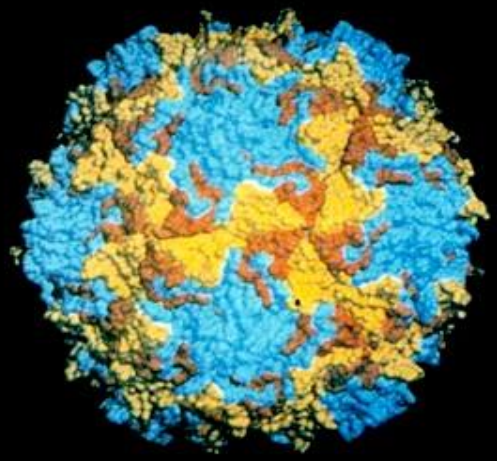
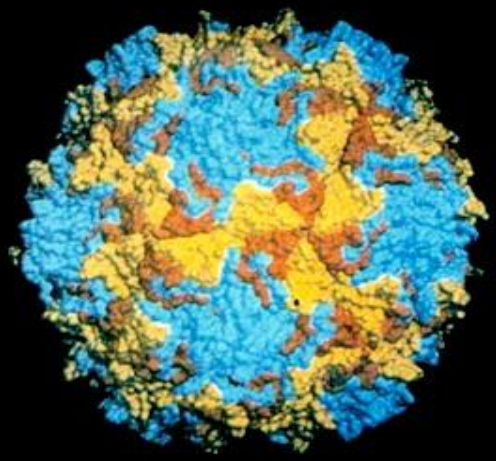
Polio Eradication Update and The Polio End Game KACHCON - 2015

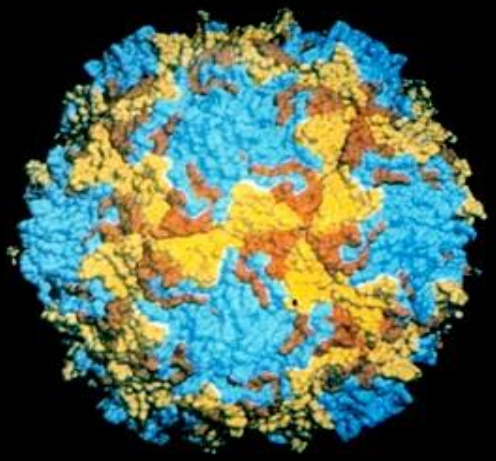
Dr BP Subramanya
SMO, Bengaluru
WHO-NPSP



POLIO TYPE 1

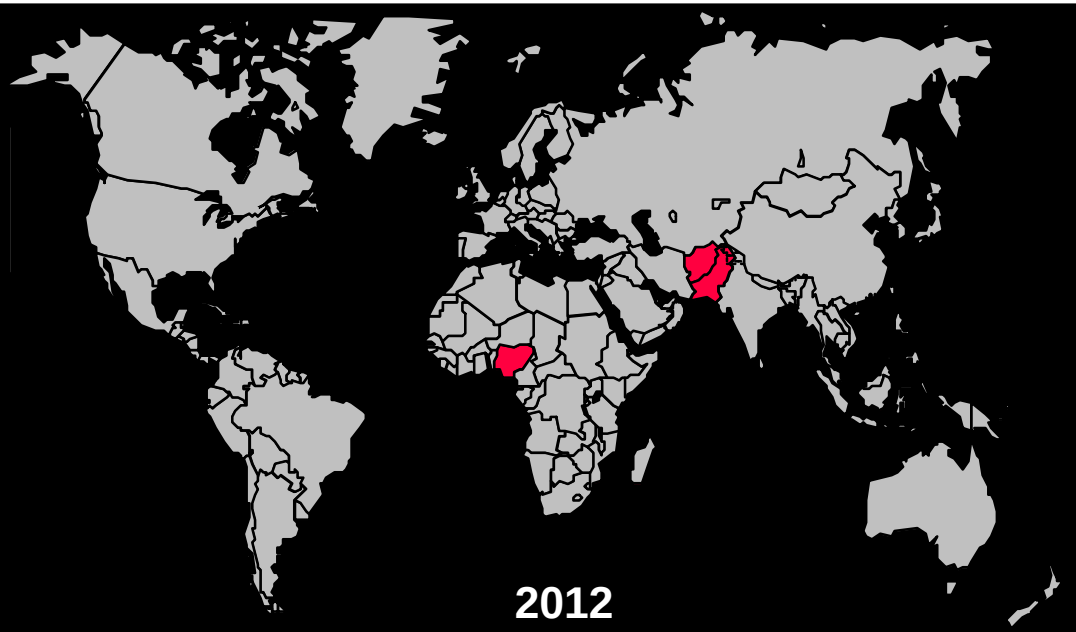


POLIO TYPE 2



Not detected since Nov 2012

Wild Poliovirus Eradication, 1988-2012



Polio cases (thousands)

400
300
200
100
0

1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012

Last *type 2* polio in the world

Last Polio Case in India

Declaration

We, the members of the Global Commission for the Certification of Poliomyelitis Eradication, conclude today, 20th September 2015, that indigenous wild poliovirus type 2 has been eradicated worldwide.

Anthony Adams, Chair

Supamit Chunsuttiwat

Rose Gana F. Leke

Arlene King

Yagob Al Mazrou

David M. Salisbury

Bali, Indonesia

Global eradication of wild poliovirus type 2 declared

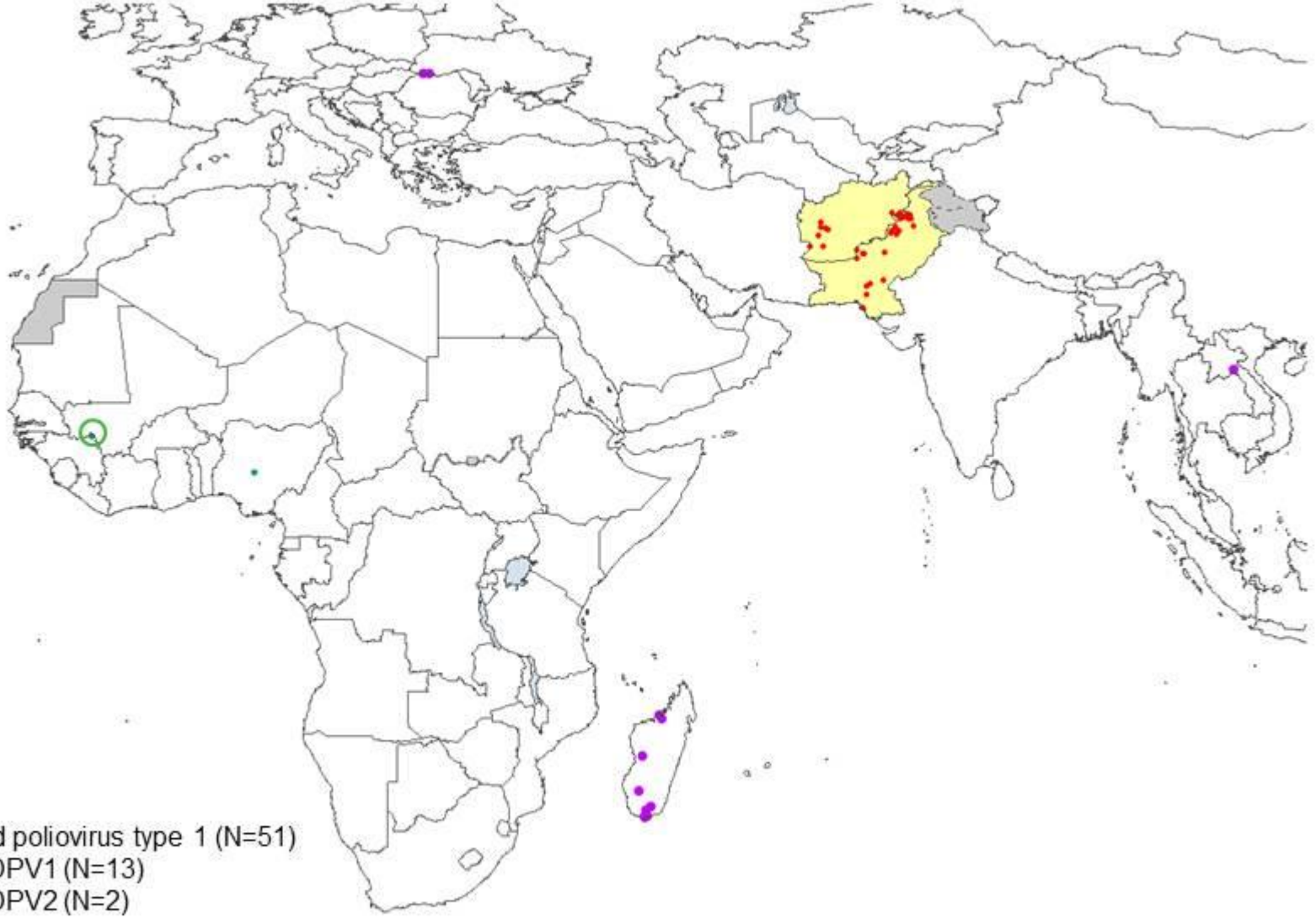
Declaration further milestone for globally-coordinated vaccine switch in 2016



Friday, September 25, 2015
WHO Removes Nigeria from Polio Endemic List !!



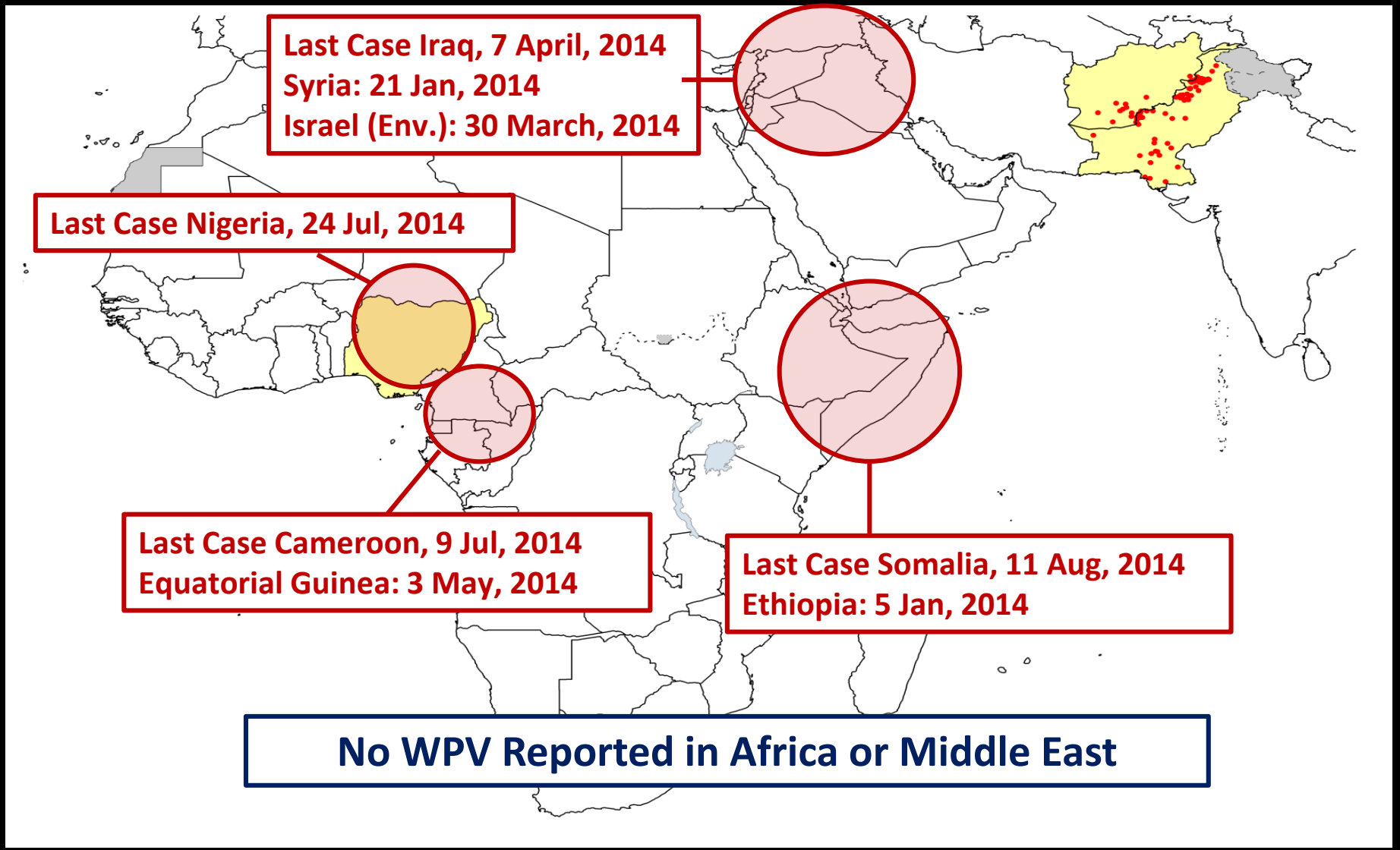
Wild Poliovirus & cVDPV Cases[1], 2015
01 January – 27 October



[1]Excludes viruses detected from environmental surveillance.

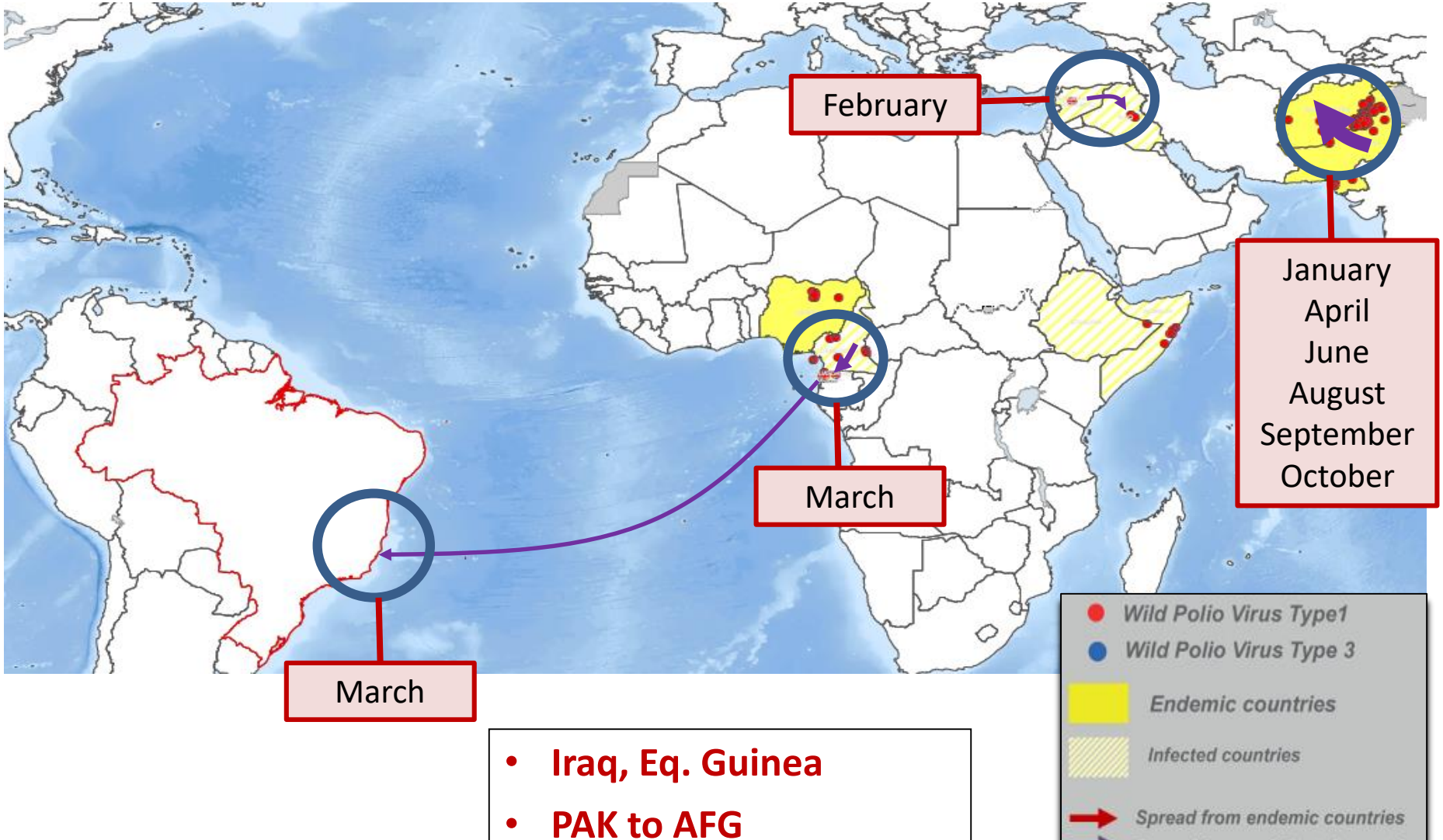
Data in WHO HQ as of 27 October 2015

Wild Poliovirus Cases in 2014-15



But the Risk Remains……

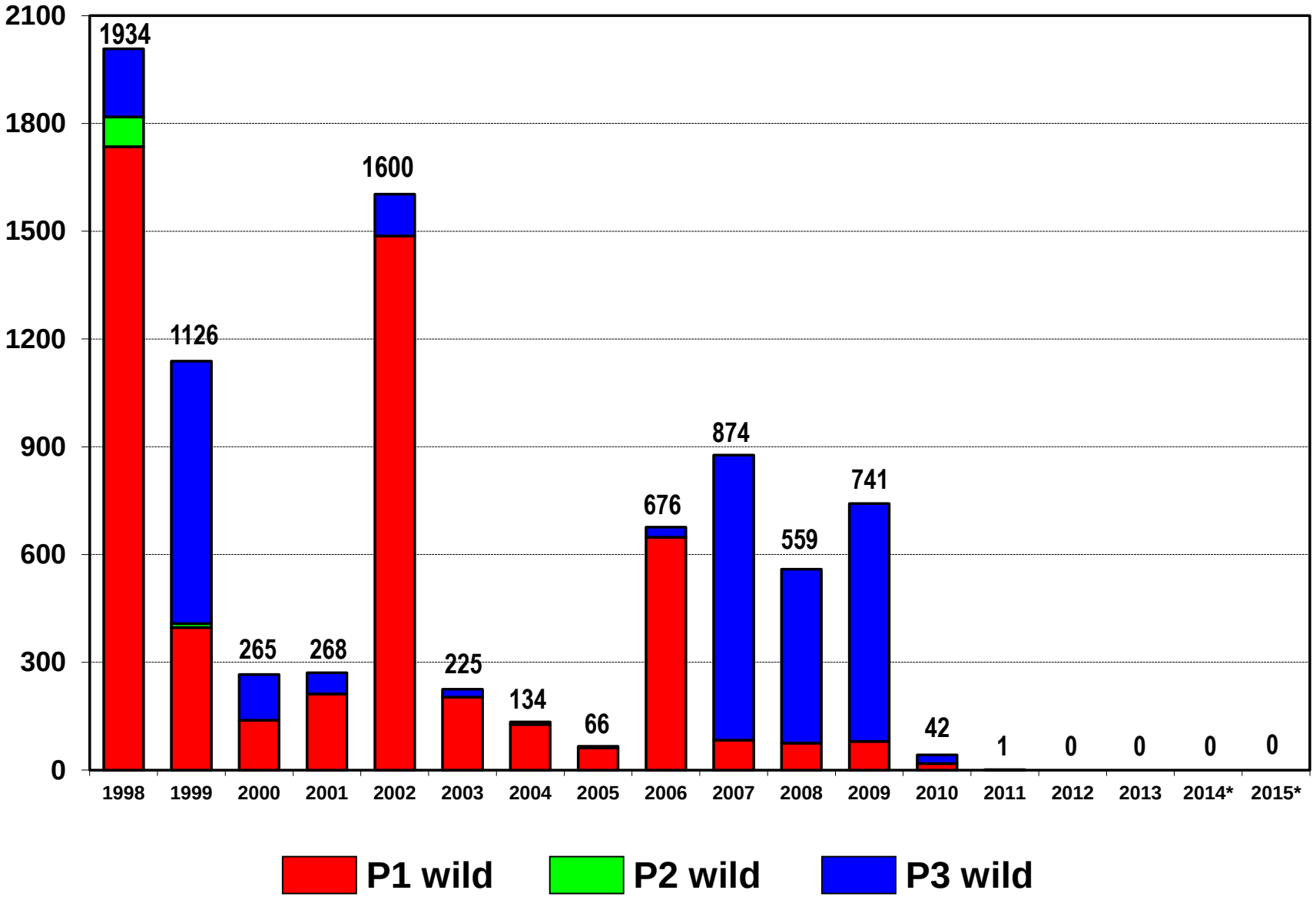
International Spread of Polio, 2014



- **Iraq, Eq. Guinea**
- **PAK to AFG**

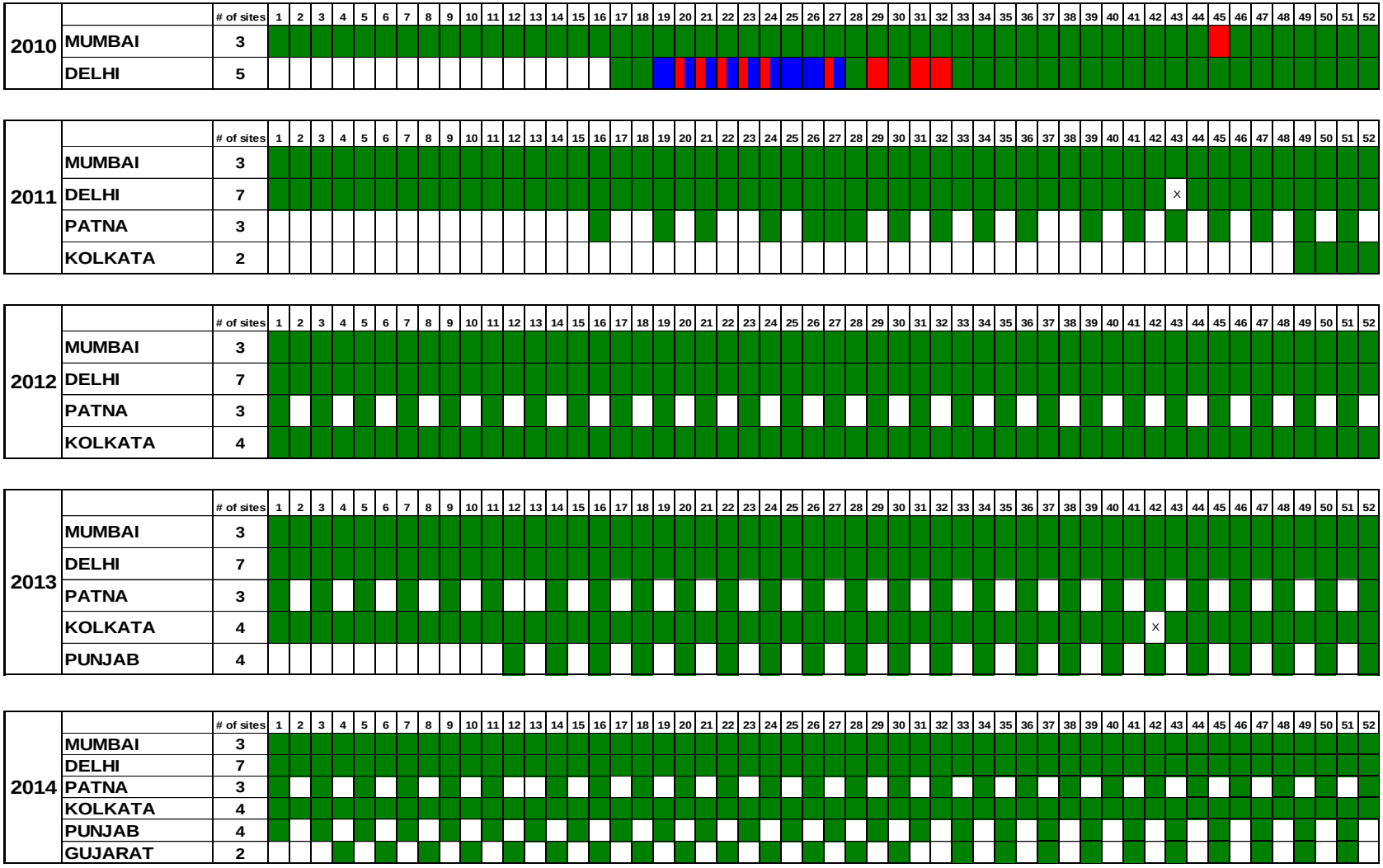
Situation of polio eradication in India

Polio free status maintained for >4 years

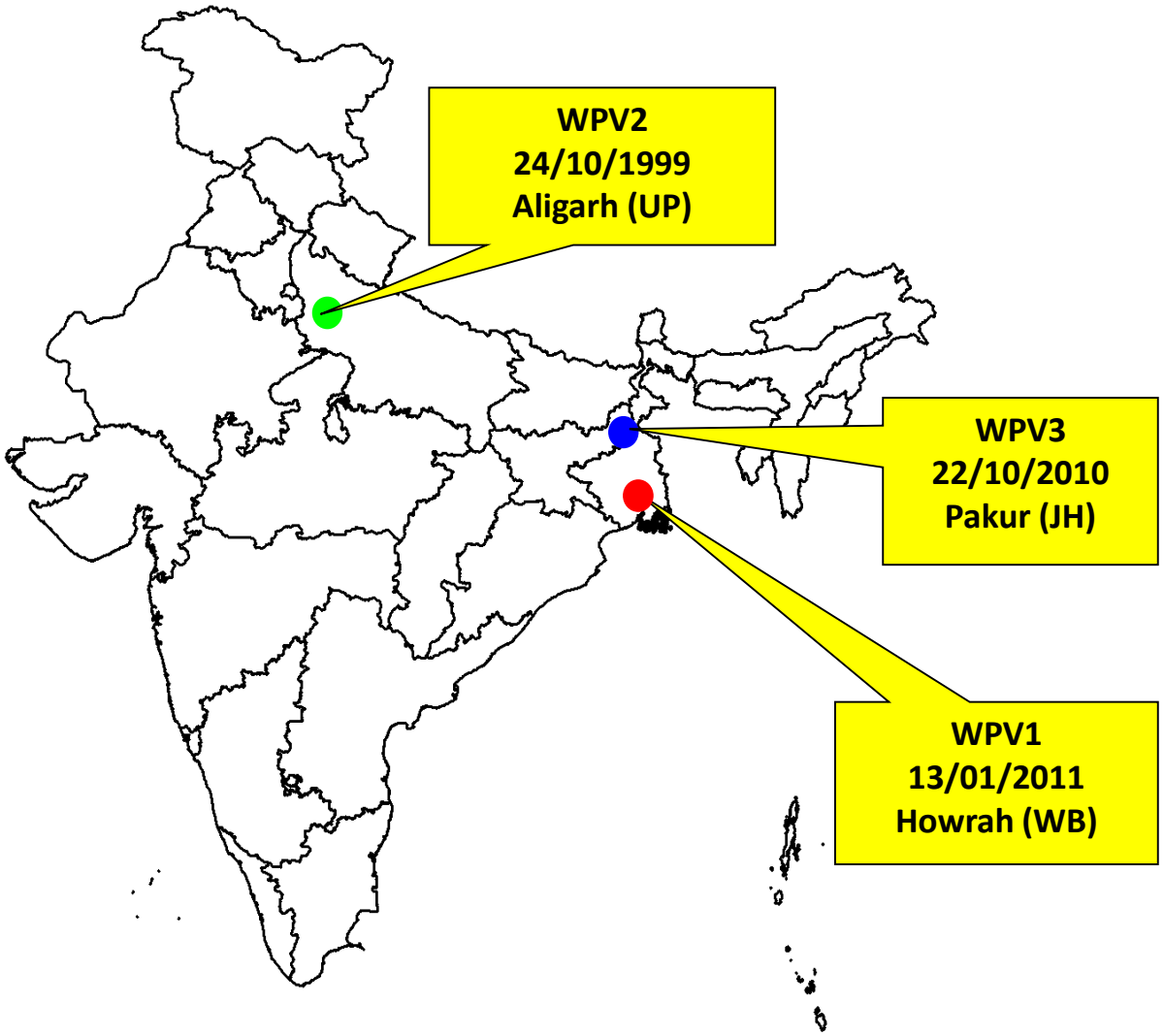


** data as on 18 July 2015*

Environmental surveillance confirms no WPV since January 2011 in the country



Major developments, India



- **Feb 2012:**
  WHO removes India from the list of polio endemic countries

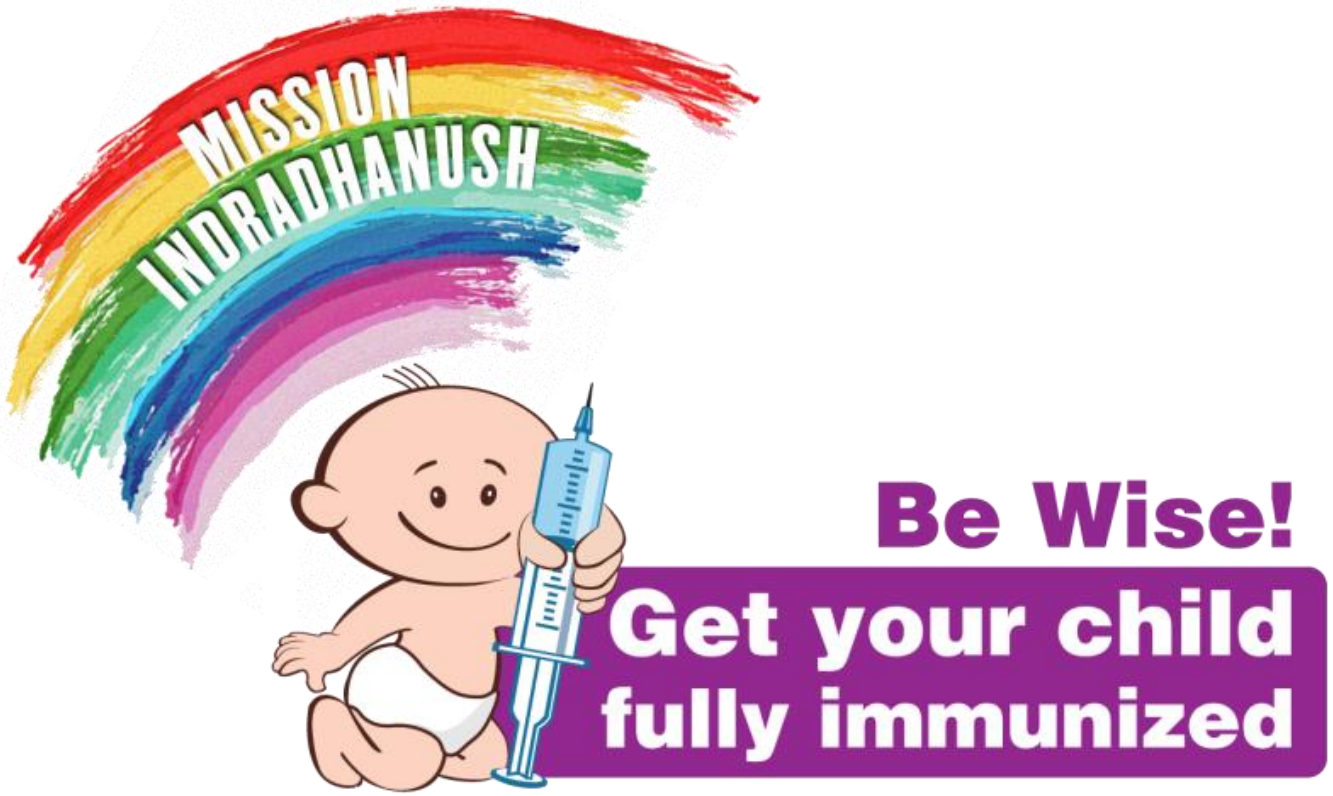
- **Jan 2014:**
  India marks the third anniversary of the last polio case

World Health Organization
COUNTRY OFFICE FOR India

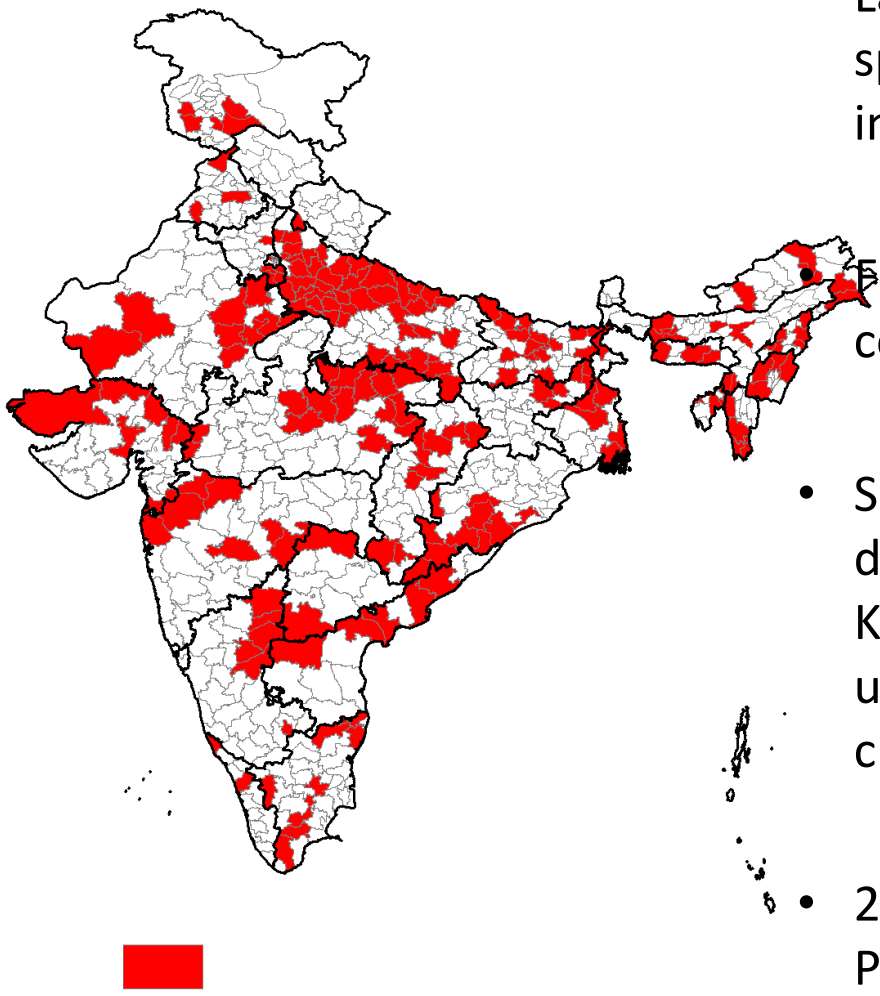
March 27, 2014:
South-East Asia Region of WHO certified polio-free



Mission Indradhanush:
A new beginning for RI in 2015!!



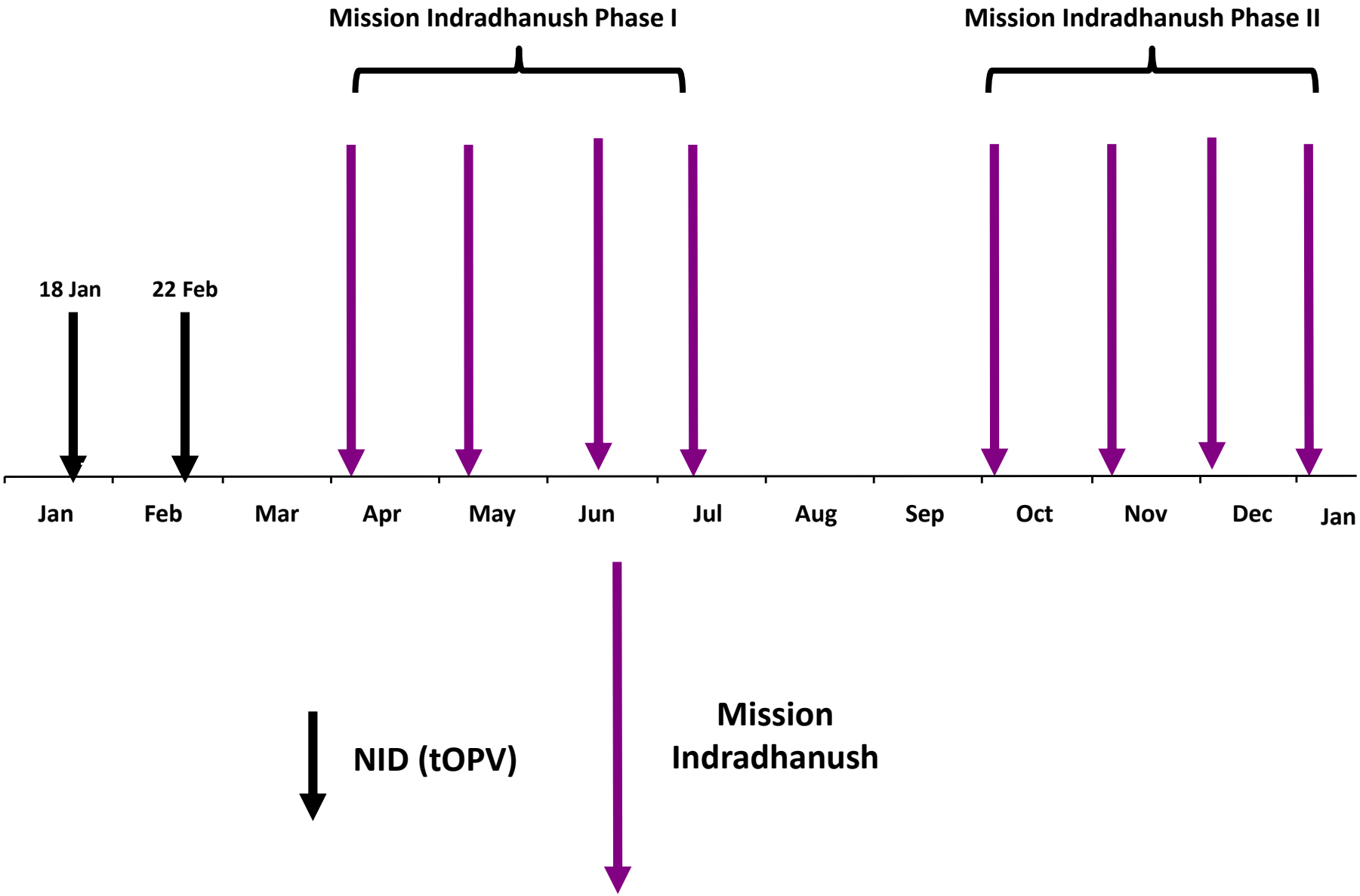
Mission Indradhanush (Rainbow): Reaching all children



201 High focus districts in Phase 1
And 297 districts in Phase 2

- Launched by MoHFW on 25 Dec 2014 as a special drive to strengthen routine immunization in the country
- Focuses on interventions to ensure high coverage of children and pregnant women
- Special attention to 201 high focus districts in Phase 1 including 6 in Karnataka with nearly 50% of all unvaccinated or partially vaccinated children
- 297 Medium Focus districts selected in Phase 2 including 12 in Karnataka
- Karnataka State has chosen 6 more districts – Total 18 Districts in Karnataka

Timelines for Mission Indradhanush: 2015 & 16



Areas under focus - Mission Indradhanush

1. S1. Settled HRA identified during Polio Campaigns - Low Coverage Area – (Due to large population/ high workload)Small villages, hamlets, tandas, field huts etc. clubbed/tagged with another village for RI sessions and not having independent RI sessions
2. S2: Areas with vacant sub-centers and temporary vacant sub centres (areas with last three RI sessions not held: JHA(F) on long leave/ other reason)
3. S3. Areas with Measles outbreaks or cases of Diphtheria/ Neonatal Tetanus in last two years
4. Migrant population areas identified during Polio campaigns:
   - M-1 (Slum with Migration)
   - M-2 (Nomads)
   - M-3(Brick Kilns)
   - M-4 (Construction Sites)
   - M-5 (Others)

Be Wise!
Get your child fully immunized

Strategy for Mission Indradhanush

- **4 intensified RI drives in 4 successive months:**
  - *Each drive will begin on **07th of the month** and will last for up-to seven working days (based on the actual need).*

- **Targeted beneficiaries:**
  - *Pregnant women and Children under two years of age who have missed Routine Immunization doses*
  - *Children above two years of age seeking vaccination services at any Indradhanush Vaccination Centre (IVC) will not be denied services*

- **Routine immunization system strengthening:**
  - *Try to Include areas identified for Mission Indradhanush in regular RI plans*
  - *RI sessions on other days of the week other than Thursday to focus on areas identified for Indradhanush*



Mission Indradhanush was launched by Hon'ble Health Minister and Medical Education Minister on April 7th the World Health Day at the historic Vidhan Soudha Banquet hall - Karnataka

Release of Posters and other IEC material







Principal Secretary and Commissioner lead from the front & motivated the team





Strong ownership by District DCs, CEOs and Taluk level officials in all the districts









Extensive IEC efforts for MI









RI Sessions held <u>beyond</u> the PHC, Health Sub Centre and Anganwadi centres….close to the community

AND Intense monitoring of the MI campaign by GoI, State nodal officers, WHO NPSP officers and External monitors



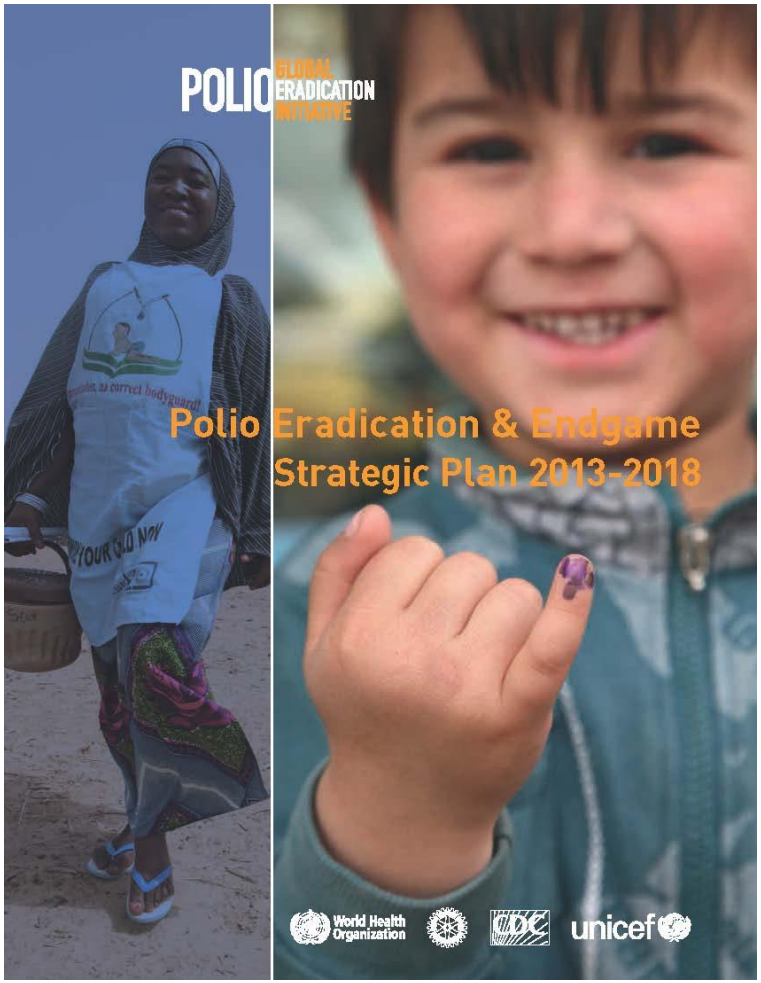


The out come of Phase 1
April to July 2015

- About 38,395 children fully immunized with first year's doses of all vaccines
- More than 33,300 children completed second year booster doses
- About 5% children received vaccine for the first time in their life…..
- Quality of sessions, parent's awareness improved from round to round
- The campaign extended for 3 more months from August to October in all the six districts at State's own initiative.
- 10,000 more children have been Fully immunized (Total 48000 children immunized) till now in the six districts

Polio Endgame

The Polio Eradication & Endgame Strategic Plan 2013-2018

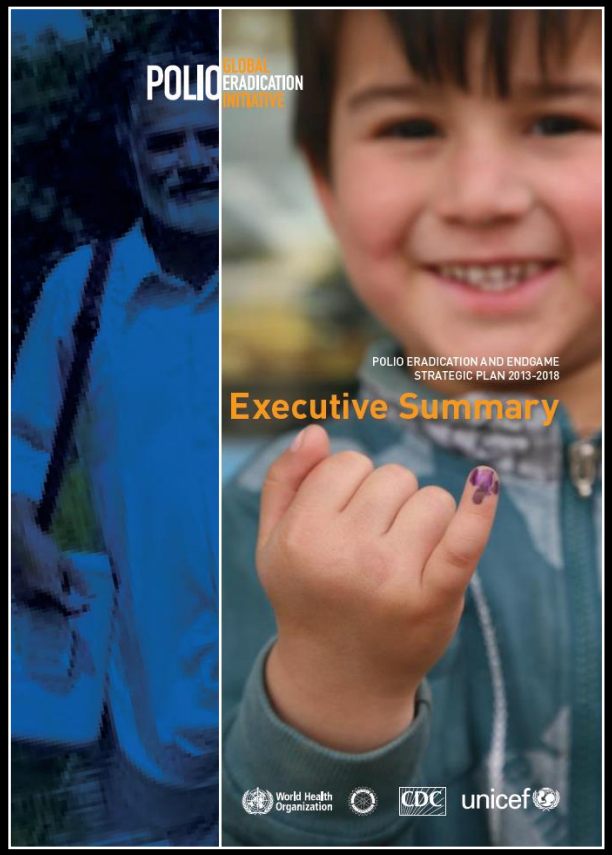


Endgame Goal:

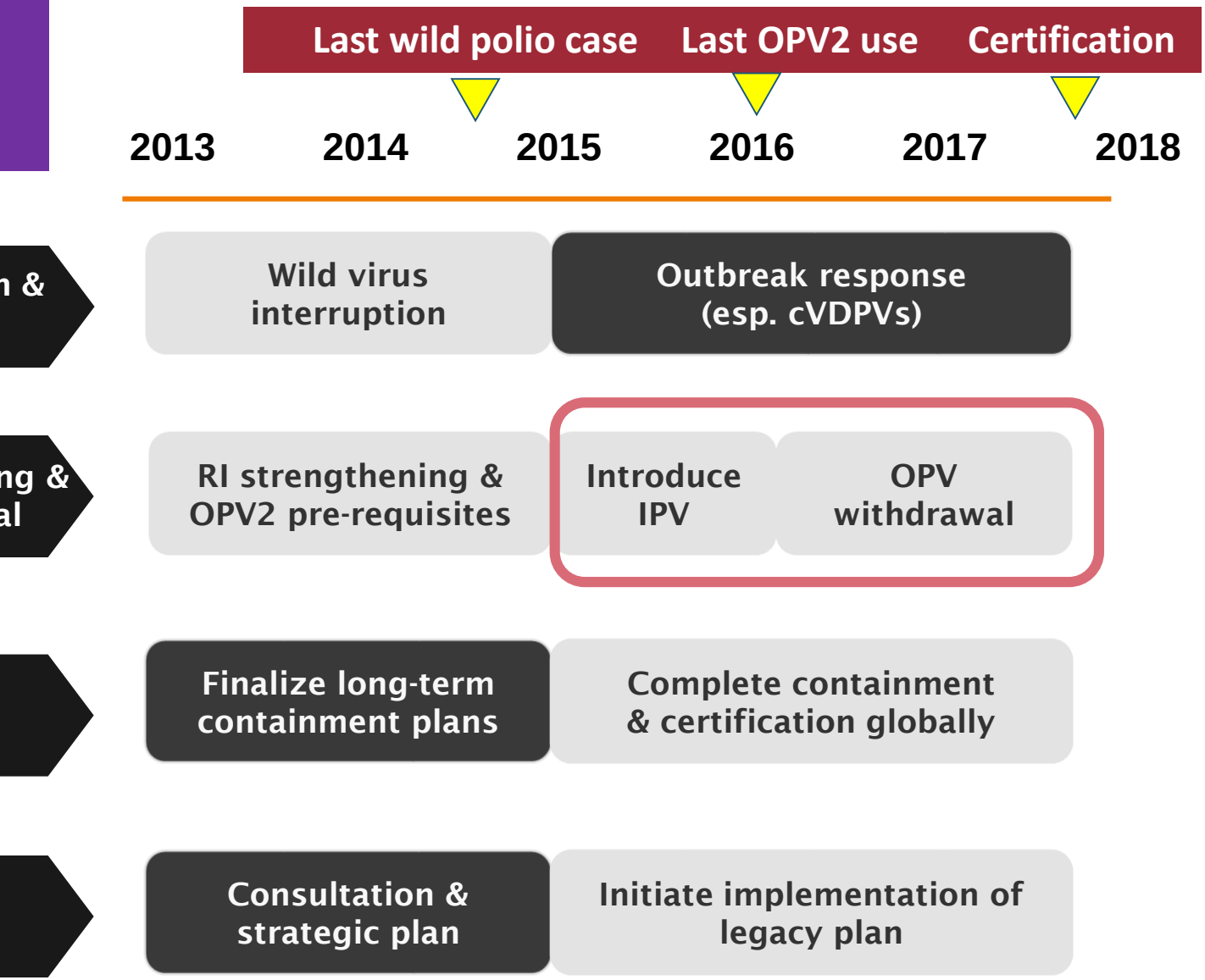
complete the eradication, containment & certification of all wild & vaccine-related polioviruses.

Endgame Plan, 2013-18

- Poliovirus detection & interruption
- OPV withdrawal, IPV introduction, RI strengthening
- Containment & Global Certification
- Legacy Planning



Endgame Major Objectives



Why is the Polio endgame needed?

- To secure the polio eradication forever, all live polioviruses must be removed from populations, including all vaccine viruses.

- Without achieving this, polio eradication is not possible.

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

  Types of VDPVs:

  - circulating VDPVs (cVDPVs)
  - immunodeficient VDPVs (iVDPVs)
  - ambiguous VDPVs (aVDPVs)

Rationale for OPV2 withdrawal

Risks of OPV2 now outweigh the benefits

Last naturally occurring case of WPV case detected in Aligarh, India in 1999 – WPV 2 ERADICATION CERTIFIED

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

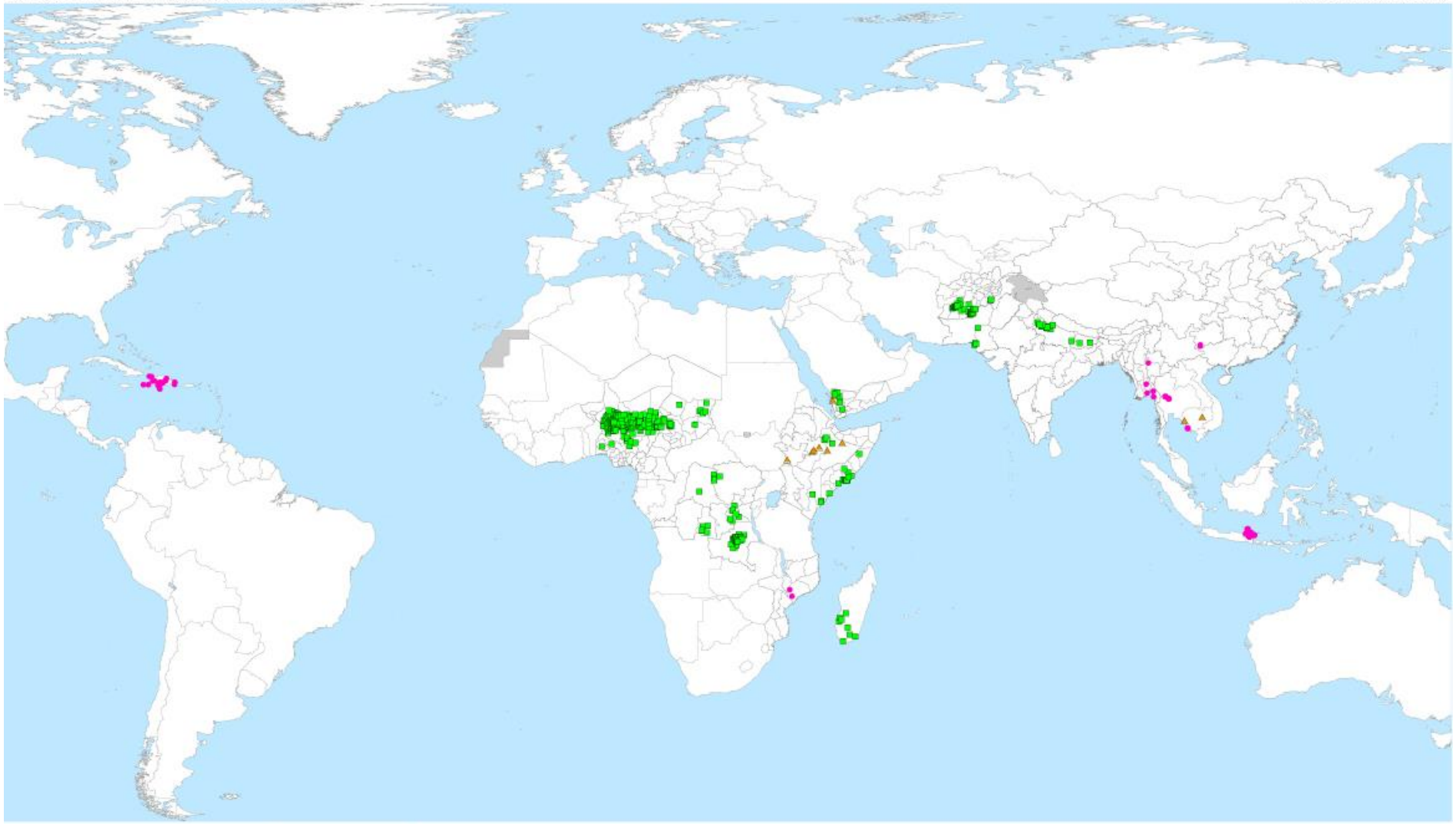
Type 2 component of OPV interferes with immune response to types 1 and types 3

GLOBAL cVDPV CASES 2000 - 2013*

© WHO 2013 All rights reserved

Global circulating vaccine derived polio cases between 2000-2013

MAP DATE: 10 July 2013 Version 1.0



Map Scale (A3): 1:66,720,833

1 cm = 667 km

Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree



Data Source:
Admin. Boundaries: World Health Organization
Map Production: Public Health Information and Geographic Information Systems (GIS)
World Health Organization
*Data as on 18 November 2013

- cVDPV1
- cVDPV2
- cVDPV3

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

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

Mitigate the risk of low population immunity against type 2 polio



Introduce IPV prior to OPV type 2 withdrawal

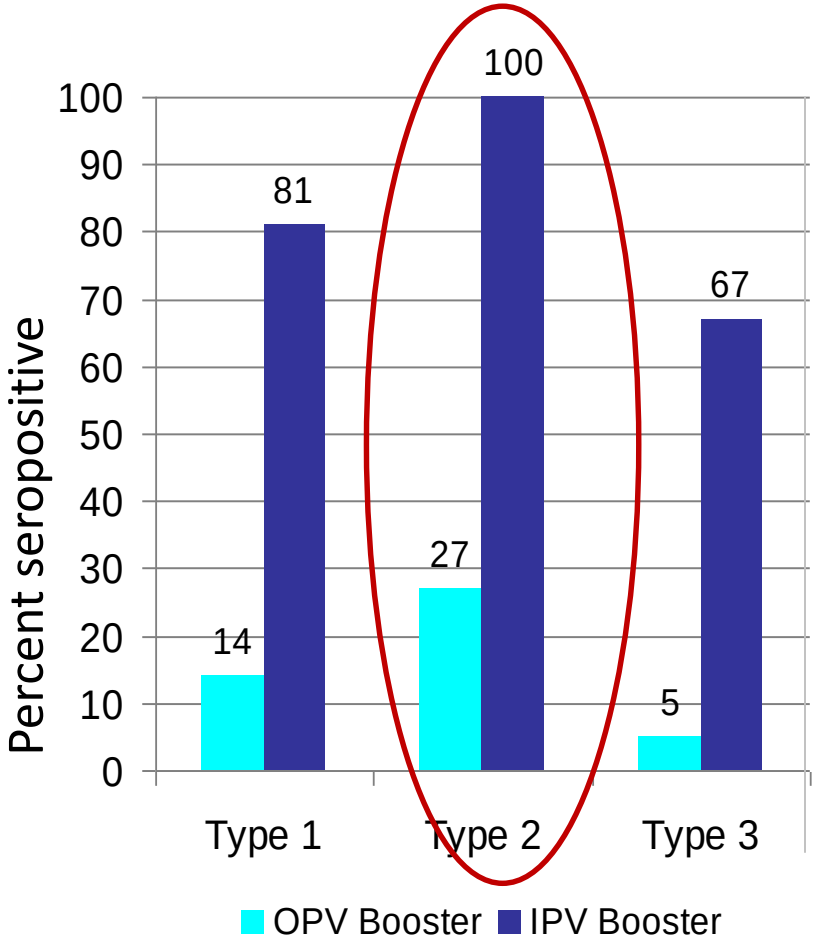
How does IPV help?

- Single dose of IPV, given to children previously vaccinated with OPV, boosts humoral and mucosal immunity significantly

- Single dose of IPV given to children that have not received OPV doses previously seroconverts 63% children and primes 99% children

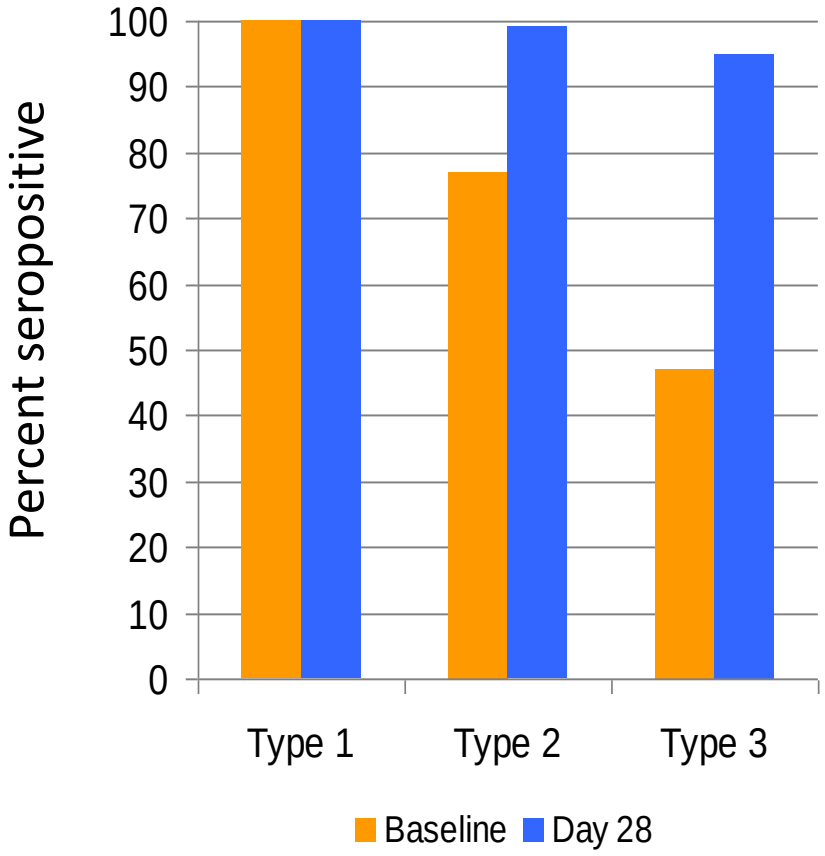
How does IPV help?

- Will IPV provide good humoral immunity
- Will IPV increase humoral immunity in OPV primed children?
- Will IPV increase mucosal immunity?
- Will IPV help in reducing VAPP?
- What is the best age to give IPV?
- How many IPV doses are needed?



Impact of IPV vs. OPV booster in OPV vaccinated sero-negative children 9 months of age

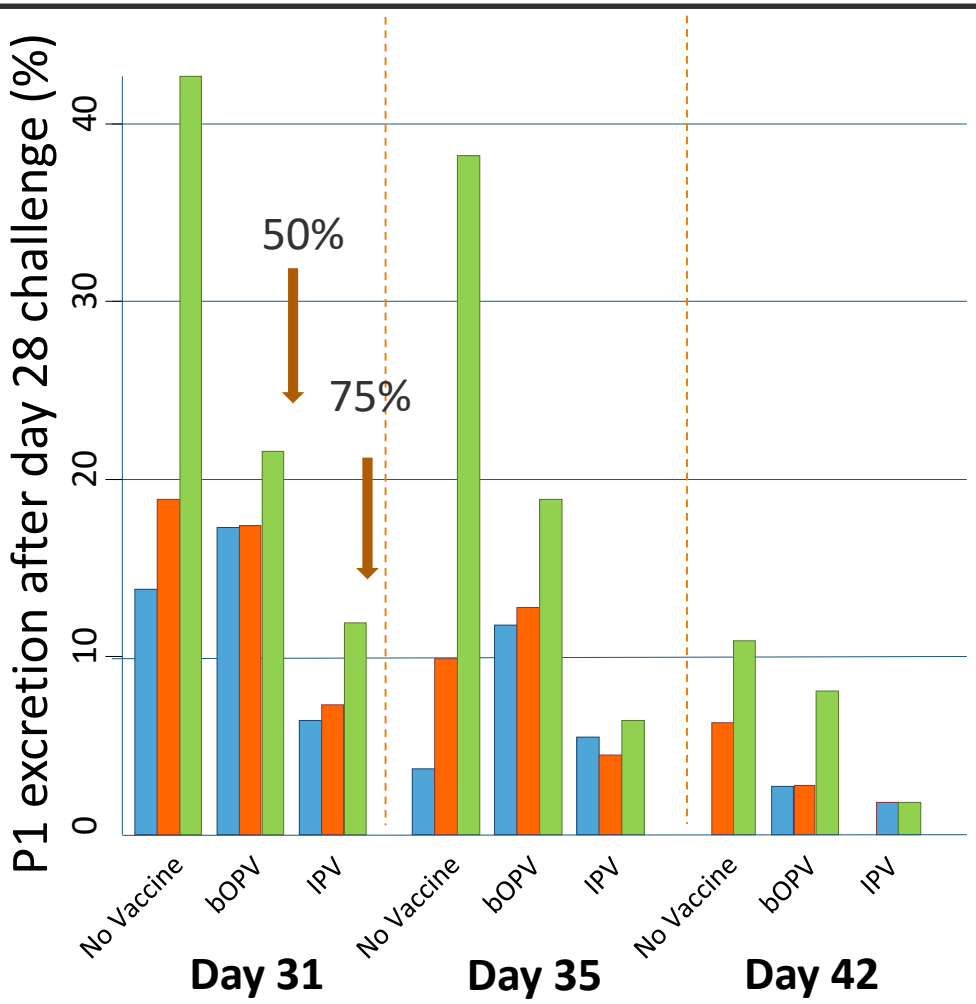
N=346



N= 862

- *Age: 6-9 months*
- *OPV primed children*
- *Single dose of IPV given at day 0 of study*
- *Blood collected at baseline & 28 days*

Single IPV boosts mucosal immunity in children with multiple OPV doses (Moradabad, 2011)



Science

AAAS

- ☑ IPV reduced fecal excretion for poliovirus types 1 and 3 between 38.9-74.2% and 52.8-75.7%, respectively, compared to control

- ☑ After challenge with vaccine viruses, the reduction in fecal excretion was also greater in children who received an additional dose of IPV prior to challenge, than children who received an additional dose of bOPV

*Hamid Jafari et al. Efficacy of inactivated poliovirus vaccine in India. Science 345, 922 (2014).

THE LANCET

Effect of a single inactivated poliovirus vaccine dose on intestinal immunity against poliovirus in children previously given oral vaccine: an open-label, randomised controlled trial

Jacob John*, Sidhartha Giri*, Arun S Karthikeyan, Miren Iturriza-Gomara, Jayaprakash Muliyil, Asha Abraham, Nicholas C Grassly†, Gagandeep Kang†

STUDY FINDINGS

A dose of IPV given to children aged 1–4 years previously vaccinated with OPV substantially increased humoral and intestinal mucosal immunity to poliovirus

Serum neutralizing antibodies were substantially increased and these children were significantly less likely to shed poliovirus after challenge with bOPV

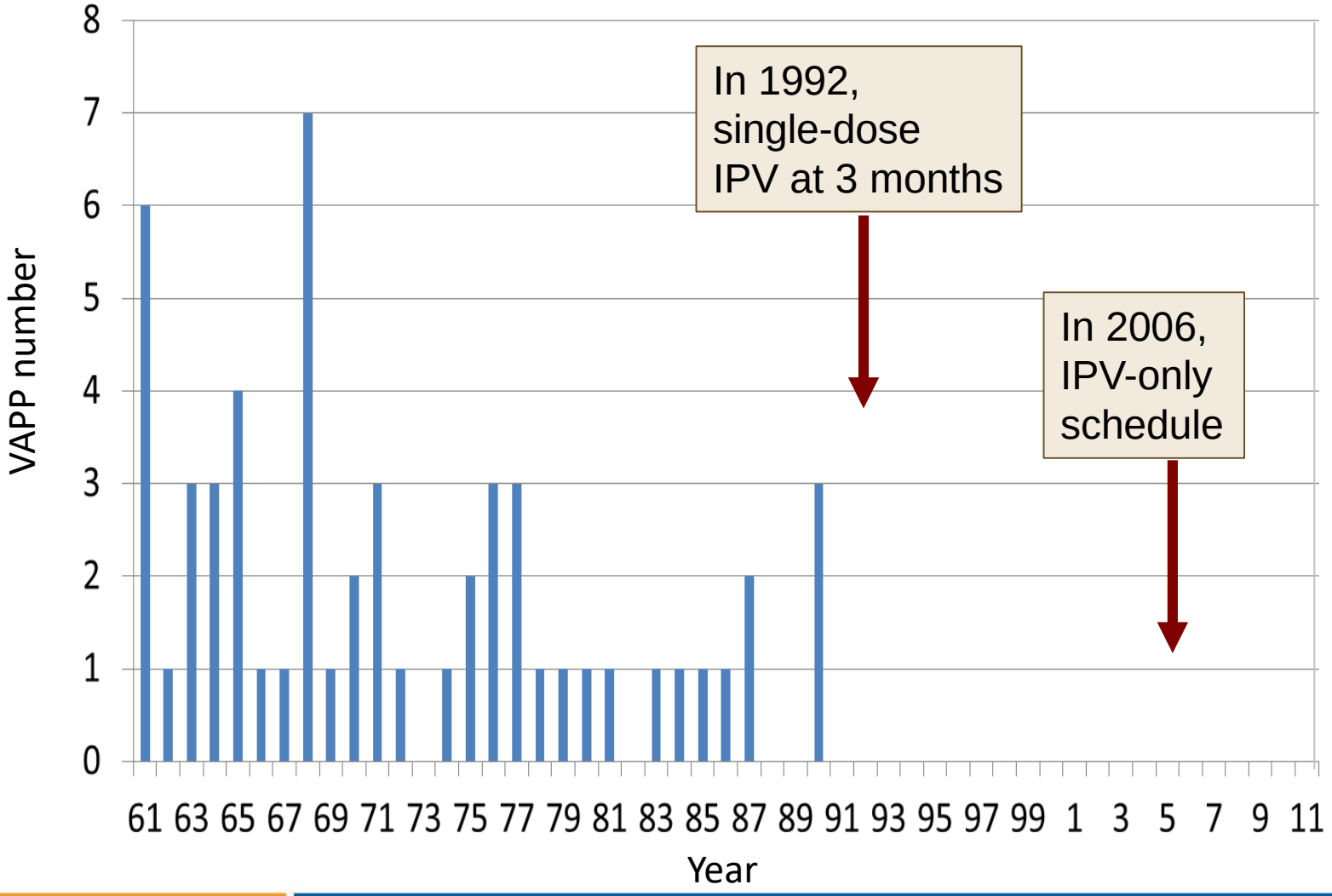
*http://dx.doi.org/10.1016/S0140-6736(14)60934-X

Early versus later IPV administration

Seroconversion for type 2 after a dose of IPV – studies from different countries

Author	Year	Country	Number of Subjects	Schedule	% Seroconversion for Type 2
McBean	1988	US	309	2 Month	35%
Simasathein	1994	Thailand	103	2 Month	39%
Resik	2010	Cuba	177	6 Weeks	36%
Mohammed	2010	Oman	186	2 Month	32%
Resik	2013	Cuba	153	4 Month	63%

- *4 month IPV dose: 63% seroconversion; 99% seroconversion & priming*
- *Earlier administration (potential losses): seroconversion decreased (32-39% vs 63%); priming also lower (<90%)*
- *Later administration: (potential gains): ? Seroconversion (>63%); ? Priming (> 98%)*


In 1992, single-dose IPV at 3 months
In 2006, IPV-only schedule
VAPP number
0
1
2
3
4
5
6
7
8
61 63 65 67 69 71 73 75 77 79 81 83 85 87 89 91 93 95 97 99 1 3 5 7 9 11
Year

The approach

Emphasis on routine immunization strengthening

- *raising coverage critical for achieving the endgame*

IPV to be introduced into the routine program

Switch from tOPV to bOPV

Recommended IPV Schedule*

At least one dose of IPV at 14 weeks or first contact afterwards

- All children who are behind on their schedule should receive **at least one dose** of the IPV at the first immunization contact after 14 weeks of age

IPV does **not replace ANY of the OPV doses**

- Until polio transmission is interrupted globally, OPV will be a critical component of the eradication strategy

WER, 3 Jan 2014, vol. 89, 1 (pp 1-20): at http://www.who.int/wer/2014/wer8901/en/index.html

National Immunization Schedule

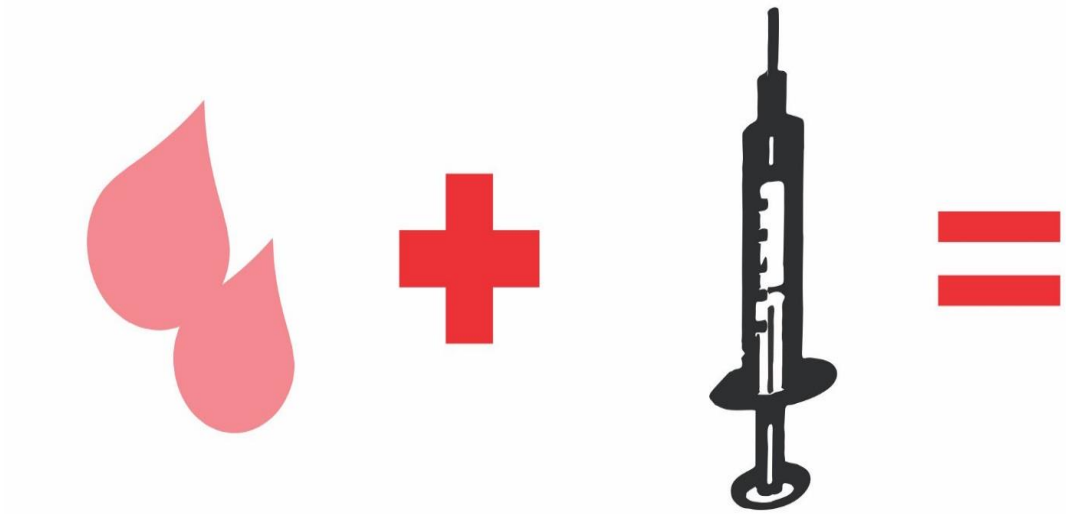
Age	Vaccines given
Birth	BCG, OPV, Hepatitis B
6 Weeks	Pentavalent-1/DPT1+Hep-B1, OPV1
10 weeks	Pentavalent-2/DPT2+Hep-B2, OPV2
14 weeks	Pentavalent-3/DPT3+Hep-B3,OPV3, **IPV**
9-12 months	Measles (MCV1), JE**
16-24 months	Measles (MCV2), JE**, DPT booster-1, OPV
5-6 years	DPT booster 2
10 years	TT
16 years	TT
Pregnant Mother	TT1, 2 or TT Booster***

*Pentavalent (DPT+HepB+Hib)- currently in 20 *states, to be **rolled out in 16 states** by Sep/Oct 2015*

** *in endemic districts only*

*** *one dose if previously vaccinated within 3 years*

Combined use of IPV and OPV provides strong intestinal immunity and antibody protection against all three serotypes



OPV (polio drops)

IPV (Polio Injection)



Strong protection against Polio

Summary – Polio End Game

- Globally coordinated withdrawal of OPV type 2 essential to eliminate VDPV and VAPP risks associated with continued use of OPV type 2
- Withdrawal of type 2 OPV implies switching from tOPV to bOPV in the programme
- Single dose of IPV will helps boost both humoral and mucosal immunity in children that **have received OPV doses**
- **Single dose of IPV at 14 weeks or the first contact thereafter is preferred option**
- Routine Immunization needs to be strengthened and AFP surveillance should remain highly sensitive

Thank you