Estimated Public Health Impact of Adjuvanted RSVPreF3 Vaccination in US Adults Aged 18–49 Years Who Are at Increased Risk for Severe RSV Disease

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Conclusions

Findings suggest **substantial potential public health benefits and reduced RSV disease burden following adjuvanted RSVPreF3 vaccination in adults aged 18–49 years** who are at increased risk for severe RSV disease

Future analyses may further inform the potential value of adjuvanted RSVPreF3 vaccination for increased-risk adults aged 18–49 years

Background

- Adults with certain comorbidities, including asthma and diabetes, have an increased risk of severe RSV disease and RSV-related hospitalization[1,2]
- Previous modeling has estimated substantial public health benefits of adjuvanted RSVPreF3 vaccination in the US among adults aged ≥60 years and increased-risk adults aged 50–59 years[3,4]
- **The objective of this study was to estimate the public health impact of adjuvanted RSVPreF3 vaccination in US adults aged 18–49 years at increased risk for severe RSV disease**

Study design

Overview: A Markov model estimated outcomes over a 5-year time horizon[3]

Data source: Scientific literature and public data sources were used to inform model inputs; vaccine efficacy inputs were based on phase 3 clinical trial data[5] (see Supplement)

Population: US adults aged 18–49 years at increased risk for severe RSV disease by comorbidity[a]

- Diabetes (N=5,249,761)
- Asthma (N=9,956,842)
- Heart failure, CAD, severe obesity, and chronic kidney disease (see Supplement)

Analysis: Estimated public health outcomes were compared with and without one-time adjuvanted RSVPreF3 vaccination (assuming vaccination uptake of 32.8%)[b]

- RSV-ARI cases, RSV-related healthcare use, RSV-related deaths, and QALY losses

[a]Each comorbidity was modeled separately; thus, the results cannot be combined due to the real-world overlap of the populations affected by these disease areas. [b]Vaccination uptake was assumed to be the same as influenza vaccine uptake among US adults aged 18–49 years in 2023–2024.[6]

Results

Adults aged 18–49 years **with diabetes**

n=1,721,922 vaccinated

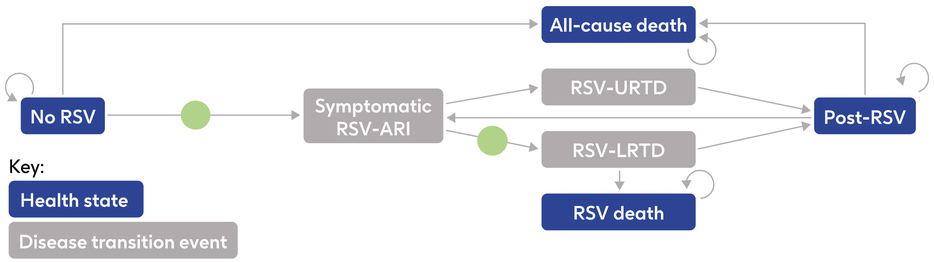
Adults aged 18–49 years **with asthma**

n=3,265,844 vaccinated

RSV-related outcomes avoided (adjuvanted RSVPreF3 vaccination compared to no vaccination)

Note: See Supplement for results from US adults aged 18–49 years with heart failure, CAD, severe obesity, and chronic kidney disease. [a]Differences in total RSV-ARI cases and the sum of RSV-LRTD and RSV-URTD cases are due to rounding. [b]Discounted QALY losses due to premature RSV-related deaths were calculated over the remaining lifetime, using a 3% discount rate.

Model schematic



Number needed to vaccinate (NNV) to avoid 1 RSV-related case or outcome

	Diabetes	Asthma
Symptomatic RSV-ARI case	9	9
RSV-LRTD case	14	16
Medically-attended RSV case	23	27
RSV-related hospitalization	321	1,808
RSV-related death	10,171	56,843

The NNV with adjuvanted RSVPreF3 to avoid one RSV-LRTD case was 14 (diabetes) and 16 (asthma)

Audio File

Abbreviations

ARI, acute respiratory illness; **CAD**, coronary artery disease; **ED**, emergency department; **LRTD**, lower respiratory tract disease; **NNV**, number needed to vaccinate; **QALY**, quality-adjusted life year; **RSV**, respiratory syncytial virus; **URTD**, upper respiratory tract disease; **US**, United States.

References

(1) CDC. Clinical overview of RSV. Aug 2024.
(2) Britton A et al. MMWR Morb Mortal Wkly Rep. 2024;73:696–702.
(3) La EM et al. Hum Vaccin Immunother. 2024;20(1):2432745.
(4) Singer D et al. 13th International RSV Symposium. 12–15 March 2025. Iguazu Falls, Brazil.
(5) Ison MG et al. Lancet Respir Med. 2025 Apr 11:S2213-2600(25)00048-7. Online ahead of print.
(6) CDC. Flu vaccination coverage, United States, 2023–24 influenza season. Sep 2024.

Acknowledgments

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Disclosures

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Conflicts of interest: **DS**, **EL**, **CDG**, **EB**, **SP**, and **FV** are GSK employees and hold financial equities in GSK. **JG** and **MG** are employees of RTI Health Solutions, which received funding from GSK to conduct this study.

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Supplement

Table S1. RSV-related outcomes with and without one-time adjuvanted RSVPreF3 vaccination among adults aged 18–49 years over a 5-year period

Table S1a. Diabetes

Population vaccinated (n/N): 1,721,922/5,249,761

Health outcomes	Adjuvanted RSVPreF3 vaccine	No vaccine	Incremental: adjuvanted RSVPreF3 vs. no vaccine
RSV-ARI cases[a]	**1,272,425**	**1,460,695**	**-188,270**
RSV-URTD cases	640,272	703,875	-63,603
RSV-LRTD cases	632,154	756,820	-124,666
Healthcare resource use			
Hospitalizations	27,199	32,563	-5,364
Emergency department visits	45,981	55,049	-9,068
Outpatient visits	448,471	522,293	-73,822
Courses of antibiotics	373,457	436,379	-62,922
RSV-related deaths	**858**	**1,028**	**-169**
QALY losses[b]	**32,733**	**38,481**	**-5,748**

Table S1b. Asthma

Population vaccinated (n/N): 3,265,844/9,956,842

Health outcomes	Adjuvanted RSVPreF3 vaccine	No vaccine	Incremental: adjuvanted RSVPreF3 vs. no vaccine
RSV-ARI cases[a]	2,422,223	2,780,263	-358,039
RSV-URTD cases	1,376,856	1,528,921	-152,066
RSV-LRTD cases	1,045,368	1,251,341	-205,974
Healthcare resource use			
Hospitalizations	9,167	10,974	-1,806
Emergency department visits	81,912	98,051	-16,139
Outpatient visits	742,484	863,569	-121,085
Courses of antibiotics	612,220	714,353	-102,133
RSV-related deaths	**292**	**349**	**-57**
QALY losses[b]	**40,338**	**46,822**	**-6,484**

Table S1c. Heart failure

Population vaccinated (n/N): 233,837/712,916

Health outcomes	Adjuvanted RSVPreF3 vaccine	No vaccine	Incremental: adjuvanted RSVPreF3 vs. no vaccine
RSV-ARI cases[a]	**171,933**	**197,409**	**-25,475**
RSV-URTD cases	90,596	100,009	-9,412
RSV-LRTD cases	81,337	97,400	-16,063
Healthcare resource use			
Hospitalizations	11,786	14,114	-2,328
Emergency department visits	5,900	7,065	-1,165
Outpatient visits	57,727	67,217	-9,490
Courses of antibiotics	47,912	55,973	-8,060
RSV-related deaths	**196**	**234**	**-39**
QALY losses[b]	**5,408**	**6,386**	**-978**

Table S1d. Coronary artery disease

Population vaccinated (n/N): 937,472/2,858,145

Health outcomes	Adjuvanted RSVPreF3 vaccine	No vaccine	Incremental: adjuvanted RSVPreF3 vs. no vaccine
RSV-ARI cases[a]	**690,169**	**792,403**	**-102,234**
RSV-URTD cases	346,607	381,016	-34,409
RSV-LRTD cases	343,562	411,386	-67,824
Healthcare resource use			
Hospitalizations	5,818	6,967	-1,149
Emergency department visits	23,360	27,972	-4,612
Outpatient visits	243,727	283,904	-40,177
Courses of antibiotics	203,030	237,287	-34,257
RSV-related deaths	**251**	**300**	**-49**
QALY losses[b]	**13,895**	**16,234**	**-2,339**

Table S1e. Severe obesity

Population vaccinated (n/N): 4,640,270/14,147,164

Health outcomes	Adjuvanted RSVPreF3 vaccine	No vaccine	Incremental: adjuvanted RSVPreF3 vs. no vaccine
RSV-ARI cases[a]	**3,414,129**	**3,919,960**	**-505,830**
RSV-URTD cases	1,820,441	2,011,574	-191,133
RSV-LRTD cases	1,593,689	1,908,386	-314,697
Healthcare resource use			
Hospitalizations	16,954	20,301	-3,348
Emergency department visits	115,531	138,344	-22,813
Outpatient visits	1,131,221	1,317,005	-185,784
Courses of antibiotics	937,926	1,095,554	-157,628
RSV-related deaths	**778**	**931**	**-154**
QALY losses[b]	**61,407**	**71,493**	**-10,086**

Table S1f. Chronic kidney disease

Population vaccinated (n/N): 3,321,394/10,126,201

Health outcomes	Adjuvanted RSVPreF3 vaccine	No vaccine	Incremental: adjuvanted RSVPreF3 vs. no vaccine
RSV-ARI cases[a]	**2,460,520**	**2,824,323**	**-363,803**
RSV-URTD cases	1,316,378	1,454,686	-138,308
RSV-LRTD cases	1,144,142	1,369,637	-225,495
Healthcare resource use			
Hospitalizations	49,211	58,910	-9,699
Emergency department visits	83,222	99,624	-16,402
Outpatient visits	812,128	945,207	-133,079
Courses of antibiotics	673,224	786,113	-112,889
RSV-related deaths	**1,424**	**1,704**	**-281**
QALY losses[b]	**60,328**	**70,830**	**-10,502**

[a]Differences in total RSV-ARI cases and the sum of RSV-LRTD and RSV-URTD cases are due to rounding. [b]Discounted QALY losses due to premature RSV-related deaths were calculated over the remaining lifetime, using a 3% discount rate.

Abbreviations

ARI, acute respiratory illness; **LRTD**, lower respiratory tract disease; **QALY**, quality-adjusted life year; **RSV**, respiratory syncytial virus; **URTD**, upper respiratory tract disease; **US**, United States.

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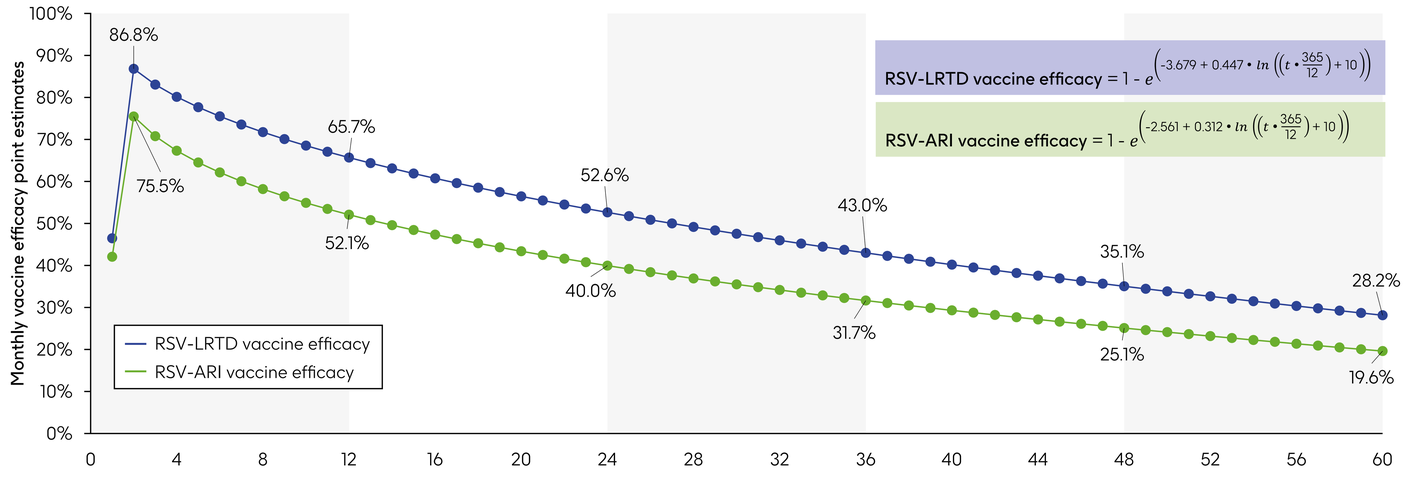
Supplement

Table S2. Number needed to vaccinate (NNV) to avoid RSV-related health outcomes among adults aged 18–49 years

Outcome	Diabetes	Asthma	Heart failure	Coronary artery disease	Severe obesity	Chronic kidney disease
NNV to avoid 1 symptomatic RSV-ARI case	9	9	9	9	9	9
NNV to avoid 1 RSV-LRTD case	14	16	15	14	15	15
NNV to avoid 1 medically-attended RSV case	23	27	25	23	25	25
NNV to avoid 1 RSV-related hospitalization	321	1,808	100	816	1,386	342
NNV to avoid 1 RSV-related death	10,171	56,843	6,049	18,942	30,206	11,836

Figure S1. Adjuvanted RSVPreF3 vaccine efficacy against RSV-ARI and RSV-LRTD over a 5-year time horizon



Note: In the month of vaccination, the analysis includes 50% of peak vaccine efficacy. Data from the phase 3 clinical trial were used to estimate vaccine efficacy waning functions using Cox models for RSV-ARI and RSV-LRTD. The figure is shown for the modeled time horizon of 5 years. This time horizon is used to capture expected protection of adjuvanted RSVPreF3 vaccination beyond the trial follow-up period.

Abbreviations

ARI, acute respiratory illness; **LRTD**, lower respiratory tract disease; **NNV**, number needed to vaccinate; **RSV**, respiratory syncytial virus; **US**, United States.

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Supplement

Table S3. Model inputs

	Diabetes	Asthma	Heart failure	Coronary artery disease	Severe obesity	Chronic kidney disease	Sources
Demographic inputs							
Population size, 18–49 years[a]	5,249,762	9,956,842	712,916	2,858,145	14,147,164	10,126,201	1–7
18–29 years	682,428	4,502,985	169,861	460,251	3,588,504	2,780,659	
30–39 years	1,374,412	3,113,723	218,445	393,946	5,151,373	3,329,001	
40–49 years	3,192,922	2,340,134	324,610	2,003,948	5,407,286	4,016,541	
Annual probability of mortality	Probability of dying by single year of age						1, 5, 8–10
Vaccine-related inputs							
Adjuvanted RSVPreF3 vaccination uptake	32.8%						11
RSV epidemiology and healthcare resource use inputs							
Annual incidence of symptomatic RSV-ARI per person-year at risk	0.0562						12
Percentage of RSV-ARI cases that are RSV-LRTD	18–29y: 35.8%						13–15
	30–39y: 50.0%						
	40–49y: 56.0%						
Percentage of RSV-LRTD cases that result in death	18–29y: 0.09%	18–29y: 0.02%	18–29y: 0.21%	18–29y: 0.05%	18–29y: 0.04%	18–29y: 0.09%	6, 8–10, 15–21
	30–39y: 0.11%	30–39y: 0.03%	30–39y: 0.25%	30–39y: 0.06%	30–39y: 0.04%	30–39y: 0.11%	
	40–49y: 0.15%	40–49y: 0.04%	40–49y: 0.25%	40–49y: 0.08%	40–49y: 0.06%	40–49y: 0.15%	
RSV-LRTD resource use							
Hospitalization	4.3%	0.9%	18–29y: 13.0% 30–39y: 13.0% 40–49y: 15.9%	1.7%	18–29y: 1.1% 30–39y: 1.1% 40–49y: 1.0%	4.3%	6, 15, 18, 20–22
Emergency department visit	6.8%	7.8%	7.3%	6.8%	7.3%	7.3%	22
Outpatient visit	18–29y: 36.6%						Assumption, 12, 23, 24
	30–39y: 46.1%						
	40–49y: 49.7%						
Antibiotic use	18–29y: 21.7%						12, 23, 24
	30–39y: 27.4%						
	40–49y: 29.5%						
RSV-URTD resource use							
Outpatient visit	18–29y: 18.1%						Assumption, 12, 23, 24
	30–39y: 22.9%						
	40–49y: 24.7%						
Antibiotic use	18–29y: 13.3%						12, 23, 24
	30–39y: 16.8%						
	40–49y: 18.1%						
Utility inputs							
Baseline utility	18–29y: 0.8832	18–29y: 0.8979	18–29y: 0.8547	18–29y: 0.8800	18–29y: 0.8680	18–29y: 0.8657	25–27
	30–39y: 0.8627	30–39y: 0.8800	30–39y: 0.8361	30–39y: 0.8616	30–39y: 0.8495	30–39y: 0.8471	
	40–49y: 0.8345	40–49y: 0.8505	40–49y: 0.8062	40–49y: 0.8295	40–49y: 0.8234	40–49y: 0.8188	
QALY loss due to RSV-URTD case	0.0133						28
QALY loss due to RSV-LRTD case	0.0178						
QALY loss due to vaccine-related Grade 3 AEs	0.0007						29

[a]Differences in total population aged 18–49 years and the sum of those aged 18–29, 30–39, and 40–49 years are due to rounding.

Supplement references

1. US Census Bureau. Projected population by single year of age, sex, race, and Hispanic origin for the United States: 2023 to 2100. 2023. https://www.census.gov/data/datasets/2023/demo/popproj/2023-popproj.html. Accessed May 22, 2024.
2. Wang L et al. JAMA. 2021;326(8):1–13.
3. Pleasants RA et al. Pulm Ther. 2022;8(3):255–268.
4. Martin SS et al. Circulation. 2024 Feb 20;149(8):e347–e913. Erratum in: Circulation. 2024 May 7;149(19):e1164.
5. NIH. National Institute of Diabetes and Digestive and Kidney Disease. Overweight & obesity statistics. 2021. https://www.niddk.nih.gov/health-information/health-statistics/overweight-obesity. Accessed May 29, 2024.
6. Hales CM et al. NCHS Data Brief. 2020 Feb;(360):1–8.
7. CDC. Chronic kidney disease (CKD) surveillance system. Crude estimates. 2024a. https://nccd.cdc.gov/CKD/detail.aspx?Qnum=Q372&topic=1#refreshPosition. Accessed August 17, 2024.
8. Arias E et al. Natl Vital Stat Rep. 2023 Nov;72(12):1–64.
9. CDC. WONDER database. Underlying cause of death by single race 2018–2022. 2024b. https://wonder.cdc.gov/. Accessed May 22, 2024.
10. Global BMI Mortality Collaboration, et al. Lancet. 2016 Aug 20;388(10046):776–86.
11. CDC. Flu vaccination coverage, United States, 2023–24 influenza season. 2024c. https://www.cdc.gov/fluvaxview/coverage-by-season/2023-2024.html. Accessed October 7, 2024.
12. Falsey AR et al. N Engl J Med. 2005;352(17):1749–1759.
13. Ison MG et al. Lancet Respir Med. 2025 Apr 11:S2213-2600(25)00048-7. Online ahead of print.
14. Brogan AJ et al. Hum Vaccin Immunother. 2017 Mar 4;13(3):533–542.
15. CDC RSV-NET. Cumulative rates of RSV-associated hospitalizations, by season. 2023–24. 2024d. https://www.cdc.gov/rsv/php/surveillance/rsv-net.html. Accessed December 9, 2024.
16. CDC RSV-NET. Epidemiology of respiratory syncytial virus hospitalizations in adults-RSV-NET. 2024e. https://stacks.cdc.gov/view/cdc/134689. Accessed July 29, 2024.
17. Tseng HF et al. J Infect Dis. 2020;222(8):1298–1310.
18. Branche AR et al. Clin Infect Dis. 2022;74(6):1004–1011.
19. Anderson NW et al. Diagn Microbiol Infect Dis. 2016 Jul;85(3):367–371.
20. Patel M et al. Emerg Infect Dis. 2020 Aug;26(8):1720–1730.
21. CDC. Chronic conditions as risk factors for RSV-associated hospitalization. ACIP meeting. February 29, 2024. 2024f. https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2024-02-28-29/03-RSV-Adults-Woodruff-508.pdf. Accessed August 13, 2024.
22. McLaughlin JM et al. Open Forum Infect Dis. 2022;9(7):ofac300.
23. Belongia EA et al. Open Forum Infect Dis. 2018;5(12):ofy316.
24. Herring WL et al. Vaccine. 2022;40(3):483–493.
25. Janssen B, Szende A. Dordrecht (NL): Springer; 2014. Chapter 3.
26. Sullivan PW et al. Med Decis Making. 2006;26(4):410–20.
27. Li B et al. Value Health. 2017 Jul-Aug;20(7):976984.
28. Rendas-Baum R et al. ISPOR 2023, 7–10 May 2023, Boston, MA, US.
29. Schmader KE et al. J Gerontol A Biol Sci Med Sci. 2019;74(8):1217–1224.

Abbreviations

AE, adverse event; **ARI**, acute respiratory illness; **LRTD**, lower respiratory tract disease; **QALY**, quality-adjusted life year; **RSV**, respiratory syncytial virus; **URTD**, upper respiratory tract disease; **US**, United States; **y**, years.

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