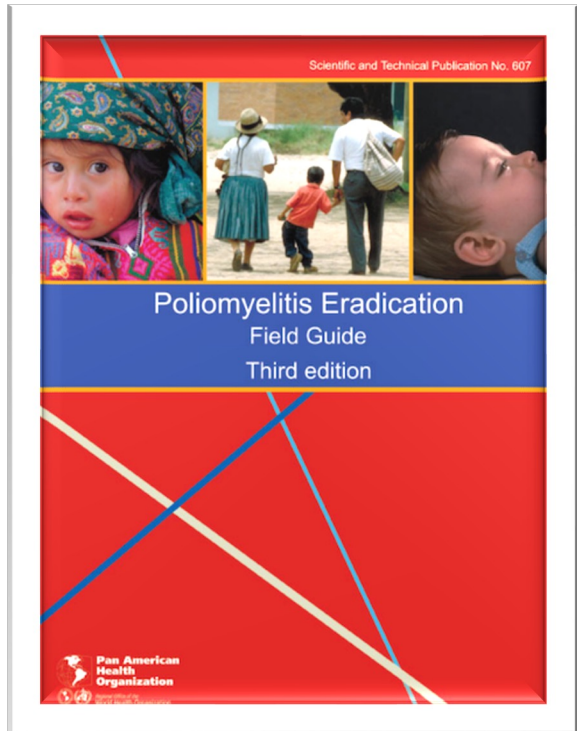


2005

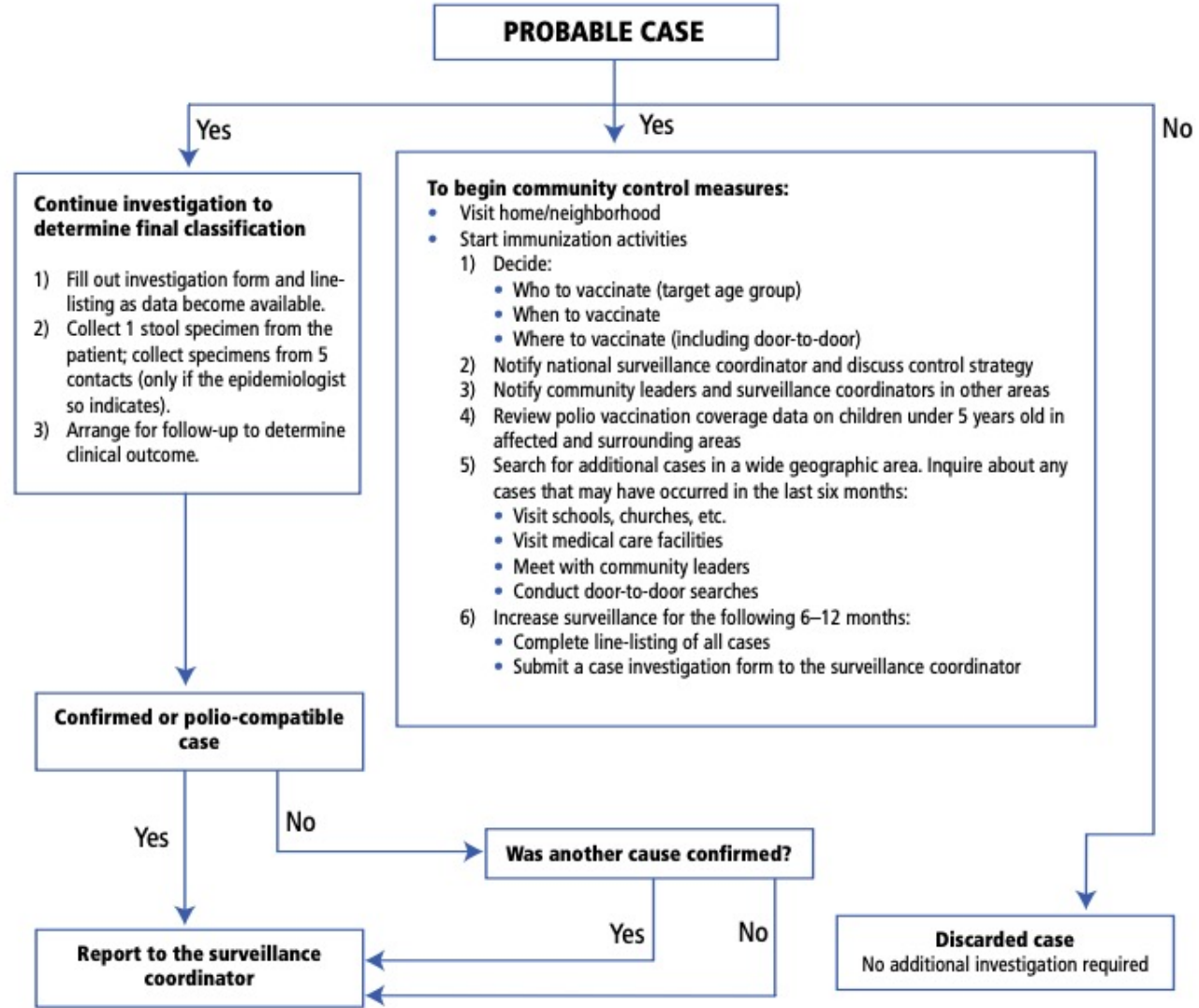
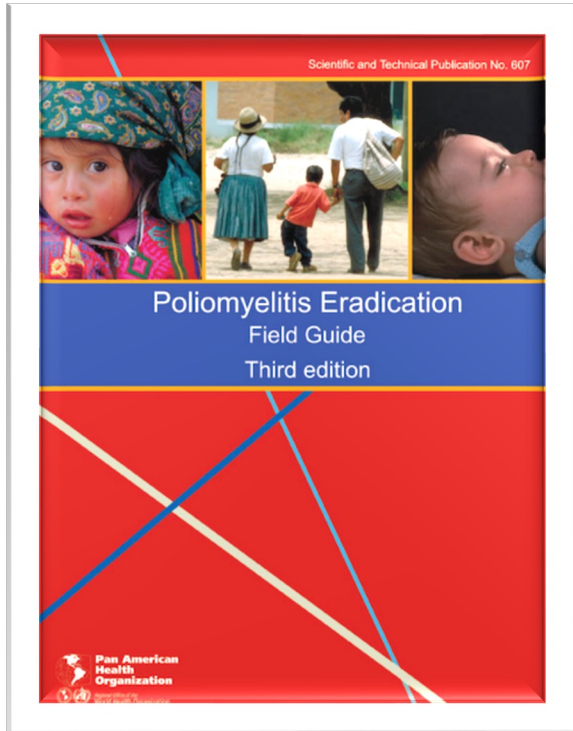


2023\*

# Investigation of a suspected case of poliomyelitis



# Decision tree for case investigation

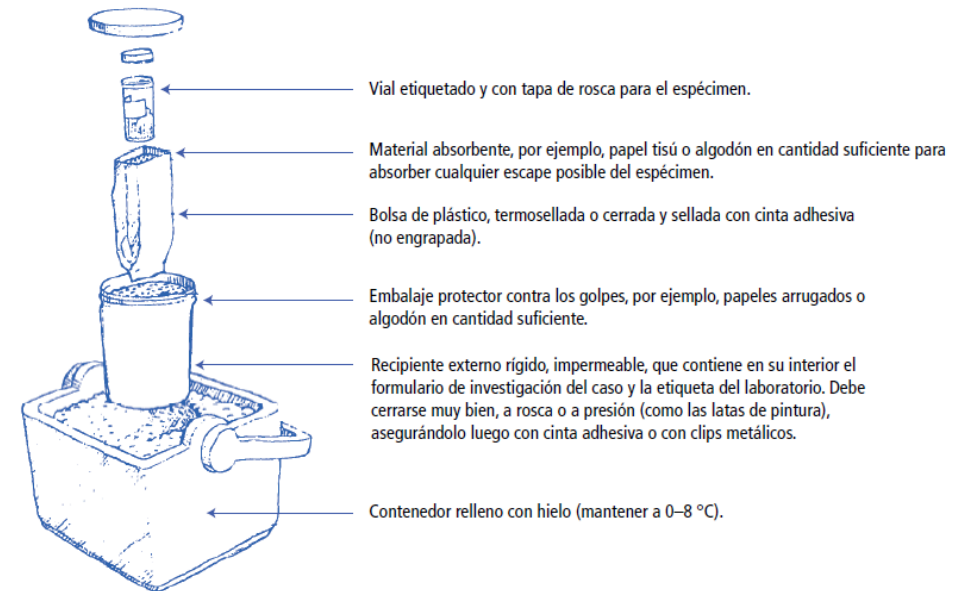


# Obtaining samples for laboratory diagnosis

- Obtain a stool sample within 14 days of the onset of paralysis.
- Use a clean, empty container to collect 8 g of stool (two-inch size).
- Label all samples (case or contact name, case number, date of sample obtained).
- Refrigerate samples immediately after collection (4 - 8 oC).
- *Rectal swab is a non-suitable sample.*



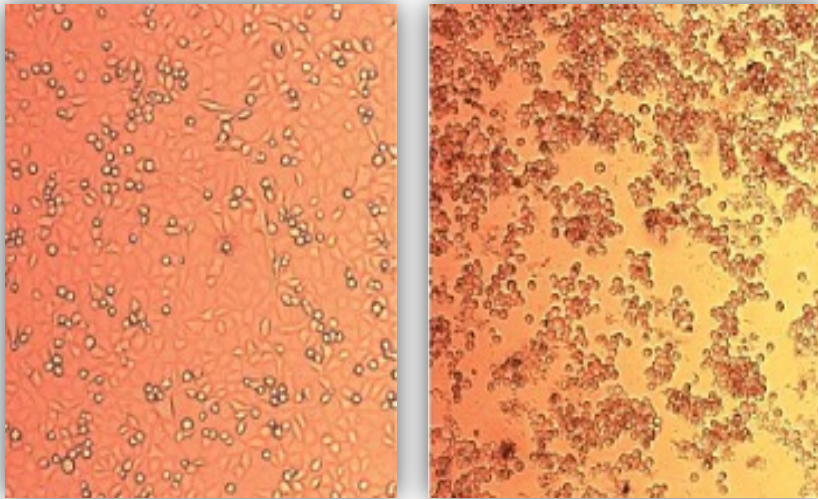
## Packaging of biological samples



# Laboratory diagnosis of poliovirus

1

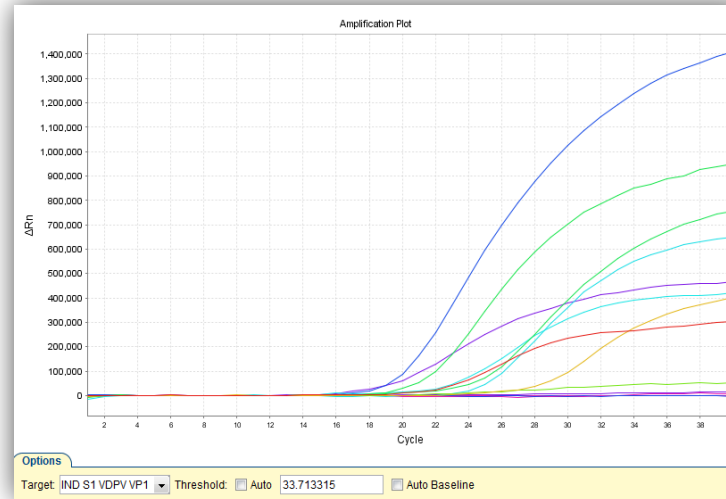
## Virus Isolation in Cell Cultures



Timely reporting of results = 14 days

2

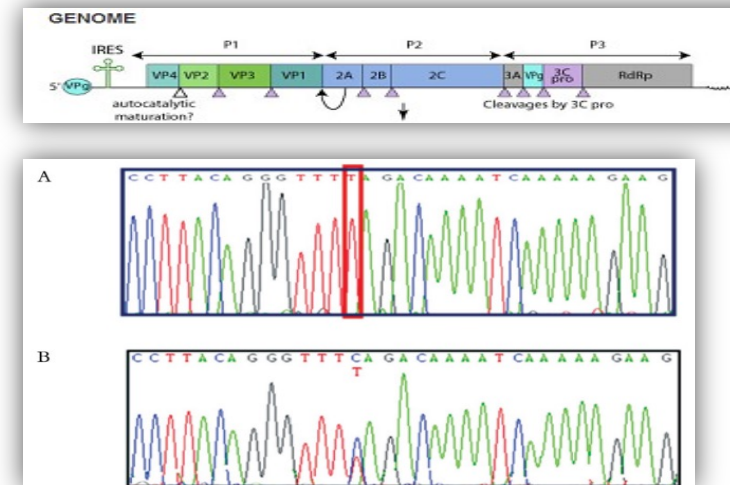
## Intratypic differentiation of poliovirus



Timely reporting of results = 7 days

3

## Genetic sequencing of VP1 region



Timely reporting of results = 7 days

# AFP Surveillance, case definitions



1

## Probable case

Any person under 15 years of age presenting AFP, for any reason except severe trauma, or any person of any age in whom poliomyelitis is suspected.

2

## Confirmed case

Acute flaccid paralytic disease associated with isolation of wild poliovirus (or derived poliovirus VDPV), with or without residual paralysis.

3

## Compatible case

Acute paralytic disease with residual polio-like paralysis after 60 days, or failure to follow up or death, in which a stool sample was not obtained within 15 days of paralysis.

4

## Dismissed case

Any case of acute paralytic disease for which an adequate stool sample has been obtained within 14 days of the onset of paralysis and with a negative laboratory result for poliovirus.

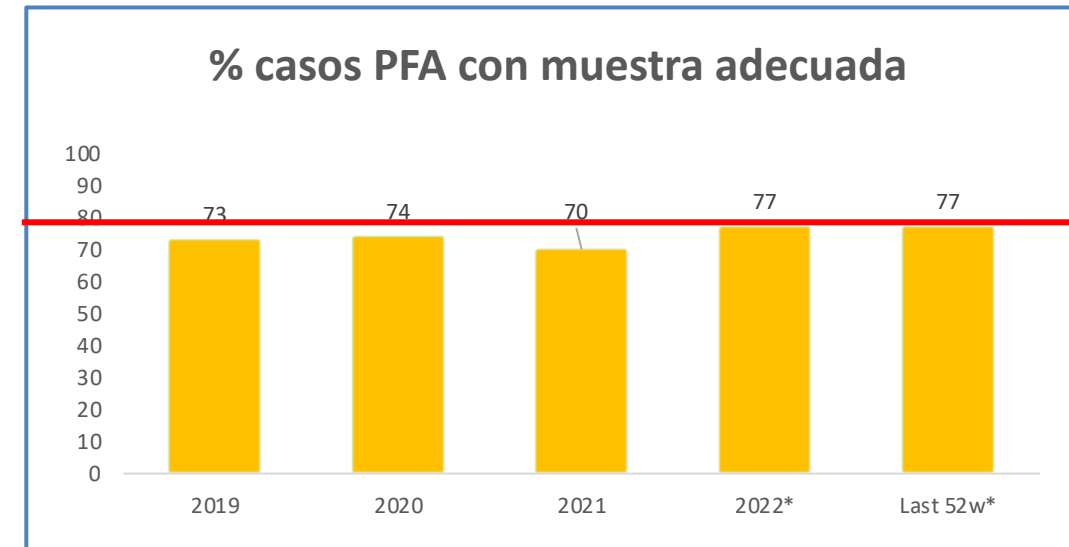
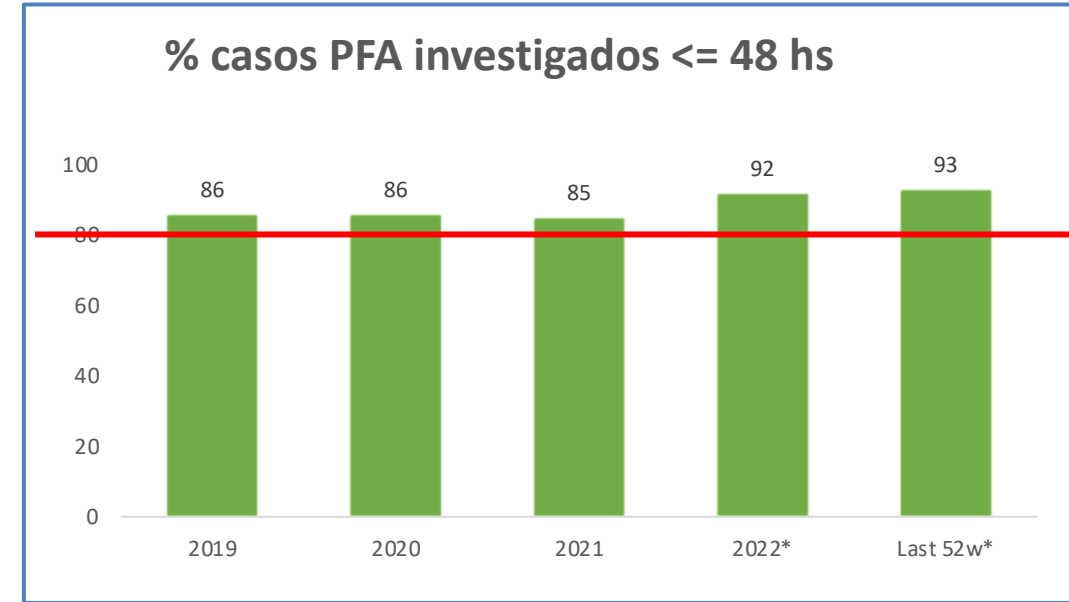
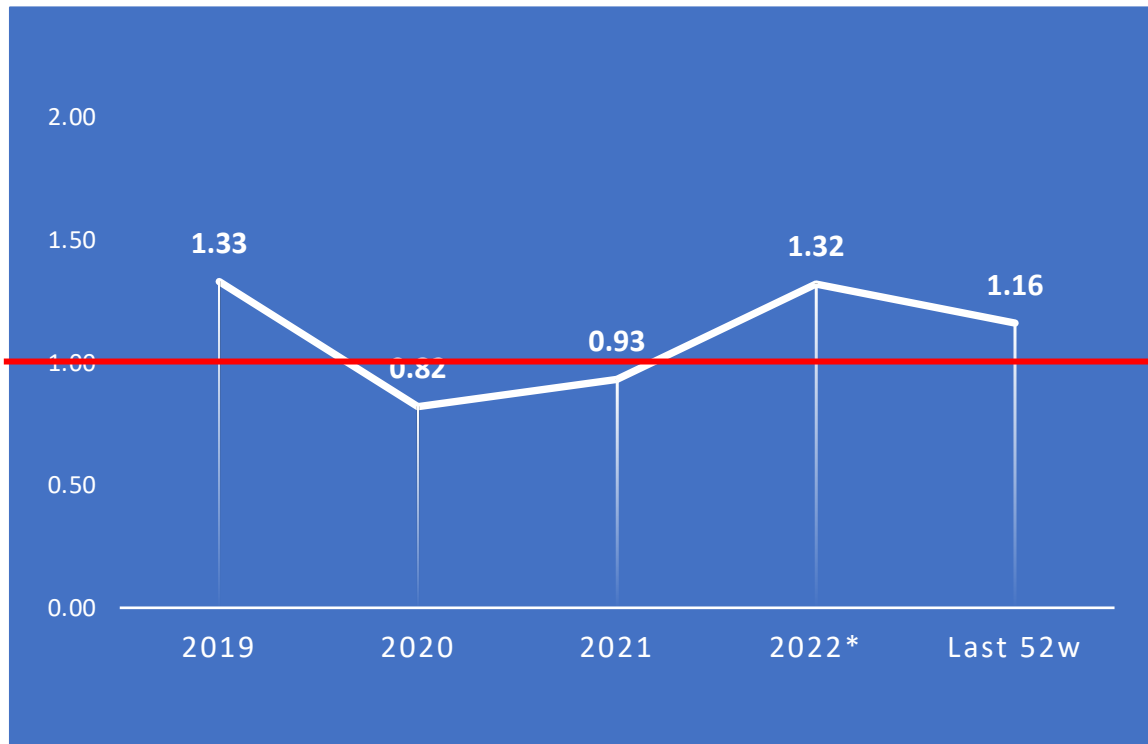


# AFP Surveillance Indicators

Indicator	
System sensitivity	Detection of at least <b>1 case of AFP/100,000 children under 15 years of age.</b>
Adequate investigation of the case	<b>≥80%</b> of cases <b>investigated</b> (clinical, epidemiological) within 48 hours of notification.
Adequate stool sample	<b>≥80%</b> of cases had adequate stool samples collected for enterovirus detection (within <b>14</b> days of onset of paralysis)
Case follow-up	<b>≥80%</b> of investigated AFP cases will be clinically evaluated within <b>60</b> days of onset of paralysis.

# AFP Surveillance Indicators, Region of the Americas 2019 – 2022\*

Tasa anual de casos de PFA



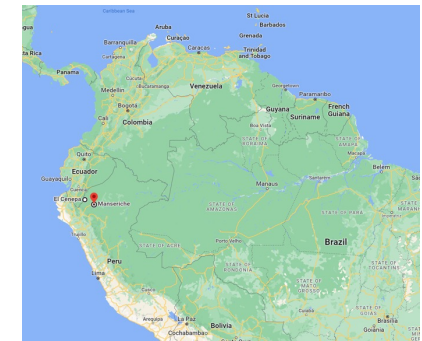
# Polio Cases in the Americas, 2022-2023

## Case of cVDPV2 Polio in NY, USA

- In an unimmunized immunocompetent young adult with no history of travel during the exposure period.
- Provenance: Rockland County, NY State
- Onset of paralysis: June 20, 2022
- Notification to PAHO/WHO: 21 July 2022
- Classification as cVDPV2: 10 Sept 2022
- GPLN confirmed genetic linkage of virus to cVDPV2 detected in UK and Israel.

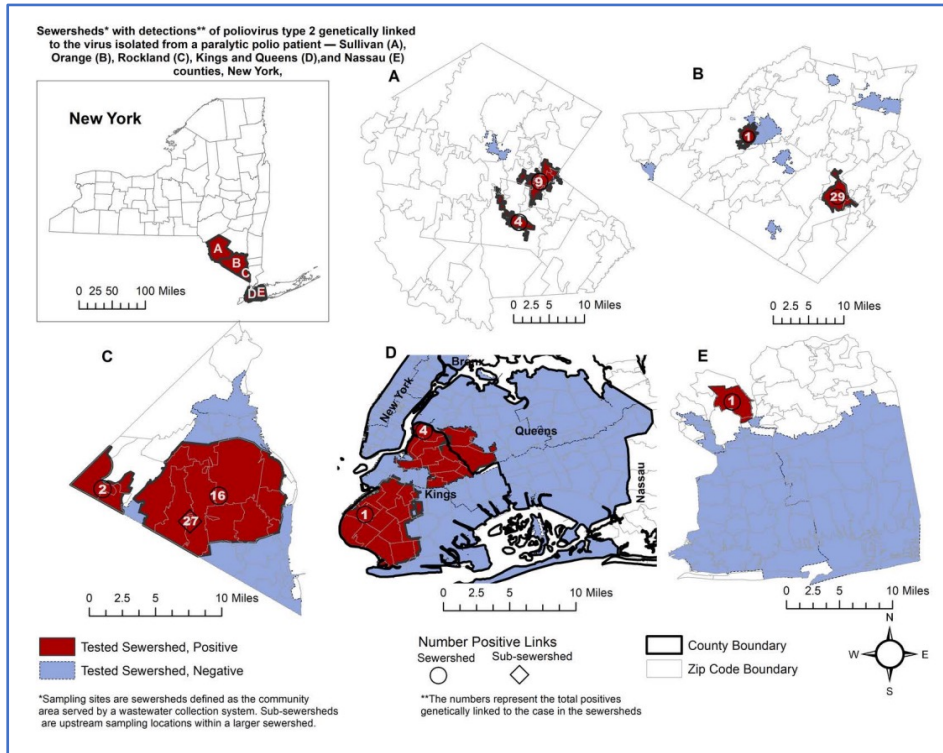
## Case of polio due to VDPV1 in Loreto, PER

- Male, **14 months old**, with no history of vaccination or travel history.
  - Origin: Manseriche district, department of Loreto.
  - Onset of paralysis: December 29, 2022.
  - Stool sample collection: January 18, 2022
  - VDPV1 confirmation: March 21, 2023
- Investigation and clinical evaluation of the case ruled out primary immunodeficiency.



# Detection of cVDPV2 in wastewater, USA and Canada, 2022

## Detection of PV2 in wastewater, NYS



Source: [https://health.ny.gov/diseases/communicable/polio/docs/waste\\_water\\_surveillance\\_report.pdf](https://health.ny.gov/diseases/communicable/polio/docs/waste_water_surveillance_report.pdf)

## cVDPV2 in wastewater, Quebec, CAN

- Notification to PAHO/WHO 06 Jan 2023, detection of VDPV2 in two samples collected in August 2022
- CDC confirmed genetic linkage to cVDPV2 case detected in Rockland, NYS
- No confirmed cases of polio or increase in AFP cases have been observed in the province of Quebec.
- Ambiguous, case is immunocompetent and the virus is not genetically related.

No confirmed cases of poliomyelitis or an increase in AFP cases have been observed in the province of Quebec in 2022.

Source: Canada IHR National Focal Point

# Polio Bulletin



## Polio Bulletin

Comprehensive Immunization Program (CIM)  
Acute Flaccid Paralysis Surveillance in the Americas

Vol. 38, No. 17-18

Week ending 6 May 2023



Sub Region	Country	Population <15 years*	Expected AFP cases	Reported AFP cases 2023/18
AND	BOL	3,530,417	35	5
	COL	11,121,585	111	47
	ECU	4,880,846	49	0
	PER	8,247,308	82	20
	VEN	7,603,501	76	22
BRA	BRA	43,505,408	435	1
	CRI	1,053,428	11	0
	GTM	6,033,767	60	28
	HND	3,026,923	30	10
	NIC	1,946,204	19	12
CAP	PAN	1,156,102	12	3
	SLV	1,704,629	17	15
	CAR	1,798,300	18	0
	CLB	1,766,424	18	2
	DOM	2,973,499	30	0
LAC	HTI	3,707,407	37	0
	MEX	33,108,878	331	172
	CAN	6,016,679	60	0
	USA	60,604,372	606	NR
	ARG	11,095,716	111	0
SOC	CHL	3,626,085	36	0
	PRY	2,070,528	21	11
	URY	703,696	7	0
	Total	221,281,702	2212	348

\* 2022 UN population estimated Rev 2019. NR - No reporting. - No data

Sub Region	Country	Polio 2023					Polio 2022								
		AFP Cases and indicators, last 52 weeks (2022/19 - 2023/18)		AFP Cases and indicators, 2022 (2022/1 - 2022/52)			Confirmed		Compatible						
		Confirmed	Compatible	Cases	Rate	% Inv. <48 hrs.	% Adeq. spec.*	% Sites reporting	Cases	Rate	% Inv. <48 hrs.	% Adeq. spec.**	% Sites reporting		
AND	BOL	0	0	40	1.13	98	90	0	0	43	1.22	98	88	...	
	COL	0	0	146	1.31	79	90	97	0	150	1.35	83	93	97	
	ECU	0	0	24	0.49	83	75	...	0	33	0.68	79	70	...	
	PER	0	0	47	0.57	77	60	6	0	45	0.55	71	51	6	
	VEN	0	0	108	1.42	99	91	...	0	6	131	1.72	99	93	...
BRA	BRA	0	0	444	1.02	97	68	75	0	1	607	1.40	98	65	86
	CRI	0	0	9	0.85	89	89	...	0	13	2.23	92	92	100	...
	GTM	0	0	71	1.18	100	34	75	0	0	60	0.99	100	48	74
	HND	0	0	36	1.19	81	92	86	0	0	40	1.32	78	90	83
	NIC	0	0	29	1.49	93	86	...	0	0	24	1.23	88	92	...
CAP	PAN	0	0	14	1.21	79	93	87	0	0	17	1.47	65	82	89
	SLV	0	0	38	2.23	87	97	81	0	0	38	2.23	66	100	89
	CAR	0	0	7	0.39	14	57	58	0	0	7	0.39	14	57	59
	CLB	0	0	18	1.02	94	100	100	0	0	29	1.64	100	100	100
	DOM	0	0	6	0.20	33	...	0	0	8	0.27	25	...	...	
LAC	HTI	0	0	11	0.30	82	45	91	0	0	14	0.38	86	50	90
	MEX	0	0	629	1.90	100	87	95	0	0	627	1.89	100	90	95
	CAN	0	0	10	0.17	...	10	...	0	0	13	0.22	...	8	...
	USA*	NR	NR	NR	NR	NR	NR	NR	1	NR	NR	NR	NR	NR	NR
	ARG	0	0	96	0.87	89	38	...	0	0	147	1.52	77	40	...
SOC	CHL	0	0	34	0.94	65	82	77	0	0	48	1.32	71	81	73
	PRY	0	0	41	1.98	100	90	95	0	0	39	1.88	97	95	94
	URY	0	0	0	...	...	...	...	0	0	0	...	...	...	...
	Total	0	0	1858	1.16	93	77	...	1	7	2133	1.32	92	77	...

\* Taken within 14 days of onset of paralysis. NR - No reporting. - No data. CARL includes reports from all CARPHA member countries.  
\* A polio case caused by a cVDPV2 was confirmed in the USA in an unvaccinated 20-year-old male. The date of paralysis onset was June 20, 2022 and two samples were collected on 28 and 29 June 2022. The samples were received at CDC on 20 July 2022 and preliminary ITD results were reported on 21 July 2022. Final results were reported on 8 August 2022. The USA does not report disaggregated data; therefore, the tables of the bulletin do not include the information from this case.

Only data for AFP cases in children < 15 years shown on Table 1 and 3

Issues of the Polio Bulletin can be accessed at: <https://www.paho.org/en/polio-bulletin>



## Poliovirus Surveillance in the Americas

Vol. 38, No. 17-18

Week ending 6 May 2023



Table No.1  
Virus isolation results and indicators, last 52 weeks  
Epidemiological weeks 2022/19 - 2023/18

Lab.	Country	Number of specimens from AFP cases	Virus Isolation Test													
			Pending results			With results					Timing of isolation results					
			Not yet in lab.	Received <14 Days	Received >14 Days	Only poliovirus	Poliovirus & NPEV	Only NPEV	Negative	Others	Inadequate	% Positive specimens for NPEV	Total specimens with results	Total with reception & result dates	% Results < 14 days	
CAR	BLZ	3	0	0	0	0	0	0	0	3	0	0	0	3	3	100
	GTM	2	0	0	0	0	0	0	0	2	0	0	0	2	2	100
	HND	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0
	HTI	11	7	0	0	0	0	1	3	0	0	25	4	3	100	
	JAM	3	0	0	0	0	0	0	2	1	0	0	3	2	100	
FIO	NIC	28	8	0	0	0	0	1	19	0	0	5	20	20	35	
	PAN	14	3	0	0	0	0	0	11	0	0	0	11	11	91	
	BOL	35	0	0	0	0	0	6	29	0	0	17	35	35	0	
	CRI	9	0	0	5	0	0	0	4	0	0	4	4	4	25	
	GTM	69	21	0	2	0	0	0	46	0	0	0	46	46	15	
CDC	HND	29	0	0	0	0	0	2	26	0	0	7	28	28	93	
	PRY	43	8	0	1	1	0	2	31	0	0	9	34	34	71	
	SLV	38	0	1	3	0	0	0	34	0	0	0	34	34	0	
	BRA	332	4	0	10	5	0	9	304	0	0	4	318	317	47	
	PER	25	0	0	1	1	0	0	23	0	0	4	24	24	75	
IEC	BRA	59	2	0	3	2	0	2	50	0	0	7	54	53	58	
	MEX	568	8	8	4	0	0	57	491	0	0	10	548	548	100	
	VEN	106	11	0	1	0	0	3	91	0	0	3	94	94	29	
	COL	145	0	2	0	0	0	6	137	0	0	4	143	143	90	
	INS	23	0	0	0	0	0	0	22	0	0	0	22	22	82	
MAL	IPK	18	1	0	2	0	0	3	12	0	0	20	15	15	80	
	CHL	36	0	0	0	0	0	1	35	0	0	3	35	35	89	
	ARG	70	0	0	0	0	0	2	68	0	0	3	70	69	83	
	ARG	1	0	0	0	0	0	0	1	0	0	1	1	1	100	
	BOL	23	23	0	0	0	0	0	0	0	0	0	0	0	0	0
(no lab name)	BRA	2	1	0	0	0	0	0	1	0	0	1	1	1	100	
	CAN	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	ECU	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	HND	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0
	PER	13	13	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1717	121	11	32	9	0	95	1446	1	0	7	1550	1544	72		

... No data. Only stool specimens from AFP cases < 15 years shown

Table No.2  
Status of Intratypic Differentiation (ITD) testing for specimens with isolated poliovirus, last 52 weeks  
Epidemiological weeks 2022/19 - 2023/18

Lab.	Country	Number of poliovirus isolated	Poliovirus Intratypic Differentiation Results									ITD Indicators					
			Sabin			VDPV			Wild			Pending ITD results	Number of specimens with ITD results	ITD Results w/ reception or deflection and results dates	% ITD results < 7 days of reception or detection	% ITD results < 45 days of onset of paralysis	% ITD results < 60 days of onset of paralysis
			P1	P2	P3	P1	P2	P3	P1	P2	P3						
CDC	PRY	1	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0
	USA	2	0	0	0	2	0	0	0	0	0	0	2	2	100	100	100
FIO	BRA	7	1	0	4	0	0	0	0	0	0	5	5	40	80	80	
	PER	1	0	0	1	0	0	0	0	0	0	0	1	1	100	0	0
IEC	BRA	2	0	0	2	0	0	0	0	0	0	2	2	100	100	100	
	Total	13	1	0	7	1	2	0	0	0	0	0	11	11	64	73	73

Issues of the Polio Bulletin can be accessed at: <https://www.paho.org/en/polio-bulletin>

## Polio Bulletin



<https://www.paho.org/es/boletin-semanal-polio>

# GTA Recommendations

1. Countries should make an effort to improve the performance of AFP surveillance indicators to avoid undiagnosed cases of paralysis caused by poliovirus.
2. Countries with a very high risk of outbreaks should consider collecting a second stool sample on a temporary basis while they strengthen their immunization program and surveillance system.
3. If a stool sample cannot be collected from the AFP case within 14 days of the onset of paralysis, or if the sample arrives at the laboratory in poor condition, it is recommended that a sample from three contacts be collected.

# The commitment to keep the region polio-free

## Resolution CSP30.R13, September 2022



### 30.<sup>a</sup> CONFERENCIA SANITARIA PANAMERICANA 74.<sup>a</sup> SESIÓN DEL COMITÉ REGIONAL DE LA OMS PARA LAS AMÉRICAS

Washington, D.C., EUA, del 26 al 30 de septiembre del 2022

CSP30.R13  
Original: inglés

#### RESOLUCIÓN

#### CSP30.R13

MANTENER A LA REGIÓN DE LAS AMÉRICAS  
LIBRE DE POLIOMIELITIS

LA 30.<sup>a</sup> CONFERENCIA SANITARIA PANAMERICANA,

Habiendo examinado el documento *Mantener a la Región de las Américas libre de poliomielitis* (documento CSP30/19, Rev. 1);

Develop and implement a prioritized and targeted mitigation plan based on the recommendations of the GTA and the RCC.

- Increase vaccination coverage
- Improve surveillance
- Ensure adequate preparedness for outbreak response

Engage civil society, community leaders, NGOs, private sector, academia and other stakeholders to move forward and work in a joint and coordinated manner.

The logo features the text 'PAHO' in a vertical stack of white letters on the left. To its right, the number '120' is rendered in a large, bold, white font. The '0' is stylized with a blue and white wavy pattern that resembles a ribbon or a stylized '0'. The word 'th' is positioned to the right of the '0'. Above the '120' is a large orange circle with a white outline, partially overlapping the 'PAHO' text. Below the '120' is the word 'ANNIVERSARY' in a smaller, white, sans-serif font.

PAHO 120<sup>th</sup>

ANNIVERSARY

## Acknowledgment

To all health professionals in the countries of the Region who have collaborated with polio program activities.

To the Ministries of Health for maintaining their commitment to the polio program and sharing information with PAHO/WHO. To the CAN and the NCCs for their ongoing support and recommendations to keep the Region polio-free.

The PAHO logo consists of the letters 'PAHO' in a bold, white, sans-serif font.

PAHO



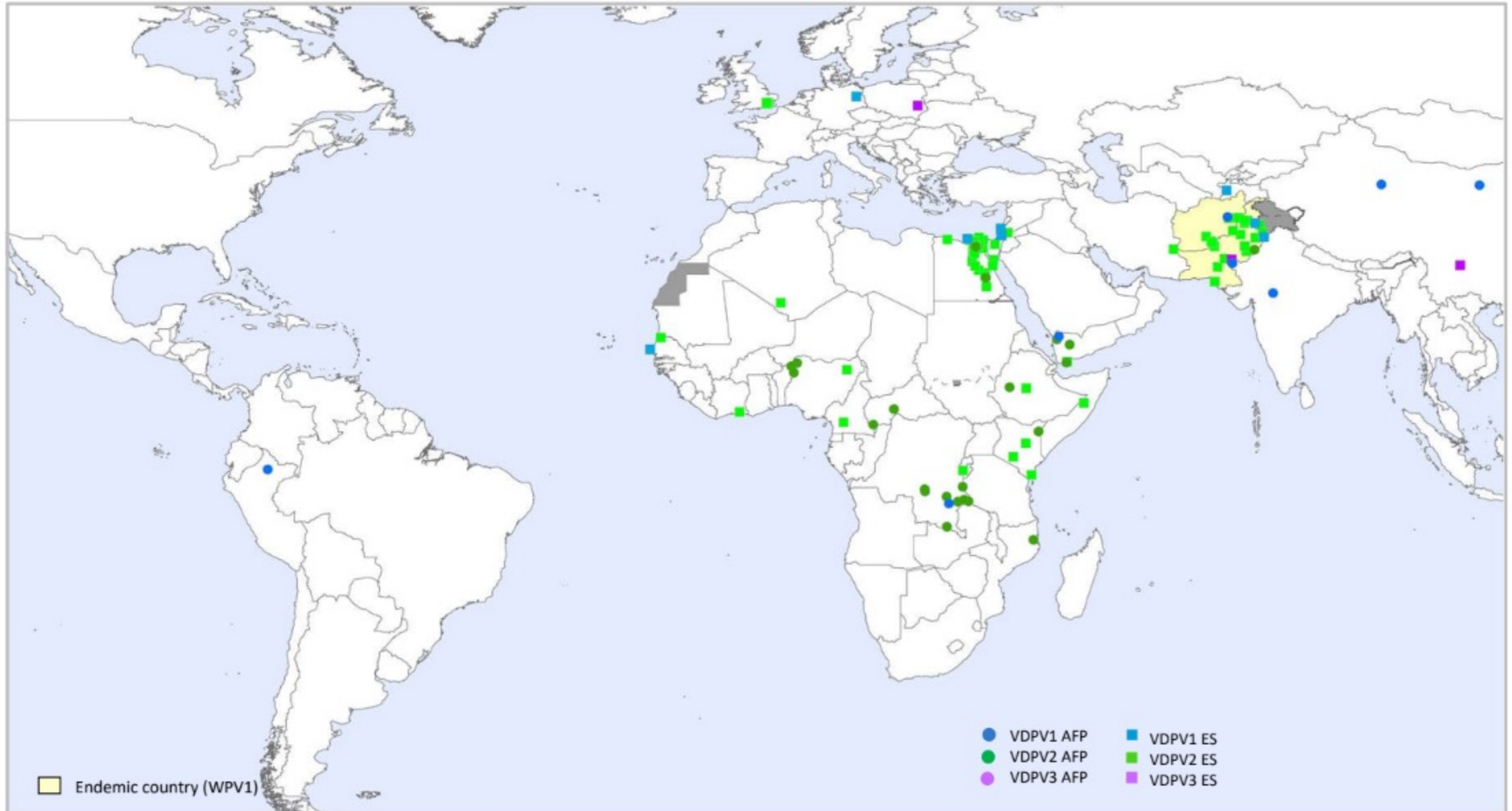
Pan American  
Health  
Organization



World Health  
Organization  
REGIONAL OFFICE FOR THE  
Americas



## Global VDPV1, VDPV2 and VDPV3<sup>1</sup> positive isolates, 2021-2023<sup>2</sup>



<sup>1</sup> includes pending, ambiguous and immunodeficient positive isolates; <sup>2</sup>Onset of paralysis/collection: 01 Jan. 2021 to 23 May 2023