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Pediatric Influenza-Associated Encephalopathy and Acute Necrotizing Encephalopathy — United States, 2024–25 Influenza Season

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Abstract

In January 2025, CDC received several reports of deaths among children aged <18 years with a severe form of influenza-associated encephalopathy (IAE) termed acute necrotizing encephalopathy (ANE). Because no national surveillance for IAE currently exists, CDC requested notification of U.S. pediatric IAE cases from clinicians and health departments during the 2024–25 influenza season, a high-severity season with a record number of pediatric influenza-associated deaths. Among 192 reports of suspected IAE submitted to CDC, 109 (57%) were categorized as IAE, 37 (34%) of which were subcategorized as ANE, and 72 (66%) as other IAE; 82 reports did not meet IAE criteria and were categorized as other influenza-associated neurologic disease. The median age of children with IAE was 5 years and 55% were previously healthy, 74% were admitted to an intensive care unit, and 19% died; 41% of children with ANE died. Only 16% of children with IAE who were vaccination-eligible had received the 2024–25 influenza vaccine. Health care providers should consider IAE in children with encephalopathy or altered level of consciousness and a recent or current febrile illness when influenza viruses are circulating. Annual influenza vaccination is recommended for all children aged ≥6 months to prevent influenza and associated complications, potentially including severe neurologic disease such as IAE and ANE.

Introduction

The 2024–25 influenza season was historically severe with the highest number of pediatric influenza-associated deaths reported during a seasonal influenza epidemic since U.S. surveillance for these deaths began in 2004 (excluding the 2009–10 influenza A(H1N1)pdm09 pandemic). No U.S.

Continuing Education examination available at https://www.cdc.gov/mmwr/mmwr_continuingEducation.html

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surveillance for neurologic complications of influenza exists. Influenza-associated encephalopathy (IAE), a recognized complication of influenza, refers to neurologic syndromes triggered by influenza virus infection of the respiratory tract, resulting in a dysregulated host inflammatory response and leading to varying degrees of brain dysfunction (*1*,*2*). One of the most severe forms of IAE is acute necrotizing encephalopathy (ANE), a condition that disproportionately affects children and is characterized by rapid neurologic decline and neuroimaging with evidence of necrosis or hemorrhage involving the thalami; ANE has a poor prognosis and can result in lasting neurologic sequelae or death (*2*,*3*).

In January 2025, CDC was alerted to several deaths of children with influenza-associated ANE (*4*). In response, CDC requested notification from clinicians and health departments of possible cases of pediatric IAE, including influenza-associated ANE, to better characterize these syndromes in the U.S. during the 2024–25 influenza season. This report describes cases reported in response to CDC's request.

Methods

Data Collection

On February 28, 2025, CDC released a call for cases of IAE in persons aged <18 years via the Epidemic Information Exchange | Epi-X, asking clinicians and health departments to contact CDC if cases fulfilled CDC's IAE surveillance criteria (Box) (*4*). Case report forms[†] were completed by clinicians, public health practitioners, and partners from CDC-sponsored surveillance networks (i.e., FluSurv-NET | FluView, New Vaccine Surveillance Network | NVSN, and Influenza-Associated Pediatric Mortality | CDC) if surveillance criteria were met and electronic health record (EHR) data were available.

Case Categorization

Neuroimaging findings and discharge diagnoses underwent review by a physician to categorize cases as IAE or influenza-associated neurologic disease. IAE cases were subcategorized into ANE (those with compatible neuroimaging findings or an ANE discharge diagnosis) or other IAE. ANE cases were defined as probable if neuroimaging reports described bilateral thalamic inflammatory lesions and possible if the patient received a discharge diagnosis[§] of ANE without these neuroimaging findings. IAE cases that did not fulfill ANE criteria were categorized as other IAE if a discharge diagnosis of IAE

[†] Case report form questions covered demographics, influenza testing and vaccination status, symptoms on admission, clinical course details available in EHR, and discharge diagnoses. Optional data elements, such as illness onset date and findings and impressions from neuroimaging reports, were included on the case report form and described among cases with available data.

[§] Patients who died had discharge diagnoses selected on the case report form; postmortem diagnoses reported were likely derived from the death report in the EHR, although other sources, including death certificates, might have been reviewed to complete that section of the case report form.

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BOX. Required surveillance criteria for pediatric influenza-associated encephalopathy investigation — United States, 2024–25 influenza season

1. Patient age <18 years
2. Admitted to a U.S. acute care hospital or pronounced dead in a U.S. emergency department between October 1, 2024, and May 30, 2025
3. Laboratory-confirmed influenza virus infection within 14 days preceding hospital evaluation, during hospitalization, or in respiratory specimens collected postmortem
4. Documented neurologic abnormalities (meets one or more of the following criteria):
   - Diagnosis of encephalopathy or encephalitis
   - Neurologic signs or symptoms, including but not limited to
     - seizures
     - altered mental status
     - delirium
     - decreased level of consciousness
     - lethargy
     - hallucinations
     - personality changes lasting >24 hours
   - Neuroimaging abnormalities such as brain edema, brain inflammation, or brain lesions
   - Electroencephalogram abnormalities (unspecified)
   - Abnormal brain autopsy findings, if available, for children who died

was reported. All other submitted cases were categorized as influenza-associated neurologic disease and are described separately (Supplementary Table). Reports were excluded if co-detection of a neuroinvasive pathogen in addition to influenza was reported.

Demographics and clinical characteristics and outcomes were described overall and by case categorization. Deidentified data were collected and stored in a REDCap database (version 15.5.8; Vanderbilt University) hosted at CDC, and SAS software (version 9.4; SAS Institute) was used for all analyses. Missing responses were excluded from denominators. This activity was reviewed by CDC, deemed not research, and was conducted consistent with applicable federal law and CDC policy.[¶]

Results

CDC received 192 reports that met surveillance criteria (Figure). Among those, 109 cases were categorized as IAE, 37 (34%) of which were subcategorized as ANE (Table). An additional 82 reports were categorized as influenza-associated neurologic disease, a category for those cases that did not meet the IAE case definition; demographics and clinical characteristics, influenza antiviral treatment, and illness severity of these cases were generally similar to those of IAE cases and are described separately (Supplementary Table). Percentages of characteristics were calculated among those patients with available information.

Characteristics of All Patients with Influenza-Associated Encephalopathy

Among the 109 IAE cases with available data, median patient age was 5 years (IQR = 3–10 years) (Table). Approximately one half of patients were female (46%) and non-Hispanic White (52%). Overall, 97 (89%) patients had influenza A virus infection; among the 59 (61%) cases with influenza A virus subtype available, 37 (63%) had A(H1N1)pdm09 and 22 (37%) had A(H3N2). Approximately one half (55%) of patients were previously healthy with no underlying medical conditions.[**] Signs and symptoms most commonly reported at initial assessment were altered mental status (88%), respiratory symptoms (87%), and fever (85%). Among patients with ANE, 87% had seizures at the time of admission; among the other IAE patients, seizures were noted in 45% of cases.

Neurologic symptoms commenced a median 2 days after illness onset[††] (IQR = 1–3 days). Overall, neuroimaging was received by 94% of IAE patients; abnormal findings were reported for 97% of ANE patients and 49% of other IAE patients. Influenza antiviral treatment was administered to 84% of IAE patients, beginning a median of 3 days after illness onset, and among 90% of all IAE patients, antiviral treatment started on or after the date of hospital admission. Among all IAE patients, 74% were admitted to an intensive care unit (ICU), 54% received invasive mechanical ventilation, and 19% died. Among the 70 survivors with information on neurologic status at discharge, 47% had not returned to their neurologic baseline.[§§] Among 93 patients with information on seasonal influenza vaccination, 15 (16%) had received ≥1 dose of the 2024–25 seasonal influenza vaccine ≥14 days before illness onset.[¶¶]

[¶] 45 C.F.R. part 46.102(l)(2), 21 C.F.R. part 56; 42 U.S.C. Sect. 241(d); 5 U.S.C. Sect. 552a; 44 U.S.C. Sect. 3501 et seq.

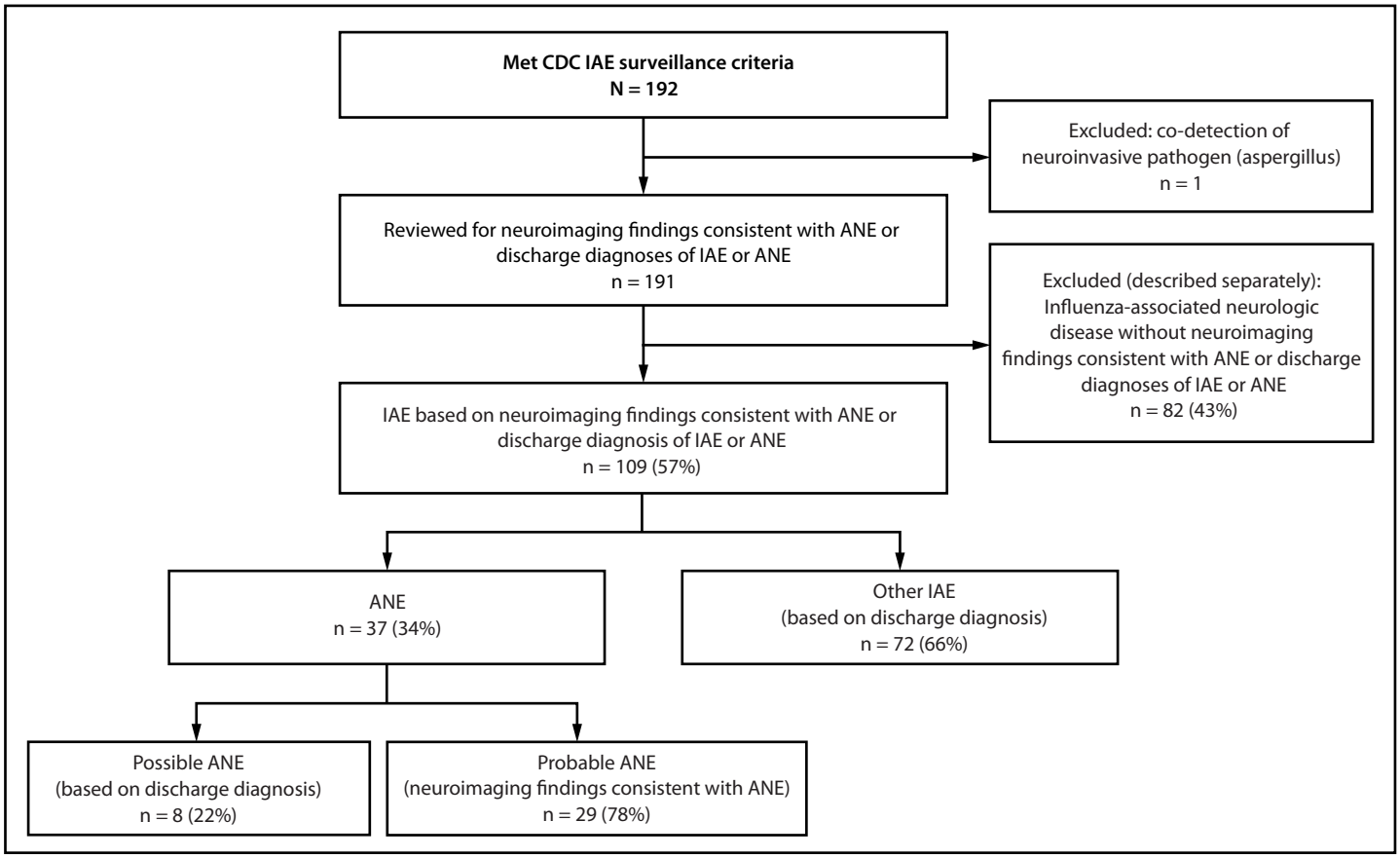
[**] Among all patients with IAE, 58% (63 of 109) were considered to be at increased risk for complications of influenza based on age <2 years or age ≥2 years with underlying medical conditions. People at Increased Risk for Flu Complications | Influenza (Flu) | CDC

[††] Among patients with both a neurologic symptom onset date and an illness onset date available.

[§§] Among patients who survived, were no longer hospitalized, and for whom survey data were available.

[¶¶] Among patients aged ≥6 months who were eligible for influenza vaccination. Admission date was used for one ANE patient and four other IAE patients with no illness onset date available.

FIGURE. Categorization of cases of pediatric influenza-associated encephalopathy reported to CDC — United States, 2024–25 influenza season



Abbreviations: ANE = acute necrotizing encephalopathy; IAE = influenza-associated encephalopathy.

Characteristics of Patients with Acute Necrotizing Encephalopathy

Among the 37 IAE cases subcategorized as ANE with available data, the median patient age was 4 years (IQR = 1–7 years). Approximately one half (51%) of patients were previously healthy. Four (13%) of 30 ANE patients had received ≥1 dose of the 2024–25 seasonal influenza vaccine ≥14 days before illness onset. Among patients with data available on interventions provided, influenza antivirals were received by 94%, systemic corticosteroids by 88%, intravenous immunoglobulin by 67%, other immunomodulators (e.g., tocilizumab, baricitinib, or anakinra) by 56%, and plasma exchange by 44%. All patients with ANE were admitted to an ICU, and 89% received invasive mechanical ventilation. Fifteen (41%) patients with ANE died. Among 13 survivors with information about neurologic sequelae at discharge, only one had returned to neurologic baseline. The median hospital stay was 16 days (IQR = 4–31 days) for all ANE patients and 30 days (IQR = 18–38 days) among survivors. ANE patients who died were hospitalized for a median of 4 days (IQR = 3–7 days) before death.

Discussion

During the 2024–25 influenza season, 109 cases of IAE in children were reported to CDC; approximately one third of these children (37; 34%) had ANE. These patients comprise the largest case series of children with IAE in the United States reported to date. Most children with IAE had fever and altered mental status at the time of hospital evaluation, and neurologic symptoms began shortly after influenza symptom onset. Many children experienced critical illness: 74% were admitted to an ICU, and 54% received invasive mechanical ventilation. Approximately one half of these children were previously healthy with no underlying medical conditions.

Although many children with IAE had neuroimaging abnormalities reported, neuroimaging abnormalities might or might not be present in patients with IAE (*2*,*5*). Influenza virus type and influenza A virus subtype distribution in these cases were generally consistent with national circulation of seasonal influenza viruses.

Patients reported to CDC with ANE had more severe illness than did those with other IAE; ANE patients had high

TABLE. Characteristics of reported pediatric influenza-associated encephalopathy cases — United States, 2024–25 influenza season

Characteristic	All cases		ANE		Other IAE	
	n/N*	Column %	n/N	Column %	n/N	Column %
Total (row %)	**109**	**100**	**37**	**34**	**72**	**66**
Median age, yrs (IQR)	**5 (3–10)**	—	4 (1–7)	—	6 (4–10)	—
Age group, yrs						
0–4	**44/109**	**40**	22/37	59	22/72	31
5–11	**46/109**	**42**	11/37	30	35/72	49
12–17	**19/109**	**17**	4/37	11	15/72	21
Female sex	**49/107**	**46**	18/37	49	31/70	44
Race and ethnicity†						
Asian, non-Hispanic	**7/102**	**7**	4/35	11	3/67	4
Black or African American, non-Hispanic	**19/102**	**19**	4/35	11	15/67	22
Hispanic or Latino	**16/102**	**16**	8/35	23	8/67	12
White, non-Hispanic	**53/102**	**52**	18/35	51	35/67	52
Other, non-Hispanic	**7/102**	**7**	1/35	3	6/67	9
U.S. Census Bureau region§						
Northeast	**31/109**	**28**	6/37	16	25/72	35
Midwest	**26/109**	**24**	8/37	22	18/72	25
South	**31/109**	**28**	14/37	38	17/72	24
West	**21/109**	**19**	9/37	24	12/72	17
Hospital admission month¶						
Before influenza peak (Oct–Dec)	**13/109**	**12**	5/37	13	8/72	11
During influenza peak (Jan–Feb)	**71/109**	**65**	29/37	78	42/72	58
After influenza peak (Mar–May)	**25/109**	**23**	3/37	8	22/72	31
Underlying medical conditions,††						
None	**58/106**	**55**	18/35	51	40/71	56
At least one	**48/106**	**45**	17/35	49	31/71	44
Asthma	**12/106**	**11**	3/35	9	9/71	13
Seizure disorder	**10/106**	**9**	5/35	14	5/71	7
Neurologic or neuromuscular disease	**15/106**	**14**	5/35	14	10/71	14
Signs and symptoms on admission§§						
Altered mental status¶¶	**93/106**	**88**	32/35	91	61/71	86
Fever	**92/108**	**85**	34/37	92	58/71	82
Headache	**22/86**	**26**	5/28	18	17/58	29
Respiratory tract symptoms	**91/104**	**87**	33/36	92	58/68	85
Seizures	**56/94**	**60**	28/32	87	28/62	45
Illness onset to neurologic symptom onset days, (IQR)* **	**2 (1–3)**	—	2 (1–3)	—	2 (1–4)	—
Influenza vaccine status†††						
Received the 2024–25 seasonal influenza vaccine ≥14 days before illness onset	**15/93**	**16**	4/30	13	11/63	17
Influenza antiviral treatment						
Received an influenza antiviral§§§	**86/102**	**84**	31/33	94	55/69	80
Illness onset to antiviral start date, days (IQR)***	**3 (1–4)**	—	2 (2–4)	—	3 (2–4)	—
Started before admission	**8/80**	**10**	2/27	7	6/53	11
Started on or after admission	**72/80**	**90**	25/27	93	47/63	89
Other treatment						
Immunomodulators***	**17/80**	**21**	14/25	56	3/55	5
Intravenous immunoglobulin***	**23/79**	**29**	16/24	67	7/55	13
Plasma exchange***	**15/80**	**19**	11/25	44	4/55	7
Systemic corticosteroids	**52/98**	**53**	29/33	88	23/65	35
Vasopressors***	**25/79**	**32**	17/24	71	8/55	15
Influenza virus type or subtype						
Influenza A	**97/109**	**89**	34/37	92	63/72	87
Influenza A (H1N1)	**37/59**	**63**	13/23	56	24/36	67
Influenza A (H3N2)	**22/59**	**37**	10/23	43	12/36	33
Influenza B	**12/109**	**11**	3/37	8	9/72	12
Bacterial, viral, or fungal detection¶¶¶	**13/109**	**12**	5/37	13	8/72	11
Neuroimaging performed**						
Yes	**102/108**	**94**	37/37	100	65/71	92
No	**6/108**	**6**	0	0	6/71	8
Abnormal findings††††	**68/102**	**67**	36/37	97	32/65	49

See table footnotes on the next page.

TABLE. (*Continued*) Characteristics of reported pediatric influenza-associated encephalopathy cases — United States, 2024–25 influenza season

Characteristic	All cases		ANE		Other IAE	
	n/N*	Column %	n/N	Column %	n/N	Column %
Illness severity						
Median length of hospitalization among survivors, days (IQR)[§§§§]	**9 (3–24)**	—	30 (18–38)	—	6 (3–17)	—
Median length of hospitalization among patients who died, days (IQR)[§§§§]	**4 (3–7)**	—	4 (3–7)	—	5 (1–8)	—
Pneumonia diagnosis at admission	**19/101**	**19**	6/34	18	13/67	19
Admitted to an ICU	**80/108**	**74**	37/37	100	43/71	61
Invasive mechanical ventilation	**59/109**	**54**	33/37	89	26/72	36
Not at neurologic baseline at discharge[¶¶¶¶]	**33/70**	**47**	12/13	92	21/57	37
Death	**21/109**	**19**	15/37	41	6/72	8

Abbreviations: ANE = acute necrotizing encephalopathy; IAE = influenza-associated encephalopathy; ICU = intensive care unit.

* Denominators are adjusted throughout the table to exclude missing and unknown responses.

† Children with multiple races selected and non-Hispanic ethnicity selected were categorized as "Other, non-Hispanic."

§ Based on state of residence. Census regions and divisions | U.S. Census Bureau

¶ Peak based on national influenza activity for the 2024–25 influenza season. Weekly US Influenza Surveillance Report: Key Updates for Week 35, ending August 30, 2025 | FluView | CDC

** Underlying medical conditions include the following categories: developmental (e.g., autism and attention deficit hyperactivity disorder), prematurity for those aged <2 years, immunocompromising conditions, chronic metabolic disease, genetic or inborn errors of metabolism, blood disorders, lung disease, cardiovascular disease, renal disease, gastrointestinal disease, rheumatologic disease, and obesity.

†† Two children had underlying medical conditions that can predispose to encephalopathy in the setting of a systemic stressor such as influenza virus. These conditions include an inborn error of metabolism (one) and a leukodystrophy (one).

§§ Numbers are not mutually exclusive.

¶¶ Altered mental status includes delirium, personality changes, hallucinations, and decreased level of consciousness.

*** Optional survey questions included illness onset date, neurologic symptom onset date, and use of other treatments.

††† Among those aged ≥6 months and thus eligible for influenza vaccination. Admission date was used for five IAE patients for whom the illness onset date was not available.

§§§ Seventy-two patients received oseltamivir alone, one received oseltamivir and baloxavir marboxil, six received oseltamivir and peramivir, six received peramivir alone, and one was missing influenza antiviral type information.

¶¶¶ Co-detections were reported from any time during hospitalization for any of the following specimen sources: blood, urine, respiratory tract, peritoneal fluid, or cerebrospinal fluid.

**** Neuroimaging performed included computed tomography of the head and magnetic resonance imaging of the brain.

†††† Percentage of patients with neuroimaging performed.

§§§§ To discharge (for survivors) or death; data were missing for five IAE patients (two ANE and three other IAE).

¶¶¶¶ Among patients who survived, were no longer hospitalized, and for whom survey data were available.

mortality (41%) and rapid progression to death, and all patients had critical illness. Hospital length of stay was prolonged among survivors, and only one survivor had returned to neurologic baseline at discharge. Patients with ANE had seizures at hospital evaluation almost twice as often (87%) as did patients with other IAE (45%). Overall, only 13% of patients with ANE reported to CDC had received influenza vaccination during the 2024–25 season.

A recently published U.S. clinical case series described influenza-associated ANE among 41 children during the 2023–24 and 2024–25 influenza seasons and observed that only 16% of patients had received seasonal influenza vaccination among 38 with known vaccination status, 76% had no significant medical history, and 27% died within days of symptom onset (*6*). ANE cases during the 2024–25 influenza season might have been reported to both this investigation and the 2023–25 case series, but the studies differed in methodology (including level of clinical detail collected and reviewed, case recruitment strategies, and exclusion criteria). Overlap among the 37 IAE cases subcategorized as ANE reported in this public health investigation and the 41 reported in that case series cannot be quantified.

Since 2010, CDC and the Advisory Committee on Immunization Practices have recommended annual influenza vaccination for all persons aged ≥6 months (*7*). Influenza vaccination can prevent influenza illness and reduce the severity of influenza in children who do become ill, including reduction in occurrence of critical and life-threatening influenza (CDC | Benefits of the Flu Vaccine) (*8*). Influenza vaccination has also been found to reduce influenza-associated hospitalization and emergency department visits in children (*9*). Despite these known benefits, pediatric influenza vaccination coverage has declined in recent years*** and only 16% of vaccine-eligible IAE patients reported to CDC had received the 2024–25 influenza vaccine.

Preadmission oseltamivir treatment among IAE patients was low. Outpatients with suspected or confirmed influenza who are at high risk for influenza complications are recommended to start influenza antiviral treatment as soon as possible after symptom onset; antiviral treatment might also be considered for patients who are not at higher risk (CDC | Antiviral Medications). Whether influenza antiviral therapy affects the

*** Data for the 2024–25 influenza season as of April 26, 2025.

development or progression of IAE is unknown; however, one study demonstrated that oseltamivir treatment of influenza in outpatients aged 5–17 years was associated with a reduced risk for hospitalization with serious neuropsychiatric events, including neurologic events such as seizure, altered mental status, and encephalitis (*10*).

Limitations

The findings in this report are subject to at least three limitations. First, included cases are a convenience sample and might not be representative of all U.S. IAE cases during the 2024–25 influenza season. Second, categorization of IAE cases relied partially on discharge diagnoses, which likely underrepresent the true incidence of IAE, as IAE has no consensus standardized diagnostic criteria and might be underdiagnosed. Finally, deidentified data available for analysis were based on data abstracted from EHRs and reported on the surveillance case report form. Therefore, reported data did not necessarily include the complete clinical course and all clinical or laboratory data, neuroimaging reports, or primary neuroradiographic images.

Implications for Public Health Practice

IAE is a serious neurologic complication of influenza that can affect healthy children as well as those with underlying medical conditions. During influenza season, parents and caregivers of children with neurologic signs and symptoms (e.g., seizures, hallucinations, or altered level of consciousness) in conjunction with fever or respiratory symptoms should seek care urgently. Health care providers should consider IAE in children with recent or current febrile illness with encephalopathy, monitor these children for clinical deterioration, and initiate appropriate supportive care.

Annual influenza vaccination is recommended for all children aged ≥6 months to prevent influenza and associated complications, potentially including neurologic disease such as IAE and ANE. Early influenza antiviral treatment is recommended as soon as possible for all children with influenza who are hospitalized or at increased risk for influenza complications because of age or presence of comorbidities.

No consensus standardized diagnostic or surveillance case definitions for IAE currently exist. Additional measures are needed to develop and implement surveillance to improve understanding of the incidence, potential risk factors, severity, and public health impact of IAE in the United States.

CDC is integrating surveillance for IAE and ANE into existing CDC-sponsored surveillance systems for the 2025–26 influenza season to better understand these serious and potentially preventable complications of influenza.

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Summary

What is already known about this topic?

Influenza-associated encephalopathy (IAE) is a rare, severe neurologic complication of influenza.

What is added by this report?

During the high-severity 2024–25 influenza season, 109 U.S. pediatric IAE cases were identified; 55% of affected children were previously healthy. Thirty-seven IAE cases were subcategorized as acute necrotizing encephalopathy (ANE), a severe form of IAE characterized by rapid neurologic decline and a poor prognosis. Overall, 74% of IAE patients were admitted to an intensive care unit, and 19% died; 41% of ANE patients died. Only 16% of vaccine-eligible IAE patients had received the 2024–25 influenza vaccine.

What are the implications for public health practice?

All children are at risk for severe neurologic complications of influenza. Annual influenza vaccination is recommended for all children aged ≥6 months to prevent influenza and associated complications, potentially including IAE.

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Influenza-Associated Pediatric Deaths — United States, 2024–25 Influenza Season

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Abstract

Influenza-associated deaths among children aged <18 years have been nationally notifiable since 2004. The highest number of pediatric deaths reported during a single season since reporting of influenza-associated pediatric deaths began (excluding the 2009–10 influenza A[H1N1]pmd09 pandemic) occurred during the 2024–25 season. Through September 13, 2025, a total of 280 influenza-associated pediatric deaths were reported, representing a national rate of 3.8 deaths per 1 million children. The median age at death was 7 years, and 56% of children who died had at least one underlying medical condition. Influenza A viruses were associated with 240 (86%) of the deaths. Forty percent of children who died were treated with influenza antiviral medications. Among the 208 pediatric decedents with available data who were eligible for influenza vaccine, 89% were not fully vaccinated. CDC recommends that all persons aged ≥6 months who do not have contraindications receive the influenza vaccine each year, ideally by the end of October.

Introduction

Influenza can lead to severe illness and death. Vaccination against influenza is recommended for all persons aged ≥6 months who do not have contraindications, to prevent influenza and its associated complications (*1*). Some children are at higher risk for death from influenza based on their age, underlying medical conditions, and vaccination status.

Surveillance for pediatric influenza-associated mortality began in 2004, after reports of increased numbers of influenza-associated deaths among children (*2*). Since that time, the highest number of reported pediatric deaths (288) occurred during the 2009–10 influenza A(H1N1)pdm09 pandemic, and, until the current season, the second highest number (210) was reported during the 2023–24 season. During the 2020–21 season, when implementation of numerous strategies to prevent transmission of SARS-CoV-2 sharply reduced circulation of influenza viruses, only one influenza-associated death in a child was reported. This report describes influenza-associated pediatric deaths during the 2024–25 season.

Methods

Ascertainment of Influenza-Associated Pediatric Deaths

Data on influenza-associated deaths were obtained from the Influenza-Associated Pediatric Mortality Surveillance System. An influenza-associated pediatric death is defined as a death in a person aged <18 years, resulting from an influenza-compatible clinical illness, confirmed by an appropriate diagnostic test to be influenza, with no period of complete recovery between the illness and death (Influenza-associated pediatric mortality report, Council of State and Territorial Epidemiologists). State and local health departments identify these deaths and report them to CDC using standardized case report forms.* Children who lived in the United States and who died during week 40 of 2024 through week 37 of 2025 (September 29, 2024–September 13, 2025) were included. The final case count might increase as additional reports are received. Population estimates of children aged <18 years were obtained from the United States Census Bureau.

Analysis

Variables associated with health, including underlying medical conditions, vaccination status, and health care use during illness are described. Children eligible for influenza vaccine and for whom case report forms contained sufficient information to determine vaccination status were categorized as either fully vaccinated or not fully vaccinated.† SAS (version 9.4; SAS Institute) was used to perform all statistical analyses. This activity was reviewed by CDC, deemed not research, and was conducted consistent with applicable federal law and CDC policy.§

Results

Demographic Characteristics of Pediatric Influenza-Associated Deaths

During the 2024–25 influenza season, a total of 280 pediatric deaths were reported, representing a national rate of 3.8 deaths per 1 million children (Table 1). The median age at time of death was 7 years (IQR = 2–11 years); 61% of deaths occurred among children aged <9 years. The influenza-associated mortality rate was highest among children aged <6 months (11.1 per 1 million) and was higher among females (4.5) than males (3.1). White children accounted for the highest percentage of deaths (42%) but had the second lowest death rate (3.1) after Asian children (2.8). The highest mortality rate occurred among children who

* Case report form includes information on demographic characteristics, medical history, and clinical information about the illness.

† Twenty children aged <6 months were ineligible for influenza vaccination. Children aged 6 months–8 years were considered fully vaccinated if they received an influenza vaccine during the current influenza season (≥14 days before illness onset) and at least two total influenza vaccines (either 2 doses during the current season, or 1 dose during the current season and 1 dose during a previous season). Children aged 9–17 years were considered fully vaccinated if an influenza vaccine dose was received during the current season and ≥14 days before illness onset.

§ 45 C.F.R. part 46.102(l)(2), 21 C.F.R. part 56; 42 U.S.C. Sect. 241(d); 5 U.S.C. Sect. 552a; 44 U.S.C. Sect. 3501 et seq.

TABLE 1. Characteristics of children aged <18 years who died from influenza-associated illness and influenza-associated mortality, by selected demographic characteristics — United States, September 29, 2024–September 13, 2025

Characteristic	No. of deaths (%)	U.S. population, no.	Influenza death rate*
Overall	**280 (100)**	**73,132,720**	**3.8**
Age group			
Median age group (IQR)	7 (2–11)	—	—
<6 mos†	20 (7)	1,807,799	11.1
6–23 mos§	41 (15)	5,509,623	7.4
24–59 mos	48 (17)	11,281,892	4.3
5–8 yrs	62 (22)	16,024,708	3.9
9–12 yrs	53 (19)	16,614,665	3.2
13–17 yrs	56 (20)	21,894,033	2.6
Sex			
Female	161 (58)	35,727,465	4.5
Male	116 (42)	37,405,255	3.1
Race and ethnicity¶			
Asian	12 (5)	4,269,721	2.8
Black or African American	59 (23)	10,138,247	5.8
Hispanic or Latino	71 (28)	19,688,847	3.6
White	108 (42)	34,765,741	3.1
Other	8 (3)	—	—

* Influenza deaths per 1 million children aged <18 years.
† The population estimate for age <6 months was calculated as the population of children aged <12 months divided by 2.
§ The population estimate for ages 6–23 months was calculated as the population of children aged <12 months divided by 2 plus the population of children aged 1 year.
¶ Categories with fewer than five deaths were combined into an "Other" category. Rates were not calculated for this category. All children with Hispanic or Latino (Hispanic) ethnicity reported were included in the Hispanic category and not included in the categories Asian, Black or African American, White, or Other.

were Black or African American (5.8), who accounted for 23% of all pediatric influenza deaths. The number of influenza-associated pediatric deaths peaked at 28 during weeks 6 and 7 of 2025 (week ending February 8 and February 15) (Figure).

Influenza Virus Types

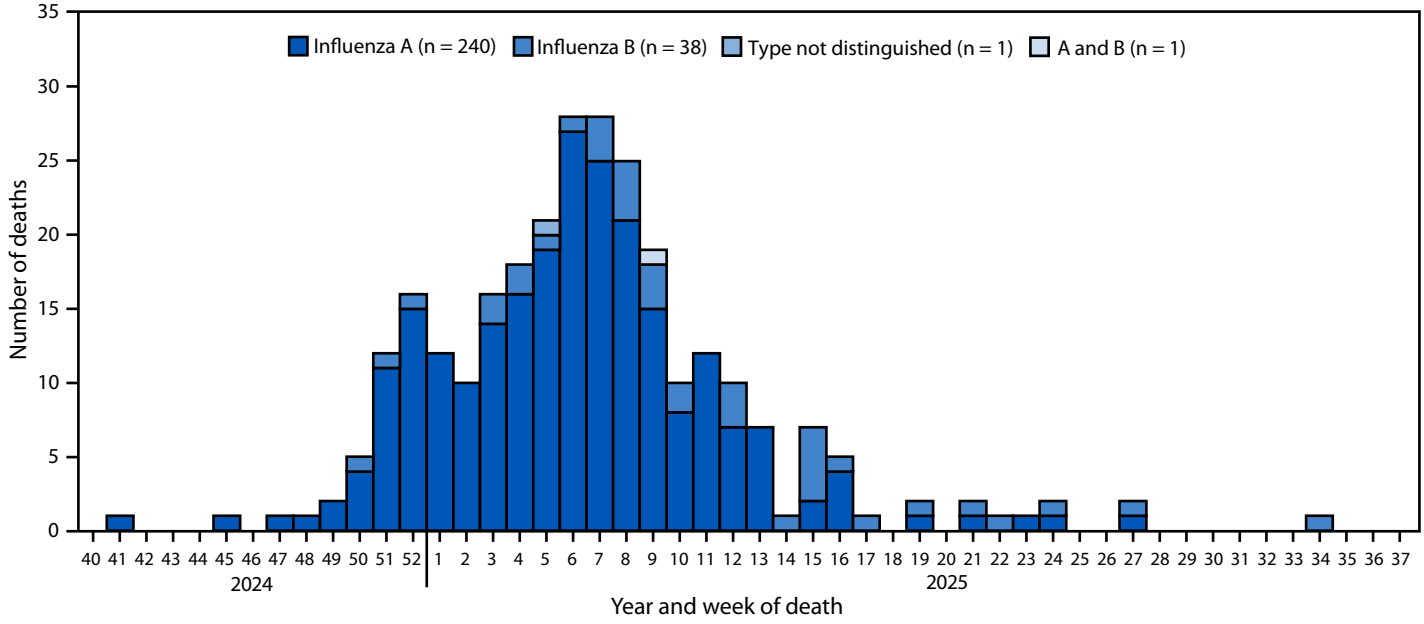
Reverse transcription–polymerase chain reaction (RT-PCR) testing was performed on specimens from 251 (90%) decedents; among the 29 children whose specimens did not undergo RT-PCR testing, specimens of 26 (90%) received rapid influenza testing, and three (10%) received viral culture testing. Among the 280 pediatric influenza-associated deaths, influenza A viruses were associated with 240 (86%) and influenza B viruses with 38 (14%) (Table 2). Among the 169 (70%) influenza A deaths with a known subtype, 95 (56%) were A(H1N1)pdm09 viruses, 73 (43%) were A(H3N2) viruses, and one (<1%) had both A(H1N1)pdm09 and A(H3N2) detected.

Clinical Characteristics and Influenza Vaccination Status

Among 262 pediatric decedents with available information on medical history, 148 (56%) had at least one reported underlying medical condition.¶ Among these, a neurologic condition

¶ Conditions were categorized as neurologic disorder (including moderate to severe developmental delay, seizure disorder, cerebral palsy, or neuromuscular disorder), pulmonary disease (including asthma/reactive airway disease, cystic fibrosis, or other chronic pulmonary disease), chromosome abnormality or genetic disorder, cardiac disease (including congenital heart disease), immunosuppressive condition (including cancer diagnosis or treatment during the previous 12 months), endocrine disorder (including diabetes mellitus), mitochondrial disorder, renal disease, pregnancy, and other medical conditions (including blood disorders, obesity, skin or soft tissue infections, or hepatic diseases).

FIGURE. Influenza-associated deaths among children aged <18 years, by week and virus type (N = 280) — United States, September 29, 2024–September 13, 2025



was reported most frequently (93; 63%); among children with neurologic conditions, approximately two thirds (59; 63%) were described as having developmental delay.

Among 260 decedents who were age-eligible for vaccination, sufficient information to determine vaccination status was available for 208 (80%). Among those with known vaccination status who were vaccine-eligible, 186 (89%) had not been fully vaccinated against influenza during the 2024–25 season. Although influenza vaccination coverage was low overall, the percentage of children who were not fully vaccinated was slightly lower among children with medical conditions (86%) than among those without (95%).

Clinical Course and Location of Death

Clinical complications before death were documented for 218 (88%) of 247 children with available data. Among the 247 children for whom data were available, the most common complication experienced before death was shock or sepsis (108; 50%) followed by pneumonia (82; 38%), acute respiratory distress syndrome (60; 28%), seizures (53; 24%), and encephalopathy or encephalitis (40; 18%). Isolation of a bacterial pathogen from a sterile site was reported for 42 (41%) of 102 children who received testing. The most commonly isolated pathogens were *Staphylococcus aureus*, *Streptococcus pneumoniae,* and group A *Streptococcus*. Overall, 112 (40%) children were treated with influenza antiviral medications, most commonly oseltamivir (104; 93%).

Among 278 deaths with information on location of death, 61 (22%) occurred outside a hospital, 74 (27%) occurred in an emergency department (ED), and 143 (51%) occurred in a hospital after admission (Supplementary Table). The median interval from illness onset to death among children who died outside a hospital, in an ED, and while hospitalized was 3 days (IQR = 1–6 days), 2 days (1–4), and 7 days (4–13), respectively. The median number of days from symptom onset to death was 4 days (IQR = 2–10 days). Among children who died outside a hospital, in an ED, and in a hospital, influenza antivirals were received by 23%, 11%, and 62%, respectively.

Discussion

The 2024–25 influenza season was marked by the highest number of pediatric deaths since influenza-associated pediatric mortality became nationally notifiable in 2004 (excluding the 2009–10 influenza A(H1N1)pmd09 pandemic, during which the overall highest number of pediatric deaths [288] occurred). Previously, the highest number of deaths reported during a nonpandemic influenza season was 210 during the 2023–24 influenza season. The lowest number of influenza-associated pediatric deaths occurred during the 2020–21 season, immediately after the start of the COVID-19 pandemic, when influenza virus circulation plummeted; during that season, only a single influenza death in a child was reported. Increasing numbers of deaths have been reported in each subsequent season since 2020–21.

According to a preliminary assessment, the 2024–25 influenza season has been associated with at least 43 million illnesses, 560,000 hospitalizations, and 38,000 deaths, and was the first high-severity season since the 2017–18 season. High severity was observed across all age groups. Influenza seasons are categorized as low, medium, or high severity in assessments conducted by CDC that incorporate three indicators: 1) the percentage of influenza-like illness among all outpatient or ED visits; 2) the influenza-related hospitalization rate, and 3) the percentage of deaths attributed to influenza among all deaths (*3*).

Reasons for the increase in influenza activity during the 2024–25 season, including pediatric deaths, are not clear. Prevention efforts during the early years of the COVID-19 pandemic suppressed influenza activity and deaths (*4*), and as restrictions were lifted, influenza circulation during subsequent seasons resumed. Co-circulation of multiple influenza A virus subtypes (influenza A[H1N1]pdm09 and A(H3N2) with nearly equal distribution) might have led to increased influenza activity. These subtypes can each result in varying impacts and severity among different age groups (*5*).

Characteristics of pediatric deaths reported during the 2024–25 season were mostly consistent with deaths reported during previous seasons. In all but two seasons since surveillance began (i.e., during the 2012–13 and 2019–20 seasons), influenza A viruses have been associated with more pediatric deaths than have influenza B viruses. During the 2024–25 season, 56% of children who died had conditions associated with higher risk for severe illness; this percentage has ranged from 38% during the 2006–07 season to 69% during the 2009–10 season (FluView Interactive | CDC). Whereas approximately 80% of pediatric decedents who were vaccine-eligible had not received seasonal influenza vaccine in previous seasons (*6,7*), during the 2024–25 season, approximately 90% of eligible children with known vaccination status who died from influenza were not fully vaccinated.

Approximately one half of children who died had not been admitted to a hospital at the time of death. Among children who died in an ED or another location outside a hospital, the interval from symptom onset until death was substantially shorter (median = 2–3 days) than it was for those who died in a hospital (median = 7 days). Children who died in EDs or outside a hospital were less likely to have an underlying medical condition than did those who died after being hospitalized, and very few had been treated with antiviral medications. Parents, caregivers, and clinicians should be mindful of

TABLE 2. Number and percentage of children aged <18 years who died from influenza-associated illness, by selected characteristics — United States, September 29, 2024–September 13, 2025

Characteristic	No. of deaths (%)
Total deaths	**280 (100)**
PCR testing done	
Yes	251 (90)
No	29 (10)
Influenza virus type and subtype/lineage	
Influenza A	240 (86)
A(H1N1)pdm09*	95 (56)
A(H3N2)*	73 (43)
A(H1N1)pdm09 and A(H3N2) co-infection*	1 (1)
Subtype not known	71 (—)
Influenza B	38 (14)
B Victoria†	4 (100)
Lineage testing not performed	34 (—)
A and B	1 (0)
A/B not distinguished	1 (0)
ACIP-defined high-risk medical conditions§	
Yes, any	148 (56)
No, none	114 (44)
Missing	18 (—)
Number of ACIP-defined high-risk medical conditions¶	
1	76 (51)
2	43 (29)
3	20 (14)
4	8 (5)
5	0 (0)
6	1 (1)
Type of medical conditions**	
Neurologic disorder	93 (35)
Moderate or severe developmental delay	59 (23)
Seizure disorder	46 (18)
Cerebral palsy	27 (10)
Neuromuscular disorder	22 (8)
Other neurologic disorder	51 (19)
Pulmonary disease	43 (16)
Asthma or reactive airway disease	28 (11)
Chronic pulmonary disease	16 (6)
Chromosome/genetic disorder	43 (16)
Congenital heart disease or other cardiac disease	30 (11)
Immunosuppressive condition	11 (4)
Received steroids before illness	3 (1)
Cancer (received chemotherapy or radiation)	3 (1)
Endocrine disorder	14 (5)
Diabetes mellitus	3 (1)
Obesity	9 (3)
Mitochondrial disorder	3 (1)
Renal disease	8 (3)
Pregnant	0 (—)
Complications during acute illness	
Yes	218 (88)
No	29 (12)
Unknown	33 (—)
Complications††	
Shock or sepsis	108 (50)
Pneumonia	82 (38)
Acute respiratory distress syndrome	60 (28)
Seizures	53 (24)
Encephalopathy/encephalitis	40 (18)
Cardiomyopathy/myocarditis	28 (13)
Bronchiolitis	11 (5)
Hemorrhagic pneumonia/pneumonitis	4 (2)
Croup	1 (0)
Other complication	92 (42)
Location of death	
Outside hospital	61 (22)
ED	74 (27)
Hospital (in-patient)	143 (51)
Missing	2 (—)
Antiviral therapy received	
Yes	112 (40)
Oseltamivir	104 (37)
Zanamivir	0 (—)
Peramivir	14 (5)
No	167 (60)
Unknown	1 (—)
Duration of illness	
Median days (range)	4 (2–10)
Bacterial testing from sterile site performed	
Yes	118 (55)
No	95 (45)
Unknown	67 (—)
Bacteria isolated from sterile site§§	
Yes	42 (41)
No	60 (59)
Unknown	16 (—)
Bacteria isolated from sterile site¶¶	
Streptococcus pneumoniae	8 (19)
Staphylococcus aureus, susceptibility not specified	6 (14)
Group A *Streptococcus*	6 (14)
MRSA	3 (7)
MSSA	1 (2)
Other	23 (55)
Influenza vaccination status***	
Fully vaccinated	22 (11)
Not fully vaccinated	186 (89)
Ineligible for vaccination (age <6 mos)	20 (—)
Missing	52 (—)

Abbreviations: ACIP = Advisory Committee on Immunization Practices; ED = emergency department; MRSA = methicillin-resistant *Staphylococcus aureus*; MSSA = methicillin-sensitive *Staphylococcus aureus*; PCR = polymerase chain reaction.

* Percentage calculated among 169 children with known influenza A subtype.

† Percentage calculated among four children with known influenza B lineage.

§ Categorized as neurologic disorder (including moderate to severe developmental delay, seizure disorder, cerebral palsy, or neuromuscular disorder), pulmonary disease (including asthma/reactive airway disease, cystic fibrosis, or other chronic pulmonary disease), chromosome abnormality or genetic disorder, cardiac disease (including congenital heart disease), immunosuppressive condition (including cancer diagnosis or treatment during the previous 12 months), endocrine disorder (including diabetes mellitus), mitochondrial disorder, renal disease, pregnancy, and other medical conditions (including blood disorders, obesity, skin or soft tissue infections, or hepatic diseases).

¶ Calculated as the count of types of underlying medical conditions, including neurologic disorder, pulmonary disease, chromosome/genetic disorder, congenital heart disease or other cardiac disease, immunosuppressive condition, endocrine disorder, obesity, mitochondrial disorder, renal disease, and pregnancy. Percentage calculated among 148 children with underlying medical conditions.

** Percentage calculated among 262 children with known medical history.

†† Percentage calculated among 218 children with complications reported during acute illness.

§§ Percentage calculated among 102 children with a specimen collected for bacterial culture from a normally sterile site with known results.

¶¶ Percentage calculated among 42 children with bacteria cultured from a sterile site.

*** Children aged ≥6 months–8 years were considered fully vaccinated if they received an influenza vaccine during the current influenza season (≥14 days before illness onset) and at least two total influenza vaccines (either 2 doses during the current season, or 1 dose during the current season and 1 dose during a previous season). Children aged 9–17 years were considered fully vaccinated if an influenza vaccine dose was received during the current season and ≥14 days before illness onset.

Summary

What is already known about this topic?

Influenza can cause severe illness and death among all persons, including children.

What is added by this report?

The 2024–25 influenza season had the highest number of pediatric deaths reported (280) since child deaths became nationally notifiable in 2004, except for the 2009–10 influenza A(H1N1)pdm09 pandemic. Approximately one half of children who died from influenza had an underlying medical condition, and 89% were not fully vaccinated.

What are the implications for public health practice?

All persons aged ≥6 months who do not have contraindications should receive an annual influenza vaccination to prevent influenza and its complications, including influenza-associated death.

warning signs of respiratory virus complications when children are ill and should seek immediate medical care for the child.

During the 2024–25 influenza season, the virus type and subtype distribution observed in pediatric mortality surveillance was similar to that from public health laboratory (PHL) surveillance, which monitors circulating viruses among a larger population. Influenza A viruses represented 86% of viruses detected in pediatric mortality and 89% among persons aged <25 years in PHL surveillance systems. Among pediatric deaths associated with influenza A viruses with known subtype, 56% were (H1N1)pdm09 and 43% were H3N2 viruses. A similar distribution of subtypes was observed among persons aged <25 years in PHL data (47% [H1N1]pdm09 and 53% H3N2).

Limitations

The findings in this report are subject to at least three limitations. First, deaths are likely underreported because of factors including failure to identify or diagnose influenza, attributing death to another cause even if influenza was identified, and nonreporting. Thus, the number of reported cases likely represents an underestimate. Second, misclassification of underlying medical conditions, vaccination status, bacterial co-infections, and other characteristics of the children is possible. Misclassification might have been more likely among children for whom little clinical data were available because of young age, limited exposure to health care providers, or rapid progression from illness onset to death. Finally, data were missing from some reports for a number of variables, including medical conditions and complications. Data on antiviral treatment, medical conditions, and complications were more likely to be missing for children who died outside a hospital or in an ED than for those who died in a hospital.

Implications for Public Health Practice

Influenza can cause serious illness and death in children; therefore, preventing infection, particularly among those who have underlying medical conditions, can reduce influenza-associated morbidity and mortality. All persons aged ≥6 months without a contraindication should receive an annual influenza vaccine; vaccinating children annually against influenza can help prevent severe illness and death.

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Interim Effectiveness Estimates of 2025 Southern Hemisphere Influenza Vaccines in Preventing Influenza-Associated Outpatient and Hospitalized Illness — Eight Southern Hemisphere Countries, March–September 2025

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Abstract

Seasonal influenza vaccination provides important protection from influenza illness and associated potential complications. Monitoring seasonal influenza vaccine effectiveness (VE) in Southern Hemisphere countries can apprise health authorities in Northern Hemisphere countries about the potential protection provided from vaccination. Using data from influenza-like illness (ILI) and severe acute respiratory infection (SARI) sentinel surveillance networks in eight Southern Hemisphere countries, investigators estimated interim VE against influenza-associated outpatient visits and hospitalization using a test-negative case-control study design. During March–September 2025, Australia and South Africa identified 2,122 patients with ILI; Argentina, Australia, Brazil, Chile, New Zealand, Paraguay, and Uruguay identified 42,752 patients with SARI. Overall, 21.3% of patients with ILI and 15.9% of patients with SARI were vaccinated against influenza. Adjusted VE against influenza-associated outpatient visits and hospitalization was 50.4% and 49.7%, respectively, for any influenza virus, and 45.4% and 46.1%, respectively, for influenza A viruses. Adjusted VE against hospitalization with the predominant influenza subtype, A(H1N1)pdm09, was 41.6%. These interim estimates suggest that vaccination reduced medically attended influenza-associated illness by approximately one half in eight Southern Hemisphere countries. Health authorities should prioritize vaccination of all eligible persons ≥6 months to reduce incidence of influenza disease.

Introduction

Each year, influenza virus infections result in approximately 5 million hospitalizations and 650,000 deaths worldwide. Virus circulation tends to occur during April–September in Southern Hemisphere and October–May in Northern Hemisphere temperate countries (*1*,*2*). Influenza vaccination during campaigns targeting eligible persons, including groups at higher risk for severe influenza illness (e.g., young children, persons with comorbidities, and older adults), contributes to the reduction in influenza-associated morbidity and mortality worldwide (*3*,*4*). Sentinel surveillance systems facilitate systematic monitoring of seasonal influenza vaccine effectiveness (VE), which provides information to guide public health messaging and influenza vaccine composition deliberations each season (*5*). This analysis used data from influenza-like illness (ILI) and severe acute respiratory infection (SARI) sentinel surveillance networks in eight Southern Hemisphere countries to estimate interim VE against influenza-associated outpatient visits and hospitalization.

Methods

Data Sources

Patients with ILI, who were examined in an outpatient setting, and patients with SARI, who were admitted to a hospital, were identified through sentinel surveillance systems in eight countries.[†] As part of the sentinel surveillance protocols, respiratory specimens from patients who met the ILI or SARI case definition were tested for influenza viruses by reverse-transcription–polymerase chain reaction (RT-PCR) and typed and subtyped in national reference laboratories. One country (South Africa) contributed only ILI surveillance data. Six countries contributed only SARI surveillance data: New Zealand and five countries (Argentina, Brazil,[§] Chile, Paraguay, and Uruguay) from the Pan American Health Organization Network for the Evaluation of Vaccine Effectiveness in Latin America and the Caribbean–influenza (Red para la Evaluación de Vacunas en Latino América y el Caribe–influenza [REVELAC-i]).

[*] These authors contributed equally to this report.

[†] ILI is defined as acute respiratory illness (ARI) with history of fever or documented body temperature of ≥100.4°F (≥38°C), cough and symptom onset within the previous 10 days (South Africa); and ARI with fever and cough with onset of symptoms within the previous 7 days (Australia). SARI is defined as history of fever or documented body temperature of ≥100.4°F (≥38°C) and cough with onset within the previous 10 days resulting in hospitalization (REVELAC-i countries and New Zealand); hospital admission with ARI (age >16 years: ARI symptoms; age <16 years: ARI symptoms or fever) (Australia).

[§] Data were not contributed from the North Region of Brazil, which uses the Northern Hemisphere vaccine formulation.

One country (Australia) contributed both ILI and SARI surveillance data.

ILI and SARI surveillance data during March–September 2025 were pooled across 163 general practitioner practices and across 3,157 hospitals, respectively (Supplementary Table 1). VE evaluation began on the date of the first influenza case detection after the start of the influenza vaccination campaign in each respective country.[¶] All countries used World Health Organization (WHO)-recommended egg-based, inactivated Southern Hemisphere influenza vaccine formulations.[**]

Study Design

VE against influenza-associated outpatient visits and hospitalization was estimated using a test-negative case-control design. The study population comprised patients with ILI or SARI who were vaccination-eligible in each country, based on national policy. Case-patients were those who received a positive influenza RT-PCR test result; control patients were those who received a negative influenza RT-PCR test result. Vaccination status was ascertained using national vaccination registries, medical records, or self-report. Patients who received a 2025 influenza vaccine dose ≥14 days before symptom onset were considered vaccinated; those not vaccinated before symptom onset were considered unvaccinated. Patients who were vaccinated <14 days before symptom onset or who received a concurrent positive SARS-CoV-2 RT-PCR test result were excluded (*6*).

Data Analysis

VE was calculated by comparing the odds of influenza vaccination between case- and control patients using multivariable logistic regression. Models were adjusted for sex, age (in years, fit as a cubic spline with five knots), week of symptom onset (fit within each country as a cubic spline with five knots), and country. Overall VE was estimated among all patients eligible for the influenza vaccine (i.e., all patients aged ≥6 months) using STATA statistical software (version 17.0, StataCorp).[††] In addition, VE was estimated among patients included in one of three mutually exclusive influenza vaccination priority groups considered high risk for severe outcomes associated with influenza infection (young children,[§§] persons [older children and adults] with comorbidities,[¶¶] and older adults[***]) as defined by national policy (Supplementary Table 1). When sufficient data were available, VE was estimated within the nationally defined influenza priority vaccination groups by including an interaction term between vaccination status and inclusion in a priority group and exponentiating the linear combination of the estimated coefficients. Analyses were stratified by influenza virus type and subtype when the expected frequency of vaccinated and unvaccinated case- and control patients in each stratum was at least five, and when the 95% CI for the adjusted odds ratio spanned <140 percentage points from lower to upper bound.

The frequency of influenza viral clades reported by study countries to the Global Initiative on Sharing All Influenza Data (GISAID) during their respective evaluation period was calculated. This activity was reviewed by CDC, deemed not research, and conducted consistent with applicable federal law and CDC policy.[†††]

Results

Characteristics of the Study Population

During March–September 2025, a total of 2,554 patients with ILI and 181,566 patients with SARI were identified through the included surveillance networks; among these, 432 patients with ILI and 138,814 patients with SARI were ineligible for inclusion or were excluded because influenza RT-PCR results, vaccination status, or demographic data were missing (Supplementary Table 2). Among the 2,122 included patients with ILI, 1,442 (68.0%) were from Australia and 680 (32.0%) were from South Africa; 50.3% of patients belonged to an influenza vaccination priority group considered high risk for severe outcomes associated with influenza infection. Among the 42,752 included patients with SARI, 4,499 (10.5%) were from Australia, 1,335 (3.1%) were from

[¶] Influenza vaccination campaign start dates were March 1 (Chile), March 25 (Argentina), March 27 (Australia), March 31 (South Africa and Uruguay), April 1 (New Zealand), April 3 (Paraguay), and April 7 (Brazil).

[**] Trivalent vaccines containing antigens from A/Victoria/4897/2022 (H1N1) pdm09–like virus, A/Croatia/10136RV/2023 (H3N2)–like virus, and B/Austria/1359417/2021 (B/Victoria lineage)–like virus were used in Argentina, Brazil, Chile, Paraguay, South Africa, and Uruguay; quadrivalent vaccines containing the addition of a B/Yamagata lineage–like virus were used in Australia, New Zealand, South Africa, and Uruguay; adjuvanted vaccines were available for older adults in Argentina (aged ≥65 years), Australia (aged ≥65 years), and Paraguay (aged ≥60 years).

[††] VE was estimated using multivariable logistic regression as (1 – adjusted odds ratio) × 100%.

[§§] Young children aged 6 months–1 year (Argentina), 6 months–4 years (Australia and Uruguay), 6 months–5 years (Brazil), 6 months–2 years (Paraguay), and 6 months–10 years (Chile). In South Africa and New Zealand, young children are not considered a priority vaccination group.

[¶¶] Comorbid conditions included chronic respiratory disease (including asthma and chronic obstructive pulmonary disease); cancer; cardiovascular disease (including hypertension and stroke); diabetes/chronic renal disease; and immunocompromising conditions (including HIV/AIDS) in all countries. In selected countries, the following comorbid conditions were included: obesity (Argentina, Australia, Brazil, Chile, Paraguay, and Uruguay); chronic neurologic diseases (Australia and New Zealand); chronic liver disease (Australia and New Zealand); tuberculosis (New Zealand and South Africa); current alcohol or drug dependency (New Zealand); chronic hematologic disorder (Australia and New Zealand); chronic metabolic disorder (Australia); and long-term aspirin therapy in children aged 5–19 years (Australia).

[***] Aged ≥60 years (Brazil, Chile, and Paraguay) and aged ≥65 years (Argentina, Australia, New Zealand. South Africa, and Uruguay).

[†††] 45 C.F.R. part 46. 102(1)(2), 21 C.F.R. part 56; 42 U.S.C. Sect. 241(d); 5 U.S.C. Sect. 552a; 44 U.S.C. Sect. 3501 et seq.

New Zealand, 2,028 (4.7%) were from Argentina, 28,962 (67.7%) were from Brazil, 2,286 (5.3%) were from Chile, 3,314 (7.8%) were from Paraguay, and 328 (0.8%) were from Uruguay; 85.3% of patients belonged to an influenza vaccination priority group (Table 1).

Case-Patient Influenza Typing and Subtyping Results

Among patients with ILI and patients with SARI, 563 (26.5%) and 17,787 (41.6%), respectively, received positive influenza RT-PCR test results. Most identified viruses were influenza A (ILI case-patients = 464; 82.4% and SARI case-patients = 16,885; 94.9%); influenza B viruses were identified among 99 (17.6%) ILI case-patients and 837 (4.7%) SARI case-patients. Among the 464 influenza A viruses identified from ILI case-patients, 211 (45.5%) were A(H3N2), 185 (39.9%) were A(H1N1)pdm09, and 68 (14.7%) were not subtyped. Among the 16,885 influenza A viruses identified from SARI case-patients, 4,490 (26.6%) were A(H3N2), 9,914 (58.7%) were A(H1N1)pdm09, and 2,481 (14.7%) were not subtyped (Figure).

Vaccination Status of Case-Patients and Control Patients

Overall, 453 of 2,122 (21.3%) patients with ILI and 6,781 of 42,752 (15.9%) patients with SARI were vaccinated. Among the 563 ILI case-patients, 78 (13.9%) had received a 2025 seasonal influenza vaccine, compared with 375 (24.1%) of 1,559 ILI control patients (Table 1). Of the 17,787 SARI case-patients identified, 2,433 (13.7%) had received a 2025 seasonal influenza vaccine compared with 4,348 (17.4%) of 24,965 SARI control patients.

Vaccine Effectiveness

Among patients with ILI, adjusted VE against influenza-associated outpatient illness with any influenza virus was 50.4% (Table 2). Adjusted VE against any influenza A virus subtype was 45.4%, against influenza A(H1N1)pdm09 virus was 53.3%, and against any influenza B virus was 62.3%. Among only patients in the priority vaccination groups, adjusted VE against influenza-associated outpatient illness with any influenza virus was 51.8%. Data were insufficient to estimate type- or subtype-specific VE for the priority vaccination groups.

Among patients with SARI, adjusted VE against influenza-associated hospitalization with any influenza virus was 49.7%. Adjusted VE was 46.1% against any influenza A virus subtype; adjusted VE was 41.6% against influenza A(H1N1)pdm09 and 37.2% against influenza A(H3N2). Adjusted VE against influenza B viruses was 77.6%. Among patients in the selected vaccination groups, adjusted VE against influenza-associated

TABLE 1. Seasonal influenza vaccination status and influenza test results among patients with influenza-like illness and patients with severe acute respiratory infection, by selected characteristics — eight Southern Hemisphere countries,* March–September 2025

Characteristic	No. (column %)	Vaccination status, no. (row %)†		p-value§	Influenza test result, no. (row %)		p-value§
		Unvaccinated	Vaccinated		Negative	Positive	
Patients with ILI, total	**2,122**	**1,669 (78.7)**	**453 (21.3)**	—	**1,559 (73.5)**	**563 (26.5)**	—
Priority vaccination group¶	1,067 (50.3)	755 (70.8)	312 (29.2)	—	841 (78.8)	226 (21.2)	—
Young children	247 (11.6)	196 (79.4)	51 (20.6)	<0.001	218 (88.3)	29 (11.7)	<0.001
Persons with comorbidities	490 (23.1)	380 (77.6)	110 (22.4)		350 (71.4)	140 (28.6)	
Older adults	330 (15.6)	179 (54.2)	151 (45.8)		273 (82.7)	57 (17.3)	
Sex							
Female	1,187 (55.9)	917 (77.3)	270 (22.7)	0.076	887 (74.7)	300 (25.3)	0.14
Male	935 (44.1)	752 (80.4)	183 (19.6)		672 (71.9)	263 (28.1)	
Country							
Australia	1,442 (68.0)	1,014 (70.3)	428 (29.7)	<0.001	1,088 (75.5)	354 (24.5)	0.003
New Zealand	—	—	—		—	—	
South Africa	680 (32.0)	655 (96.3)	25 (3.7)		471 (69.3)	209 (30.7)	
REVELAC-i countries	—	—	—		—	—	
Argentina	—	—	—		—	—	
Brazil	—	—	—		—	—	
Chile	—	—	—		—	—	
Paraguay	—	—	—		—	—	
Uruguay	—	—	—		—	—	
Influenza test result							
Negative	1,559 (73.5)	1,184 (75.9)	375 (24.1)	—	1,559 (100.0)	—	—
Positive (all)	563 (26.5)	485 (86.1)	78 (13.9)		—	563 (100.0)	
Influenza A	464 (82.4)	399 (86.0)	65 (14.0)		—	464 (100.0)	
Influenza A(H1N1)pdm09	185 (39.9)	144 (77.8)	41 (22.2)		—	185 (100.0)	
Influenza A(H3N2)	211 (45.5)	205 (97.2)	6 (2.8)		—	211 (100.0)	
Influenza A (unknown subtype)	68 (14.7)	50 (73.5)	18 (26.5)		—	68 (100.0)	
Influenza B	99 (17.6)	86 (86.9)	13 (13.1)		—	99 (100.0)	

See table footnotes on the next page.

TABLE 1. (*Continued*) Seasonal influenza vaccination status and influenza test results among patients with influenza-like illness and patients with severe acute respiratory infection, by selected characteristics — eight Southern Hemisphere countries,* March–September 2025

Characteristic	No. (column %)	Vaccination status, no. (row %)†		p-value§	Influenza test result, no. (row %)		p-value§
		Unvaccinated	Vaccinated		Negative	Positive	
Patients with SARI, total	**42,752**	**35,971 (84.1)**	**6,781 (15.9)**	—	**24,965 (58.4)**	**17,787 (41.6)**	—
Priority vaccination group¶	36,455 (85.3)	30,089 (82.5)	6,366 (17.5)	—	21,755 (59.7)	14,700 (40.3)	—
Young children	16,426 (38.4)	13,935 (84.8)	2,491 (15.2)	<0.001	13,107 (79.8)	3,319 (20.2)	<0.001
Persons with comorbidities	7,066 (16.5)	6,286 (89.0)	780 (11.0)		3,674 (52.0)	3,392 (48.0)	
Older adults	12,963 (30.3)	9,868 (76.1)	3,095 (23.9)		4,974 (38.4)	7,989 (61.6)	
Sex							
Female	21,309 (49.8)	18,090 (84.4)	3,353 (15.6)	0.20	12,962 (60.4)	8,481 (39.6)	<0.001
Male	21,443 (50.2)	17,881 (83.9)	3,428 (16.1)		12,003 (56.3)	9,306 (43.7)	
Country							
Australia	4,499 (10.5)	3,394 (75.4)	1,105 (24.6)	<0.001	2,318 (51.5)	2,181 (48.5)	<0.001
New Zealand	1,335 (3.1)	1,077 (80.7)	258 (19.3)		894 (67.0)	441 (33.0)	
South Africa	—	—	—		—	—	
REVELAC-i countries							
Argentina	2,028 (4.7)	1,738 (85.7)	290 (14.3)	<0.001	1,459 (71.9)	569 (28.1)	
Brazil	28,962 (67.7)	24,882 (85.9)	4,080 (14.1)		15,698 (54.2)	13,264 (45.8)	
Chile	2,286 (5.3)	1,388 (60.7)	898 (39.3)		1,679 (73.4)	607 (26.6)	
Paraguay	3,314 (7.8)	3,218 (97.1)	96 (2.9)		2,680 (80.9)	634 (19.1)	
Uruguay	328 (0.8)	274 (83.5)	54 (16.5)		237 (72.3)	91 (27.7)	
Influenza test result							
Negative	24,965 (58.4)	20,617 (82.6)	4,348 (17.4)	—	24,965 (100.0)	—	—
Positive (all)**	17,787 (41.6)	15,354 (86.3)	2,433 (13.7)		—	17,787 (100.0)	
Influenza A	16,885 (94.9)	14,519 (86.0)	2,366 (14.0)		—	16,885 (100.0)	
Influenza A(H1N1)pdm09	9,914 (58.7)	8,582 (86.6)	1,332 (13.4)		—	9,914 (100.0)	
Influenza A(H3N2)	4,490 (26.6)	3,880 (86.4)	610 (13.6)		—	4,490 (100.0)	
Influenza A, unknown subtype	2,481 (14.7)	2,057 (82.9)	424 (17.1)		—	2,481 (100.0)	
Influenza B	837 (4.7)	781 (93.3)	56 (6.7)		—	837 (100.0)	

Abbreviations: ILI = influenza-like illness; REVELAC-i = Pan American Health Organization Network for the Evaluation of Vaccine Effectiveness in Latin America and the Caribbean–influenza (Red para la Evaluación de Vacunas en Latino América y el Caribe–influenza); SARI = severe acute respiratory infection.

* Argentina, Australia, Brazil, Chile, New Zealand, Paraguay, South Africa, and Uruguay.

† Patients who received ≥1 dose of the 2025 season influenza vaccine ≥14 days before symptom onset were considered vaccinated; patients who did not receive any influenza vaccine during the 2025 season by the time of symptom onset were considered unvaccinated. Patients vaccinated 0–13 days before symptom onset or who received positive SARS-CoV-2 reverse-transcription–polymerase chain reaction test results were excluded.

§ Pearson's chi-square test was used to ascertain differences in the number of persons who were vaccinated and unvaccinated or who received positive and negative influenza test results.

¶ Priority vaccination groups are included as mutually exclusive groups of persons considered at high risk for severe outcomes associated with influenza infection. Young children were defined as follows, by country and age: Argentina = 6 months–1 year; Australia and Uruguay = 6 months–4 years, Brazil = 6 months–5 years; Paraguay = 6 months–2 years, Chile = 6 months–10 years, and South Africa and New Zealand = not applicable (young children not included as a priority group). Older adults were defined as those aged ≥60 years (Brazil, Chile, and Paraguay) and aged ≥65 years (Argentina, Australia, New Zealand, South Africa, and Uruguay). The preexisting conditions considered by all eight countries include chronic respiratory disease (including asthma and chronic obstructive pulmonary disease), cancer, cardiovascular disease (including hypertension and stroke), diabetes and chronic renal disease, and immunocompromising conditions (including HIV/AIDS). Some conditions were considered by select countries including obesity (Argentina, Australia, Brazil, Chile, Paraguay and Uruguay), chronic neurologic diseases (Australia and New Zealand), chronic liver disease (Australia and New Zealand), tuberculosis (New Zealand and South Africa), current alcohol/drug dependency (New Zealand), chronic hematologic disorder (Australia and New Zealand), chronic metabolic disorder (Australia), and long-term aspirin therapy in children aged 5–19 years (Australia).

** Fifty-three SARI case-patients from Argentina and 12 SARI case-patients from Brazil did not have an influenza type or subtype reported.

hospitalization with any influenza virus was 45.7%; VE was 51.3% among young children, 51.9% among persons with comorbidities, and 37.7% among older adults.

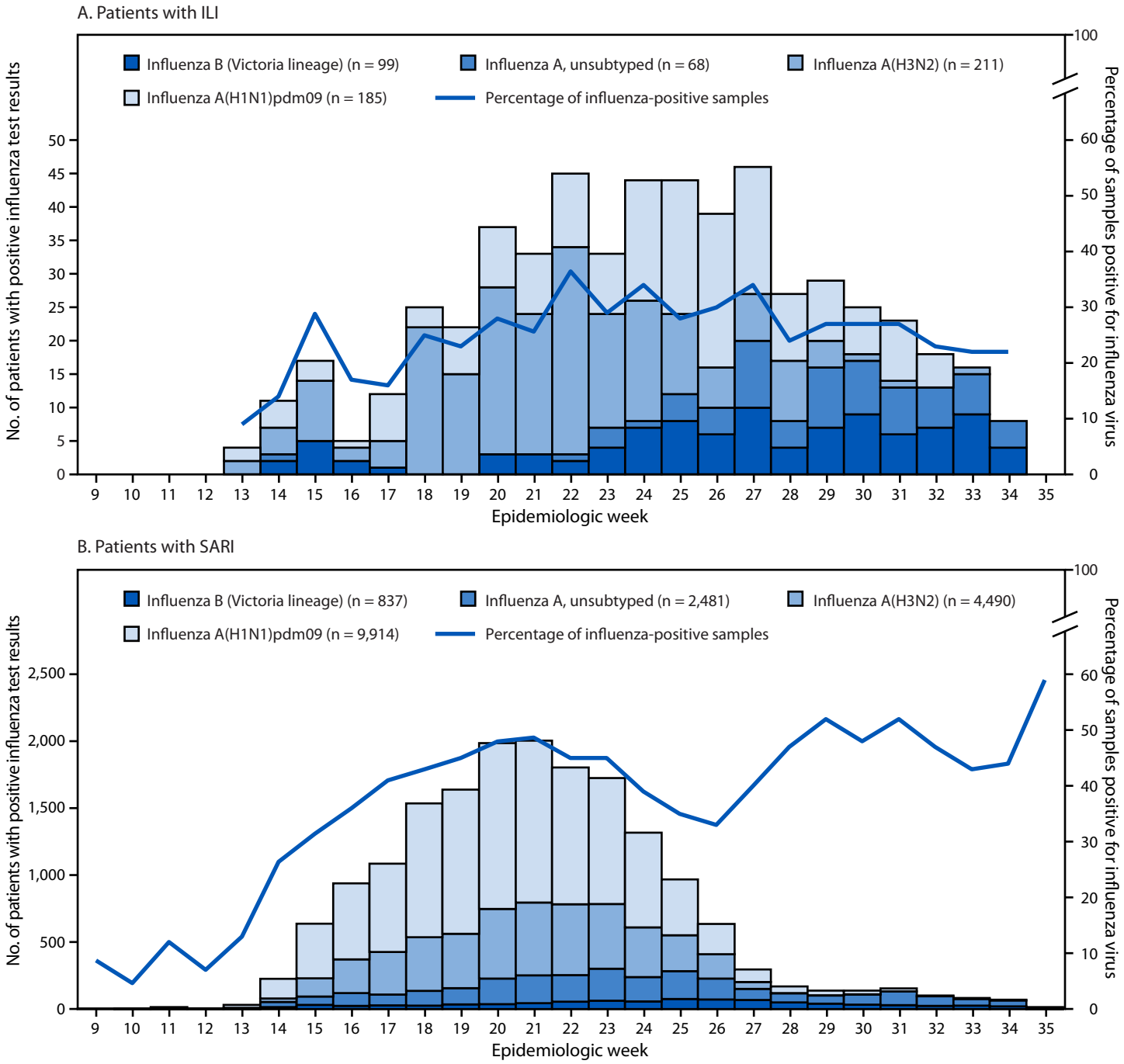
Genetic Characterization of Viruses Reported

As of September 5, 2025, the majority of A(H1N1)pdm09 influenza viruses reported by study countries to GISAID were clade 5a.2a.1 (94.5%). Among A(H3N2) viruses, 100% were clade 2a.3a.1; 100% of influenza B viruses were the Victoria lineage and clade V1A.3a.2 (Journal of Open Source Software: Nextclade).

Discussion

Findings from this evaluation suggest that the 2025 seasonal influenza vaccines reduced influenza-associated outpatient visits and hospitalization by an estimated one half in eight Southern Hemisphere countries. These estimates are similar to interim VE estimates from the 2024–25 Northern Hemisphere season against illness from any influenza virus in an outpatient (40%–56%) (*3*,*7*) and hospital (34%–52%) setting (*7*). Within the prioritized vaccination groups, VE against influenza A virus–associated and influenza A(H1N1) pdm09 virus–associated hospitalizations was higher among

FIGURE. Number of patients with influenza-like illness (A)* and patients with severe acute respiratory infection† (B) with positive influenza test results, by week,§,¶ influenza type and subtype, and percentage of all samples positive for influenza virus — eight Southern Hemisphere countries, 2025



Abbreviations: ILI = influenza-like illness; SARI = severe acute respiratory infection.

* Patients with ILI reported from Australia (weeks 13-35) and South Africa (weeks 13-30).

† Patients with SARI reported from Argentina (weeks 13–27), Australia (weeks 13–35), Brazil (weeks 14–27), Chile (weeks 9–26), New Zealand (weeks 14–34), Paraguay (weeks 14-26), and Uruguay (weeks 16–25).

§ ILI surveillance begins in week 13 and concludes in week 34.

¶ Epidemiologic week 9 started on March 1, 2025; epidemiologic week 35 ended on September 1, 2025.

TABLE 2. Interim 2025 Southern Hemisphere seasonal influenza vaccine effectiveness against influenza in patients with influenza-like illness and patients with severe acute respiratory infection — eight Southern Hemisphere countries,* March–September 2025

Influenza type, priority vaccination group,† and country	Case-patients with positive influenza test results§		Control patients with negative influenza test results		Vaccine effectiveness¶	
	Total, no.	Vaccinated, no. (%)	Total, no.	Vaccinated, no. (%)	Unadjusted % (95% CI)	Adjusted % (95% CI)
Patients with ILI						
Any influenza virus, type A or B, total	563	78 (13.9)	1,559	375 (24.1)	49.2 (33.8 to 61.1)	50.4 (33.2 to 63.2)
Priority vaccination groups	226	49 (21.7)	841	263 (31.3)	39.2 (13.8 to 57.1)	51.8 (27.9 to 67.7)
Young children	29	1 (3.4)	218	50 (22.9)	NC	NC
Persons with comorbidities	140	23 (16.4)	350	87 (24.9)	NC	NC
Older adults	57	25 (43.9)	273	126 (46.2)	NC	NC
Influenza virus type A, total	464	65 (14.0)	1559	375 (24.1)	48.6 (31.5 to 61.4)	45.4 (24.4 to 60.5)
Priority vaccination groups	195	46 (23.6)	841	263 (31.3)	32.2 (2.6 to 52.7)	45.7 (17.5 to 64.3)
Young children	21	1 (4.8)	218	50 (22.9)	NC	NC
Persons with comorbidities	117	20 (17.1)	350	87 (24.9)	NC	NC
Older adults	57	25 (43.9)	273	126 (46.2)	NC	NC
Influenza A(H1N1)pdm09 virus, total	185	41 (22.2)	1559	375 (24.1)	10.1 (–29.6 to 37.6)	53.3 (29.3 to 69.1)
Priority vaccination groups	105	30 (28.6)	841	263 (31.3)	12.1 (–37.6 to 43.8)	55.5 (25.4 to 73.5)
Young children	17	0 (—)	218	50 (22.9)	NC	NC
Persons with comorbidities	54	13 (24.1)	350	87 (24.9)	NC	NC
Older adults	34	17 (50.0)	273	126 (46.2)	NC	NC
Influenza A(H3N2) virus, total	211	6 (2.8)	1,559	375 (24.1)	NR	NR
Priority vaccination groups	54	4 (7.4)	841	263 (31.3)	NR	NR
Young children	0	0 (—)	218	50 (22.9)	NC	NC
Persons with comorbidities	46	4 (8.7)	350	87 (24.9)	NC	NC
Older adults	8	0 (—)	273	126 (46.2)	NC	NC
Influenza virus type B, total	99	13 (13.1)	1,559	375 (24.1)	52.3 (13.5 to 73.7)	62.3 (28.8 to 80.0)
Priority vaccination groups	31	3 (9.7)	841	263 (31.3)	76.5 (21.9 to 92.9)	77.7 (19.7 to 93.8)
Young children	8	0 (—)	218	50 (22.9)	NC	NC
Persons with comorbidities	23	3 (13.0)	350	87 (24.9)	NC	NC
Older adults	0	0 (—)	273	126 (46.2)	NC	NC
Any influenza virus type A or B, by country						
Australia	354	72 (20.3)	1,088	356 (32.7)	47.5 (30.0 to 60.6)	59 (43.6 to 70.2)
New Zealand	—	—	—	—	—	—
South Africa	209	6 (2.9)	471	19 (4.0)	NR	NR
REVELAC-i	—	—	—	—	—	—
Argentina	—	—	—	—	—	—
Brazil	—	—	—	—	—	—
Chile	—	—	—	—	—	—
Paraguay	—	—	—	—	—	—
Uruguay	—	—	—	—	—	—
Patients with SARI						
Any influenza virus, type A or B, total	17,787	2,433 (13.7)	24,965	4,348 (17.4)	24.9 (20.7 to 28.8)	49.7 (46.3 to 52.8)
Priority vaccination groups	14,700	2,278 (15.5)	21,755	4,088 (18.8)	20.7 (16.2 to 25.1)	45.7 (41.8 to 49.3)
Young children	3,319	295 (8.9)	13,107	2,196 (16.8)	51.5 (44.9 to 57.4)	51.3 (44.5 to 57.3)
Persons with comorbidities	3,392	302 (8.9)	3,674	478 (13.0)	34.7 (23.9 to 43.9)	51.9 (43.2 to 59.3)
Older adults	7,989	1,681 (21.0)	4,974	1,414 (28.4)	32.9 (27.2 to 38.2)	37.7 (31.7 to 43.1)
Influenza virus type A, total	16,885	2,366 (14.0)	24,965	4,348 (17.4)	22.7 (18.4 to 26.8)	46.1 (42.4 to 49.6)
Priority vaccination groups	14,206	2,223 (15.6)	21,755	4,088 (18.8)	19.8 (15.2 to 24.2)	43.4 (39.3 to 47.2)
Young children	3,137	274 (8.7)	13,107	2,196 (16.8)	52.4 (45.7 to 58.3)	51.1 (44.0 to 57.3)
Persons with comorbidities	3,172	286 (9.0)	3674	478 (13.0)	33.7 (22.6 to 43.2)	48.9 (39.4 to 56.9)
Older adults	7,897	1,663 (21.1)	4974	1,414 (28.4)	32.8 (27.1 to 38.1)	35.0 (28.7 to 40.7)
Influenza A(H1N1)pdm09 virus, total	9,914	1,332 (13.4)	24,965	4,348 (17.4)	26.4 (21.4 to 31.1)	41.6 (36.7 to 46.0)
Priority vaccination groups	8,405	1,261 (15.0)	21,755	4,088 (18.8)	23.7 (18.3 to 28.8)	38.8 (33.5 to 43.8)
Young children	1,657	123 (7.4)	13,107	2,196 (16.8)	60.2 (51.9 to 67.0)	53.4 (43.5 to 61.6)
Persons with comorbidities	1,875	161 (8.6)	3,674	478 (13.0)	37.2 (24.2 to 48.0)	44.6 (31.9 to 54.9)
Older adults	4,873	977 (20.0)	4,974	1,414 (28.4)	36.9 (30.7 to 42.5)	29.7 (21.9 to 36.7)
Influenza A(H3N2) virus, total	4,490	610 (13.6)	24,965	4,348 (17.4)	25.5 (18.3 to 32.0)	37.2 (29.7 to 43.9)
Priority vaccination groups	3,822	573 (15.0)	21,755	4,088 (18.8)	23.8 (16.2 to 30.7)	34.7 (26.5 to 42.0)
Young children	913	101 (11.1)	13,107	2,196 (16.8)	38.2 (23.6 to 50.0)	30.3 (13.3 to 43.9)
Persons with comorbidities	744	43 (5.8)	3,674	478 (13.0)	59.0 (43.4 to 70.3)	58.4 (40.4 to 70.9)
Older adults	2,165	429 (19.8)	4,974	1,414 (28.4)	37.8 (29.7 to 44.9)	28.8 (17.4 to 38.6)

See table footnotes on the next page.

TABLE 2. (*Continued*) Interim 2025 Southern Hemisphere seasonal influenza vaccine effectiveness against influenza in patients with influenza-like illness and patients with severe acute respiratory infection — eight Southern Hemisphere countries,* March–September 2025

Influenza type, priority vaccination group,† and country	Case-patients with positive influenza test results§		Control patients with negative influenza test results		Vaccine effectiveness¶	
	Total, no.	Vaccinated, no. (%)	Total, no.	Vaccinated, no. (%)	Unadjusted % (95% CI)	Adjusted % (95% CI)
Influenza virus type B, total	837	56 (6.7)	24,965	4,348 (17.4)	66.0 (55.3 to 74.1)	77.6 (70.0 to 83.3)
Priority vaccination groups	445	45 (10.1)	21,755	4,088 (18.8)	51.4 (33.7 to 64.3)	74.8 (64.9 to 81.9)
Young children	172	17 (9.9)	13,107	2,196 (16.8)	45.5 (9.9 to 67.0)	64.4 (40.6 to 78.7)
Persons with comorbidities	196	15 (7.7)	3,674	478 (13.0)	44.6 (5.4 to 67.6)	71.8 (50.0 to 84.1)
Older adults	77	13 (16.9)	4,974	1,414 (28.4)	48.9 (6.9 to 71.9)	82.3 (67.1 to 90.4)
Any influenza virus type A or B, by country						
Australia	2,181	448 (20.5)	2,318	657 (28.3)	34.6 (25.0 to 43.0)	55.0 (47.0 to 61.8)
New Zealand	441	64 (14.5)	894	194 (21.7)	38.7 (16.6 to 55.0)	45.5 (22.6 to 61.7)
South Africa	—	—	—	—	—	—
REVELAC-i	15,165	1,921 (12.7)	21,753	3,497 (16.1)	24.3 (19.6 to 28.7)	40.3 (35.7 to 44.5)
Argentina	569	54 (9.5)	1,459	236 (16.2)	45.7 (25.7 to 60.3)	51.1 (32.3 to 64.7)
Brazil	13,264	1,645 (12.4)	15,698	2,435 (15.5)	22.9 (17.5 to 27.9)	40.1 (34.8 to 45.0)
Chile	607	198 (32.6)	1,679	700 (41.7)	32.3 (17.7 to 44.3)	40.5 (25.8 to 52.2)
Paraguay	634	12 (1.9)	2,680	84 (3.1)	40.4 (–9.9 to 67.6)	47.1 (2.0 to 71.5)
Uruguay	91	12 (13.2)	237	42 (17.7)	29.5 (–41.0 to 64.7)	31.9 (–41.6 to 67.2)

Abbreviations: ILI = influenza-like illness; NC = not calculated; NR = not reported; REVELAC-i = Pan American Health Organization Network for the Evaluation of Vaccine Effectiveness in Latin America and the Caribbean–influenza (Red para la Evaluación de Vacunas en Latino América y el Caribe–influenza); SARI = severe acute respiratory infection.

* Argentina, Australia, Brazil, Chile, New Zealand, Paraguay, South Africa, and Uruguay.

† Priority vaccination groups are included as mutually exclusive groups of persons considered at high risk for severe outcomes associated with influenza infection. Young children were defined as follows, by country and age: Argentina = 6 months–1 year; Australia and Uruguay = 6 months–4 years; Brazil = 6 months–5 years; Paraguay = 6 months–2 years, Chile = 6 months–10 years; and South Africa and New Zealand = not applicable (young children not included as a priority group). Older adults were defined as those aged ≥60 years (Brazil, Chile, and Paraguay) and aged ≥65 years (Argentina, Australia, New Zealand, South Africa, and Uruguay). The preexisting conditions considered by all eight countries include chronic respiratory disease (including asthma and chronic obstructive pulmonary disease), cancer, cardiovascular disease (including hypertension and stroke), diabetes and chronic renal disease, and immunocompromising conditions (including HIV/AIDS). Some conditions were considered by select countries including obesity (Argentina, Australia, Brazil, Chile, Paraguay and Uruguay), chronic neurologic diseases (Australia and New Zealand), chronic liver disease (Australia and New Zealand), tuberculosis (New Zealand and South Africa), current alcohol or drug dependency (New Zealand), chronic hematologic disorder (Australia and New Zealand), chronic metabolic disorder (Australia), and long-term aspirin therapy in children aged 5–19 years (Australia).

§ Reverse-transcription polymerase–chain reaction testing for influenza was conducted at national reference laboratories.

¶ Vaccine effectiveness estimated from logistic regression model adjusting for sex, age in years (fit as a cubic spline with five knots), week of symptom onset (fit within each country as a cubic spline with five knots), and country.

young children than among older adults, consistent with interim VE estimates from past Southern and Northern Hemisphere seasons (*3*,*4*).

Influenza vaccination provides important protection from influenza illness and associated potential complications. Despite this, 21% of patients with ILI and 16% of patients with SARI in this population had received the 2025 influenza vaccine. Surveys regarding influenza vaccine knowledge, attitudes, and practice might help to identify improved vaccine messaging and campaign approaches for increasing coverage in subsequent Southern Hemisphere seasons.

Examination of seasonal influenza VE in the Southern Hemisphere can provide information for influenza vaccine composition deliberations for the subsequent Southern Hemisphere season. In addition, these VE estimates help to prepare Northern Hemisphere health authorities for anticipated levels of protection that influenza vaccines might provide, should similar viral clades predominate during the 2025–26 season (*8*). To add to mitigation efforts against severe illness in the coming season, health care providers can recommend the use of antivirals, where available, for patients with suspected or confirmed influenza.

Limitations

The findings in this report are subject to at least six limitations. First, the interim VE estimates included are preliminary and might differ from end-of-season estimates. Second, estimates for patients with ILI were generated using a small analytic sample which reduced precision and prevented estimation of VE across all subgroups. Third, despite use of high-quality surveillance data, 61% of patients were excluded because of missing RT-PCR results, which might have biased estimates and suggests a need to strengthen the integration of laboratory and epidemiologic data used to support this analysis. Fourth, this analysis was unable to distinguish between previously unvaccinated young children who received 1 dose versus the recommended 2 doses of influenza vaccine, potentially biasing VE among this population. Fifth, the sequenced specimens reported to GISAID are not necessarily the same as those from patients included in this VE evaluation. Finally, these VE

Summary

What is already known about this topic?

Monitoring seasonal influenza vaccine effectiveness in Southern Hemisphere countries can guide health authorities in Northern Hemisphere countries about the potential protection provided from vaccination.

What is added by this report?

During the 2025 Southern Hemisphere influenza season, seasonal influenza vaccination reduced influenza-associated outpatient visits by 50.4% and hospitalization by 49.7%.

What are the implications for public health practice?

CDC recommends that all eligible persons aged ≥6 months receive the seasonal influenza vaccine. The 2025–26 Northern Hemisphere seasonal influenza vaccine composition is the same as that used during the 2025 Southern Hemisphere influenza season and might be similarly effective if the same viruses circulate in the coming season.

estimates might not be generalizable to Southern Hemisphere countries that have had different circulating viruses in the 2025 season.

Implications for Public Health Practice

Interim VE estimates for the Southern Hemisphere 2025 influenza season suggest that influenza vaccines were effective in reducing influenza-associated outpatient visits and hospitalization by approximately one half. Examination of influenza VE during the Southern Hemisphere season might provide insights for health authorities who are actively preparing and planning for the upcoming Northern Hemisphere influenza season. The 2025–2026 Northern Hemisphere seasonal influenza vaccine composition is the same as the 2025 Southern Hemisphere seasonal influenza vaccine; health authorities in Northern Hemisphere locations might anticipate similar levels of protection against influenza illness, should the same influenza viruses circulate during the upcoming season. These findings support CDC's recommendations for all eligible persons aged ≥6 months to receive a seasonal influenza vaccine before the start of the Northern Hemisphere influenza season (*9*).

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