



End-of-Season Estimates of 2019–20 Seasonal Influenza Vaccine Effectiveness against Medically Attended Influenza from three U.S. Networks

Data from the US Flu VE Network,
New Vaccine Surveillance Network (NVSN), and
Hospitalized Adult Influenza Vaccine Effectiveness Network (HAIVEN)

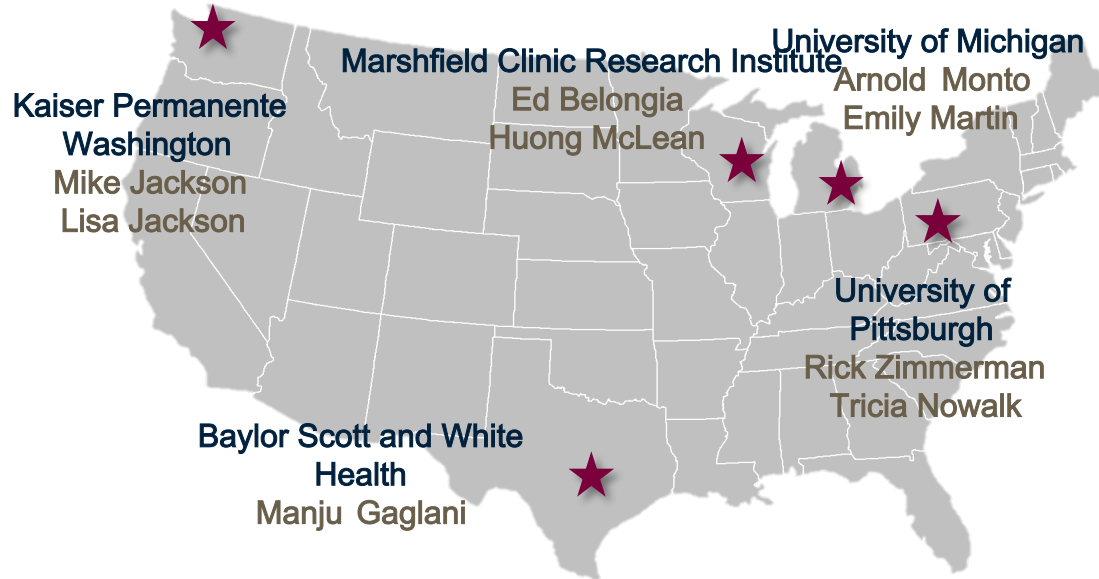
Advisory Committee on Immunization Practices

October 28, 2020

Preliminary results

Three networks to evaluate vaccine effectiveness against laboratory-confirmed influenza in ambulatory and inpatient settings

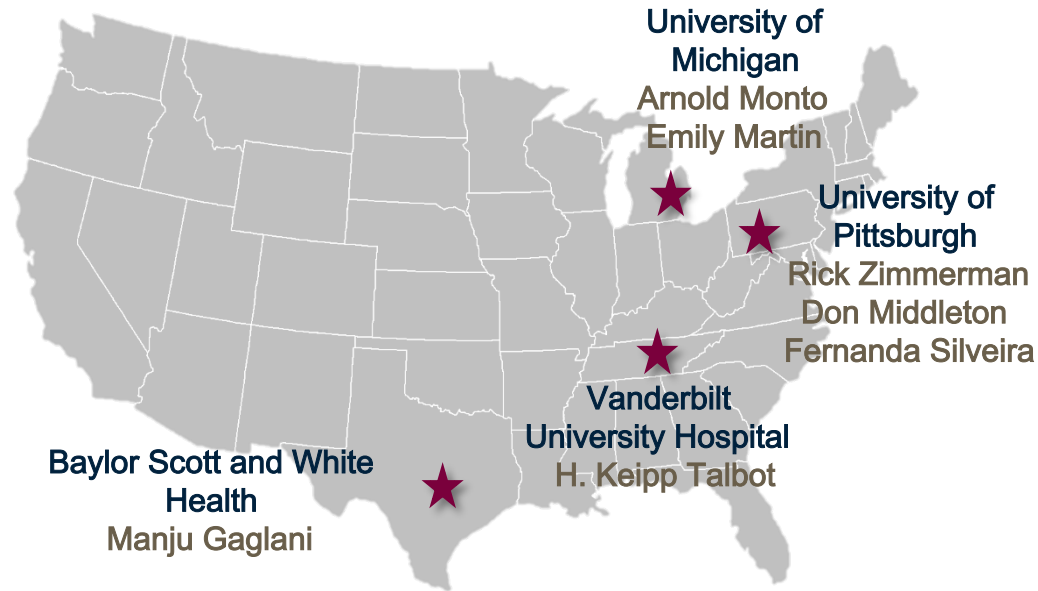
Ambulatory patients—ages ≥ 6 months: US Flu VE* Network sites and principal investigators



	US Flu VE
Setting	Ambulatory
Ages	≥ 6 months
Symptoms	ARI
Symptom duration	≤ 7

*US Flu VE—US Influenza Vaccine Effectiveness Network

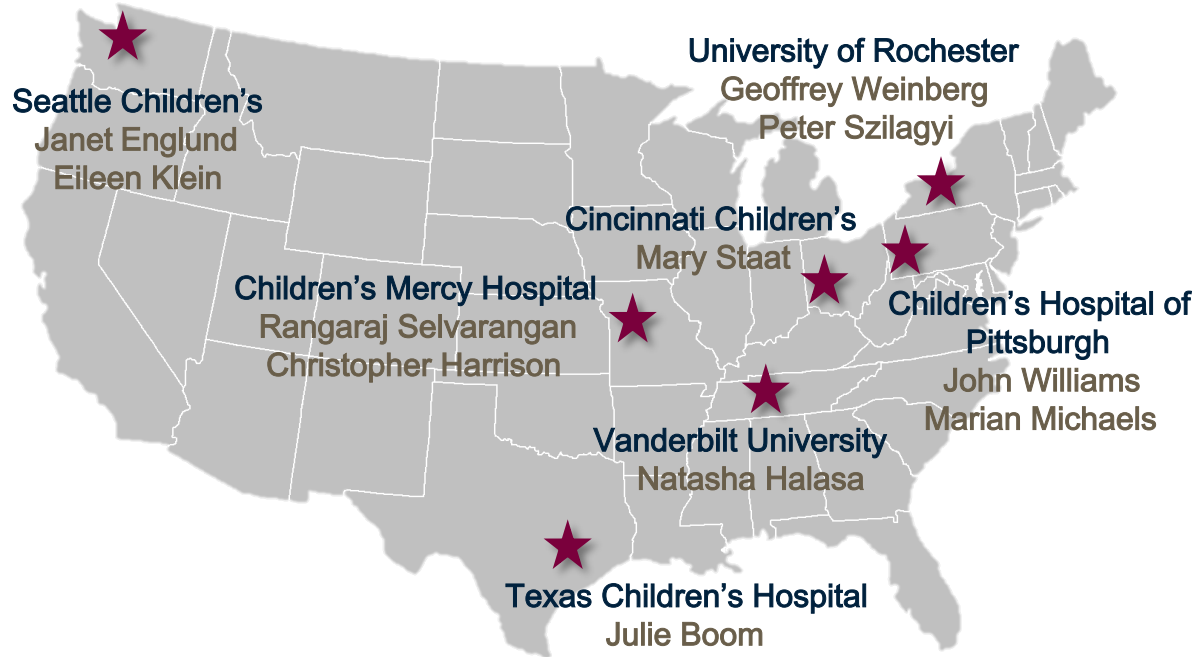
Inpatients—adults aged ≥ 18 years: HAIVEN* sites and principal investigators



	HAIVEN
Setting	Inpatient
Ages	≥ 18 years
Symptoms	ARI
Symptom duration	≤ 10

*HAIVEN-Hospitalized Adult Influenza Vaccine Effectiveness Network

Inpatients—children aged 6 months–17 years: NVSN* sites and principal investigators



	NVSN
Setting	Inpatient/ED
Ages	6 months-17 years
Symptoms	ARI
Symptom duration	≤ 10

*NVSN-New Vaccine Surveillance Network

Methods

Design: Test-negative design

- Comparing odds of influenza vaccination among patients with laboratory-confirmed influenza vs. patients testing influenza negative by RT-PCR
- Vaccination status: receipt of one dose (≥ 1 dose for children 6m-8 years) of any 2019–20 seasonal flu vaccine at least 14 days prior to illness onset (if known)
- Sources: Medical records, immunization registries, and/or self-report

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

- Adjustment for potential confounding variables (i.e. study site, age, calendar time)

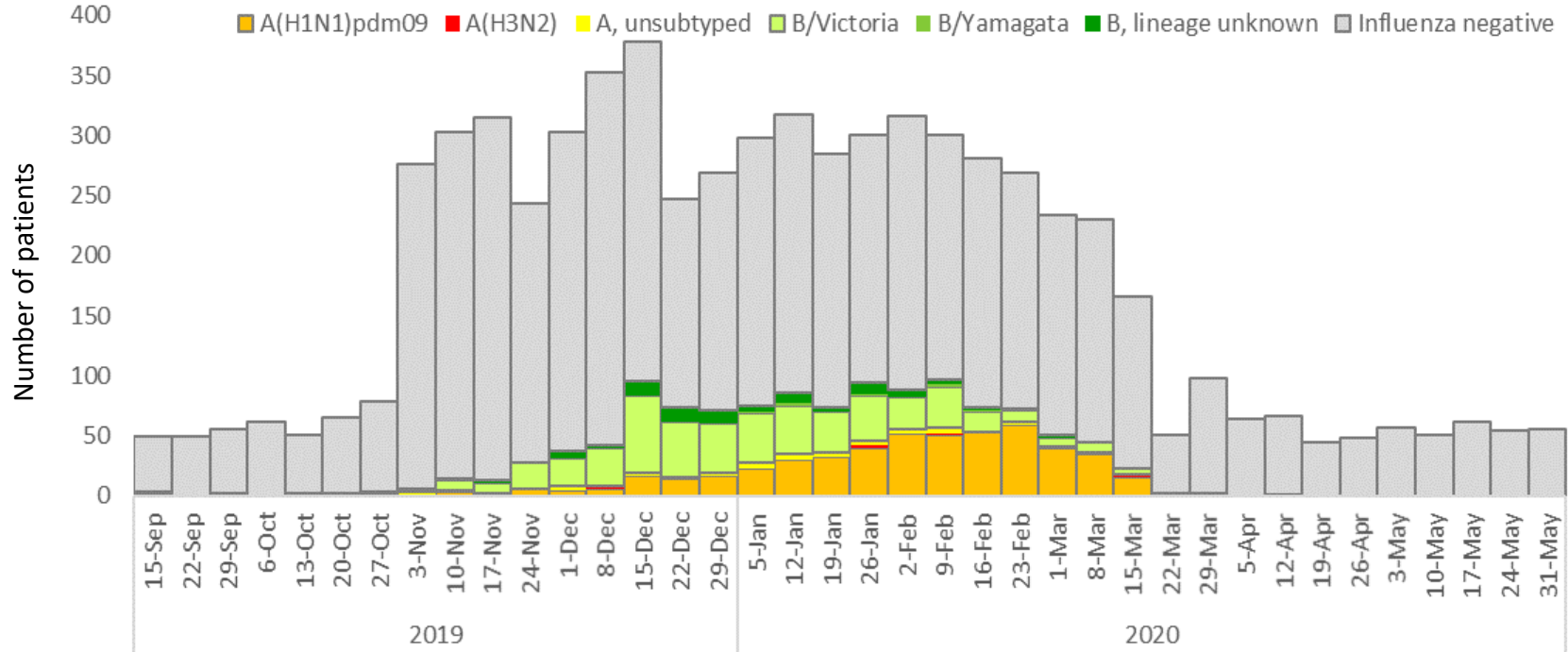
Influenza virus type/subtype distribution by VE network

	US Flu VE	HAIVEN	NVSN-Hosp
Enrollment period	Nov-Mar	Oct-Mar	Sep-May
Enrolled	8,845	3,116	2,029
Influenza pos (%)	2,722(31%)	553 (18%)	335 (17%)

Enrollment period
Enrolled
Influenza pos (%)

NVSN-ED
Sep-May
2,102
671 (32%)

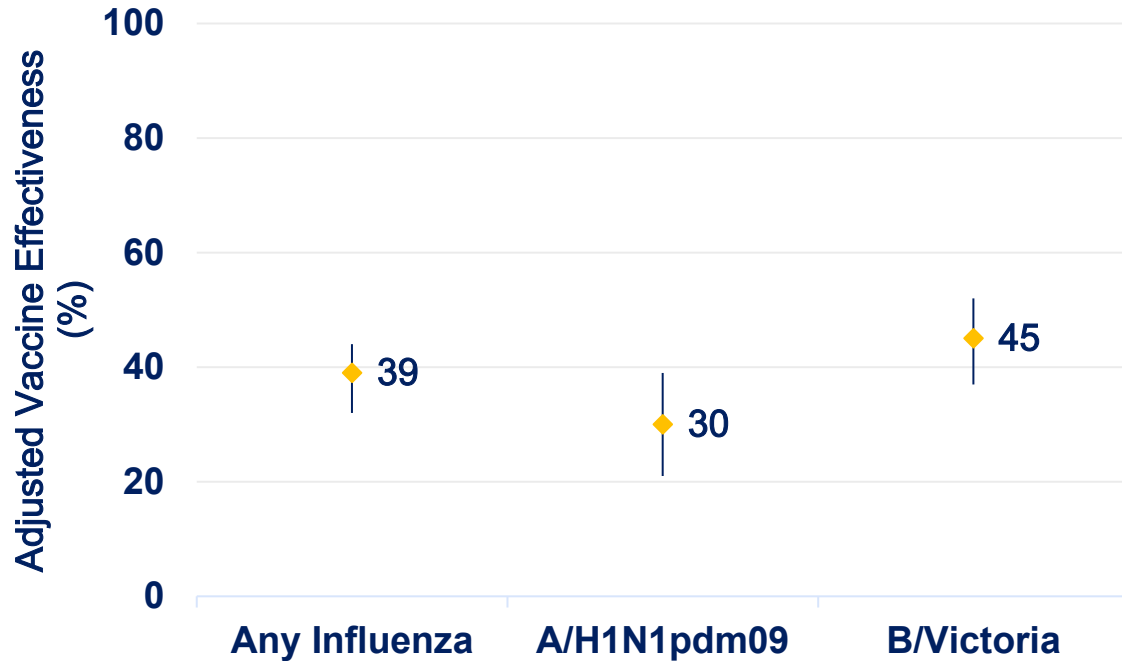
Influenza Virus Infections in NVSN Hospitalized and ED Subjects, 2019–2020



Ambulatory settings – ages ≥ 6 months

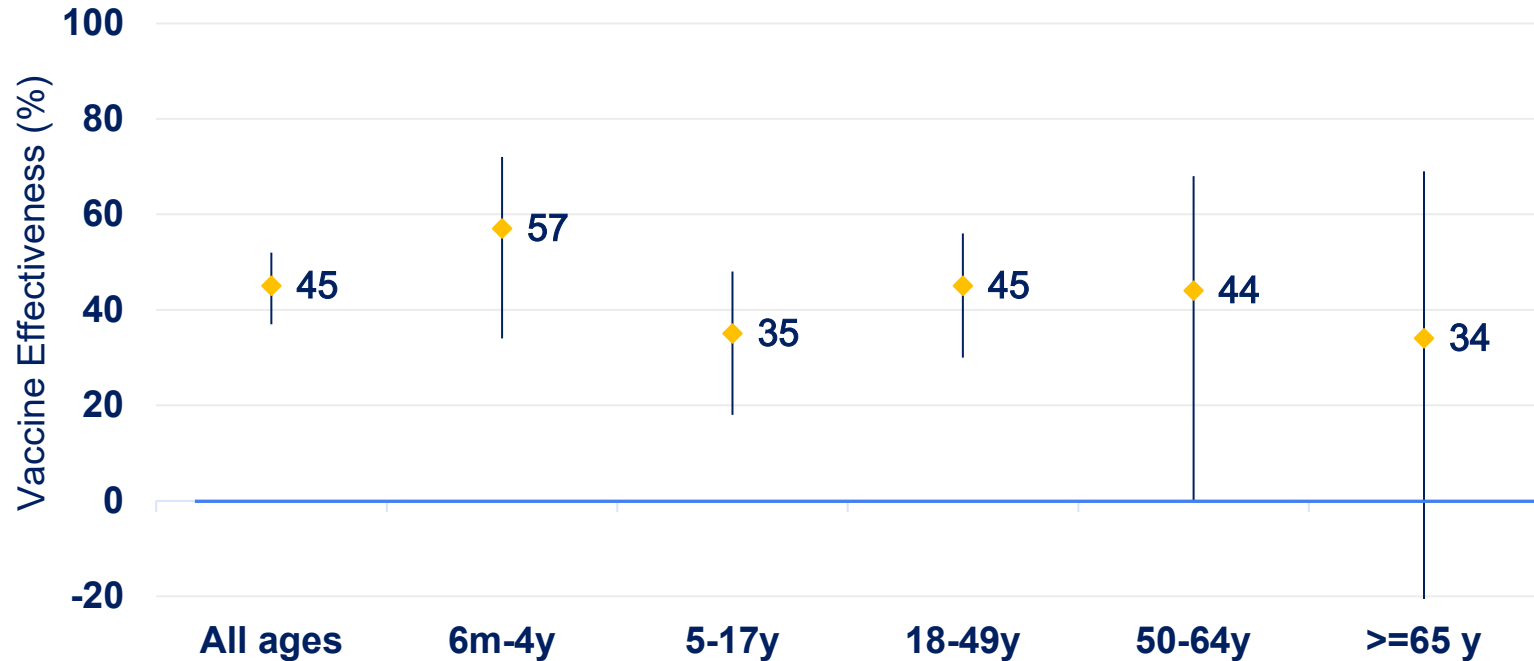
US Flu VE Network

Adjusted vaccine effectiveness against medically attended influenza ages ≥ 6 months, US Flu VE Network, 2019–20



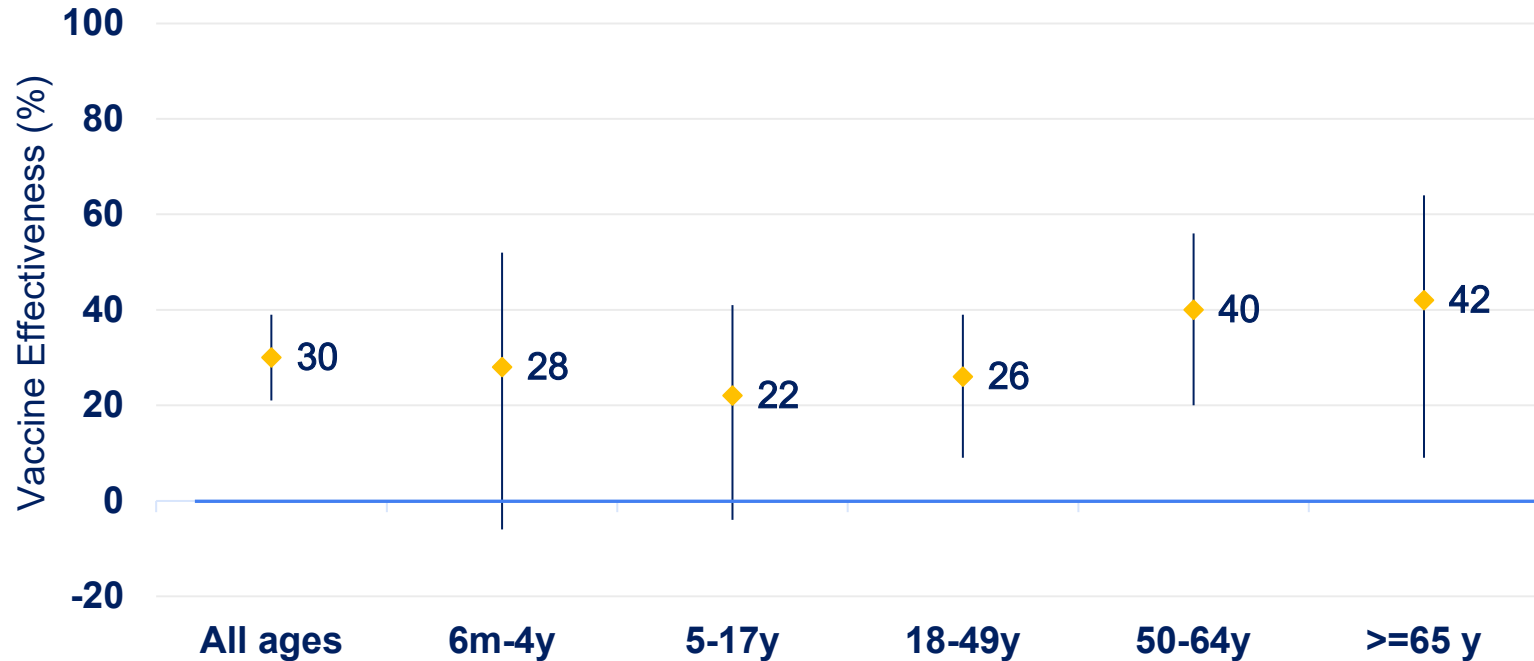
* Multivariable logistic regression models adjusted for site, age, sex, race/ethnicity, self-rated general health status, interval from onset to enrollment, and calendar time.

Adjusted vaccine effectiveness against influenza B/Victoria by age group, US Flu VE Network, 2019–20



* Multivariable logistic regression models adjusted for site, age, sex, race/ethnicity, self-rated general health status, interval from onset to enrollment, and calendar time.

Adjusted vaccine effectiveness against influenza A/H1N1pdm09 by age group, US Flu VE Network, 2019–20

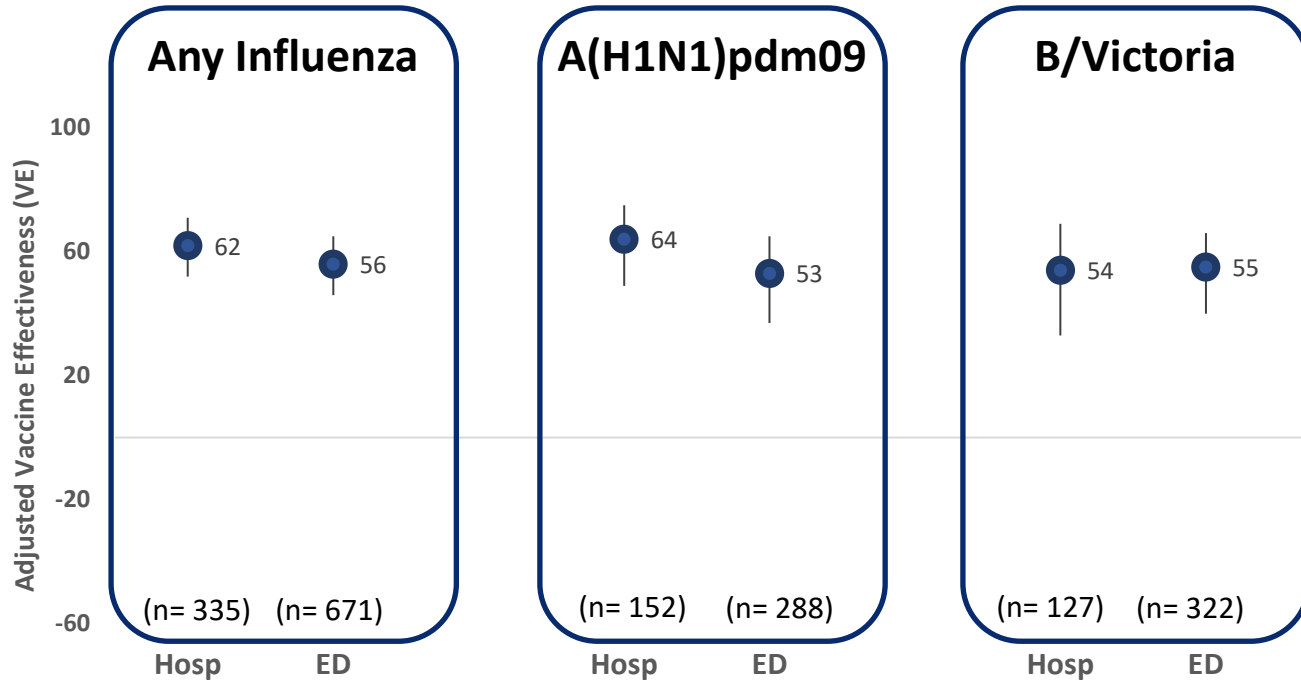


* Multivariable logistic regression models adjusted for site, age, sex, race/ethnicity, self-rated general health status, interval from onset to enrollment, and calendar time.

**VE against influenza associated
hospitalization and ED visits among
patients aged 6 months to 17 years**

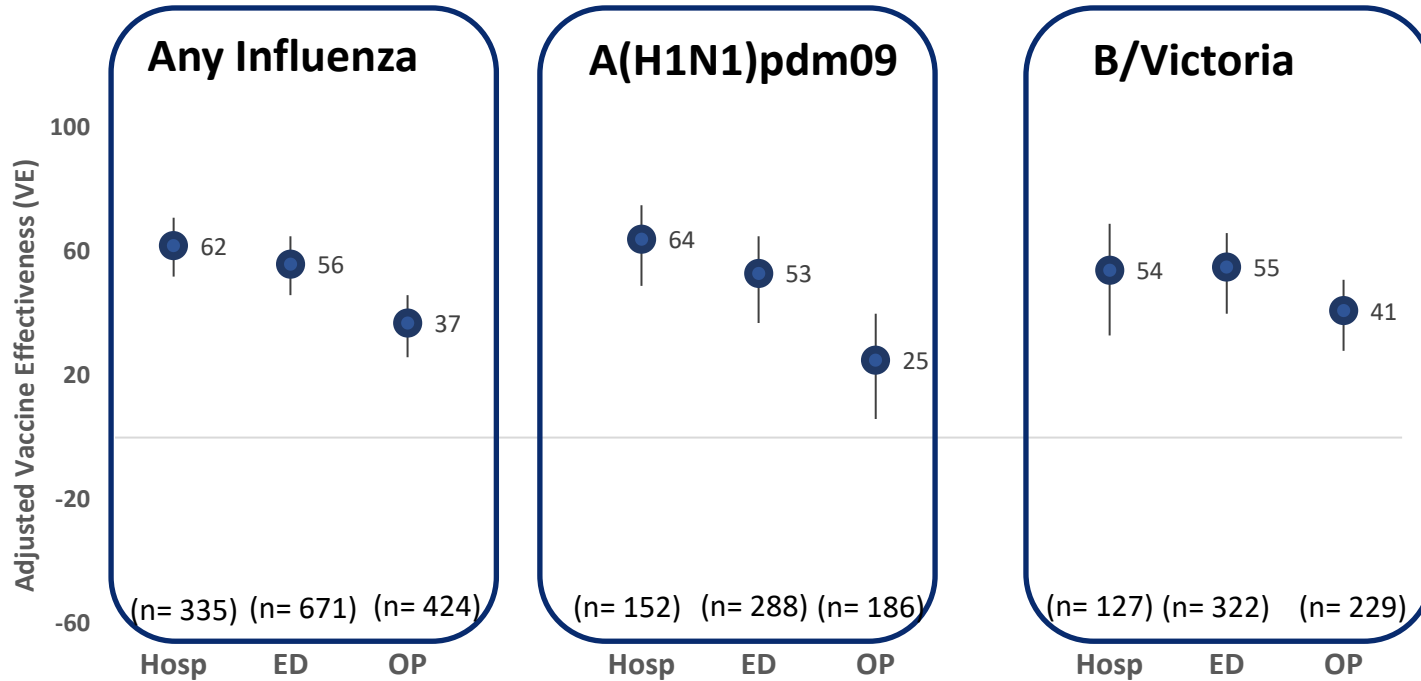
NVSN preliminary results

2019–2020 VE* against influenza hospitalizations, ED visits, by virus type, aged 6m–17 yrs, NVSN



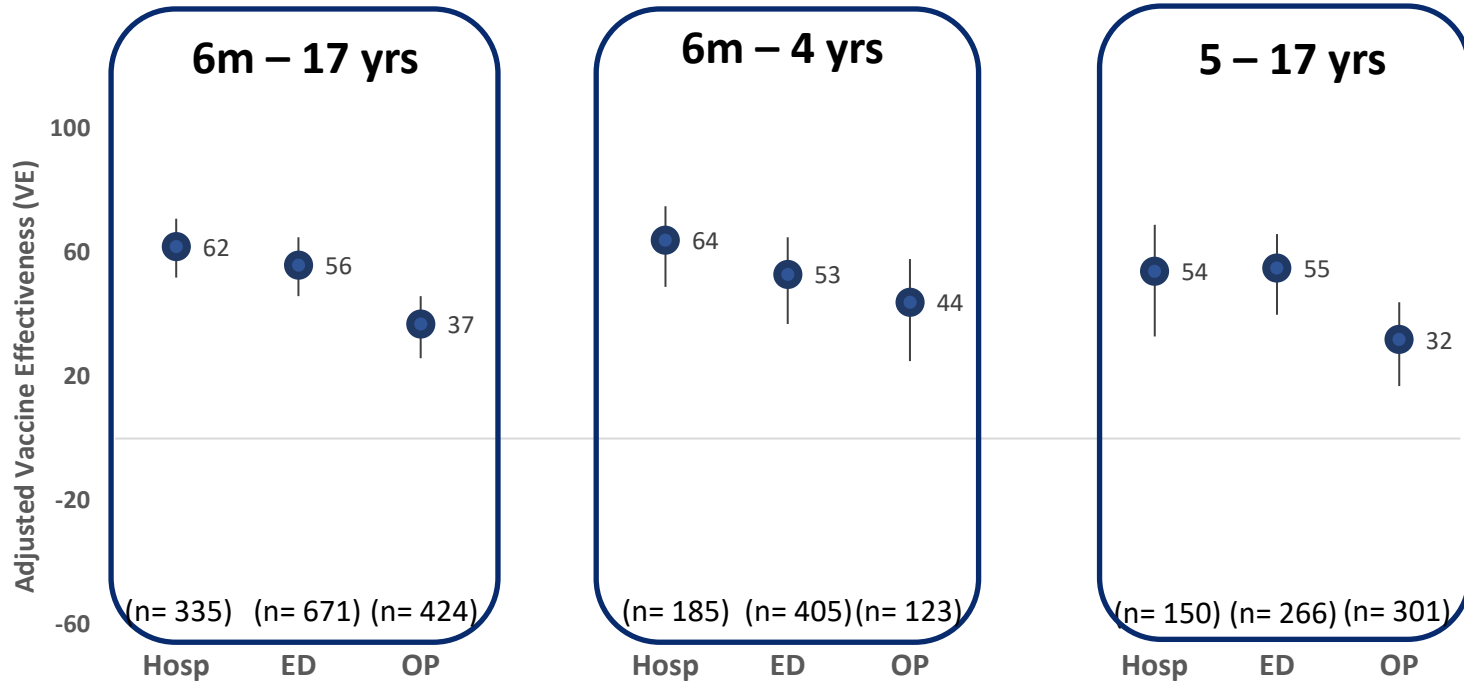
- Final models adjusted for study site, age as a continuous variable and calendar time (monthly intervals)
- n values show the total number of influenza positive subjects in each group

2019–2020 VE* against influenza hospitalizations, ED and outpatient visits by virus type, aged 6m–17 yrs, NVSN/Flu VE



- Final models adjusted for study site, age as a continuous variable and calendar time (monthly intervals)
- n values show the total number of influenza positive subjects in each group

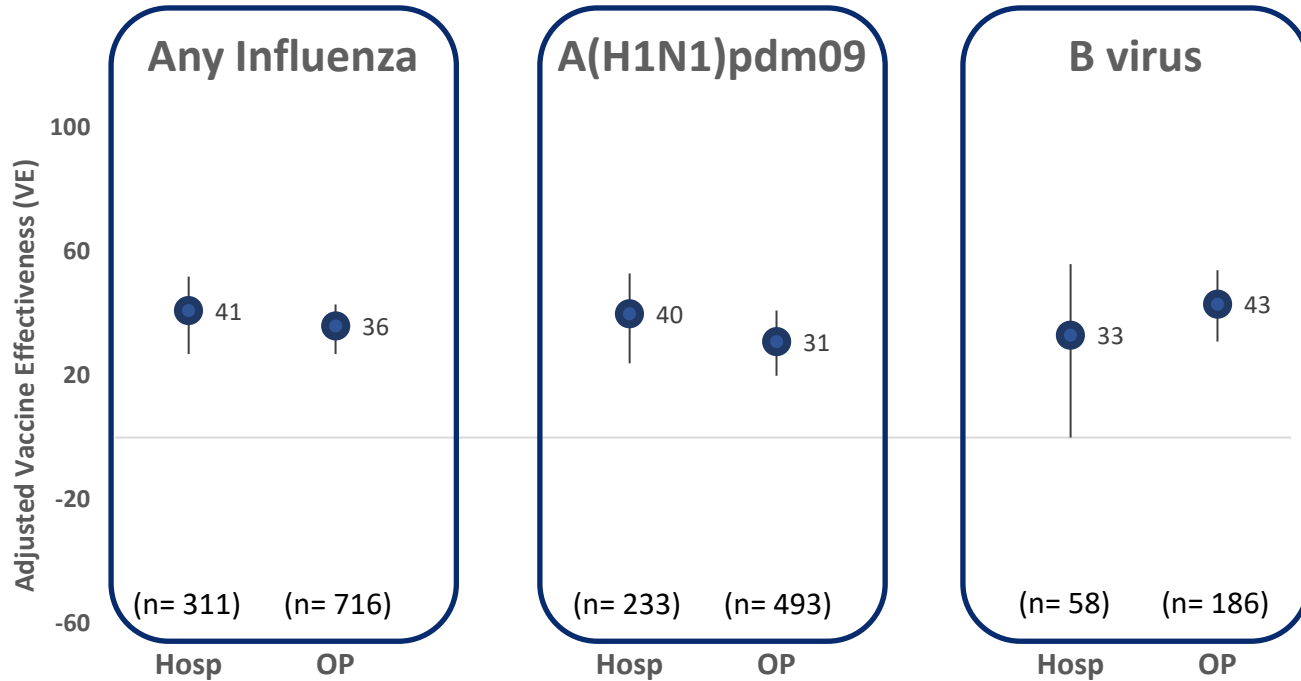
2019–2020 VE* against influenza hospitalizations, ED and outpatient visits aged 6m–17 yrs, by age group, NVSN/Flu VE



- Final models adjusted for study site, age as a continuous variable and calendar time (monthly intervals)
- n values show the total number of influenza positive subjects in each group

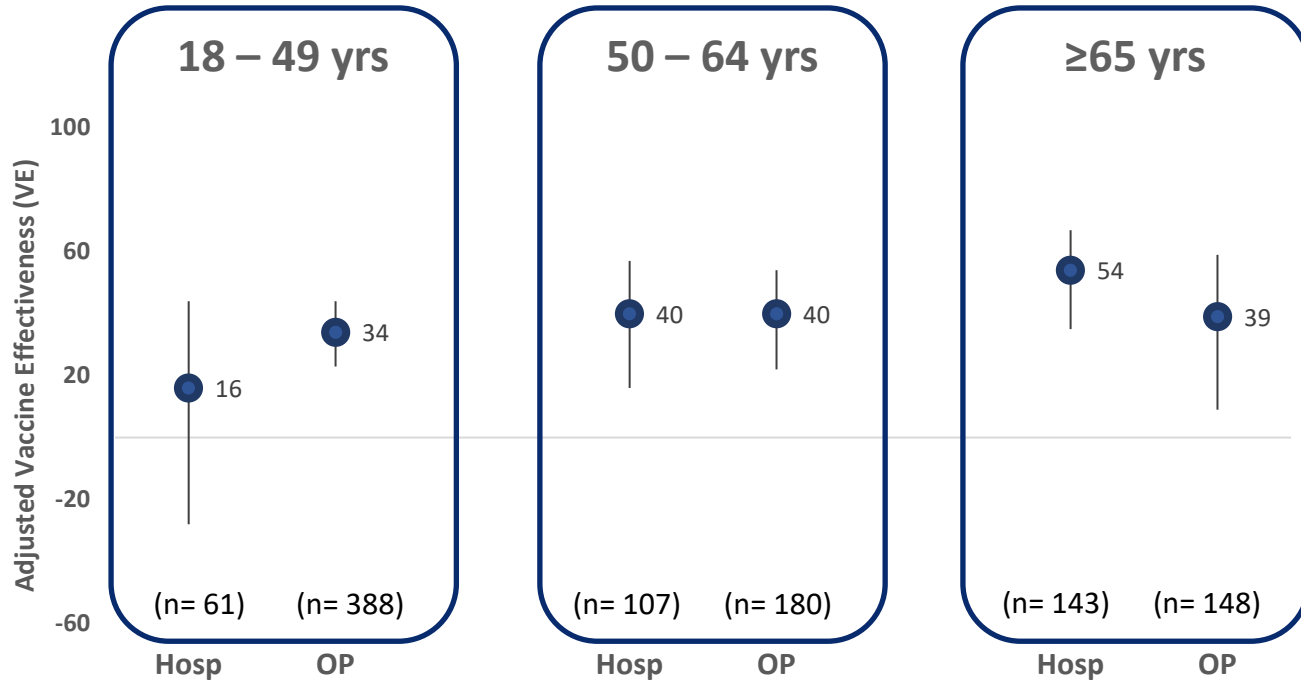
**Hospitalized Adult Influenza Vaccine
Effectiveness Network (HAIVEN)
preliminary results**

2019–2020 VE* against influenza hospitalizations and outpatient visits among adults, by virus type, HAIVEN/Flu VE



* Final models adjusted for study site, age, sex, race/ethnicity, days from illness onset to specimen collection, timing of illness onset, ≥ 1 hospitalizations (versus none) in prior year (HAIVEN)

2019–2020 VE* against influenza hospitalizations and outpatient visits among adults, by age group, HAIVEN/Flu VE



* Final models adjusted for study site, age, sex, race/ethnicity, days from illness onset to specimen collection, timing of illness onset, ≥ 1 hospitalizations (versus none) in prior year (HAIVEN)

Discussion

Limitations

- VE by vaccine type not included
 - Limited use of LAIV4 among children in NVSN and Flu VE to estimate VE for LAIV4 against A(H1N1)pdm09
 - Challenges estimating VE of egg-based vs non-egg based vaccines (recombinant/cell-culture) due to site-specific differences in vaccines offered
 - Among inpatients and outpatients aged ≥ 65 years, patient characteristics differed by vaccine type (majority received IIV4-HD)
- VE estimates include reported vaccination and partially vaccinated children; results are preliminary pending final vaccination data

Summary—Importance of three VE networks

- 2019–20 influenza vaccination significantly reduced laboratory confirmed medically attended influenza in all VE networks:
 - 39% (95%CI: 32, 44) against outpatient illness aged ≥ 6 months (Flu VE)
 - 62% (95%CI: 52, 71) against pediatric hospitalizations (NVSN)
 - 56% (95%CI: 46, 65) against pediatric ED visits (NVSN)
 - 41% (95%CI: 27, 52) against adult hospitalizations (HAIVEN)
- Important protection against influenza B virus given severity of 2019-20 season for children and vaccine mismatch
- Outpatient VE trended lower among pediatric outpatient than inpatients/ED visits; outpatient and inpatient VE similar among adults

Acknowledgments

US Flu VE Network Contributors

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Advisory Committee on Immunization Practices

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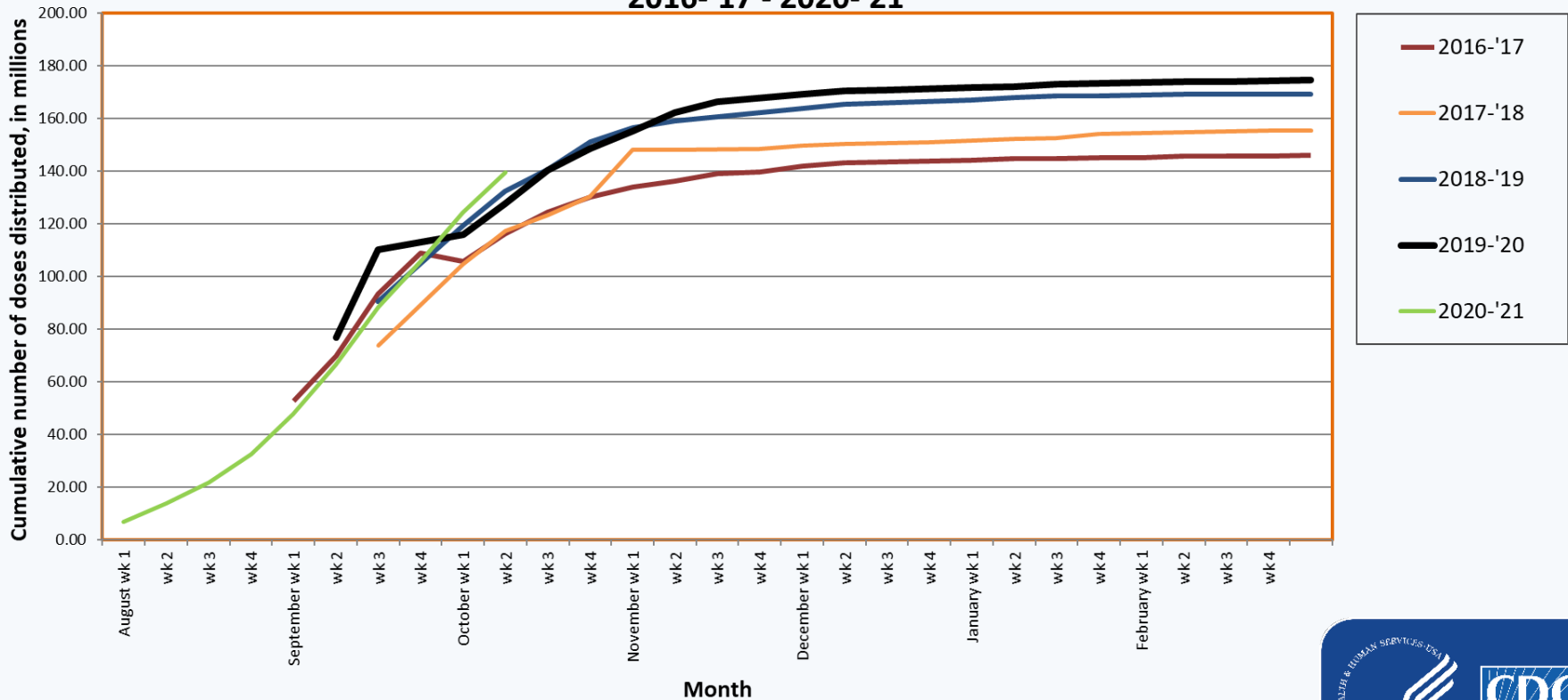
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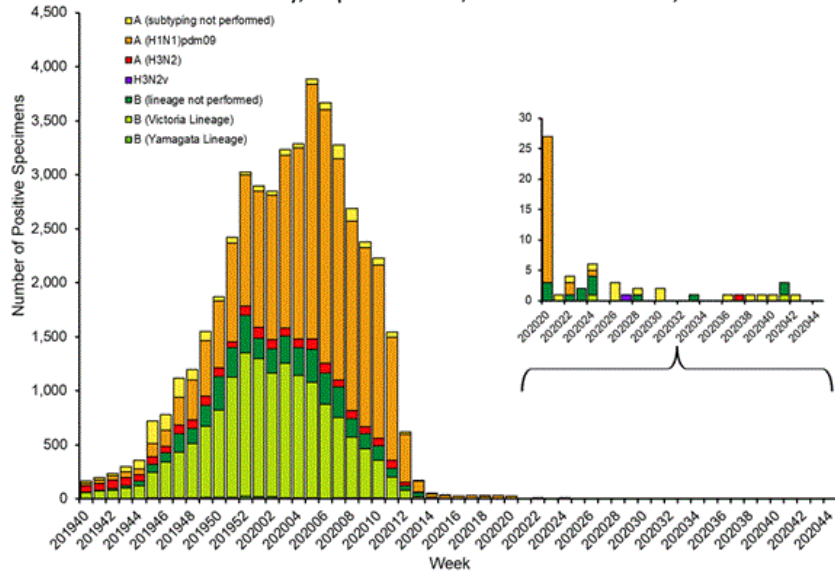
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CDC's FluFinder Distribution Tracking Program: Cumulative doses of influenza vaccines distributed by month, by season: 2016-'17 - 2020-'21

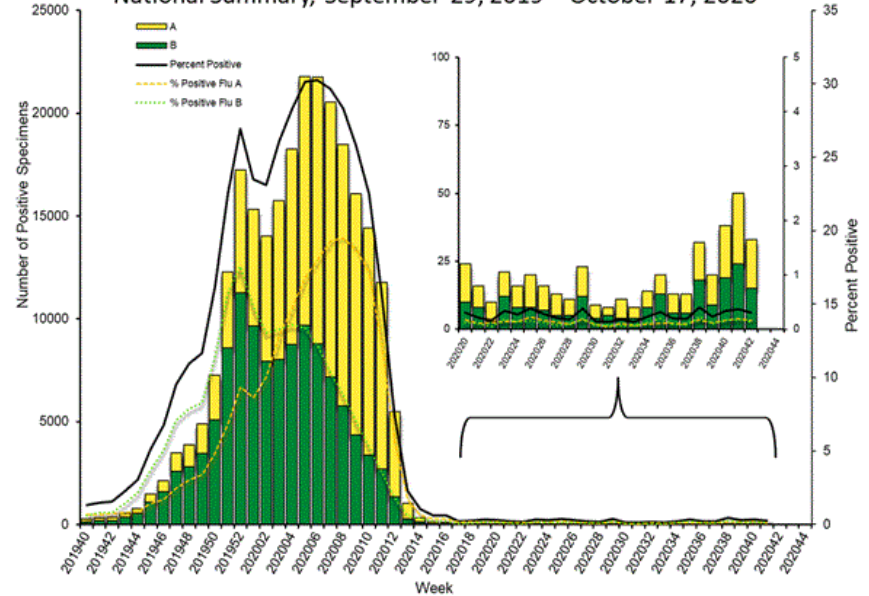


FluView, Week 42 (ending October 17, 2020): Virologic Surveillance

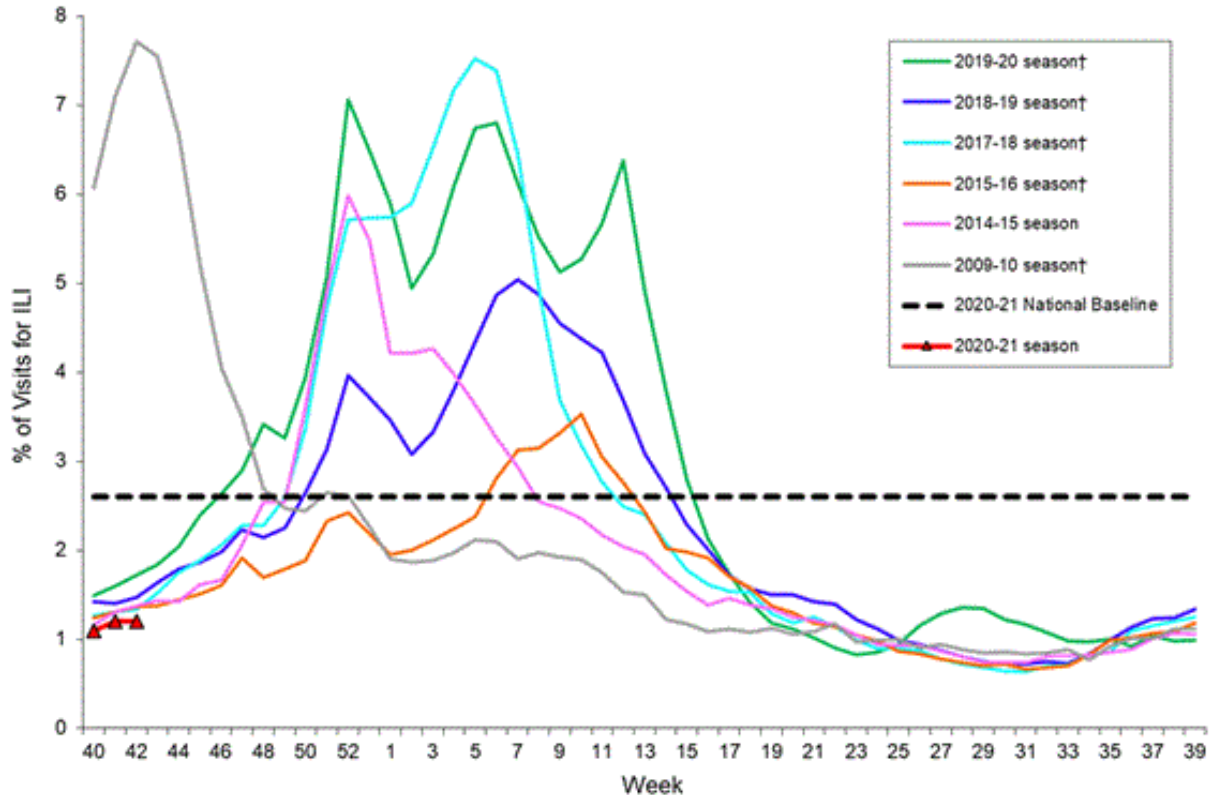
Influenza Positive Tests Reported to CDC by U.S. Public Health Laboratories, National Summary, September 29, 2019 – October 17, 2020



Influenza Positive Tests Reported to CDC by U.S. Clinical Laboratories, National Summary, September 29, 2019 – October 17, 2020



Percentage of Visits for Influenza-like Illness (ILI) Reported by the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet), Weekly National Summary, 2020-2021 and Selected Previous Seasons



†These seasons did not have a week 53, so the week 53 value is an average of week 52 and week 1.

**FluView, Week 42
(ending
October 17, 2020):**

**Influenza-Like
Illness Surveillance**

Work Group Discussion and Considerations

- Influenza WG heard and discussed presentation of trial of Flucelvax Quadrivalent for children aged ≥ 2 through < 18 years.
- Some clarifying questions concerning study design and study population.
- No specific concerns raised.

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.

