Table III1: Persistence of protective antibodies following immunization with OPV

**Population**: Immunocompetent individuals  
**Intervention**: ≥ 3-4 doses of oral poliovirus vaccine  
**Comparison**: No vaccination  
**Outcome**: Protective antibodies

| PICO Question: What is the level of scientific evidence for ≥80% long-term (>5-10 years) persistence of protective antibodies following ≥3-4 doses of OPV before school age, according to national schedules? |
|---|---|
| | Rating | Adjustment to rating |
| No of studies/starting rating | 4 RCTs/ 5 observational\(^1\) | 4 |
| Factors decreasing confidence | | |
| Limitation in study design | None serious\(^2\) | 0 |
| 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/mitigating bias and confounding | Not applicable | 0 |
| Final numerical rating of quality of evidence | 4 |

**Summary of Findings**  
**Statement on quality of evidence**: Evidence supports a high level of confidence that the true effect lies close to that of the estimate of the effect on the health outcome  
**Conclusion**: High scientific evidence for ≥80% long-term (>5-10 years) persistence of protective antibodies following ≥3-4 doses of OPV.

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\(^1\) Nishio O et al (1984) investigated the persistence of neutralizing antibody (NA) against poliovirus after two doses of OPV in 67 children. After 5 years, more than 80% of them retained NA against all three types of poliovirus. Kelley PW et al (1991) using micro-neutralization assay to investigate susceptibility to poliovirus types 1, 2, and 3 among young US Army recruits believed to have received polio vaccination (mainly tetravalent OPV (tOPV)) 15-25 years earlier. The seronegativity rates for poliovirus types 1, 2, and 3 were 2.3%, 0.6%, and 14.6%, respectively; deviating trends by age, sex, and race-ethnicity were generally unremarkable.Faden H et al (1993) found that immunization with OPV, eIPV, and combinations of the two vaccines confers long-term (>5 year) immunity. Viviani S et al (2004) studied vaccine-induced antibody prevalences in representative samples of 8–9 year-olds as compared to 3–4 year olds (Fortuin M et al, 1995) in The Gambia. The geometric mean concentration of antibodies in children 8-9 years of age was lower than in the 3–4 year-old children; 88% of 3–4 year-olds and 89% of 8–9 year-olds had detectable antibody levels against poliovirus type 1. Fewer children at 8–9 years of age had antibodies against poliovirus type 3 than 3–4 year-olds (78% vs. 89% P < 0.001).

\(^2\) Given the limited time since first use of bOPV in 2009, no long-term data on the duration of protection conferred by bivalent OPV (bOPV) are available(Sutter et al 2010 and 2015, O’Ryan 2015 and Mangal 2014). Though given the higher initial efficacy of bOPV compared to tOPV, duration of continued protection against polio is assumed non-inferior or even superior to tOPV.
References

**Table III2 : Persistence of protective antibodies following immunization with IPV**

*Population*: Immunocompetent individuals  
*Intervention*: $\geq 3$-4 doses of inactivated poliovirus vaccine  
*Comparison*: No vaccination  
*Outcome*: Protective antibodies

<table>
<thead>
<tr>
<th>PICO Question: What is the level of scientific evidence for $\geq 80%$ long-term (&gt;5-10 years) persistence of protective antibodies following $\geq 3$-4 doses of IPV before school age, according to national schedules?</th>
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<td>Inconsistency</td>
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<td>Indirectness</td>
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3 Faden H et al (1993) found that all of the 86 children who by one year of age had received 3 doses of OPV and/or eIPV according to one of 4 different schedules (OPV-OPV-OPV, eIPV-eIPV-eIPV, eIPV-OPV-OPV, and eIPV-eIPV-OPV) exhibited an initial 10- to 100-fold decline in neutralizing antibody to poliovirus types 1, 2, and 3 during the first 2 years of follow-up; thereafter antibody titers stabilized. Böttiger M (1990) found persisting neutralizing antibodies against polio in all of the 250 Swedish children who had received 3 doses of killed polio vaccine (IPV) 18 years earlier. Among 64 children who were tested more frequently, a marked fall of antibody titers was observed during the first few years after vaccination, then the decline leveled off to a mean decrease in titer of 0.05-0.10 log10 per year. Children who had a fourth dose of IPV at 10 years of age rather than at the scheduled age of 6 years had significantly higher antibody levels at 18 years of age. Swartz TA et al (1986) showed adequate levels of neutralizing antibody persisting for five years after immunization with a 2 + 1 dose schedule of a combined DTP-IPV vaccine. Carlsson RM et al (2002) found neutralizing antibodies against polioviruses in 96% - 99% of 180 vaccinees who 4.5 years earlier had received IPV-containing combination vaccines. There were no clinically relevant differences between children who had been vaccinated in their infancy according to a 3, 5 plus 13 months schedule versus a 2, 4, 6 plus 12 months schedule. Langue J et al (2004) evaluated the persistence among 5-6 year old French children of antibodies against poliovirus types 1, 2, and 3 following primary immunization at 2 and 4 months and subsequent booster doses at 12-16 months and 5-6 years, using an IPV-containing tetravalent vaccine. Before the second booster, more than 90%, and 1 month after the second booster 100% of children had protective antibody titers.
## Summary of Findings

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<th>Factors increasing confidence</th>
<th>Imprecision</th>
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<td>Final numerical rating of quality of evidence</td>
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### Statement on quality of evidence

Our confidence in the estimate of the effect on the health outcome is limited

### Conclusion

Low scientific evidence for ≥ 80% long-term (>5-10 years) persistence of protective antibodies following ≥3-4 doses of IPV.

## References

5. Langue J, Matisse N, Pacoret P, Undreiner F, Boisnard F, Soubeyrand B; Pentavac study group. Persistence of antibodies at 5-6 years of age for children who had received a primary series vaccination with a pentavalent whole-cell pertussis vaccine and a first booster with a pentavalent acellular pertussis vaccine: immunogenicity and tolerance of second booster with a tetravalent acellular vaccine at 5-6 years of age. Vaccine. 2004 Mar 29;22(11-12):1406-14.