

Shingles Vaccination Correlated with Reduced Likelihood of Dementia and Alzheimer's

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Key Findings:

- Patients who received a live or recombinant shingles vaccination between ages 50 and 65 are less likely to be diagnosed with dementia or Alzheimer's disease after age 65 compared to those who didn't receive a shingles vaccination.

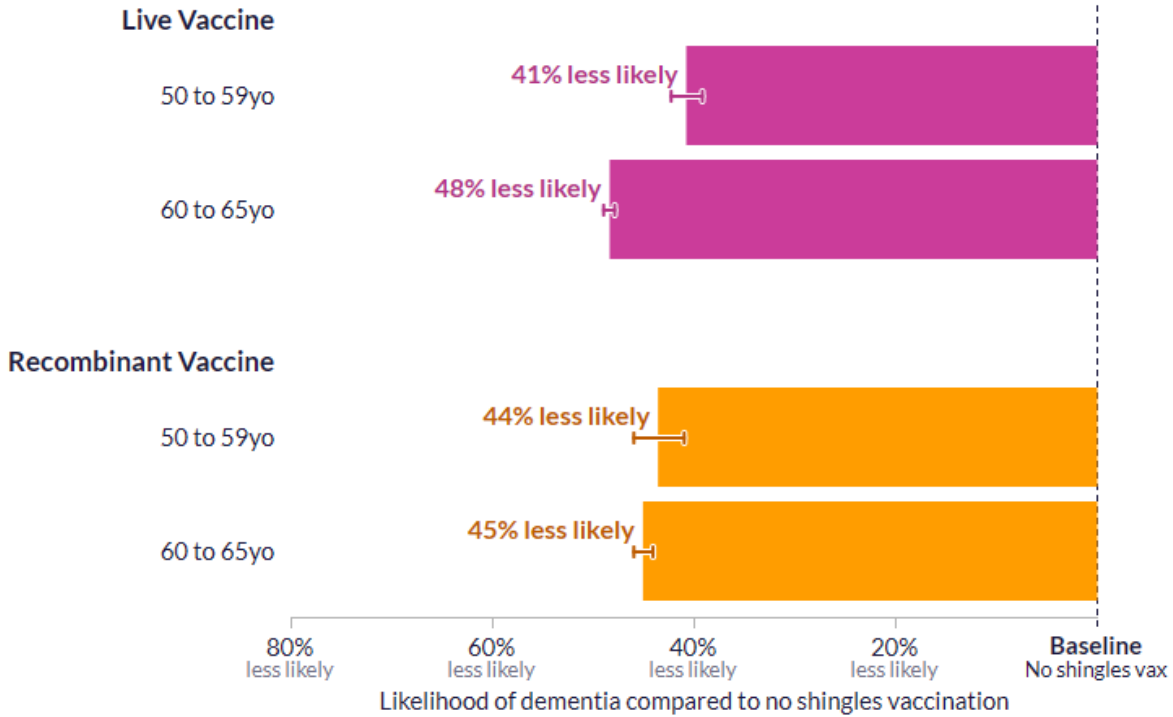
The U.S. Centers for Disease Control and Prevention (CDC) recommends shingles vaccination for all adults aged 50 and older.¹ The recombinant version of the vaccine has been recommended since late 2020 in the United States. Previously, a live (or attenuated) vaccine was recommended.¹ Dementia and Alzheimer's disease are conditions which affect a patient's behavior and memory, with many factors that can contribute to the development of these conditions.²

To understand the relationship between shingles vaccination and the likelihood of developing dementia or Alzheimer's disease, we compared 3,258,533 patients who received the shingles vaccination between ages 50 and 65 to 4,329,780 patients of the same age with no evidence of a shingles vaccination. The vaccination rate in our study population was 42.9%, likely higher than the general population, as we required evidence of a pneumonia or influenza vaccine during the study period. This criteria aimed to ensure that immunizations were reliably captured in the EHR. We tracked dementia or Alzheimer's disease diagnoses after the patient turned 65 and adjusted for patient race, age, Social Vulnerability Index quartile, rural-urban status, legal sex, BMI classification, frequency of care, and various comorbidities.

Compared to patients with no evidence of any shingles vaccine, patients who received the live shingles vaccine between the ages of 50 and 59 were 41% less likely to be diagnosed with dementia after age 65. Patients who received the live vaccine between the ages of 60 and 65 were 48% less likely to be diagnosed with dementia after age 65. Similarly, patients who received the recombinant vaccine were also less likely than unvaccinated patients to be diagnosed with dementia after age 65: 44% less likely if they received it between ages 50 and 59, and 45% less likely if they received it between ages 60 and 65.

Likelihood of Dementia by Shingles Vaccination

■ 95% Confidence Interval



N=6,517,111 patients

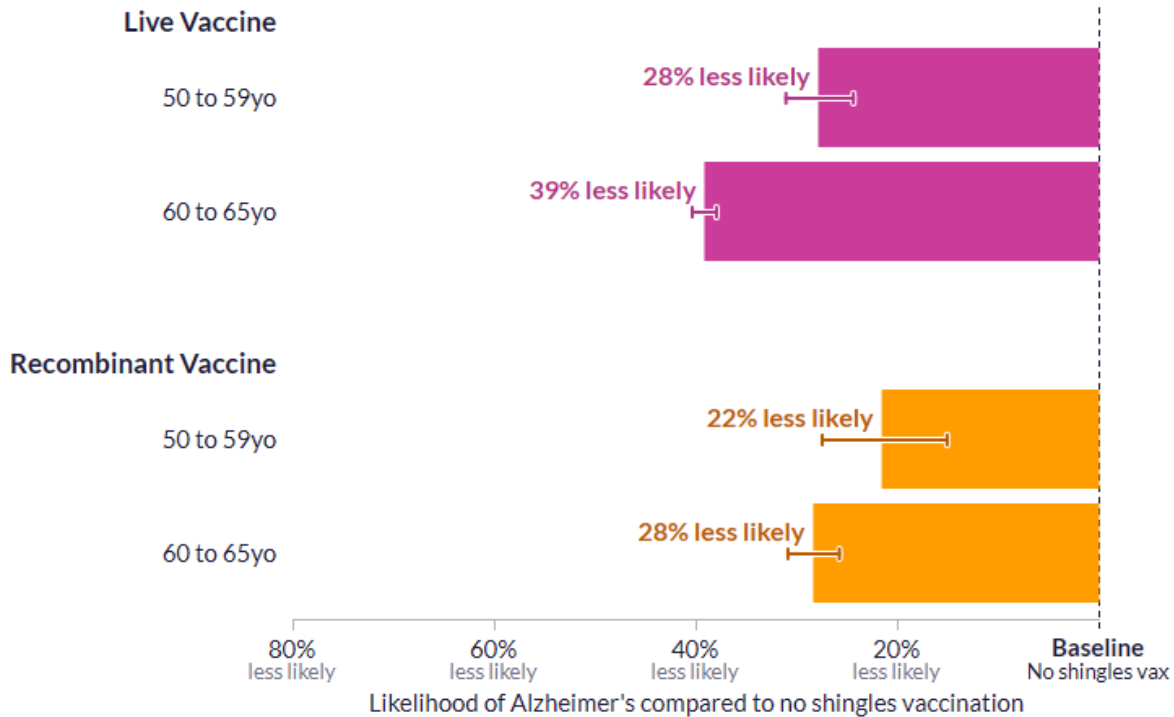
"Likelihood of Dementia by Shingles Vaccination," 2025. EpicResearch.org

Figure 1. Likelihood of a patient being diagnosed with dementia after age 65 by shingles vaccination and age at vaccination.

We also examined the relationship between shingles vaccinations and Alzheimer's diagnoses. Compared to patients who did not have evidence of any shingles vaccine, patients who received the live shingles vaccine between the ages of 50 and 59 were 28% less likely to be diagnosed with Alzheimer's disease after age 65. Patients who received the live vaccine between the ages of 60 and 65 were 39% less likely to be diagnosed with Alzheimer's disease after age 65. Similarly, patients who received the recombinant vaccine were also less likely than unvaccinated patients to be diagnosed with Alzheimer's disease after age 65: 22% less likely if they received it between ages 50 and 59, and 28% less likely if they received it between ages 60 and 65.

Likelihood of Alzheimer's by Shingles Vaccination

■ 95% Confidence Interval



N=6,517,082 patients

"Likelihood of Alzheimer's by Shingles Vaccination," 2025. EpicResearch.org

Figure 2. Likelihood of a patient being diagnosed with Alzheimer's after age 65 by shingles vaccination and age at vaccination.

These data come from Cosmos, a dataset created in collaboration with a community of Epic health systems representing more than 289 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. Shingles vaccine recommendations. U.S. Centers for Disease Control and Prevention. October 22, 2024. <https://www.cdc.gov/shingles/hcp/vaccine-considerations/index.html>. Accessed December 11, 2024.
2. About dementia. U.S. Centers for Disease Control and Prevention. August 17, 2024. <https://www.cdc.gov/alzheimers-dementia/about/index.html>. Accessed January 15, 2025.

Data Definitions

Term	Definition
Study period	1/1/2000 to 11/14/2024
Study population	Case: Patients who received the live or recombinant shingles vaccine, regardless of whether they had also received a pneumonia or influenza vaccine. Control:

	<p>Patients who received a pneumonia or influenza vaccine but did not receive a shingles vaccine</p> <p>Exclusions:</p> <ul style="list-style-type: none"> • Patients with a history of dementia or Alzheimer's disease before age 65
Exposures	<p>Type of vaccine the patient received:</p> <ul style="list-style-type: none"> • Live shingles: CVX code 121 • Recombinant shingles: CVX code 187 • Shingles (type unknown): CVX code 188 • Pneumonia: CVX code 133, 215, 216, 327, 109, 152, or 33 • Influenza: CVX code 160, 205, 168, 197, 135, 161, 166, 149, 111, 186, 171, 320, 153, 185, 155, 231, 201, 202, 200, 194, 158, 150, 141, 140, 15, 16, 88, 166, 151
Outcomes	<p>Conditions the patient developed after age 65:</p> <ul style="list-style-type: none"> • Dementia: ICD-10-CM code F01*, F02*, or F03* • Alzheimer's disease: ICD-10-CM code G30*
Confounders	<p>Race/ethnicity</p> <p>Social Vulnerability Index quintile</p> <p>Legal sex</p> <p>Highest BMI classification during study:</p> <ul style="list-style-type: none"> • Normal: 18.5 to <25 • Overweight: 25 to <30 • Class 1 obesity: 30 to <35 • Class 2 obesity: 35 to <40 • Class 3 obesity: 40+ <p>Prior encounter count between ages 50 and 64</p> <ul style="list-style-type: none"> • <6 • 6-10 • 11-15 • 16-20 • 21-30 • >30 <p>History of a comorbidity</p>
Race and ethnicity	<p>We analyze race and ethnicity by classifying patients as Hispanic (if they have an ethnicity of Hispanic) or Black (if they have a race of Black included).</p>
Social Vulnerability Index	<p>The social vulnerability quintile for the ZIP Code of the patient's most recent address.</p>
Prior encounter	<p>Encounters flagged as outpatient face-to-face, hospital admission, or hospital outpatient.</p>
Comorbidity	<p>Cardiovascular disease: ICD-10-CM code I20*, I21*, I22*, I23*, I24*, I25*, I26*, I27*, I28*, I7*, I50*, I3*, or I4*.</p> <p>CKD: ICD-10-CM code N18*</p> <p>Essential hypertension: ICD-10-CM code I10</p> <p>Diabetes: ICD-10-CM code E10* or E11*</p>

	Cancer: ICD-10-CM code C*
	Psychiatric conditions: ICD-10-CM code F31*, F33*, F34*, or F39*
Model specifications	Cox PH model with patients matched by year of birth.

Table 1: Characteristics of the Study Population Cohort

Category	Subcategory	Patients	Vaccine pts	Control pts	Live Vaccine Pts	Recomb Vaccine Pts
Ethnicity	Hispanic or Latino	385,206	128,605	256,601	58,080	81,856
Ethnicity	Not Hispanic or Latino	7,203,127	3,129,948	4,073,179	1,771,495	1,714,868
Race	Black or African American	864,788	254,490	610,298	124,454	151,477
Race	Not black or African American	6,723,545	3,004,063	3,719,482	1,705,121	1,645,247
Sex	Female	4,284,380	1,085,663	1,903,241	2,381,139	1,041,895
Sex	Male	3,303,953	743,912	1,355,312	1,948,641	754,829
SVI	[.0,.25)	1,926,277	974,345	951,932	561,641	533,407
SVI	[.25,.5)	1,901,119	879,734	1,021,385	500,042	482,043
SVI	[.5,.75)	1,831,477	755,045	1,076,432	423,974	413,130
SVI	[.75,1]	1,870,563	631,339	1,239,224	334,288	358,141
SVI	Unknown	58,897	18,090	40,807	9,630	10,003
Total		7,588,333	3,258,553	4,329,780	1,829,575	1,796,724

Table 2: Likelihood of Dementia and Alzheimer's with Shingles Vaccination

	Dementia Odds Ratio	Dementia Low CI	Dementia High CI	Alzheimer's Odds Ratio	Alzheimer's Low CI	Alzheimer's High CI
Live Vaccine						
60 to 65yo	0.516	0.510	0.521	0.608	0.596	0.620
50 to 59yo	0.592	0.577	0.608	0.721	0.689	0.756
Recombinant Vaccine						
60 to 65yo	0.549	0.540	0.559	0.716	0.691	0.742
50 to 59yo	0.564	0.540	0.590	0.784	0.725	0.849