

Hospitalizations for Flu and Its Complications Higher in the 2024/2025 Season Than Other Recent Flu Seasons

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Key Findings:

- Hospitalization rates in the 30 days following an influenza infection have risen in recent seasons, from 4.9% in 2022/2023, 5.6% in 2023/2024, and 7.0% in 2024/2025. Before the COVID-19 pandemic, rates trended slightly down, reaching 4.2% in the 2019/2020 season.
- 35.9% of patients with confirmed influenza in the 2023/2024 season and 35.0% of patients with confirmed influenza in the 2024/2025 season visited the emergency department (ED) within 30 days of their influenza infection—the highest rates in the past 12 seasons.

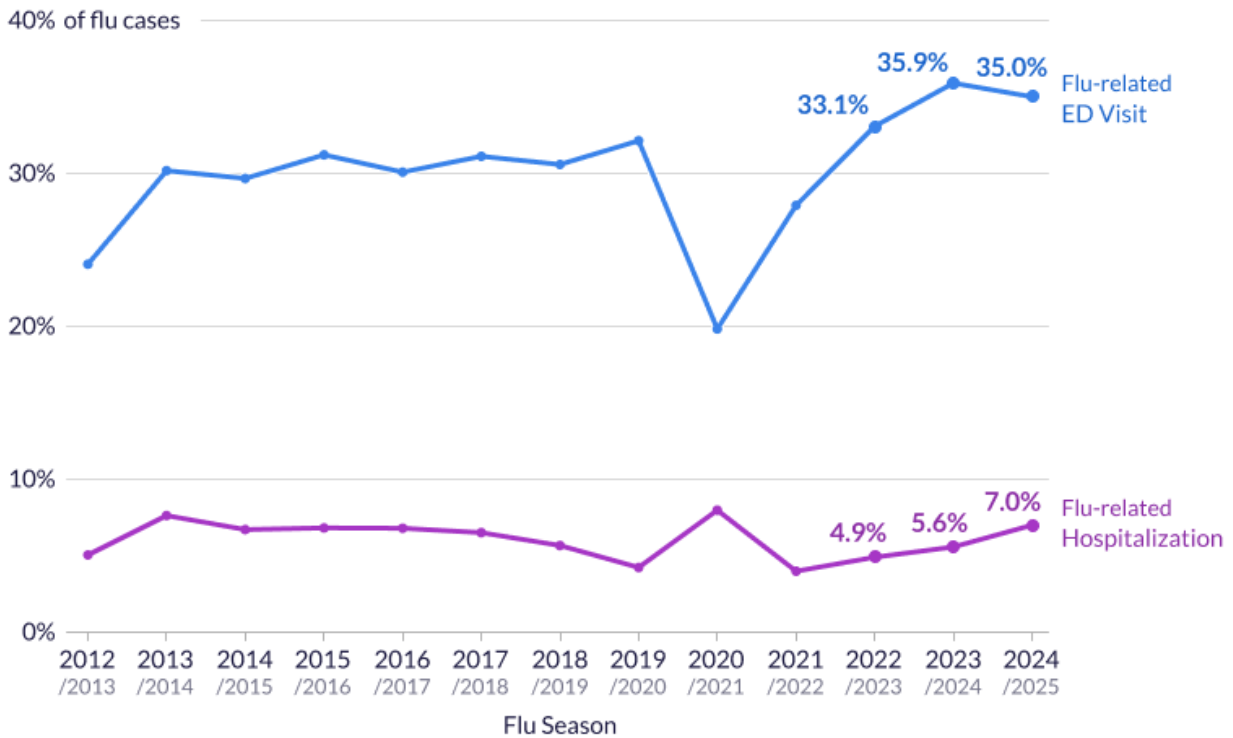
Seasonal influenza remains a significant contributor to healthcare burden in the United States, causing annual spikes in emergency department visits and hospitalizations. While year-to-year variability is common, broader shifts have occurred in recent seasons. In particular, the aftermath of the COVID-19 pandemic brought about changes in public health behaviors, population immunity, and viral circulation patterns. Amid these changes, early reports from the 2024/2025 flu season suggested more severe presentations and higher demand for acute care services.¹ This study was designed to quantify recent trends in flu-related emergency department visits, hospitalizations, and complications, building on more than a decade of data to contextualize the current season within historical patterns.

We examined data from 11 million patients with medically attended influenza infections recorded between August 1, 2013, and April 19, 2025. An influenza infection was identified by a positive lab test or a clinical diagnosis of flu. We then looked for a flu-related hospitalization or emergency department (ED) visit within the following 30 days, which were defined as those with an influenza diagnosis or a secondary condition commonly associated with an influenza infection, including COPD, heart failure, and acute necrotizing hemorrhagic encephalopathy.

Over the past 12 flu seasons, the rate of flu-related ED visits has been the highest in the three most recent seasons. In 2022/2023, 33.1% of patients with influenza visited the ED within 30 days of the infection. This increased slightly to 35.9% in 2023/2024 and remained elevated at 35.0% in 2024/2025. For comparison, just 24.1% of patients visited the ED within 30 days of infection in the 2012/2013 season, highlighting the substantial rise in acute care use in recent years.

Similarly, the proportion of patients hospitalized within 30 days of a flu infection has risen in recent seasons. In the 2022/2023 season, 4.9% of patients were hospitalized within 30 days of a flu infection. This increased to 5.6% in 2023/2024 and further to 7.0% in 2024/2025.

Flu-Related Hospitalization and ED Visit Rates



N=11,007,247 flu cases

"Flu-Related Hospitalization and ED Visit Rates," 2025. EpicResearch.org

Figure 1. The annual rate of flu-related hospitalizations and ED visits within 30 days of a positive flu test or flu diagnosis.

These data come from Cosmos, a dataset created in collaboration with a community of Epic health systems representing more than 299 million patient records from 1,700 hospitals and more than 40,000 clinics from all 50 U.S. 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. Preliminary estimated flu disease burden 2024-2025 flu season. U.S. Centers for Disease Control and Prevention. March 28, 2025. <https://www.cdc.gov/flu-burden/php/data-vis/2024-2025.html>. Accessed April 3, 2025.

Data Definitions

Term	Definition
Study period	8/1/2013 to 4/19/2025
Study population	Patients with: <ul style="list-style-type: none"> • An influenza infection during the study period with no influenza infection documentation in the 30 days prior • A current U.S. residence • A legal sex of male or female

	For infections to be included, the contributing organization must have contributed encounter data for at least 40 days beyond the infection date for follow-up tracking and organizations must contribute data through at least 10/1/2024.
Influenza Season	August through July of the following year, except for the 2024/2025 season which went through April 19
Outcomes	Instances where the patient develops the following on their flu infection date or in the 30 days that follow: <ol style="list-style-type: none"> 1. Flu-related hospitalization 2. Flu-related emergency department visit
Confounders	Age (< 30 days, 1-12 months, 1-4 years, 5-12 years, 13-17 years, 18-64 years, 65-79 years, 80+ years) Legal Sex Social Vulnerability Index quartile RUCA (Metropolitan, Micropolitan, Small Town, Rural) Race and ethnicity Pregnancy during infection Highest BMI within a year before or after index date <ul style="list-style-type: none"> • <40 • 40+ • Not documented Influenza vaccination in current flu season prior to index date (Y/N) History of asthma: a diagnosis with ICD-10-CM code J45* History of diabetes: a diagnosis with ICD-10-CM code E10*-E11* History of HIV: a diagnosis with ICD-10-CM code B20 History of hypertension: a diagnosis with ICD-10-CM code I10 History of liver disease: a diagnosis with SNOMED code 233604007 History of kidney disease: a diagnosis with ICD-10-CM code N18* History of heart disease: a diagnosis with ICD-10-CM code J41*-J44*
Influenza infection	Evidence of one of the following: <ul style="list-style-type: none"> • Positive influenza lab: A value of “Positive,” “Detected,” “Present,” or “Influenza A virus positive” or an abnormal flag to a lab mapped to LOINC 86318-3, 85821-7, 85802-7, 85803-5, 85804-3, 85805-0, 85801-9, 23102-7, 23104-3, 44564-3, 15472-4, 44575-9, 46082-4, 46083-2, 5860-2, 6435-2, 5864-4, 6439-4, 5862-8, 6437-8, 5866-9, 6441-0, 80381-7, 72366-8, 72356-9, 72367-6, 80382-5, 80383-3, 72365-0, 61102-0, 77383-8, 77384-6, 44559-3, 44572-6, 49529-1, 50701-2, 49522-6, 49534-1, 44560-1, 44573-4, 44558-5, 44571-8, 88904-8, 88905-5, 5861-0, 6436-0, 5865-1, 6440-2, 86565-9, 23781-8, 88194-6, 44561-9, 44574-2, 5863-6, 6438-6, 6442-8, 5867-7, 29721-8, 22828-8, 22825-4, 23769-3, 23782-6, 31821-2, 31822-0, 31823-8, 50697-2, 44562-7, 44563-5, 43874-7, 31858-4, 31859-2, 44566-8, 44567-6, 33535-6, 31860-0, 24015-0, 31861-8, 31862-6, 54240-7, 44576-7, 54241-5, 44577-5, 43895-2, 31863-4, 31864-2, 31865-9, 88200-1, 88568-1, 91772-4, 6602-7, 6601-9, 6603-5, 6604-3, 48310-7, 94600-4, 38382-8, 80204-1, 49538-2, 85535-3, 54242-3, 54244-9, 49530-9, 100973-7, 100974-5, 82168-6, 82166-0, 82167-8, 82169-4, 82170-2, 92977-8, 92976-0, 101293-9,

	<p>101292-1, 101294-7, 101295-4, 90455-7, 90456-5, 81233-9, 88601-0, 92882-0, 90457-3, 55466-7, 97733-0, 44264-0, 44265-7, 44266-5, 56024-3, 44263-2, 59424-2, 59423-4, 60494-2, 53250-7, 53251-5, 88187-0, 55133-3, 55134-1, 49537-4, 95423-0, 91072-9, 91771-6, 82461-5, 22827-0, 48509-4, 39102-9, 39103-7, 55463-4, 74784-0, 51668-2, 62493-2, 76077-7, 76079-3, 88193-8, 88195-3, 86568-3, 86571-7, 49526-7, 60530-3, 49531-7, 49520-0, 49523-4, 49527-5, 50700-4, 49535-8, 60267-2, 76078-5, 77028-9, 77026-3, 77027-1, 80588-7, 80589-5, 80590-3, 76080-1, 80591-1, 88600-2, 88596-2, 92142-9, 101423-2, 101424-0, 101983-5, 81428-5, 92141-1, 94395-1, 94396-9, 94394-4, 88599-6, 88592-1, 92809-3, 92808-5, 85477-8, 85478-6, 100344-1, 100343-3, 86569-1, 86572-5, 55465-9, 38381-0, 49521-8, 57985-4, 49524-2, 44795-3, 38272-1, 68986-9, 68987-7, 38271-3, 38270-5, 49528-3, 99623-1, 34487-9, 55464-2, 62462-7, 60538-6, 95658-1, 103787-8, 40982-1, 62860-2, 74785-7, 74786-5, 81305-5, 81308-9, 81307-1, 81309-7, 81327-9, 81325-3, 86317-5, 74038-1, 74039-9, 77605-4, 74040-7, 88835-4, 90886-3, 85526-2, 90885-5, 81320-4, 81321-2, 44091-7, 74787-3, 40981-3, 54243-1, 87715-9, 39025-2, 49532-5, 87714-2, 50702-0, 87716-7, 61101-2, 50705-3, 93762-3, 93763-1, 50704-6, 93761-5, 93760-7, 93759-9, 50706-1, 50707-9, 50708-7, 50711-1, 85532-0, or 49536-6</p> <ul style="list-style-type: none"> • A diagnosis with ICD-10-CM code J09*-J11*
Influenza-related hospitalizations or ED visits	Hospitalization or ED visit in the 30 days following influenza infection with diagnosis of influenza or influenza-related complication
Influenza-related complications	Diagnosis of COPD , heart failure , or acute necrotizing hemorrhagic encephalopathy
Race and ethnicity	Non-exclusive flag for Hispanic ethnicity and race of Black and Asian
Influenza vaccination	A vaccine with CVX codes 160, 205, 168, 197, 135, 161, 166, 149, 111, 186, 171, 320, 153, 185, 155, 231, 201, 202, 200, 194, 158, 150, 141, or 140
COPD	A diagnosis with ICD-10-CM code J41*-J44*
Heart failure	A diagnosis with ICD-10-CM code I11.0, I13.0, or I50*
Acute necrotizing hemorrhagic encephalopathy	A diagnosis with ICD-10-CM code G04.30, G04.31, or G04.39
Model specifications	Raw rates of influenza-related ED visits and admissions Logistic regression with outcomes of influenza-related ED visits and admissions
Limitations	2024/2025 season incomplete

Table 1: Flu-Related Hospitalization and ED Visit Rates

	2012	2013	2014	2015	2016	2017	2018
ED Visit	24.1%	30.2%	29.7%	31.2%	30.1%	31.1%	30.6%
Hospitalization	5.1%	7.6%	6.7%	6.8%	6.8%	6.5%	5.7%

	2019	2020	2021	2022	2023	2024
ED Visit	32.1%	19.8%	27.9%	33.1%	35.9%	35.0%
Hospitalization	4.2%	8.0%	4.0%	4.9%	5.6%	7.0%