

HIGHLIGHTS

Environmental surveillance for detection of poliovirus in Papua New Guinea

Environmental surveillance (ES) is a key tool in the achievement of polio eradication. Declaration of the cVDPV1 outbreak in Papua New Guinea (PNG) has prompted urgent action to further strengthen surveillance by implementing ES in targeted provinces to supplement AFP surveillance to monitor circulation of poliovirus, as outlined in GPEI recommendations for high risk countries.

A national ES development plan has been prepared in which two cities/provinces have been identified to start with the ES: Lae, Morobe and Port Moresby, National Capital District. Additional support has been requested from the Department of Health in the Philippines for processing and testing of samples in the national polio laboratory at the Research Institute for Tropical Medicine (RITM). On 5 September, two ES samples were collected from two sites in Port Moresby and shipped to RITM in the Philippines for testing.

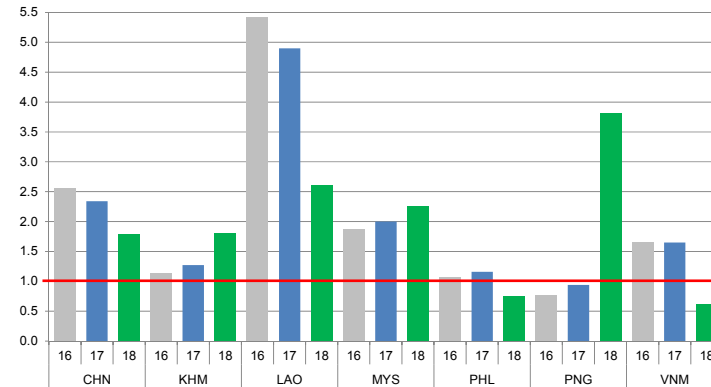
WHO, in collaboration with the National Department of Health in PNG, have conducted ES collection training and site assessments in Lae, from 19 to 20 September. To further strengthen the laboratory capacity in PNG, training for processing of ES samples with two-phase concentration method is organized in RITM from 24 to 26 September for staff from Central Public Health Laboratory in Port Moresby and Angau Memorial Hospital in Lae.



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Chart 1. Non-polio AFP rate (per 100 000 persons < 15 years of age), 2016–2018*



* AFP rate annualized as of week 38

Chart 2. Adequate specimen collection rate, 2016–2018

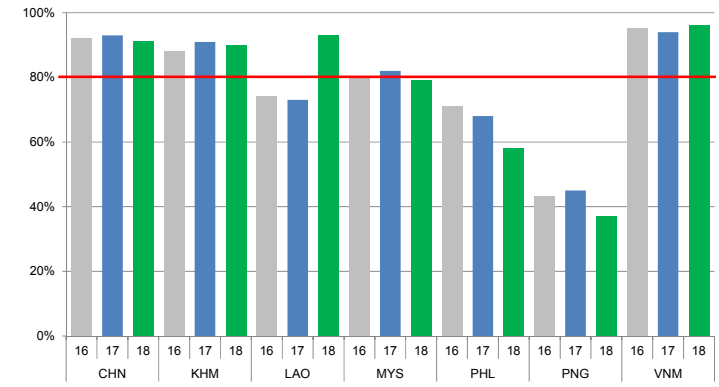


Chart 3. Percentage of reported AFP cases by number of polio vaccination doses, 2018

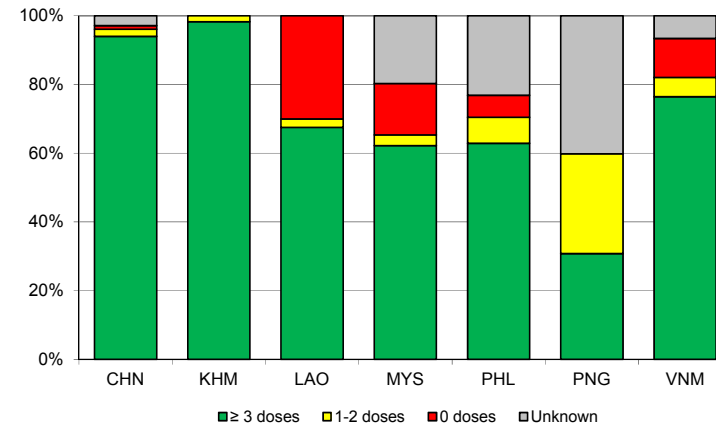
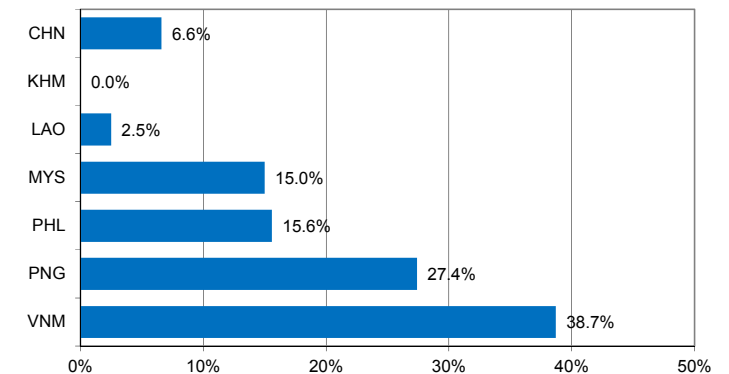


Chart 4. Percentage of reported AFP cases with pending classification > 90 days after onset, 2018



Note: Priority countries were selected for the charts. Official WHO acronyms have been used for abbreviation: CHN (China), KHM (Cambodia), LAO (Lao People's Democratic Republic), MYS (Malaysia), PHL (Philippines), PNG (Papua New Guinea), and VNM (Viet Nam).

Table 1. Classification of AFP cases with onset in 2018 and key surveillance indicators

Country/area	2017	2018												
	Total reported cases	Annual expected cases <15 years of age	Total reported cases	Classification						Indicators			Latest report date	Days since last report ⁵
				Confirmed wild poliovirus	Vaccine-derived poliovirus (VDPV)	Polio-compatible	Discarded (Non-polio)	Pending		Non-polio AFP rate ²	% with adequate specimens ³	% investigated ≤ 2 days of notification ⁴		
								Total	> 90 days ¹ # (%)					
≥ 1	≥ 80%	≥ 80%	≤ 30											
Australia	61	46	44	0	0	2	27	15	4 (9.1%)	1.31	50%	77%	21-Sep-18	4
Brunei Darrusalam	1	1	2	0	0	0	1	1	0 (0.0%)	2.74	100%	100%	03-Sep-18	22
Cambodia	57	44	58	0	0	0	51	7	0 (0.0%)	1.80	90%	86%	21-Sep-18	4
China	5278	2256	2951	0	1	0	2122	828	194 (6.6%)	1.79	91%	100%	19-Sep-18	6
China, Hong Kong SAR	15	9	9	0	0	0	6	3	0 (0.0%)	1.37	89%	78%	19-Sep-18	6
China, Macao SAR	2	1	2	0	0	0	1	1	0 (0.0%)	2.74	100%	100%	18-Sep-18	7
Japan	-	161	-	-	-	-	-	-	-	-	-	-	-	-
Lao People's Democratic Republic	103	21	40	0	0	0	31	9	1 (2.5%)	2.61	93%	73%	24-Aug-18	32
Malaysia	154	77	127	0	0	0	72	55	19 (15.0%)	2.26	79%	72%	19-Sep-18	6
Mongolia	6	9	5	0	0	0	4	1	0 (0.0%)	0.76	100%	80%	07-Sep-18	18
New Zealand	13	9	6	0	0	0	6	0	0 (0.0%)	0.91	67%	100%	31-Aug-18	25
Papua New Guinea	29	37	117	0	14	0	15	88	32 (27.4%)	3.81	37%	83%	25-Sep-18	0
Philippines	462	338	186	0	0	0	135	51	29 (15.6%)	0.75	58%	94%	17-Aug-18	39
Republic of Korea	68	67	41	0	0	0	31	10	0 (0.0%)	0.84	88%	100%	11-Sep-18	14
Singapore	7	6	8	0	0	0	8	0	0 (0.0%)	1.82	88%	100%	10-Sep-18	15
Viet Nam	385	234	106	0	0	0	50	56	41 (38.7%)	0.62	96%	87%	30-Aug-18	26
Pacific island countries and areas	16	11	1	0	0	0	1	0	0 (0.0%)	0.12	0%	100%	24-Aug-18	32
Total	6657	3327	3703	0	15	2	2561	1125	320 (8.6%)	1.52	87%	97%		

1. Number (%) of reported cases pending classification more than 90 days from date of onset of paralysis to date of last report
2. Annualized non-polio AFP rate per 100 000 population under 15 years of age
3. Percentage of reported cases with two stool specimens collected 24 hours apart and within 14 days of onset of paralysis
4. Percentage of reported cases investigated within two days of notification
5. Countries are expected to submit data at least once per month to WPRO

	Reached or surpass target
	Nearly reached target 0.5-0.99 for non-polio AFP rate; 60-79% for other indicators
	Substantially below target

Table 2. Laboratory investigation of stool samples from AFP cases with onset in 2018 and key laboratory indicators

Country/area	Poli laboratory	Total no. of AFP cases with specimens	Results of virus isolation for AFP cases										Intratyptic differentiation/ Sequencing laboratory ¹	No. of isolates received	Results of intratyptic differentiation (ITD)/sequencing for virus isolates															
			L20B positive	L20B positive + NPEV	NPEV only	Negative	Pending ≤ 14 days	Pending > 14 days	% results reported ≤ 14 days	% specimens positive for NPEV	Latest report date	Type 1			Type 2			Type 3			NPEV ²	Pending ITD	Discordant pending sequencing	% ITD results reported ≤ 7 days of receipt						
												Wild			Sabin	VDPV	Wild	Sabin	VDPV	Wild					Sabin	VDPV				
Australia	VIDRL	34	0	0	1	28	3	2	93%	4%	21-Sep-18	VIDRL	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brunei Darussalam	VIDRL	2	0	0	0	2	0	0	50%	0%	10-Sep-18	VIDRL	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cambodia	NIID	54	0	0	11	43	0	0	98%	19%	10-Sep-18	NIID	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
China (total)		2902	19	0	245	2588	0	50	97%	7%	19-Sep-18		60	0	10	0	0	0	0	0	42	8	0	0	0	0	0	0	0	100%
China, Anhui	Prov. Lab	163	1	0	13	141	0	8	100%	8%		Prov. Lab/CCDC	6	0	2	0	0	0	0	0	4	0	0	0	0	0	0	0	0	100%
China, Beijing	Prov. Lab	22	0	0	0	22	0	0	100%	0%		Prov. Lab/CCDC	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
China, Chongqing	Prov. Lab	21	0	0	2	18	0	1	85%	8%		Prov. Lab/CCDC	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
China, Fujian	Prov. Lab	112	1	0	11	100	0	0	100%	8%		Prov. Lab/CCDC	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	100%
China, Gansu	Prov. Lab	63	1	0	2	56	0	4	100%	3%		Prov. Lab/CCDC	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	100%
China, Guangdong	Prov. Lab	245	1	0	15	228	0	1	92%	5%		Prov. Lab/CCDC	4	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	100%
China, Guangxi	Prov. Lab	118	1	0	12	104	0	1	97%	10%		Prov. Lab/CCDC	2	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	100%
China, Guizhou	Prov. Lab	90	0	0	7	78	0	5	99%	8%		Prov. Lab/CCDC	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
China, Hebei	Prov. Lab	165	0	0	23	141	0	1	100%	11%		Prov. Lab/CCDC	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
China, Heilongjiang	Prov. Lab	65	0	0	2	63	0	0	100%	3%		Prov. Lab/CCDC	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
China, Henan	Prov. Lab	333	1	0	45	287	0	0	100%	12%		Prov. Lab/CCDC	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	100%
China, Hubei	Prov. Lab	93	0	0	7	86	0	0	99%	8%		Prov. Lab/CCDC	4	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	100%
China, Hunan	Prov. Lab	137	0	0	18	119	0	0	99%	11%		Prov. Lab/CCDC	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
China, Jiangsu	Prov. Lab	103	5	0	10	87	0	1	100%	9%		Prov. Lab/CCDC	15	0	0	0	0	0	0	7	8	0	0	0	0	0	0	0	0	100%
China, Jiangxi	Prov. Lab	94	0	0	4	86	0	4	97%	3%		Prov. Lab/CCDC	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	100%
China, Jilin	Prov. Lab	33	2	0	4	27	0	0	100%	9%		Prov. Lab/CCDC	8	0	4	0	0	0	0	4	0	0	0	0	0	0	0	0	0	100%
China, Neimongol	Prov. Lab	52	2	0	2	48	0	0	98%	3%		Prov. Lab/CCDC	4	0	1	0	0	0	0	3	0	0	0	0	0	0	0	0	0	100%
China, Ningxia	Prov. Lab	12	0	0	1	11	0	0	100%	8%		Prov. Lab/CCDC	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
China, Shaanxi	Prov. Lab	55	0	0	2	52	0	1	87%	3%		Prov. Lab/CCDC	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
China, Shandong	Prov. Lab	237	2	0	20	213	0	2	100%	6%		Prov. Lab/CCDC	3	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	100%
China, Shanghai	Prov. Lab	18	0	0	0	18	0	0	100%	0%		Prov. Lab/CCDC	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
China, Shanxi	Prov. Lab	80	0	0	0	80	0	0	95%	0%		Prov. Lab/CCDC	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
China, Sichuan	Prov. Lab	165	0	0	5	147	0	13	97%	3%		Prov. Lab/CCDC	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
China, Tianjin	Prov. Lab	15	0	0	0	15	0	0	100%	0%		Prov. Lab/CCDC	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
China, Xinjiang	Prov. Lab	82	1	0	6	74	0	1	88%	7%		Prov. Lab/CCDC	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	100%
China, Yunnan	Prov. Lab	156	0	0	23	131	0	2	93%	12%		Prov. Lab/CCDC	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	100%
China, Zhejiang	Prov. Lab	87	1	0	6	79	0	1	100%	7%		Prov. Lab/CCDC	5	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	100%
China, Hainan	Prov. Lab	23	0	0	4	19	0	0	100%	15%		CCDC	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
China, Liaoning	Prov. Lab	39	0	0	0	35	0	4	100%	0%		CCDC	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
China, Qinghai	Prov. Lab	21	0	0	0	21	0	0	100%	0%		CCDC	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
China, Tibet	Prov. Lab	3	0	0	1	2	0	0	60%	20%		CCDC	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
China, Hong Kong SAR	PHLC	9	0	0	0	7	2	0	100%	0%	19-Sep-18	PHLC	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
China, Macao SAR	PHLC	2	0	0	0	2	0	0	100%	0%	19-Sep-18	PHLC	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Japan	NIID	-	-	-	-	-	-	-	-	-	-	NIID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lao People's Democratic Republic	NIID	52	1	0	4	47	0	0	99%	5%	25-Aug-18	NIID	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	100%
Malaysia	IMR	121	0	0	8	113	0	0	92%	5%	30-Aug-18	IMR	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mongolia	PHI	5	0	0	2	3	0	0	100%	40%	14-Sep-18	NIID	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Zealand	IESR	6	0	0	1	5	0	0	100%	17%	18-Sep-18	IESR	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Papua New Guinea	VIDRL	86	24	0	12	44	0	6	63%	12%	20-Sep-18	VIDRL	55	0	10	26	0	0	0	0	19	0	0	0	0	0	0	0	0	100%
Philippines	RITM	284	4	1	13	257	9	0	95%	4%	18-Sep-18	RITM	10	0	2	0	0	0	0	8	0	0	0	0	0	0	0	0	0	100%
Republic of Korea	NIH	41	0	0	4	34	3	0	100%	9%	11-Sep-18	NIH	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Singapore	SGH	9	0	0	2	7	0	0	94%	12%	21-Sep-18	SGH	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Viet Nam (North)	NIHE	126	3	0	14	103	6	0	100%	10%	13-Sep-18	NIHE	4	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	100%
Viet Nam (South)	PI	98	3	0	9	81	5	0	100%	10%	18-Sep-18	PI	6	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	100%
Pacific island countries and areas	VIDRL	1	0	0	0	1	0	0	100%	0%	02-May-18	VIDRL	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total		3832	54	1	326	3365	28	58	97%	7%			136	0	24	26	0	0	0	0	78	8	0	0	0	0	0	0	100%	

1. CCDC (Chinese Center for Disease Control and Prevention, China); IESR (Institute of Environmental Science and Research, New Zealand); IMR (Institute of Medical Research, Malaysia); NIH (National Institute of Health, Republic of Korea); NIHE (National Institute of Hygiene and Epidemiology, Ha Noi, Viet Nam); NIID (National Institute of Infectious Diseases, Japan); PHI (Public Health Institute, Mongolia); PHLC (Public Health Laboratory Center, China, Hong Kong SAR); PI (Pasteur Institute, Ho Chi Minh, Viet Nam); RITM (Research Institute for Tropical Medicine, Philippines); SGH (Singapore General Hospital); VIDRL (Victorian Infectious Diseases Reference Laboratory, Australia)

2. NPEV growing in L20B cells

Table 3. Laboratory confirmation of polio isolates from environmental samples in 2017–2018 ¹

Country/area	Intratyptic differentiation lab ²	2017													2018															
		Total number of samples processed	Total number of samples with polio isolates	Polio isolates									NPEV	Pending ITD	Discordant pending sequencing	Total number of samples processed	Total number of samples with polio isolates	Polio isolates									NPEV	Pending ITD	Discordant pending sequencing	
				Type 1			Type 2			Type 3								Type 1			Type 2			Type 3						
				Wild	Sabin	VDPV	Wild	Sabin	VDPV	Wild	Sabin	VDPV						Wild	Sabin	VDPV	Wild	Sabin	VDPV	Wild	Sabin	VDPV				
Australia	VIDRL	6	2	0	0	0	0	0	1	0	1	0	4	0	0	17	2	0	2	0	0	0	0	0	0	0	0	12	0	0
China (total)		325	188	0	213	0	0	0	0	0	650	0	1158	0	0	151	110	0	153	0	0	0	1	0	379	2	693	0	0	
China, Fujian	Prov. Lab/CCDC	53	22	0	8	0	0	0	0	0	42	0	331	0	0	49	34	0	9	0	0	0	0	0	77	1	382	0	0	
China, Gansu	Prov. Lab/CCDC	12	10	0	10	0	0	0	0	0	29	0	18	0	0	7	5	0	2	0	0	0	0	0	7	0	21	0	0	
China, Guangdong	Prov. Lab/CCDC	48	39	0	18	0	0	0	0	0	87	0	108	0	0	32	27	0	16	0	0	0	0	0	64	1	144	0	0	
China, Guangxi	Prov. Lab/CCDC	36	20	0	22	0	0	0	0	0	36	0	94	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	
China, Heilongjiang	Prov. Lab/CCDC	42	17	0	12	0	0	0	0	0	34	0	112	0	0	9	7	0	1	0	0	0	0	0	16	0	3	0	0	
China, Shandong	Prov. Lab/CCDC	48	28	0	18	0	0	0	0	0	90	0	272	0	0	23	8	0	13	0	0	0	0	0	36	0	61	0	0	
China, Shanghai	Prov. Lab/CCDC	22	18	0	17	0	0	0	0	0	65	0	51	0	0	7	5	0	3	0	0	0	0	0	7	0	25	0	0	
China, Xinjiang	Prov. Lab/CCDC	36	34	0	108	0	0	0	0	0	267	0	115	0	0	24	24	0	109	0	0	0	1	0	172	0	57	0	0	
China, Yunnan	Prov. Lab/CCDC	28	0	-	-	-	-	-	-	-	-	-	57	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	
Malaysia	IMR	24	0	-	-	-	-	-	-	-	-	-	22	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	
Philippines	RITM	40	8	0	1	0	0	0	0	0	7	0	21	0	0	58	3	0	2	0	0	0	0	0	1	0	18	0	0	
Total		395	198	0	214	0	0	0	1	0	658	0	1205	0	0	226	115	0	157	0	0	0	1	0	380	2	723	0	0	

1. Based on year of collection of sample, if available. Otherwise, based on year of receipt at reference laboratory.

2. CCDC (Chinese Center for Disease Control and Prevention, China); IMR (Institute of Medical Research, Malaysia); RITM (Research Institute for Tropical Medicine, Philippines); VIDRL (Victorian Infectious Diseases Reference Laboratory, Australia)

Table 4. Vaccine-derived poliovirus¹ identified from laboratory testing², 2000–2018

Country/area	2000–2009 ³	2010	2011	2012	2013	2014	2015	2016	2017	2018
Australia									aVDPV2 (1 env)	
Cambodia	2006 - 1 Total - 2									
China	2009 - 1 Total - 27	aVDPV2 (3 AFP + 1 contact + 1 non-AFP) aVDPV3 (1 AFP + 1 non-AFP)	aVDPV1 (1 AFP) aVDPV2 (2 AFP + 1 contact) cVDPV2 (2 AFP) iVDPV2 (1 AFP + 1 non-AFP) iVDPV3 (1 AFP)	aVDPV1 (1 AFP) aVDPV2 (2 AFP) cVDPV2 (2 AFP + 1 contact) iVDPV2 + iVDPV3 (1 AFP)	aVDPV2 (1 non-AFP) iVDPV2 + iVDPV3 (1 AFP)	aVDPV1 (1 non-AFP) aVDPV2 (2 AFP) iVDPV3 (1 AFP)	aVDPV1 (1 AFP) aVDPV2 (1 AFP) iVDPV2 (1 AFP) aVDPV2 (1 env)	aVDPV3 (1 AFP)	aVDPV3 (1 AFP) iVDPV3 (1 AFP) ⁴	aVDPV2 (1 env) iVDPV3 (2 AFP) aVDPV3 (1 env) ?VDPV3 (1 env)
China, Hong Kong SAR	2005 - 3									
Japan	2005 - 1 Total - 2									
Lao People's Democratic Republic	2004 - 3						cVDPV1 (8 AFP + 21 contacts)	cVDPV1 (3 AFP + 4 contacts)		
Mongolia	2003 - 1									
Papua New Guinea										cVDPV1 (14 AFP + 6 contacts)
Philippines	2001 - 3					aVDPV2 (1 AFP)				
Viet Nam				aVDPV2 (2 AFP)						

1. Prefix letter refers to the VDPV category: "cVDPV" = circulating VDPV, "iVDPV" = immunodeficiency-associated VDPV, "aVDPV" = ambiguous VDPV, "?VDPV" = pending. Suffix number refers to the poliovirus serotype (types 1, 2 or 3).

2. Source of specimens could be AFP cases, contacts, non-AFP cases or environmental

3. Refers to year of last VDPV case, and aggregate total of VDPV cases for 2000-2009

4. Continuous excretion for 4 months; potential immunodeficient person.