Polio Vaccine Schedules: IPV-only and IPV-containing wP Hexavalent

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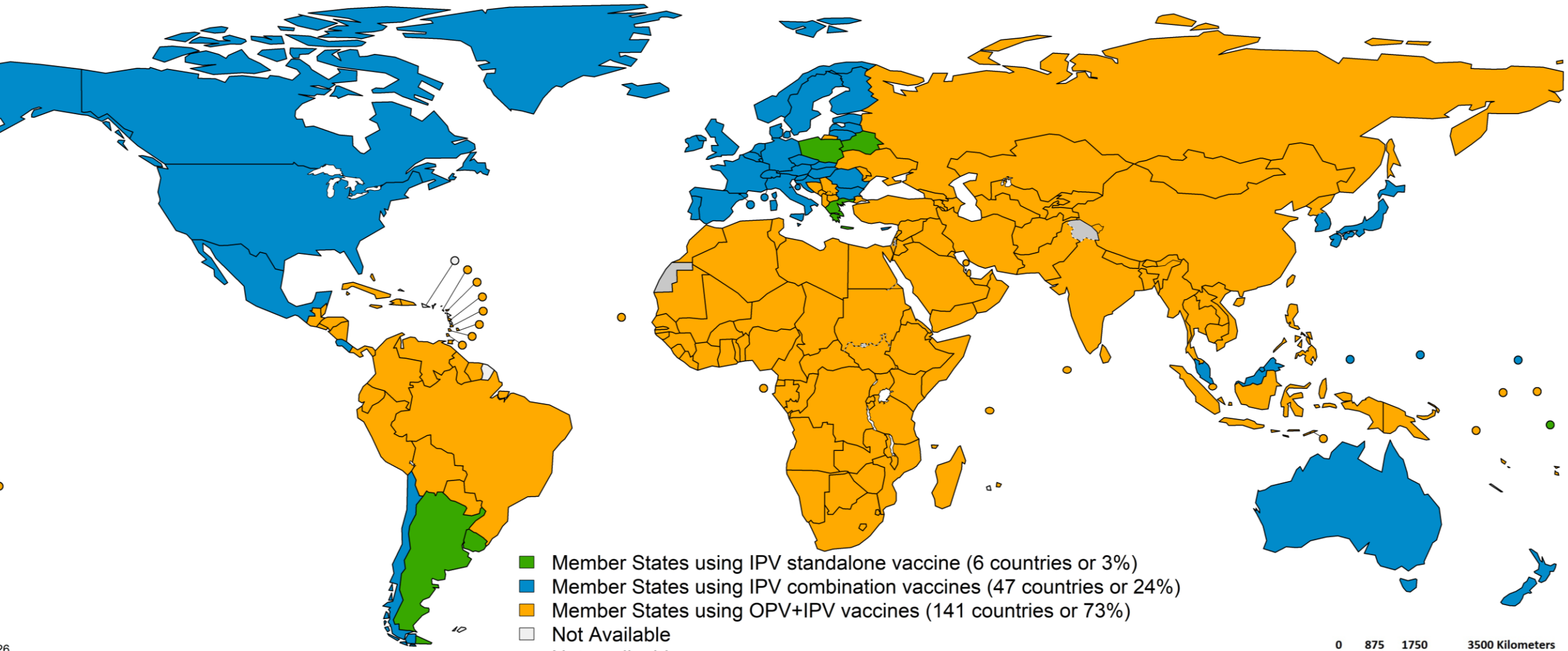
Member States using different polio vaccination schedules, 2021



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unization, Vaccines and Biologicals (IVB), World Health Organization (WHO)
atabase as at 27th July 2021

World Health Organization

of countries using polio vaccination schedules by region, 2021

[bOPV+IPV (1 or 2 IPV doses), IPV-only (standalone & in combo Hexa-aP)]

WHO Region (# of Member States)	**OPV+IPV**	**IPV- only**	**IPV Combo**
AMR (35)	28 (80%)	2 (6%)	5 (14%)
EUR (53)	18 (34%)	3 (6%)	32 (60%)
WPR (27)	16 (59%)	1 (4%)	10 (37%)
EMR (21)	21 (100%)	0	0
AFR (47)	47 (100%)	0	0
SEAR (11)	11 (100%)	0	0
TOTAL (n= 194)	**141**	**6**	**47**

Question #1 to SAGE WG: IPV-only schedules

Among the currently recommended schedules, what is the preferred IPV-only schedule(s) for polio free regions/countries, if they want to stop OPV before global cessation? What are the pros and cons of different schedules in the present epidemiological context?

Background

- There are existing WHO schedule recommendations for:
  - bOPV+IPV (3 doses +2 doses) (pre-eradication era)
  - IPV (3 dose primary series with a booster if 1st dose given "early" <2 months of age)
  - IPV 2 doses (for OPV cessation/post eradication era)

- There is a renewed request from polio free regions of PAHO, EURO and WPRO for guidance as some countries indicate intention to stop using OPV
- This is a continuation of discussions at March 2020 meeting

Presenting

- Data on various schedules to revisit the evidence and reaffirm the recommendations

Polio Vaccines: Current WHO Recommendations

Table 2: Summary of WHO Position Papers - Recommended Routine Immunizations for Children

Antigen		Age of 1st Dose	Doses in Primary Series	Interval Between Doses			Booster Dose	Considerations (see footnotes for details)
				1st to 2nd	2nd to 3rd	3rd to 4th		
Recommendations for all children								
Polio [3]	bOPV + IPV	bOPV 6 weeks (min) IPV 14 weeks (min)	5 (3 bOPV and 2 IPV)	bOPV 4 weeks (min) with DTPCV2 IPV 4 months (min)	bOPV 4 weeks min with DTPCV3			bOPV birth dose Type of vaccine Fractional dose IPV Alternative early IPV schedule Transmission and importation risk
	IPV / bOPV Sequential	8 weeks (IPV 1st)	1-2 IPV 2 bOPV	4-8 weeks	4-8 weeks	4-8 weeks		
	IPV	8 weeks	3	4-8 weeks	4-8 weeks		(see footnote)	IPV booster needed for early schedule (i.e. first dose given <8 weeks)

- Polio Vaccine Position paper: Weekly Epid. Record (2016, 9:145-68)
  (A revised Polio Vaccine Position Paper is forthcoming in 2022)

- SAGE Meetings - Conclusions & Recommendations: March 2021 SAGE Meeting: Weekly Epid. Record (2021, 96:133-144); October 2020 SAGE Meeting: Weekly Epid. Record (2020, 95: 585 - 607); March 2020 Meeting: Weekly Epid. Record (2020, 95: 241-256)

World Health Organization

Question #1: IPV-only Schedule Evidence Review

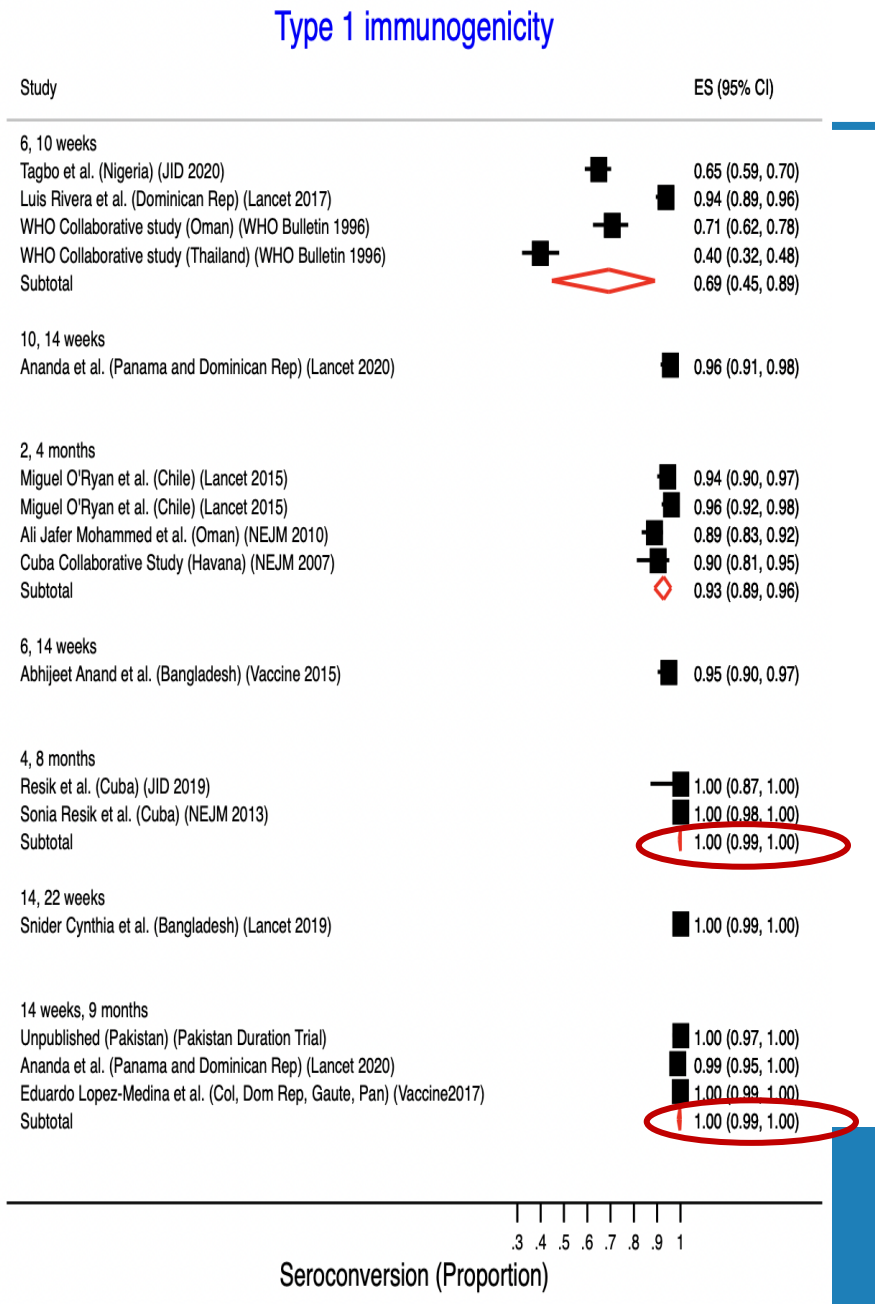
Reminders:

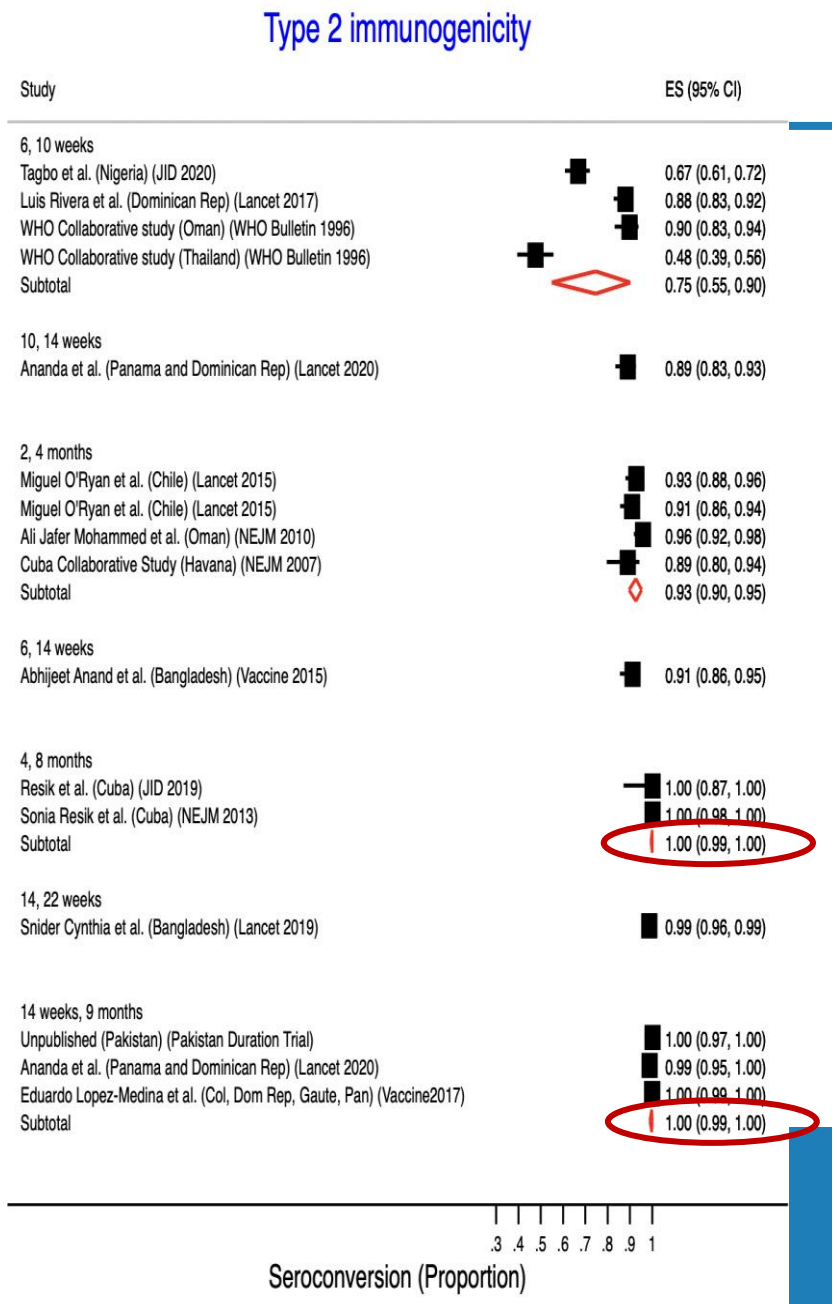
- **Polio Vaccine Position Paper (2016):** An IPV-only schedule may be considered in countries with sustained high vaccination coverage and very low risk of both WPV importation and transmission. IM IPV may be included as a component of combination vaccines

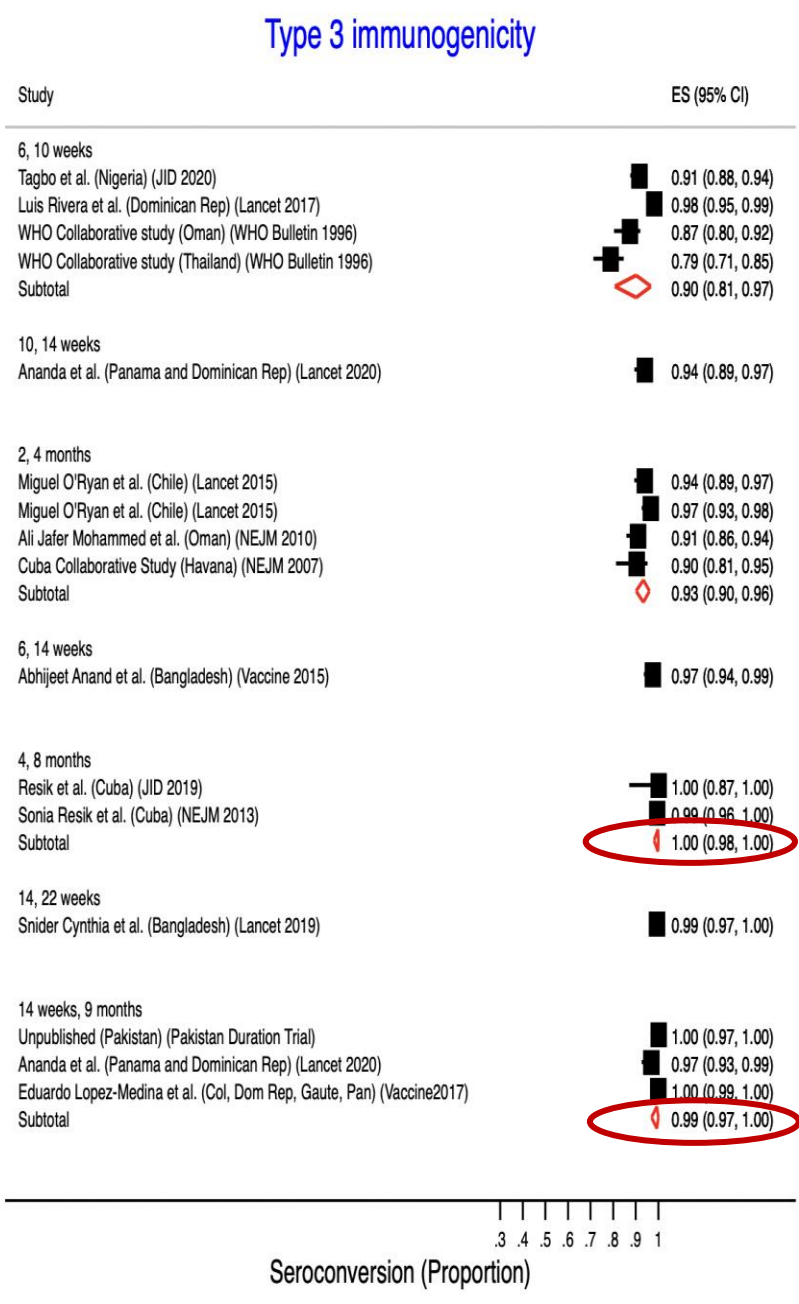
- **SAGE Meeting March 2020:** In the current epidemiological context and as a general principle, SAGE expressed the need for regions or countries to be cautious about moving from bOPV + IPV schedule to an IPV-only schedule in their routine immunization programmes and recommended that instead they take a gradual approach, by first introducing a second dose of IPV into their routine immunization schedules.

  - The following series of slides summarize a WHO meta-analsyis of IPV immunogenicity data for different primary immunizations schedules and the booster
  - Risk and benefits of OPV cessation in the current epidemiological context

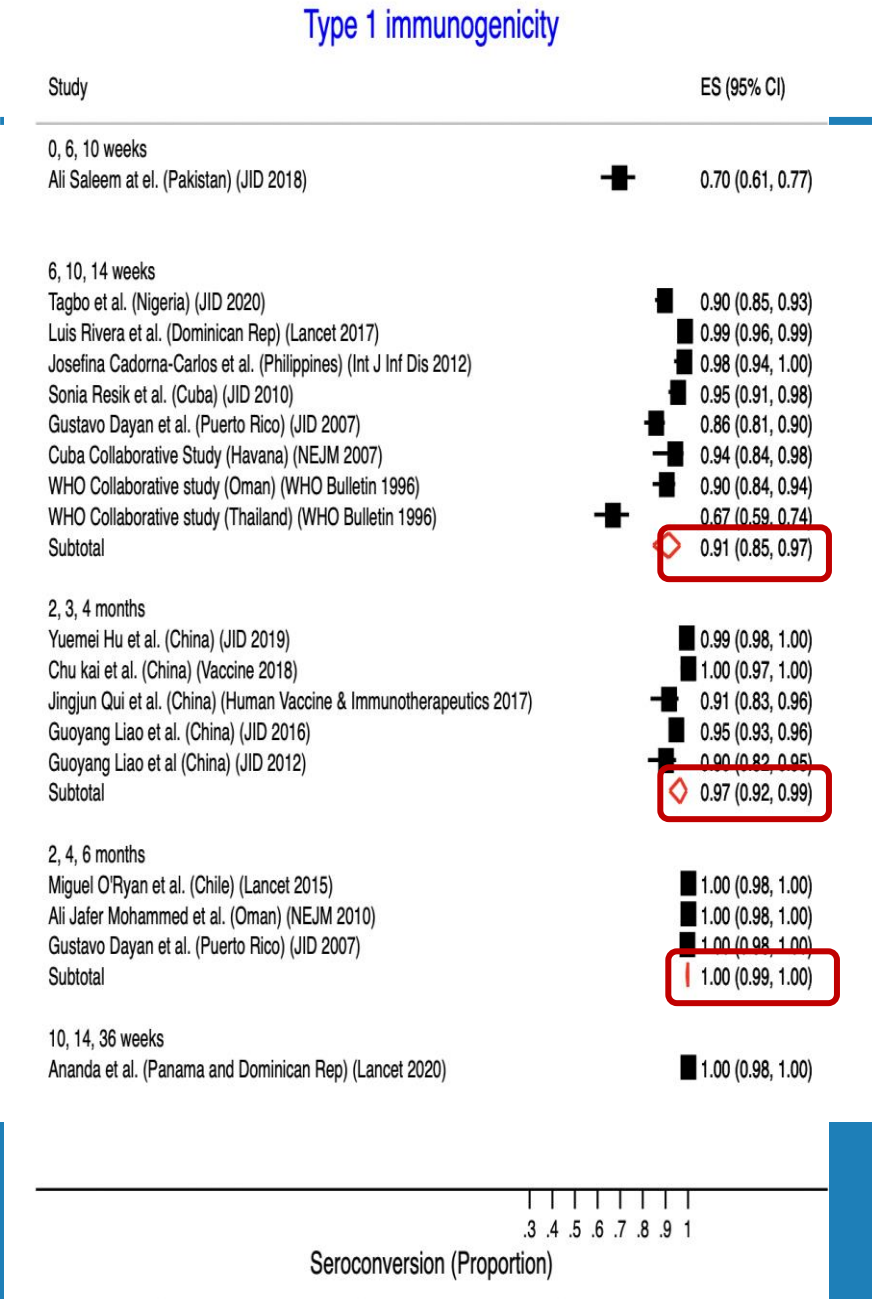
Meta-analysis findings of 2 full doses of IPV (no OPV) by different schedules (SALK)

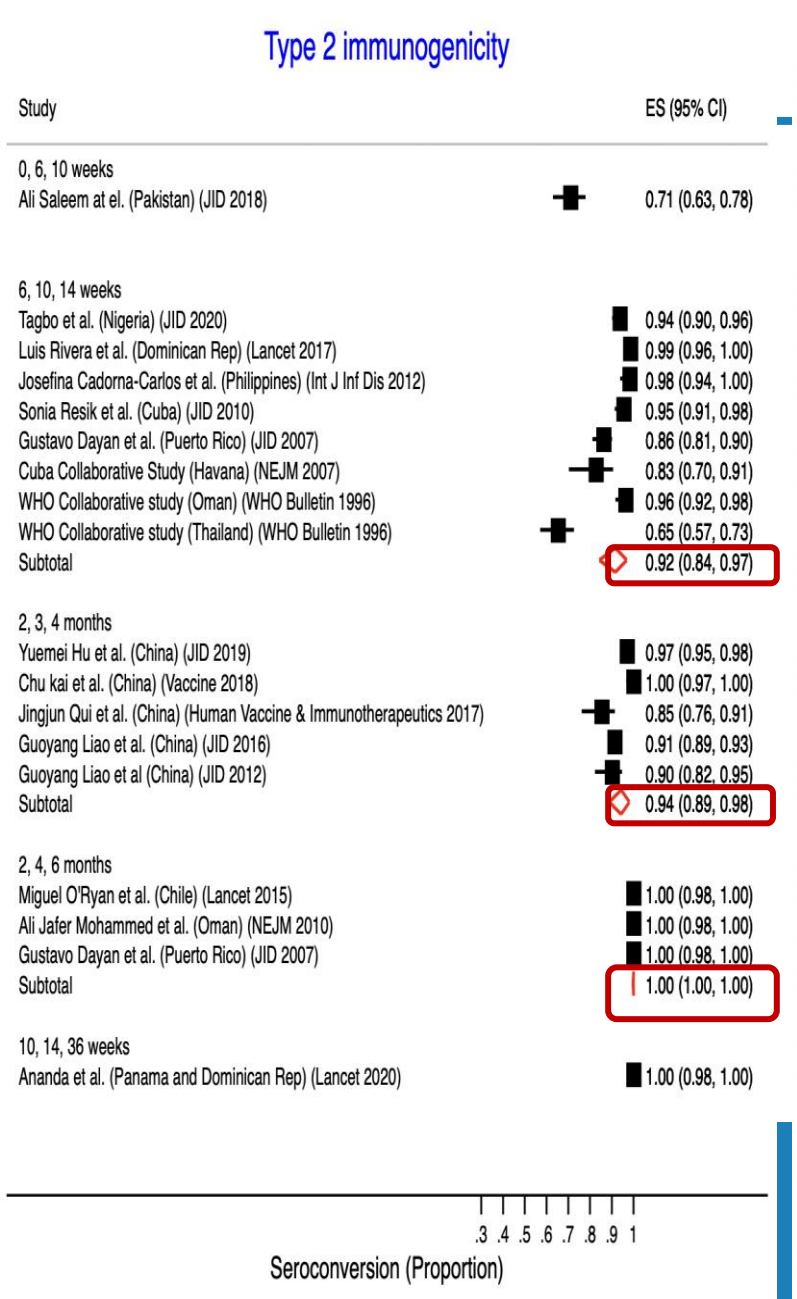


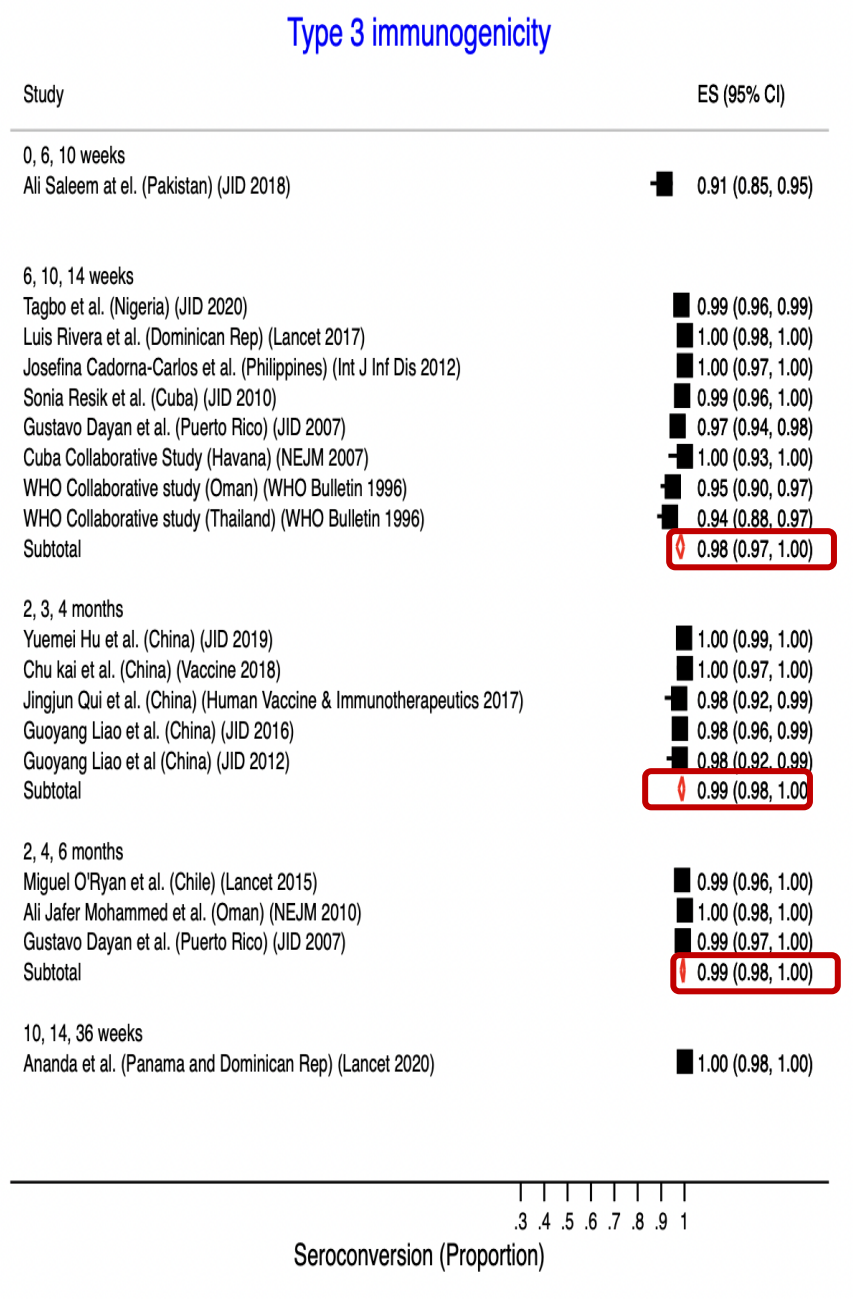




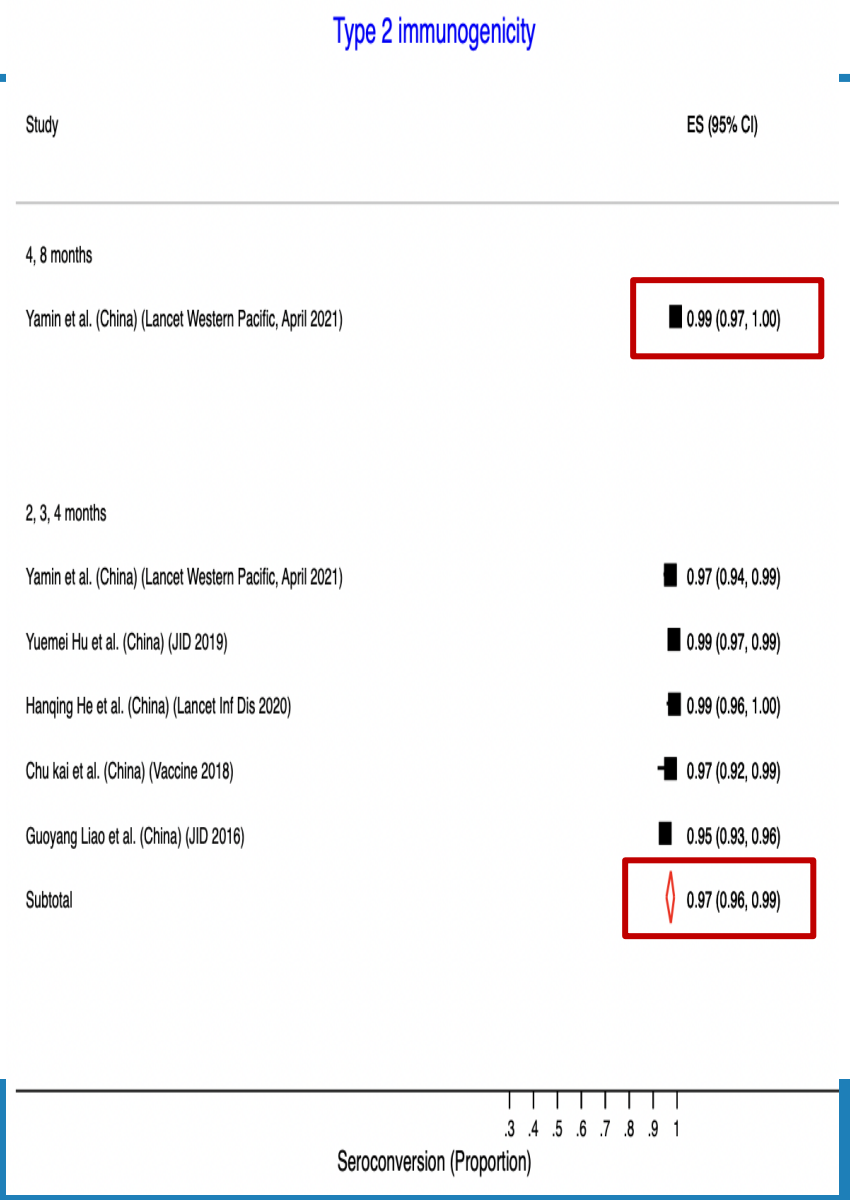
Meta-analysis findings of 3 IPV only (full) doses by different schedules (SALK)



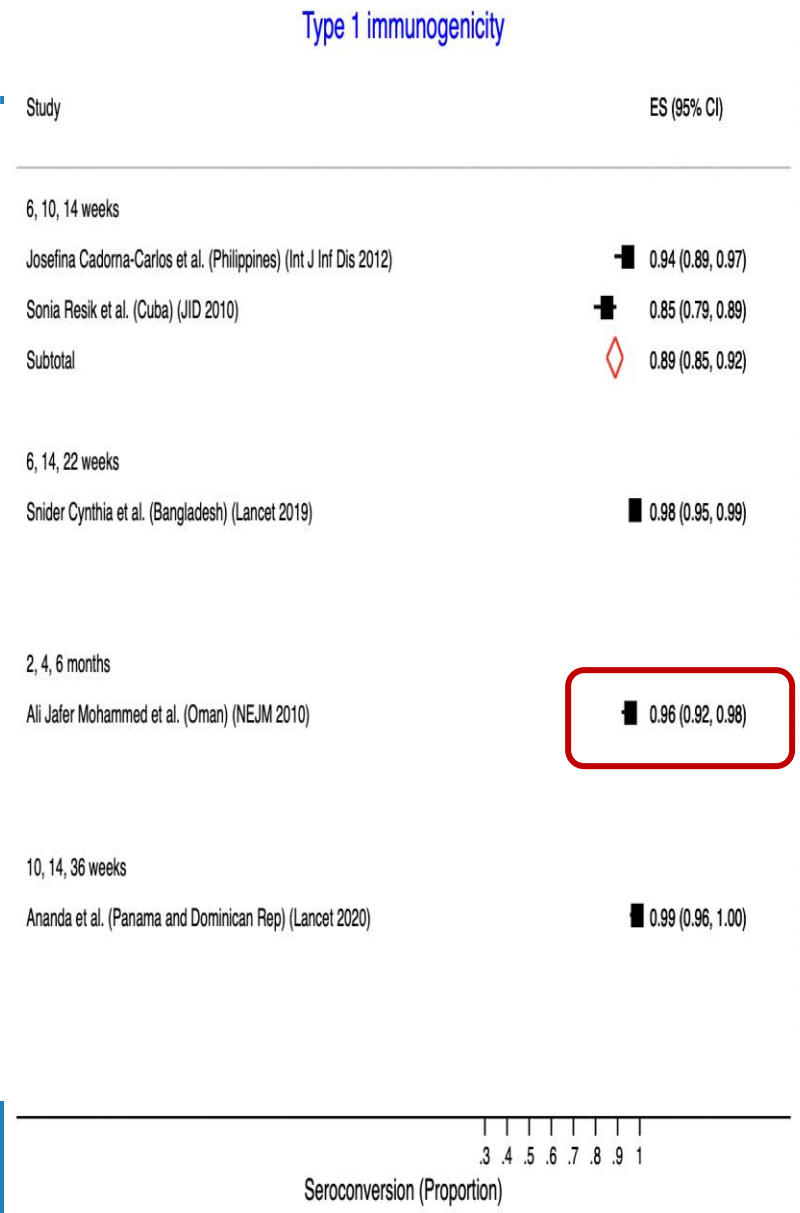


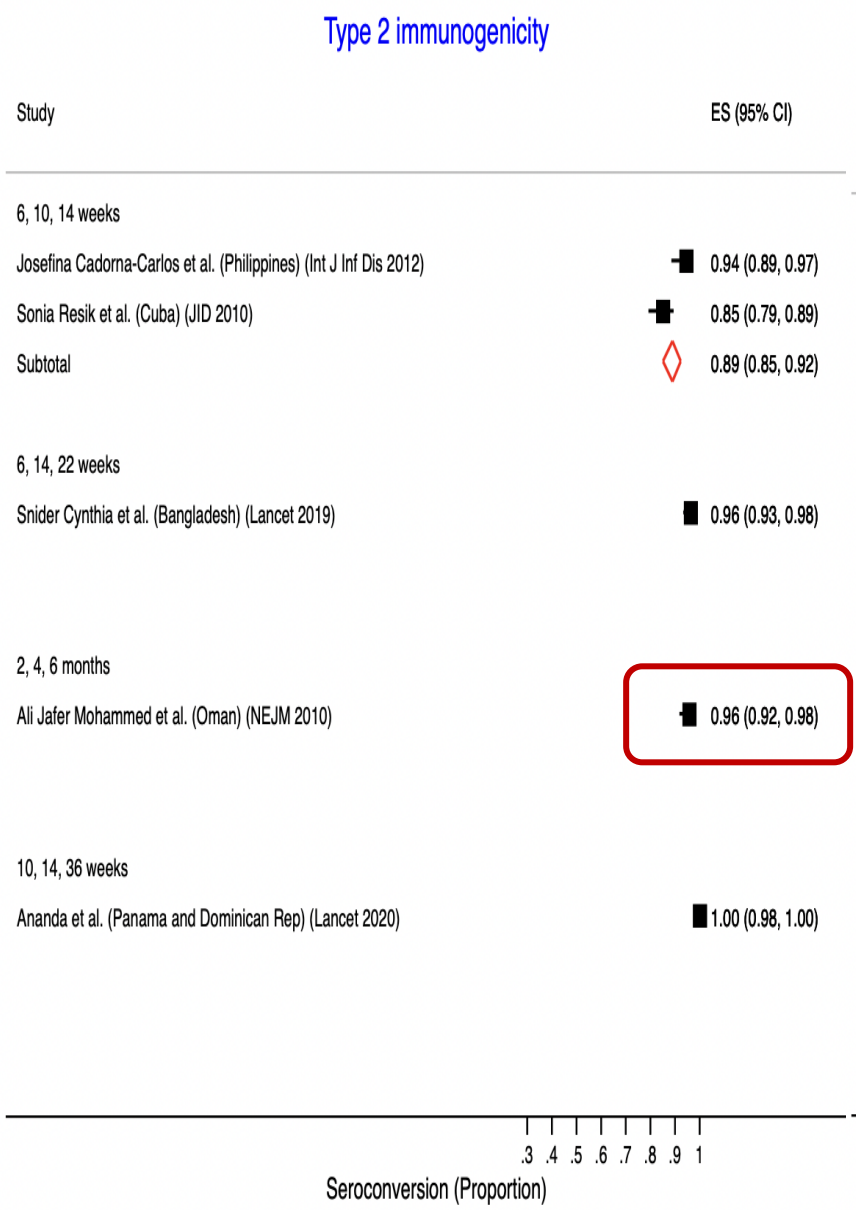


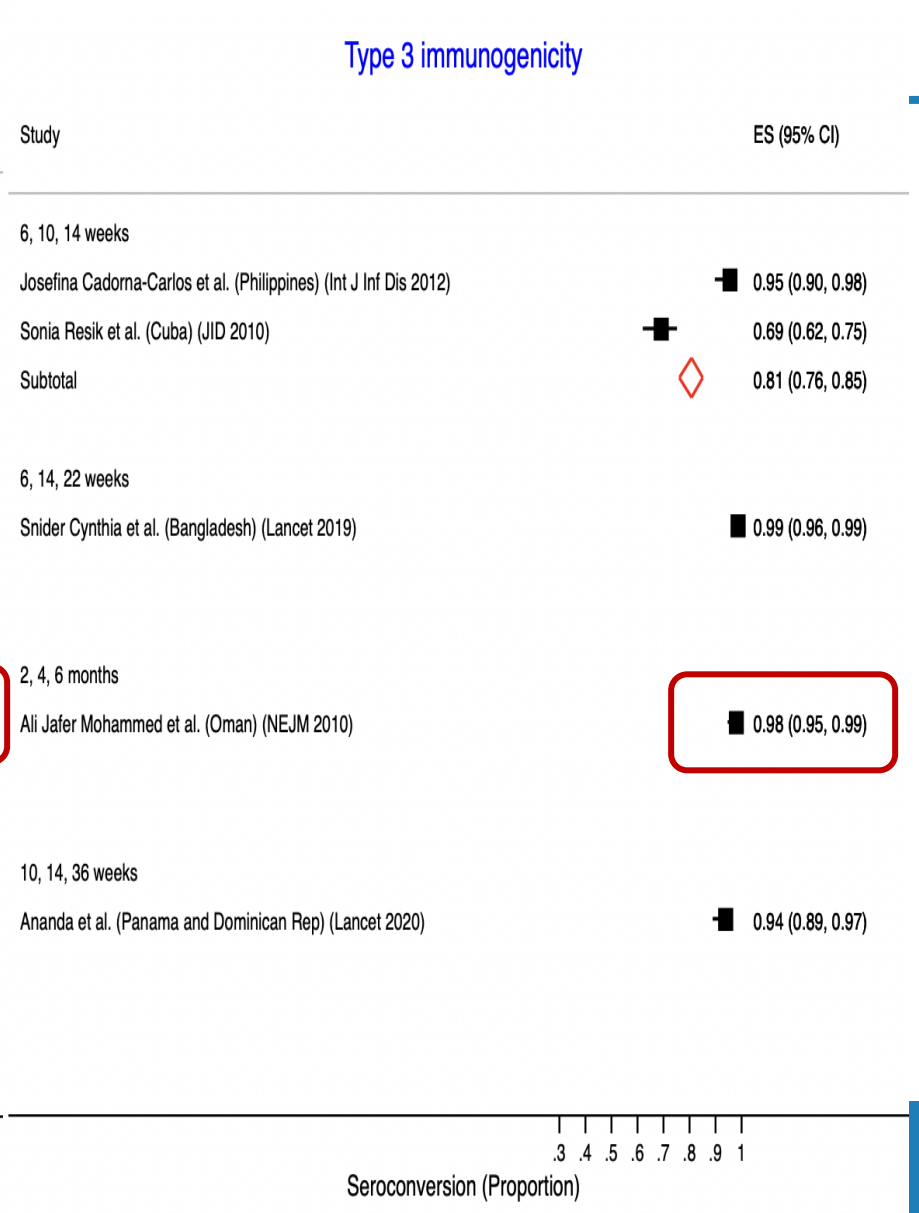
Meta-analysis findings comparing two dose IPV only and three dose IPV only schedules (SABIN)



Meta-analysis findings comparing three dose fIPV only schedules (SALK)







Impact of IPV booster dose on antibody titres

Author, Journal	Schedule		fIPV		IPV		sIPV	
			Pre-booster titers (95% CI)	Post-booster titers (95% CI)	Pre-booster titer (95% CI)	Post-booster titers (95% CI)	Pre-booster titers (95% CI)	Post-booster titers (95% CI)
Josefina Cadorna-Carlos et al; Int J Inf Dis 2012	6, 10, 14 weeks, 18 months	Type 1	48.2 (38.7-59.9)	2833 (2392-3356)	109.8 (84.3-143.2)	6666 (5540-7678)		
Josefina Cadorna-Carlos et al; Int J Inf Dis 2012	6, 10, 14 weeks, 18 months	Type 2	94 (65.8-134.2)	3210 (2672-3857)	132.5 (98.4-178.3)	6522 (5540-7678)		
Josefina Cadorna-Carlos et al Int J Inf Dis 2012	6, 10, 14 weeks, 18 months	Type 3	50.3 (37.8-87.4)	4498 (3608-5607)	136 (103-181)	11952 (10046-14220)		
Guoyang Liao et al; JID 2016	2, 3, 4, 18 months	Type 1			92.1 (83.6-101.4)	4012.4 (3762.1-4283)	729.3 (661.2-804.4)	11935 (11485-12403)
Guoyang Liao et al; JID 2016	2, 3, 4, 18 months	Type 2			79.7 (71.9-88.5)	3017.6 (8210.1-3240.4)	114.8 (101.2-130.2)	6616.2 (6195.1-7066)
Guoyang Liao et al; JID 2016	2, 3, 4, 18 months	Type 3			79.3 (69.5-90.4)	5516.4 (5122.8-5940.2)	219.6 (195.5-246.7)	6795.3 (6372.2-7246.4)

Summary Findings: IPV-only Schedule

- 2 IPV doses (full/fractional) starting at 14 weeks with an interval of at least 4 months provide high sero-protection against all three polio types *(reconfirms current recommendation)*
- 3 IPV full doses (Salk/Sabin) provide high seroprotection when starting from 8 weeks of age with benefit of early protection *(reconfirms current recommendation)*
- 3 IVP full doses (Salk/Sabin) using «early schedule» starting at 6 weeks of age (6,10, 14 weeks) showed lesser immunogenicity. *Justifying the need for a booster?*
- 3 fIPV doses in «early schedule» (6, 10, 14 weeks) do not provide equivalent/high seroconversion as compared to 2 fIPV starting at 14 weeks of age with longer interval between the doses
- Affordable fIPV schedule options with benefits of early protection and higher immunity being explored: 10,14,36 weeks fIPV data available; 6,14,36 weeks fIPV data being generated. Moreover, fIPV IM study in Cuba showed equivalence to fIPV ID; Follow up study is in progress in Mozambique, no data yet on fIPV Sabin

Early Cessation of OPV in bOPV+IPV Countries: Risks & Benefits of moving to IPV-only schedule

PROS

- ✓ Excellent humoral immunity: No paralytic cases of polio in IPV only using countries (caveat: cVDPV1 cases and VDPV1 and 2 in ES in Malaysia in 2019-2020)
- ✓ No vaccine-associated paralytic polio (VAPP) reported from IPV only using countries
- ✓ No seeding of Sabin strains and no resultant emergence of VDPV or cVDPV outbreaks in IPV only using countries

CONS

- × Poor to non-existent mucosal immunity:
  - Spread of WPV1 in Israel in 2012 was stopped only with reintroduction of OPV;
  - VDPV in Malaysia required OPV response
- × No secondary spread of OPV virus
- × Early protection requires a 3-4-dose IPV schedule (because of interference with maternal antibodies)
- × IPV supply situation? Improved enough for 2 doses or more, but may create an imbalance if many more countries move to a 3-4-dose schedule

Question #1 to SAGE WG: IPV-only schedules

Among the currently recommended schedules, what is the preferred IPV-only schedule(s) for polio free regions/countries, if they want to stop OPV before global cessation?

What are the pros and cons of different schedules in the present epidemiological context?

- **2 dose IPV**, full/fractional, starting ≥14 weeks and 2nd dose at an interval of ≥ 4 months
- **3 dose IPV primary series**, starting ≥8 weeks of age with 4–8-week interval between doses. If 1st dose given <8 weeks of age, then a booster is required ≥ 6 months after the 3rd dose. Early protection is an obvious advantage in the pre-eradication phase to avoid risk of infection/importation
- Should fractional-dose IPV be recommended for early schedules? For IPV affordability /availability reasons
- Besides high immunogenicity and early protection, are there other criteria that should be considered, such as operational ease, coverage/compliance benefits, need for additional logistics/training and smooth transitioning to hexavalent schedule in future?
- Is there any need for new recommendations for IPV-only schedules, or for revision of the current recommendations?
- Should the current caution about moving from bOPV+IPV to IPV-only schedules be retained?

IPV-containing wP Hexavalent vaccine (DTwP-Hib-HepB-IPV)

Currently no country is using wP Hexa in EPI schedule, but some products are in development and Gavi is considering support to the eligible countries

Requesting SAGE WG to reflect on schedule(s)

Gavi's perspectives about Hexa support (1/2)

- In the last 3 years, Gavi worked on **several strategic assessments** about Hexa, and the **Board approved in principle support of Hexa**[1] (Nov 2018)
- Gavi considers Hexa as a potentially **attractive immunization option** and targets a **gradual market evolution** towards a choice of 1) Penta + IPV, and 2) Hexa based options for vaccination
  - **Hexa-based schedules** (3+1 or 3+DTP/Penta) are expected to provide **programmatic advantages** by reducing the total number of injections and delivery costs and potentially improving IPV coverage
  - **Hexavalent vaccines for Gavi support** should achieve SAGE defined IPV immunogenicity targets with the least number of doses
  - **Mixed schedule** Penta/IPV/Hexa in primary series is **not considered as programmatically suitable** for Gavi-supported countries
  - Some countries are expected to stay on [Penta+IPV] for cost-related reasons or if they are currently using fIPV
- The delay of polio eradication timelines and subsequently longer use of IPV increase attractiveness of Hexa that can **reduce the risk of premature discontinuation of IPV**
  - bOPV cessation is **not considered as a prerequisite** to introduce Hexa

(1): The "in principle decision" expresses Gavi's interest to support Hexa vaccine, while acknowledging that a prequalified product is not yet available and that some conditions need to be met before Gavi's support is made available.

Gavi The Vaccine Alliance

Gavi's perspectives about Hexa support (2/2)

- Gavi considers the 2019-2022 period as a **critical window of opportunity for market shaping** to improve Hexa market attributes and ensure such developments are not detrimental to the Penta and IPV standalone markets.
- **SAGE's recommendation** about Hexa schedule will **support planning efforts** ahead of a potential Gavi Board decision to open a funding window for Hexa in 2022.
  - If a funding window is opened for Hexa, **earliest country introduction is expected in 2023 (best case)**
  - **Uncertainties** remain about whether the necessary conditions to open a funding window would be met, including the availability of Hexa vaccines at an **acceptable price**

IPV-containing wP Hexavalent Pipeline update

Sanofi / Shantha	- **Licensed** - Submitted PQ application - Expected PQ in Q1 2022
Panacea	- **Licensed** - No clear timelines for PQ
Supplier 3	- Licensure expected end of 2021 - PQ submission in 2022
Supplier 4	- **In development with targeted PQ in H2 2025**
Supplier 5	- **In development with targeted PQ in H2 2025**

One of the suppliers uses Sabin IPV in its Hexa development program

Available data on IPV wP Hexa products*

sno	Product	Trial design/Schedule	Results (seroprotection, GMTs)	Inference	Conclusion
1	Easy 6 (Panecea Biotech Ltd product) vs Pentavac SD and Imovax Polio	Phase III; 6, 10, 14 weeks (In India)	Anti-polio type 1: 89.7 (83.3-94.3) vs 91.9 (86-96) Anti-polio type 2: 93.4 (87.8-96.8) vs 94.1 (88.7-97.4) Anti-polio type 3: 88.2 (81.6-93.1) vs 90.4 (84.2-94.8)	High immunogenicity to all penta antigens, around 90% seroconversion to all three poliovirus serotypes	NI for immunogenicity to Penta + IPV
2	Shan6 (Sanofi product) vs Shan5 + Shan IPV and a booster at 12-24 months	Phase III; 6, 10, 14 weeks and 12 months (In India)	Anti-polio type 1: 100 (99.6-100) vs 100 (98.7-100) Anti-polio type 2: 99.7 (99-99.9) vs 100 (98.7-100) Anti-polio type 3: 100 (99.6-100) vs 100 (98.7-100)	High immunogenicity to all penta antigens, almost 100% seroconversion to all three poliovirus serotypes	NI for immunogenicity to Penta + IPV

NI – Non-inferior

References:

1. Mohanty L, Sharma S, Behera B, Panwar S, Paliwal C, Gupta A, Chilkoti DC, Singh A. A randomized, open label trial to evaluate and compare the immunogenicity and safety of a novel liquid hexavalent DTwP-Hib/Hep B-IPV (EasySix™) to licensed combination vaccines in healthy infants. Vaccine. 2018 Apr 19;36(17):2378-2384. doi: 10.1016/j.vaccine.2017.09.029. Epub 2018 Mar 23. PMID: 29580640.
2. Unpublished/Personal communication

Immune data from previous studies

Ab Persistence and Booster responses (early data)

GMTs: Transition from Pre-Dose 1 to Post-dose 4

Antigen	Primary series	SH601 Study (Cohort 2)		SH602 Study	
		Pre-Dose 1	Post-Dose 3	Ab persistence	Post-Dose 4 (Shan6 Booster)
Anti-Polio-1 1/dil	Shan6	34.6 (24.6;48.5)	1327 (1031;1708)	1307 (930;1837)	4240 (3359;5353)
	Shan5+IPV	19.2 (12.3;30.1)	587 (430;803)	965 (640;1454)	2448 (1795;3338)
Anti-Polio-2 1/dil	Shan6	13.4 (10.3;17.4)	724 (547;959)	218 (158;301)	3898 (3116;4876)
	Shan5+IPV	13.6 (9.25;20.1)	334 (248;452)	181 (118;277)	3262 (2350;4527)
Anti-Polio-3 1/dil	Shan6	18.7 (13.0;27.0)	1599 (1330;1966)	924 (667;1281)	5458 (4256;7001)
	Shan5+IPV	24.1 (14.6;39.7)	424 (322;558)	710 (452;1114)	5144 (3591;7368)

Shan6 Clinical Development Program: second wave (ongoing)

Study	Sample Size	No of SHAN6 recipients	Design
SH600004 India (Booster of SH600003) (Phase III)	676 toddlers *(12-24 months)*	676	• Descriptive, open-label • SHAN6 booster (10-d vial) in 2nd year of life (12-24 mos) • SHAN6 vs SHAN6 + MMR (2nd dose)
SH600008 Kenya (Phase III)	690 infants *(6-8 weeks)*	460	• Randomized, active control (vs SHAN5 & bOPV/IPV) • Safety, immunogenicity • 3 doses at 6 / 10 / 14 weeks of age • Sequential infant schedule in one arm Hexa-Penta-Hexa • Concomitant: ORV and PCV • Toddler booster at 18 months
SH600009 Thailand (Phase III)	460 infants *(8-10 weeks)*	230	• Randomized, active control (vs SHAN5 & bOPV/IPV) • Safety, immunogenicity • 3 doses at 2 / 4 / 6 months of age • Concomitant: ORV and PCV • Toddler booster at 18 months
SH600007 Vietnam (Phase III)	500 infants *(8-10 weeks)*	250 FVFS Q2-22	• Randomized, active control (vs wP pentavalent + bOPV & IPV) • Safety, immunogenicity • 3 doses at 2 / 3 / 4 months of age

Summary: Polio immunogenicity of IPV-containing wP Hexavalent schedules

- Non-inferiority demonstrated (Hexa vs Penta+IPV) in «early schedule» weeks (6,10,14 weeks) with high immunogenicity (~90%) against all three poliovirus serotypes (also confirmed NI for other antigens – see additional slides for data)
- We can expect/assume similar/higher immunogenicity with schedules starting from 8 weeks of age (e.g. 2, 3 & 4 months or 2, 4 & 6 months); Studies are in pipeline to confirm
- Can we conclude there should be no major concerns about IPV immunogenicity in IPV-containing wP Hexavalent products in different primary schedules
- Is a Hexa booster needed for polio immunogenicity in early schedule or DTPCV booster should continue?*

* WHO Recommends DTP-containing vaccine booster at 12-23 months of age following 3 primary doses starting from 6 weeks of age (min) with 4 week interval between doses.

Schedule Options for Discussion

	Primary immunization schedule				DTPCV booster	Number of injections
Schedule options	**6 weeks**	**10 weeks**	**14 weeks**	**9 months**	**12-24 months**	
Penta + IPV (with/without bOPV)	Penta1	Penta2	Penta3 + IPV1 (full or fIPV*)	IPV2 (full or fIPV*)	Penta4 or DTwP	6
Penta-Hexa mixed +IPV	Penta1	Penta2	Hexa1	IPV1	Penta or DTwP	5
3 dose Hexa (Penta or DTWP booster)	Hexa1	Hexa2	Hexa3		Penta1 or DTwP	4
Full Hexa (3+1 booster)	Hexa1	Hexa2	Hexa3		Hexa4	4

* Per current recommendations, Salk IPV can be used as fractional dose but not Sabin IPV

Pros and Cons of Different Schedules

Schedule	Pros	Cons	other considerations
Penta (3) + IPV (2) (with/without bOPV)	• High affordabilty/cost saving from IPV point of view • Dose/supply sparing with fIPV	• Missing early IPV protection in high risk countries	• Countries are transitioning to this schedule now
Penta-Hexa mixed (2 Penta + 1 Hexa + 1 IPV) (with Penta or DTwP booster)	• Some affordability and cost savings retained	• Programmatically complex? • Confusion for HWs when child delayed for vaccination, missed doses and off schedule, what booster?	• Vaccine wastage for Hexa > than Penta? • Management of multiple products in cold chain
3 dose Hexavalent (with Penta or DTwP booster)	• Easy to do - replace penta+IPV with Hexa (and reduce 1 injection and associated costs) • Presumed good polio immunogenicity if 1st dose starts at 8 weeks age	• Higher cost versus Penta + IPV schedule • There might be concerns for polio immunity for countries using early schedule starting from 6 weeks (i.e. most Gavi countries) unless a booster is provided	• Very practical (less injections) • Higher vaccine procurement costs will be offset by programmatic ease
Full Hexa (3+1 booster)	• Ideal situation if more products, favourable data, enough supplies and affordable	• Possibly none except the Cost? • As combo vaccine will never stop using IPV	• Advantageous to have one product for the primary series and the booster, from the supply and cold chain perspectives

Question #2 to SAGE WG:

Considering the pre and post eradication contexts and the available licensed products, data, supply pipeline and the timeline of IPV-containing wP Hexavalent and in support of Gavi's planning efforts:

- Is it possible to offer a perspective on preferred schedule(s) if some countries wish to introduce IPV-containing wP Hexavalent (replacing Penta/DTP and standalone IPV)?
- Is a Hexa booster (4th dose) recommended for early schedule starting from 6 weeks of age?

Thanks

Additional slides

IMMUNOGENICITY RESULTS

SANOFI

SH603: Immunogenicity data

Primary Objective: Non-inferiority vs Shan5 + ShanIPV (1/3)

Anti-D, Anti-T, Anti-HBs and Anti-PRP: Seroprotection (SP) rates

	Results (N=1149)				Non-Inferiority Comparison				
Antigen/Criteria Post- dose 3	Group	n/M	%	(95% CI)	Comparison	Difference	(95%CI)	Delta (%)	**Non-inferiority**
Anti-D	All Shan6	864/864	**100.0**	(99.6; 100.0)	Shan6 Vs Shan5+IPV	0.00	(-0.44; 1.33)	-10%	**Yes**
SP (≥ 0.01 IU/mL)	Shan5+IPV	285/285	**100.0**	(98.7; 100.0)					
Anti-T	All Shan6	864/864	**100.0**	(99.6; 100.0)	Shan6 Vs Shan5+IPV	0.00	(-0.44; 1.33)	-10%	**Yes**
SP(≥ 0.01 IU/mL)	Shan5+IPV	285/285	**100.0**	(98.7; 100.0)					
Anti-HBs	All Shan6	860/863	**99.7**	(99.0; 99.9)	Shan6 Vs Shan5+IPV	-0.35	(-1.02; 1.01)	-10%	**Yes**
SP (≥ 10 mIU/mL)	Shan5+IPV	283/283	**100.0**	(98.7; 100.0)					
Anti-PRP	All Shan6	864/864	**100.0**	(99.6; 100.0)	Shan6 Vs Shan5+IPV	0.00	(-0.44; 1.33)	-10%	**Yes**
SP (≥ 0.15 µg/mL)	Shan5+IPV	285/285	**100.0**	(98.7; 100.0)					

Non-inferiority concluded if the lower limit of 2-sided 95% CI of difference between batches is greater than -10%

SH603: Immunogenicity data

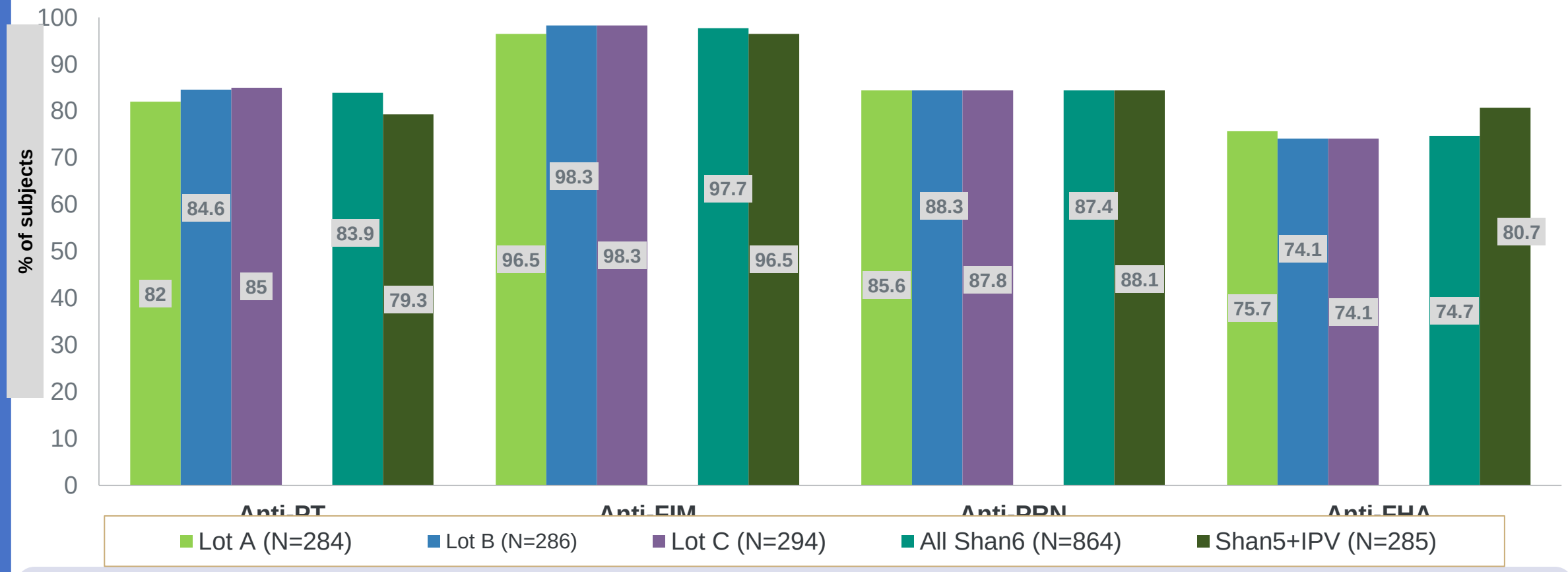
Primary Objective: Non-inferiority vs Shan5 + ShanIPV (3/3)

Anti-PT and anti-FIM: Adjusted GMCs (aGMCs)

	Results (N=1149)				Non-Inferiority Comparison				
Antigen/Criteria Post- dose 3	Group	M	aGMC	(95% CI)	Comparison	Ratio	(95%CI)	Delta (%)	**Non-inferiority**
Anti-PT	All Shan6	864	**86.2**	(77.3; 96.1)	Shan6 Vs Shan5+IPV	1.33	(1.07; 1.66)	0.5	**Yes**
	Shan5+IPV	285	**64.6**	(53.4; 78.1)					
Anti-FIM	All Shan6	864	**1251**	(1148; 1365)	Shan6 Vs Shan5+IPV	0.994	(0.83; 1.18)	0.5	**Yes**
	Shan5+IPV	285	**1260**	(1083; 1465)					

Non-inferiority concluded if the lower limit of 2-sided 95% CI of ratio between 2 batches is greater than 0.5

Secondary Endpoints: Vaccine Response Rate for Pertussis Post-dose 3



VRR Definition:

- **If the pre-primary vaccination concentration is <4xLLOQ, then the post-Primary vaccination concentration is ≥ 4x LLOQ.**
- **If the pre-primary vaccination concentration is ≥4xLLOQ, then the post-Primary vaccination concentration is ≥ the pre-primary vaccination concentration.**

Immune data from previous studies

Ab Persistence and Booster responses (1/3)

GMCs : Transition from Pre-Dose 1 to Post-dose 4

Antigen	Primary series	SH601 Study (Cohort 2)		SH602 Study	
		Pre-Dose 1	Post-Dose 3	Ab persistence at 18 months	Post-Dose 4 (Shan6 Booster)
Anti-D IU/mL	Shan6	0.016 (0.013;0.020)	2.39 (1.94;2.69)	0.237 (0.181;0.310)	6.34 (4.93;8.15)
	Shan5 + IPV	0.022 (0.015;0.033)	2.46 (1.76;3.44)	0.263 (0.165;0.419)	7.57 (4.96;11.6)
Anti-T IU/mL	Shan6	2.50 (2.06;3.04)	2.26 (1.89;2.71)	0.762 (0.561;1.03)	15.4 (12.6;18.9)
	Shan5 + IPV	2.30 (1.65;3.21)	3.20 (2.42;4.24)	1.34 (0.813;2.21)	21.2 (15.4;29.3)
Anti-HBs mIU/mL	Shan6	4.18 (3.08;5.67)	1219 (912;1629)	384 (247;597)	12020 (8313;17380)
	Shan5 + IPV	4.03 (2.72;5.98)	974 (746;1271)	293 (193;445)	17769 (12375;25513)
Anti-PRP µg/mL	Shan6	0.240 (0.177;0.325)	21.1 (17.8;25.0)	15.5 (10.9;22.0)	186 (147;237)
	Shan5 + IPV	0.247 (0.160;0.382)	19.0 (14.8;24.6)	8.46 (5.56;13.3)	203 (146;282)

Ab Persistence and Booster responses (3/3)

Anti-PT and Anti-FIM: Transition from Pre-Dose 1 to Post-dose 4

Antigen	Primary series	SH601 Study (Cohort 2)		SH602 study	
		Pre-Dose 1	Post-Dose 3	Ab persistence	Post-Dose 4 (Shan6 Booster)
Anti- PT EU/mL	Shan6	3.87 (3.24;4.63)	96.9 (66.3;142)	20.9 (14.5;30.1)	163 (122;217)
	Shan5+IPV	4.65 (3.63;5.95)	52.6 (30.4;91.1)	14.2 (8.71;23.2)	121 (79.9;183)
Anti-FIM EU/mL	Shan6	7.35 (5.38;10.0)	1080 (832;1404)	116 (85.6;157)	1687 (1421;2001)
	Shan5+IPV	8.86 (6.26;12.5)	1001 (681;1472)	119 (69.9;203)	1419 (858;2347)