

## **Abstract**

This article considers the investment case for using the Vi polysaccharide vaccine (Vi) in developing countries from two perspectives: reducing typhoid cases and limiting new health care spending. Consumer demand functions that predict probabilities of adults and children purchasing typhoid vaccinations at different prices are incorporated in a formal mathematical model. This optimisation model solves for the optimal vaccine prices to charge adults and children to maximise the number of typhoid cases avoided subject to the constraint that the sum of 1) vaccination revenues, 2) the public savings from avoided cases, and 3) an external (e.g., donor) contribution (if any), is sufficient to pay for the costs of the vaccination program. Using values from the recent literature for South and Southeast Asia for typhoid incidence, Vi vaccine effectiveness, public cost of illness, and vaccination program cost, three mass vaccination policy alternatives are evaluated: charging adults and children different (optimal) prices, charging uniform prices, and providing free vaccines. Assuming differential pricing is politically feasible, the vaccine price for children should be zero (because their incidence is much higher than adults), and fees for adults should cover most of costs of the vaccination program (because the savings from reduced public sector treatment are small). Equal prices for children and adults produce very similar results to the optimal solution. Alternatively, if vaccines are free, the number of cases is not significantly reduced compared to either pricing policy, but a large external financial contribution would be required.

**Keywords:** Typhoid vaccine, policy, optimisation, user charges, vaccine demand

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