

Multi-state case-control study of the effectiveness of influenza vaccine in preventing laboratory-confirmed influenza hospitalizations among children aged 6-23 months during the 2005-06 and 2006-07 seasons

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Background

- ACIP recommended annual influenza vaccine for all children aged 6-23 months beginning 2004-05, based on burden of disease in this age group
- Hospitalization rates in this age group similar to those among the elderly
- No past studies of effectiveness of trivalent inactivated vaccine (TIV) in preventing lab-confirmed hospitalizations in this age group

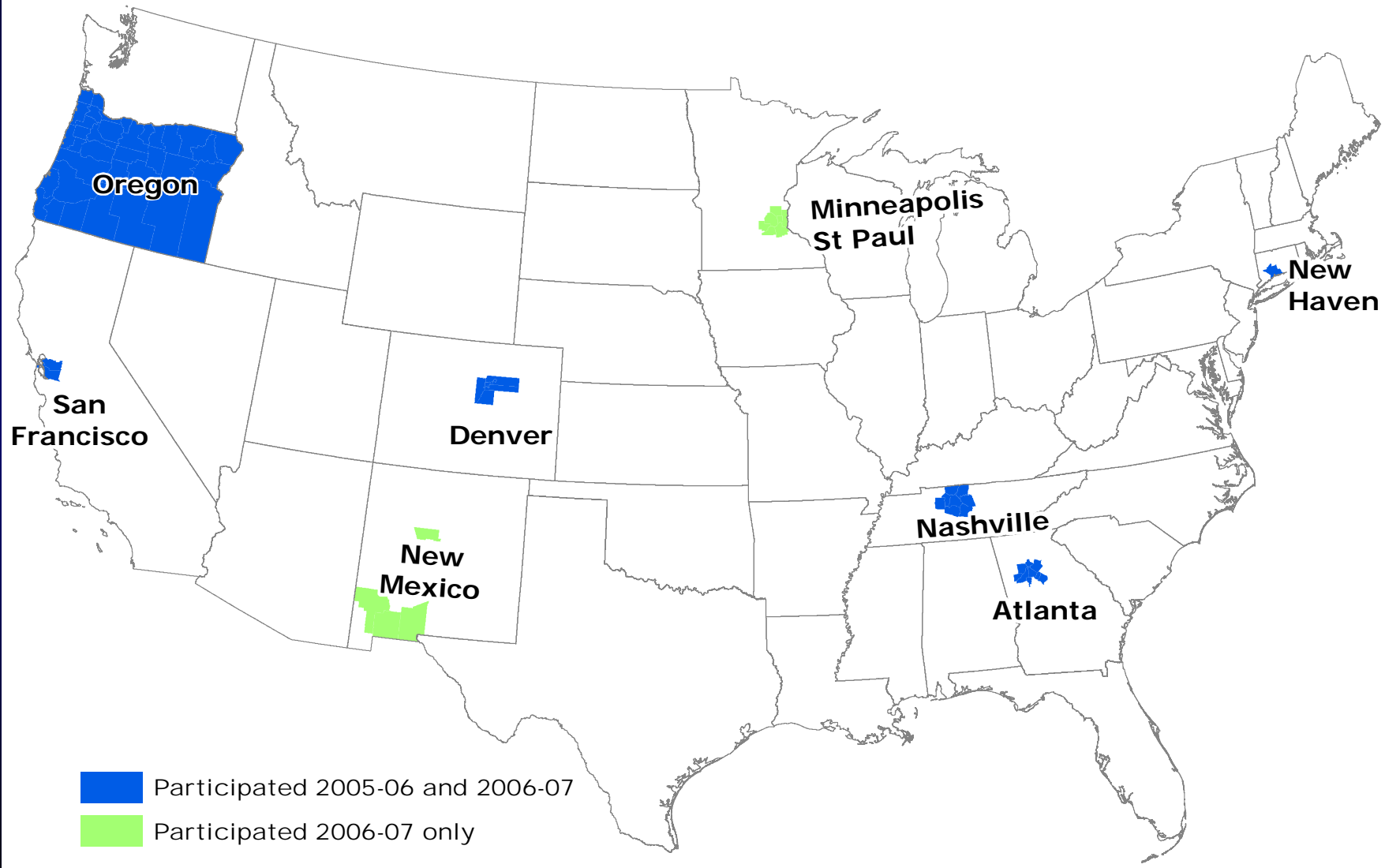
EIP study

- Objective: To estimate effectiveness of TIV in preventing hospitalizations among children aged 6-23 months over several seasons
- Present VE estimates from 2005-06 and 2006-07 in a study conducted within the Emerging Infections Program, a network of state health departments conducting surveillance for lab-confirmed influenza hospitalizations

Methods

- Cases were children hospitalized with lab-confirmed influenza infection in areas of 8 states
- Influenza diagnosed by direct fluorescence antibody, viral culture, RT-PCR, or a rapid diagnostic test
- For each case, attempts were made to enroll 4 age- and zipcode-matched controls using birth records
- Case and control families interviewed and providers contacted for vaccination and covariate status
- Conditional logistic regression used to estimate the effectiveness of partial and full immunization in preventing influenza-associated hospitalization

Based on 2000 census, 277,365 children aged 6-23 months reside in these sites, or 4.8% of all US children



Definitions of immunization

- Children considered immunized 14 days after receipt of each dose of vaccine
- Definition used of 'fully immunized' changed during the planned 3 seasons of the study
 - 2007 ACIP recommendations more stringent than 2006 recs
- 2007 ACIP definition of fully immunized used here
 - 2 doses in current season: if first season, or if had 1 dose in last season
 - 1 dose in current season: if had 2 doses in a single prior season (or if had 1 doses in 2 or more prior seasons)

Results

- 93 (49%) of 191 eligible cases and 334 controls (mean of 3.6 per case) enrolled
- Influenza diagnosed by rapid test in 50%, DFA in 40%, viral culture in 11%, RT-PCR in 2%, and by multiple tests in 8%
- Influenza type
 - A in 85%
 - B in 12%
 - unknown in 3%

Characteristics: cases & controls

| <u>Characteristic</u> | <u>Cases</u> | <u>Controls</u> |
|-----------------------|--------------|-----------------|
| Male | 56% | 52% |
| White | 72% | 80% |
| Age group | | |
| 6-11 months | 40% | 40% |
| 12-17 months | 38% | 38% |
| 18-23 months | 23% | 23% |

Immunization by season and status

| Season | Status | Fully Immunized | Partially Immunized | Not Immunized |
|---------|---------|-----------------|---------------------|---------------|
| 2005-06 | Case | 9% | 24% | 67% |
| | Control | 20% | 25% | 55% |
| 2006-07 | Case | 13% | 23% | 65% |
| | Control | 32% | 30% | 38% |
| Overall | | 23% | 27% | 51% |

TIV effectiveness in preventing hospitalization

Crude VE by immunization status

| <u>Full</u> | <u>95% CI</u> | <u>Partial</u> | <u>95% CI</u> |
|-------------|---------------|----------------|---------------|
| 74% | 44% to 88% | 39% | -10% to 66% |

Adjusted* VE by immunization status

| <u>Full</u> | <u>95% CI</u> | <u>Partial</u> | <u>95% CI</u> |
|-------------|---------------|----------------|---------------|
| 76% | 41% to 91% | 27% | -39% to 62% |

* Adjusted for high-risk conditions, VLBW, and insurance status

Summary

- Provided estimates of TIV effectiveness in preventing lab-confirmed influenza hospitalizations in U.S. children
- Full immunization was ~75% effective in preventing hospitalizations
- Partial immunization was less effective, and not significantly protective, based on 2 seasons of data
- It is critical to ensure that children aged 6-23 months are fully immunized, if we seek to prevent influenza-associated hospitalizations among children