Vaccinations & Pregnancy

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(No conflicts to declare)
The 1918 “Spanish Flu” Pandemic

- “Shut your eyes,” said Miss Tanner. “Oh no,” said Miranda, “for then I see worse things…”
- “Death always leaves one singer to mourn.”
  — Katherine Anne Porter in Pale Horse, Pale Rider (1939)

From on-line archive of the US Army
What did we learn from the 1918 flu pandemic?

PREGNANCY COMPLICATED BY EPIDEMIC INFLUENZA

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PITTSBURGH

EPIDEMIC PNEUMONIA (SPANISH INFLUENZA) IN PREGNANCY

EFFECT IN ONE HUNDRED AND ONE CASES

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CHICAGO

JAMA 1919
Maternal Morality Rate USA

Rate per 100,000 live births

2009 Influenza A/H1N1 and Pregnancy

H1N1 2009 influenza virus infection during pregnancy in the USA

Denise J Jamieson, Margaret A Honein, Sonja A Rasmussen, Jennifer L Williams, David L Swerdlow, Matthew S Biggerstaff, Stephen Lindstrom, Janice K Louie, Cara M Christ, Susan R Bohm, Vincent P Fonseca, Kathleen A Ritter, Daniel J Kuhles, Paula Eggers, Hollianne Bruce, Heidi A Davidson, Emily Lutterloh, Meghan L Harris, Colleen Burke, Noelle Cocores, Lyn Finelli, Kitty F MacFarlane, Bo Shu, Sonja J Olsen, and the Novel Influenza A (H1N1) Pregnancy Working Group*

~ 6% of deaths in US from pandemic (H1N1) 2009 Influenza were among pregnant women, including first American to die in pandemic

Pregnant women ~1% of the general population

Jamieson et al 2009
Odds Ratios of Cardiopulmonary Events by Pregnancy Status

Tennessee Medicaid Program 1974-1993

Data Source: Neuzil et al, AJE, 1998
Pregnancy and Influenza Vaccination

- Vaccination prevents maternal illness
- Initial reports of safety of flu vaccine date back several decades
- “New” benefits of maternal immunization with influenza vaccination include neonatal projection and prevention of adverse obstetrical outcomes

See Thompson et al ‘13
Newborns are at highest risk of influenza related mortality

Mortality highest at $\leq 6$ months, before infant can be vaccinated.

Would passive immunization via maternal vaccination protect newborns less than 6 months?

From Bhat et al ‘05
Benefits of Influenza Vaccine during Pregnancy

- Randomized trial of influenza vaccination during pregnancy, 340 mothers in study in Bangladesh aka “Mother’s Gift”
- Main outcome – newborn respiratory illness
- Decreased influenza and respiratory illnesses in mother, other obstetrical benefits found in additional analysis
Newborn cases of influenza – Zaman et al ’08

Other benefits noted –
Decreased maternal illness
Increased birthweight
Influenza and Burden of PTD

• PRAMS Data from Georgia – survey
• 4300 births from 2004 to 2006
• “For births during the 8 wk of widespread influenza activity, the odds of prematurity were approximately 70% lower among the newborns of the vaccinated mothers compared to mothers who did not receive the influenza vaccine.”

Omer et al ’11 and Steinoff et al ‘14
Adjusted Odds Ratios of Prematurity by Maternal Influenza Vaccine Status

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Omer et al., PLoS Medicine, 2011
Estimated vaccine coverage in women – 2001-2011

Source CDC - MMWR
Sept 27, 2013
Estimated vaccine coverage in pregnant women 2010 to 2015

Flu vaccination coverage before and during pregnancy among pregnant women by early November and Mid-April for 2010-11 through 2014-15 flu season, Internet panel survey, United States

Source: CDC
Most frequently reported main reasons for receiving flu vaccination among women pregnant any time during August 1 – November 5, 2014, who were vaccinated before or during pregnancy, Internet panel survey, United States, (n=935)

- To protect my baby from flu (n = 329) - 35.2%
- To protect myself from flu (n = 188) - 19.7%
- My doctor, nurse, or other medical professional recommended the flu vaccination to me (n = 144) - 15.2%
- To protect my friends or family from flu (n = 61) - 6.3%
- Because the flu might be bad this season (n=51) - 5.6%
- It was easy/convenient to get the flu vaccination (n= 46) - 5.0%
Reasons Pregnant Women do not get Flu Vaccine 2014

Most frequently reported main reasons for not receiving flu vaccination among women pregnant any time during August 1 – November 5, 2014, who do not intend to receive flu vaccination for the rest of the flu season, Internet panel survey, United States (n=536)

- I do not think the vaccination is effective in preventing flu (n=90): 16.1%
- I am concerned about possible safety risks to my baby if I got vaccinated (n=73): 12.8%
  - I get sick when I get one (n=59): 10.6%
- I am concerned that the vaccination would give me the flu (n=51): 10.1%
- I am concerned about side effects (n=43): 7.9%
- I am concerned about possible safety risks to myself if I got vaccinated (n=37): 7.3%
- I do not need the vaccination (n=36): 7.1%
Flu Vaccine Uptake in Pregnant Women 2014-15
ACOG Recommendations - Flu

• “Influenza vaccination is an essential element of preconception, prenatal, and postpartum care because pregnant women are at an increased risk of serious illness due to seasonal and pandemic influenza.”

• Every pregnant woman receive influenza vaccination

• Any form of inactivated vaccine acceptable

• Can be vaccinated in 1st, 2nd or 3rd trimester
Reported NNDSS pertussis cases: 1922-2013

SOURCE: CDC, National Notifiable Diseases Surveillance System and Supplemental Pertussis Surveillance System and 1922-1949, passive reports to the Public Health Service
Reported pertussis incidence by age group: 1990-2013

*2012 data are provisional.

SOURCE: CDC, National Notifiable Diseases Surveillance System and Supplemental Pertussis Surveillance System
California Pertussis Outbreak 2010
Pertussis Vaccination during pregnancy

• “dramatic and persistent increase in pertussis disease” lead to pregnancy recommendation

• Adult version is “Tdap” licensed in 2005

• Should be given every pregnancy at 27-36 weeks gestation

• Goal – prevention of newborn morbidity and mortality
Effectiveness of maternal pertussis vaccination

- UK experienced similar pertussis outbreak
- Recommendation for maternal pertussis booster with rapid uptake to approximately 70% starting Sept 2012
- “effectiveness” is prevention of newborn pertussis at age less than 3 months
- Maternal vaccine > 7 days prior to delivery – 91% vs 38% post partum
### Preliminary Safety Data of Tdap in Pregnancy – California 2010-2012 VSD

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<thead>
<tr>
<th></th>
<th>Tdap (27-36 wks)</th>
<th>Unvaccinated</th>
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<tbody>
<tr>
<td>Chorioamnionitis</td>
<td>5.6 %</td>
<td>5.5 %</td>
</tr>
<tr>
<td>Preterm delivery (&lt; 37 wk)</td>
<td>5.3 %</td>
<td>7.8 %</td>
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<tr>
<td>SGA (&lt; 10 % tile)</td>
<td>8.6 %</td>
<td>8.3 %</td>
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From ACIP meeting February 2014. N = 11,351 and 97,265 for vaccinated (27-36 weeks) and unvaccinated respectively. Another analysis done for hypertensive disorders.
A dose of Tdap vaccine should be given to all pregnant women preferably between 27-36 weeks gestation during every pregnancy.

Vaccination & Pregnancy - Conclusions

• Influenza vaccination is an safe and effective intervention ie maternal illness, newborn illness, pregnancy complications

• Pertussis vaccination (Tdap) is recommended to prevent newborn disease

• Initial reports show maternal Tdap immunization effective

• Provider recommendation is most important factor in pregnant women receiving recommended maternal immunization

• http://www.immunizationforwomen.org is the ACOG website for both providers and patients
“Thank you ever so much”

Any questions?

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Spare slides
FAQs

Is breastfeeding Safe after Tdap Vaccination?
• YES! Breastfeeding is not a contraindication for receiving Tdap vaccine and is, in fact, fully compatible with Tdap vaccination. Tdap vaccine can and should be given to women who plan to breastfeed.

Can Pertussis and Flu Vaccines be co-administered?
• YES! Pregnant women
  • should receive the flu vaccine as early as possible in the flu season, during any trimester,
  • pertussis vaccine is recommended later in pregnancy (between 27 and 36 weeks gestation).

Do Pertussis vaccines contain Thimerosal?
• None of the pertussis vaccines (Tdap and DTaP) currently used in the United States contain thimerosal.
Resources

ACOG Immunization for Women: 
http://www.immunizationforwomen.org


CDC: http://www.cdc.gov/vaccines/vpd-vac/pertussis/tdap-pregnancy-hcp.htm