

Real-world assessment of patient factors that impact respiratory vaccine rate variability in patients with solid organ tumors (2023-2025)

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BACKGROUND

Patients with solid organ tumors are at increased risk for respiratory infections due to cancer-related immune dysfunction, antineoplastic therapies, advanced age, and multiple chronic comorbid conditions. These infections are associated with increased morbidity, healthcare utilization, treatment interruptions, hospitalization, and mortality.¹

National organizations including the Centers for Disease Control and Prevention (CDC) and National Comprehensive Cancer Network (NCCN) recommend routine vaccination against influenza, COVID-19, pneumococcal disease, and, when eligible, respiratory syncytial virus (RSV) among patients with cancer.² Despite these recommendations, vaccination uptake remains suboptimal across oncology populations, leaving many patients vulnerable to preventable infectious complications.³

Comorbidity burden may further influence vaccination needs and utilization, as patients with multiple chronic conditions may have increased susceptibility to severe respiratory infections while also facing additional complexities in preventive care.

Although prior studies have described respiratory vaccination rates among patients with solid organ tumors, limited real-world evidence exists regarding the relationship between patient characteristics, comorbidity burden, and vaccine utilization.⁴

Understanding these patterns may help identify gaps in preventive care and inform managed care strategies to improve vaccination uptake among patients with solid organ tumors.

OBJECTIVE

To evaluate respiratory vaccination rate among patients with solid organ tumors and assess associations between patient

characteristics, including comorbidity burden, using real-world pharmacy claims data.

METHODS

A retrospective cohort analysis was conducted using VytlOne commercial PBM pharmacy claims data from January 1, 2023 through December 31, 2025.

Study Population

- Adults aged 18 years or older with breast, colorectal, lung, or prostate cancer were identified using ICD-10 diagnosis data present in claims data.

Vaccination Assessment

- Respiratory vaccination status was identified using pharmacy claims for influenza, COVID-19, pneumococcal, and RSV vaccines. Patients with evidence of at least one qualifying vaccination during the study period were classified as vaccinated.

Patient Characteristics

- Patient characteristics evaluated included age, sex, solid tumor type, and comorbidity burden.

Comorbidity Burden Assessment

- Comorbidity burden was estimated using medication claims after excluding predefined therapeutic classes.

Statistical Analysis

- Descriptive analyses evaluated vaccination patterns by demographic characteristics, tumor type, and comorbidity burden.

RESULTS

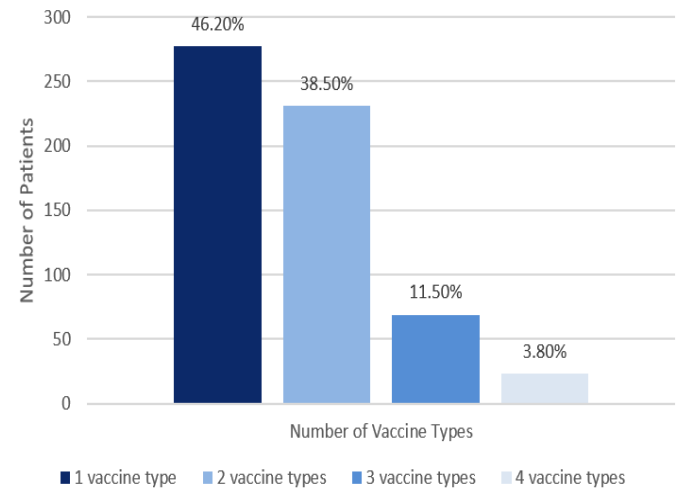
Among patients with solid organ tumors, 601(28.1%) had evidence of receiving at least one respiratory vaccination during the study period; 1,538 (71.9%) had no qualifying respiratory vaccination identified.

Table 1: Overall Vaccinated Percent		
Status	Patients	%
Vaccinated	601	28.1%
Not vaccinated	1,538	71.9%
Total	2139	100%

Vaccination uptake increased with age, from 19.5% among patients aged 19–45 years to 38.8% among those older than 65 years. Vaccination rates were similar between males (28.4%) and females (27.9%).

Table 2: Vaccination Uptake by Age			
Age group	Total Patients	# of Vaccinated	%
19 to 45	205	40	19.5%
46 to 65	1,396	352	25.2%
Older than 65	538	209	38.8%

Vaccination update by age, Table 2
Respiratory vaccination rate increased with age while the variation between male and female were minimal.



Multi respiratory vaccine type data, Chart 1
Overall, 15.3% of vaccinated patients received three or more respiratory vaccines.

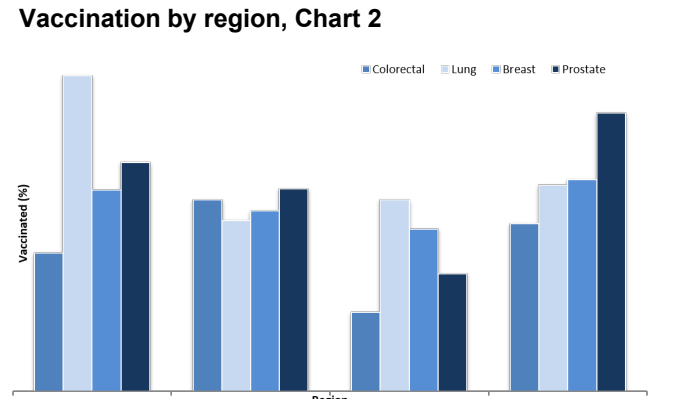
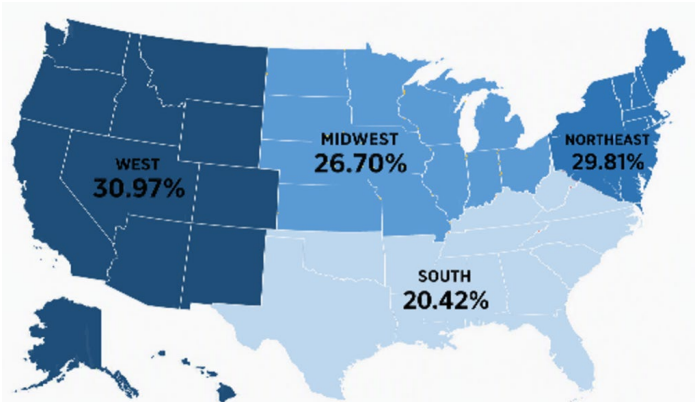
Among vaccinated patients with respiratory vaccine data (n=600), 46.2% received one of the four vaccine types, 38.5% received two, 11.5% received three, and 3.8% received all four vaccination types.

Table 3: Vaccination Rate by Tumor Type				
Tumor Type	Total Patients	Vaccinated	Un vaccinated	Vaccination Rate
Breast	1,345	373	972	27.7%
Prostate	402	121	281	30.1%
Lung	218	70	148	32.1%
Colorectal	174	37	137	21.3%

Vaccination rate by tumor type, Table 3
Vaccination rate varied across diagnosis with the highest rate of respiratory vaccination seen in lung cancer patients.

Table 4: Comorbidity Burden by Tumor Type			
Tumor type (ICD-10)	Range	% Vaccinated	% Unvaccinated
Colorectal (C18)	0 to 2	43.2%	70.1%
	3 to 5	43.2%	27.0%
	6 or more	13.5%	2.9%
Lung (C34)	0 to 2	25.7%	51.4%
	3 to 5	54.3%	39.9%
	6 or more	20.0%	8.8%
Breast (C50)	0 to 2	56.8%	70.7%
	3 to 5	35.9%	25.5%
	6 or more	7.2%	3.8%
Prostate (C61)	0 to 2	45.5%	63.4%
	3 to 5	44.6%	34.2%
	6 or more	9.9%	2.5%

Comorbidity burden by tumor type and vaccination status, Table 4
Across all tumor types, vaccinated patients showed greater comorbidity burden versus unvaccinated patients.



Vaccination by region by tumor type, Chart 3
Regional differences in vaccination uptake were observed. Overall uptake was highest in the West (31.0%) and lowest in the South (20.4%). Tumor-specific uptake was highest for lung cancer in the Northeast (47.1%) and South (28.6%) while prostate cancer had the highest uptake in the Midwest (30.2%) and West (41.5%).

CONCLUSIONS

- Respiratory vaccination uptake remained low in this real-world oncology population, with only 28.1% of patients receiving at least one of the four respiratory vaccine types evaluated.
- Vaccination uptake increased with age and was similar between males and females, suggesting age was a more prominent demographic differentiator than sex in this cohort.
- Among vaccinated patients, broader vaccine coverage was uncommon; only 15.3% received three or more vaccine types during the study period.

- Vaccinated patients consistently demonstrated greater moderate-to-high comorbidity burden across tumor types, with the largest difference observed among patients with lung cancer.
- These findings identify opportunities to improve respiratory vaccine coverage, particularly among younger patients and those with lower comorbidity burden and may help inform targeted managed care outreach within oncology populations.
- Improving respiratory vaccine uptake in these populations may prevent avoidable respiratory-related hospitalizations, reduce associated acute care costs, and help patients on active cancer therapy avoid treatment delays and interruptions.

LIMITATIONS

- Vaccine status was based on VytlOne PBM pharmacy claims and may not capture all vaccinations received.
- Comorbidity burden was estimated from medication claims and may not fully reflect clinical complexity.
- The descriptive analysis identifies patterns and associations but cannot establish causality.
- Differences in vaccine eligibility and recommendations may affect interpretation of uptake across vaccine categories.

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