Table VI: Seroprevalence after an additional dose of IPV

Population : Immunocompetent individuals
Intervention: Additional booster dose of IPV to an OPV primary schedule
Comparison: Additional booster dose of OPV to an OPV primary schedule
Outcome : Seroprevalence of poliovirus type 1, type 2 and type 3

PICO Question: What is the quality of scientific evidence that an additional dose of IPV added to a primary schedule of OPV induces higher levels of protective antibodies to all two poliovirus serotypes compared to a primary schedule of OPV with a booster dose of OPV.				
			Rating	Adjustment to rating
Quality Assessment	No of studies/starting rating		3 RCT[1]	4
	Factors decreasing confidence	Limitation in study design	Serious[2]	-1
		Inconsistency	None serious	0
		Indirectness	None serious	0
		Imprecision	None serious	0
		Publication bias	None detected	0
	Factors increasing confidence	Strength of association/ large effect	Not applicable	0
		Dose-response	Not applicable	0
		Antagonistic /mitigated bias and confounding	Not applicable	0
	Final numerical rating of quality of evidence			**3**
Summary of Findings	**Statement on quality of evidence**			Evidence supports a moderate level of confidence that the true effect lies close to that of the estimate of the effect on the health outcome.
	Conclusion			An additional dose of IPV to a primary OPV schedule significantly enhances immune response compared to a booster dose of OPV or results in priming of infants. One dose of IPV can close the immunity gap against type 1 and 3 among OPV-immunized population from one full dose of IPV.

[1] 3 RCTs evaluated the effect of an additional dose of IPV. Moriniere et al evaluated neutralizing antibody response in 368 primary OPV (3 dose) vaccinated children after IPV or OPV boosting. Antibody response was higher in the IPV group- 94% vs 85% to type 1, 100% vs 95% for type 2 and 89% vs 65% for typ 3 4-6 weeks after vaccination. In addition, IPV was significantly more likely to induce seroconversion to all 3 types of poliovirus in seronegative children- 81% vs 14% to type 1, 100% vs 27% for type 2 and 67% vs 5% for type 3, 6 weeks after vaccination. Sutter et al randomized 785 primary vaccinated children with of OPV (5 dose) to receive IPV, US or European tOPV or mOPV. Seroprevalence was highest for infants receiving IPV (97%) compared to 86%/87% tOPV and 92% mOPV one month after vaccination. Estivariz et al conducted a randomized controlled trial in 869 infants having received routine immunization of primary trivalent OPV plus an additional booster dose of IPV and mOPV. Seroconversion 4 weeks after administration of IPV i.m. ranged from >90% (serotype 3) to 100% (serotypes 1&2). In addition a large randomized controlled trial (Resik et al) conducted in Cuban infants aged 4 months, demonstrated that 63% of infants seroconverted to type 2 following a single full dose of IPV administered intramuscularly and 98% of infants who did not seroconvert were successfully primed, so most population are considered to be protected after one dose of IPV. Studies in Nigeria and India (Sutter 2010 and Mangal 2014) evaluated the immunogenicity of bivalent OPV (bOPV) compared to tOPV and found that seroconversion rates to poliovirus types 1 and 3 following immunization with bOPV were significantly higher than those induced by tOPV. Therefore there the protection conferred by bOPV after the global switch in April 2016 is assumed superior to tOPV.

[2] Participants and staff were not blinded (Moriniere et al; Estivariz et al) or blinding was not reported (Sutter et al.)

References

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4. Resik S, et al. Priming after a fractional dose of inactivated poliovirus vaccine. New England Journal of Medicine, 2013, 368:416-24.
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