

RSV Vaccine Can Prevent More Than 70% of RSV Infections, ED Visits, and Admissions Among Older Adults

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Key Findings:

- Patients aged 60 to 74 at increased risk of severe complications from a respiratory syncytial virus (RSV) infection have up to a 75% reduced likelihood of an RSV-related complication if they have received the RSV vaccination.
- Among patients aged 75 and older, the RSV vaccine is 73% effective at preventing RSV-related admissions and ED visits.

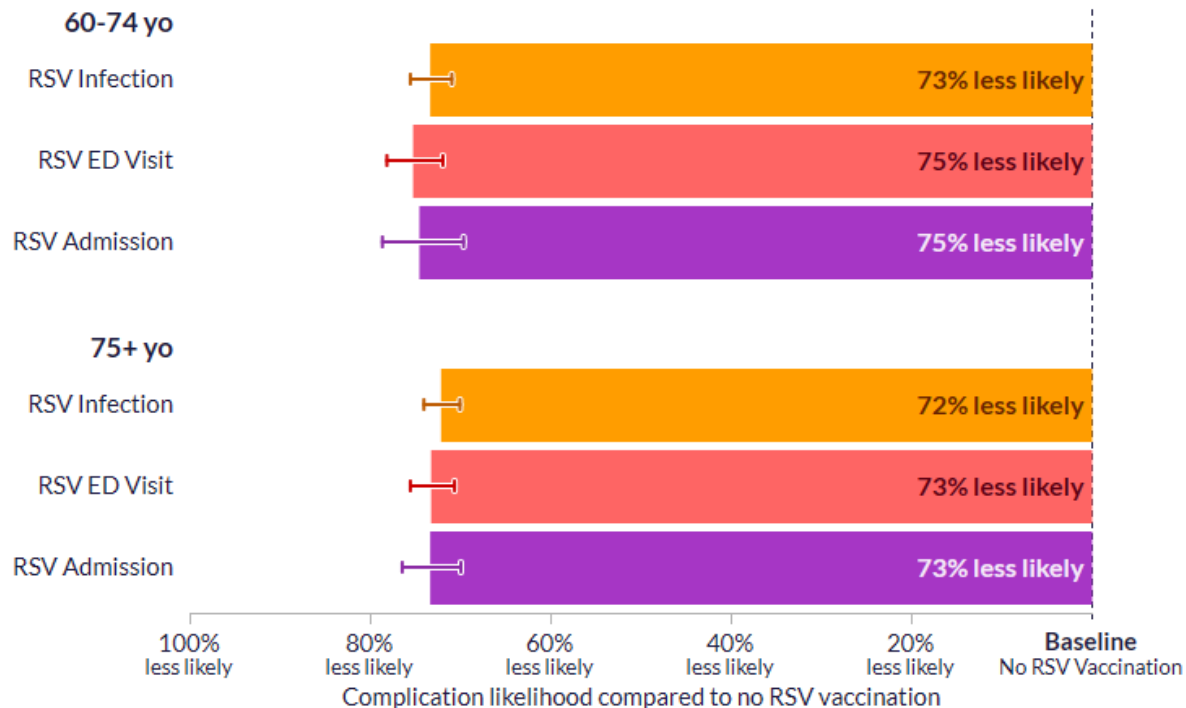
Respiratory syncytial virus (RSV) poses a significant health threat to older adults—particularly those with underlying conditions such as chronic lung disease, heart disease, or weakened immune function—increasing their risk of severe complications, hospitalization, and death.¹ The U.S. Food & Drug Administration (FDA) recently approved an RSV vaccine, offering a new preventive measure to reduce these risks.¹ The Centers for Disease Control and Prevention (CDC) currently recommends RSV vaccination for adults aged 60 to 74 with risk factors for severe RSV, as well as all adults aged 75 or older, to prevent infection and hospitalization.²

To evaluate the vaccine's effectiveness, we studied 348,376 patients tested for RSV between May 2023 and December 2024. These patients were either 75 or older or aged 60 to 74 and at increased risk. We adjusted for patient age, geographic region, rural or urban status, social vulnerability, history of influenza vaccination, smoking history, and BMI. For patients 75 or older, we also adjusted for an increased risk of a severe RSV infection. All patients had an RSV lab result. We matched each patient with an RSV vaccine to four patients who did not get an RSV vaccine, were tested for RSV in the same month, and were the same age as the vaccinated patient.

We found that patients aged 60 to 74 who received the RSV vaccine were 73% less likely to have a medically attended RSV infection, 75% less likely to have an RSV-related ED visit, and 75% less likely to be admitted for RSV compared to those who did not receive the RSV vaccine. We also found similar rates of effectiveness in the 75 and older group, as shown in Figure 1.

RSV Vaccine Effectiveness by Patient Age

■ 95% Confidence Interval



N=348,376 patients

"RSV Vaccine Effectiveness by Patient Age," 2025. EpicResearch.org

Figure 1. The likelihood of a patient having a medically attended RSV infection, an RSV-related ED visit, or an RSV-related hospital admission by RSV vaccination status and patient age.

A sensitivity analysis of patients with RSV-like symptoms or an RSV diagnosis showed similar results.

These data come from Cosmos, a dataset created in collaboration with a community of Epic health systems representing more than 295 million patient records from 1,600 hospitals and more than 37,000 clinics from all 50 states, Lebanon, and Saudi Arabia. This study was completed by two teams that worked independently, each composed of a clinician and research scientists. The two teams came to similar conclusions. Graphics by Brian Olson.

References

1. FDA approves first respiratory syncytial virus (RSV) vaccine. U.S. Food and Drug Administration. May 4, 2023. Accessed December 26, 2024. <https://www.fda.gov/news-events/press-announcements/fda-approves-first-respiratory-syncytial-virus-rsv-vaccine>. Accessed December 26, 2024.
2. RSV vaccine guidance for older adults. U.S. Centers for Disease Control and Prevention. August 30, 2024. <https://www.cdc.gov/rsv/hcp/vaccine-clinical-guidance/older-adults.html>. Accessed December 26, 2024.

Data Definitions

Term	Definition
Study period	5/1/2023 to 12/4/2024
Study population	Patients over 60 with an RSV lab result, with those 60-74 having an increased risk for severe RSV
Exposure	RSV vaccine: An immunization with CVX code 303, 304, 305, 306, 307, 314, 315, or 326
Confounders	Age: 60-64, 65-69, 70-74, 75-79, 80-84, 85+ RUCA score Social Vulnerability Index score Census region: MW, NE, S, W Increased risk Only for 75+ models History of smoking Recent influenza vaccine (within year prior to the index event) Distant influenza vaccine (more than a year prior to the index event) Legal sex: male or female Race and ethnicity
Model specifications	Logistic Regression 1:4 matched on age within 5-year bands and calendar month for those with a positive RSV lab result and those with a negative RSV lab. For the sensitivity analysis, we further required that cases and controls had either an RSV diagnosis or RSV-like symptom starting between a day prior and five days after the index test day.
RSV lab	A lab with LOINC code 14129-1, 17520-8, 55100-2, 88527-7, 91782-3, 91785-6, 101425-7, 77022-2, 88595-4, 91795-5, 101426-5, 77023-0, 88597-0, 91794-8, 101298-8, 76088-4, 76089-2, 82176-9, 85479-4, 91133-9, 92131-2, 92957-0, 30075-6, 101982-7, 41456-5, 80597-8, 88204-3, 80598-6, 88202-7, 30076-4, 40987-0, 88528-5, 60271-4, 40988-8, 31949-1, 31950-9, 32040-8, 33045-6, 50329-2, 5874-3, 5875-0, 5876-8, 5877-6, 68966-1, 72885-7, 77389-5, 77390-3, or 88909-7 - A result of "Positive," "Detected," or "Present" indicated a positive result - An abnormal flag also was also treated as a positive result unless the result text was "Negative" or "Not detected" - A result of "Negative" or "Not detected" indicated a negative result unless the lab also had an abnormal flag
Increased risk	CAR-T cell therapy: A procedure with CPT code 0540T CVD: ICD-10-CM code I20*-I28* or I30*-I51* Chronic liver disease: ICD-10-CM code K70.3*-K70.4*, K71.3*-K71.5*, K71.7*, K72.1, K73*, or K76.1 Chronic lung disease: ICD-10-CM code J41*-J45*, J84*, E84*, J60, J67.8, J69.8, or J82.83 Diabetes: ICD-10-CM code E08*-E13* ESRD: ICD-10-CM code N18.5 or N18.6 Immunocompromised: ICD-10-CM code C81*-C89*, C90*-C96*, Z94.0-Z94.4, Z94.83, D83*, D82.0, D82.1, or B20 Immunocompromising medications Muscular dystrophy: ICD-10-CM code G71.0*

	Sickle cell disease: ICD-10-CM code D57.0*-D57.2* or D57.4*-D57.9* Spinal muscular atrophy: ICD-10-CM code G12* Stroke: ICD-10-CM code I60*-I63* or I65*-I69* Transplant: A transplant episode for a kidney or liver
RUCA	Rural-Urban Commuting Area is a classification of geographic areas based on population density, urbanization, and daily commuting. It ranges from 1 to 10, with lower values indicating more urban areas and higher values indicating more rural areas. Rural (10), small town (7-9), micropolitan (4-6), and metropolitan (1-3) were used.
Social Vulnerability Index	The social vulnerability index score quintile for the ZIP Code of the patient's most recent address.
Influenza vaccine	An immunization with CVX code 111, 149, 141, 135, 140, 201, 197, 186, 161, 185, 150, 202, 205, 168, 200, 194, 171, 158, 160, 166, 155, 151, 153, 231, or 320
Race and ethnicity	Non-mutually exclusive flag for Black race and Hispanic ethnicity
RSV diagnosis	A diagnosis with ICD-10-CM code J12.1*, J20.5*, J21.0*, or B97.4
RSV-like symptom	An encounter with a chief complaint of: - Cough - Shortness of breath - Breathing problem - Respiratory distress - Wheezing - Flu symptoms - Sore throat - Common cold - Chest congestion - Asthma - Croup - Pneumonia - Hypoxia - Sinus problems
Immunocompromising medications	A prescription for one of the following medications: abatacept, adalimumab, adriamycin, aldesleukin, alefacept, alemtuzumab, altretamine, amifostine, amsacrine, anakinra, arsenic trioxide, asparaginase, auranofin, aurothioglucose, axicabtagene ciloleucel, azacytidine, azathioprine, basiliximab, belatacept, Belimumab, bendamustine hydrochloride, benralizumab, betamethasone, bevacizumab, bexarotene, bleomycin sulfate, blinatumomab, bortezomib, brentuximab vedotin, brexucabtagene autoleucel, budesonide, busulfan, cabazitaxel, canakinumab, capecitabine, carboplatin, carfilzomib, carmustine, certolizumab pegol, cetuximab, chlorambucil, ciltacabtagene autoleucel, cisplatin, cladribine, clofarabine, cyclophosphamide, cyclosporine, cytarabine (conv,0), cytarabine (lipo,0), dacarbazine, daclizumab, dactinomycin, dasatinib, daunorubicin, daunorubicin citrate liposome, decitabine, defibrotide, denileukin diftitox, Denosumab, Dexamethasone, dexrazoxane, docetaxel, doxorubicin, doxorubicin hydrochloride liposome, eculizumab, efalizumab, emapalumab-lzsg, epirubicin, eribulin mesylate, erlotinib, estramustine phos sodium, etanercept, etoposide, etoposide phos, everolimus, fingolimod, floxuridine, fludarabine, fluorouracil, gefitinib, gemcitabine, gemtuzumab, glatiramer

acetate, gold sodium thiomalate, golimumab, Granulocyte - colony stimulating factor (G-CSF,0), Granulocyte - colony stimulating factor (G-CSF,0), Granulocyte - colony stimulating factor (G-CSF,0), guselkumab, hydroxychloroquine, hydroxydaunorubicin hydrochloride (doxorubicin hydrochloride,0), ibritumomab, idarubicin, idecabtagene vicleucel, ifosfamide, ifosfamide/mesna, imatinib, indium In-111 ibritumomab tiuxetan, infliximab, inotuzumab ozogamicin, interferon alfa-2a, interferon alfa-2b, interferon alfa-n3, interferon alfacon-1, interferon beta-1a, interferon beta-1b, interferon gamma-1b, ipilimumab, irinotecan, ixabepilone, ixazomib, lapatinib, leflunomide, lenalidomide, levamisole, lisocabtagene maraleucel, lomustine, mechlorethamine, melphalan, mepolizumab, mercaptopurine, mesalamine, mesna, methotrexate, Methylprednisolone, methylprednisolone sod succinate, mitomycin, mitotane, mitoxantrone, muromonab-cd3, mycophenolate acid, mycophenolate mofetil, natalizumab, nelarabine, nilotinib, obinutuzumab, ocrelizumab, ofatumumab, osimertinib, oxaliplatin, paclitaxel, palifermin, Palivizumab, panitumumab, pazopanib, pegademase bovine, pegaspargase, peginterferon alfa-2a, peginterferon alfa-2b, pemetrexed, pentostatin, pertuzumab, pimecrolimus, plicamycin, porfimer, pralatrexate, prednisolone, prednisone, procarbazine, rilonacept, rituximab, romidepsin, selinexor, sipuleucel-t, sirolimus, sorafenib, streptozocin, sulfasalazine, sunitinib, tacrolimus, temozolomide, temsirolimus, teniposide, thalidomide, thioguanine, thiopurine, thiopurine, thiopurine, thiotepa, tisagenlecleucel, tocilizumab, topotecan, tositumomab and iodine, trastuzumab, tretinoin, triamcinolone, uracil mustard, ustekinumab, vedolizumab, venetoclax, vinblastine, vincristine, vincristine sulfate, vinorelbine, vorinostat, or yttrium 90 ibritumomab tiuxetan

Table 1: RSV Vaccine Effectiveness by Patient Age

	Odds Ratio	Low CI	High CI
60-74 yo			
RSV Infection	0.27	0.24	0.29
RSV ED Visit	0.25	0.22	0.28
RSV Admission	0.25	0.21	0.30
75+ yo			
RSV Infection	0.28	0.26	0.30
RSV ED Visit	0.27	0.24	0.29
RSV Admission	0.27	0.24	0.30