Revisiting Old and Addressing Current Issues on Vaccines: **POLIO**

Maria Carmen B. Nievera MD
Fellow, Pediatric Infectious Disease Society of the Philippines
Fellow, Philippine Pediatric Society
Regional Medical Expert, Sanofi Pasteur Asia Pacific
Pediatric Infectious Disease Specialist, Asian Hospital and Medical Center

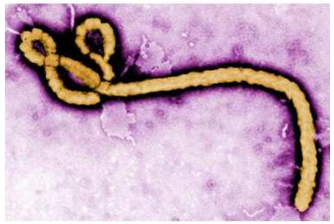
Before this …

News › World news › Ebola

WHO declares Ebola outbreak an international public health emergency

Director general Margaret Chan says west African countries' health systems need international help to manage infection

Maev Kennedy
The Guardian, Friday 8 August 2014 11.15 BST



And this…

theguardian

Zika virus

World Health Organisation declares Zika virus public health emergency

UN body acts over mosquito-borne virus to trigger funding for prevention campaign and research to establish exact link to serious birth defects

POLIO: Declared a Public Health Emergency of International Concern

May 2014: WHO declares the international spread of poliovirus as a public health emergency of international concern.

GPEI goal of interrupting transmission both WPV and cVDPV by end 2014 at extreme risk →

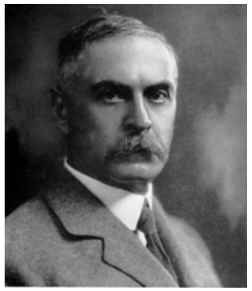
Fragile security/political situation in some countries

Feb 2015: WHO assessed that the spread of polio still constitutes a Public Health Emergency of International Concern.

CDC MMWR July 7, 2014.; http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6327a4.htm
http://www.who.int/mediacentre/news/statements/2015/polio-27-february-2015/en

The fight against Polio has lasted for over 70 years…

1908 — 1938 — 1955 — 1988 — 2012



Landsteiner (Vienna)
Viral etiology established

March of Dimes
Saving babies, together

The Thomas Francis Field Trial of Salk's Inactivated Polio Vaccine: the largest efficacy clinical trial ever done

POLIO GLOBAL ERADICATION INITIATIVE

Born from a coalition between WHO, Rotary, Unicef and US CDC, **GPEI initiative** is launched at 41st WHA with the objective to eradicate Polio by 2000.

Polio Eradication and End Game Strategic Plan 2013-2018 *launched by the GPEI*

More children will be receiving injected killed polio vaccine in a bid to finally eradicate the virus.

HEALTH

Vaccine switch urged for polio endgame

Inactivated virus vaccine could deliver the final blow.

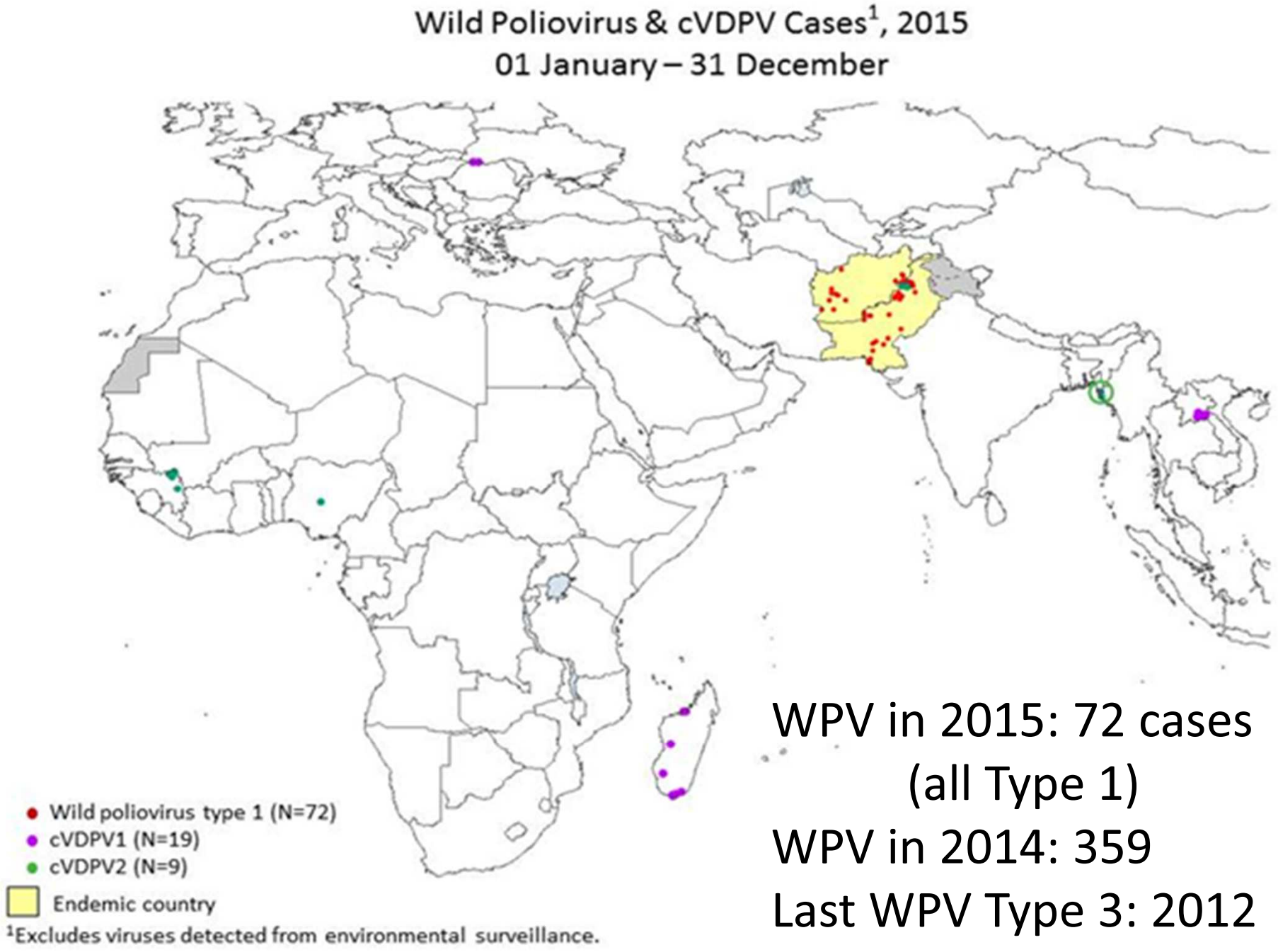
Sources: Plotkin.S, Poliovirus vaccine-Live. Vaccines. 2013:598-645.pdf / Plotkin.S, Vidor.E. Poliovirus vaccine-inactivated. Vaccines. 2013:573-597 / CDC.Polio:unprotected story page. Available at http://www.cdc.gov/vaccines/vpd-vac/polio/unprotected-story.htm.Accessed April, 2012 / The March of Dimes. History page. Available at: http://www.marchofdimes.com/mission/history_indepth.html. Accessed April, 2012; ; Global Polio Eradication Initiative Fact File www.polioeradication.org

Tools against Polio: Comparing OPV and IPV

Oral Polio Vaccine (OPV)	*Inactivated Polio Vaccine (IPV)*
*Administered by **drops***	*Administered by **injection***
Contains live, weakened virus	*Contains killed virus*
Provides immunity through the gut and associated herd immunity	*Provides immunity through the blood*
***tOPV** protects against types 1, 2 and 3* ***bOPV** protects against types 1 and 3* ***mOPV** protects against only one type: 1, 2 or 3*	***IPV protects against types 1, 2 and 3***

Rarely, OPV can cause:

- VAPP (Vaccine-associated Paralytic Polio)
- Vaccine-Derived Polioviruses (VDPV)



WPV in 2015: 72 cases
(all Type 1)
WPV in 2014: 359
Last WPV Type 3: 2012

Data in WHO HQ as of 26 January 201

Sunday, September 20, 2015

Global eradication of wild poliovirus type 2 declared

Declaration further milestone for globally-coordinated vaccine switch in 2016

- Last WPV Type 2 detected in 1999 in India

http://www.polioeradication.org/mediaroom/newsstories/Global-eradication-of-wild-poliovirus-type-2-declared/tabid/526/news/1289/Default.aspx

Circulating Vaccine-derived Poliovirus Cases[1], 2000 - 2016

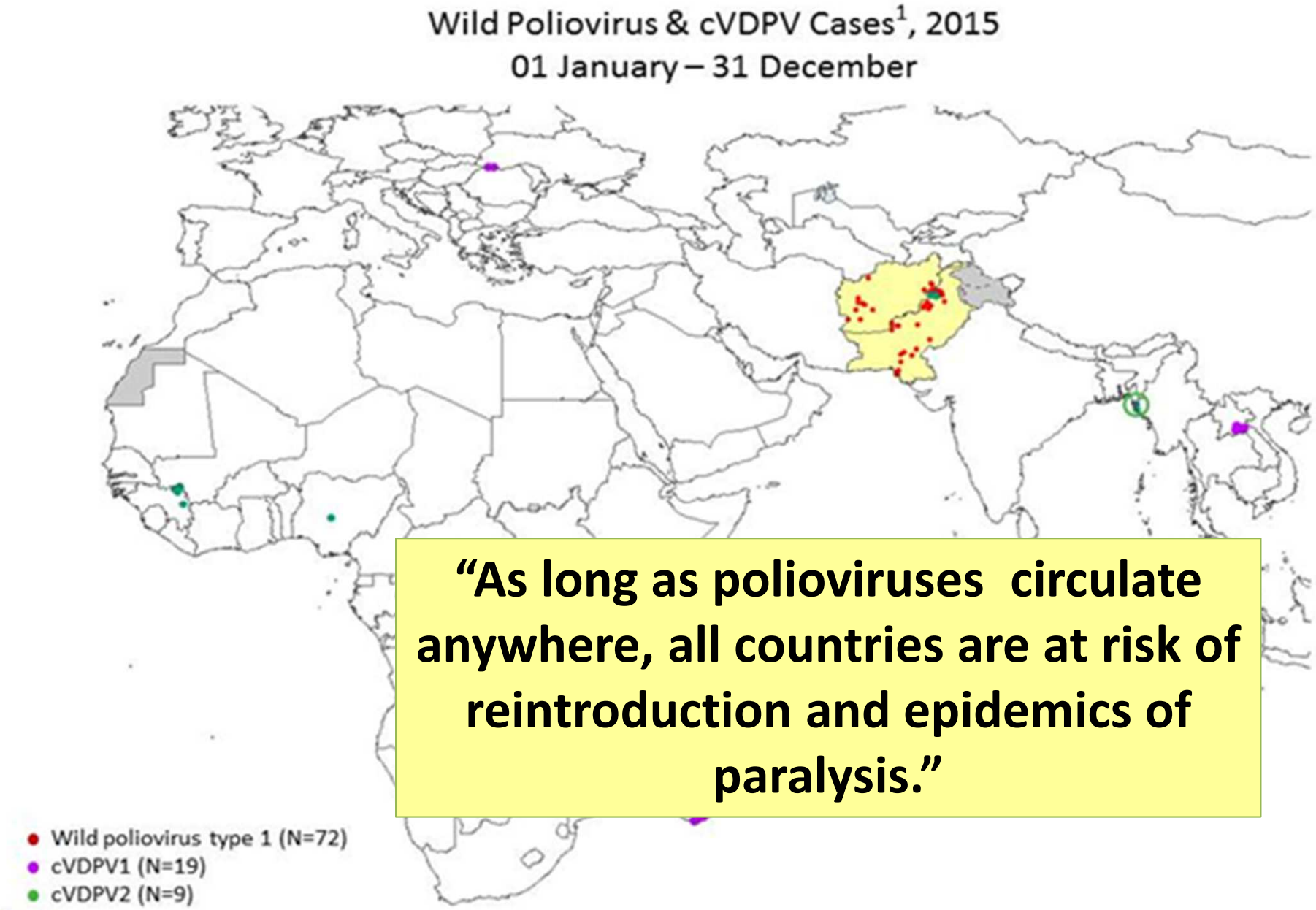
	cVDPV type 1[2]																	
Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Onset of most recent case
Laos																7		18-Dec-15
Madagascar															1	10		22-Aug-15
Ukraine																2		07-Jul-15
Mozambique												2						02-Jun-11
Myanmar							1	4										06-Dec-07
Indonesia						46												26-Oct-05
China					2													
Philippines		3																
DOR/Haiti	12	9																
Total type 1	12	12	0	0	2	46	1	4	0	0	0	2	0	0	1	19	0	

	cVDPV type 2[2]																	
Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	On re
Myanmar																2		0
Guinea															1	4		0
Nigeria						3	22	71	68	155	27	34	8	4	30	1		1
Pakistan													16	48	22	2		0
South Sudan															2			1
Cameroon														4				1
Niger							2			2	1	1		1				
Chad											1		12	4				1
Afghanistan											5	1	9	3				1
Somalia									1	6	1	9	1	1				0
Kenya													3					2
DRCongo									13	5	18	11	17					0
China													2					0
Yemen												9						0
India										15	2							18-Jan-10
Ethiopia									3	1								16-Feb-09
Madagascar		1	4			3												13-Jul-05
Total type 2	0	1	4	0	0	6	24	71	85	184	55	65	68	65	55	9	0	

	cVDPV type 3[2]																	
Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Onset of most recent case
Yemen													3	1				12-Jul-13
Ethiopia										1	5							17-May-10
Cambodia						1	1											15-Jan-06
Total type 3	0	0	0	0	0	1	1	0	0	1	5	0	3	1	0	0	0	

2015: more countries infected by cVDPVs than WPV

Data in WHO HQ as of 26 January 2016



"As long as polioviruses circulate anywhere, all countries are at risk of reintroduction and epidemics of paralysis."

Orenstein W. PEDIATRICS vol 135 no 1 Jan 201

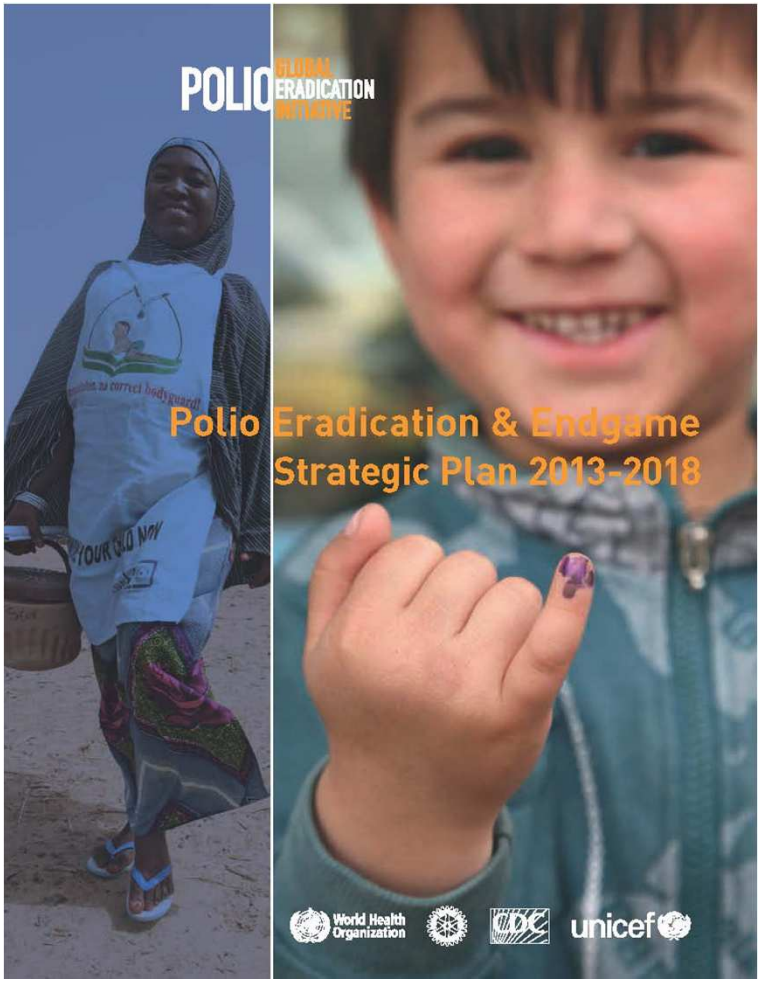
Data in WHO HQ as of 26 January 201

Stopping vaccine-derived polioviruses

- VDPVs:
  - very rare mutation strains from the weakened poliovirus in OPV when levels of immunization are very low, allowing the vaccine virus to circulate amongst unprotected children for an extended period of time.
- In many areas of the world, too many children continue to go unvaccinated, leaving them vulnerable to WPV and allowing VDPVs to emerge.

http://www.polioeradication.org/mediaroom/newsstories/Stopping-vaccine-derived-polioviruses/tabid/526/news/1330/Default.aspx

Polio Eradication and Endgame Strategic Plan 2013–2018



The Plan differs from previous eradication plans

"complete the eradication and containment of all *wild*, *vaccine-related*, and *Sabin polioviruses* such that no child ever again suffers paralytic poliomyelitis."

IPV Comprehensive Technical Module GPEI version date: Feb 10, 2014

Polio Eradication and Endgame Strategic Plan 2013–2018

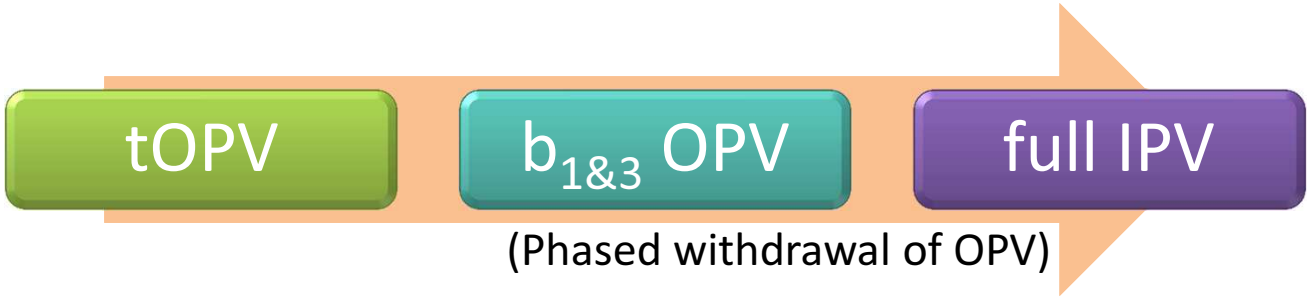
Objectives:

1. **Detect and Interrupt Poliovirus**
   - The plan provides a strategy to interrupt all wild poliovirus transmission by the end of 2014.
2. **Strengthen Immunization Systems and Withdraw OPV**
3. **Contain and Certify**
   - All regions must pass three years without a case to attain polio-free status, to be followed by global certification.
4. **Plan Polio's Legacy**

GPEI Fact File. www.polioeradication.org

Withdrawing OPV type 2:

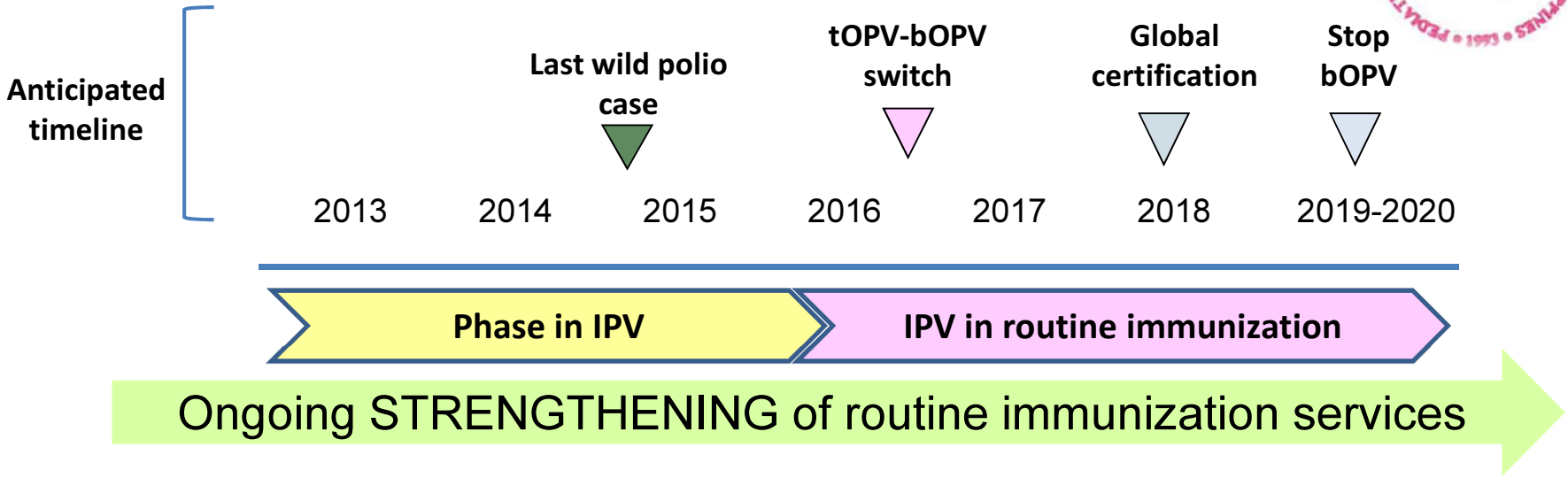
- With the eradication of WPV type 2, the type 2 component of OPV is no longer needed.
- OPV Type 2 component: caused 90 % of circulating VDPV outbreaks in recent years.
- OPV-2 now carries more risk than benefit
- Continuing OPV-2 unacceptable
- Plan: Shift:



Planning for IPV Introduction FAQs September 2013. IMG GPEI

Timeline for implementation of Objective 2:

Strengthen Immunization Systems and Withdraw OPV



3 Stages:

Introduction

- **Before end of 2015**: introduce **one dose of IPV** in immunization programs of all countries

Switch

- **2016**: **tOPV to $b_{1\&3}$OPV switch** globally

Withdrawal

- **2019-2020**: **withdrawal of bOPV** after the world is certified polio-free in 2018 (use all IPV)

IPV Comprehensive Technical Module GPEI version date: Feb 10, 2014

World Health Organization

Organisation mondiale de la Santé

Weekly epidemiological record
Relevé épidémiologique hebdomadaire

28 FEBRUARY 2014, 89th YEAR / 28 FÉVRIER 2014, 89e ANNÉE
No. 9, 2014, 89, 73–92
http://www.who.int/wer

Polio vaccines: WHO position paper, January 2014

Primary purpose of the IPV dose:

- To maintain immunity against type 2 polio during and after the global withdrawal of OPV2 and switch from tOPV to $b_{1\&3}$OPV
- To reduce VAPP risks (depending on the timing of the IPV administration)
- To boost immunity against polio types 1 and 3 → hasten the eradication of these WPVs

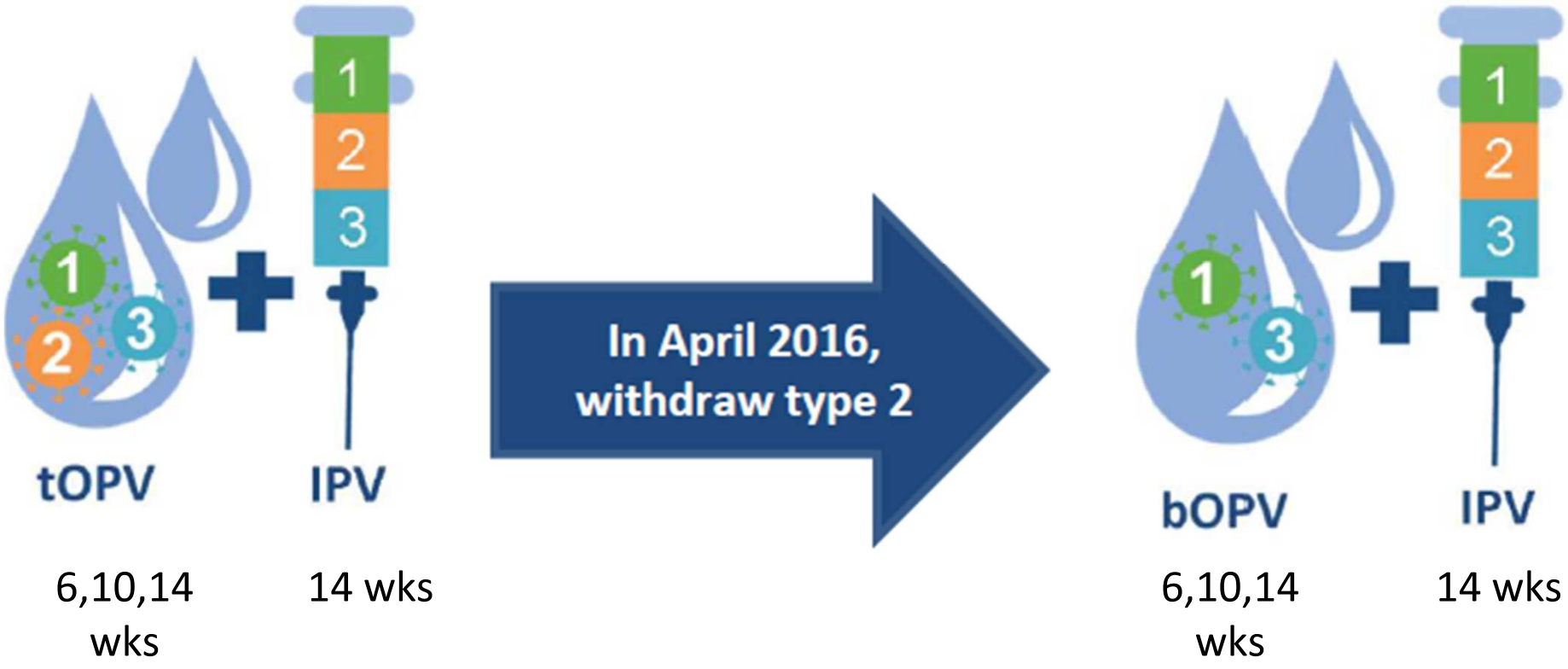
Replacing trivalent OPV (tOPV) with bivalent OPV (bOPV):

"The switch" in April 2016

- April 2016: 155 countries and territories will stop using the trivalent OPV and switch to the bivalent version of the vaccine, in a single two week period (April 18-May 1).
- This will have an important impact on progress towards achieving the eradication of all polioviruses worldwide.

http://www.polioeradication.org/mediaroom/newsstories/Stopping-vaccine-derived-polioviruses/tabid/526/news/1330/Default.aspx

Transition in the vaccines used:



6,10,14 wks

14 wks

6,10,14 wks

14 wks

- All OPV will be phased out eventually to fully eradicate polio.

Key Points to Remember:

- The tOPV-bOPV switch is a globally synchronized event
- bOPV simply replaces tOPV
  - (i.e. same schedule, same route)
- Adding IPV to routine schedules will further protect infants against polio from all 3 types
- All health facilities in every country must stop using tOPV on one day within the 2-week switch period from April 18 to May 1.
  - Any remaining stock of tOPV must be collected and destroyed following national recommendations.

THANK YOU