Importance of surveillance and vaccination in managing respiratory syncytial virus infections among older adults in Hong Kong

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This article was published on 25 Jul 2025 at www.hkmj.org.

This version may differ from the print version.

Hong Kong Med J 2025;31:Epub
https://doi.org/10.12809/hkmj255182

Respiratory syncytial virus: an underrecognised and evolving public health threat

Respiratory syncytial virus (RSV) is a common cause of respiratory infections globally and in Hong Kong.[1,2] It is the leading cause of hospitalisation due to respiratory viral infections among infants and young children, and it is increasingly recognised as a substantial threat to older adults.[1-4] Although hospitalised at lower rates than infants and young children, older people are more likely to experience severe outcomes, including cognitive decline, infection-triggered acute myocardial infarction, stroke, or even death.[1-4] Contemporary data suggest that the spread and consequences of RSV, particularly in older adults, have consistently been underestimated.[1,2,4] In older adults, the clinical outcomes of RSV infection are comparable to, or even more severe than, those of influenza.[2,3] In Hong Kong, large-scale epidemiological data on RSV are currently unavailable.

Both upper respiratory tract and lower respiratory tract (LRT) specimens may be used to test for RSV. In a previous local study reviewing multiplex polymerase chain reaction (PCR) results from 20 127 respiratory specimens tested in a hospital across all age-groups between 2014 and 2023, RSV was detected in 2.03% of LRT specimens (including sputa and endotracheal/tracheal/bronchial aspirates) and in 7.93% of upper respiratory tract specimens (combined nasal/nasopharyngeal and throat swabs).[5] In a multicentre, prospective study recruiting adult patients with chronic obstructive pulmonary disease and infective exacerbations, a higher RSV positivity rate by quantitative PCR was observed in sputum samples compared with nasopharyngeal swabs (7.69% vs 2.02%, respectively).[6] Given that there is no single RSV test in adults with acceptable diagnostic accuracy, these figures may represent underestimates.[6] In this study, 59% of RSV-associated exacerbations were PCR-negative, despite sample collection within 5 days of symptom onset.[6]

Local studies have demonstrated substantial morbidity and mortality associated with RSV infections among older adults. A small study found that, of 71 older adults (median age 75 years; 74% with comorbidities) hospitalised with RSV, 61%

required supplemental oxygen, and 18% had severe disease requiring non-invasive ventilation or intensive care, or resulting in death within 30 days.[7] Furthermore, in a retrospective study of adults admitted between 2009 and 2011 to three acute care general hospitals in Hong Kong serving a population of over 1.5 million, 607 patients (mean age 75 years) had virologically confirmed RSV infection; 30- and 60-day mortality rates were 9.1% and 11.9%, respectively.[3] Finally, in a study of hospitalised patients with laboratory-confirmed respiratory virus infections between 1998 and 2012, the incidence of hospitalisation due to RSV was 2.09 per 10 000 population in both men and women aged 65 to 74 years. The mean annual mortality in this age-group was 17.44 per 1 000 000 population for men and 11.02 per 1 000 000 population for women.[1]

A disruption in the population genetic diversity and seasonality of RSV as a consequence of the COVID-19 pandemic has been observed.[8-10] Australian data demonstrated that many historically detected RSV lineages were no longer circulating after 2021, having been superseded by two novel RSV-A lineages, which may become dominant due to their greater resilience, fitness, infectivity, or a combination of these factors.[8] Additionally, the RSV Hospitalization Surveillance Network in the United States has shown that COVID-19 affected RSV seasonality, with a shorter but more intense season of infection in 2022-2023, though with at least a trend towards pre-COVID norms in the 2023-2024 season.[9]

Although surveillance for RSV in Hong Kong is comparatively less extensive, data from the local health authority suggest that the post-COVID pattern of RSV has also changed; it may now comprise a single infective season peaking between April and October.[10] Moreover, a recent local paediatric study showed significantly increased odds of RSV infection in children aged 3 years or above after the COVID-19 lockdown, although the full impact remains to be determined.[11]

In addition to the evolving pathogenicity of RSV infection following the COVID-19 pandemic, it is important to note the increasingly ageing population and, consequently, a growing vulnerable population in regions such as Hong Kong, which will inevitably contribute to a heavier RSV disease burden.[12] Accordingly, it is crucial to conduct adequate surveillance to monitor the changing epidemiology and to inform appropriate risk mitigation strategies.

Along with increased surveillance, the recent introduction of vaccines against RSV (from 2023 onwards) has created a new opportunity to manage the risk of infection and its consequences.[13] Internationally, vaccination against RSV has been recommended by national or supranational organisations in multiple locations; older age is recognised as an independent risk factor, alongside various cardiopulmonary, metabolic, and immune conditions (Table).[2,13] Understanding the extent of risk for the local population in Hong Kong, as well as the effectiveness of targeted interventions (eg, vaccine rollout), will rely on analyses of epidemiological data.

Respiratory syncytial virus surveillance: international approaches and implications for Hong Kong

Globally, approaches to RSV surveillance vary considerably. In Australia and South Korea, RSV is actively monitored as a notifiable disease, and healthcare professionals (HCPs) are mandated to report all confirmed cases to a central source.[14,15] Active surveillance promotes testing for RSV, while its status as a notifiable disease facilitates systematic data collection, which, upon analysis, can effectively support the formulation of health strategies, their implementation, and informed health policy decision making.

Given that RSV is not a notifiable disease, its surveillance in Hong Kong is primarily conducted through sentinel clinics and a limited number of public and private hospitals. Sentinel systems generally require relatively low resource consumption but may not cover a sufficiently large population to provide accurate estimates of virus circulation. The impetus to test for RSV may also be limited in patients presenting with non-severe respiratory illnesses, which are common, exhibit non-specific symptoms, and are typically managed in a similar manner regardless of aetiology.[15] Thus, where most sentinel activity occurs in primary care or community settings, the true burden may be underrepresented and skewed towards less severe cases. In contrast, sentinel systems in hospital settings can yield more detailed information on severe cases and outcome data concerning the most serious consequences of infection.[15] In Hong Kong, RSV is likely underdiagnosed, partly due to low testing rates in adults, and partly due to skewed reporting by the existing sentinel system.

To enhance the RSV testing rate, educational campaigns for HCPs should be implemented to increase clinical suspicion of RSV in adults and to raise awareness of its potential consequences in older adults and other high-risk populations (eg, those with chronic respiratory, cardiac, endocrine, or renal diseases, as well as those with immunodeficiency).[12,13] Targeted surveillance in these patient groups may offer cost savings. Testing sites can also be prioritised in areas of greatest risk, assessing the penetration and spread of RSV among populations such as older adults residing in higher-density settings, including long-term care facilities.

To mitigate the resource and workload implications of increased testing, European and other international guidelines have recommended incorporating RSV into existing surveillance systems for respiratory infections.[15,16] Furthermore, it is important to standardise the testing method[5,12,15]; PCR remains the preferred tool for confirming RSV cases, given the risk of false-negative results with current rapid antigen tests. Hospital-based surveillance, covering nasopharyngeal specimens and beyond, may be considered, particularly to address the potential underdiagnosis of severe RSV cases.

Practical considerations for enhancing RSV surveillance in Hong Kong may include integration with broader respiratory pathogen surveillance and diagnostic systems, such as those for COVID-19 and influenza.[15] Moreover, it is essential to centralise procedures, standardise case definitions, and expand laboratory capacity to streamline the implementation of territory-wide surveillance.[15]

Respiratory syncytial virus vaccines: efforts for prioritisation

At present, the management of severe RSV infection is non-specific and largely supportive.[2] Although this approach may discourage testing or screening in patients presenting with symptomatic infections, increased quantity and quality of surveillance data could be used to optimise an RSV vaccination campaign. For example, such optimisation could involve prioritisation of high-risk groups, setting an appropriate age threshold for vaccination, and determining the overall cost-benefit ratio for reducing healthcare resource utilisation under various vaccination coverage scenarios.

To date, two of the three internationally licensed RSV vaccines are available in Hong Kong: the adjuvanted RSVPreF3 OA (Arexvy, GSK) and RSVpreF (Abrysvo, Pfizer) [Table].[17-20] These vaccines have been evaluated using similar study designs, although variations exist in the trial centres' coverage of RSV 'season' periods and in the case definitions used for acute respiratory illness, LRT illness, and severe LRT illness across at least two RSV seasons.[18-20] Both trials have shown high efficacy and safety of the respective vaccines against symptomatic infection and severe outcomes (Table).[18,20] However, head-to-head comparisons between the vaccines are not yet available.

Recent data from the US Centers for Disease Control and Prevention support the real-world effectiveness of both RSV vaccines.[21] Based on findings from the VISION multi-site network of electronic health records (between 1 October 2023 and 31 March 2024), the effectiveness of the adjuvanted RSVPreF3 OA vaccine against RSV-associated emergency department visits and hospitalisations was 77% and 83%, respectively, among adults aged 60 years or above (Table).[21] Similarly, RSVpreF demonstrated effectiveness of 79% against emergency department visits and 73% against hospitalisations.[21]

The primary concerns regarding RSV vaccination are similar to those associated with other vaccines: how to enhance uptake, raise awareness, address misconceptions, and identify which populations should be prioritised for free or subsidised vaccination through public health programmes.[12,15] Unresolved scientific questions—such as the duration of protection and the appropriate age for vaccine administration—continue to be investigated and can be informed by local data. The US Centers for Disease Control and Prevention recommends RSV vaccination for adults aged 75 years or above, and for those aged 60 to 74 years with certain chronic medical conditions or other risk factors (eg, communal living) for severe RSV infection (Table).[22] On 16 April 2025, the Advisory Committee on Immunization Practices extended this recommendation to adults aged 50 to 59 years who are at increased risk of severe RSV infection, following the US Food and Drug Administration's licensure of the vaccine for this population group (Table).[23]

Although RSV vaccines are generally well tolerated, there have been reports of Guillain–Barré syndrome (GBS) and acute disseminated encephalomyelitis following vaccination.[24,25] Assessment of GBS risk after vaccination with RSVpreF and adjuvanted RSVPreF3 OA was conducted in a self-controlled case series analysis, using risk windows defined as 1 to 42 days post-vaccination and control windows as 43 to 90 days post-vaccination.[25] The analysis of all GBS cases from this study suggests an increased risk within the first 42 days post-vaccination, equating to seven excess cases per million doses of adjuvanted RSVPreF3 OA and nine excess cases per million doses of RSVpreF, in adults aged 65 years or above.[24,25] While the findings indicate an increased GBS risk, they are not sufficient to establish a causal relationship.[25] In the RENOIR study, one case each of GBS and Miller Fisher syndrome (a GBS variant) was reported after RSVpreF vaccination,[19] whereas no cases of GBS have been reported to date in the AReSVi-006 study investigating the adjuvanted RSVPreF3 OA vaccine.[17] Nonetheless, both vaccines are required to include a GBS warning, as mandated by the US Food and Drug Administration.[25]

Respiratory syncytial virus vaccination in Hong Kong

Collectively, international experience suggests that the commercial availability of RSV vaccines will deliver clinical and public health benefits by reducing

TABLE. Summary of approved respiratory syncytial virus vaccines in Hong Kong, their efficacies from respective clinical trials, and recommendations by national organisations across multiple countries

Vaccine	Adjuvanted RSVPreF3 OA (GSK vaccine; Arexvy)[17,18]	RSVpreF (Pfizer vaccine; Abrysvo)[19,20]
Antigen	RSV prefusion F protein	RSV prefusion F protein
Adjuvant	$AS01_E$-adjuvanted	-
Clinical trial	AReSVi-006 (NCT04886596)	RENOIR (NCT05035212)
Study population	Adults >60 years (n=24 966)	Adults >60 years (n=34 284)
Vaccine efficacies* after the first RSV season from respective clinical trials (primary endpoint)[17,19]		
RSV-related LRTD, % (CI)†	82.6 (57.9-94.1)	≥2 signs or symptoms 66.7 (28.8-85.8) ≥3 signs or symptoms 85.7 (32.0-98.7)
RSV-related severe LRTD, % (95% CI)	94.1 (62.4-99.9)	-
RSV-related ARI, % (95% CI)	71.7 (56.2-82.3)	62.1 (37.1-77.9)
RSV-related LRTD in individuals with ≥1 comorbidity of interest, % (CI)‡	94.6 (65.9-99.9)	≥2 signs or symptoms 62.5 (-8.4 to 89.1) ≥3 signs or symptoms 75.0 (-39.1 to 97.9)
Real-world vaccine effectiveness over one RSV season from the VISION multi-site network of electronic health records[21]		
RSV-associated emergency department visits, % (95% CI)	77 (70-83)	79 (59-89)
RSV-associated hospitalisation, % (95% CI)	83 (73-89)	73 (52-85)
Vaccine efficacies* over two RSV seasons from respective clinical trials[18,20]		
RSV-related LRTD, % (CI)§	74.5 (60.0-84.5)‖ ¶	≥2 signs or symptoms 58.8 (43.0-70.6) ≥3 signs or symptoms 81.5 (63.3-91.6)
RSV-related severe LRTD, % (95% CI)	82.7 (61.6-93.4)‖ ¶	-
RSV-related ARI, % (95% CI)	62.1 (52.1-70.3)‖ ¶	44.3 (33.2-53.7)
RSV-related LRTD in individuals with ≥1 comorbidity of interest, % (95% CI)	74.5 (55.7-86.1)‖ ¶	≥2 signs or symptoms 49.3 (23.2-67.0) ≥3 signs or symptoms 73.5 (43.6-88.8)
Vaccine efficacies* over three RSV seasons from respective clinical trials[26]		
RSV-related LRTD, % (CI)**	69.1 (55.8-78.9)¶ ††	No published data as of 15 May 2025
RSV-related LRTD in individuals with ≥1 comorbidity of interest, % (95% CI)	71.1 (55.2-82.0)¶ ††	
National organisations which recommend RSV vaccination‡‡ for older adults[2,13,22,23]		
Adults ≥75 years	• CDC and ACIP (US) • NACI (Canada) • JCVI (UK) • ATAGI (Australia)	
Adults 60-74 years with high risk of RSV infection	• CDC and ACIP (US) • NACI (Canada) • ATAGI (Australia)	
Adults 50-59 years with high risk of RSV infection	• ACIP (US)	

Abbreviations: ACIP = Advisory Committee on Immunization Practices; ARI = acute respiratory infection; ATAGI = Australian Technical Advisory Group on Immunisation; CDC = Centers for Disease Control and Prevention; CI = confidence interval; JCVI = Joint Committee on Vaccination and Immunisation; LRTD = lower respiratory tract disease; NACI = National Advisory Committee on Immunization; RSV = respiratory syncytial virus; UK = United Kingdom; US = United States

* Data obtained from independent clinical trials for illustrative purposes only; not intended as a head-to-head comparison

† 96.95% CI for AReSVi-006 study and 96.66% CI for RENOIR study

‡ 95% CI for AReSVi-006 study and 96.66% CI for RENOIR study

§ 97.5% CI for AReSVi-006 study and 95% CI for RENOIR study

‖ Vaccine efficacy for individuals who received only one dose of adjuvanted RSVPreF3 OA vs placebo over two seasons

¶ Without season as a covariate

** 97.5% CI for AReSVi-006 study

†† Vaccine efficacy for individuals who received only one dose of adjuvanted RSVPreF3 OA vs placebo over three seasons

‡‡ All listed organisations recommend a single dose of either RSV vaccine. This list is not comprehensive and may be subject to change

severe infections and the utilisation of healthcare resources.

In Hong Kong, the adjuvanted RSVPreF3 OA vaccine is indicated for active immunisation to prevent LRT disease caused by RSV in adults aged 60 years or above, as well as in adults aged 50 to 59 years who are at increased risk of RSV disease. RSVpreF is indicated for active immunisation in individuals aged 60 years or above to prevent LRT disease caused by RSV. To promote uptake of privately purchased (self-paid) vaccines, health education initiatives and advertising campaigns highlighting the importance of RSV vaccination should be encouraged.

As of January 2025, due to the lack of cost-benefit studies in older adults, the Hong Kong Scientific Committee on Vaccine Preventable Diseases does not universally recommend RSV vaccination. Instead, the Committee has advised that vaccination should be considered, particularly for individuals aged 75 years or above and those residing in nursing homes.[24] Given that hospitalised patients with RSV infection frequently present with comorbidities (over 70% based on available local data),[3,7] it is suggested that vaccination be prioritised for all adults aged 75 years or above, immunocompromised individuals, adults aged 60 years or above with relevant comorbid conditions (eg, chronic obstructive pulmonary disease, asthma, congestive heart failure, coronary artery disease, cerebrovascular disease, diabetes mellitus, chronic kidney disease, or frailty), and those living in community housing or residential care settings—concordant with recommendations from the Advisory Committee on Immunization Practices.[13] Vaccination subsidies should be considered for at-risk groups who are economically disadvantaged. The precise target groups, as well as the potential health and cost savings from a targeted vaccine rollout, will depend on local epidemiological data. However, the development of formal recommendations should be prioritised by the government and relevant medical societies involved in the care of at-risk populations.

Conclusion

Respiratory syncytial virus infection is not only a childhood disease; it also poses a major health risk to older adults, especially those with underlying morbidities who require targeted prevention and treatment. The ageing population in Hong Kong further exacerbates this challenge. The recent development of effective vaccines (Table)[17-20,26] underscores the urgent need to develop up-to-date recommendations and policies to guide the rational use of vaccination, both to prevent severe RSV infection and to reduce the associated healthcare utilisation and societal costs. The precise determination of target groups should be informed by local epidemiological data, which can be generated through dedicated studies and enhanced RSV surveillance, particularly in hospital settings. In the interim, HCPs are encouraged to proactively raise awareness of RSV among both medical peers and the public, and to consider extending vaccination to at-risk groups in line with international guidance and published literature. These combined efforts will promote a coherent policy of systematic vaccination, achieving the greatest benefit for patients and the broader community. Future studies should address the cost-effectiveness of RSV vaccination across various at-risk populations.[12,27]

Author contributions

Concept or design: JCK Chan.
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Analysis or interpretation of data: All authors.
Drafting of the article: JCK Chan.
Critical revision for important intellectual content: All authors.

All authors had full access to the data, contributed to the study, approved the final version for publication, and take responsibility for its accuracy and integrity.

Conflicts of interest

None of the authors received an honorarium for participating in the preceding advisory board meeting as declared in the submitted ICMJE disclosure forms.

Acknowledgement

This editorial incorporates insights from an advisory board meeting held on 15 July 2024 in Hong Kong, with contributions from private practitioners Dr Aaron Lai, Dr Leung Cheung Goh, and Dr Mary Cheng.

Funding/support

Medical writing, editorial, and publication coordination support were independently funded by GSK in accordance with the Good Publication Practice (GPP3) guidelines. Editorial and medical writing support were provided by MediPaper Medical Communications Ltd. The funders had no role in study design, data collection, analysis, interpretation, or manuscript preparation. Ultimate responsibility for the opinions, interpretation, and conclusions lies with the authors.

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