Interim Estimates of 2018–19 Seasonal Influenza Vaccine Effectiveness against Medically Attended Influenza from the US Flu VE Network

US Flu VE Network

May 16, 2019

Effects of Influenza Vaccination in the United States during the 2017–2018 Influenza Season

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- In a severe influenza season, influenza vaccination prevented
  - 7.1 million illnesses
  - 3.7 million medical visits
  - 109,000 (39,000–231,000) hospitalizations
  - 8,000 (1,100–21,000) deaths
CDC estimates that, from October 1, 2018 through April 27, 2019, there have been:

- 37.2 million – 42.7 million flu illnesses
- 524,000 - 637,000 flu hospitalizations
- 36,100 – 59,600 flu deaths

*These estimates are preliminary and based on data from CDC's weekly influenza surveillance reports summarizing key influenza activity indicators.

US Flu VE Network sites and principal investigators

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- University of Michigan
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  - Emily Martin
- University of Pittsburgh
  - Rick Zimmerman
  - Tricia Nowalk
- Baylor Scott and White Health
  - Manju Gaglani
US Flu VE Network Methods

**Enrollees:** Outpatients aged ≥6 months with acute respiratory illness with cough ≤7 days duration

**Dates of enrollment:** November 23, 2018–February 2, 2019 (updated March 8, 2019)

**Design:** Test-negative design

- Comparing vaccination odds among influenza RT-PCR positive cases and RT-PCR negative controls
- Vaccination status: receipt of at least one dose of any 2018–19 seasonal flu vaccine according to medical records, immunization registries, and/or self-report

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

- Adjustment for study site, sex, age, self-rated general health status, race/Hispanic ethnicity, interval from onset to enrollment, and calendar time

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**Number of enrolled participants by influenza RT-PCR result and percent positivity by week of onset, Nov 23, 2018—Feb 2, 2019**

Note: Week 7 only includes patients with completed laboratory tests and thus does not reflect all enrolled patients during that week across study sites.
Interim Results (Published Feb 15, 2019 MMWR)

- 3,254 enrolled from Nov 23, 2018–Feb 2, 2019 at 5 sites
- 465 (14%) influenza RT-PCR positive
- 2,789 (86%) influenza RT-PCR negative

Cases enrolled by (sub)type, N=465

- H1N1pdm09 63%
- H3N2 22%
- B/Yamagata 1%
- B/Victoria 1%
- A, unsubtyped 13%

Doyle et al, MMWR 2019

Interim estimates of 2018–19 Seasonal Influenza Vaccine Effectiveness — United States, February 2019

- Interim results for 2018–19 season (through February 2, 2019) indicate protection against influenza
  - 47% (CI: 35, 57) vaccine effectiveness against any influenza virus
  - 46% (CI: 30, 58) against H1N1pdm09, 44% (CI: 13, 64) against H3N2
2019-2020 WHO Northern hemisphere strain selection, February 23, 2019

<table>
<thead>
<tr>
<th>Strain</th>
<th>Reference</th>
</tr>
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<tbody>
<tr>
<td>H1N1 pdm09</td>
<td>A/Brisbane/02/2018</td>
</tr>
<tr>
<td>A(H3N2)</td>
<td>Delayed till March 21, 2019</td>
</tr>
<tr>
<td>B Victoria</td>
<td>B/Colorado/06/2017</td>
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<tr>
<td>B Yamagata</td>
<td>B/Phuket/3073/2013</td>
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FluView

A Weekly Influenza Surveillance Report Prepared by the Influenza Division
Percentage of Visits for Influenza-like Illness (ILI) Reported by the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet), Weekly National Summary, 2018-2019 and Selected Previous Seasons
A Weekly Influenza Surveillance Report Prepared by the Influenza Division

Influenza Positive Tests Reported to CDC by U.S. Public Health Laboratories, National Summary, 2018-2019 Season

ILI Activity Level

- High
- Moderate
- Low
- Minimal
- Insufficient Data

2018-19 Influenza Season Week 10 ending Mar 09, 2019
Influenza Season Continues with an Increase in Influenza A(H3N2) Activity

CDC reminds clinicians to have a high suspicion for influenza and recommends rapid antiviral treatment of high-risk patients with suspected influenza.

Number of enrolled participants by influenza RT-PCR result and percent positivity by week of onset

Note: Weeks 9-10 only includes patients with completed laboratory tests and thus does not reflect all enrolled patients during that week across study sites.
Updated Interim Results

- 6,128 enrolled from Nov 23, 2018–Mar 8, 2019 at 5 sites
- 1,513 (25%) influenza RT-PCR positive
- 4,615 (75%) influenza RT-PCR negative

Cases enrolled by (sub)type, N=465

- H3N2 (57)
- H1N1pdm09 (881)
- A, unsubtyped (45)
- B/Yamagata (10)
- B/Victoria (11)
Interim estimate of vaccine effectiveness against medically attended influenza by influenza type, 2018–19 (Nov – Feb)

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

Updated interim estimate of vaccine effectiveness against medically attended influenza, 2018–19 (Nov – Mar)

* Multivariate logistic regression models adjusted for site, age, sex, race/ethnicity, self-rated general health status, interval from onset to enrollment, and calendar time.
2019-2020 WHO Northern hemisphere strain selection (updated March 21, 2019)

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<td>A(H3N2)</td>
<td>A/Kansas/14/2017*</td>
</tr>
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<td>B Victoria</td>
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<td>B Yamagata</td>
<td>B/Phuket/3073/2013</td>
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*A(H3N2) strain selected on March 21, 2019

Summary of changes since earlier interim estimate

- Increased percentage of A(H3N2) cases enrolled in US Flu VE network since 2 February (38% of all cases through 8 March vs 22% through 2 Feb)
- Updated interim results (through March 8, 2019) suggested reduced VE against A(H3N2) compared to earlier estimate (vs. no change in H1N1pdm09 estimate)
  - Circulation of antigenically drifted A(H3N2) clade 3C.3a
  - Supported decision to update A(H3N2) vaccine component
- Note: Interim estimates are preliminary; end-of-season VE estimates will include updated vaccination status and may differ from interim VE
US Flu VE Network

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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.