

Polio vaccines. Grading tables

Table IV: Efficacy/effectiveness of inactivated polio vaccine (IPV) against clinical poliomyelitis

Settings: Global

Question: What is the evidence that inactivated poliovaccine (IPV) protects against clinical poliomyelitis?

Conclusion: High scientific evidence that IPV protects against clinical poliomyelitis.

Quality assessment						Summary of Findings
No of studies	Design	Limitations	Inconsistency	Indirectness	Imprecision	Quality
1	Randomised controlled	No serious	No serious	No serious	No serious	High
6	Observational	Serious	No serious	No serious	Serious	Low

Francis T et al (1955, as cited by Plotkin S et al 2008) conducted a major field trial in the USA in 1954 that involved about 400 000 children, randomly assigned to IPV or placebo. A related, non randomized study by the same authors involved another 200 000 children who were vaccinated and observed together with unvaccinated children. Altogether, 71 cases of paralytic polio occurred in vaccinated individuals versus 445 among unvaccinated individuals. In the placebo controlled trial, 11 cases of polio occurred among vaccines as compared to 70 cases in the control group. The calculated vaccine efficacy was 80%-90% against paralytic polio and 60%-70% against all types of polio.

Melnick JL et al (1961) calculated an efficacy of 96% through two polio seasons in Houston, Texas.

Stoeckel P et al (1984) studied the protective efficacy IPV among children in a rural area of Senegal. During the 3 year observation period following vaccination, no case of polio occurred in the vaccinated group. During the preceding 13 years an average of 3.9 cases of paralytic poliomyelitis (range, one to 13) were observed annually in the test region.

Centers for Disease Control and Prevention (1988) In a case-control analysis following a polio type 1 outbreak in Senegal, two doses of combined dtwP-IPV conferred 89% (96% CI 62-97) protection. Serological studies of patients who have received 2 doses of N-IPV have seroconversion rates ranging from 90% to 100% for each of the three polioviruses.

John T (1992) found 92% efficacy of IPV in a case-control study in the North Arcot district of India.

Varughese PV et al (1989) found more than 90% vaccine efficacy following the introduction of this vaccine in Canada.

Robertson S et al (1994) conducted a case control study in Oman during an outbreak involving 118 cases of poliomyelitis type 1. They analyzed 70 cases and 762 aged-matched controls to estimate the immunogenicity and clinical efficacy of OPV. They reported that 3 doses of OPV reduced the risk of paralysis by 91%. Cases and controls had similar type 1 neutralizing antibody profiles that suggested widespread type 1 poliovirus transmission.

Literature:

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Melnick JL, Benyeh-Melnick M, Peña R, Yow M. Effectiveness of Salk vaccine. Analysis of virologically confirmed cases of paralytic and nonparalytic poliomyelitis. *JAMA*. 1961 Apr 1;175:1159-62.

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John T. Poliovirus vaccine and poliomyelitis control in India [Abstract], 1992. World conference on poliomyelitis and measles, New Delhi.

Varughese PV, Carter AO, Acres SE, Furesz J. Eradication of indigenous poliomyelitis in Canada: impact of immunization strategies. *Can J Publ Health* 80: 363-368, 1989.

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