EPH83 - Evidence-Based Benefit-Risk Assessment of the RSVpreF Vaccine in Adults Aged ≥ 60 Years

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BACKGROUND

- Respiratory syncytial virus (RSV) is a leading cause of severe acute respiratory illness in older adults.
- In the United States, annual incidence rates of RSV-related hospitalizations and emergency department (ED) visits are estimated at 282/100,000 and 200/100,000 persons, respectively.[1]
- In May 2023, the RSVpreF vaccine was approved for the prevention of RSV-related lower respiratory tract disease (LRTD) in adults aged ≥60 years.[2]
- Following RSV vaccination, cases of Guillain-Barré syndrome (GBS) have been reported, highlighting the need for a structured benefit-risk assessment (sBRA) to systematically evaluate and quantify the balance between benefits and potential risks in older adults.[2]

OBJECTIVE

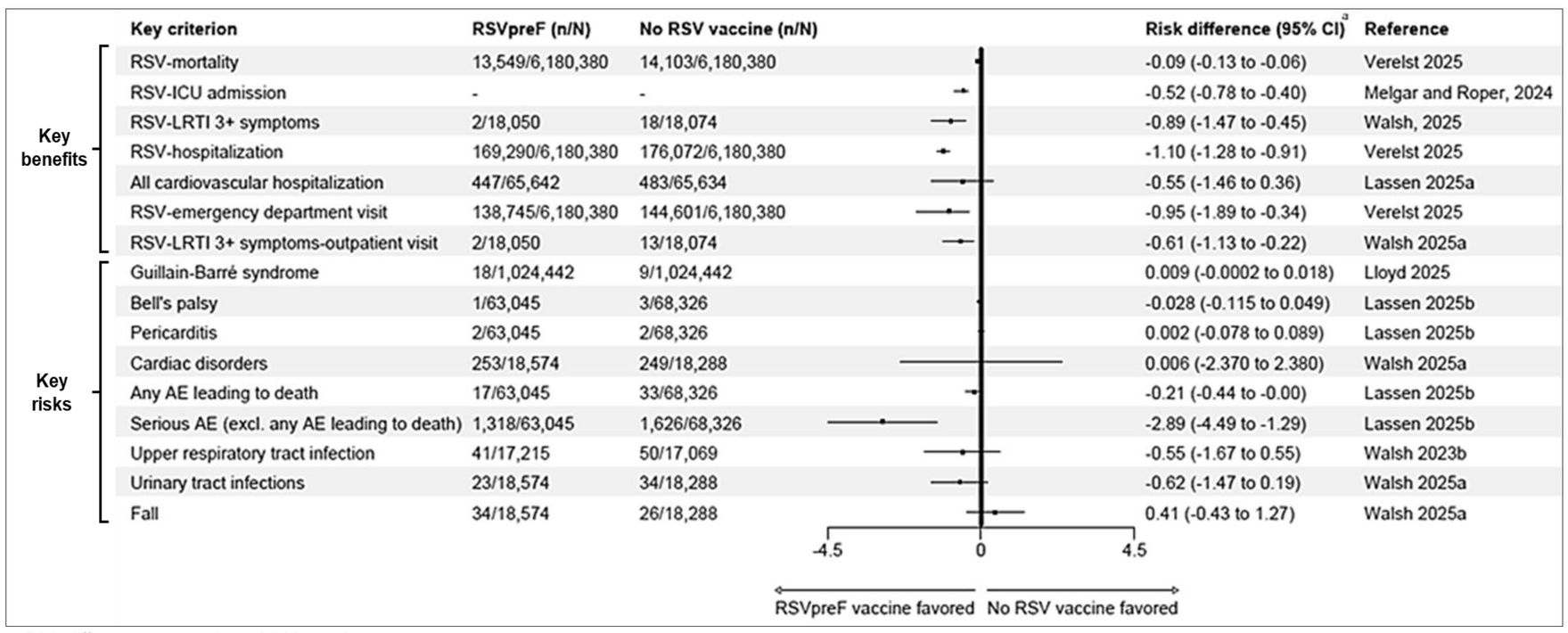
- To assess whether the benefits of RSVpreF vaccine outweigh the risks, particularly GBS, in adults aged ≥60 years using a systematic review-informed structured benefit-risk assessment (sBRA).

METHODS

- **Phase 1**: A systematic literature review (January 1, 2018 – September 2, 2025) identified clinical trial and real-world data comparing the RSVpreF vaccine with no RSV vaccination in adults aged ≥60 years (PROSPERO CRD420251107096).
- **Phase 2**: Key benefits and risks were selected based on clinical relevance to construct a value tree for the benefit-risk assessment.
- **Qualitative assessment:** The benefit-risk profile was evaluated using the Benefit-Risk Action Team (BRAT) framework. [3]
- **Quantitative assessment:** The benefit-risk profile was quantified using stochastic multicriteria acceptability analysis version 2 (SMAA-2).[4,5]
- Primary analysis aligned all outcomes to the first RSV season after vaccination.
- Sensitivity analyses included the use of pooled estimates across two consecutive RSV seasons and a worse case scenario.
- Analyses were conducted using R software (version 2024.12.1; packages smaa and hitandrun).[5,6]

RESULTS

Figure 1. Primary Analysis (RSV Season 1): Forest Plot of Benefits and Risks (Qualitative BRA)



a. Risk difference reported per 1,000 vaccinees.
Abbreviations: AE: Adverse event, BRA: Benefit-risk assessment, CI: Confidence interval, ICU: Intensive care unit, LRTI: Lower respiratory tract infection, RSV: Respiratory syncytial virus, RSVpreF: Respiratory syncytial virus Prefusion F

Key points

- Of 31 publications identified in the SLR, 10 provided data suitable for the sBRA; 21 were excluded due to lack of absolute risk estimates or patient counts.

Estimated events prevented per million RSVpreF vaccinees (95% CI)

- RSV-LRTI with ≥3 symptoms: 885 (451-1,475)
- RSV-hospitalizations: 1,097 (914-1,281)
- RSV-ED visits: 948 (781-1,114)
- RSV-deaths: 90 (61-125)

Estimated excess GBS cases per million RSVpreF vaccinees (95% CI)

- 9 (-0.2 to 18)

Table 1. Primary and Sensitivity Analyses Comparing RSVpreF Vaccine with No Vaccination (SMAA-2 Quantitative BRA))

Analyses	RSVpreF vaccine Rank acceptability Index [first rank] (%)	RSVpreF vaccine Confidence factor (%)
Primary analysis	**81.79**	92.81
Sensitivity analyses		
Using estimates across two consecutive RSV seasons	**81.39**	92.49
Including any cardiovascular SAEs instead of cardiac disorders as potential key risk	82.24	92.94
Including the prevention of all-cause mortality instead of RSV-mortality as potential key benefit	80.19	91.78

Abbreviations: RSV: Respiratory syncytial virus, RSVpreF: Respiratory syncytial virus Prefusion F, SAE: Serious adverse event, SMAA-2: Stochastic multicriteria acceptability analysis version 2

- The RSVpreF vaccine ranked first compared with no RSV vaccination in 81.79% of 100,000 simulations.
- Including pooled estimates across two seasons where available yielded similar results.

CONCLUSION

- The RSVpreF vaccine demonstrates a favorable benefit-risk balance compared with no RSV vaccination in adults aged ≥60 years based on available evidence.

Limitations

- Results are data-driven and depend on available evidence.
- In SMAA-2, preference weights were stochastically assigned (uniform distribution) and may not reflect clinical priorities or patient preferences.

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DISCLOSURE

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