



Interim Influenza Vaccine Effectiveness against Inpatient, Emergency Department, and Outpatient Illness in the 2022–23 season

Data from the New Vaccine Surveillance Network (NVSN),
Flu and Other Viruses in the Acutely Ill Network (IVY),
& VISION Network

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Preliminary results

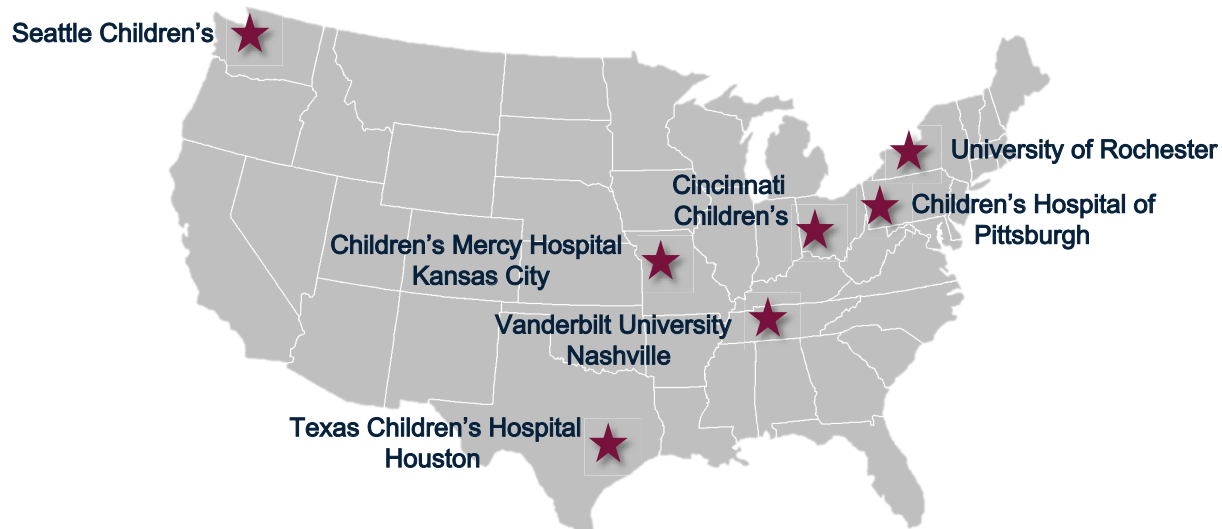
Three networks to evaluate vaccine effectiveness against laboratory-confirmed influenza-associated **outpatient visits, emergency department visits, and hospitalization**

Vaccine effectiveness (VE) against influenza-associated **hospitalization** and **emergency department** visits among **children** aged 6 months – 17 years

New Vaccine Surveillance Network (NVSN)

Preliminary Results

NVSN* Pediatric Inpatient & ED Network sites, 2022-2023



*NVSN-New Vaccine Surveillance Network

NVSN Methods

Enrollees: Inpatient and ED patients aged >6 months to 17 years with acute respiratory illness within 10 days of illness onset

Dates of enrollment: September 13, 2022–January 25, 2023

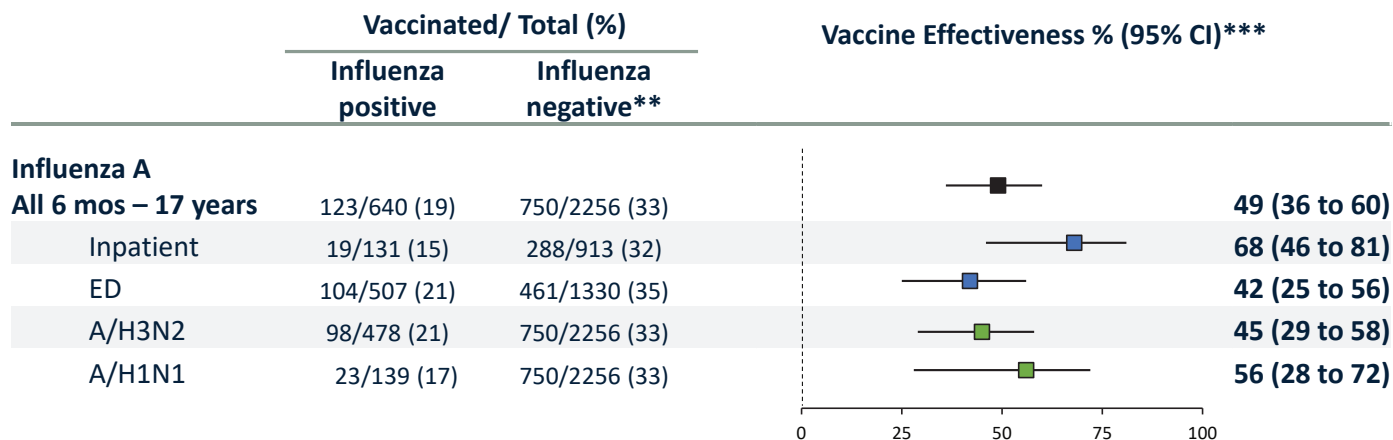
Design: Test-negative design

- Comparing vaccination odds among case patients with RT-PCR confirmed influenza versus control patients testing negative for influenza and SARS-CoV-2
- Vaccination status: receipt of at least one dose of any 2022–23 seasonal flu vaccine according to medical records, immunization registries, and/or self-report

Analysis: $VE = (1 - \text{adjusted OR}) \times 100\%$

- Adjustment for site, age, and calendar time of admission

Vaccine effectiveness against laboratory confirmed influenza A* in hospital and ED settings, September 13, 2022–January 25, 2023



*Of 335 influenza-positive specimens sequenced, 250 were A(H3N2) clade 3C.2a1b.2a.2b and 32 were clade 3C.2a1b.2a.2a.1 and 38 were A(H1N1) clade 6B.1A.5a.2a.1. There were 16 coinfections with Influenza and SARS-CoV-2 that were excluded from the VE estimate.

**Persons testing negative for both influenza and SARS-CoV-2 using molecular assays.

***Multivariable logistic regression models adjusted for site, age, and calendar time.

Preliminary interim estimates—NVSN

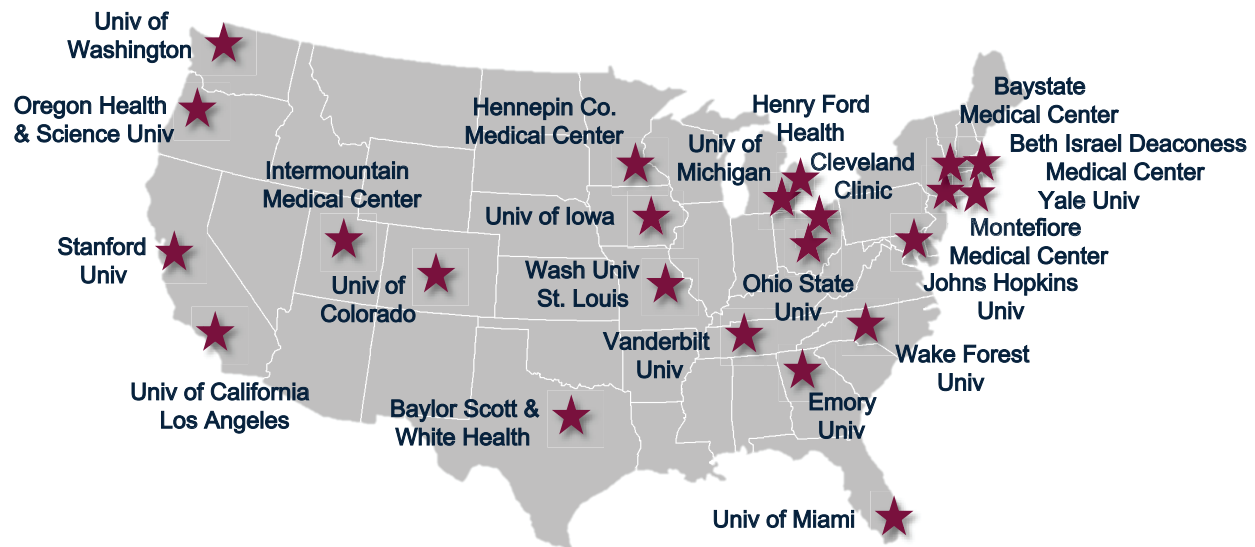
- Through January 25, 2023, influenza vaccination significantly reduced laboratory confirmed medically attended influenza
 - 68% (95% CI: 46, 81) against pediatric hospitalizations
 - 42% (95% CI: 25, 56) against pediatric ED visits
- Important protection against both A/H3N2 and A/H1N1 associated illness

VE against influenza-associated
hospitalization among patients aged
≥18 years

Investigating Respiratory Viruses in the
Acutely Ill (IVY)

Preliminary Results

IVY* Adult Inpatient Network sites, 2022–2023



*IVY—Investigating Respiratory Viruses in the Acutely Ill

IVY Methods

Enrollees: Inpatient patients aged ≥ 18 years with acute respiratory illness with fever or cough ≤ 7 days duration

Dates of enrollment: October 1, 2022–February 28, 2023

Design: Test-negative design

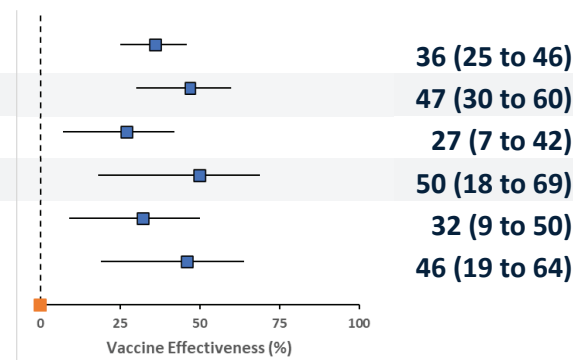
- Comparing vaccination odds among influenza RT-PCR positive cases and influenza RT-PCR negative controls, excluding persons testing positive for SARS-CoV-2
- Vaccination status: receipt of at least one dose of any 2022–23 seasonal flu vaccine according to medical records, immunization registries, and/or self-report

Analysis: $VE = (1 - \text{adjusted OR}) \times 100\%$

- Adjustment for census region, age, sex, race/ethnicity and month of onset

Vaccine effectiveness against laboratory confirmed influenza A in inpatient settings, October 1, 2022–February 28, 2023

	Vaccinated/ Total (%)		Vaccine Effectiveness % (95% CI)**
	Influenza positive	Influenza negative*	
Influenza A			
All adults ≥18 years	238/713 (33)	1499/3056 (49)	36 (25 to 46)
18-64 years	90/382 (24)	591/1443 (41)	47 (30 to 60)
≥65 years	135/343 (48)	908/1613 (50)	27 (7 to 42)
Immunocompromised****	39/93 (37)	275/469 (59)	50 (18 to 69)
A(H3N2)	81/245 (33)	1499/3056 (49)	32 (9 to 50)
A (H1N1)	39/129 (30)	1499/3056 (49)	46 (19 to 64)



* Multivariable logistic regression models adjusted for Census region, age, sex, race/ethnicity, month, number of categories of chronic medical conditions reported (0,1,2,3, or ≥4) and number of medications taken.

** Includes active solid-organ cancer, active hematologic cancer, solid-organ transplant, bone marrow/stem cell transplant, HIV infection, congenital immunodeficiency syndrome, use of an immunosuppressive medication within the past 30 days, splenectomy, graft-versus-host disease (currently or in the past), or any other condition that causes moderate or severe immunosuppression.

IVY

Preliminary interim estimates—IVY

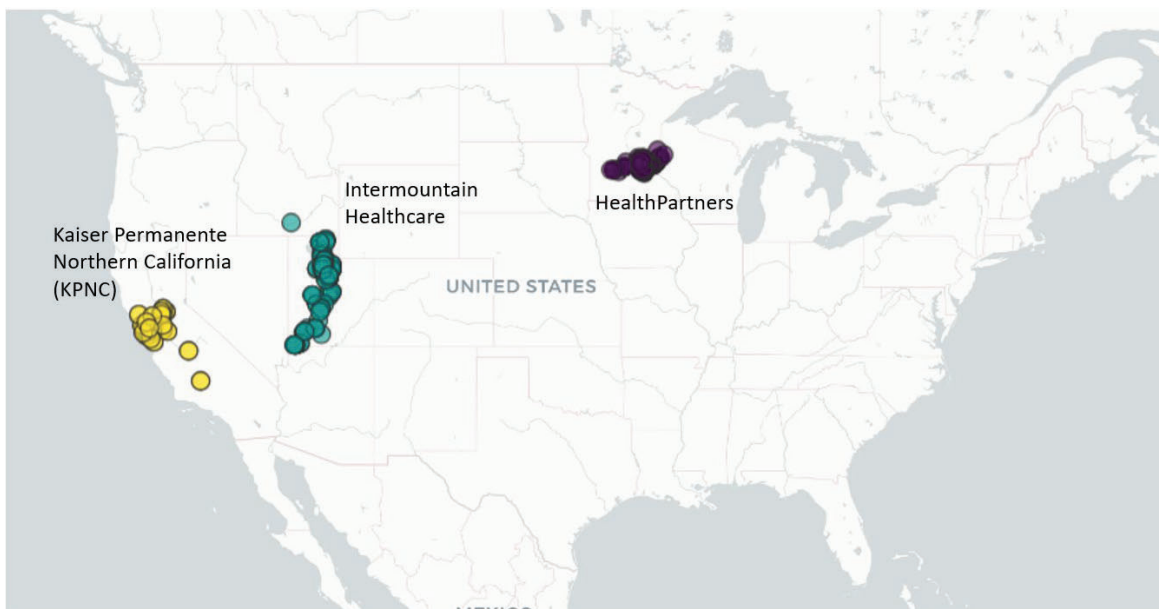
- Through February 28, 2023, influenza vaccination significantly reduced laboratory confirmed medically attended influenza
 - 43% (95%CI: 30% to 54%) against adult hospitalizations
- Important protection among adults aged 18-64 and ≥65 years, and immunocompromised adults, and for both subtypes A(H3N2) and A(H1N1)

Influenza vaccine effectiveness (VE) against influenza-associated **hospitalization** and **emergency department / urgent care** visits among **adults** aged ≥ 18 years

VISION Network

Preliminary Results

VISION Network sites, 2022-2023



VISION Methods

Encounters: ED/UC or inpatient encounters among adults ≥18 years tested for influenza and with ≥1 acute respiratory illness (ARI)-associated ICD-10 discharge code

Dates: October 15, 2022–January 24, 2023

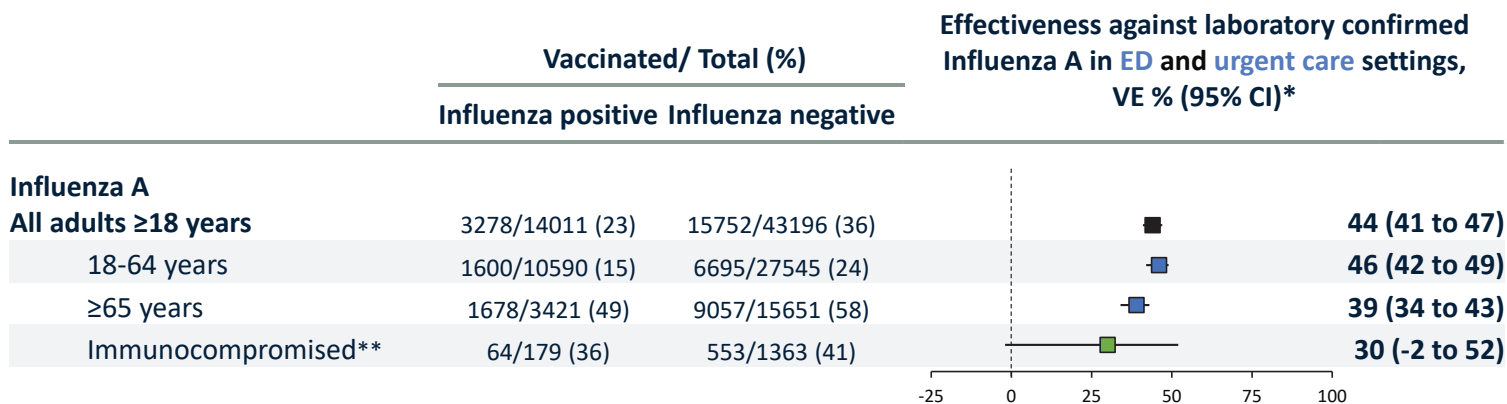
Design: Test-negative design

- Comparing vaccination odds among patients with influenza A confirmed by molecular assay versus controls who tested negative for influenza and SARS-CoV-2
- Vaccination status: receipt of any 2022–23 seasonal flu vaccine ≥14 days before index date according to medical records, immunization registries, claims data

Analysis: $VE = (1 - \text{adjusted OR}) \times 100\%$

- Inverse-propensity-to-be-vaccinated weights and adjustment for patient age, study site, and calendar time

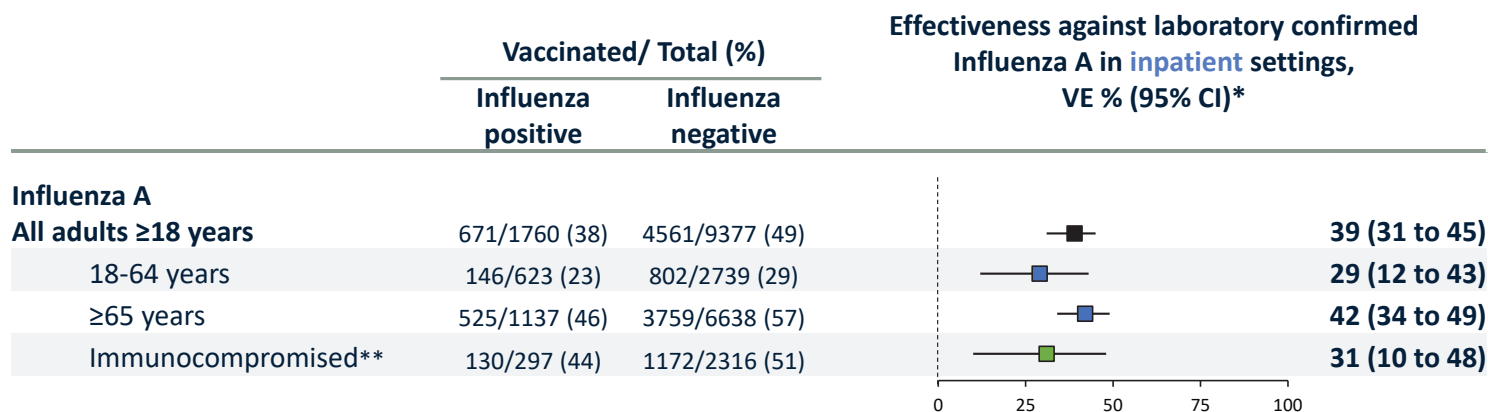
Vaccine effectiveness against laboratory confirmed influenza A in ED/UC settings, October 15, 2022–January 24, 2023



* Adjusted for patient age, study site, and calendar time.

** Defined as at least one discharge diagnosis for solid malignancy, hematologic malignancy, rheumatologic or inflammatory disorder, other intrinsic immune condition or immunodeficiency, or organ or stem cell transplant.

Vaccine effectiveness against laboratory confirmed influenza A in Hospital settings, October 15, 2022–January 21, 2023



* Adjusted for patient age, study site, and calendar time.

** Defined as at least one discharge diagnosis for solid malignancy, hematologic malignancy, rheumatologic or inflammatory disorder, other intrinsic immune condition or immunodeficiency, or organ or stem cell transplant.

VISION

Preliminary interim estimates—VISION

- Through January 2023, influenza vaccination significantly reduced laboratory confirmed medically attended influenza
 - 39% (95%CI: 31, 45) against adult hospitalizations
 - 44% (95%CI: 41, 47) against adult ED or UC visits
 - VE observed across age group and immunocompromised
- Estimates higher than VE estimates against hospitalization (25%) and ED or UC visits (25%) from the 2021–22 season at the same VISION sites
- Limitations include lack of VE by influenza A subtype

Discussion

Summary of Three Flu VE Networks

- Across three Flu VE platforms, we observed **consistent influenza vaccine effectiveness** during the 2022-2023 season.
- Influenza **vaccination provided substantial protection** against inpatient, emergency department, and outpatient illness **among all ages**.
- Influenza **vaccination provided substantial protection among important high-risk groups** (ages 65+ and immunocompromised).

Network Contributors

NVSN

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VISION

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IVY

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Thank you!

For more information, contact CDC
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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

