Provider Perspective:
The Impact of Maternal Immunizations

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Why Immunize a Pregnant Woman?

• Immunologic changes that increase a woman’s susceptibility to infection-related morbidity
  – Decrease inflammatory immune responses to diminish fetal rejection
  – Shift from a T-helper (Th1) to a Th2-favored-response, allowing for fetal antigen tolerance

• Potential to protect mother against infections during pregnancy and life long

• Regular care during pregnancy, i.e. accessible for vaccination

• Should not be excluded from potentially beneficial therapies based solely on pregnancy status
Why Immunize a Fetus

• To boost maternal levels of pathogen-specific antibodies and endow the neonate and infant with sufficient concentrations of antibodies to resist infections during a period of increased vulnerability.

• Response to active immunization in pregnancy vs. immature neonatal immune system.

• Transplacental transfer of antibodies is a natural process, safer, more effective and less expensive than administration of IG, antibiotics or vaccines to the infant.
IgG Placental Transport Across Gestation

$r^2 = 0.87, P < 0.04$

# Effectiveness of Maternal Influenza Vaccination

<table>
<thead>
<tr>
<th>Reference</th>
<th>Study Design</th>
<th>Study Participants</th>
<th>Main Findings and Conclusions</th>
</tr>
</thead>
</table>
| Zaman 2008<sup>a</sup> | RCT in Bangladesh | 3<sup>rd</sup> trimester vaccination with trivalent inactivated influenza (TIV) (n=172) vs. Pneumococcal polysaccharide vaccine (n=168) with infant follow-up to 6 months age | • 36% reduction in maternal respiratory illness + fever  
• 63% reduction in infant laboratory-confirmed influenza  
  - 6 cases TIV vs. 16 cases pneumo  
• 29% reduction in infant respiratory febrile illness  
  - 110 cases TIV vs. 153 cases pneumo |
| Madhi, 2014<sup>b</sup> | RCT in South Africa | 24 – 36 weeks gestation at time of vaccination with infant follow up to 6 months age, TIV vs. placebo in 2,116 pregnant women | • Laboratory-confirmed maternal influenza  
  - 1.8% TIV vs. 3.6% placebo group  
  - 50.4% vaccine efficacy rate  
• Laboratory-confirmed infant influenza  
  - 1.9% TIV vs. 3.6% placebo group  
  - 48.8% vaccine efficacy rate |

Proportions of Immunized Mothers and their Infants with Hemagglutination-Inhibition Titer of 1:40 or Greater by Influenza Viral Strain

Zaman et al, NEJM. 2008.
Time to Laboratory-Confirmed Influenza in HIV-uninfected Mothers and Infants by Study Arm

Insets show the same data on an expanded y-axis
# Effectiveness of Maternal Tdap Vaccination

<table>
<thead>
<tr>
<th>Reference</th>
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</thead>
<tbody>
<tr>
<td>Winter, 2016</td>
<td>Retrospective birth cohort analysis in California 2013-2014</td>
<td>~ 75,000 live births</td>
<td>• 42,941 (58%) were vaccinated during pregnancy and 31,563 (42%) were vaccinated postpartum</td>
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<td></td>
<td></td>
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<td>• 119 cases of pertussis within 1st year of life</td>
</tr>
</tbody>
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Effectiveness of Tdap Vaccination: Antenatal vs. Postpartum

<table>
<thead>
<tr>
<th></th>
<th>Pertussis &lt;8 weeks of age</th>
<th></th>
<th>Pertussis ≤12 weeks of age</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Adjusted VE*</td>
<td>95% CI</td>
<td>Number of cases &lt;8w</td>
<td>Adjusted VE*</td>
</tr>
<tr>
<td>Pregnancy Tdap</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27-36 weeks gestation</td>
<td>85.4%</td>
<td>33.0-96.7</td>
<td>18</td>
<td>71.6%</td>
</tr>
<tr>
<td>Any time during pregnancy</td>
<td>63.8%</td>
<td>10.6-85.4</td>
<td>23</td>
<td>53.0%</td>
</tr>
</tbody>
</table>

*adjusted for mother's ethnicity, number of prenatal visits, prior births, payer, mother's country of birth, infant's birth weight and gestational age

Strategies and Resources to Vaccinate Women during Pregnancy
Integrating Immunizations Into Practice

• Advocate directly to patients
• Identify patients who need vaccines
• Educate staff
• Integrate into practice – workflow & administration
Provider Recommendations

* Excluded women who had not visited a health care provider since July 2014 (n = 18).

Trend of Flu Vaccination Coverage Before and During Pregnancy

- Received provider recommendation and offer*
- Vaccination coverage†
- Received no recommendation*

% of respondents

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</thead>
<tbody>
<tr>
<td>2010-11</td>
<td>Received provider recommendation and offer*</td>
<td>56.9</td>
<td>51.2</td>
<td>54.6</td>
<td>65.1</td>
<td>64.9</td>
<td>67.6</td>
</tr>
<tr>
<td></td>
<td>Vaccination coverage†</td>
<td>44.0</td>
<td>46.4</td>
<td>50.5</td>
<td>52.2</td>
<td>50.3</td>
<td>49.9</td>
</tr>
<tr>
<td></td>
<td>Received no recommendation*</td>
<td>33.9</td>
<td>37.5</td>
<td>28.7</td>
<td>19.8</td>
<td>20.3</td>
<td>19.9</td>
</tr>
</tbody>
</table>
Pregnancy Resources

ACOG Clinical Guidance

- "Influenza Vaccination During Pregnancy," Committee Opinion 608 published September 2014
Vaccination toolkit includes materials for providers and patients

- FAQs
- Education
- Disease management
- VIS sheets

Download the full Influenza Immunization During Pregnancy 2015 Tool Kit here

Influenza Immunization during Pregnancy 2016 tool kit components:

- Influenza Immunization during Pregnancy Committee Opinion 608
- Frequently Asked Questions for Pregnant Women Concerning Influenza (Flu) Vaccination During Pregnancy
- Frequently Asked Questions for Patients Concerning Vaccine Safety
- Frequently Asked Questions Concerning Seasonal Influenza for Obstetrician–Gynecologists
- Influenza Season Assessment and Treatment for Pregnant Women With Influenza-Like Illness
- ACOG Patient Education “The Flu Vaccine and Pregnancy” Patient Education Pamphlet [requires ACOG member login]
- ACOG Patient Education “The Flu Vaccine and Pregnancy” Frequently Asked Questions
- Vaccine Information Statement Influenza Inactivated
- Vaccine Information Statement Influenza Inactivated (Spanish)
CDC and ACOG have mobile applications for vaccination schedules.
Course Code: WC2661-110916

Verification Code: Safety119

CE credit expires: December 12, 2016

Instructions available in the resource pod
Continuing Education Information

- CE credit go to:
  - www2a.cdc.gov/TCEOnline
- Search live event course number: WC2661-110916
- CE credit expires: December 12, 2016

Verification Code: Safety119
For Help with the Online CE System

1-800-41-TRAIN
OR
CE@cdc.gov
Email Your Immunization Questions to Us

NIPINFO@cdc.gov
Call Us With Your Immunization Questions

1.800.CDC.INFO

8 am to 8 pm ET

Monday through Friday
Additional Resources


• CDC Vaccines & Immunizations Home Page: [www.cdc.gov/vaccines/default.htm](http://www.cdc.gov/vaccines/default.htm)

• CDC Immunization Resources For You & Your Patients: [www.cdc.gov/vaccines/ed/downloads/imz-resources.pdf](http://www.cdc.gov/vaccines/ed/downloads/imz-resources.pdf)
Q&A
Thank You!