

Economic Evaluation of Typhoid Vaccination in India

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RECOMMENDATIONS

- Introduction of single-dose Typhoid conjugate vaccine at 16 months of age is recommended in the routine immunization programme of India.
- Routine adoption of a two-dose TCV schedule is not recommended at present. The strategy may be reconsidered as additional evidence on long-term vaccine effectiveness and waning immunity becomes available

KEY FINDINGS

- As compared to no vaccination, the single-dose strategy averts 1,837 cases (29%) and 11 deaths (29%) per 100,000 children, while a two-dose strategy averts 2,591 cases (41%) and 16 deaths (41%) over a 15-year time horizon.
- The single-dose strategy generates 94 additional QALYs and reduces health system treatment costs by ₹26 lakhs and out-of-pocket expenditure by ₹80 lakhs per 100,000 children.
- The incremental cost per QALY gained with a single-dose TCV strategy is ₹1.51 lakh, which is below India's cost-effectiveness threshold (1 times GDP per capita).
- Although the two-dose strategy provides greater health gains (121 QALYs), its ICER of ₹2,63,304 per QALY gained exceeds the cost-effectiveness threshold and is associated with substantial decision uncertainty (50.5% probability of cost-effectiveness).

BACKGROUND

- Typhoid fever remains a major public health problem in India, which accounts for one of the highest burdens of disease globally.
- Among children aged 6 months–14 years, incidence ranges from 12 to 1,622 cases per 100,000 child-years, with children and socioeconomically vulnerable populations disproportionately affected.
- Antimicrobial therapy remains the cornerstone of treatment; however, rising antimicrobial resistance (AMR), particularly widespread fluoroquinolone resistance, threatens the effectiveness of currently available treatment options and increases the complexity of case management.
- The World Health Organization recommends the inclusion of TCVs in routine immunization programmes in typhoid-endemic countries, and more than 130 million children have already been immunized through TCV introduction programmes globally.
- Existing evidence on the cost-effectiveness of TCV in India remains insufficient to inform national policy decisions, owing to limited geographical representativeness (separate urban and rural analyses) and the use of non-generalizable incidence estimates.
- Evaluating the cost-effectiveness of TCV introduction in India is critical to inform national immunization policy, particularly in view of the substantial disease burden, growing AMR concerns, and ongoing deliberations by National Technical Advisory Group on Immunization (NTAGI) regarding inclusion of TCV in the Universal Immunization Programme.

KEY MODEL INPUTS



TYPHOID DISEASE BURDEN

Incidence rate per 100,000 child-years



391

6 months to
5 years



561

5 years to
9 years



413

10 years to
14 years



TCV-RELATED INPUTS



84%

Vaccine efficacy



13%

Annual rate of
waning immunity



80%

Vaccine coverage

COST INPUTS



₹139

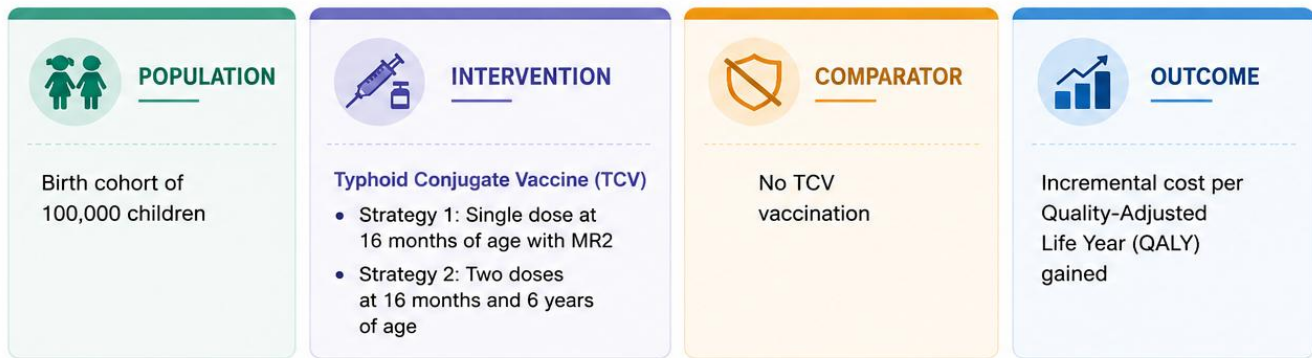
Vaccine price



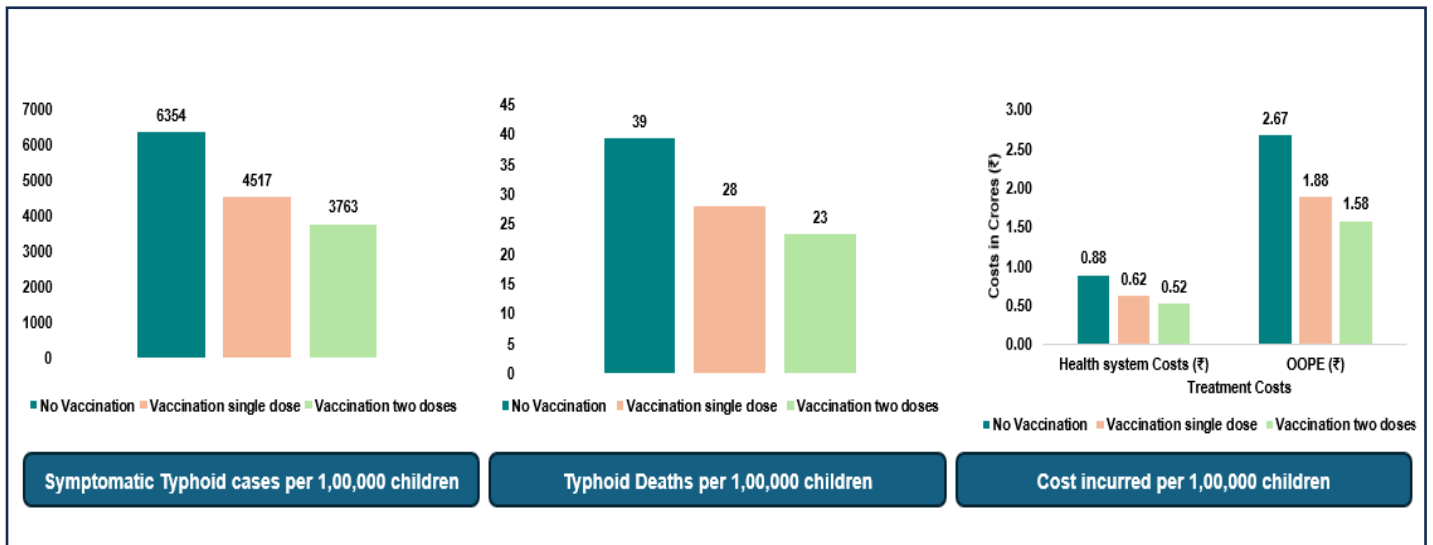
₹195

Vaccination
delivery cost

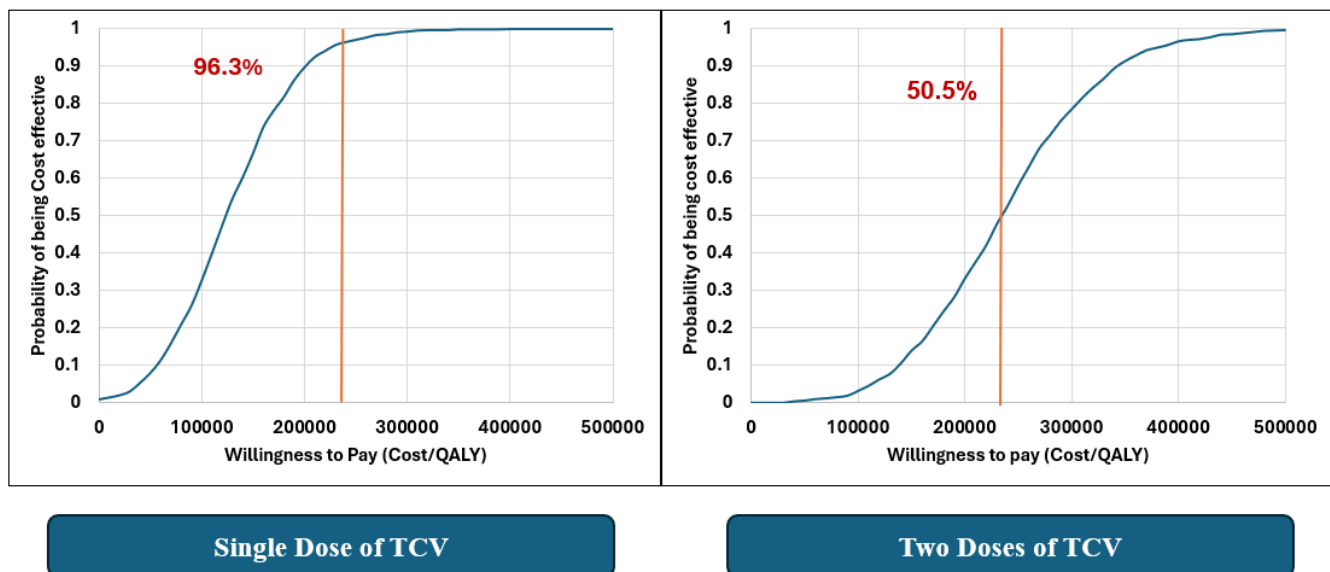
PICO FRAMEWORK



ESTIMATED HEALTH GAINS AND COST



PROBABILITY OF COST-EFFECTIVENESS



CONCLUSION

Introduction of a single-dose Typhoid Conjugate Vaccine (TCV) at 16 months of age represents a cost-effective strategy for reducing typhoid morbidity and mortality in India and should be prioritized for inclusion in the routine immunization programme.