EPH176

Controlling RSV in Older Adults: Clinical Benefits of a Dutch Vaccination Program

Tjalke A. Westra,[1]* Florian Zeevat,[2,3] Vincent Lempers,[1] Parinaz Ghaswalla,[4] Keya Joshi,[4] Jan C. Wilschut,[2] Simon van der Pol,[3] Maarten J. Postma,[2,3] Cornelis Boersma[2,3]

[1]Moderna, Inc., Amsterdam, Netherlands; [2]University of Groningen, Groningen, Netherlands; [3]Health-Ecore, Zeist, Netherlands; [4]Moderna, Inc., Cambridge MA, USA

*Presenting author.

BACKGROUND

- Respiratory syncytial virus (RSV) can cause significant and often severe respiratory infections, particularly affecting older adults and individuals with underlying health conditions
- Annually, 4-7% of adults aged ≥60 years will contract RSV, leading to substantial morbidity and mortality. This age group accounts for most RSV-related hospitalizations, placing a heavy burden on healthcare systems during the winter seasons[1-9]
- RSV vaccines for adults aged ≥60 years have been available since 2023 and have demonstrated sustained efficacy in clinical trials against both RSV-associated acute respiratory disease (ARD) and lower respiratory disease (LRTD), as well as RSV-associated hospitalizations based on severity indicators[10-13]

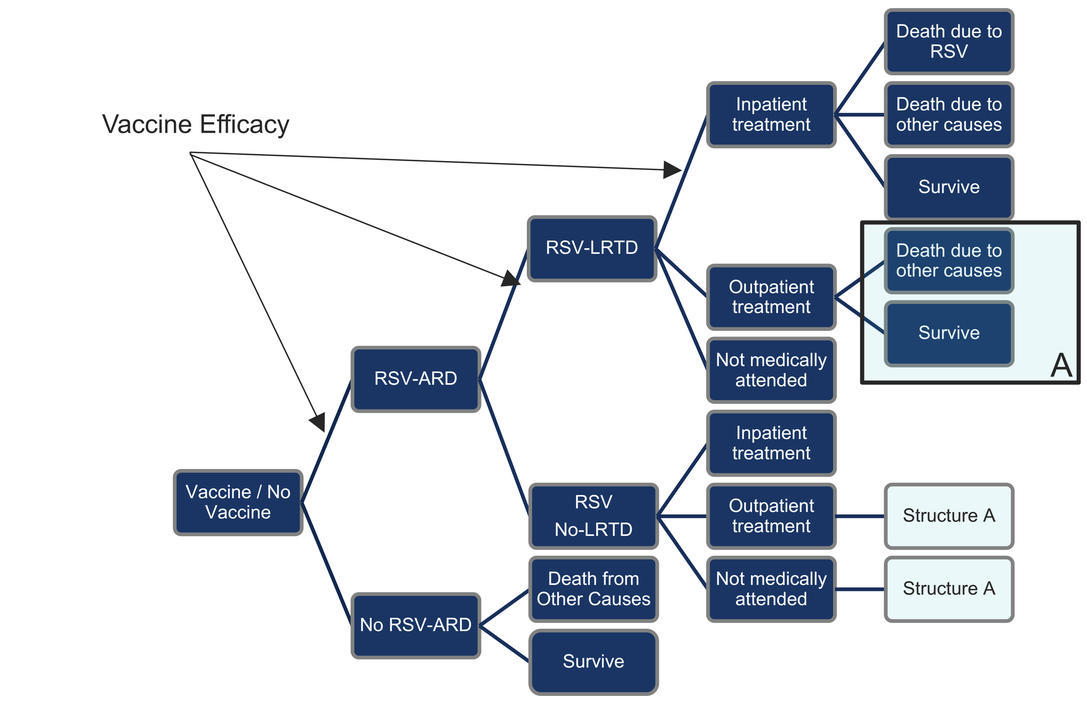
OBJECTIVE

- To assess the clinical value and potential public health impact of introducing a National Immunization Programme for RSV focusing on older adults (≥60 years)

METHODS

- A static health-economic model (**Figure 1**) was adapted to reflect the current situation in the Netherlands, specifically tailored to account for the local RSV epidemiology and healthcare system
- The model was calibrated using recent local disease burden and epidemiological data to ensure an accurate representation of RSV incidence and outcomes in the elderly Dutch population[1-9]
- Several alternative scenarios were analyzed to explore the impact of vaccinating different age groups, such as 70+ or 80+ years, to compare the potential public health outcomes (**Table 1**)
- Vaccine efficacy inputs were derived from the ConquerRSV study, which was the pivotal efficacy trial of the mRNA-1345 vaccine[14] (**Table 1**)
  - Data from an extended analysis, with a median follow-up of 18.8 months, were used to linearly project the duration of vaccine protection over time for RSV-ARD, RSV-LRTD, and RSV-LRTD inpatient (**Figure 2**)

Figure 1. Model Structure



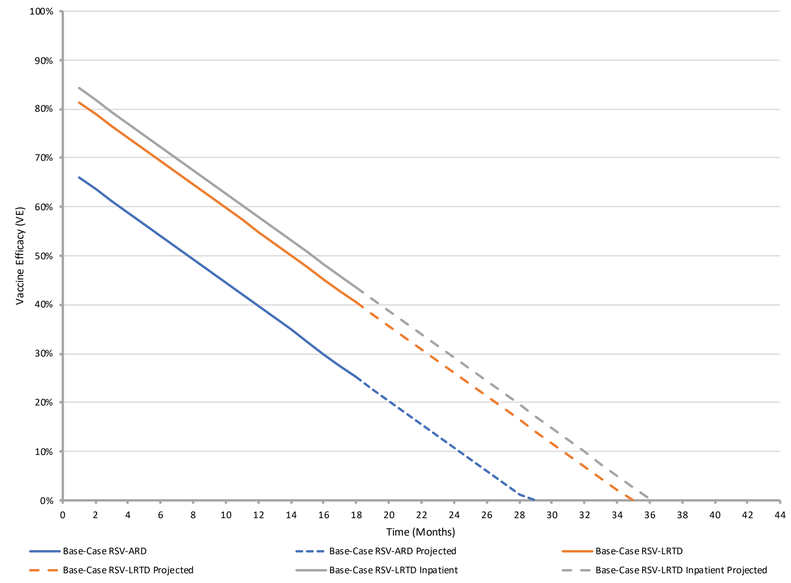
ARD, acute respiratory disease; LRTD, lower respiratory tract disease; RSV, respiratory syncytial virus.

Table 1. Model Inputs

Parameter	Base case	Scenario analysis
Age range	60+ years	70+ and 80+ years
RSV-ARD	4.6-7.3% (age-specific)	
Proportion LRTD	12%	
RSV-LRTD inpatient	0-35% (age-specific)	
RSV-LRTD outpatient	21-30% (age-specific)	
No RSV-LRTD inpatient	0%	
No RSV-LRTD outpatient	21-30% (age-specific)	
Inpatient mortality	4-12% (age-specific)	
Outpatient mortality	0-4% (age-specific)	
No treatment mortality	0-4% (age-specific)	
Vaccine efficacy	81% LRTD, 66% ARD[14-16]	
Waning rate per month	2.4% per month[14-16]	
Vaccine uptake	60%	40% and 80%

ARD, acute respiratory disease; LRTD, lower respiratory tract disease; RSV, respiratory syncytial virus.

Figure 2. Base-Case Vaccine Efficacy[a,14,15]



ARD, acute respiratory disease; CI, confidence interval; LRTD, lower respiratory tract disease; RSV, respiratory syncytial virus; VE, vaccine efficacy; WLS, weighted least square.

[a]VE duration of protection over time was calculated by estimating the VE for RSV-LRTD with ≥2 symptoms every 2 months through 18 months as an ad hoc analysis. A WLS regression was performed on the estimated VE for every 2 months. The weights were determined by the relative case numbers in the placebo arm. The estimated slope of 2.4% was used as the monthly waning rate for mRNA-1345 for RSV-ARD, RSV-LRTD, and RSV-LRTD requiring inpatient care. In sensitivity analyses, 95% CIs around the VE estimate from the primary analysis were used to vary the VE estimate at time 0 for all endpoints, while a monthly waning rate of 2.4% per month was maintained.

- The base-case analysis focused on assessing the clinical value of mRNA-1345 for all adults aged ≥60 years, aligned with the flu and COVID National Immunization Program, assuming a vaccination coverage of 60%
- Clinical outcomes included number of cases of RSV-ARD, RSV-LRTD, medically attended RSV, RSV-related hospitalizations, and deaths prevented over a 3-year time frame

RESULTS

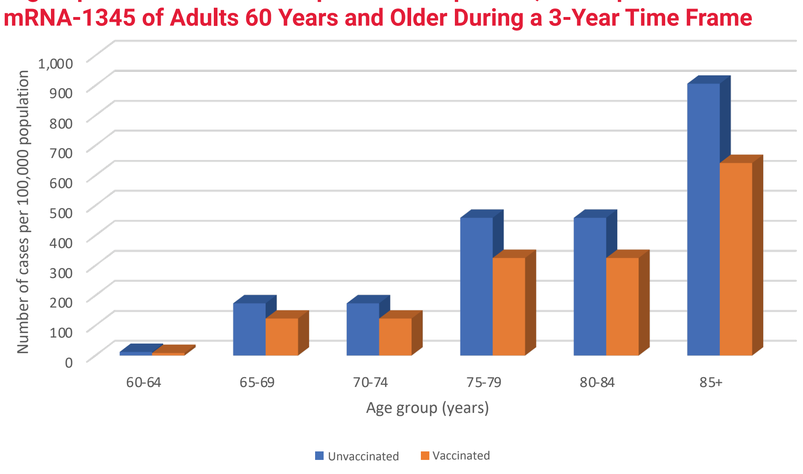
- **Table 2** shows the model-predicted outcomes per 100,000 population in the Netherlands. RSV vaccination would reduce the burden of RSV-LRTD by 26-29% and the burden of RSV-No LRTD by approximately 17% during the 3-year time frame
- **Figure 3** shows the age-specific clinical benefit of RSV vaccination for adults 60 years and older. In particular, the clinical benefits during the 3-year time horizon of the model are the prevention of:
  - 3,558 RSV hospitalizations
  - More than 37,000 outpatient cases
  - 1,208 RSV-related deaths
- **Table 2** shows that considering older age groups, the overall clinical benefit decreases
- Reduced duration of vaccine-induced protection, capturing clinical benefits only within the first 2 years post-vaccination, prevents 36,398 outpatient visits, 3,129 hospitalizations, and 1,160 deaths

Table 2. Clinical Outcomes per 100,000 Population (Relative Reduction, Vaccine vs No Vaccine) After a 3-Year Follow-Up Post-Vaccination

Outcome	Strategy: 60+ years		Strategy: 70+ years		Strategy: 80+ years	
	No Vaccine	mRNA-1345	No Vaccine	mRNA-1345	No Vaccine	mRNA-1345
RSV-LRTD						
Cases	1818	1313	1889	1361	2171	1553
Hospitalizations	254	178	398	279	597	415
Outpatient Visits	472	345	560	411	644	471
Deaths*	33	24	58	41	115	81
RSV-No LRTD						
Cases	13,329	11,002	13,854	11,405	15,923	13,028
Outpatient Visits	3465	2859	4115	3387	4729	3869
Deaths	103	84	183	150	445	363

LRTD, lower respiratory tract disease; RSV, respiratory syncytial virus.

Figure 3. Average Age-Specific Number of Hospitalizations per 100,000 Population With and Without Vaccination With mRNA-1345 of Adults 60 Years and Older During a 3-Year Time Frame



CONCLUSIONS

- Vaccination of older adults with mRNA-1345 has the potential to substantially reduce the burden of RSV disease within the Dutch population. Therefore, it should be considered as a valuable addition to the national immunization program in the Netherlands
- The RSV burden of disease is not well understood, despite the intensive literature search specifically for the situation in the Netherlands:
  - Limited data are available on the underreporting of RSV disease by outpatient and in-hospital setting
  - The mortality in the outpatient setting is not well understood, and consequently, we might have underestimated the burden of RSV disease in our model
- The long-term durability of RSV vaccine–induced immunity needs to be confirmed in real-world settings, and the optimal timing and frequency of revaccination still needs to be defined
  - Clinical studies with mRNA-1345 have shown that revaccination has the potential to bring immunity levels back to those observed after the first dose.[16] Therefore, revaccination has the potential to further reduce the burden of RSV disease

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For additional information, please contact Tjalke Westra (Tjalke.Westra@modernatx.com).

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