Matching enhances IIS data – assessing Tdap and influenza vaccine uptake during pregnancy in Washington State

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Background and Methods

• National increases in pertussis; WA pertussis epidemics in 2012 and 2015
• Influenza and Tdap recommendations for pregnant women
• Difficult to assess vaccine uptake in pregnancy and lack of published studies

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• Matched one month of birth certificates (mothers) to IIS patient records using SAS
• 3,711 unique mothers matched to IIS record (53% match rate)
## Results – Vaccinations

- 33,852 total vaccination records for 3,711 matched mothers

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Total vaccination records (valid and before 2/1/2015)</th>
<th># records per matched mother</th>
<th>% matched mothers vaccinated during pregnancy</th>
<th>% matched mothers vaccinated at 27-36 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tdap</td>
<td>3,285</td>
<td>0 – 4</td>
<td>39.1% (N= 1,451)</td>
<td>31.4% (N=1,164)</td>
</tr>
<tr>
<td>Influenza</td>
<td>4,158</td>
<td>0 – 14</td>
<td>32.3% (N=1,209)</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Percentage of matched mothers with a Tdap vaccination between 27 and 36 weeks gestation, by county.

Range: 0% - 63% of mothers vaccinated between 27 and 36 weeks gestation. Similar pattern for flu (not shown).
Includes all counties with >4 matched mothers.
Race/ethnicity vs. Tdap and influenza vaccination rates

- **Asian**
  - Tdap: 38%
  - Flu: 43%
  - (N= 442)

- **Black**
  - Tdap: 38%
  - Flu: 37%
  - (N= 289)

- **Hispanic**
  - Tdap: 51%
  - Flu: 47%
  - (N= 186)

- **Native American**
  - Tdap: 34%
  - Flu: 37%
  - (N= 107)

- **White**
  - Tdap: 28%
  - Flu: 28%
  - (N= 2,585)

- **Other**
  - Tdap: 33%
  - Flu: 50%
  - (N= 13)

- **Unknown**
  - Tdap: 40%
  - Flu: 47%
  - (N= 89)
Maternal age vs. Tdap and influenza vaccination rates

Maternal age at delivery (years)

- Under 21 (N= 287)
  - Tdap: 37%
  - Flu: 41%
- 21 - 25 (N= 983)
  - Tdap: 34%
  - Flu: 34%
- 26 - 30 (N= 1,116)
  - Tdap: 28%
  - Flu: 28%
- 31 - 35 (N= 916)
  - Tdap: 30%
  - Flu: 33%
- 36 - 40 (N= 332)
  - Tdap: 37%
  - Flu: 38%
- 41 - 45 (N= 56)
  - Tdap: 27%
  - Flu: 32%
- Over 45 (N <10)
  - Tdap: 40%
  - Flu: 20%
Gestational age at delivery vs. Tdap and flu vaccination rates

Percent mothers vaccinated

<table>
<thead>
<tr>
<th>Estimated gestational age at delivery</th>
<th>Tdap</th>
<th>Flu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely preterm (&lt;28 wks)</td>
<td>6%</td>
<td>49%</td>
</tr>
<tr>
<td>Very preterm (28-&lt;32 wks)</td>
<td>21%</td>
<td>43%</td>
</tr>
<tr>
<td>Late preterm (32-&lt;37 wks)</td>
<td>28%</td>
<td>26%</td>
</tr>
<tr>
<td>Early term (37-&lt;39 wks)</td>
<td>32%</td>
<td>31%</td>
</tr>
<tr>
<td>Full term (39-&lt;41 wks)</td>
<td>33%</td>
<td>34%</td>
</tr>
<tr>
<td>Late term (41-&lt;42 wks)</td>
<td>30%</td>
<td>32%</td>
</tr>
<tr>
<td>Post term (&gt;=42 wks)</td>
<td>10%</td>
<td>13%</td>
</tr>
</tbody>
</table>
Discussion

• 31.4% (N=1,164) of pregnant mothers received a Tdap at 27-36 weeks gestation, as recommended. 32.3% (N=1,209) received a flu shot during pregnancy.
• WA Tdap coverage is higher than that found in most other studies; flu coverage is lower.
• Higher vaccine coverage was associated with non-white mothers, mothers <25 years-old and 36 – 40 years-old, mothers who deliver preterm infants (flu) and full term gestational age of infant (Tdap).
EXTRA SLIDES

## Coverage comparisons

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Time frame and population of pregnant women</th>
<th>N</th>
<th>Coverage during pregnancy</th>
<th>Data source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza</td>
<td>2010-11; USA</td>
<td>18,522</td>
<td>54.1%</td>
<td>PRAMS¹</td>
</tr>
<tr>
<td>Influenza</td>
<td>2010-11; WA state</td>
<td>918</td>
<td>64.5%</td>
<td>PRAMS</td>
</tr>
<tr>
<td>Influenza</td>
<td>Jan 2015; WA state</td>
<td>3,707</td>
<td>32.3%</td>
<td>This study</td>
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<td>13.4%</td>
<td>PRAMS</td>
</tr>
<tr>
<td>Tdap</td>
<td>Nov 2011- Feb 2013; MI Medicaid enrollees</td>
<td>15,181</td>
<td>14.3%</td>
<td>MI study²</td>
</tr>
<tr>
<td>Tdap</td>
<td>2013-2014; USA</td>
<td>N/A</td>
<td>14.4%</td>
<td>CDC internet panel survey³</td>
</tr>
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<td>Tdap</td>
<td>Jan 1 2007 – Nov 15 2013; women insured through seven health systems</td>
<td>438,487</td>
<td>41.7%</td>
<td>Kharbanda et al⁴</td>
</tr>
<tr>
<td>Tdap</td>
<td>Jan 2015; WA state</td>
<td>3,707</td>
<td>39.1% during pregnancy 31.4% at 27-36 wks</td>
<td>This study</td>
</tr>
</tbody>
</table>

1. PRAMS. 2010-11. CDC.
2. Housey M et al. Vaccination with tetanus, diphtheria, and acellular pertussis of pregnant women enrolled in Medicaid – Michigan, 2011-2013. MMWR. 63(38);839-42.