# Humoral and mucosal immunity developed by alternative routine immunization schedules of polio vaccines: a network meta-analysis

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# Review question

What is the relative efficacy of different routine vaccination schedules in inducing humoral immunity to poliovirus serotypes 1, 2 and 3?

What is the relative efficacy of different vaccination schedules in inducing mucosal immunity to poliovirus serotypes 1, 2 and 3?

Searches

Eligible trials will be identified by systematic searching of the literature, that will include the following electronic databases: PubMed and Cochrane Central Register of Controlled Trials (CENTRAL). Search results will be restricted to studies in humans. There will be no language restrictions. Studies published between January 1980 and the date the searches are run will be sought. The searches will be re-run just before the final analyses and further studies retrieved for inclusion.

Types of study to be included

Randomized controlled trials only

# Condition or domain being studied

Poliovirus vaccine

# Participants, Intervention, Comparator, Outcomes (PICOS)

|  |  |  |
| --- | --- | --- |
|  | Included | Excluded |
| Participants | Infants | Adults, Children |
| Intervention | Current poliovirus routine immunisation schedules:   * IPV-only * bOPV-only * IPV-bOPV only   First dose given at birth, or 4-8 weeks | Non-study poliovirus routine immunisation schedules:   * tOPV-IPV, tOPV-mOPV or tOPV-bOPV combination schedules * mOPV-only schedules     Incomplete routine immunisation schedule  Booster vaccination  Historical vaccine formulations  Variation in age schedule between arms  Trials in North America and Western Europe |
| Comparator | Current poliovirus routine immunisation schedules:   * IPV-only * bOPV-only * IPV-bOPV only   Historical poliovirus routine schedule:   * tOPV-only   First dose given at birth, or 4-8 weeks |  |
| Outcome | 1. Seroconversion to serotype 1, 2 and 3 polioviruses   and/or   1. Shedding serotype 2 polioviruses, 7 days after challenge dose with mOPV2 or tOPV. | Report non-serotype-specific outcomes |

# Primary outcome(s)

1. Development of humoral immunity to poliovirus serotype 1, 2 and 3 (as binary outcome)

This will be defined as seroconversion, or a >1:4-fold increase in antibody titers. Blood sample to be taken before and after the full primary vaccination series.

1. Development of mucosal immunity to poliovirus serotype 2 (as binary outcome)

This will be defined as the absence of shed virus after challenge dose of OPV. The challenge dose vaccine should be given following the full primary vaccination series. Fecal sample taken 7 days after challenge OPV dose.

# Data extraction (selection and coding)

One investigator will examine (screening by title and abstract) the records to identify potentially eligible trials. The full texts of potentially eligible trials reports will be retrieved and assessed against the inclusion criteria. Two investigators will extract data using an extraction form and assess the risk of bias.

# Risk of bias (quality) assessment

We will assess risk of bias in the included studies using the tool described in the Cochrane Collaboration Handbook as a reference guide (Higgins et al., 2011). The following domains for each trial will be assessed: sequence generation, allocation concealment, blinding, andincomplete outcome data.

Strategy for data synthesis

For each outcome and serotype, study-arm level data will be used to compute: (1) a random-effect meta-analysis of single proportions and (2) a random-effect network meta-analysis. The network meta-analysis will be running in a Bayesian framework and the relative effects between interventions will summarized as an effect ratio with 95% credible intervals (CrIs). The random effects standard deviation (τ) will be used as a measure of heterogeneity and a node-splitting model will be used to measure network inconsistency.

# Analysis of subgroups or subsets

Additional analysis will include network meta-regression and/or sub-group analysis to explore the effect of study-level covariates. If the necessary data are available, study-level covariates may include: country of study, vaccination schedule (birth dose) and if country is polio endemic.

# Contact

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# Organisational affiliation of the review

None

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# Conflicts of interest

None known

# Language

English