NEJM Evidence

Published January 16, 2026

DOI: 10.1056/EVIDpha2500136

PUBLIC HEALTH ALERTS | IN PARTNERSHIP WITH CIDRAP

Seasonal Influenza Activity, Vaccination Rates, and Pediatric Influenza Mortality, Massachusetts 2024–2025

Catherine M. Brown, D.V.M., M.Sc., M.P.H.,[1] Carley Perez Kauffman, M.P.H.,[1] Victoria Carroll, M.P.H.,[1] Spencer C. Cunningham, M.P.H.,[1] Rosa Ergas, M.P.H.,[1] Joyce Cohen, M.P.H.,[1] Mia Haddad, M.P.H.,[1] Erika Buzby,[1] Juliana Jacoboski, M.P.H.,[1] Stephanie Ash,[1] Elizabeth Russo, M.D.,[1] Peter Breen,[1] Joshua Norville, M.P.H.,[1] Seana Cofsky,[1] Andrew Tibbs, M.P.H.,[1] Eric Fahim,[1] Joshua Hall,[1] Sandra Masson,[1] Ramesh Jadi, Ph.D.,[1] Sanjib Bhattacharyya, Ph.D.,[1] Angela Fowler, M.D., M.P.H.,[1] Nicolas Epie, Ph.D., H.C.L.D., T.S.(A.B.B.), M.L.S.(A.S.C.P.),[1] Lawrence C. Madoff, M.D.,[1] and Robert H. Goldstein, M.D., Ph.D.[1]

Abstract

To inform public health actions during the current influenza season, the authors describe activity, vaccination, and pediatric mortality during the 2024–2025 influenza season in Massachusetts using public health surveillance data. Influenza activity was elevated, as measured by influenza-like illness, emergency department visits, and hospitalizations. Vaccination coverage was low in pediatric patients but remained high in people 65 years of age and older. There were 10 reported pediatric deaths; 7 of those occurred among children with preexisting conditions; 8 of 10 had not received that year's influenza vaccination.

The Public Health Alerts section in *NEJM Evidence* is in partnership with the Center for Infectious Disease Research and Policy (CIDRAP) at the University of Minnesota.

Introduction

Prior to the coronavirus disease 2019 (Covid-19) pandemic, seasonal influenza activity in Massachusetts was tracked from early October through the end of May. Our influenza surveillance system consists of influenza-like illness (ILI) reporting by sentinel sites; electronic laboratory reporting of influenza-positive polymerase chain reaction tests; influenza-associated hospitalizations connected with emergency department (ED) visits; and testing of samples submitted by hospital laboratories for influenza subtyping, identification of other circulating respiratory viruses, and antiviral resistance screening. Beginning in the period 2020–2021, this surveillance was incorporated into year-round viral respiratory illness surveillance focused on Covid-19, influenza, and respiratory syncytial virus (RSV). Vaccine administration data reported to the Immunization Information Systems are used to calculate coverage.

The author affiliation is listed at the end of the article.

Catherine M. Brown can be contacted at catherine.brown@mass.gov.

Surveillance and Outcomes

SEASONAL INFLUENZA ACTIVITY[1]

The percentage of visits for ILI reported by sentinel sites during the 2024–2025 season in Massachusetts peaked at almost 12% in early February, 2025, and remained above the epidemic threshold until mid-April. This was the highest rate of ILI in Massachusetts as far back as data are accessible (2001–2002), including when compared with seasonal peaks since 2019 (Figure 1A). Hospitalizations identified in ED data associated with influenza diagnosis peaked at 10.4%, more than 1.5 times greater than the next highest peak during the five previous seasons (Figure 1B).

Among people 20–64 years of age, ED visits for influenza, i.e., the "base-rate", peaked at 66.8 per 100,000 population. Individuals 65–79 years of age presented to the ED at a rate of 1.6 times (108.7 per 100,000) that rate, and those 80 years of age and over presented at a rate 3 times (199.9 per 100,000) higher. Children 5–19 years of age presented to the ED at a rate of 135.9 per 100,000, but children under 5 years of age presented at a rate of 298.7 per 100,000, 4.5 times the base rate (Figure 1C).

Hospitalization rates for influenza were highest among those 80 years of age and older (143.5 per 100,000) and individuals 65–79 years of age (58 per 100,000). Those 50–64 years of age were hospitalized at a rate of 19 per 100,000, those under 5 years of age were hospitalized at a rate of 16.8 per 100,000, and those 5–49 years of age were hospitalized at rates between 5.1 and 7.6 per 100,000. Although not tracked routinely, there were 15 known hospitalizations for influenza-associated encephalopathy in children (10 children were unvaccinated and 5 were vaccinated).

Influenza surveillance testing conducted through the State Public Health Laboratory showed that influenza A subtypes were predominant (H3N2 slightly more than pdm2009H1N1); the proportion of influenza B increased in March and April. No variant H3N2 or H5N1 avian influenza subtypes were detected.

MORTALITY

Deaths associated with influenza infection are reported every year in Massachusetts, with total reported deaths across all age groups ranging from 18 during the 2020–2021 season to 441 during the 2024–2025 season. Ten of these were pediatric influenza deaths, the highest number since before the 2009 H1N1 pandemic (Figure 1D).

Of these 10 deaths, 5 occurred in boys and 5 in girls; no race or ethnicity predominated (Asian, one child; Black non-Hispanic, one child; Black Hispanic, one child; White non-Hispanic, two children; White Hispanic, two children; other Hispanic, two children; and unknown, one child). Four children were 6 months to 5 years of age, two were 6–10 years of age, three were 11–15 years of age, and one was 16–18 years of age. Seven children were reported to have had chronic medical conditions; four of them had coinfections identified through laboratory testing. Three children without reported chronic conditions also had identified coinfections. Although most children had received vaccines in previous years, only two received a current vaccine. Only one of the seven children with comorbidities, and therefore at highest risk for severe disease, was up to date with influenza vaccination.

Pediatric deaths associated with influenza virus infections alone occurred with unspecified influenza A, A H3, and B viruses in three children; all three of these children were reported to have had preexisting medical conditions. Pediatric patients who were identified as having more than one infection had isolates for influenza H3, influenza H1, RSV, human coronaviruses (HCoV-OC43, HCoV-NL63, and SARS-CoV-2), adenovirus, rhinovirus/enteroviruses, *Mycoplasma pneumoniae*, and *Streptococcus pneumoniae*. RSV was the coinfection identified in most deaths (50%). The largest number of coinfections identified in a single child was five.

VACCINATION

Overall, the rates of influenza vaccination in Massachusetts in the 2024–2025 season were comparatively lower than in the most recent previous seasons (2019–2024). By mid-April 2025, 40.4% of Massachusetts residents had received a flu vaccine. Vaccination coverage varied considerably by age group and by season (Table 1).

Conclusion

Following five seasons of decreased influenza activity, most likely due to a combination of competition from SARS-CoV-2 and the increased use of respiratory illness prevention measures during those years, influenza activity was substantially increased during the 2024–2025 season, as measured by both ILI and influenza-associated hospitalization rates.

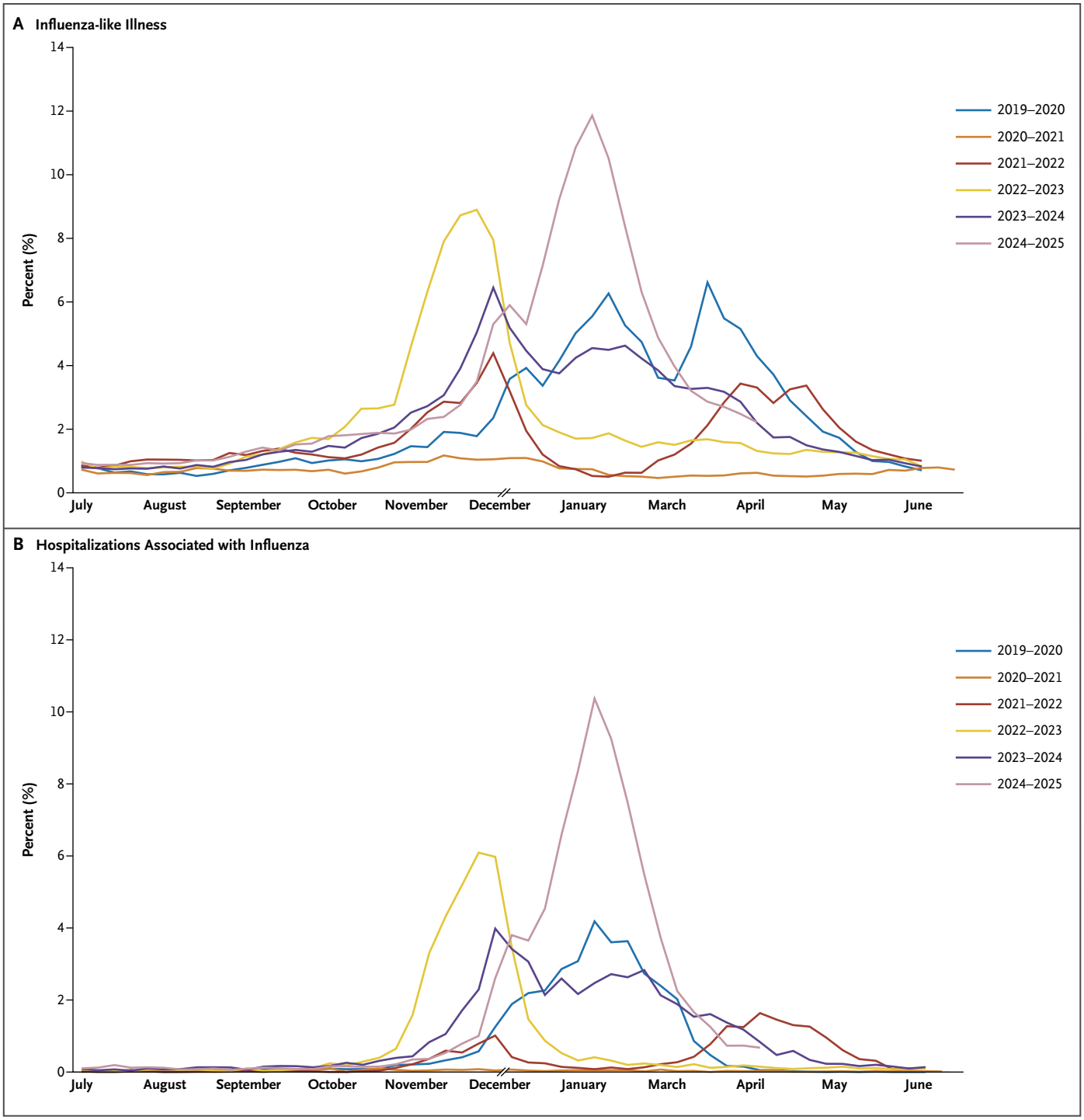

Figure 1. Health Care Visits and Pediatric Mortality During the 2024–2025 Influenza Season in Massachusetts.

Panel A shows the percentage of influenza-like illness visits reported by sentinel sites by influenza season in Massachusetts. Panel B shows the percentage of hospitalizations associated with influenza, as reported by emergency departments, by season in Massachusetts. Panel C shows the rate of emergency department visits associated with influenza by age group per 100,000 population in Massachusetts. Panel D shows the number of pediatric deaths associated with influenza, reported by season, in Massachusetts. In Panel D, the data shown includes pediatric deaths between September 1 and May 1 for all seasons except 2009–2010. This includes all deaths reported from March 1, 2009, to August 1, 2010, to account for all deaths during the H1N1 pandemic.

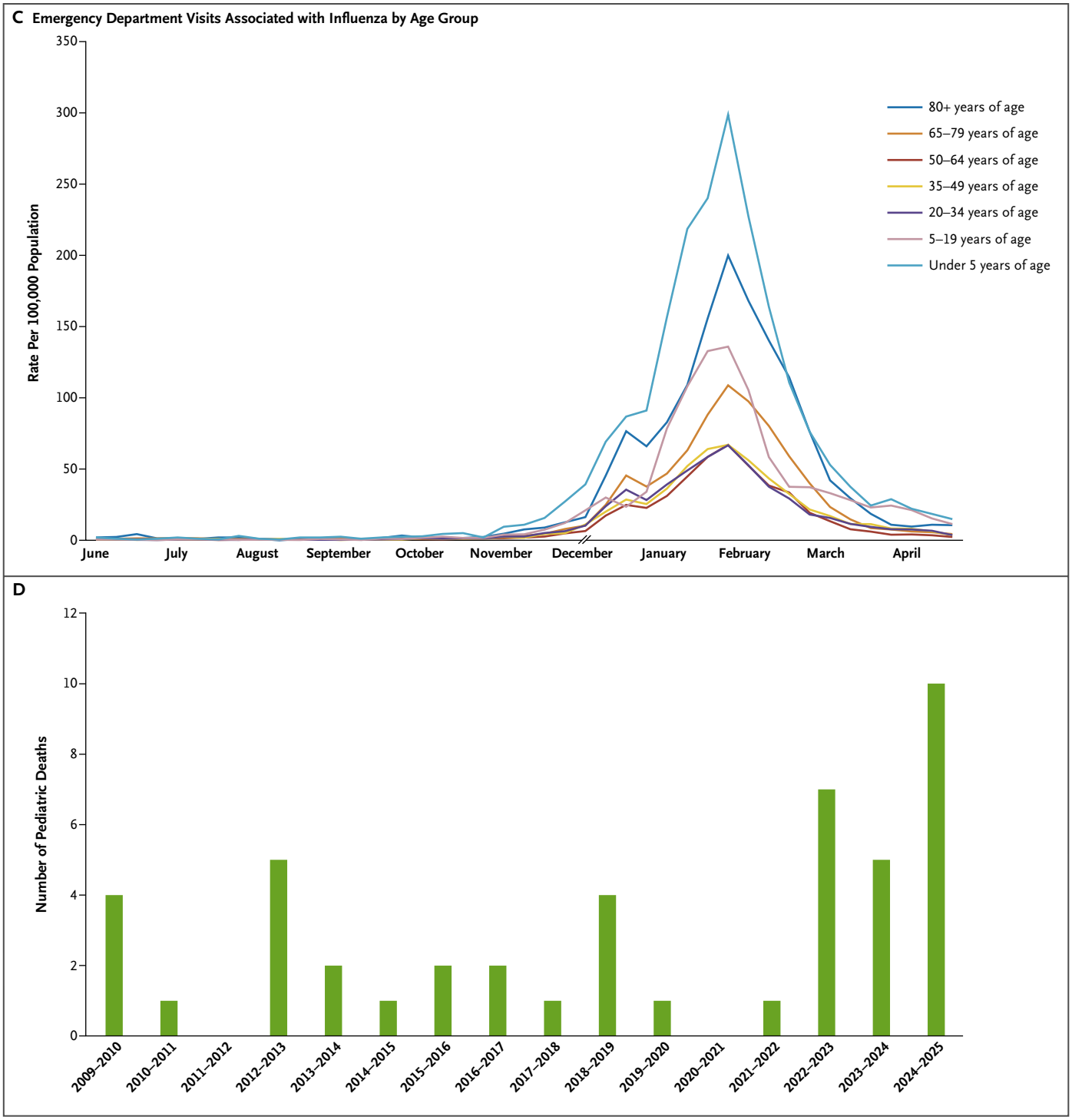

Figure 1. (*Continued*)

Prior to the 2022–2023 season, pediatric mortality surveillance relied solely on health care provider reporting. Recently, case ascertainment has been improved by adding death certificate review, which most likely contributed to an increase in numbers. Although pediatric deaths from influenza are rare, evidence of decreased vaccine coverage in this age group, combined with higher disease incidence, most likely contributed to the increase in pediatric influenza

Table 1. Cumulative Influenza Vaccination Rates by Age Group and Season in Massachusetts.

	Age Group (Years)						
Influenza Season	**<5 (%)**	**5–19 (%)**	**20–34 (%)**	**35–49 (%)**	**50–64 (%)**	**65–79 (%)**	**80+ (%)**
2019–2020	67.3	47.4	24.1	28.8	37.1	53.9	51.1
2020–2021	70.0	63.7	28.8	35.6	44.3	61.6	56.1
2021–2022	60.9	47.6	30.5	37.5	46.6	70.8	65.7
2022–2023	55.8	43.8	29.6	36.8	45.7	73.9	69.5
2023–2024	51.8	39.8	27.0	33.0	40.0	71.3	71.3
2024–2025	49.5	38.4	26.0	32.1	37.4	71.5	72.4

infections presenting to the ED, and at least partially contributed to the number of pediatric deaths reported last season. The proportion of pediatric deaths with evidence of multiple coinfections is consistent with previous work indicating that SARS-CoV-2 and influenza coinfections can cause more severe disease than infection with either virus alone.[2] However, overall, the effect of viral respiratory coinfections on disease severity in children remains unclear.

Increasing vaccine confidence around all vaccines, including for influenza, is a priority. These data suggest the need for focused vaccination efforts in higher-risk pediatric populations. In addition, providers should consider testing for multiple respiratory pathogens in children with acute respiratory disease who may be at higher risk for severe illness. These considerations can be guided by local surveillance data about the extent of circulation of respiratory viruses.

Disclosures

Author disclosures are available at evidence.nejm.org.

Author Affiliation

[1] Massachusetts Department of Public Health, Boston, MA, USA

References

1. Massachusetts Department of Public Health. Viral respiratory illness reporting. 2025 (https://www.mass.gov/info-details/viral-respiratory-illness-reporting).

2. Adams K, Tastad KJ, Huang S, et al. Prevalence of SARS-CoV-2 and influenza coinfection and clinical characteristics among children and adolescents aged <18 years who were hospitalized or died with influenza — United States, 2021–22 influenza season. MMWR Morb Mortal Wkly Rep 2022;71:1589-1596. DOI: 10.15585/mmwr.mm7150a4.