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RSV disease burden in older adults

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Antwerp, Belgium

Summary

- **Landscape of the RSV vaccines**
- **Systematic reviews of RSV Disease burden in older adults**
- **A RESCEU prospective study in European adults**

RSV Vaccine and mAb Snapshot

TARGET INDICATION: (P)=PEDIATRIC (M)=MATERNAL (E)=ELDERLY

	PRECLINICAL	PHASE 1	PHASE 2	PHASE 3	MARKET APPROVED
LIVE-ATTENUATED/ CHIMERIC	LID/NIAID/NIH — PIV1-3/RSV LID/NIAID/NIH — RSV	Blue Lake — PIV5/RSV Codagenix, LID/NIAID/NIH (P) — RSV Intravacc (P) — RSV-ΔG Pontificia Universidad Catolica de Chile (P) — BCG/RSV SIIPL, St. Jude Hospital (P) — SeV/RSV	Meissa Vaccines (P) — RSV Sanofi, LID/NIAID/NIH (P) — RSV		
PROTEIN-BASED • INACTIVATED • PARTICLE • SUBUNIT	Blue Willow Biologics — Inactivated RSV Georgia State University — VLP Health Guard — RSV F Protein Sanofi (E) — Nanoparticle — Replaced by RNA candidate Sciogen — RSV G Protein University of Georgia — RSV G Protein University of Massachusetts — VLP University of Saskatchewan — RSV F Protein	Icosavax (E) — RSV/hMPV VLP Immunovaccine, VIB (E) — RSV SH Protein NIH/ NIAID/VRC (E M) — RSV F Protein Virometix — VLP	Advaccine Biotechnology (P E) — RSV G Protein Daiichi Sankyo (E) — Protein ?	GlaxoSmithKline (E) — RSV F Protein GlaxoSmithKline (M) — RSV F Protein — Discontinued Pfizer (M) — RSV F Protein Pfizer (E) — RSV F Protein	
NUCLEIC ACID	CureVac — RNA	Moderna (M P) — RNA Sanofi (E) — RNA		Moderna (E) — RNA	
RECOMBINANT VECTORS	BravoVax — Adenovirus GlaxoSmithKline (P) — Adenovirus Vaxart (E) — Adenovirus		Janssen Pharmaceutical (P) — Adenovirus	Bavarian Nordic (E) — MVA Janssen Pharmaceutical (E) — Adenovirus	
IMMUNO-PROPHYLAXIS	Aridis — Anti-F mAb Pontificia Universidad Catolica de Chile — Anti-N mAb UCAB, mAbXience — Anti-F mAb	Gates MRI (P) — Anti-F mAb Trinomab Biotechnology (P) — Anti-F mAb		Merck (P) — Anti-F mAb	Astra Zeneca, Sanofi (P) — Nirsevimab Astra Zeneca (P) — Palivizumab

UPDATED: January 3, 2023

Indicates Change

https://www.path.org/resources/rsv-vaccine-and-mab-snapshot/

PATH

gsk

Pfizer

moderna

BAVARIAN NORDIC

https://www.path.org/resources/rsv-vaccine-and-mab-snapshot/

Global disease burden (systematic reviews)

Volume 222, Issue Supplement_7
1 November 2020

JOURNAL ARTICLE

RESCEU
REspiratory Syncytial virus Consortium in EUrope

Global Disease Burden Estimates of Respiratory Syncytial Virus–Associated Acute Respiratory Infection in Older Adults in 2015: A Systematic Review and Meta-Analysis

Ting Shi, Angeline Denouel, Anna K Tietjen, Iain Campbell, Emily Moran, Xue Li, Harry Campbell, Clarisse Demont, Bryan O Nyawanda, Helen Y Chu ... Show more

The Journal of Infectious Diseases, Volume 222, Issue Supplement_7, 1 November 2020, Pages S577–S583, https://doi.org/10.1093/infdis/jiz059

Published: 18 March 2019 **Article history**

Influenza and other respiratory viruses Open Access isirv

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ORIGINAL ARTICLE | Open Access

Respiratory syncytial virus disease burden in adults aged 60 years and older in high-income countries: A systematic literature review and meta-analysis

Miloje Savic, Yolanda Penders, Ting Shi, Angela Branche, Jean-Yves Pirçon

First published: 11 November 2022 https://doi.org/10.1111/irv.13031

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Burden of respiratory syncytial virus infection in older and high-risk adults: a systematic review and meta-analysis of the evidence from developed countries

Jonathan S. Nguyen-Van-Tam, Maureen O'Leary, Emily T. Martin, Esther Heijnen, Benoit Callendret, Roman Fleischhackl, Christy Comeaux, Thao Mai Phuong Tran, Karin Weber

European Respiratory Review 2022 31: 220105; **DOI:** 10.1183/16000617.0105-2022

Original Research | Open Access | Published: 20 March 2023

Pfizer

Adjusting for Case Under-Ascertainment in Estimating RSV Hospitalisation Burden of Older Adults in High-Income Countries: a Systematic Review and Modelling Study

You Li, Durga Kulkarni, Elizabeth Begier, Pia Wahi-Singh, Bhanu Wahi-Singh, Bradford Gessner & Harish Nair

Infectious Diseases and Therapy (2023) | Cite this article

RSV disease burdens in two systematic reviews

	RSV-ARI	RSV hospitalizations	RSV in-hospital deaths
Savic 2022			
Overall (point estimates, 95% CI)	Attack rate 1.62% (0.84–3.08)	Hospitalization rate 0.15% (0.09–0.22)	hCFR 7.13% (5.40–9.36)

	RSV – ARI incidence	RSV – case fatality proportion

Nguyen-Van-Tam 2022	▪ Annual studies: 4.66% (3.34-6.48)
	▪ Seasonal studies: 7.80% (5.77-10.45%)
		▪ Overall: 8.8% (5.54-11.94%)
		▪ High-risk group: 9.88% (6.66-14.43)
		  ▪ Annual studies: 7.03% (5.18-9.48%)
		  ▪ Seasonal studies: 7.69% (6.23-9.46%)

Comparison among the systematic reviews

	Age	Adjusted for under-ascertainment	Estimates hospitalisation rate (95% CI) per 100,000	Key study characteristics for comparison
Shi et al 2020	≥ 65 years	No	**100 (50-210)**	A wide range of case definitions allowed
Savic 2022	≥ 60 years	No	**145(94-224)**	Hospitalisation attack rate (rather than annual hospitalisation rate)
McLaughlin et al 2022	≥ 65 years	No	**178 (152-204)**	Limited to the USA; including all RSV-associated hospitalisations; not excluding modelling studies
McLaughlin et al 2022	≥ 65 years	Partly	**267 (228-306)**	Limited to the USA; including all RSV-associated hospitalisations; not excluding modelling studies; limited to studies using PCR or serology
Li et al 2023	≥ 65 years	No	**157 (98-252)**	Strictly limited to ARI
Li et al 2023	≥ 65 years	Yes	**347 (203-595)**	Strictly limited to ARI

After adjusting for diagnostic testing characteristics related to clinical specimens and testing approaches ➔ An estimated 2.2-fold higher disease burden

The older adult (aged ≥60 years) study

RESCEU
REspiratory Syncytial virus Consortium in EUrope

Burden of respiratory syncytial virus infection in community-dwelling older adults in Europe (RESCEU): an international prospective cohort study

Koos Korsten, Niels Adriaenssens, Samuel Coenen, Christopher Butler, Behnaz Ravanfar, Heather Rutter, Julie Allen, Ann Falsey, Jean-Yves Pirçon, Olivier Gruselle, Vincent Pavot, Charlotte Vernhes, Sunita Balla-Jhagjhoorsingh, Deniz Öner, Gabriela Ispas, Jeroen Aerssens, Vivek Shinde, Theo Verheij, Louis Bont, Joanne Wildenbeest on behalf of the RESCEU investigators

European Respiratory Journal 2021 57: 2002688; **DOI:** 10.1183/13993003.02688-2020

Volume 226, Issue Supplement_1
1 August 2022

Article Contents

JOURNAL ARTICLE

Economic Burden and Health-Related Quality of Life of Respiratory Syncytial Virus and Influenza Infection in European Community-Dwelling Older Adults

Zhuxin Mao, Xiao Li, Koos Korsten, Louis Bont, Christopher Butler, Joanne Wildenbeest, Samuel Coenen, Niel Hens, Joke Bilcke, Philippe Beutels ... Show more

Author Notes

The Journal of Infectious Diseases, Volume 226, Issue Supplement_1, 1 August 2022,

Prospective, observational, cohort study (N=1040)

- 3 European countries & 2 seasons

Objective:

- Estimate average costs and Health-related quality-of-life in older adults (≥60 years) with RSV infection
- Compared RSV to influenza-related costs and HRQoL

Cost per RSV and influenza (non-hospital) episode

The mean [median] and (1st – 3rd quartile) costs per RSV and influenza episode (2020 € value)

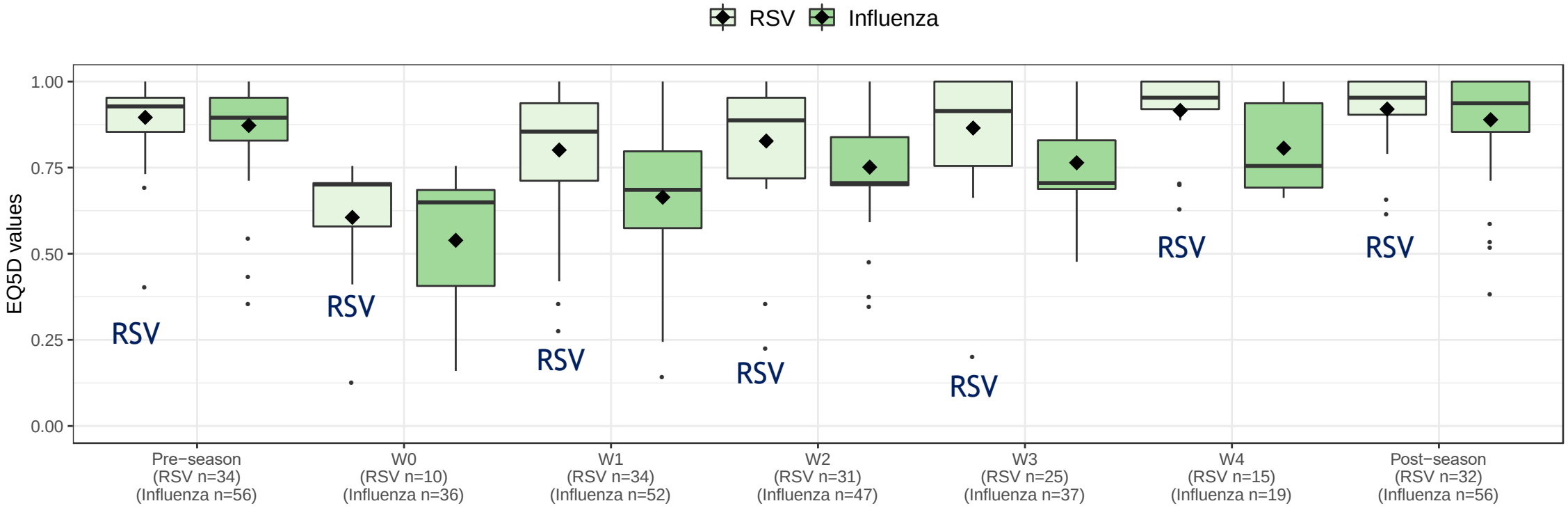
	RSV (N=36)				Influenza (N=59)			
Perspective	Patient	Healthcare provider	Healthcare payer	Societal	Patient	Healthcare provider	Healthcare payer	Societal
Health care visits	0.78 [0] (0 - 0)	11.74 [0] (0 - 23.06)	12.52 [0] (0 - 27.06)		1.76 [0] (0 - 2.00)	21.67 [23.06] (0 – 35.00)	23.44 [27.06] (0 – 35.00)	
Medication	10.97 [2.7] (0 - 12.2)	2.88 [0] (0 - 0.55)	13.85 [5.54] (0 - 18.39)		14.44 [3.12] (0 - 17.63)	4.62 [0] (0 - 4.1)	19.06 [7.80] (0.97 - 24.83)	
Direct cost	**11.74 [3.42] (0 - 12.2)**	**14.62 [0] (0 - 23.22)**	**26.37 [5.54] (0 - 47.31)**		**16.2 [4.00] (0.21 - 22.9)**	**26.29 [23.06] (0 - 40)**	**42.49 [35.98] (3.34 - 66.7)**	
Productivity loss				4.38 [0] (0 - 0)				32.07 [0] (0 - 0)
Total costs				**30.75 [5.54] (0 - 50.02)**				**74.56 [36.90] (5.42 - 73.53)**

Findings:

- The mean costs were lower per RSV episode vs. influenza episode, but interquartile ranges overlapped largely.
- Due to small sample size, no formal statistical comparisons were made.
- Extensive subgroup analyses were performed (e.g. by medically attendance, by country)

Health-related quality-of-life

RSV episodes had higher utility values than influenza episodes at each time point, in other words, quality-of-life impact of RSV seems smaller than for influenza



Discussion

- The first RSV older adults vaccine is likely to be approved by FDA in Q2 2023
- The burden of RSV disease among older adults is still unclear, and almost unknown in adults including pregnant women
- In order to make a more informed decision, collecting cost and health-related quality-of-life studies are crucial
- Cost-effectiveness of RSV vaccines in older adults need to be carefully evaluated


Thank you!