RWD298

Digital Poster Supplementary Material

SCAN ME

Public Health Impact Assessment of RSVPreF3 OA Adjuvanted Vaccine on Respiratory Syncytial Virus in Taiwan, Hong Kong and Singapore

Vaccinating older adults, with or without comorbidities, with the adjuvanted RSVPreF3 vaccine could reduce RSV disease burden and healthcare resource use in Asian settings.

Efforts are needed to ensure access to vaccination for RSV prevention in this population.

Yufan Ho,[1] Kam Lun Ellis Hon,[2] Ivan Hung,[3] Helen Oh,[4] Limin Wijaya,[5] Pin-Kuei Fu,[6] Yhu-Chering Huang,[7] Beverly Giam,[1] Corina Poh,[1] Koey Ko,[8] Hanna Lee,[9] Aruni Seneviratna[1]

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Introduction

- Respiratory syncytial virus (RSV) is a leading cause of acute respiratory infection (ARI), which can progress to lower respiratory tract disease (LRTD) and hospitalisations, particularly among older adults and those with underlying chronic medical conditions.[1,2]
- Due to age-related immunosenescence, comorbidities and frailty, older adults (OAs) are at increased risk of severe RSV infection and exacerbation of their underlying chronic conditions (e.g., chronic obstructive pulmonary disease, asthma and congestive heart failure), which can lead to poor health outcomes and increased healthcare resource utilisation (HCRU).[2–4]
- High-income Asian settings such as Hong Kong, Singapore and Taiwan share demographic challenges such as aging populations, high chronic disease prevalence, and high population density, all of which elevates the RSV burden.
- Vaccines against RSV are available to reduce disease burden.
  - One such vaccine is the adjuvanted RSV prefusion F protein (RSVPreF3) vaccine, which is approved in Hong Kong, Singapore and Taiwan for the prevention of RSV-LRTD in OAs aged ≥60 years, and OAs aged 50–59 years at increased risk for RSV infections.[5–7]

Objective

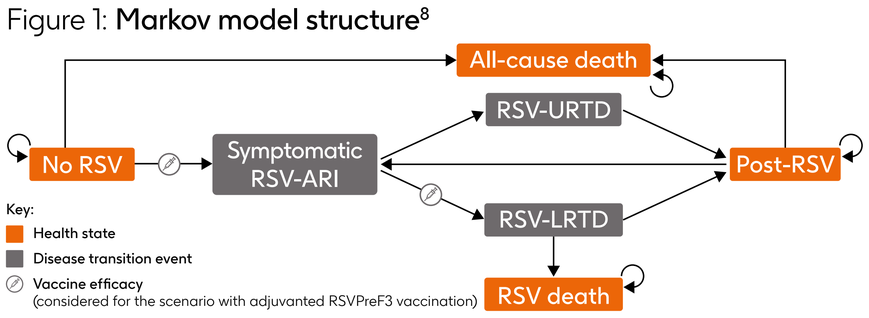
To evaluate the potential **public health impact** (PHI) of **adjuvanted RSVPreF3 vaccination** in **OAs aged ≥60 years** in Hong Kong, Singapore and Taiwan.

Methods

Model overview

- A static multi-cohort Markov model with monthly cycles was used to evaluate the PHI of one-time vaccination with adjuvanted RSVPreF3 versus no vaccination, over a five-year time horizon in each region (Hong Kong, Singapore or Taiwan) (Figure 1).
  - Base-case analysis: Among OAs aged ≥60 years (age-based approach)
  - Subgroup analysis: Among OAs aged ≥60 years with ≥1 comorbidity (risk-based approach)
- Deterministic and probabilistic sensitivity analyses assessed the impact of parameter uncertainty on the results.

Figure 1: **Markov model structure**[8]



Note: RSV reinfections use the same model structure as initial RSV infections.

Model inputs

- **Vaccine efficacy and waning** used a logarithmic function to include the most recent data from three full seasons (median follow-up time: 30.6 months) of the AReSVi-006 Phase 3 trial (Supplementary Figure S1).[8,9]
- **Vaccine coverage** was estimated based on the most recent local influenza vaccination coverage and validated by local experts: 51.5% in Hong Kong, 27.2% in Singapore, and 53.9% in Taiwan (Supplementary Table S1).[10–12]
- **Epidemiology** and **HCRU inputs** were based on data from ocally-relevant published literature, and validated by local clinical experts (Supplementary Tables S2–5).

Results

Base-case

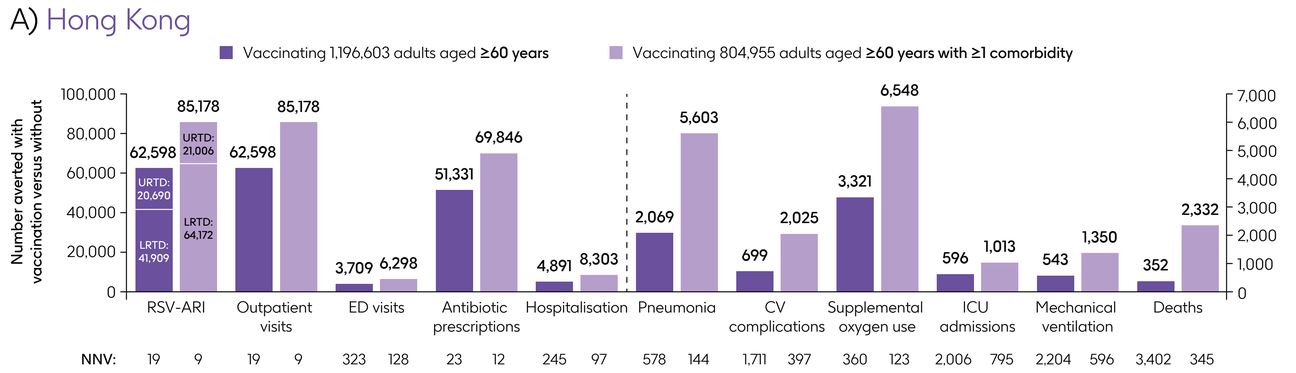
- Vaccinating OAs aged ≥60 years with adjuvanted RSVPreF3 (1,196,603 in Hong Kong, 275,164 in Singapore, and 3,261,870 in Taiwan) was estimated to **substantially reduce the number of RSV cases, HCRU and complications** over a five-year time horizon (Figure 2).
- The **number needed to vaccinate (NNV)** to prevent one case of RSV-related LRTD, hospitalisation and death was 29, 245 and 3,402 in Hong Kong, 30, 142 and 2,017 in Singapore, and 30, 297 and 4,254 in Taiwan, respectively (Figure 2).
- Results were robust across extensive sensitivity analyses.

Subgroup with ≥1 comorbidity

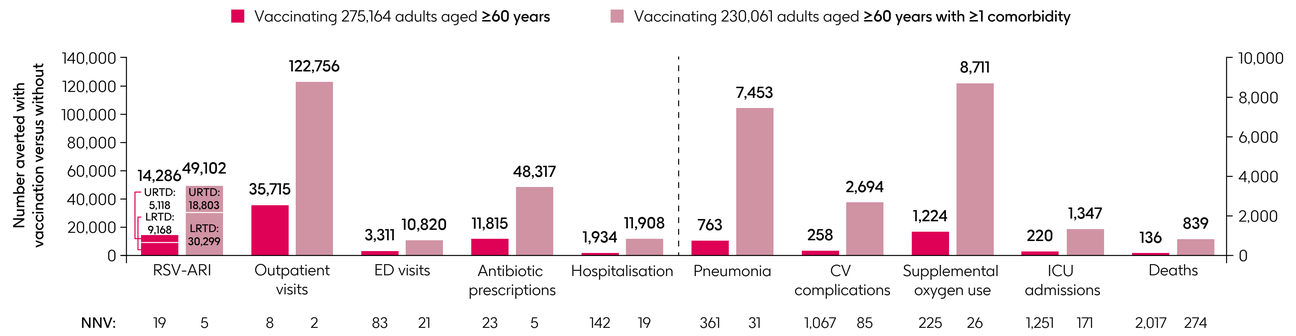
- Vaccinating OAs aged ≥60 years with ≥1 comorbidity with adjuvanted RSVPreF3 (804,955 in Hong Kong, 230,061 in Singapore, and 2,659,892 in Taiwan) was estimated to **substantially reduce the number of RSV cases, HCRU and complications** over a five-year time horizon (Figure 2).
- The **NNV** to prevent one case of RSV-related LRTD, hospitalisation and death was 13, 97 and 345 in Hong Kong, 8, 19 and 274 in Singapore, and 15, 139 and 1,719 in Taiwan, respectively (Figure 2).
  - NNV was lower compared with that of the base-case ≥60 years population, suggesting **greater benefit** of adjuvanted RSVPreF3 vaccination **among OAs aged ≥60 years with ≥1 comorbidity**.

Figure 2: **RSV clinical outcomes and HRCU averted with adjuvanted RSVPreF3 vaccination over a five-year time horizon**

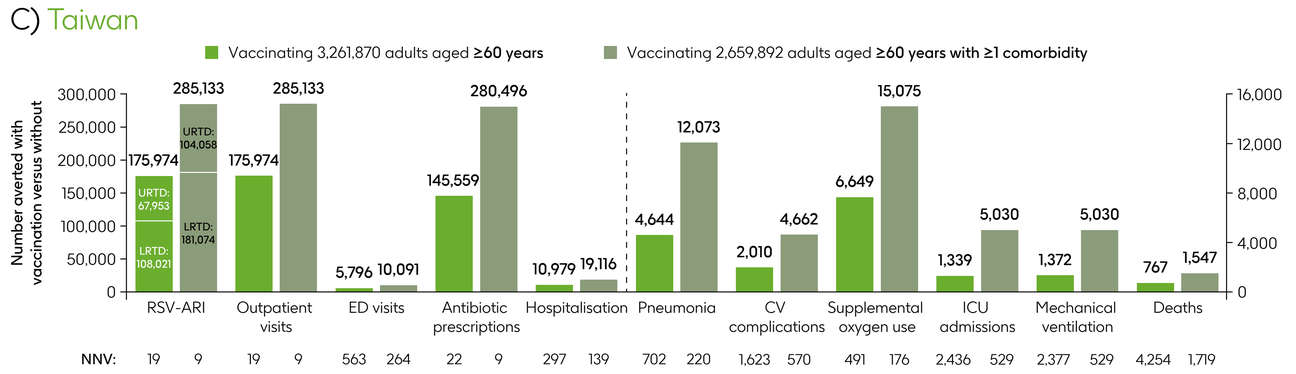
A) Hong Kong



B) Singapore



C) Taiwan



Conclusions

Adjuvanted RSVPreF3 vaccination was projected to **substantially reduce the burden of RSV** among OAs aged ≥60 years in Hong Kong, Singapore and Taiwan; this could support evidence-based policymaking in these settings with well-established vaccination infrastructures.

Ensuring **access to vaccination for RSV prevention** is essential for safeguarding the health and wellbeing of OAs in Asia.

Abbreviations

ARI, acute respiratory infection; **CV**, cardiovascular; **ED**, emergency department; **HCRU**, healthcare resource utilisation; **ICU**, intensive care unit; **LRTD**, lower respiratory tract disease; **NNV**, number needed to vaccinate; **OA**, older adult; **PHI**, public health impact; **RSV**, respiratory syncytial virus; **RSVPreF3**, RSV prefusion F protein; **URTD**, upper respiratory tract disease.

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Disclosures

YH and **AS** are employees of and hold financial equities in GSK. **IH** received honoraria and/or meeting/travel support from AstraZeneca, Gilead, MSD, and Pfizer; participated in data safety monitoring and and/or advisory boards for AstraZeneca, Fosun, Moderna, Sinopharm and Sinovac; and is a member of the COVID-19 Vaccines Advisory Panel, HKSAR, Scientific Committee on Vaccine Preventable Diseases, and Co-Convenor of the Expert Committee on Clinical Events Following COVID-19 Immunization, HKSAR. **KLEH**, **HO**, **PF** and **YCH** have no conflicts of interest to disclose. **LW** received honoraria from GSK related to this study. **BG**, **CP**, **KK** and **HL** are employed by GSK.

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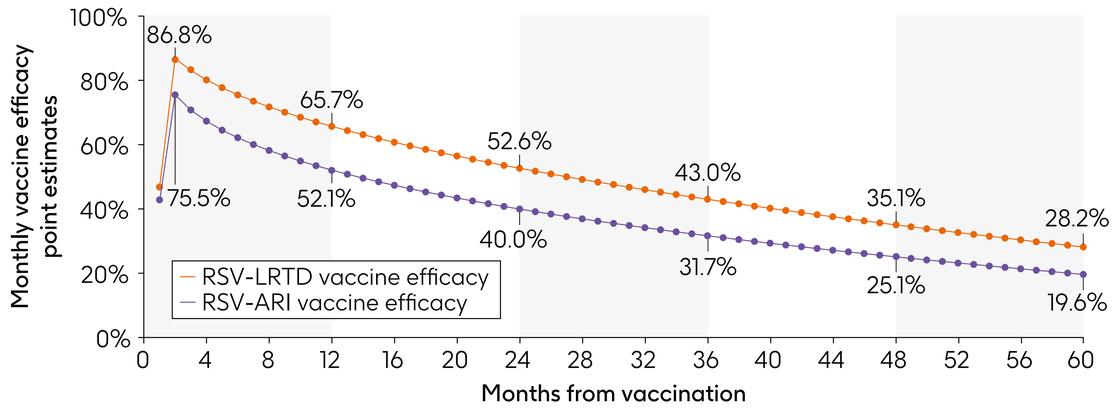
Supplementary Data

Vaccine model inputs

Figure S1: **Vaccine efficacy and waning**[1]



Vaccine efficacy against RSV-ARI and RSV-LRTD was modelled using a Cox model with time-varying affect. Month 1 vaccine efficacy was assumed to be 50% of the intercept value, allowing for immune build-up post vaccination.

Epidemiology and healthcare resource utilisation (HCRU) model inputs

Table S2: **RSV seasonality multiplier (%)**

	Hong Kong	Singapore	Taiwan	Source
January	28.8	100.0[a]	44.3	Hong Kong: [5] Singapore: [6*] Taiwan: [7]
February	36.8		4.4	
March	26.9		15.0	
April	83.6		5.0	
May	104.8		17.5	
June	117.0		18.7	
July	189.8		21.8	
August	244.5		217.9	
September	245.7		458.8	
October	91.6		248.4	
November	24.0		109.2	
December	6.4		37.5	

[a]Singapore is a tropical country with generally warm and humid climate throughout the year with no distinct seasonality for RSV; local clinical experts considered that it would be reasonable to apply the incidence of RSV consistently throughout the year.

Table S3: **RSV epidemiology inputs**

	Hong Kong	Singapore	Taiwan	Source
RSV-ARI incidence (%)				
≥60 years (overall)				
60–64 years		2.25		[8]
65–109 years		3.22		
≥60 years with ≥1 comorbidity subgroup				
60–64 years	4.61	13.5	4.61	Hong Kong, Taiwan: [8,9] Singapore: [10]
65–109 years	6.58	13.5	6.58	
Proportion of first RSV-ARI that are LRTD (%)				
60–64 years		13.8		[11,12]
65–69 years		39.6		
70–74 years		63.0		
75–79 years		76.5		
80–89 years		83.9[a]		
90–109 years	99.9[b]	83.9		Hong Kong: [11,12,13*] Singapore, Taiwan: [11,12]
RSV-LRTD mortality (%)				
≥60 years (overall)				
60–64 years	0.07	0.4	0.07	Hong Kong, Taiwan: [14–16] Singapore: [6*,16,17]
65–69 years	0.19	0.6	0.19	
70–74 years	0.19	0.8	0.19	
75–79 years	1.56	2.0	1.56	
80–84 years	1.56	2.6	1.56	
85–109 years	1.56	3.7	1.56	
≥60 years with ≥1 comorbidity subgroup				
60–64 years	0.28	0.7	0.09	Hong Kong: [15,16,18] Singapore: [6*,16,17,19] Taiwan: [15,16,20]
65–69 years	0.71	1.1	0.21	
70–74 years	0.71	1.5	0.21	
75–79 years	5.98	3.6	1.79	
80–84 years	5.98	4.8	1.79	
85–109 years	5.98	6.8	1.79	

[a]In Hong Kong, the proportion of RSV-LRTD among OAs aged ≥80 years with comorbidities was increased by 10% based on clinical expert opinion (i.e., 92.3% for 80–89 years). In Singapore and Taiwan, the proportion of RSV-LRTD among OAs aged ≥80 years with comorbidities was assumed to be the same as that of the overall population. [b]Risk ratio increased by 20% for the 90–109 age tier based on clinical expert opinion. As the proportion of RSV-ARI that are LRTD in the model cannot be above or equal to 100%, a maximum of 99.99% was applied.

*Expert opinion; please refer to the reference list for details.

Table S1: **Vaccine inputs**

	Hong Kong	Singapore	Taiwan	Source
Vaccine efficacy (VE)				
Against RSV-ARI	Peak VE: 75.5% 36-month VE: 31.7% 60-month VE: 19.6%			[1]
Against RSV-LRTD	Peak VE: 86.8% 36-month VE: 43.0% 60-month VE: 28.2%			
Vaccine coverage (%)	51.5	27.2	53.9	Hong Kong: [2] Singapore: [3] Taiwan: [4]
Vaccination month	August	January	August	Hong Kong, Taiwan: One month prior to the peak in seasonality Singapore: By default

Table S4: **HCRU inputs (Hong Kong and Taiwan)**

	Hong Kong	Taiwan	Source
Proportion requiring outpatient visits (%)			
≥60 years	100		[21,22]
Proportion of RSV requiring ED visits (%)			
60–64 years	1.57	1.10	Hong Kong: [14,23] Taiwan: [7,14]
65–74 years	3.15	2.19	
75–109 years	15.20	10.58	
Proportion of RSV requiring hospitalisation (%)			
60–64 years	2.08		[14,15]
65–74 years	4.15		
75–109 years	20.04		
Proportion of RSV requiring antibiotics (%)			
≥60 years (overall)	82.0	82.7	Hong Kong: [24] Taiwan: [25]
≥60 years with ≥1 comorbidity subgroup	82.0	98.4	Hong Kong: [24] Taiwan: [20]

Table S5: **HCRU inputs (Singapore)**

	RSV-URTD	RSV-LRTD	Source
Proportion requiring outpatient visits (%)			
≥60 years	100		[21]
Proportion requiring ED visits (%)			
60–64 years	1.7	6.8	[6*,26]
65–74 years	4.6	18.5	
75–109 years	6.2	24.8	
Proportion requiring hospitalisation (%)			
≥60 years (overall)			
60–64 years	2.3	9.3	[6*,26–28]
65–69 years	3.0	11.8	
70–74 years	3.9	15.6	
75–79 years	5.4	21.5	
80–84 years	7.1	28.4	
85–109 years	10.2	40.8	
≥60 years with ≥1 comorbidity subgroup			
60–64 years	4.3	17.1	[19]
65–69 years	5.4	21.7	
70–74 years	7.2	28.7	
75–79 years	9.9	39.6	
80–84 years	13.1	52.3	
85–109 years	18.8	75.1	
Antibiotics			
≥60 years (overall)	82.7		[25]
≥60 years with ≥1 comorbidity subgroup	98.4		[20]

Abbreviations

ARI, acute respiratory infection; **ED**, emergency department; **HCRU**, healthcare resource utilisation; **LRTD**, lower respiratory tract disease; **OA**, older adult; **PHI**, public health impact; **RSV**, respiratory syncytial virus; **RSVPreF3**, RSV prefusion F protein; **URTD**, upper respiratory tract disease.

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