

Global Polio Eradication: Progress and Prospects

ACIP Meeting
February 26-27, 2020



POLIO

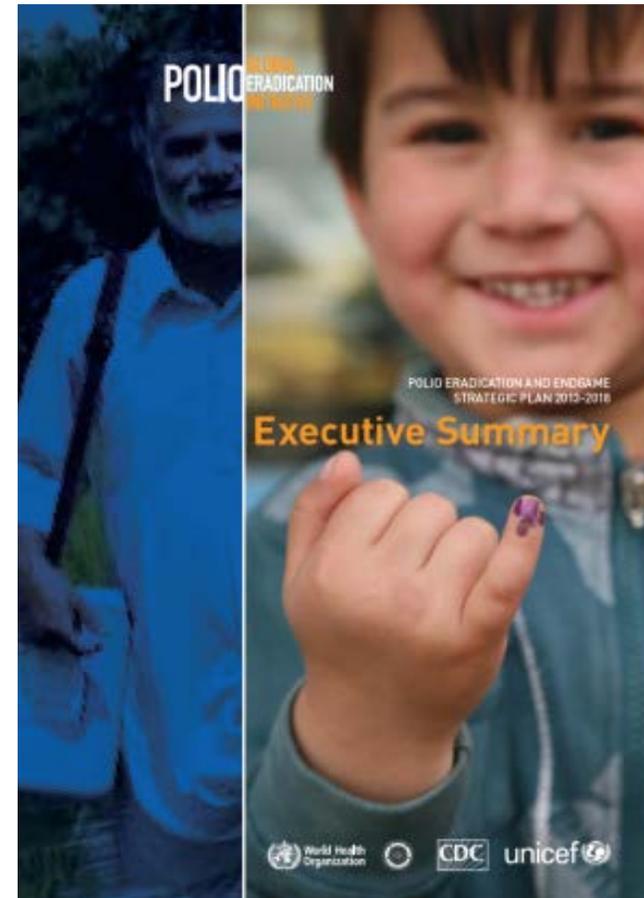
WHERE ARE WE NOW?

Center for Global Health
Global Immunization Division



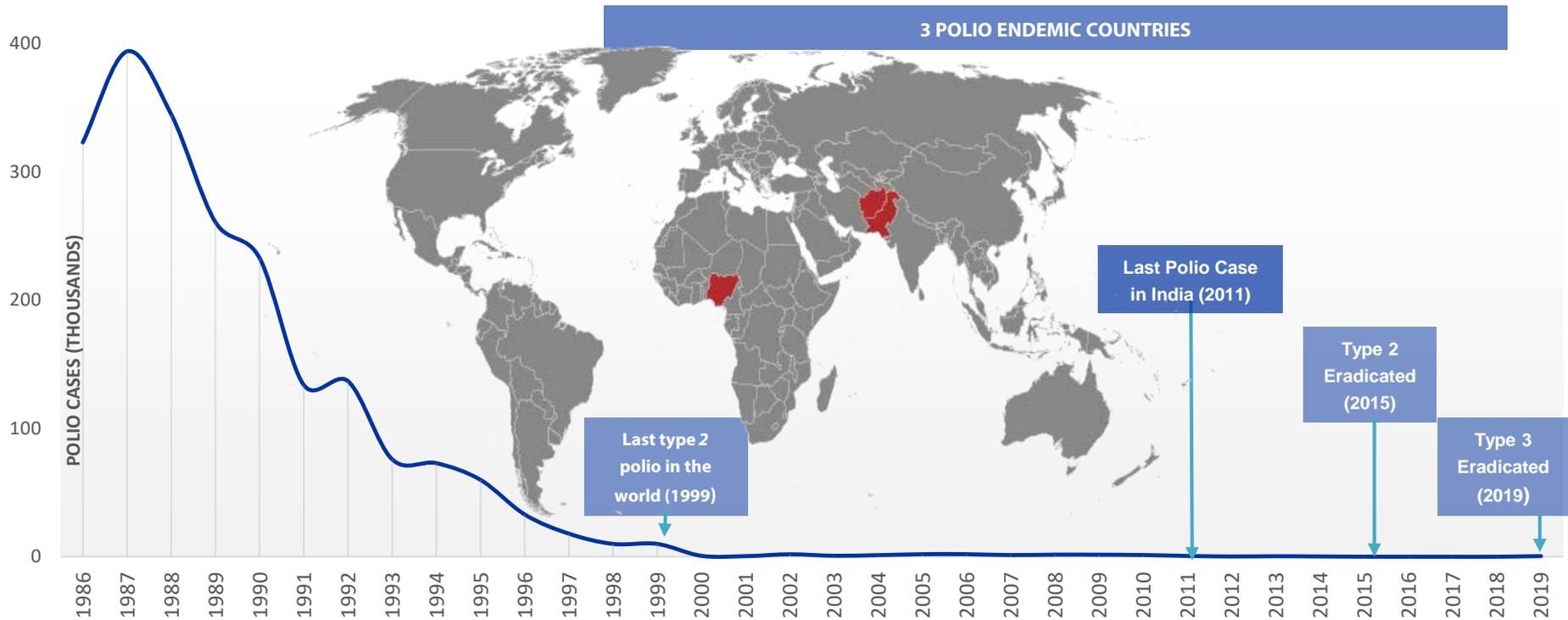
Polio Eradication and Endgame Strategy

1. Poliovirus detection & interruption
2. OPV2 withdrawal, IPV introduction, immunization system strengthening
3. Containment & Global Certification
4. Transition Planning



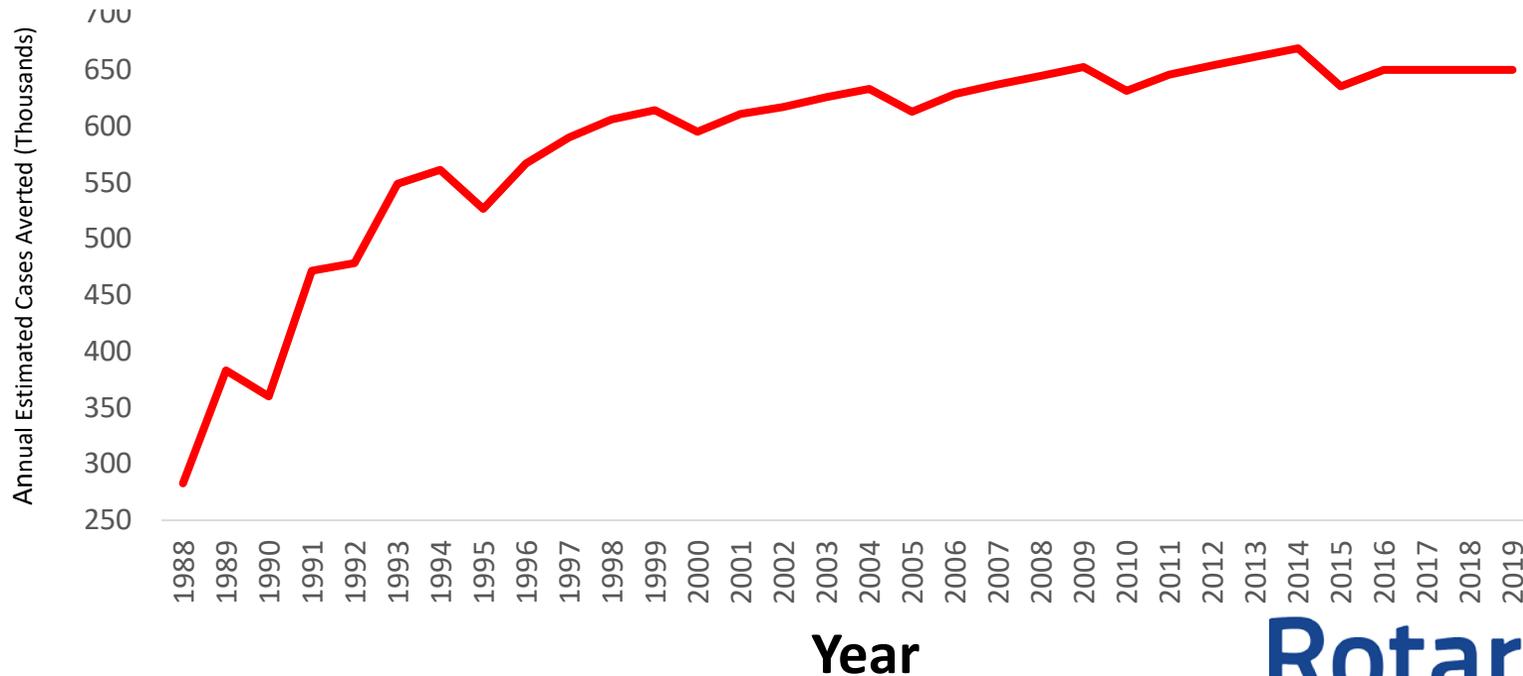
GLOBAL UPDATE

Distribution of Wild Poliovirus 2019



Annual Number of Polio Cases Averted Globally, 1988-2019

- Total Number of Polio Cases Averted: 18.7 Million



Source: WHO/CDC



Rotary



WPV3 Eradication Certified



World Health Organization

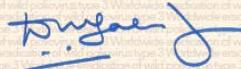
CERTIFICATE OF ERADICATION

WILD POLIOVIRUS TYPE 3

Geneva, Switzerland

We, the members of the Global Commission for the Certification of Poliomyelitis Eradication, conclude today, 17 October 2019, that

indigenous wild poliovirus type 3 has been eradicated worldwide.



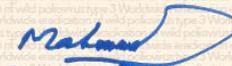
Professor David Salisbury, Chair
WHO European Region



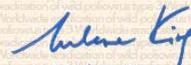
Professor Yagoub Al-Mazrou
WHO Eastern Mediterranean Region



Professor Rose Leke
WHO African Region



Professor Mahmudur Rahman
WHO South-East Asian Region



Dr Arlene King
WHO Region of the Americas



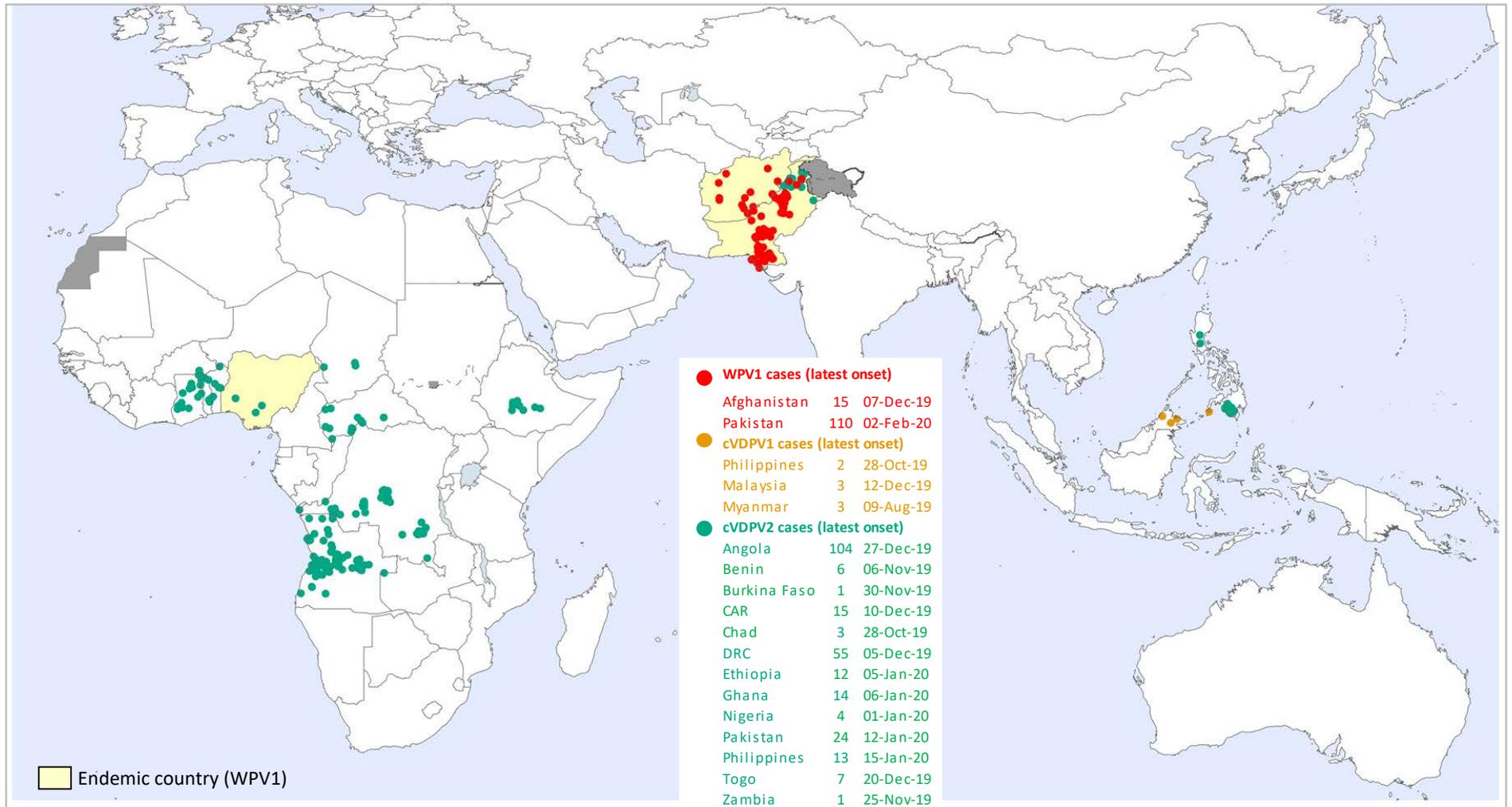
Dr Nobuhiko Okabe
WHO Western Pacific Region

The “good” news

- 7+ years have passed without detection of wild poliovirus type 3
 - **GCC certified WPV3 eradication on 17 October 2019**
- The number of inaccessible children in formerly Boko Haram controlled areas in Borno State, Nigeria, has been drastically reduced
- 3+ years have passed with detection of any wild poliovirus in Africa, and African Regional Certification Commission will convene in June 2020 to determine regional certification
- IPV supplies are now sufficient for routine immunization, and catch-up of missed cohorts is in progress
- EURO, PAHO, SEARO remain polio-free (incl. cVDPV2)
- Gavi (the Vaccine Alliance) has joined GPEI



Global WPV1 & cVDPV Cases¹, Previous 6 Months²



¹Excludes viruses detected from environmental surveillance

Data in WHO HQ as of 18 Feb. 2020

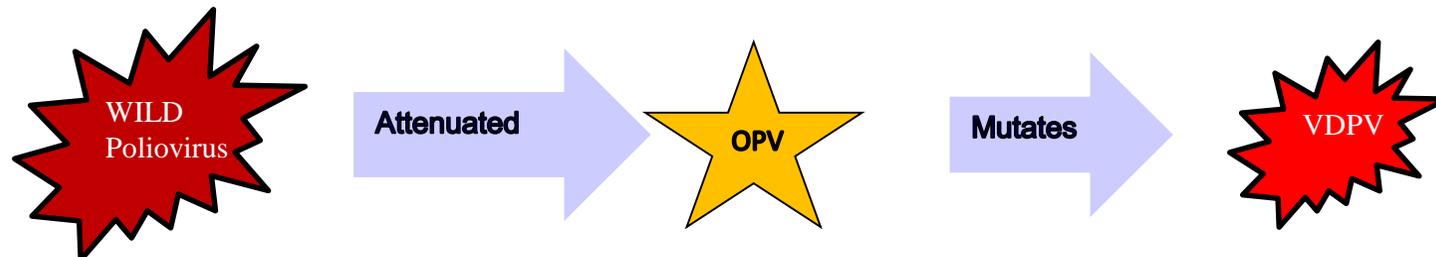
²Onset of paralysis: 19 Aug.2019 – 18 Feb. 2020

The “bad” news

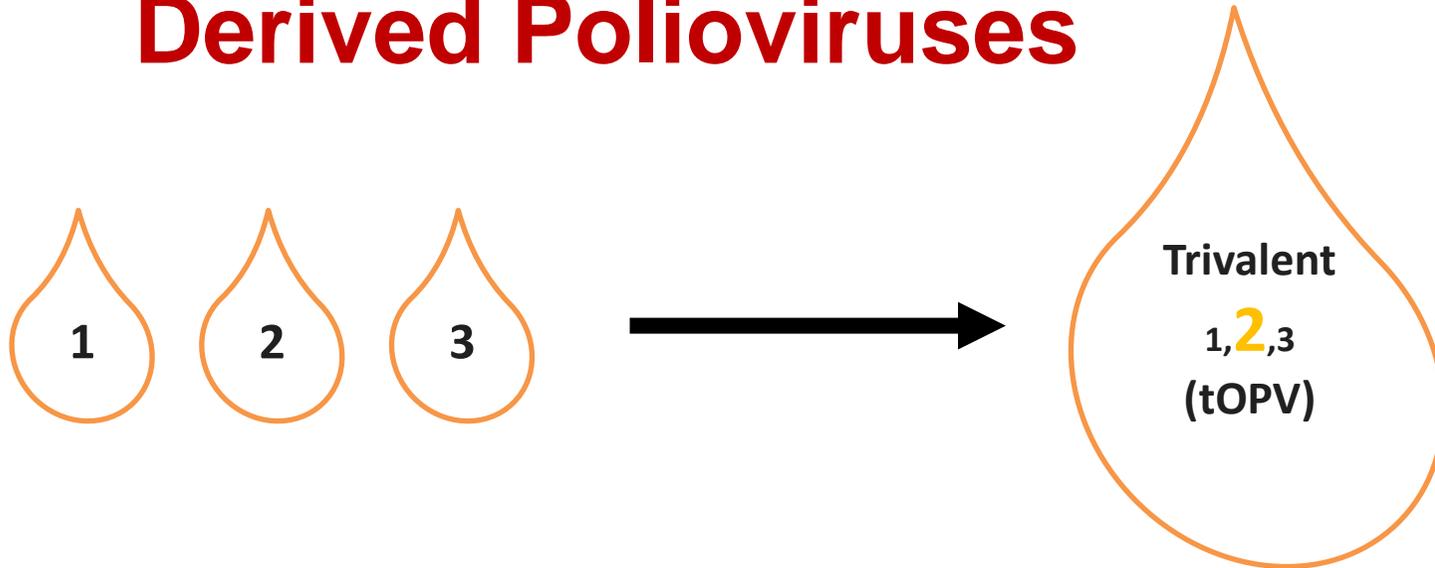
- Wild type 1 cases increased from 33 cases in 2018 to 173 cases in 2019
- The Taliban ban on house-to-house vaccination in Afghanistan is severely affecting the ability of the program to carry out campaigns
- In Pakistan, a new government is starting to provide national leadership – but >6 months passed in 2nd half of 2019 without large-scale vaccination campaigns and wild polio cases surged
- AFRO, EMRO and WPRO battle outbreaks of type 2 circulating vaccine-derived poliovirus (cVDPV2)

Polioviruses Can Rarely Regain Ability to Cause Paralysis

- Polioviruses in trivalent OPV are attenuated wild polioviruses (WPVs)
- Attenuation results in:
 - Markedly less ability to cause paralysis than WPV
 - Less capacity to pass from person to person than WPV
 - Similar induction of antibodies as WPV
- OPV polioviruses **in areas with low polio vaccine coverage** can rarely mutate during prolonged circulation and become **vaccine-derived polioviruses (VDPVs)** able to spread and cause paralysis (circulating VDPVs, cVDPV)

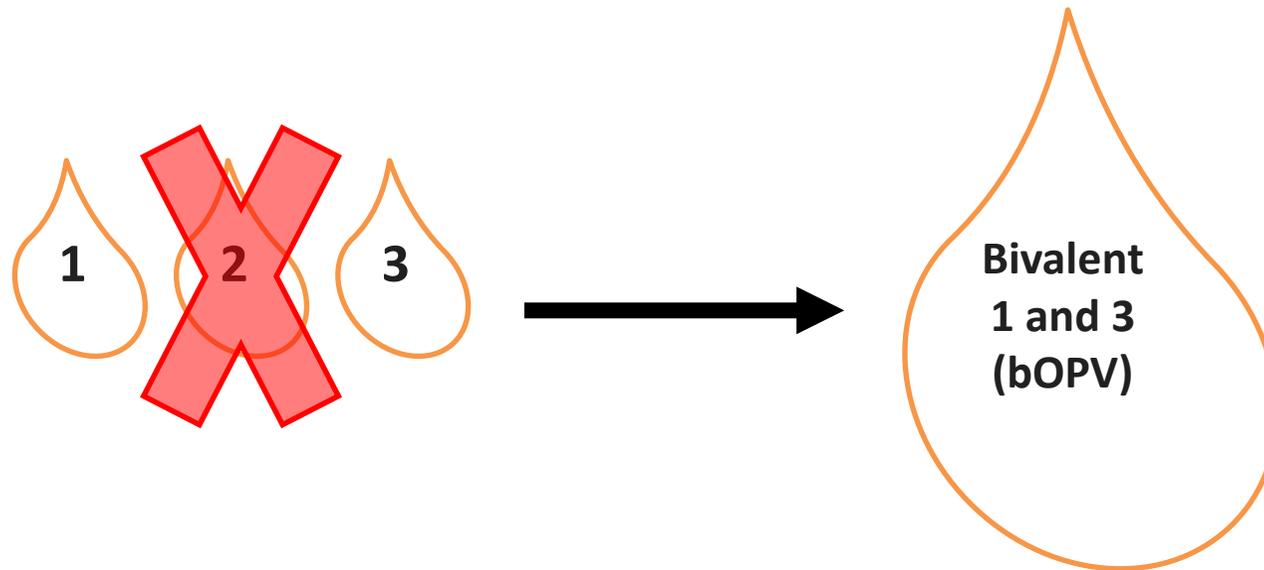


Preventing Circulating Type 2 Vaccine-Derived Polioviruses



- 700 paralytic cases due to type 2 cVDPV polioviruses confirmed during 2001-2015
- Prompted strategic decision to withdraw OPV2 use in all routine and supplementary immunization activities

Globally Coordinated Switch from tOPV to bOPV in 2016



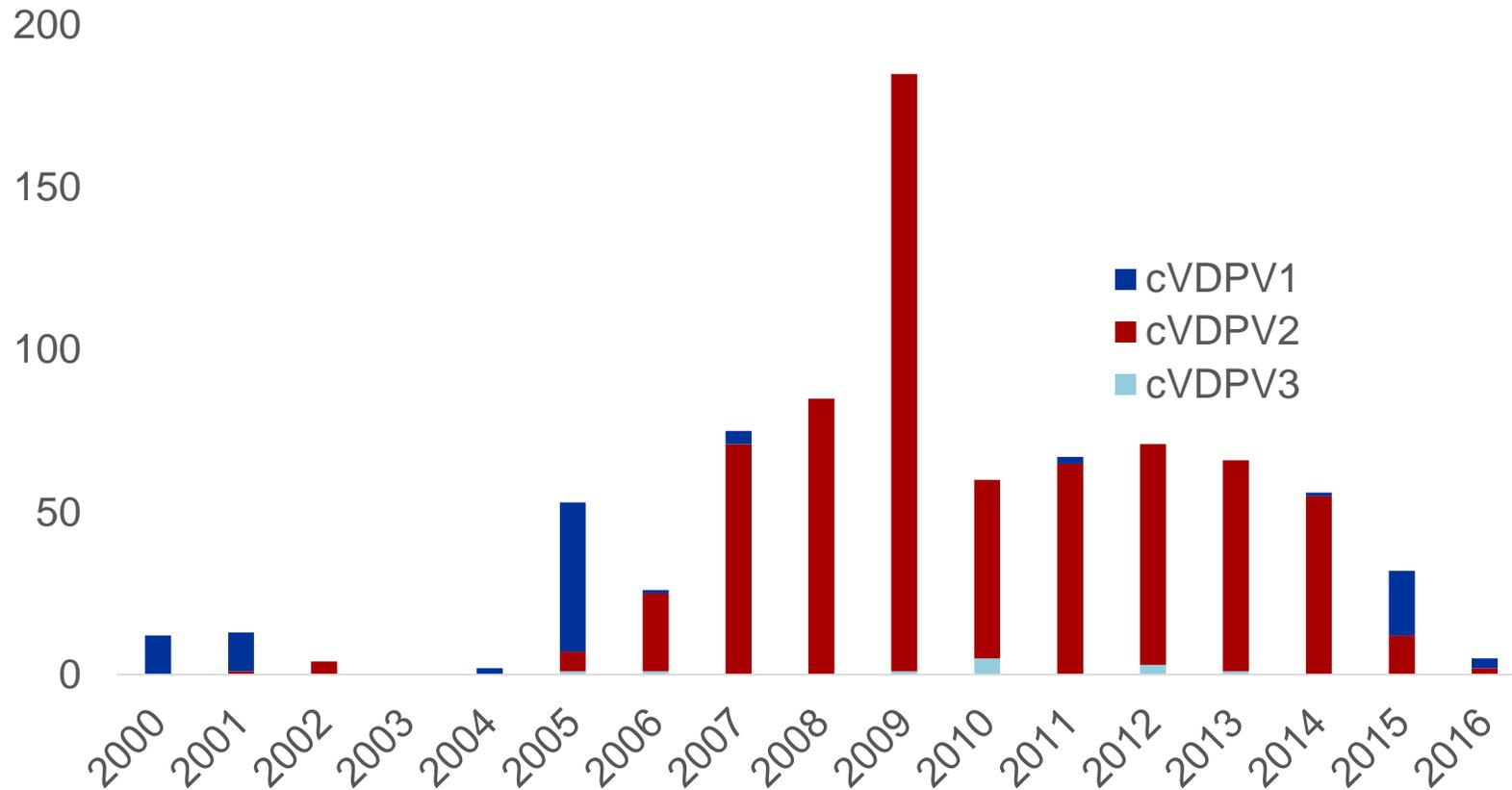
**Wild poliovirus type 2 last
isolated in 1999, certified
eradicated in 2015**

**155 countries
switch in April 2016**

Why Introduce IPV?

- IPV complements tOPV by increasing immunity to all three types of polioviruses, prepares for withdrawal of all OPV
- After the switch:
 - IPV will provide protection against paralysis from type 2 polioviruses (in those reached and who seroconvert)
 - In previous OPV2 recipients, IPV will boost intestinal immunity to infections with type 2 polioviruses
 - Strategic use of IPV in response to type 2 poliovirus outbreaks alongside monovalent OPV 2 (mOPV2) will increase population protection from paralysis

In 2016, fewer cVDPVs than in over a decade

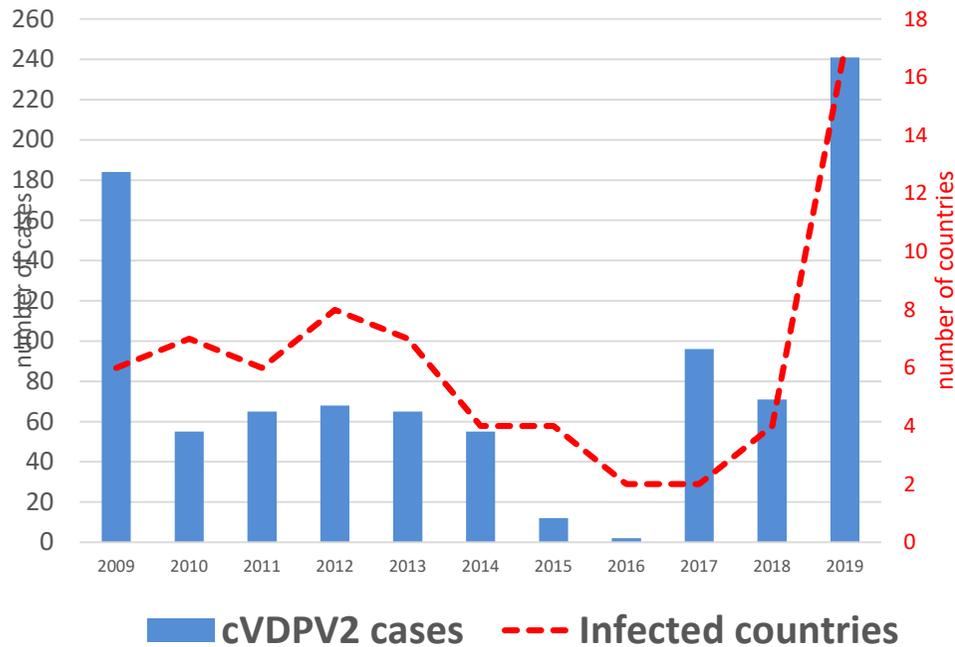


as of 10 February 2017

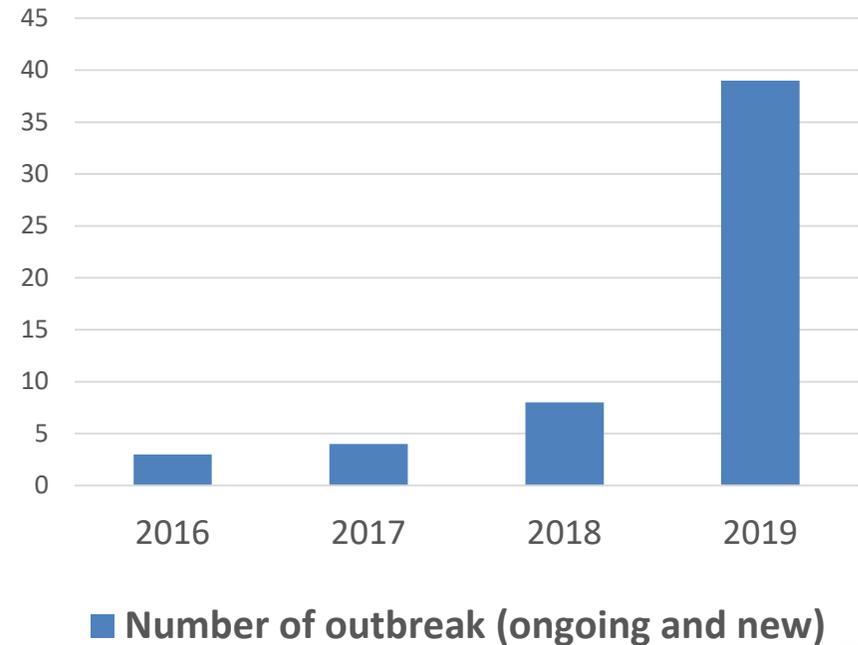
(current numbers: <http://www.polioeradication.org/Dataandmonitoring/Poliothisweek.aspx>)

In 2019, the Number of cVDPV2 Cases and Infected Countries Sharply Increased

Number of cVDPV2 cases and infected countries, 2009-2019



Number of cVDPV2 outbreaks, 2016-2019



cVDPV2 outbreaks

- Several outbreaks have been terminated after successful implementation of at least two mOPV2 rounds
- However :
 - To stop outbreaks, many responses required ≥ 4 rounds
 - Many new emergences are occurring across the African region due to low quality responses with mOPV2
 - Increasingly, outbreaks are occurring in areas where mOPV2 has not been used
- Caused by :
 - Decreasing population mucosal immunity since OPV2 withdrawn in 2016
 - Population movement

More “bad” news

An evolving new challenge

- The program is battling many outbreaks of cVDPV2 in Sub-Saharan Africa → and at risk of re-establishing poliovirus type 2 endemicity in Africa
- Detection of cVDPV2 outbreaks in Asia (China, Pakistan and the Philippines) may herald a global emerging problem
- Limited supply in global mOPV2 stockpile requires balancing use with availability of new shipments



'The switch' was supposed to be a major step toward eradicating polio. Now it's a quandary

By HELEN BRANSWELL @HelenBranswell / SEPTEMBER 13, 2019



A child is vaccinated against polio in Kajiado, Kenya.
YASUYOSHI CHIBA/AFP/GETTY IMAGES

Three years ago, the leaders of the international campaign to eradicate polio pulled off a landmark feat, [phasing out a problematic component of the vaccine](#) used in developing countries, and introducing a newer version that they hoped would put the world on a better footing to finally eliminate a global scourge.

Now, some organizers are weighing whether “the switch,” as the process was known, needs to be reversed.

If it's not, some fear, the world could face a heightened risk of spread of the disease, currently confined to its last redoubt, Pakistan and Afghanistan.

Quandary (definition):

- a state of perplexity or uncertainty over what to do in a difficult situation

Way forward -- cVDPV2

- Prevent cVDPV2 spread into new geographies
 - Rapid deployment of mOPV2
 - Revised strategy guidance for control of cVDPV2 finalized in January 2020
 - Increase scope and quality of mOPV2 SIAs with surge in technical support
- Accelerate development & regulatory review & use of novel OPV2 → **Emergency Use Listing (EUL)**

What is novel OPV2 (nOPV2)?

- nOPV2 is a **genetic modification of the existing OPV type 2**
- The modifications made are designed to **improve genetic stability of OPV**
- This will in turn **decrease the risk of seeding new cVDPVs and the risk of VAPP** when deployed for cVDPV2 outbreak response

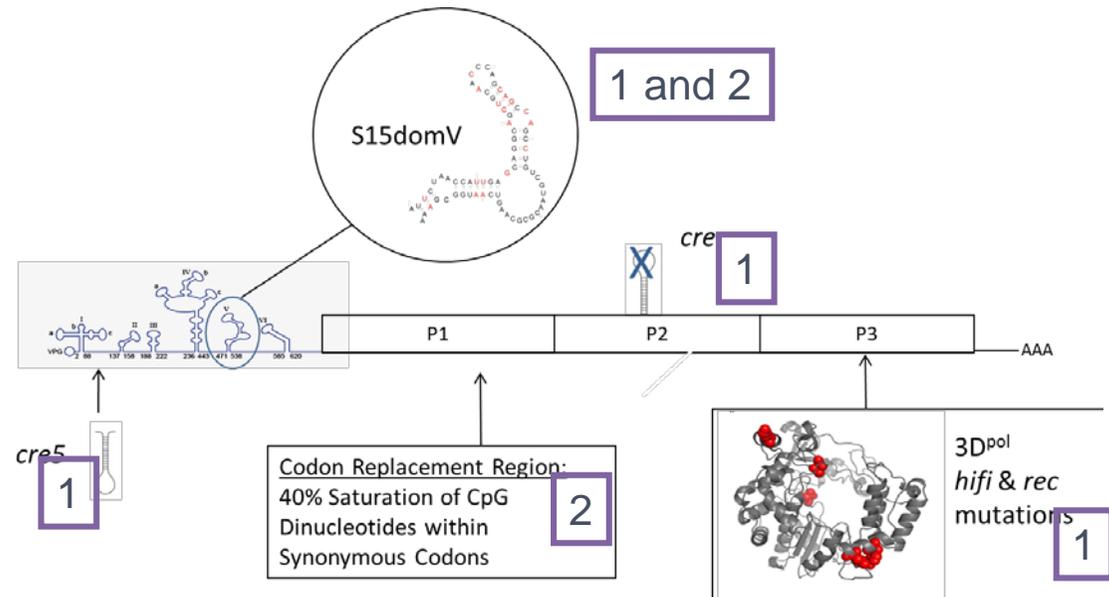


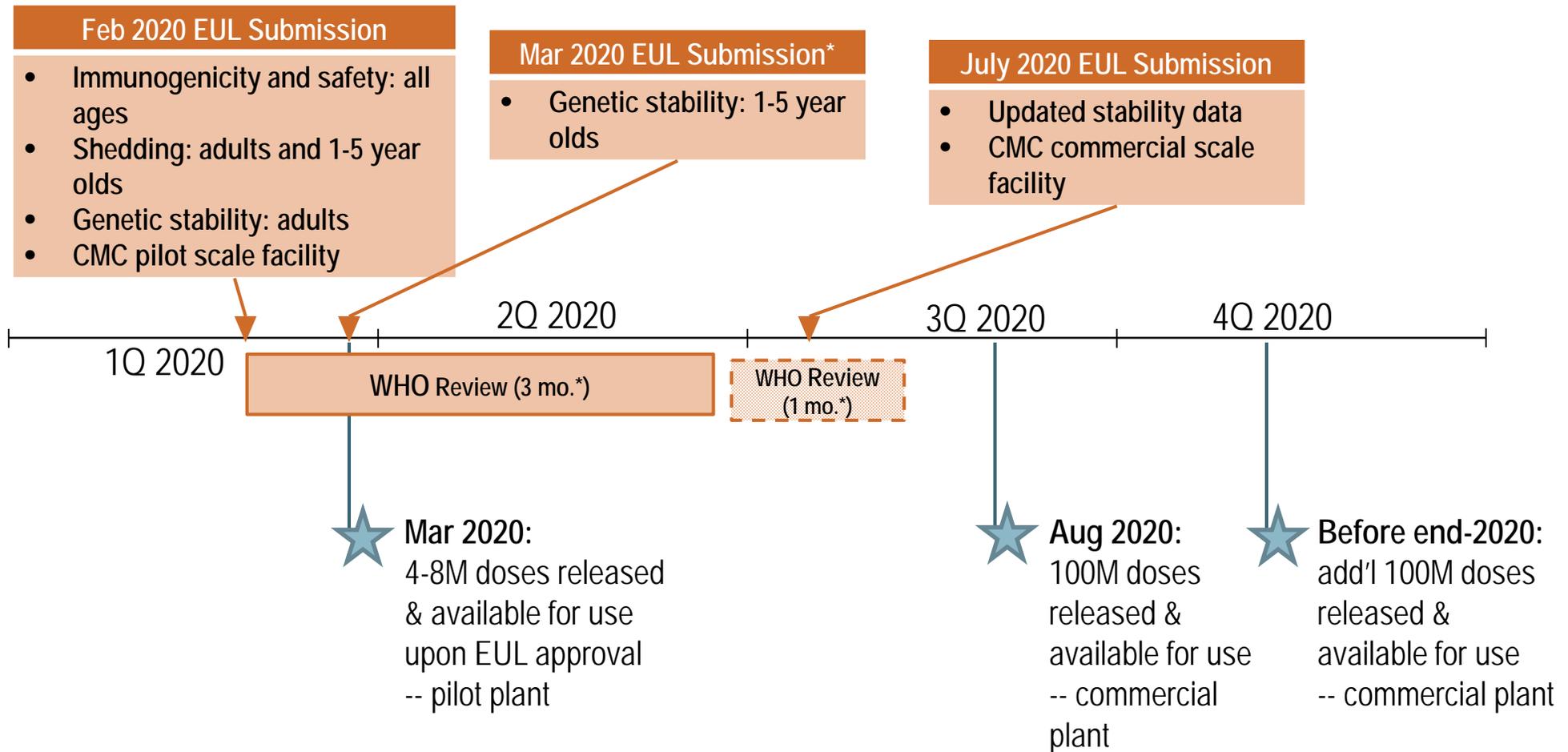
Figure 1: Modifications in nOPV2 Candidates

Sabin 2 genome is depicted showing the 5' untranslated region (UTR) in grey shading, polyproteins (P1-3), 3' UTR and polyA; locations of modifications within the genome are shown. Nucleotide differences between Sabin 2 and S15 domain V are shown in red.

Accelerating Regulatory Approval through EUL

- Owner: WHO Essential Medicine Department (EMP, PQ)
- Goal: make “experimental” health products available for emergency response
- Products listed under EUL so far: 0
- Eligibility criteria nOPV2: poliovirus spread is a Public Health Emergency of International Concern (PHEIC)
- Fastest way to obtain regulatory review and approval

Ramp-up of nOPV2 Clinical Development and Production to Align with EUL Approval



* Estimated

Summary

- Polio eradication made some progress in 2019, but encountered serious challenges
- Wild poliovirus eradication requires access in Afghanistan and vaccination quality improvements/accountability in Pakistan
- cVDPV2 outbreaks threaten the success of “switch” and may lead to re-establishment of type 2 endemicity
- mOPV2 needs to be replaced as soon as feasible by genetically more stable novel OPV2
- A 2nd dose of IPV in Routine Immunization is under discussion when supplies allow
- Securing the funds to run the program is a very high priority

Thank you

