

Polio

Endgame Strategy

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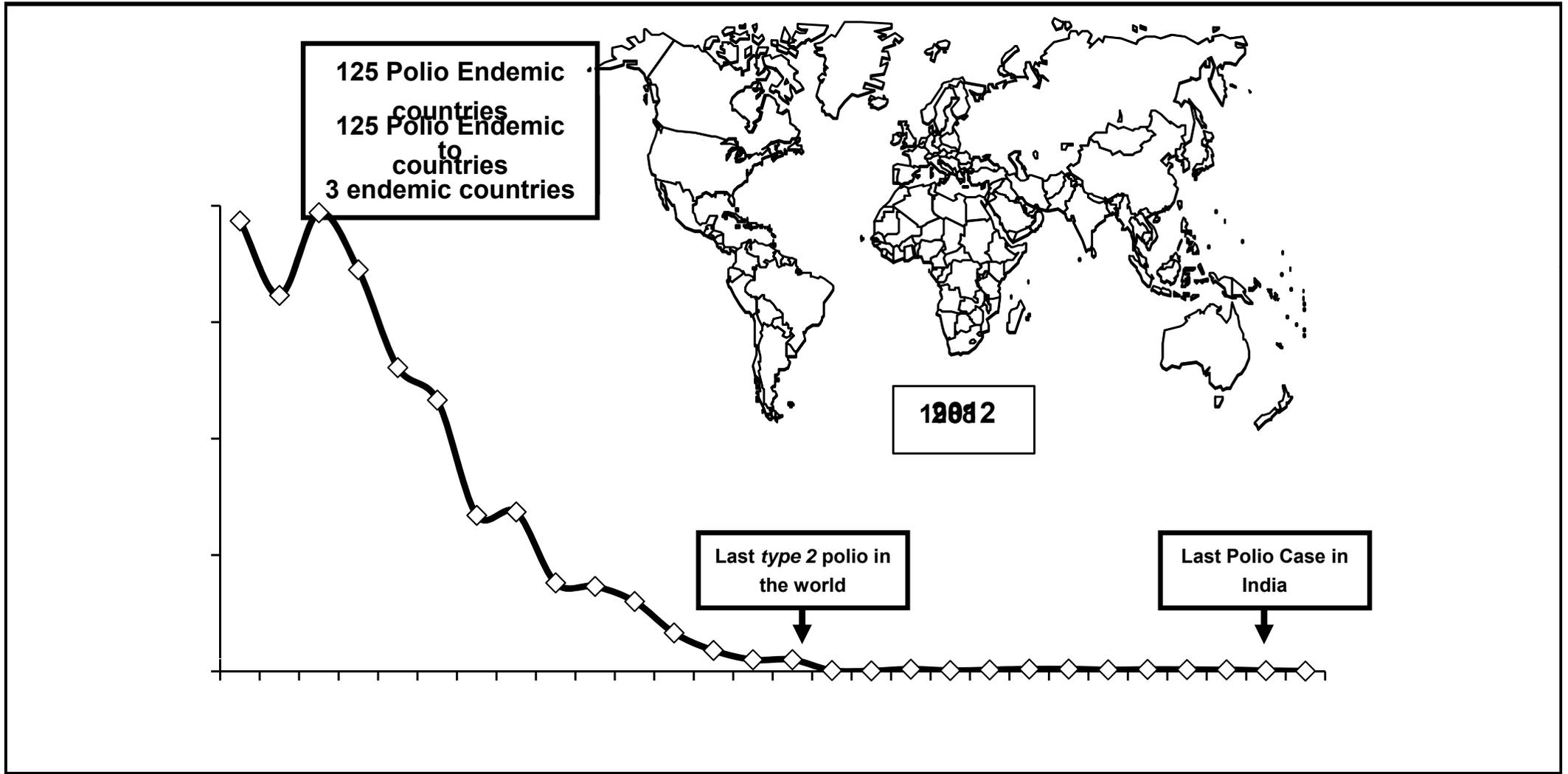
Specific Learning Objectives

- Progress toward polio eradication.
- Polio Endgame Plan.
- Withdrawal of Oral Polio Vaccine type 2.
- Introduction of IPV.

Introduction

- Global polio cases - an all-time low.
- The Global Polio Eradication Initiative (GPEI) has developed a new plan
- *Unprecedented opportunity to eradicate polio.*
- In 2012 the world saw fewer polio cases in

Wild Poliovirus Eradication, 1988-2012



Beginning of the Endgame

- Success in India established strategic & scientific feasibility of poliovirus eradication
- Poliovirus Type 2 eradication raised concerns about continued use of tOPV

- India, long regarded as the most difficult place to end polio, has not recorded a case in more than 05 years.
 - **On 13th January 2011: last case reported**
 - **On 28th March 2014: declared polio-free**
- Outbreaks in re-infected countries-stopped
 - Angola and the Democratic Republic of the Congo regaining polio-free status in the last 03 years.

- 03 remaining endemic countries (Afghanistan, Pakistan and Nigeria)
- launched Emergency Action Plans in 2012
 - to boost vaccination coverage to levels necessary
 - to stop polio transmission.
- Now, only 2 countries (Afghanistan and Pakistan) remain endemic for the disease
 - the smallest geographic area in history.

- The Eradication and Endgame Strategic Plan
 - a comprehensive, long-term strategy
 - addresses what is needed to eradicate polio by 2018.
- The plan was developed by the Global Polio Eradication Initiative (GPEI)
 - a partnership launched in 1988 to guide the world's polio efforts.

Highlights of GPEI plans

Routine Immunization	Places an urgent emphasis on strengthening routine immunization to boost immunity and aid in the introduction of new vaccines, including polio vaccines.
Vaccine Switch	Addresses both wild and vaccine-derived poliovirus (VDPV) , using a global vaccine switch to manage long-term poliovirus risks and potentially accelerate wild poliovirus eradication.
Risk Mitigation	Anticipates and prepares for potential challenges , particularly insecurity, to enable rapid responses to obstacles and avoid delays.

Concrete Timeline	Employs rigorous data analysis of recent progress to project a concrete, realistic timeline and budget to reach eradication.
Lessons Learned	Builds upon recent successes in India and endemic countries and provides strategies for overcoming potential obstacles.
Legacy Planning	Prepares to transfer the polio program's knowledge, assets and infrastructure to benefit other health initiatives.

- The Strategic Plan involves four **OBJECTIVES**, which the GPEI will pursue simultaneously:

1. **Detect and Interrupt Poliovirus.**
2. **Strengthen Routine Immunization and Withdraw OPV.**
3. **Contain and Certify.**
4. **Plan Polio's Legacy.**

1. Detect and Interrupt Poliovirus.

- The plan provides a strategy to interrupt all wild poliovirus transmission by the end of 2014 by:
 - Improving immunization campaigns to boost immunity
 - Heightening surveillance to detect circulating virus
 - Responding rapidly to outbreaks to prevent spread

- The three remaining endemic countries are already seeing results from implementing Emergency Action Plans that incorporate these and other strategies.
- In 2012, Nigeria increased the percentage of high-risk communities reaching target vaccination levels from 10% to 70%.

2. Strengthen Routine Immunization and Withdraw OPV.

- Strengthening routine immunization (RI):
 - a critical element of eradication efforts.
 - boosts immunity to minimize the risk and extent of outbreaks and
 - provides a platform for introducing new vaccines.
- The plan lays out a clear strategy for leveraging GPEI best practices and infrastructure to strengthen RI.
 - e.g. the polio program's micro plans can be used to improve RI planning.

- To eliminate the risk of vaccine-derived poliovirus
oral polio vaccines (OPV) with inactivated polio vaccines (IPV).
- Strong RI programs will be critical for the rapid and successful introduction of these new vaccines.

3. Contain and Certify.

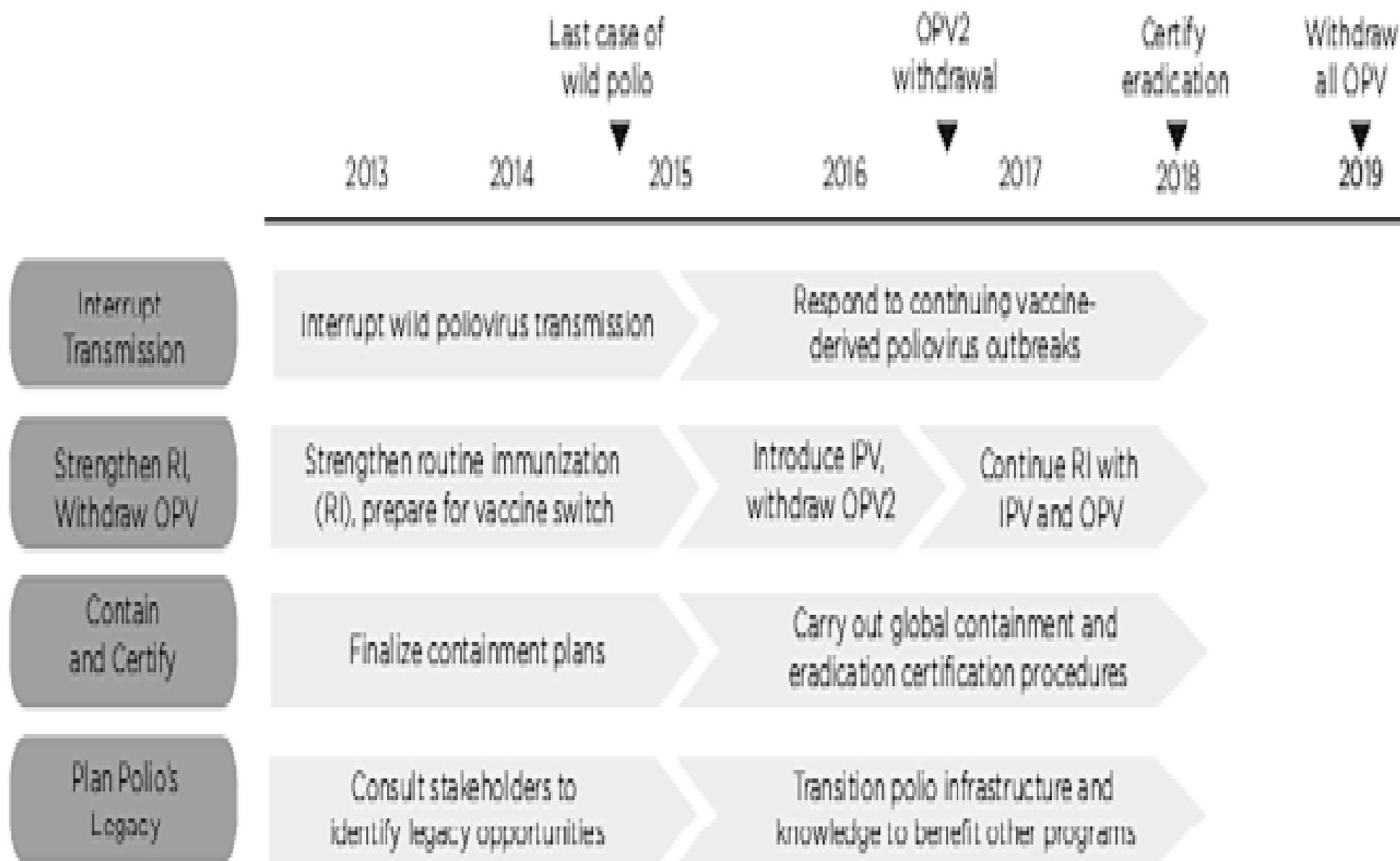
- Before certifying eradication,
 - Labs and vaccine-production facilities worldwide must **properly contain all virus samples.**
 - Both recently infected and polio-free countries must **address gaps in surveillance.**
 - All regions must surpass **three years without a case** to attain polio free status.

4. Plan Polio's Legacy.

- The polio program provides a **blueprint** for accessing the most marginalized and hard-to-reach communities in the world.
- Sharing this expertise can benefit other health and
 - e.g. delivering vitamin A during polio campaigns.
 - to combat other vaccine-preventable diseases.

A concrete timeline for eradication

- The GPEI used rigorous data analysis to establish a
- Learning from past experience, the GPEI anticipates potential obstacles that could interfere with this timeline and develops strategies to avoid and respond to them.



Pursuing all four objectives simultaneously reduces the timeline for and overall cost of eradication.

The plan identifies six main risks.

- **Input Risks**

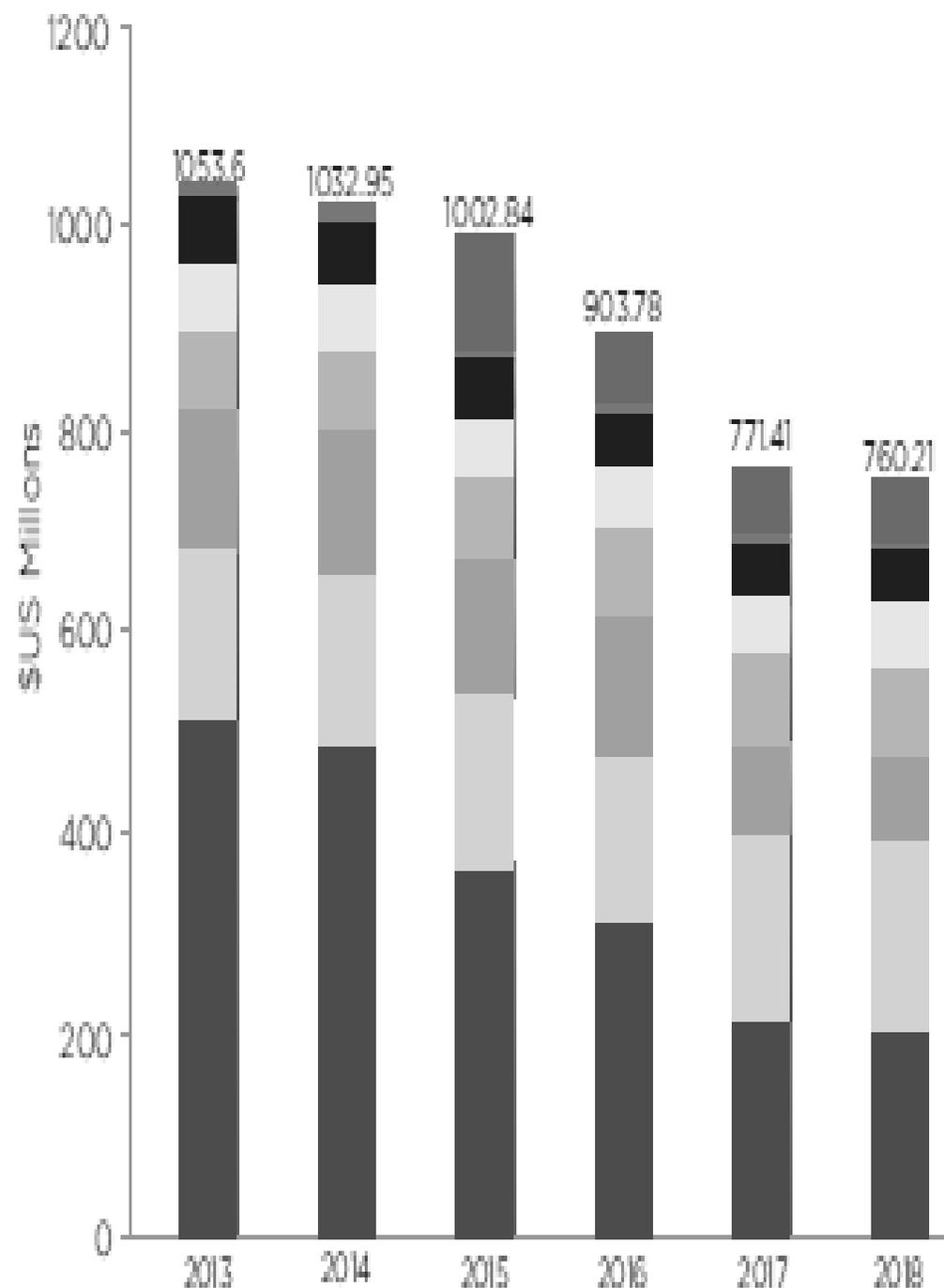
- Insufficient funding
- Inability to recruit and/or retain the necessary staff
- Insufficient supply of appropriate vaccines

- **Implementation Risks**

- Inability to operate in areas of insecurity
- Decline in political and/or social will
- Lack of accountability for quality activities

- **Upfront commitment to fully fund the plan is critical for eradicating polio by 2018.**
- Funding the Eradication and Endgame Strategic Plan will cost the global community US\$5.5 billion (Figure 5),
 - will be raised from multiple sources—including existing and new donors—and through innovative financing mechanisms.

Figure 5: Eradication and Endgame Strategic Plan Budget, 2013-2018



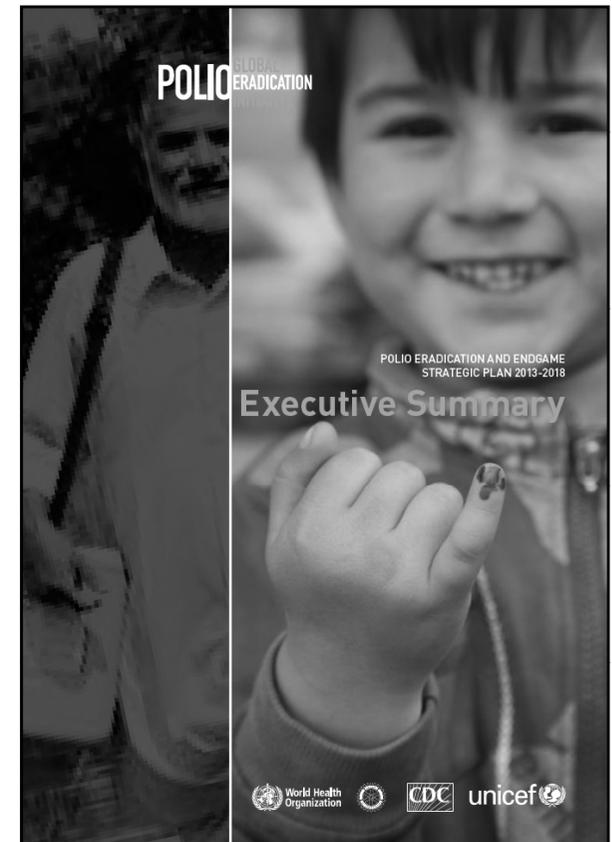
- **IPV in Routine Immunization:** Introduced globally beginning in 2015.
- **Research & Development:** Funds development of new vaccines, drugs, diagnostics and other tools to address remaining challenges.
- **Other:** Indirect costs.
- **Emergency Response:** Enables immediate and full-scale responses to any outbreaks. Includes funding for social mobilization, vaccine stockpiles and operational costs.
- **Surveillance and Laboratory Costs:** Supports intensified global surveillance efforts to identify and respond to all remaining poliovirus, and containment and certification procedures.
- **Quality Improvement/Community Mobilization:** Expands program capacity to vaccinate all children by funding community engagement, social mobilization, quality improvement, program innovations, and surge capacity.*
- **Technical Assistance:** Provides on-the-ground staff support to improve campaign quality.
- **OPV Campaigns:** Covers 6-8 immunization campaigns per year in endemic countries & 2-4 in other high-risk areas. OPV usage will gradually decrease after wild poliovirus transmission is interrupted in 2014.

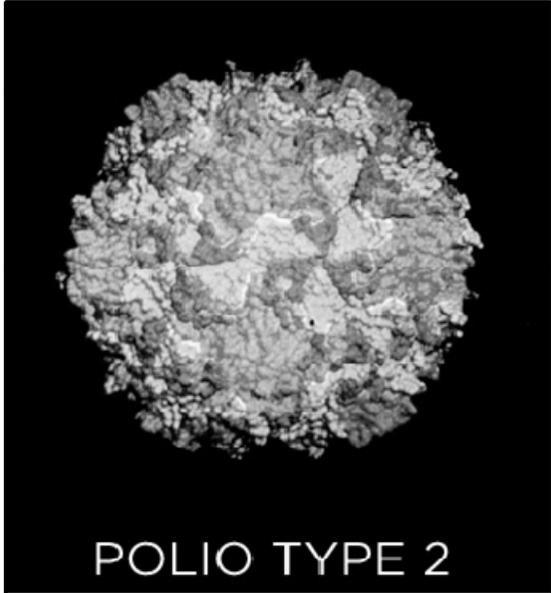
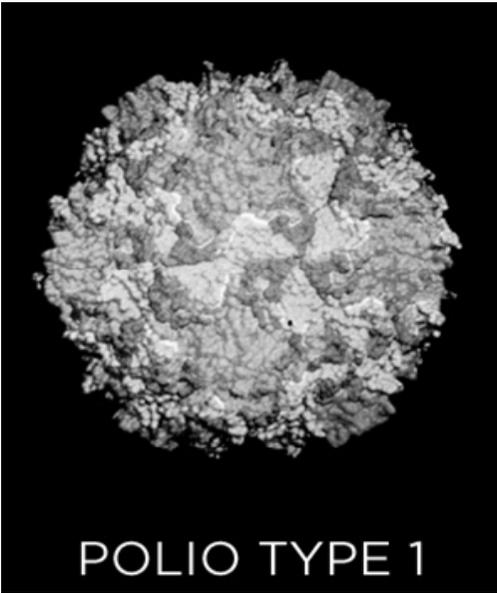
Assurance of full funding

- Enables advance planning for late-stage activities, ensuring they can be carried out promptly and efficiently.
- Increases operational certainty, protecting programs from being delayed or cancelled.
- Maximizes health impact by enabling program extensions that benefit other health initiatives.
- Sharpens focus, allowing the GPEI to concentrate on eradication activities instead of fundraising or preparing for funding shortages.

Endgame Plan, 2013-18

- Poliovirus detection & interruption
- OPV withdrawal IPV
- Containment & Global Certification
- Legacy Planning



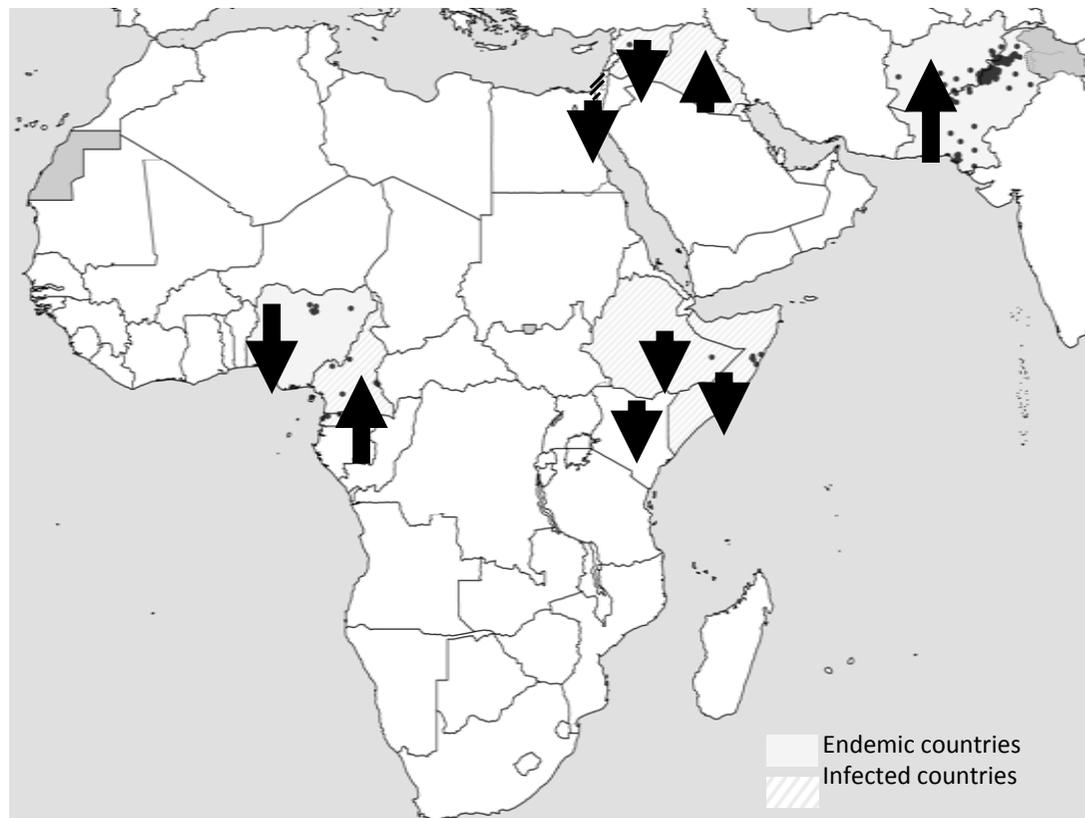


Global Wild Poliovirus 2014 - 2015*

Comparative Corresponding period

Countries										
Pakistan										
									0	24-Jul-14
Somalia	1			1	5	0			0	11-Aug-14
Equatorial Guinea	4			4	5	0			0	03-May-14
Iraq	2			2	2	0			0	07-Apr-14
Cameroon	3			3	5	0			0	09-Jul-14
Syria	1			1	1	0			0	21-Jan-14
Ethiopia	1			1	1	0			0	05-Jan-14
Total	114			114	359	30			30	
Total in endemic countries	102			102	340	30			30	
Total in Non-endemic countries	12			12	19	0			0	

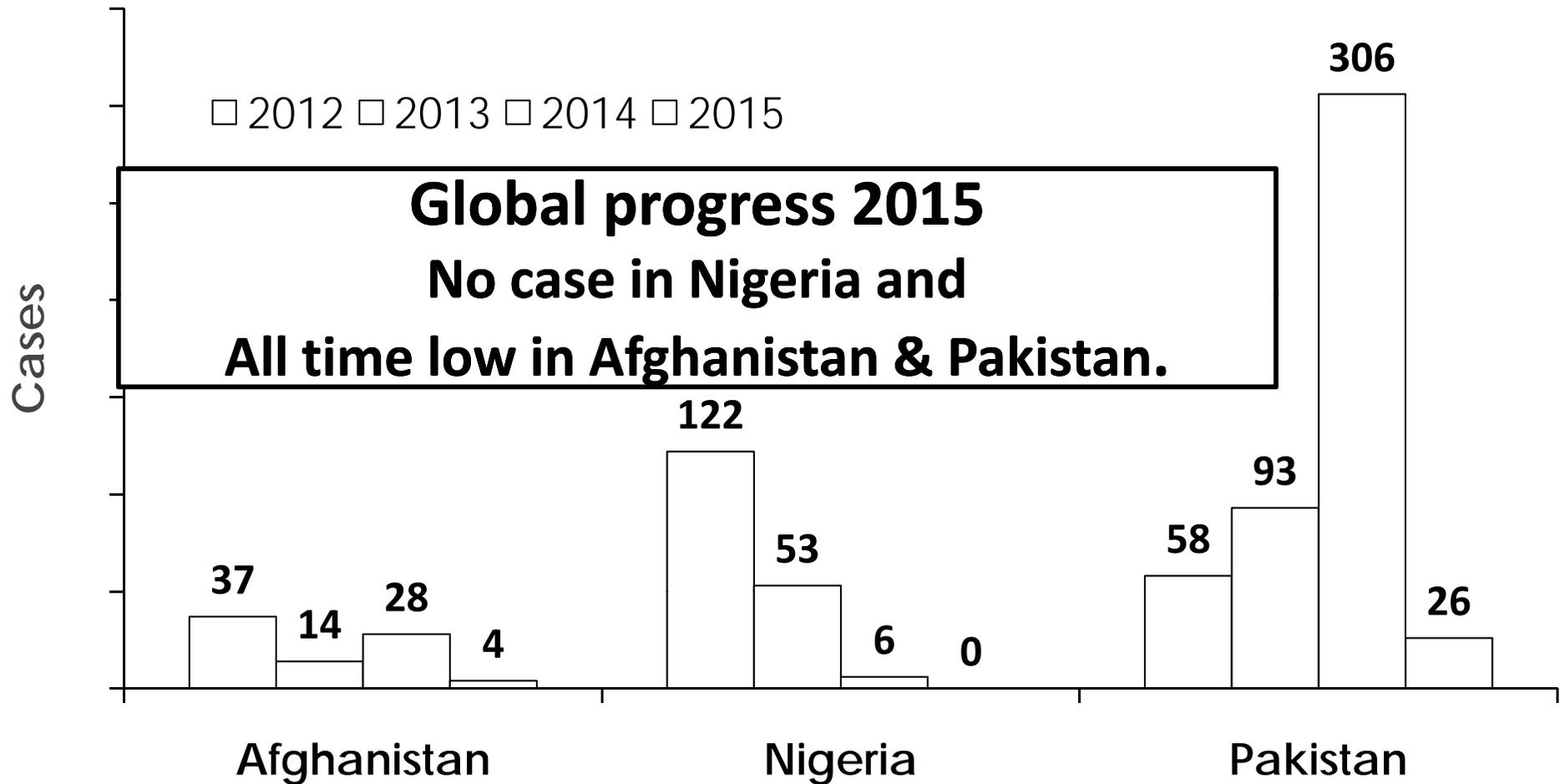
Wild Poliovirus type 1 Cases, 2014



Country	2013 (Full year)	2014*
Pakistan	93	
Afghanistan	14	28
Nigeria	53	6
Somalia	194	5
Cameroon	4	5
Equatorial Guinea	0	5
Iraq	0	2
Syria	35	1
Ethiopia	9	1
Kenya	14	0
Total	416	

 Israel = Env. positive isolates (2013 , N=136 ; 2014, N=14 , last 30 Mar 2014)
 Gaza = Env. positive isolates (2013, N= 7 ; 2014, N=1, Jan)

WPV1 Cases, 2012-15*



*Data in WHO HQ as of 3 June 2015
Data as of 1 July 2015

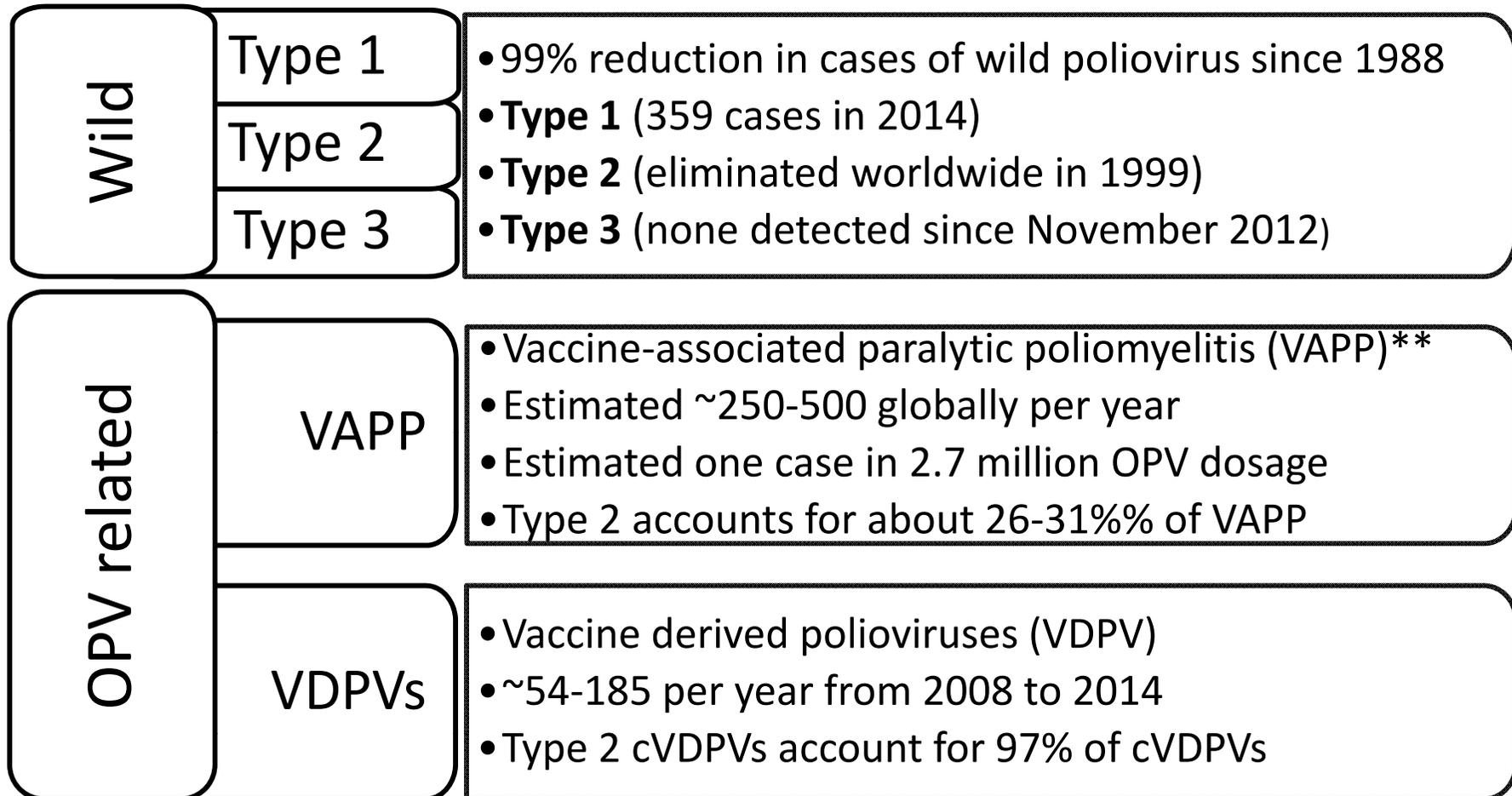
Wild poliovirus type 1 and Circulating vaccine-derived poliovirus cases

Total cases	Year-to-date 2016		Year-to-date 2015		Total in 2015	
	WPV	cVDPV	WPV	cVDPV	WPV	cVDPV
Globally	9	3	21	1	74	32
Endemic countries	9	0	21	1	74	3
Non-endemic countries	0	3	0	0	0	29

Countries	Year-to-date 2016		Year-to-date 2015		Total in 2015	
	WPV	cVDPV	WPV	cVDPV	WPV	cVDPV
Afghanistan	2	0	1	0	20	0
Pakistan	7	0	20	1	54	2
Guinea	0	0	0	0	0	7
Lao PDR	0	3	0	0	0	8
Madagascar	0	0	0	0	0	10
Myanmar	0	0	0	0	0	2
Nigeria	0	0	0	0	0	1
Ukraine	0	0	0	0	0	2

OPV withdrawal, IPV introduction
Why.....???

Types of polioviruses



Paralysis associated with use of OPV

- **VAPP (Vaccine Associated Paralytic Poliomyelitis):**
 - Vaccine virus acquires neurovirulence and causes paralysis in vaccine recipient or close contact.

- **VDPVs (Vaccine Derived Polio Viruses):**
 - Vaccine virus acquires the virulence and transmissibility characteristics of wild virus following prolonged multiplication in the gut or community.

Vaccine derived Polio Viruses (VDPVs)

What are they?

- Strains of poliovirus which emerge after prolonged multiplication of attenuated strains of the virus contained in the oral polio vaccine (OPV).
- Prolonged multiplication happens in the guts of children with immunodeficiency or in populations with very low immunity.
- After prolonged multiplication, these vaccine virus derived strains change and revert to a form that can cause paralysis in humans.

Types of Vaccine derived Polio Viruses

- **cVDPV:**

- >1 isolation of genetically related viruses from any source (AFP case/ healthy child/ environmental sample) implies **circulation** of VDPV due to low population immunity.

- **iVDPV:**

- VDPV isolated from **immuno-deficient** person.
- Implies long-term replication of the virus within the same individual.

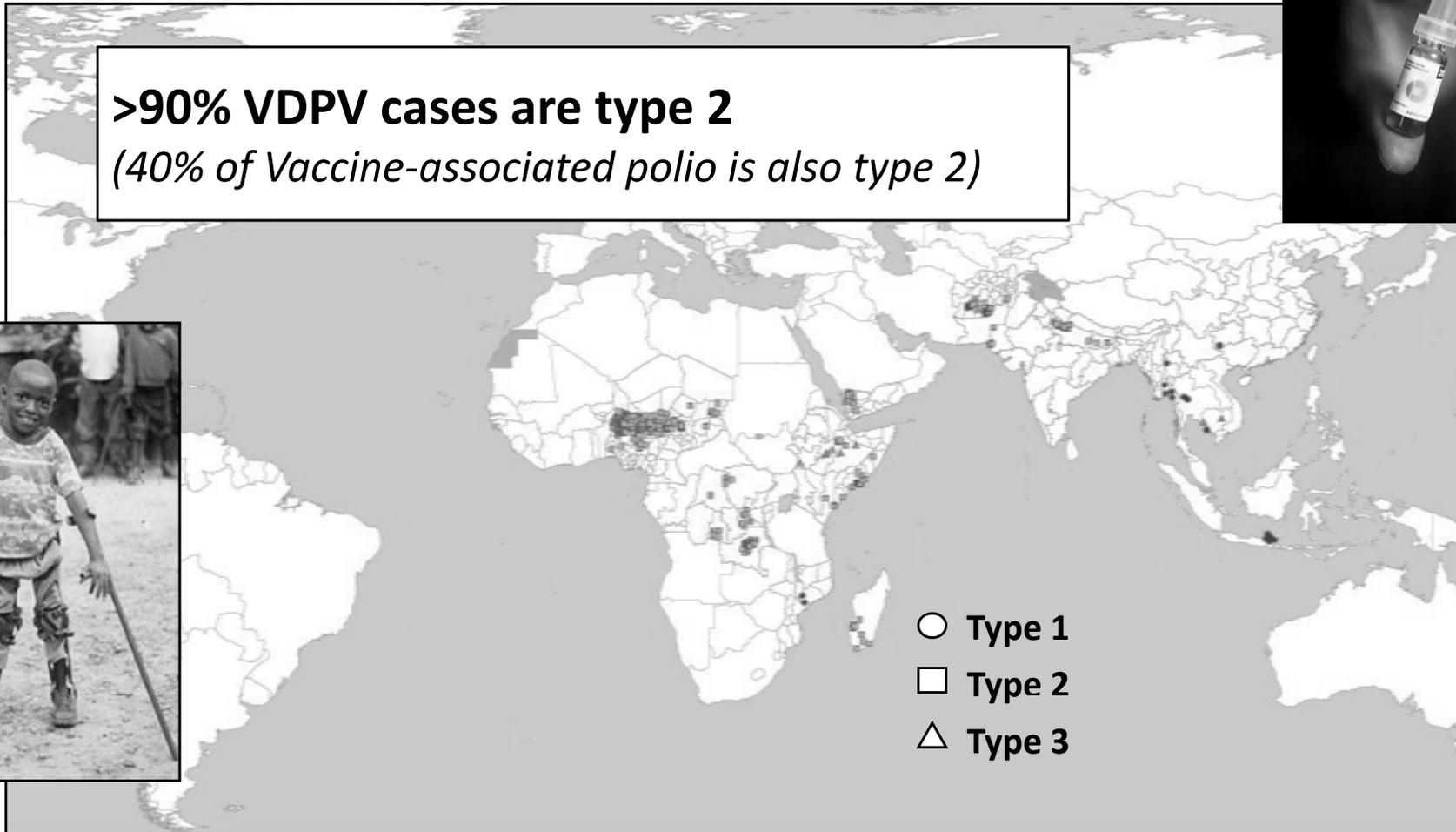
- **aVDPV:**

- origin uncertain (**ambiguous**) e.g. single isolate from single AFP case, healthy or non-immuno-deficient person.

Vaccine-derived polio outbreaks (cVDPVs) 2000-2013



>90% VDPV cases are type 2
(40% of Vaccine-associated polio is also type 2)



Rationale for OPV2 withdrawal

Last naturally occurring case of WPV case detected in Aligarh, India in 1999

Type 2 polio vaccine causes >95% of Vaccine Derived Polio Virus (VDPV) cases

Type 2 causes approximately 40% of Vaccine-associated paralytic poliomyelitis (VAPP) cases

Type 2 component of OPV interferes with immune response to types 1 and types 3

Risks of OPV2 now outweigh the benefits

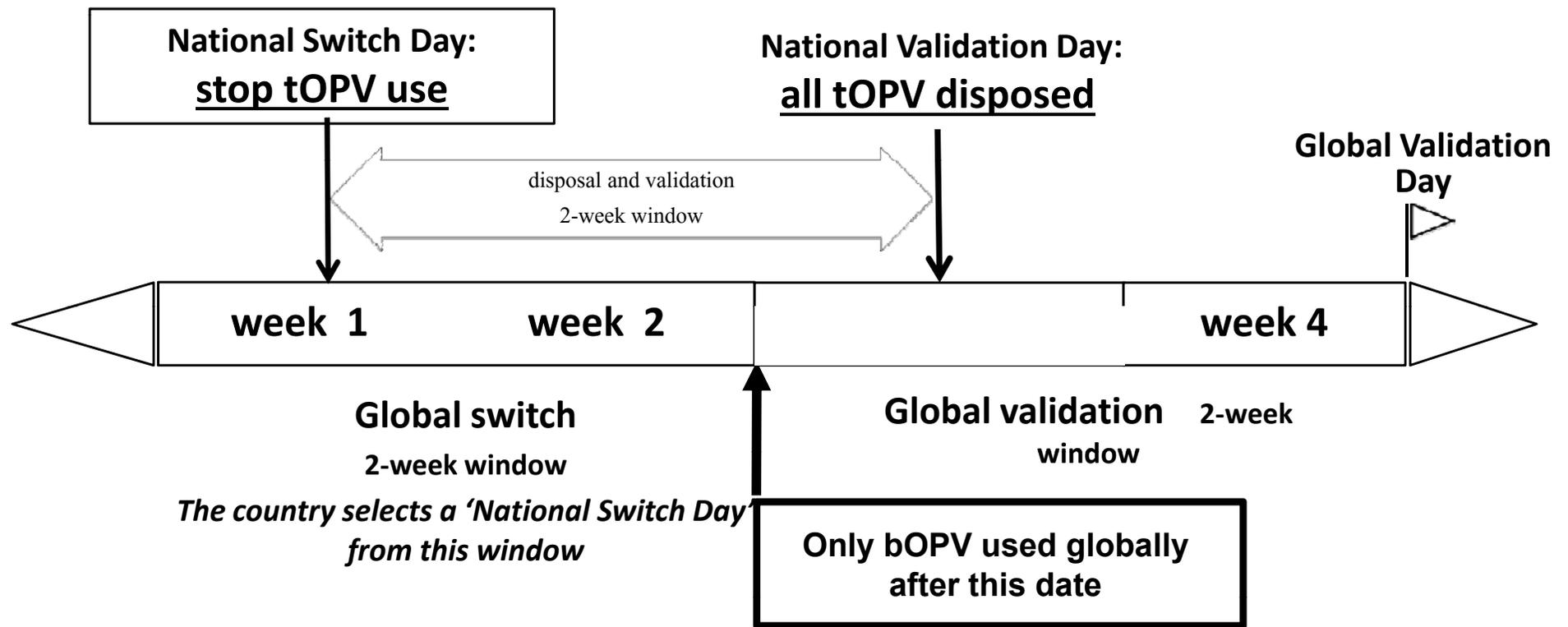
Withdrawal of Oral Polio Vaccines

- Globally synchronized, phased withdrawal of OPV strains, starting with OPV type 2
- OPV type 2 withdrawal means that tOPV (P1+P2+P3) must be replaced with bOPV (P1+P3)
- Withdrawal of OPV type 2 will reduce risk of emergence of cVDPV type 2 and also reduce the burden of VAPP cases due to OPV type 2

National Switch Day

- Country will select one day during two weeks of April 2016 as their National Switch Day.
- On this day, countries will:
 - Recall tOPV from cold chain and initiate its disposal
 - Begin administration of bOPV
- tOPV and bOPV should not be administered simultaneously

Switch example (April 2016)



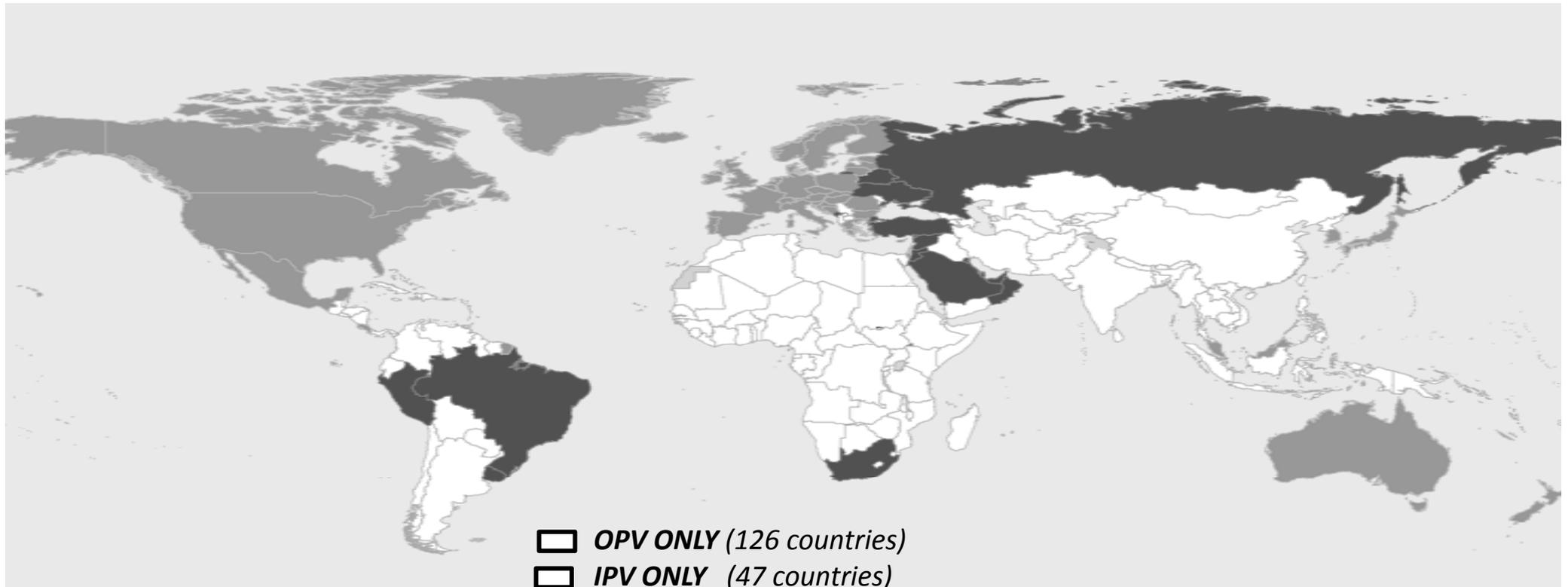
Risks associated with OPV type 2 withdrawal

- Withdrawal of OPV type 2 will leave a gap in population immunity against type 2 poliovirus
- Increased risk of outbreaks due to type 2 poliovirus following reintroduction
- Re-introduction could occur if:
 - cVDPV type 2 emerged during or shortly after OPV type 2 withdrawal
 - Importation of cVDPVs occurs
 - Break in bio-containment process in laboratories storing viruses.
- **Risks associated with OPV type 2 withdrawal can be mitigated**

Mitigate the risk of low population immunity against type 2 polio

- Emphasis on routine immunization strengthening
 - raising coverage critical for achieving the endgame
- Introduce IPV prior to OPV type 2 withdrawal.

126 OPV-only using countries* should introduce IPV by the end of



- OPV ONLY (126 countries)*
- IPV ONLY (47 countries)*
- IPV/OPV (24 countries and 6 Territories)*

Global progress on IPV introduction

- 126 OPV using countries to introduce IPV in their RI schedule before tOPV to bOPV switch.
- 20 countries already introduced IPV
- India have introduced IPV in Oct 2015.

Summary

- Globally no polio virus type 2 detected since 1999.
- Withdrawal of type 2 OPV implies switching from tOPV to bOPV in the programme
 - Globally coordinated withdrawal of OPV type 2 essential to eliminate VDPV and VAPP risks associated with continued use of OPV type 2
- Single dose of IPV to mitigate risk of low population immunity against type 2 polio virus.

Thank You