Budget Impact of RSVpreF among Pregnant Women for Prevention of RSV among Privately Insured Infants in Dubai, UAE

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INTRODUCTION

- Respiratory syncytial virus (RSV) is a leading cause of lower respiratory tract illness (LRTI) among young children globally[1]
- In Dubai, viral respiratory infections account for nearly one-sixth of healthcare encounters among children[2,3]

OBJECTIVE

- **To project the 5-year budgetary impact of novel RSVpreF among pregnant women compared with no intervention for protection of privately insured infants aged <1 year in Dubai**

METHODS

Model Overview

- Deterministic cohort model was developed to depict clinical outcomes and economic costs of RSV-LRTI and maternal vaccination for infants from birth to age 1 year
- Model population included non-Emirati infants born in Dubai (N=136,285 [27,257 per year]) characterized by age, calendar month of birth, and term status defined by gestational age in weeks (wGA) at birth (full-term, ≥37; late preterm, 32-36; early preterm, 28-31; extreme preterm, ≤27)
- Budgetary impact was calculated as difference in total costs associated with RSVpreF vs. No Intervention applying data on:
  - Uptake of vaccine
  - RSV incidence by care setting (hospital [H], emergency department [ED], outpatient clinic [OC])
  - Case-fatality rate (CFR) for RSV-H and general population mortality
  - Vaccine effectiveness (VE)
  - Direct costs of vaccination/administration and medical care costs
- Budget impact was reported overall as well as per-member per-year (PMPY) in 2023 USD

Estimation of Model Inputs

- Total number of infants was from Dubai Health Statistics Yearbook 2022 data[4] and distributed across term status groups[5]
- RSV-H rates (Table 1) were based on data from high-income countries[1] and allocated across single month of age;[6] RSV-ED and RSV-OC rates were estimated based on the ratio of RSV-H rates to RSV-ED and RSV-OC rates, respectively, observed in the US[6,7]:
  - RSV rates were downwardly adjusted to exclude upper respiratory tract infections,[8] and allocated by term status[9]
- Case-fatality due to hospitalized RSV-LRTI was based on data from high income countries (range: 0.02-0.4 per 100, age/term status dependent);[1] background mortality rates were based on Dubai Health Statistical Yearbook data[4]
- Age- and setting-specific costs per episode of RSV-LRTI was estimated using the Dubai Real-World Database[10]
- Cost of RSVpreF was $276.00;[10] administration fee was assumed to be $20.00 per patient
- Vaccine uptake was assumed to be 10% year-round (invariant throughout modelling horizon); vaccine administration was assumed to occur from 24-36 weeks of gestation
- Monthly VE for full term and late preterm infants aged <6 months was derived from MATISSE efficacy data (severe RSV+ medically-attended [MA] LRTI for RSV-H; RSV+ MA-LRTI for RSV-ED/OC);[10] VE was then assumed to wane linearly to 0% by age 9-<10 months (Figure 1)
  - VE was assumed to be 0% for infants born <2 weeks after RSVpreF administration and early/extreme preterm infants

Analyses

- Base case analyses evaluated RSVpreF vs. no intervention among all non-Emirati infants aged <1 year in Dubai
- Deterministic sensitivity analyses (DSA) were conducted to evaluate impact of changes to RSV-H rates, cost of RSV-H, and initial VE
- Scenario analyses were conducted to evaluate alternative assumptions for vaccine uptake (15%, 20%)

Table 1. Disease rates (per 1,000)

	Month of Age											
	<1	1-<2	2-<3	3-<4	4-<5	5-<6	6-<7	7-<8	8-<9	9-<10	10-<11	11-<12
Hospital												
Full term	19	33	24	17	15	12	11	9	8	9	7	7
Late preterm	33	58	42	42	37	29	19	15	14	16	12	12
Early preterm	9	16	11	41	35	28	74	62	56	65	46	46
Extreme preterm	9	16	11	41	35	28	74	62	56	65	46	46
ED												
Full term	14	45	51	75	82	51	46	32	31	31	23	31
Late preterm	24	78	88	185	204	125	79	54	54	54	39	54
Early preterm	6	21	24	178	196	120	316	217	215	215	156	215
Extreme preterm	6	21	24	178	196	120	316	217	215	215	156	215
OC												
Full term	60	131	164	165	188	205	90	70	94	77	82	88
Late preterm	104	229	285	408	465	508	153	120	161	132	140	150
Early preterm	28	62	77	393	448	488	613	480	643	526	560	598
Extreme preterm	28	62	77	393	448	488	613	480	643	526	560	598

Figure 1. Vaccine effectiveness

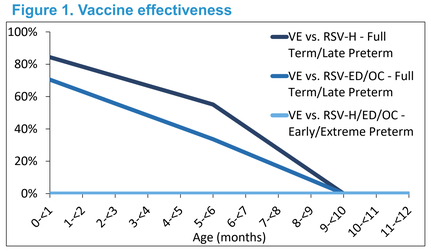


Table 2. Medical costs ($ per episode)

	Month of Age		
	<2	2-<6	6-<12
Hospital	3,128	2,750	2,880
Emergency department	396	416	420
Outpatient clinic	204	220	228

RESULTS

Base Case Analyses

- **Over 5 years, without use of RSVpreF, RSV-LRTI episodes would total >23K (RSV-H: 1,960; RSV-ED: 5,655; RSV-OC: 15,652) and medical costs would total $11.5M**
- **RSVpreF prevented 855 episodes due to RSV-LRTI in infants aged <1 year (Figures 2-3)**
- **RSV-LRTI prevention yielded a $0.5M reduction in medical costs, 62% of which was attributable to reduction in RSV-H (Figure 4)**
- **With cost of vaccination projected to be $3.6M, total costs increased by $3.1M overall and $0.19 PMPY (Table 3)**

Figure 2. Prevented outcomes by care setting

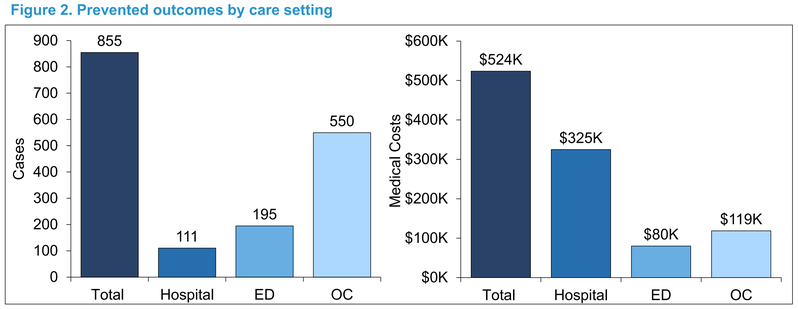
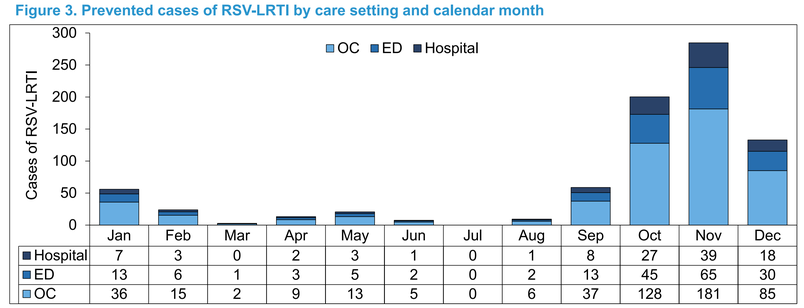


Figure 3. Prevented cases of RSV-LRTI by care setting and calendar month



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hospital	7	3	0	2	3	1	0	1	8	27	39	18
ED	13	6	1	3	5	2	0	2	13	45	65	30
OC	36	15	2	9	13	5	0	6	37	128	181	85

Sensitivity and Scenario Analyses

- In DSA, initial VE had the greatest impact on results yielding PMPY costs of $0.184 (upper bound) and $0.196 (lower bound) (Figure 5)
- Compared to base case, assuming 15% and 20% uptake year-round prevented an additional 427 and 855 cases of RSV-LRTI, respectively, and yielding additional reductions in medical care costs of $0.3 million and $0.6 million, respectively (Table 3 and Figure 6)
- Incremental PMPY cost (compared to no intervention) was $0.29 with 15% uptake and $0.38 with 20% uptake; PMPY costs increase with higher uptake due to added cost of vaccination

Figure 4. Distribution of prevented outcomes by care setting

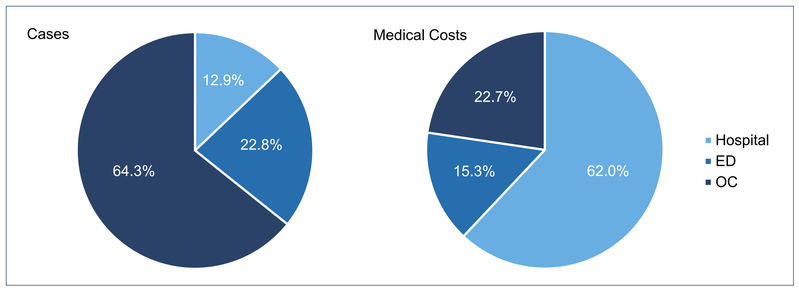


Figure 5. DSA results

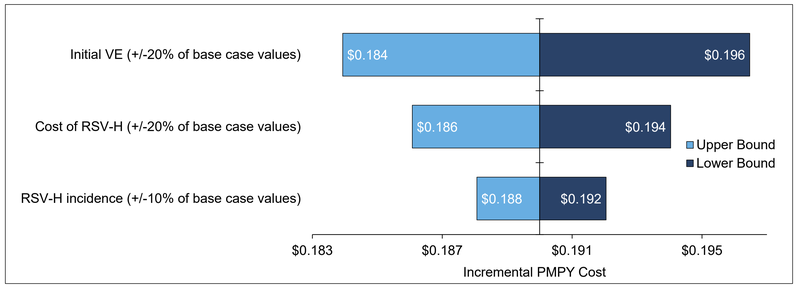


Figure 6. Cases of RSV-LRTI prevented by care setting in base case and scenario analyses

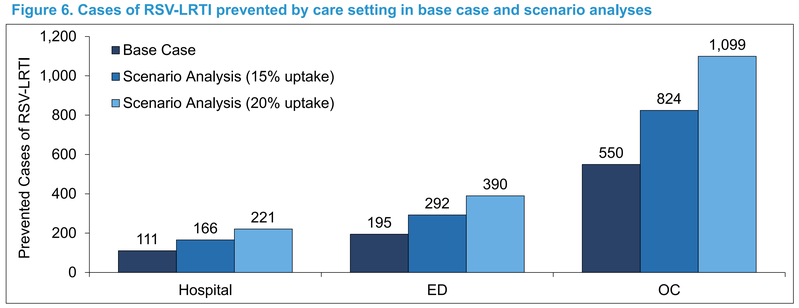


Table 3. Base case and scenario analysis results

	No Intervention	Base Case (10% uptake)	Scenario Analysis (15% uptake)	Scenario Analysis (20% uptake)
Clinical outcomes				
No. of cases	23,267	22,412	21,985	21,557
Hospital	1,960	1,850	1,794	1,739
Emergency department	5,655	5,460	5,363	5,265
Outpatient clinic	15,652	15,102	14,828	14,553
No. of deaths	1.2	1.2	1.2	1.1
Economic costs (millions)				
Medical care	$11.5	$11.0	$10.7	$10.4
Intervention	$0.0	$3.6	$5.4	$7.3
Total costs	$11.5	$14.6	$16.2	$17.7
Budget impact				
PMPY cost	$0.70	$0.89	$0.99	$1.08
Incremental PMPY cost	**--**	**$0.19**	**$0.29**	**$0.38**

LIMITATIONS

- Initial VE and waning through age 6 months were based on MATISSE, however, waning assumptions during months thereafter (i.e., 6-<10 months) were informed by evidence on kinetics and decay of maternal transfer of antibodies
- Conservatively assumed 0% VE for early and extreme preterm infants
- Dubai-specific data were not available for incidence of RSV-LRTI; values were instead based on global RSV-H incidence data from high-income countries and the ratio of incidence rates across care settings from a US meta-analysis

CONCLUSIONS

- **Use of RSVpreF among pregnant people in Dubai—in lieu of no vaccination—would yield:**
  - **Substantive reductions in RSV-LRTI cases among infants**
  - **Minimal budget impact ($0.19 PMPY) to private insurers in Dubai over a 5-year period**

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This study was sponsored by Pfizer Inc.

Poster presented at ISPOR 2024 (May 5th – 8th, Atlanta, GA, USA)