Economic and Clinical Benefits of Bivalent RSVPreF Maternal Vaccine for Prevention of RSV in Infants: A Cost-Effectiveness Analysis for Hong Kong

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Victoria Wong[1], Michael Fung[1], Robyn Kendall[2], Luka Ivkovic[2], Amy W. Law[3], Diana Mendes[4]

[1]Pfizer, Hong Kong; [2]Evidinno Outcomes Research Inc, Vancouver, BC, Canada; [3]Pfizer Inc, New York, NY, USA; [4]Pfizer UK, Tadworth, Surrey, UK; Presenting author: Amy.Law@pfizer.com

Objective

- The novel RSV prefusion F (RSVpreF) vaccine was recently approved in Hong Kong for use among pregnant women for the prevention of RSV in infants.[1]
- The clinical and economic burden of RSV infections among infants in Hong Kong, with and without a year-round RSVpreF maternal vaccination program, was evaluated.

Methods

- A Markov model was used to predict the clinical outcomes and costs related to RSV infections from birth to 1 year of age.
- Clinical outcomes consisted of RSV cases stratified by care setting (hospital [H] or physician's office [PO]), RSV-related deaths (for hospital-admitted patients), life years (LYs), and quality-adjusted life years (QALYs).
- Economic outcomes consisted of intervention costs, including vaccine and administration fee, and direct medical care costs for infants.
- Vaccine effectiveness was derived from MATISSE clinical trial data.[2]
- Utilities for Hong Kong population were derived from the literature.[3] Other model input parameters are presented in **Table 1**.
- Analyses were conducted from healthcare and societal perspectives with a lifetime time horizon. Scenario analysis tested the robustness of key model inputs such as for vaccine uptake (3.9%[4] and 90%).

Table 1. Model input parameters

Parameter [Source]	Value											
Number of pregnant women[5]/infants born[6]	33,248 / 33,373											
Distribution of births[7]	Full term ≥37 wGA					Pre-term 32-36wGA				Pre-term 28-31 wGA		
	94.1%					5.1%				0.6%		
Percentage of infants stillborn[8,9]	0.1%					1.2%				15.6%		
RSV incidence per 1,000 person, by month of age[10-12], Hospitalized/Outpatient	<1	1-<2	2-<3	3-<4	4-<5	5-<6	6-<7	7-<8	8-<9	9-<10	10-<11	11-<12
	42/211	73/273	53/268	37/187	32/163	26/131	23/11	19/98	17/89	20/103	14/73	14/73
Baseline mortality per 1,000 live births[13]	1.20 (<1 month)								0.05 (1-<12 months)			
Case-fatality rate (in hospital) due to RSV, per 100 cases[14]	3.08											
Disutility due to RSV Hospitalized/Outpatient[15,16]	0.0157/0.0061											
Medical cost per episode* Hospitalized/Outpatient[17,18]	US$2,463.95/US$65.18											
RSVpreF cost per dose*	US$316.20											
RSVpreF vaccine uptake	20%											

* All costs were reported in 2024 United States dollars (US$), while an annual discount rate of 3% was applied for both future costs and outcomes.

Results

- Use of RSVpreF vaccine among pregnant women at 20% uptake would provide protection to 6,535 infants at birth and was projected to avert 103 RSV-H cases, 372 RSV-PO cases, and 2 RSV-related deaths (**Table 2**).
- Maternal vaccination would result in a savings of US$270,000 in direct medical care costs and US$660,000 in indirect costs,* with a gain of 73 QALYs compared to no vaccination.
- From the healthcare system perspective, maternal RSVpreF vaccination would be a cost-effective strategy, with an incremental cost-effectiveness ratio (ICER) of US$25,127 per QALY gained, equivalent to 0.35 times the assumed willingness-to-pay threshold of 1 x gross domestic product per capita (GDPpc) in Hong Kong (US$71,482 per QALY gained).
- From a societal perspective, the resulting ICER would decrease to US$16,125 per QALY gained, i.e. 0.23 x GDPpc.

* Indirect costs consisted of lost productivity: 1) work absenteeism of caregivers who provided care to RSV-positive infants, and 2) lost labor opportunities that might have materialized after the maturity of the infants who experienced death due to RSV.

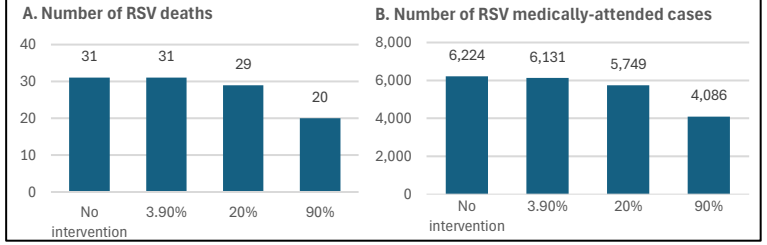
Results (continued)

Table 2. Base case results: Maternal vaccine vs. No intervention

	Maternal vaccine	No Intervention	Difference
Clinical outcomes, No. of cases			
RSV-Hospitalizations	914	1,017	-103
RSV-Physician's Office visits	4,835	5,207	-372
RSV-related deaths	29	31	-2
Life years, discounted	1,012,148	1,012,076	72
QALYs, discounted	944,637	944,566	71
Caregiver QALYs lost	25	27	-2
Economic outcomes, US$ millions			
Medical care	2.51	2.78	-0.27
Maternal vaccination	2.11	0	2.11
Indirect costs	7.86	8.52	-0.66
Total direct costs	4.62	2.78	1.84
Incremental Cost-Effectiveness Ratio (ICER), Cost per QALY gained			
Healthcare perspective			25,127
Societal perspective			16,125

- RSV medically-attended cases and RSV-related deaths for base case and vaccine uptake scenario analyses are presented in Figure 1. RSV cases and RSV-related deaths decreased with higher maternal vaccine uptake.

Figure 1. Total number of RSV deaths (A) and medically-attended cases (B) with different vaccine uptake



Conclusion

- Year-round RSVpreF maternal vaccination would be a highly cost-effective program and would substantially reduce the clinical and economic burden of RSV among infants in Hong Kong.
- The public health impact of maternal RSV vaccination is highly dependent on uptake rates; thus, a high vaccine uptake will be crucial for the success of the program in reducing the RSV burden among infants in Hong Kong.

References: 1. Centre for Health Protection of the Department of Health. Interim consensus on the use of RSV vaccines in Hong Kong, Jan 2025. 2. Kampman et al. New England Journal of Medicine. 2023;388(16):1451-1464 3. Wong et al. Value Health. 2019;22(8):916-924. 4. Lau et al. Vaccine. 2010;28(33):5389-5397. 5.Census and Statistics Department.Hong Kong. Table 115-01012 : Number of live births born in Hong Kong to Mainland women. 6. W. Robert Johnston. Historical abortion statistics, Hong Kong. 7. Lok IWY et al. Open Journal of Obstetrics and Gynecology. 2021;11(08):940-54. 8. Fung GPG et al. Hong Kong Med J 2022;28(6):430-7. 9. Wong STK et al. Hong Kong Med J 2022;28(4):285-93. 10. Chan et al. Medicine (Baltimore). 2015;94(46):e2024. 11.Tam et al. Emerg Infect Dis. 2020;26(7):1489-1496. 12.Curns et al. Pediatrics, 2024;153(3):e2023062574. 13.Census and Statistics Department. Hong Kong Monthly Digest of Statistics, May 2023. 14.Leung et al. Infection 2014;42(2):343-50. 15. Roy LMC. University of British Columbia. 2013. 16. Hutton. Centers for Disease Control and Prevention ACIP, Atlanta United States, 2023. 17.Hong Kong Hospital Authority. Public Charges – Non-eligible Persons. 18. Hon et al. J Crit Care. 2012;27(5):464-468.

This study was sponsored by Pfizer Inc.

Poster presented at ESPID 2025, May 26th – 28th, Bucharest, Romania