

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 EPI- DEMIC INFLUENZA

PAUL TITUS, M.D.

Obstetrician to the Western Pennsylvania Hospital, Pittsburgh; Profes-
sor of Obstetrics, University of Pittsburgh

AND

J. M. JAMISON, M.D.

Resident Obstetrician, Western Pennsylvania Hospital, Pittsburgh
PITTSBURGH

JAMA 1919

EPIDEMIC PNEUMONIA (SPANISH INFLU- ENZA) IN PREGNANCY

EFFECT IN ONE HUNDRED AND ONE CASES

WESLEY J. WOOLSTON, M.D.

Attending Gynecologist, Cook County and Wesley Hospitals; Assistant
Professor of Gynecology and Surgery, University of Illinois
College of Medicine

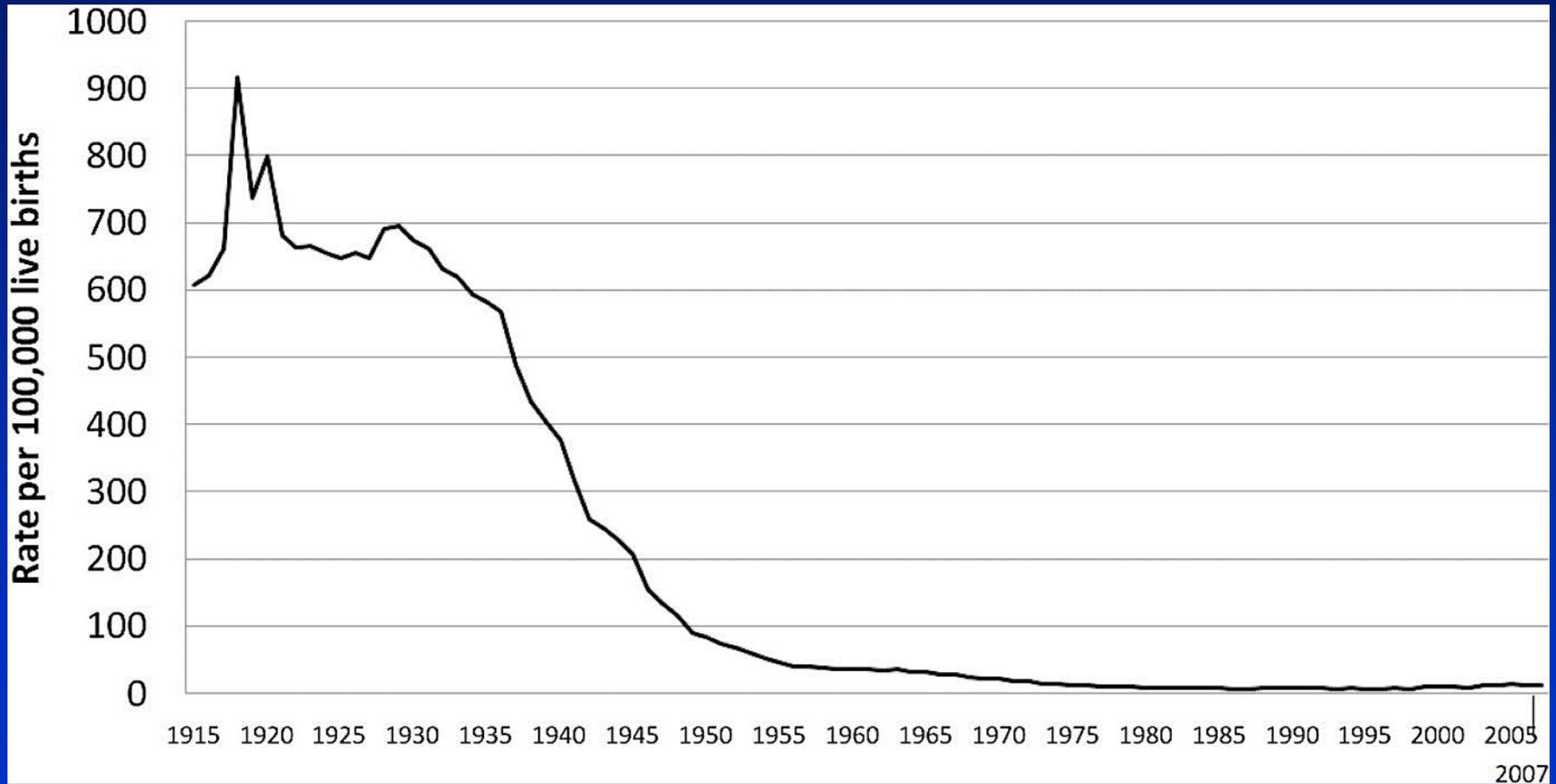
AND

D. O. CONLEY, A.B., M.D.

Resident Physician, Cook County Hospital

CHICAGO

Maternal Morality Rate USA



2007



2009 Influenza A/H1N1 and Pregnancy

Articles

H1N1 2009 influenza virus infection during pregnancy in the USA



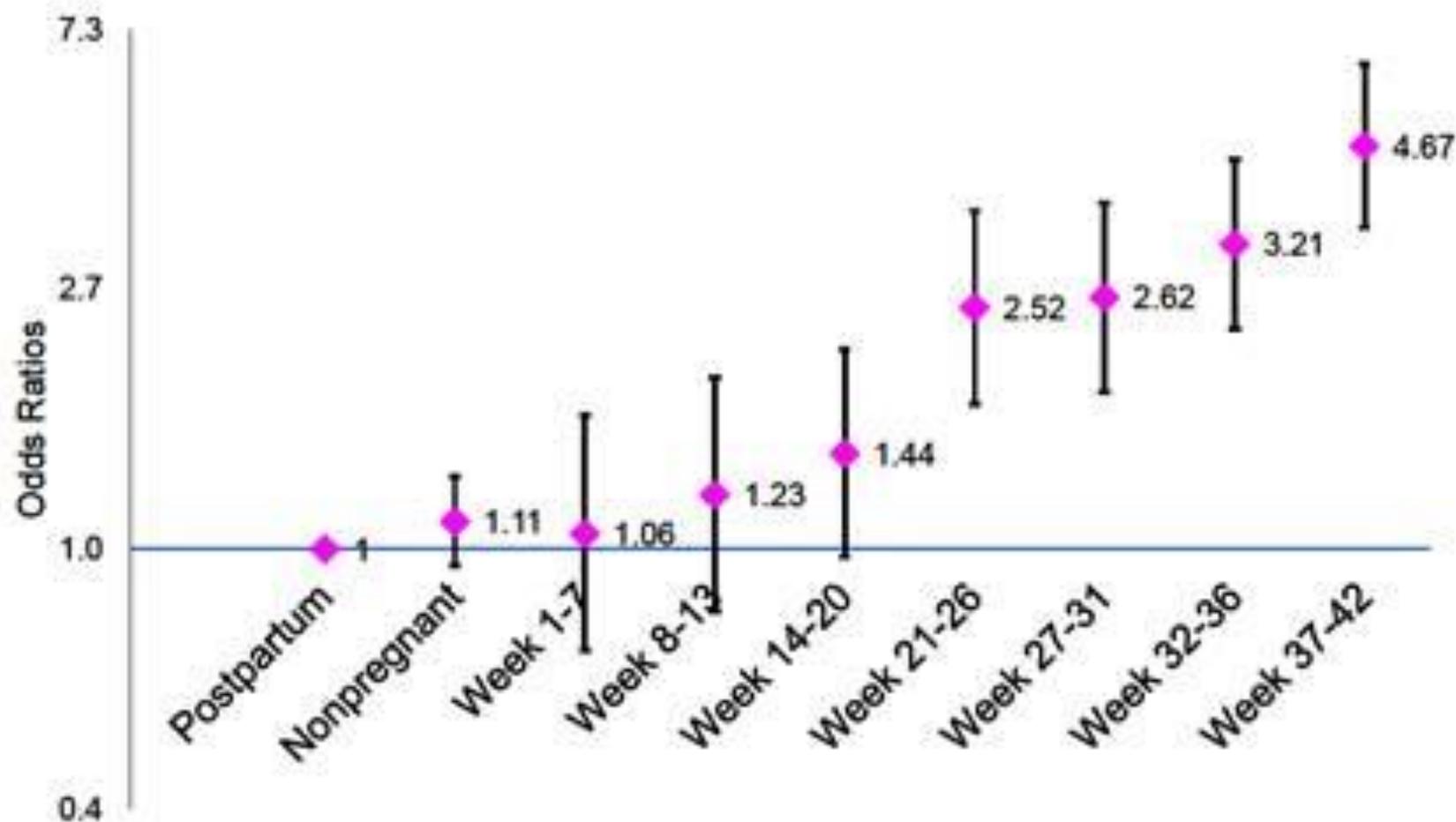
*Denise J Jamieson, Margaret A Honein, Sonja A Rasmussen, Jennifer L Williams, David L Swerdlow, Matthew S Biggerstaff, Stephen Lindstrom, Janice K Louie, Cara M Christ, Susan R Bohm, Vincent P Fonseca, Kathleen A Ritger, Daniel J Kuhles, Paula Eggers, Hollianne Bruce, Heidi A Davidson, Emily Lutterloh, Meghan L Harris, Colleen Burke, Noelle Cocoros, 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

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 protection and prevention of adverse obstetrical outcomes

Newborns are at highest risk of influenza related mortality

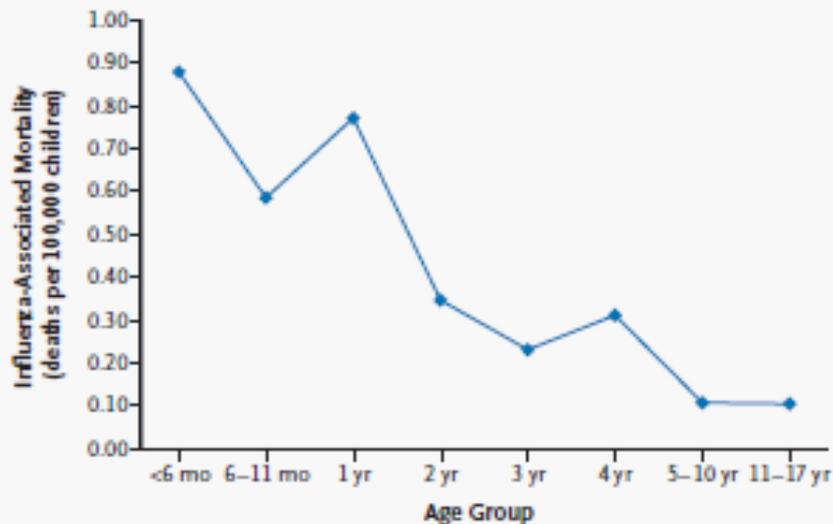


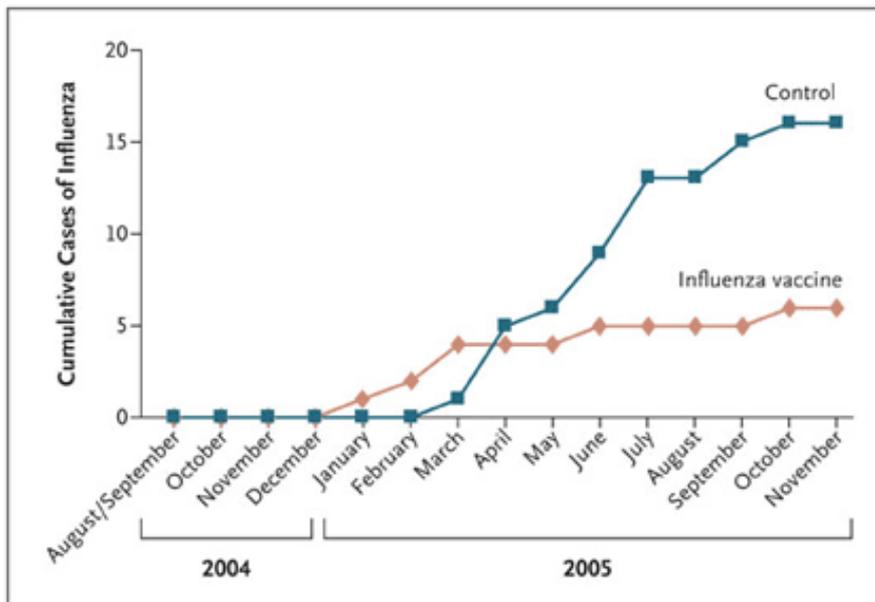
Figure 2. Influenza-Associated Mortality Rates According to Age Group—United States, 2003–2004 Season.

Mortality highest at ≤ 6 months, before infant can be vaccinated.

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

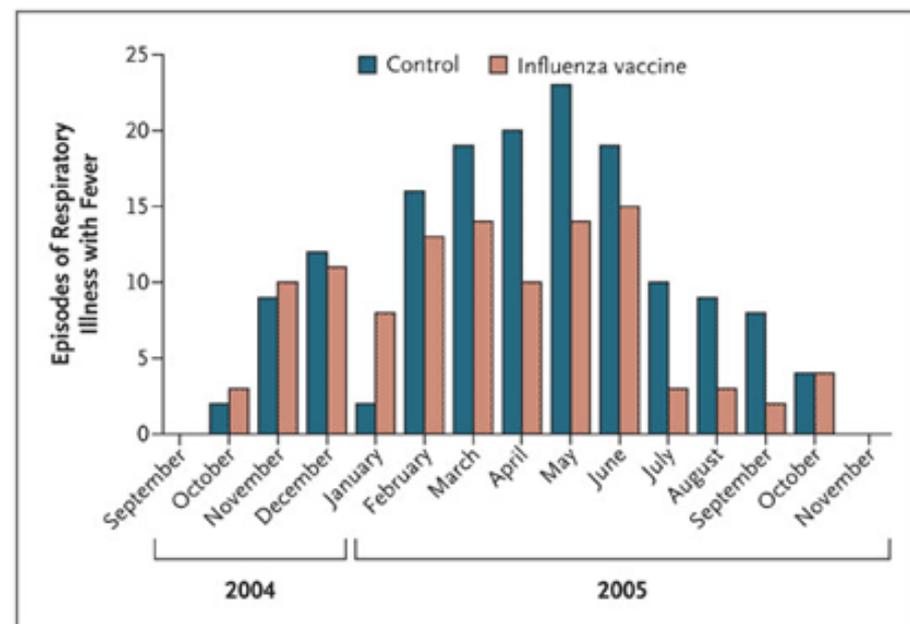
Benefits of Influenza Vaccine during Pregnancy

- 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

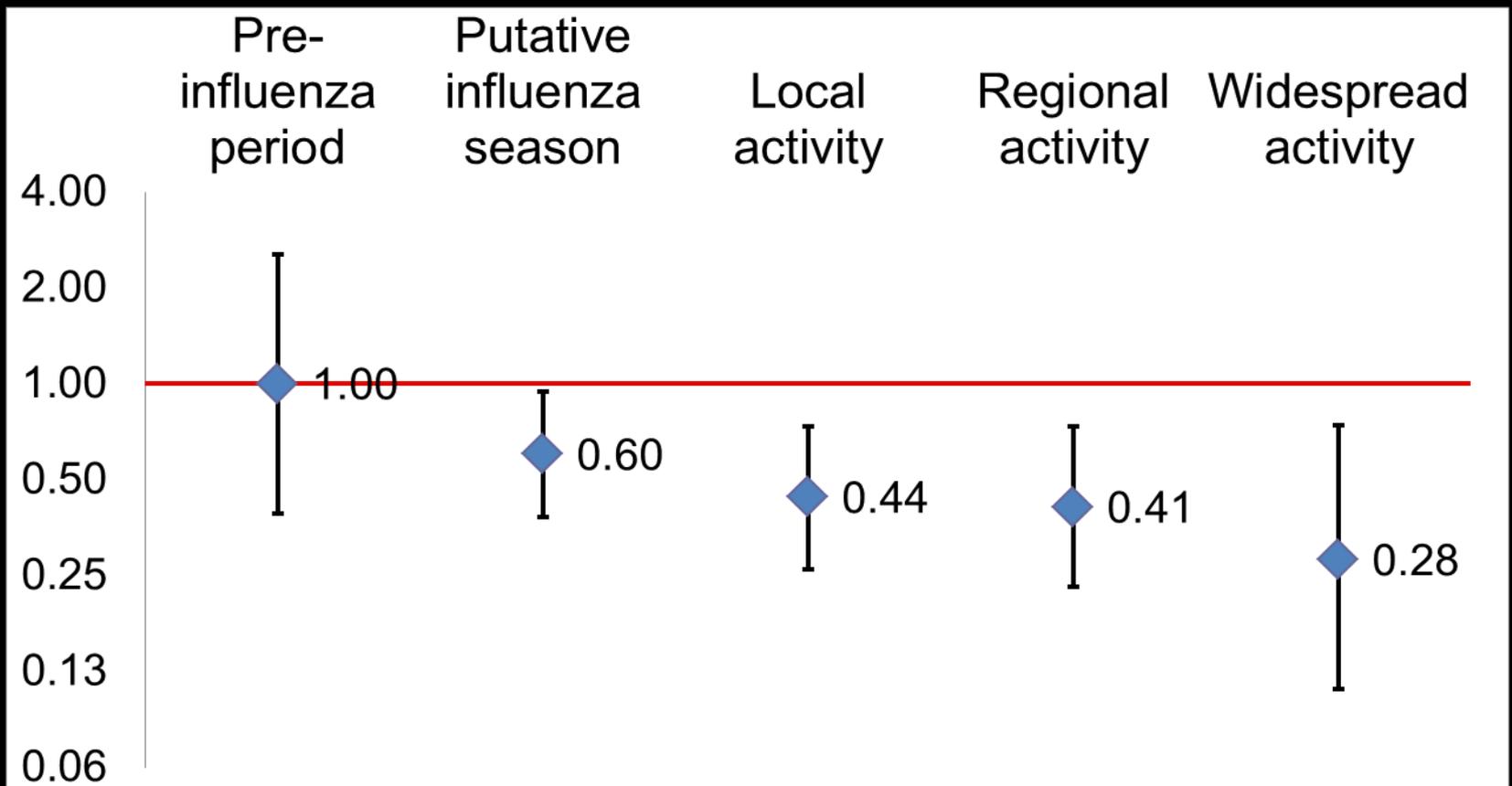
Other benefits noted –
 Decreased maternal illness
 Increased birthweight



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.”

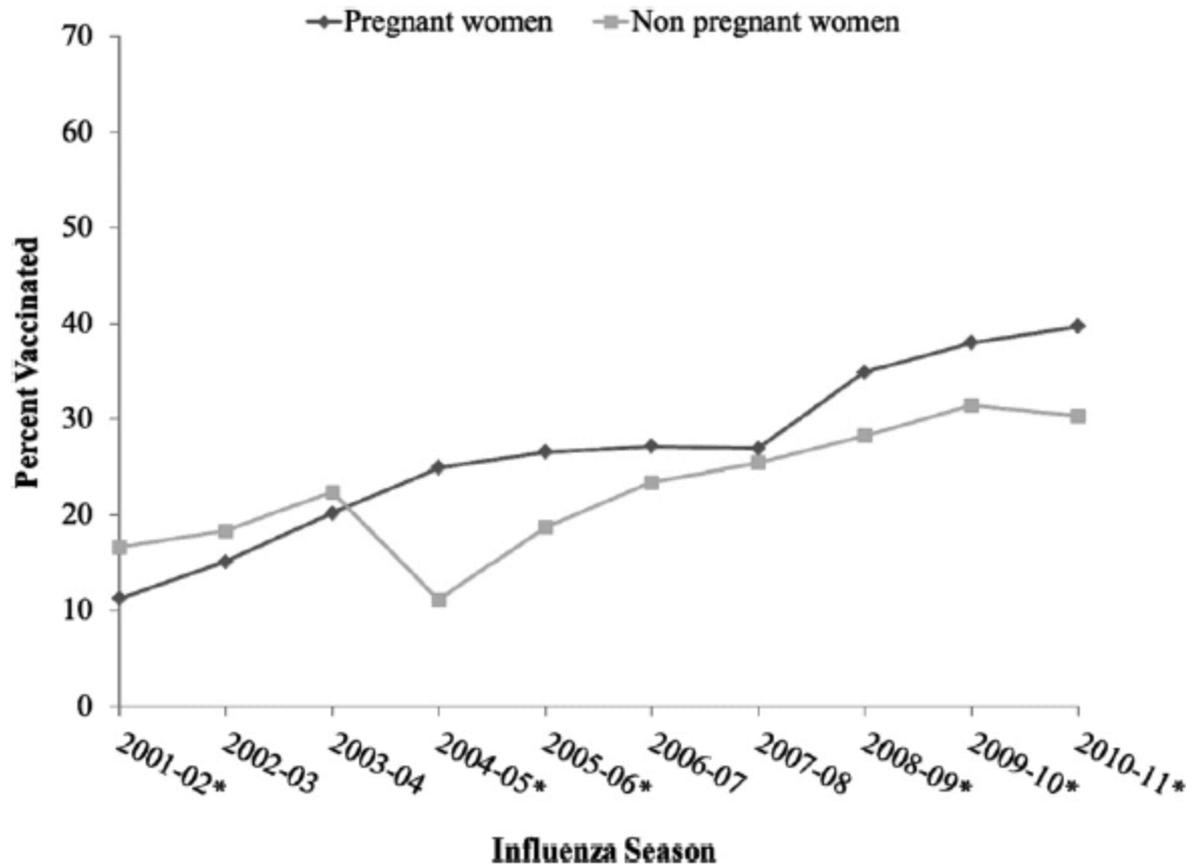
Adjusted Odds Ratios of Prematurity by Maternal Influenza Vaccine Status



Estimated vaccine coverage in women – 2001-2011

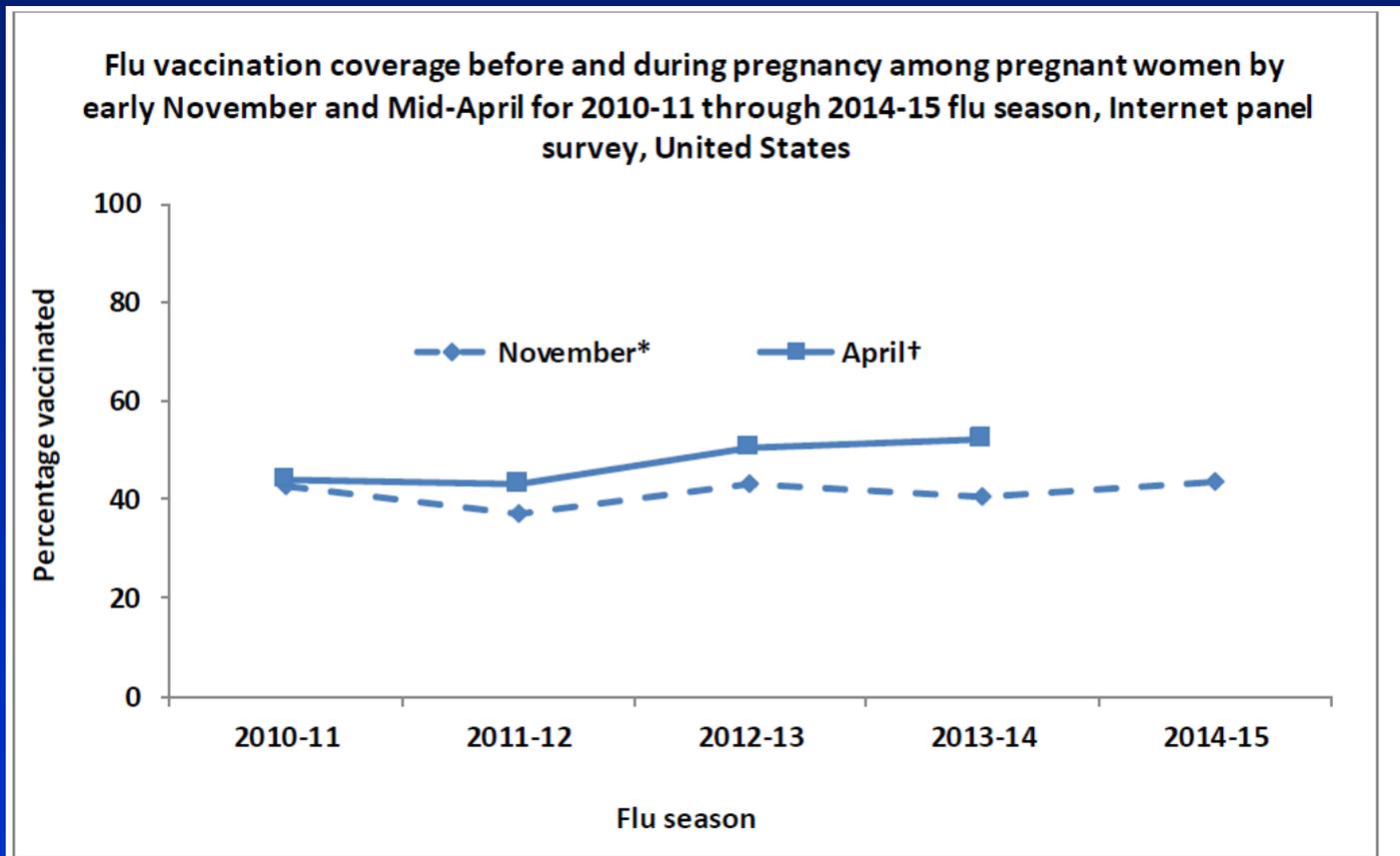
FIGURE

Influenza vaccination coverage in pregnant and nonpregnant women by influenza season



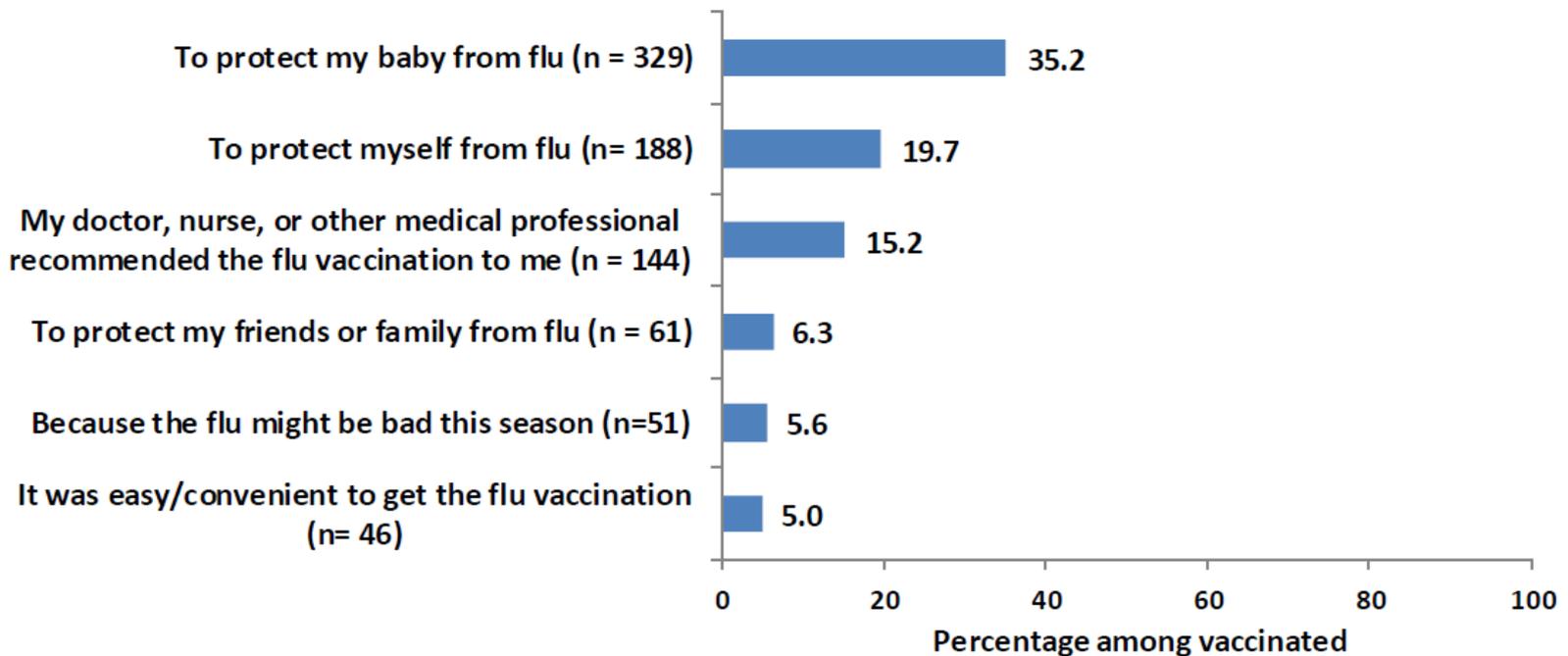
Source CDC -
MMWR
Sept 27, 2013

Estimated vaccine coverage in pregnant women 2010 to 2015



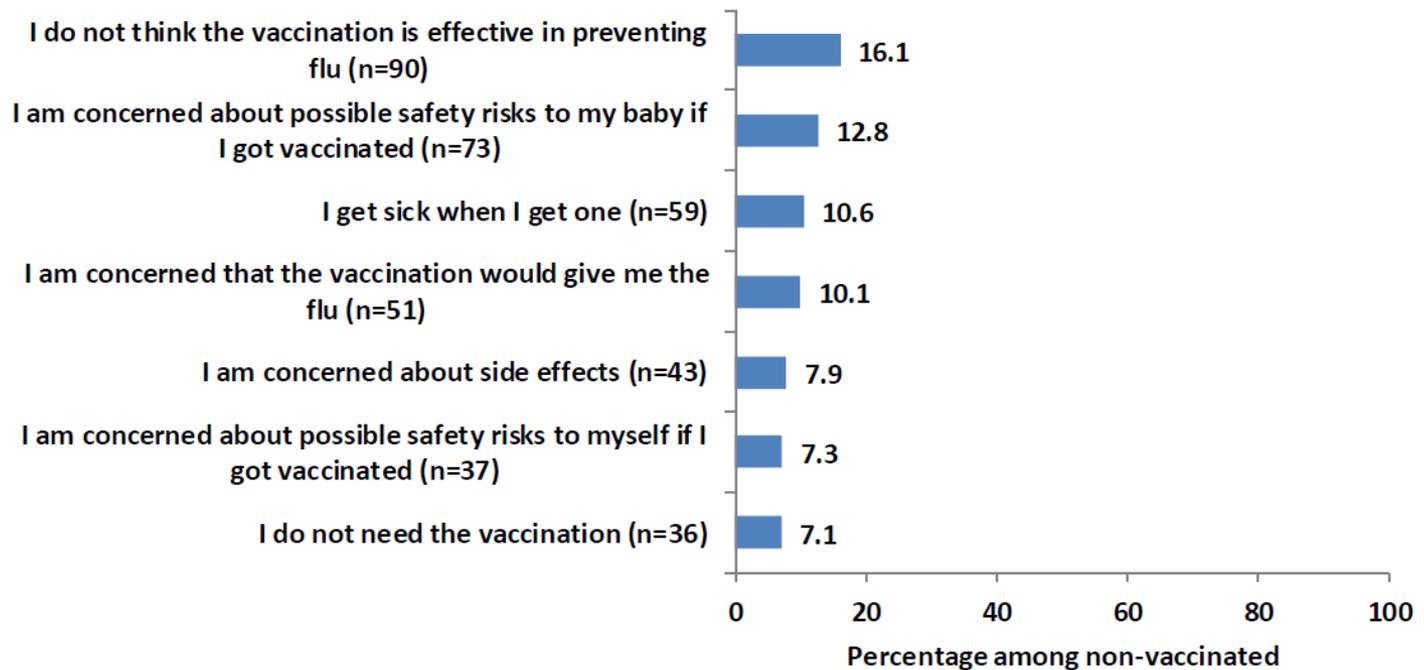
Reasons Pregnant Women Get Flu Vaccine 2014

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)

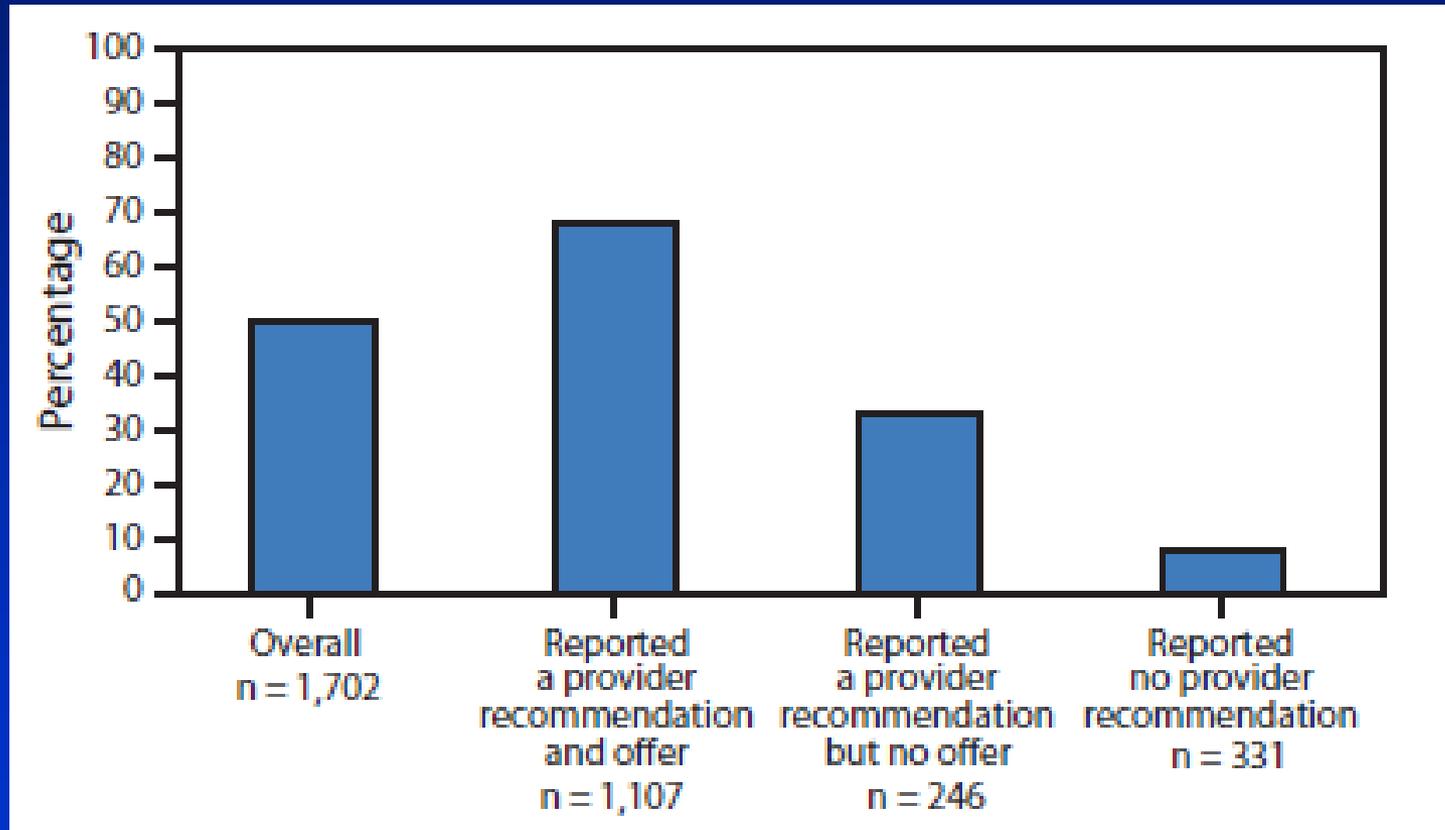


Reasons Pregnant Women do not get Flu Vaccine 2014

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)



Flu Vaccine Uptake in Pregnant Women 2014-15



ACOG Recommendations - Flu

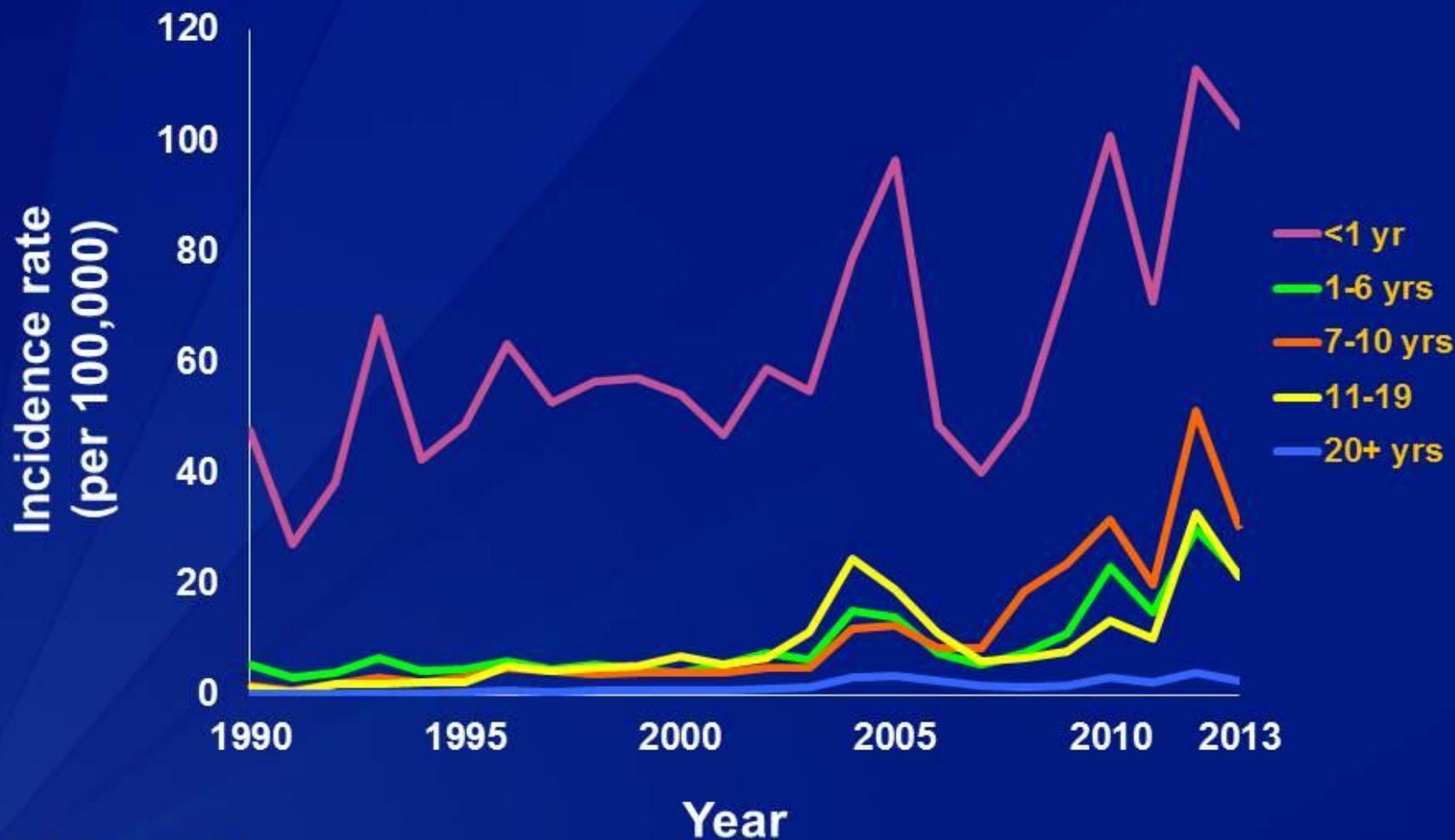
- “Influenza vaccination is an essential element of preconception, prenatal, and postpartum care because pregnant women are at an increased risk of serious illness due to seasonal and pandemic influenza.”
- Every pregnant woman receive influenza vaccination
- Any form of inactivated vaccine acceptable
- 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

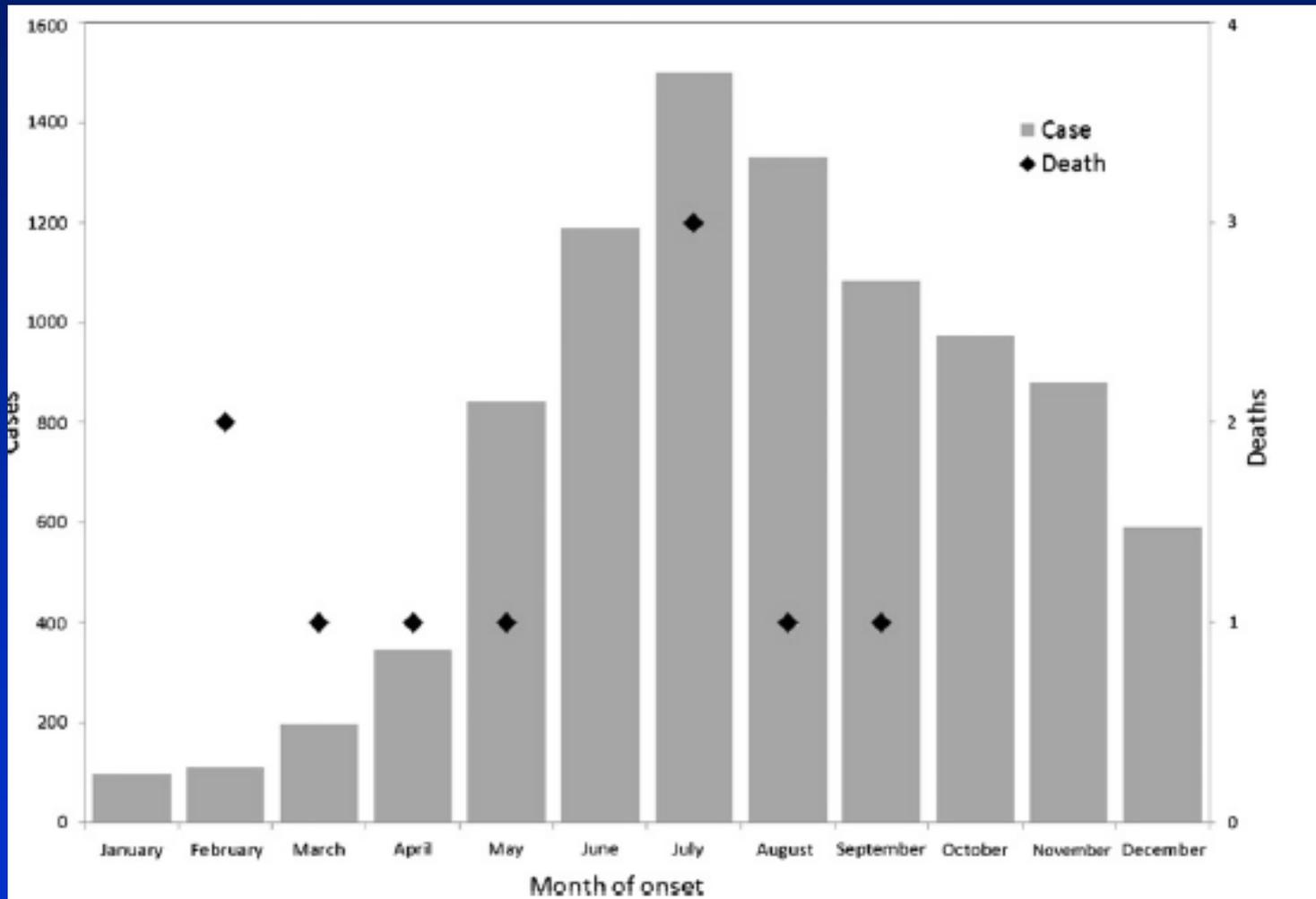
Reported pertussis incidence by age group: 1990-2013



*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

	Tdap (27-36 wks)	Unvaccinated
Chorioamnionitis	5.6 %	5.5 %
Preterm delivery (< 37 wk)	5.3 %	7.8 %
SGA (< 10 % tile)	8.6 %	8.3 %

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.

Tdap Vaccination Recommendations



The American College of
Obstetricians and Gynecologists
WOMEN'S HEALTH CARE PHYSICIANS

COMMITTEE OPINION

Number 566 • June 2013

(Replaces No. 521, March 2012)

Committee on Obstetric Practice

This document reflects emerging clinical and scientific advances as of the date issued and is subject to change. The information should not be construed as dictating an exclusive course of treatment or procedure to be followed.

Update on Immunization and Pregnancy: Tetanus, Diphtheria, and Pertussis Vaccination

ABSTRACT: In the face of dramatic and persistent increases in pertussis disease in the United States, the Centers for Disease Control and Prevention's Advisory Committee on Immunization Practices has updated its guidelines for the use of the tetanus toxoid, reduced diphtheria toxoid and acellular pertussis vaccine (Tdap) for pregnant women. The new guidance was issued based on an imperative to minimize the significant burden of pertussis disease in vulnerable newborns, the reassuring safety data on the use of Tdap in adults, and the evolving immunogenicity data that demonstrate considerable waning of immunity after immunization. The revised Advisory Committee on Immunization Practices guidelines recommend that health care personnel administer a dose of Tdap during each pregnancy, irrespective of the patient's prior history of receiving Tdap. To maximize the maternal antibody response and passive antibody transfer and levels in the newborn, optimal timing for Tdap administration is between 27 weeks and 36 weeks of gestation, although Tdap may be given at any time during pregnancy. However, there may be compelling reasons to vaccinate earlier in pregnancy. There is no evidence of adverse fetal effects from vaccinating pregnant women with an inactivated virus or bacterial vaccines or toxoids, and a growing body of robust data demonstrates safety of such use. For women who previously have not received Tdap, if Tdap was not administered during pregnancy it should be administered immediately postpartum to the mother in order to reduce the risk of transmission to the newborn. Additionally, other family members and planned direct caregivers also should receive Tdap as previously recommended (sustained efforts at cocooning). Given the rapid evolution of data surrounding this topic, immunization guidelines are likely to change over time and the American College of Obstetricians and Gynecologists will continue to issue updates accordingly.

The overwhelming majority of morbidity and mortality attributable to pertussis infection occurs in infants who are less than or equal to 3 months of age (1). Infants do not begin their own vaccine series against pertussis (with the diphtheria, tetanus and acellular pertussis vaccine [DTaP]) until 2 months of age (2). This situation leaves a window of significant vulnerability for newborns, many of whom appear to contract serious pertussis infections from family members and caregivers, including the mother (3). Starting in 2006, the Advisory Committee on Immunization Practices (ACIP) of the Centers for Disease Control and Prevention (CDC) recommended an approach to combat neonatal pertussis infection referred to as "cocooning" (4). This approach essentially consisted of a recommendation to administer Tdap to all women

in the immediate postpartum period and all other family members and caregivers who had not previously received the vaccine in order to provide a protective cocoon of immunity around the newborn. This approach has proved challenging and insufficient when used alone at preventing neonatal pertussis infections for a variety of reasons. Importantly, cocooning leaves vulnerable infants without any endogenous protective antibody until they begin their own vaccine series at 2 months of age. Thus, they are solely dependent on the immunity of those around them for pertussis protection in the critical first 2–3 months of life.

In June of 2011, the ACIP considered this situation and issued a new recommendation that pregnant women who had not previously received a dose of Tdap should

A dose of Tdap vaccine should be given to all pregnant women preferably between 27-36 weeks gestation during every pregnancy.

<http://www.acog.org/Resources-And-Publications/Committee-Opinions/Committee-on-Obstetric-Practice/Update-on-Immunization-and-Pregnancy-Tetanus-Diphtheria-and-Pertussis-Vaccination>

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>

ACOG Committee Opinion 566: Update on Immunization During Pregnancy: Tetanus, Diphtheria, and Pertussis Vaccination, June 2013. <http://www.acog.org/Resources-And-Publications/Committee-Opinions/Committee-on-Obstetric-Practice/Update-on-Immunization-and-Pregnancy-Tetanus-Diphtheria-and-Pertussis-Vaccination>

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