30-31July 2014

# 9th Meeting of the SAGE Polio Working Group

## Conclusions and recommendations

## Note for the Record

World Health Organization

**DRAFT AS OF 10/2/14**

## Background

The ninth meeting of the SAGE Polio Working Group (WG) was held on 30-31 July 2014 at the World Health Organization in Geneva, Switzerland.

The meeting was attended by the following WG members: Peter Figueroa (Chair), Elizabeth Miller, Francis Nkrumah, Walter Orenstein, Antoine Kabore, Kimberly Thompson, Nicholas Grassly, Walter Dowdle, Hyam Bashour T Jacob John and Zulfiqar Bhutta.

Participants from WHO included Bruce Aylward, Diana Chang Blanc, Alejandro Costa, Shelley Deeks, Philippe Duclos, Jackie Fournier-Caruana, Andrew Freeman, Tracy Goodman, Hamid Jafari, Hiromasa Okayasu, Elisabeth Pluute , Nicoletta C. Previsani, Alejandro Ramirez Gonzalez, Roland Sutter, Rudi Tangermann, Graham Tallis, and Michel Zaffran

Participants from GPEI partner organizations included Guillaume Chabot-Couture (Institute of Disease Modelling), John Modlin (Bill and Melinda Gates Foundation), Ann Ottosen and Jennifer Rubin (UNICEF).

This note presents a summary of the main findings, conclusions and recommendations from the meeting.

## Objectives of the Meeting

Since the launch of the Polio Endgame Strategic Plan 2013-2018 in 2013, significant progress has been made towards achievement of withdrawal of oral polio vaccine type 2 (OPV2) and introduction of IPV in routine immunization, as defined in objective 2 of the Plan. In May 2014, the World Health Assembly (WHA) adopted OPV 2 withdrawal readiness criteria and timeline. These criteria include: a) introduction of IPV in OPV-only using countries; b) access to bivalent OPV that is licensed for routine immunization; c) implementation of surveillance and response protocols for type 2 poliovirus (including constitution of a stockpile of monovalent oral polio vaccine type 2); d) completion of phase 1 containment activities under the Global Action Plan (GAP) with appropriate handling of type 2 poliovirus materials and e) verification of global eradication of wild poliovirus type 2.The trigger for setting a definitive date for OPV 2 withdrawal globally will be the absence of all persistent circulating vaccine-derived type 2 polioviruses[1] for at least six months[2]. The current target date is April 2016.

The objective of this WG meeting was to review the status of the preparation towards withdrawal of OPV2, specifically the following:

1. Trigger for OPV2 withdrawal;
2. cVDPV2 risk mitigation strategy at the time of OPV2 withdrawal;
3. Strategic approach to align containment with the new polio endgame;
4. Protocol for the management and use of the mOPV2 stockpile;
5. Plans for environmental surveillance expansion; and
6. Other readiness criteria (e.g. IPV introduction, bOPV licensure )& tOPV Withdrawal Protocol

## Topic 1: Trigger for OPV2 withdrawal

The WG reviewed progress towards the 'trigger' for OPV2 withdrawal, which is the absence of 'persistent' cVDPV2s for at least 6 months globally, particularly in the context of the timeline of OPV2 withdrawal in April 2016. Despite the significant progress made in reaching more children (e.g. increasing coverage in Nigeria and vaccination of internally displaced populations from previously inaccessible cVDPV2-infected areas in Pakistan), cVDPV2 continues to circulate in Nigeria (since July 2005) and Pakistan (since August 2012).

Since 2005, there have been more than 20 separate emergences of cVDPV2 in Nigeria and some of these strains continue to circulate in the northern states. In 2014 to date there are more cVDPV type 2 cases than

[1] Persistent cVDPVs refer to cVDPVs known to have circulated for more than six months

[2] World Health Assembly. Poliomyelitis: intensification of the global eradication initiative. Report by the Secretariat. Geneva: World Health Organization, 2014

WPV 1 (18 vs. 5)[3], and seroprevalence surveys in Sokoto and Kano indicate that the type 2 population immunity is low and has dropped significantly between 2011 and 2013 in Kano (from 75% to 42% among 6-9 months old infants)[4]. Nigeria has implemented very few immunization campaigns with tOPV. Only one large-scale tOPV campaign has been conducted in Northern Nigeria in each of 2012 and 2013, with the most recent campaign implemented 17 months ago. Moreover, vaccination efforts have been compromised due to insecurity and limited access to some areas, particularly in Borno State which has reported 12 of the 18 cVDPV2 cases this year.

Since mid-2012, there have been 5 separate emergences of cVDPV2 in Pakistan. The country has reported 16 cVDPV2 cases so far this year (as of 5 August 2014). Almost all of these cases have occurred in the Federally Administered Tribal Areas (FATA) and Khyber Pakhtunkhwa (KP)[5]where access is compromised due to insecurity. However, recently there has been significant progress in vaccinating children displaced from inaccessible areas through transit vaccination and vaccination of internally displaced persons (IDPs) and their host communities. To date, nearly 0.5 million children have been vaccinated in transit and more than 0.5 million have been vaccinated four times in districts hosting the IDPs. More tOPV rounds are planned in these communities in coming months, as is the targeted use of IPV in campaigns.

During the last meeting in April 2014, SAGE emphasized that the elimination of persistent cVDPV2 should be a high priority for the global eradication effort; it urged countries to optimize the OPV mix in efforts to interrupt transmission of both cVDPV and WPVs in parallel so that OPV2 can be withdrawn during the 'low season' for polio transmission in 2016, as planned[6]. Accordingly, Nigeria is currently planning 3 large scale tOPV campaign between August 2014 and March 2015 in Northern Nigeria (August 2014, November 2014 and March 2015). A modelling analysis by the Institute for Disease Modelling (IDM) indicated that these rounds will increase immunity in children under 5 years of age significantly against type 2 (for example, from 50% to 65% in Sokoto, and from 30% to 50% in Kano). While this increase will drastically reduce cVDPV2 transmission, it is unlikely to stop it entirely (Figure-1). The analysis also indicated that reduction in type 1 immunity which will take place in Northern Nigeria (less than 3-5% in most states) from replacing some bOPV campaigns with tOPV during in second half of 2014 and in early 2015 could be counterbalanced by an increase in campaign quality (Figure-2)[7].

**WG decisions/recommendations**

- To ensure that no new cVDPV2 emergences result in persistent cVDPV2s in advance of the OPV2 withdrawal target date of April 2016, the response to newly emergent cVDPV2s globally must be substantially enhanced, with any new cVDPV2 now recognized and treated as a public health emergency, on par with a wild poliovirus (WPV) outbreak.
- Given the increasing urgency and importance of properly managing cVDPV2s to facilitate timely withdrawal of OPV2 globally, the GPEI should by September 2014 develop a new, standard data format for tracking and communicating new and persistent cVDPVs and carry out the work to ensure their rapid interruption (including timing, epidemiology, location of emergence, interventions).
- The current vaccination strategy in Nigeria of 3 large scale tOPV rounds between August 2014 and March 2015, is not likely to stop the widespread, multiple persistent cVDPV2s in the country. This represents a major threat to the global timeline for OPV2 withdrawal in the 1st quarter of 2016, and a major risk to the children of Nigeria and surrounding countries. The Nigeria Expert Review Committee (ERC) is urged to review the new analyses on type 2 immunity in the country and the relative impact of tOPV vs bOPV campaigns on population immunity to poliovirus types 1 and 2 through March 2015. Based on these analyses, the increasing burden of type 2 disease in 2014, and the escalating risk of another major cVDPV type 2 epidemic, Nigeria must consider using tOPV in at least 4 large-scale SIAs across the northern states between August 2014 and March 2015, and possibly more in the

[3] Global Polio Eradication Initiative (2014). http://www.polioeradication.org/Dataandmonitoring/Poliothisweek/Circulatingvaccinederivedpoliovirus.aspx (Accessed on 12 August 2014)

[4] Unpublished data

[5] Global Polio Eradication Initiative (2014). http://www.polioeradication.org/Dataandmonitoring/Poliothisweek/Circulatingvaccinederivedpoliovirus.aspx (Accessed on 12 August 2014)

[6] World Health Organization. Meeting of the Strategic Advisory Group of Experts on immunization, April 2014 – conclusions and recommendations. Weekly epidemiological record. 2014: 89, 221-236

[7] IDM (2014). Unpublished analysis

northwest where neither WPV1 nor WPV 3 has been isolated in the past 2 years. Population immunity analyses suggest that this approach can address the goals for cessation of both WPV1 and cVDPV2. Nigeria should also consider the use of IPV (simultaneously with OPV) in SIAs in areas with low type 2 immunity, to the extent possible.

- Pakistan must use the current opportunity and population access in the north-west of the country to stop the persistent cVDPV2 by end-2014 by ensuring that tOPV is used in a sufficient number of the upcoming SIAs targeting children from conflict-affected areas and considering the judicious use of IPV (simultaneously with tOPV) to the extent possible. Sustaining Pakistan's usual approach in which tOPV is used in up to 50% of SIAs will be essential in this cVDPV2-infected population through end-2014.

## Topic 2: cVDPV risk mitigation strategy at time of OPV2 withdrawal

The WG reviewed modeling data related to risks and risk mitigation strategies associated with the OPV2 withdrawal, presented by three modeling groups; Kim Thompson (Kid Risk; SAGE WG member), Guillaume Chabot-Couture (IDM) and Nick Grassly (Imperial College; SAGE WG member).

The modeling by Kid Risk included characterization of the risk of cVDPV emergence in different situations (e.g. different levels of population immunity, routine immunization coverage, frequency of SIAs and impact of SIAs). The results suggest the risk of cVDPV emergence is real (less than 10%), and cVDPV2 outbreaks will most likely happen within 12 months after OPV2 withdrawal. To achieve sufficient population immunity to transmission (defined as a function of the entire population and considering the potential for reinfection and waning) before the OPV2 withdrawal to prevent the creation of cVDPV2, tOPV campaigns may be needed in some countries shortly before OPV2 withdrawal[8]. In those places that fails to prevent cVDPV2 outbreaks, the same analysis also suggested that the outbreak response with mOPV2 that successfully stops the outbreak is unlikely to cause the reemergence of cVDPV in the outbreak population, although more modelling is needed to explore the neighboring areas. Further modelling demonstrated that although IPV introduction in routine immunization offers protection from paralysis to vaccinated recipients who seroconvert to that dose, giving a dose of IPV to already OPV-vaccinated children as a simultaneous extra dose does not significantly improve the population immunity, because most of the children receiving the dose will already be recently immune and IPV doses not spread secondarily to infect and increase immunity in contacts (as occurs with OPV)[9]. The model indicated that tOPV SIAs prior to OPV2 cessation would help to increase population immunity high enough to cause any circulating OPV2-related viruses to die out after OPV2 cessation. Specific analyses for India and Nigeria demonstrated the impacts of different potential immunization strategies on population immunity and cVDPV risks[10].

The model by IDM suggested that if there are no tOPV campaigns before OPV2 withdrawal, there is a significant risk of type 2 cVDPV emergence (around 3 emergences in total; 2 expected within 12 months after OPV 2 cessation, with the risk of emergence subsequently decreasing). These risks are concentrated in a few high-risk countries (e.g. Angola, DRC, Nigeria, Somalia, Chad, Madagascar and Ethiopia) and are not homogenous in large countries (e.g. Nigeria). It also showed that tOPV campaigns in these high-risk areas before OPV 2 withdrawal are likely to mitigate the risk of cVDPV2 emergence significantly (1.07 emergences with one SIA, 0.41 with two SIAs, and 0.16 with three SIAs, assuming 50% SIA coverage)[11].

The analysis presented by Nick Grassly (Imperial College; WG member) indicated that tOPV SIAs carried out before OPV2 withdrawal could paradoxically increase the risk of cVDPV emergence depending on baseline routine immunization coverage, tOPV efficacy and SIA coverage[12]. The risk diminished with increases in the number and coverage of tOPV SIAs, suggesting that where additional tOPV SIAs are planned there should be several (minimum 2-4) rounds with high coverage. The analysis also suggested that in areas with poor routine immunization coverage, no recent tOPV SIA or circulation of VDPV2, the risks of introducing tOPV SIAs may

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[8] Thompson KM, Duintjer Tebbens RJ. Modeling the dynamics of oral poliovirus vaccine cessation. J Infect Dis 2014; In press.

[9] Duintjer Tebbens RJ, Thompson KM. Modeling the potential role of inactivated poliovirus vaccine to manage the risks of oral poliovirus vaccine cessation. J Infect Dis 2014; In press.

[10] Kalkowska DA, Duintjer Tebbens RJ, Thompson KM. Modeling strategies to increase population immunity and prevent poliovirus transmission in the high-risk area of northwest Nigeria. Journal of Infectious Diseases 2014: In Press. .

[11] IDM (2014). Unpublished analysis

[12] Grassly N and Pons-Salort M (2014). Unpublished data

outweigh the benefits, unless the number of campaigns and coverage is high (e.g. at least 5 SIAs depending on expected vaccine efficacy).

The WHO secretariat summarized the risks of cVDPV2 emergence and outlined the risk mitigation strategies, which are to: 1) stop persistent cVDPV2; 2) achieve and maintain high population immunity against type 2; 3) ensure that high coverage is achieved in SIAs; 4) enhance surveillance sensitivity, and 5) ensure adequate response capability. The presentation also pointed out the significant heterogeneity in risks for emergence of cVDPV, surveillance quality, and immunization schedules even amongst Tier 1 countries. Therefore, appropriately targeted tOPV campaigns in high risk areas will help to reduce the risk of cVDPV2 emergence.

**WG decisions/recommendations**

- Modelling reaffirms that the risk of cVDPV emergence after OPV2 withdrawal, while low, is real, and not homogenous across countries or within large countries (e.g. Nigeria) and can be reduced with targeted tOPV campaigns in the period immediately prior to OPV2 withdrawal (i.e. within four months of withdrawal). The strategies for reducing this risk, particularly the use of tOPV campaigns, should be tailored appropriately, based on a risk assessment that includes location, historical VDPV emergence, population size, and population susceptibility.
- Polio-free countries that are planning to conduct SIAs in the coming 18 months, should ensure an appropriate mix of tOPV and bOPV (i.e. for planning purposes, at least 50% of SIAs should be with tOPV). In the four months immediately before OPV2 withdrawal, all SIAs should be conducted with tOPV. The possible exception to the sole use of tOPV in campaigns may be areas that have been newly infected with wild poliovirus, and their contiguous areas, as this constitutes a public health emergency.
- To facilitate OPV demand forecasting, by end-September 2014, a specific plan for the conduct of tOPV SIAs immediately before OPV2 withdrawal should be developed based on an appropriate risk assessment and addressing:
    - which Tier 1 countries should conduct 2-4 nationwide campaigns;
    - which Tier 1 countries should conduct 2-4 sub-national campaigns targeting high risk areas;
    - which, if any, Tier 2 countries should consider 1 or more sub-national campaigns targeting at-risk areas.

  Pre OPV2-withdrawal tOPV campaigns must have exceptional planning to ensure sufficient coverage to reach previously unvaccinated children and foci of low coverage, thereby minimizing the risk of cVDPV emergence.
- In areas and countries with high routine polio vaccination coverage (in Tier 3 or 4 countries for example), the WG does not anticipate the need for additional pre-OPV2 withdrawal campaigns.
- As modelling reaffirms that the first 12 months following OPV2 withdrawal represent the period of highest risk for cVDPV emergence, the Global Polio Eradication Initiative must anticipate such emergencies and optimize capacity to detect and respond by:
    - strengthening VDPV2 surveillance, especially in high risk areas, and
    - preparing adequate mOPV2 stockpile and effective outbreak response capacity.

## Topic 3: Containment of polioviruses

The Global Action Plan (GAPIII) on containment of poliovirus was first drafted in 2009, outlining primary (i.e., facility containment), secondary and tertiary safeguards (i.e. sewage systems, vaccination coverage, and environmental conditions for efficient poliovirus transmission). The draft GAPIII is now being revised to align with the new polio Endgame Plan, which now includes a phased removal of Sabin viruses, and universal IPV introduction. In the “Poliovirus Type 2 Containment Period” (between OPV2 withdrawal and OPV cessation), type 2 poliovirus is contained with fewer primary safeguards (e.g. no effluent and, air/exhaust treatment required) because of existing population immunity sustained by the introduction of IPV and backed-up by the existence of the mOPV2 stockpile. It is also envisaged that in the long term, Sabin viruses may be contained with fewer safeguards than wild polioviruses (i.e. the same requirements as those in “Poliovirus Type 2 Containment Period“), due to the lower risk of Sabin virus transmission. The updated plan aims at reducing biosafety risks associated with the use of poliovirus while allowing necessary activities such as Sabin IPV production in developing countries, existing wild IPV production in industrialized countries, laboratory testing for poliovirus, and poliovirus research. These revisions of GAPIII will also be presented to the Expert

Committee on Biological Standardization (ECBS) later in 2014. Once endorsed by ECBS, the revised GAPIII will be submitted for endorsement by the World Health Assembly (WHA) in May 2015.

**WG decisions/recommendations**

- The new strategic approach to align GAPIII with the Polio Endgame strategy and timelines, is endorsed, particularly the provisions to:
    - phase the containment of polioviruses in line with the planned withdrawal of OPV serotypes (i.e. beginning with type 2), and
    - establish specific containment requirements for the 'Poliovirus Type 2 Containment Period' (i.e. 2016-2018).
- Containment requirements for the 'Poliovirus Type 2 Containment Period' must include the following:
    - primary safeguards that prevent operator infection and ensure the decontamination of materials and equipment, and
    - secondary safeguards that ensure population immunity with at least 1 dose of IPV at coverage levels in line with that achieved for DPT3.
- In the context of the overall containment strategy, WHO should maintain a registry of every chronic excretor of a vaccine-derived poliovirus (iVPDV) and all countries with such excretors should ensure very high population immunity with an appropriate IPV schedule in relevant areas.
- For the 'Longterm Containment Period', requirements for wild poliovirus must include the full safeguards (full primary, secondary, tertiary) currently described in GAPIII; further work should be done to determine whether the proposed 'Poliovirus Type 2 Containment Period' requirements would be appropriate for all Sabin viruses in the long-term.
- Revised GAPIII should include clear guidelines for non-poliovirus facilities holding faecal collections, which are potentially contaminated with poliovirus.
- The current working draft of GAPIII makes substantial progress in reflecting the new strategic approach to containment in the context of the 'Polio Endgame'. However, it requires substantial revisions to adequately address the management of potentially infectious materials (for both wild and Sabin viruses) during the 'Type 2 Containment Period', the specific details and implications of the primary safeguards for both laboratory and vaccine manufacturer environments in the 'Type 2 Containment Period', and the process and timelines for finalizing the primary safeguards for Sabin virus during the 'Long term Containment Period'.
- Phase 1 inventory activities (including for Sabin 2 viruses) must be completed as a matter of urgency in all countries and WHO Regions to ensure completion by end-2015 as required to achieve global readiness for OPV2 withdrawal. The provisions for 'appropriate handling of residual type 2 materials' during the 'Type 2 Containment Period' must be defined and communicated as a matter of urgency to facilitate the completion of Phase 1 inventory activities.
- GPEI should establish a process to review the merits and risk-benefit of, and to oversee conduct of, any proposed research – including for vaccine development – that is deemed critical or of substantial value to long term security from polio and requires use of live attenuated type 2 viruses during the Type 2 Containment Period of GAPIII; if such research or development is required during this period, the provisions for use of any such attenuated type 2 virus during the Type 2 Containment Period should be aligned with the safety profile of any such strains, particularly with respect to lack of virulence and limited transmissibility.

## Topic 4: mOPV2 stockpile governance, management and use

The WG reviewed the stockpile release protocol drafted by WHO secretariat. The protocol aims at ensuring: 1) rapid deployment of vaccines for countries with a type 2 outbreak, and 2) outbreak response capacity for emergency vaccination against any type 2 poliovirus. The proposed criteria for release include: 1) detection of a case of AFP associated with type 2 poliovirus (through lab-confirmation or a cluster of cases compatible with polio in a susceptible population exposed to accidental release of poliovirus), or detection of circulating type 2 virus through environmental surveillance and 2) the decision by the the Director-General of the World Health Organization based on advice by a standing expert advisory group. Based on the experience with response to WPV outbreaks, the plan proposes to maintain a minimum stock of 100 million doses of OPV in filled and finished form (assuming 5 million doses/campaign, 3 rounds of campaign/outbreak, maximum of 3 outbreaks,

and 50% buffer) and 500 million doses of bulk. The stock of mOPV will be replenished if 25 – 50 million doses of final products have been used.

**WG decisions/recommendations**

- The proposed protocol for the governance, management and use of the mOPV2 stockpile requires further specificity in the areas of the release criteria, the responsibilities and processes for decision-making and authorization for release of mOPV2, and the speed of mOPV2 dispatch and bulk replenishment.
- Specific criteria for the release of the stockpile must be defined and, given the risks associated with mOPV2 use following OPV2 withdrawal, must be linked to strength of the evidence of confirmed type 2 transmission (as opposed to simply type 2 virus detection). The protocol should include definitions for:
    i. **Confirmed** type 2 transmission (e.g. detection of an infected individual without documented physical exposure to a virus in a laboratory or a vaccine production facility),
    ii. **Probable** type 2 transmission (e.g. detection of genetically related viruses from 2 or more environmental samples over time and space consistent with circulation in the population), and
    iii. **Possible** type 2 transmission (e.g. isolation of a type 2 virus in a single environmental sample or in an individual with documented exposure[13]).

  The protocol must define the specific implications/actions for stockpile management and release for each of these scenarios.
- Recognizing the need for very rapid decision-making regarding the release of the stockpile, and the associated risks with mOPV2 use following OPV2 withdrawal, the ultimate decision on use of the stockpile should rest with the Director-General of the World Health Organization; the protocol should include provision for a standing expert advisory group on stockpile release that can be convened (e.g. by teleconference) and provide an expert opinion and risk assessment to the Director-General within 24 hours of notification of a confirmed, probable, or possible type 2 transmission event (as defined above).
- A minimum stock of 100 million doses of finished mOPV2 products should be available as part of the global stockpile in advance of OPV2 withdrawal; decisions on the size of the stock of finished product should be adjusted as needed based on further work to determine the time needed to convert further bulks to finished product and to replenish bulk mOPV2 if required.
- National stockpiles are to be discouraged to minimize the risk of uncontrolled re-introduction of Sabin type 2 viruses, into an increasingly type 2 susceptible population globally, following OPV2 withdrawal.
- GPEI should explore options for ensuring sufficient IPV is available if needed in an outbreak response (e.g. through stock management by IPV manufacturers).
- GPEI should by September 2014 develop a specific protocol for post-cessation type 2 response; this protocol will need to be aligned with and facilitate finalization of the stockpile protocol.

## Topic 5: Plans for the expansion of environmental surveillance

Environmental surveillance (ES) is currently used to supplement AFP surveillance as it increases the sensitivity of the surveillance system, especially in areas where AFP surveillance is under-performing. Following OPV2 withdrawal, there will be a need for early detection of any new emergence of cVDPV or failure of containment of Sabin 2 viruses. Therefore in the Endgame Strategy it is proposed that environmental sampling sites be established in at least 15-20 additional cities and locations globally, prior to the switch in 2016, as a primary tool to detect cVDPV2.

The objectives of the expansion of the plan include:

- Improve surveillance to detect early the emergence of cVDPV2 and to support rapid detection and eradication of wild type viruses; and
- Monitor effectiveness of poliovirus containment, particularly type 2, including Sabin 2 viruses, following OPV2 withdrawal

[13] When an individual is known to be significantly exposed to the contaminated material (e.g. exposed to highly concentrated vaccine bulk in the vaccine production facility)

ES is established in all three endemic countries, and some currently infected or recently infected countries (Kenya, Israel) and many polio free countries such as Egypt, China, India, and many European Region countries. The strategy for expansion is proposed according to the following criteria:

- Establish in priority areas for cVDPV2 emergence (i.e. Tier 1 countries) (e.g. Kenya, Somalia)
- Sustain in endemic areas and expand to capture "silent" areas within endemic countries (e.g. southern Afghanistan)
- Establish in priority countries along overland WPV exportation routes (e.g. Cameroon, Chad, southern Niger, eastern Mali)

ES is also an essential tool in monitoring poliovirus facility-associated risk from essential facilities including laboratories and vaccine manufacturing sites.

Reporting of cVDPV2 and Sabin 2 will also need to be enhanced in preparation for the switch. While the global polio laboratory network is already capable to detect cVPDV and Sabin viruses in a timely fashion, prior to the switch there is a need to accelerate the timeliness of detection and reporting of cVDPV2 and Sabin 2 viruses (the latter currently not being reportable). Endorsement of Governing Bodies will be sought on requirements for immediate notification of type 2 polioviruses.

**WG decisions/recommendations**

- Environmental surveillance must be recognized as a fundamental part of the surveillance strategy for OPV2 withdrawal (i.e. early detection of and interruption of cVDPV2s), and not simply a complement to AFP surveillance, which was designed for a different purpose (to guide the eradication of wild virus).
- The overall GPEI strategy for expanding environmental surveillance sites in the short to medium term should be driven primarily by and aligned with the Tiering of countries and areas based on the risk of cVDPV2 emergence and circulation. This must be the primary and immediate driver of expansion and these sites must be established and functioning by no later than Q3 2015 to be able to generate meaningful information on virus disappearance following OPV2 cessation. AFP Surveillance continues to be the mainstay of surveillance for WPV. Expansion of environmental surveillance in endemic, Tier 1 and other countries at high risk of WPV transmission will serve to enhance surveillance for WPV, in addition to the immediate need to identify cVDPV in these countries.
- The planning of environmental surveillance expansion should encompass a longer-term horizon that captures and is aligned with the sites retaining type 2 viruses in the long term and the risks associated with residual type 2 virus stocks and their handing (e.g. IPV production sites).
- The fundamental importance of environmental surveillance to OPV2 withdrawal should be reflected in, and in fact driving, an operational research agenda on the new and emerging technologies to facilitate environmental sampling and analysis; particular priority should be given to technologies that would be rapidly scalable – especially in difficult field environments – in the setting of new type 2 events in the post-OPV2 era to help determine whether the event reflects actual type 2 virus transmission and, if yes, the extent of that transmission.
- The protocols for the mOPV2 stockpile and type 2 poliovirus outbreak response in a post-OPV2 era must reflect the central role of environmental surveillance in the management of the risks associated with OPV2 withdrawal.

## Topic 6: Other readiness criteria (e.g. IPV introduction, bOPV licensure )& tOPV withdrawal protocol

Significant progress has been made in facilitating introduction of IPV in in OPV-using countries. To date, out of 194 WHO Member States, 72 countries (37%) have introduced IPV and 84 countries (43%) have either decided or declared their intent to introduce IPV by end-2015. As a prerequisite to OPV2 cessation, bOPV must be licensed for use in routine immunization in 144 countries that use tOPV in their immunization program (124 tOPV-only and 20 IPV-tOPV in a sequential schedule). GPEI proposed that it will work with bOPV suppliers and regulatory authorities to develop a global framework to license bOPV (e.g. universal approval to use) which reduces the burden on bOPV suppliers to prepare and file for individual licensure in each of 144 countries and which will address other individual country demands (e.g. need to conduct local clinical trials).

The WG also reviewed the operational guideline for the tOPV-bOPV switch. It outlines the steps required to implement a globally synchronized "switch" (i.e. withdrawal of tOPV, and its replacement by stocks of bOPV) in all countries currently using tOPV. The guideline proposes that countries should plan for a period of two weeks during which stocks of tOPV should be withdrawn from all sites. The National tOPV-bOPV Switch Date should be scheduled within two weeks of the Global tOPV-bOPV Switch Date. Only bOPV should be used in both routine and supplementary immunization campaigns after the National tOPV-bOPV Switch Date, and countries should continue to use tOPV in routine immunization and an appropriate mix of vaccines in supplementary immunization campaigns up until the switch date.

At global level, a small emergency stock of tOPV will be maintained to respond to any short-term shortages at country level to avoid stock outs during the period immediately preceding the tOPV-bOPV switch. The guidelines classify countries into "high risk" and "low risk" and propose different governance structures and mechanisms. In all countries, a National Switch Committee will be responsible for overseeing and managing the switch process. These committees will be assisted by a Switch Support Team to develop and track inventories of existing stocks of tOPV and to operationalize the movement of tOPV stocks within the country to minimize wastage and if needed to recall any unused tOPV stocks at the time of the Switch.

The UNICEF Supply division presented the global supply planning and implementation plan to support IPV introduction and OPV2 withdrawal. The presentation stressed the importance of closely coordinating different stakeholders (GPEI partners, countries, OPV/IPV suppliers) and forecasting vaccine demand to ensure the timely and sufficient production and procurement of IPV and OPV.

**WG decisions/recommendations**

- Significant progress has been made toward introducing IPV in all OPV-using countries. All countries should introduce IPV by end-2015, and plan carefully the best way to manage the number of injections that may need to be given simultaneously. Evidence suggests that a country can give infants three or more injections during a single visit without compromising vaccine safety or efficacy[14] [15] [16].
- The SAGE recommendation that countries using wP-based DTP should retain wP-DTP in their schedule is reiterated.
- GPEI should develop a global framework to license bOPV for use in routine immunization (e.g. through "universal approval to use", endorsed by WHA) thereby reducing the burden on bOPV suppliers to prepare and file for individual licensure in each of the 144 tOPV-using countries and address individual country requests (e.g. for local clinical trials).
- The tOPV withdrawal protocol is well thought out and the principles are endorsed. GPEI should develop a more detailed work plan for the switch, which would address recent IPAC recommendations as needed (e.g. separating scientific and operational aspects, communicating to target audience)[17]
- The tOPV-bOPV switch must be globally synchronized, including with countries that use an IPV/OPV sequential schedule, to reduce the risk of emergence and circulation of cVDPVs. In addition to the current planning, the GPEI should develop contingencies with partners to ensure the coordination in the context of a possible delay associated with failure to meet one of the prerequisites despite continued aggressive efforts to meet all of the prerequisites.

[14] Offit PA, Quarles J, Gerber MA et al. Addressing Parents' Concerns: Do Multiple Vaccines Overwhelm or Weaken the Infant's Immune System? Pediatrics 2002; 109; 124

[15] Institute of Medicine. Immunization Safety Review: Multiple immunizations and immune dysfunction. Stratton K, Wilson CB, McCormick M (editors). Washington, DC: National Academies Press; 2002.

[16] Wallacea AS, Mantel C, Mayers G et al. Experiences with provider and parental attitudes and practices regarding the administration of multiple injections during infant vaccination visits: Lessons for vaccine introduction. Vaccine (in press)

[17] World Health Organization (2014). Immunization practices advisory Committee (IPAC) 11-12 June 2014: Final meeting report and recommendations.

## Summary and next steps for the SAGE Working Group

The 9th meeting of the SAGE WG reviewed the progress of the preparation for the OPV2 withdrawal. The WG reviewed and endorsed the risk mitigation strategy before OPV2 cessation, a revised containment policy, stockpile protocol and environmental surveillance plans.

Overall, the WG concluded that the OPV2 withdrawal during the 'low season' for polio transmission in 2016 is feasible if the persistent cVDPV2s in Nigeria and Pakistan are eliminated by Q3 2015.

The WG requested a follow-up conference call in September 2014, before the next SAGE meeting to finalize the July decisions and discuss several remaining items, including:

- New standard data format for tracking and communicating newly emerged and persistent cVDPVs, to ensure the timely interruption of persistent cVDPVs before March 2015
- Plan for conducting tOPV SIAs immediately before OPV2 withdrawal based on risk assessment
- Specific protocol for post-cessation type 2 outbreak notification and response
- Updated GAPIII draft, addressing the comments by WG
- Updated protocol for mOPV2 stockpile governance, management and use, including specific criteria for release (i.e. confirmed type 2 transmission) and mechanism of release (i.e. WHO DG's decision based on the recommendation by a standing expert advisory group)
- Updated tOPV-bOPV switch protocol, including a detailed work plan incorporating IPAC recommendations

**Figure-1: Projection of type 2 immunity in children under 5 years old in 8 regions of Nigeria (IDM polio team)**

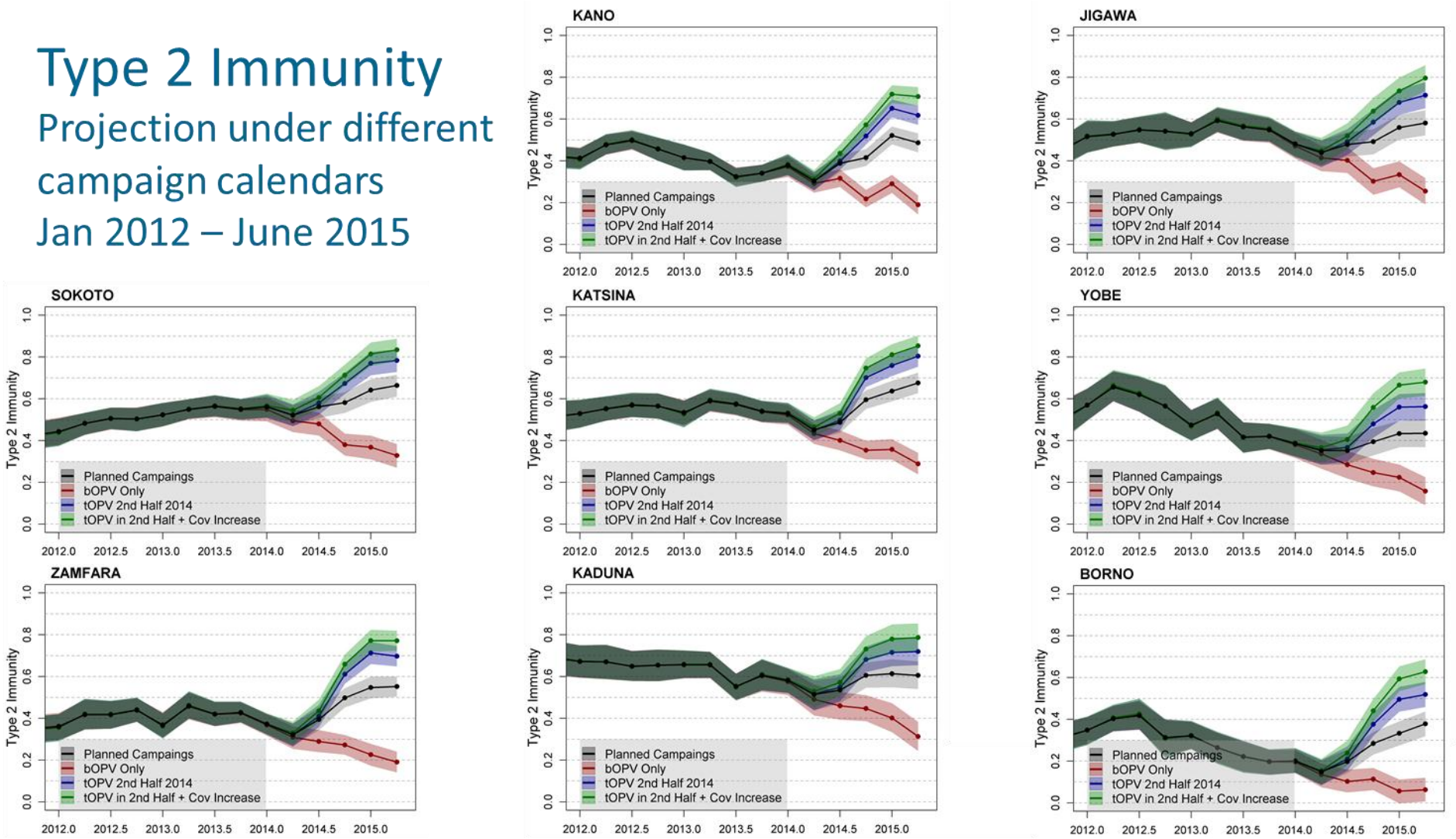

**Figure-2: Projection of type 1 immunity in children under 5 years old in 8 regions of Nigeria (IDM polio team)**