VACCIREVIEW

Cost-effectiveness analysis of bivalent respiratory syncytial virus prefusion F (RSVpreF) maternal vaccine for the prevention of RSV illness among infants in Hong Kong

Bibliography

Wong V, Fung M, Kendall R, Ivkovic L, Law AW, Mendes D. Cost-effectiveness analysis of bivalent respiratory syncytial virus prefusion F (RSVpreF) maternal vaccine for the prevention of RSV illness among infants in Hong Kong. Int J Infect Dis. 2026;xx(xx):xx–xx. doi:10.1016/j.ijid.2026.108503.

Summary

As ViP was our feature topic last week, here we cover the economic evaluation of RSVpreF vaccination in pregnancy in Hong Kong. RSV is a major cause of lower respiratory tract infection (LRTI), hospitalization, and death in infants globally, and Hong Kong experiences high RSV-associated hospitalization rates in children under five. A bivalent RSV prefusion F protein vaccine has recently been approved there for use in pregnant women at 32–36 weeks' gestation to protect infants up to six months of age. The authors model the impact of implementing a year-round maternal vaccination program compared with no intervention from the public healthcare system perspective.

The analysis uses a Markov cohort model following a hypothetical birth cohort of infants from birth to one year of age. ViP is assumed to confer passive protection to infants against RSV-LRTI, with effectiveness informed by the MATISSE phase 3 trial. Efficacy against severe medically attended RSV-LRTI is used as a proxy for protection against RSV-related hospitalization, while efficacy against medically attended RSV-LRTI represents protection against outpatient-managed RSV disease. Protection is modeled to wane with age; in the base case, efficacy is specified up to six months and assumed to decline to zero by nine months.

Epidemiologic inputs are drawn from local and international sources. Age-specific RSV hospitalization incidence is based on a 15-year study from a major Hong Kong hospital. Outpatient RSV encounter rates and age distributions are extrapolated from Singapore and United States data owing to limited local information. All hospitalized RSV cases are assumed to present as LRTI; among outpatients, a proportion in each age group is assumed to have LRTI. Age- and gestational age–specific mortality uses Hong Kong infant mortality data distributed using US patterns, and an RSV case-fatality rate for hospitalized children from a recent meta-analysis.

Cost inputs (in 2025 US dollars) include the price of maternal RSVpreF vaccination (per dose plus administration) and the costs of RSV hospitalizations and outpatient visits.

Hospitalization costs incorporate different lengths of stay and daily tariffs for intensive care and general wards, weighted by the proportion of infants requiring intensive care. Outpatient costs reflect public-sector clinic fees. The base case uses a 99-year time horizon with 3% annual discounting of costs and outcomes to capture lifetime QALY losses from RSV-related infant deaths. Utilities assume infants without RSV have a utility of 1.0; disutility for RSV-related illness and caregiver quality-of-life losses are included. The main outcome is the incremental cost-effectiveness ratio (ICER) in cost per quality-adjusted life year (QALY) gained, evaluated against a willingness-to-pay threshold of one times Hong Kong gross domestic product per capita.

In the base case, maternal vaccination coverage is assumed to be 20% of pregnant women year-round. Compared with no intervention, this program is estimated to prevent about 10% of RSV hospitalizations (113 cases annually), 6% of outpatient encounters (256 cases), and one RSV-related infant death per year. This corresponds to 38 additional discounted life years and 40 QALYs gained in the birth cohort. Direct medical care costs decrease by about 0.3 million US dollars due to fewer RSV episodes, but vaccination program costs of about 2.14 million US dollars yield a net cost increase of 1.84 million. The resulting ICER is approximately 45,800 US dollars per QALY gained, below the GDP-based threshold of 56,840 US dollars, indicating the program would be cost-effective in the base case.

One-way sensitivity analyses show the ICER is most sensitive to four parameters: vaccine effectiveness, RSV hospitalization incidence, vaccine cost, and the RSV hospitalization case-fatality rate. Probabilistic sensitivity analysis (1,000 iterations) suggests that at the chosen threshold, maternal vaccination is cost-effective in a modest majority of simulations (about half), highlighting some uncertainty.

Scenario analyses explore alternative coverage levels, perspectives, discount rates, vaccination windows, duration of protection, and lower mortality. At very low uptake (3.9%), health impact is small but the cost per QALY remains similar, as both costs and benefits scale with coverage. At high uptake (90%), approximately 46% of hospitalizations and 28% of outpatient visits are averted, with the ICER unchanged in absolute terms but a much larger absolute health impact. When indirect costs (caregiver productivity losses and future productivity from averted deaths) are included, the ICER improves substantially, dropping to roughly two-thirds of GDP per capita. Removing discounting yields a more favorable ICER, while increasing the discount rate to 5% pushes the ICER slightly above the threshold. Assuming shorter duration of vaccine protection (up to only six months) worsens the ICER; extending waning to 12 months improves it modestly. Using a much lower RSV case-fatality rate based on local data

markedly increases the ICER, making the program not cost-effective under that assumption.

Overall, the authors conclude that year-round RSVpreF ViP in Hong Kong is likely to be a cost-effective strategy from both healthcare system and societal perspectives, with impact strongly dependent on coverage and on key epidemiologic and cost parameters.

Comment

This study is a detailed and transparent cost-effectiveness analysis tailored to Hong Kong, using local hospitalization and cost data where available and carefully referencing international sources when local evidence is lacking. The model structure is standard and appropriate for an infant RSV-prevention question, and the authors clearly define their perspective, time horizon, discounting, and willingness-to-pay threshold. The explicit linkage of vaccine effectiveness assumptions to a pivotal phase 3 trial, and exploration of different waning scenarios, strengthens the clinical plausibility of the modeled effects. The inclusion of caregiver disutility and a separate societal-perspective scenario is a further strength, reflecting the real-world burden of infant RSV on families.

One of the study limitations is the reliance on extrapolated epidemiologic and utility inputs from other settings (notably the United States and Singapore) for outpatient incidence, age distributions of infection, and relative risks by gestational age. Also, assumptions about case-fatality in hospitalized infants drive a large fraction of modeled QALY gains; when a lower, locally derived mortality is used, the ICER rises above commonly accepted thresholds. This suggests that the result is sensitive to relatively small absolute differences in rare but high-impact outcomes.

Overall, given a 2% hospitalization rate for children <2 years of life, there is no doubt the benefit of vaccination, and given the cost for ViP compared to the cost of long-acting monoclonal antibodies, in countries with year-round RSV circulation there is no doubt that RSV-ViP is the method of choice for prevention.

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