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The Importance of Maternal Immunization

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Featured Speakers

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Objectives

After watching this webcast participants will be able to:

- Identify maternal vaccination recommendations
- Name at least three benefits of maternal immunization
- Recognize evidence-based maternal immunization best practices

Vaccines Are Not Just For Children

- Adult vaccination saves lives!
- Each year in the United States, ~ 60,000 adults die from vaccine preventable diseases or their complications
- Pneumonia and influenza together are the 8th leading cause of death in the United States
- The CDC sets routine adult vaccine recommendations based upon recommendations made by the Advisory Committee on Immunization Practices (ACIP) and endorsed by professional societies
- These recommendations are published as immunization schedules and are updated annually

Adult Vaccination Rates Are Low

- Most adults are NOT aware that they need vaccines
- Many missed opportunities for vaccination occur because ob-gyn's and other providers do not routinely assess vaccination status and do not routinely recommend vaccination
- A recommendation from their own provider is the strongest predictor of whether a patient gets vaccinated!

Adult Vaccine Recommendations

- Vaccines must be approved/licensed by FDA before being manufactured and distributed in the US
- Licensure based on extensive FDA safety & efficacy studies
- After licensure, CDC sets routine adult vaccine schedules based on recommendations by the Advisory Committee on Immunization Practices (ACIP) and endorsed by professional societies
- The *Adult Immunization Schedules* include specific guidance on age(s) when the vaccine should be given, the number of doses needed, the amount of time between doses, and precautions and contraindications

CDC Immunization Schedule

- Centers for Disease Control and Prevention (CDC) Recommended Adult Immunization Schedule for Adults Aged 19 Years or Older, By Vaccine and Age Group
- <http://www.cdc.gov/vaccines/schedules/hcp/imz/adult.html>
- Online, PDF, poster format and iOS/Android device apps
- Footnotes with additional information by vaccine

 Centers for Disease Control and Prevention
CDC 247: Saving Lives. Protecting People™

Immunization Schedules

CDC Immunization Schedule

- Vaccine recommendations based on medical condition or other indications - specific category for pregnancy

Figure 2. Vaccines that might be indicated for adults aged 19 years or older

| VACCINE | INDICATION | Pregnancy | Immunosuppressing conditions (excluding HIV infection) | | HIV infection CD4+ count (cells/mm ³) | |
|---|------------|-------------------------------|--|------|---|------|
| | | | <200 | ≥200 | <200 | ≥200 |
| Influenza ^{1,2} | | | | | | |
| Tetanus, diphtheria, pertussis (Td/Tdap) ^{1,3} | | It does not pose such a risk. | | | | |
| Varicella ^{1,4} | | Contraindicated | | | | |

Vaccination Opportunities for Obstetrician-Gynecologists

Vaccination should be made part of routine reproductive healthcare for women:

- Pre-conception planning
- Prenatal care
 - Two patients to protect, mother and child
- Post-partum care
- Well-woman care

Thinking Vaccines

- Factors to address when discussing vaccines with pregnant patients:
 - What is the disease being prevented?
 - What is the antigen?
 - Is there an adjuvant? If so, what is the adjuvant?
 - What is the vaccine efficacy?
 - What is the vaccine safety profile?
 - Is the vaccination given as a single dose or a series?
 - What are the unique pregnancy-related issues to consider?

Pre-Vaccination Counseling

- Federal law requires that patient education - Vaccine Information Statements (VIS) - be distributed prior to vaccination
 - Available at: www.immunize.org
- Elements of a risk/benefit discussion:
 - Recommendations/indications
 - Contraindications
 - Vaccine efficacy
 - Duration of efficacy
 - Side effects
 - What other vaccinations should/could be given

Vaccination Recommendations for Pregnant Women

- | | |
|---|--|
| <ul style="list-style-type: none"> ▪ Routine <ul style="list-style-type: none"> ▪ Inactivated influenza vaccine (IIV) ▪ Tdap (TT/Td) ▪ Contraindicated <ul style="list-style-type: none"> ▪ MMR ▪ Varicella ▪ Live attenuated influenza vaccine (LAIV) | <ul style="list-style-type: none"> ▪ Pregnancy <i>not</i> a contraindication <ul style="list-style-type: none"> ▪ Pneumococcal PS/C ▪ Hepatitis B ▪ Hepatitis A ▪ Meningococcal PS/C ▪ Inactivated poliovirus ▪ Yellow fever ▪ www.CDC.gov/vaccines/pregnancy |
|---|--|

Live Virus Vaccines & Pregnancy

- Routine live virus vaccinations (e.g., measles, mumps, rubella, and varicella) contraindicated during pregnancy
- Risk to a developing fetus from maternal vaccination primarily theoretical; only smallpox (vaccinia) vaccine has been shown to injure a fetus
- General approach:
 - Do not give live virus vaccines to pregnant women or women planning to become pregnant in the following 4 weeks
 - If pregnant and susceptible, vaccinate as early in the postpartum period as possible
 - Screening for rubella immunity and varicella immunity is part of routine prenatal care

What is Influenza?

- Influenza (“flu”) is a highly contagious viral illness
- Often confused with the “common cold,” but flu is much more severe
 - Symptoms develop quickly and include:
 - ✓Fever/feeling feverish/chills
 - ✓Headache
 - ✓Fatigue
 - ✓Myalgia
 - ✓Cough

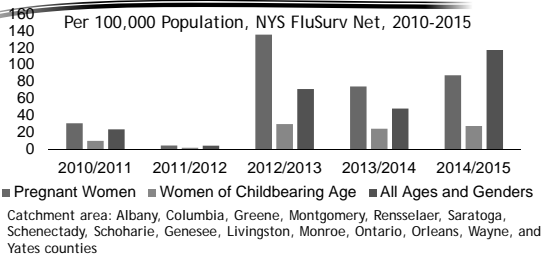
What is Influenza?

- Stomach symptoms - nausea, vomiting, and diarrhea can also occur; GI symptoms more common in children than adults
- Individuals are contagious for 1 day before symptom onset and for 5-7 days after initial symptoms begin
- Symptoms start 1 to 4 days after the virus enters the body
- Young children, adults age 65 and older, people with chronic medical conditions and pregnant women have a high risk of serious complications from the flu

Potential Flu Complications

- Maternal risks (compared to non-pregnant women):
 - 4x higher rates of complications/hospitalizations
 - Increased mortality, especially in the third trimester
 - Increased risk of premature labor and delivery
- Fetal Risks:
 - Viremia rare, transplacental passage infrequent
 - Maternal hyperthermia may place fetuses at risk for birth defects (VSD, cleft lip, neural tube defects) and preterm birth
 - In Bangladeshi study, maternal influenza vaccination associated with higher birth-weight

Influenza Hospitalizations



Potential Flu Complications Among Children

- Children < 24 months have increased risk for morbidity and mortality
- Newborns < 6 months cannot be vaccinated; protection is from maternal vaccination and cocooning
- According to the CDC in 2014/15 there were 296 pediatric deaths associated with the flu; 6 of those deaths were in New York State
- For the current flu season in NYS, almost 50% of children hospitalized for influenza had no identified underlying medical condition

Influenza Vaccination Recommendations

The Centers for Disease Control and Prevention (CDC) and ACOG recommend routine annual influenza vaccination for all persons aged 6 months and older who do not have contraindications

CDC MMWR Recommendations on Seasonal Influenza (Aug 15, 2014, 63:32)

Seasonal Influenza Vaccines

The "Flu Shot"

- Traditional trivalent inactivated influenza vaccine protected against 3 influenza virus strains (2 influenza A and 1 Influenza B)
- Newer quadrivalent vaccine protects against 4 strains (2 influenza A and 2 influenza B)
 - Old nomenclature: Trivalent Inactivated Vaccine = TIV
 - New nomenclature: Inactivated Influenza 3 = IIV3
 - New Quadrivalent Vaccine: IIV4

Influenza Vaccination Contraindications

- Contraindications:
 - Anaphylactic reaction to a previous dose or to egg protein, gelatin or other vaccine component
 - Precaution in moderate to severe illness
- Not contraindications:
 - Minor illnesses (diarrhea, upper respiratory tract infection with or without fever)
 - Antimicrobial therapy
- Persons with a history of egg allergy who have experienced only hives after exposure to egg should receive influenza vaccine

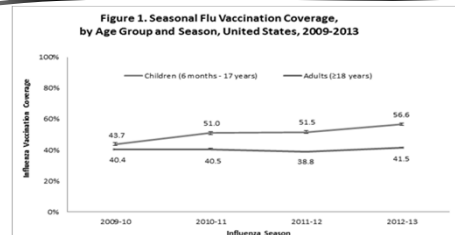
Influenza Vaccine Efficacy

- Protective antibodies are produced within 2 weeks
- Varies from season-to-season
 - 70-90% effective in preventing clinical illness when vaccine matches circulating strains
 - 50-77% effective against laboratory confirmed illness when vaccine strains are antigenically dissimilar to circulating strains

Influenza Vaccine Efficacy

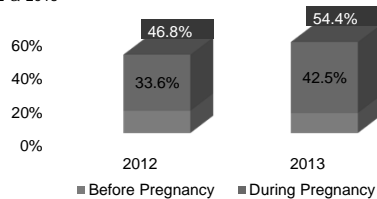
- Efficacy varies among different populations:
- Significantly less effective among the elderly
 - Vaccinating children protects entire communities
 - 80% coverage in pediatric age groups confers significant protection among those who did not receive the vaccine
 - Efficacy not diminished in pregnancy
 - Limited data

Current Nationwide Vaccination Rates



Influenza Vaccine Coverage Among New Mothers

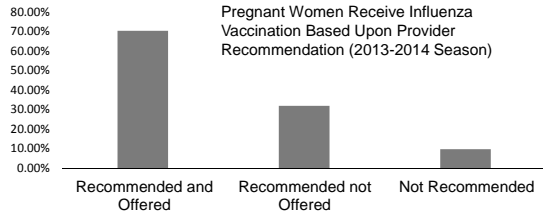
Pregnancy Risk Assessment Monitoring System (PRAMS), NYS excluding NYC, 2012 & 2013



When to Vaccinate Pregnant Women

- Flu season usually begins in October, and can run through May
- Vaccination should begin as soon as vaccine is available - no need to delay; influenza vaccine is typically available starting in mid August/September
- Peak activity is typically expected around January or February
- Timing, severity, and length of the season varies from one year to another
- Vaccination should be offered as long as influenza viruses are circulating (i.e., *October through May*)

Receipt of Influenza Vaccination Based on Provider Recommendation



What is Pertussis?

- Clinical case definition: Cough illness lasting at least 2 weeks with one of the following: paroxysms of coughing, inspiratory "whoop," or post-tussive vomiting, without other apparent cause (as reported by a health professional)
- Causative organism: *Bordetella pertussis*, a gram-negative bacterium, a uniquely human pathogen
- Incubation 7-10 days, catarrhal stage followed by paroxysm of coughing that can continue for 4-6 weeks

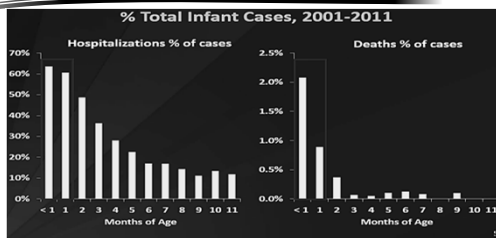
Pertussis Overview

- Substantial weight loss and sleep disturbances
- Highly infectious, secondary attack rate exceeds 80%
- Despite high childhood vaccination levels, the reports of pertussis cases have steadily increased in the United States
- One of the leading causes of vaccine preventable deaths world-wide

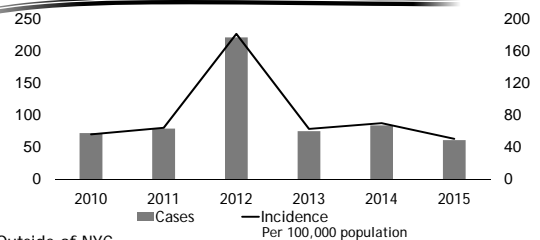
Pertussis & Pregnancy

- Pertussis can cause serious and sometimes life-threatening complications in infants, especially within the first 6 months of life
- In infants younger than 1 year of age who get pertussis, about half are hospitalized. The younger the infant, the more likely treatment in the hospital will be needed

Hospitalizations & Deaths



Pertussis Infection in NYS* Infants



Infant Pertussis Case History

- 6 week old infant
- Born at 40 weeks' gestation, uncomplicated pregnancy and delivery
 - Ob-Gyn did not recommend Tdap vaccination due to mother's prior history of Tdap vaccination
 - Missed opportunity - unaware of current recommendations for vaccination with each pregnancy
- Seen at pediatrician's office at 5 weeks of age with cold symptoms, congestion, cough of 1 days' duration

Infant Pertussis Case History

- Presented to ER 1 week later in respiratory distress with paroxysmal cough, inspiratory wheezing, and cyanosis
- Intubated, initiated on antibiotics, and admitted to Pediatric Intensive Care Unit (PICU)
- Nasopharyngeal swab PCR-positive for *Bordetella pertussis*
- Died 1 day after admission
- No source of infection was ever identified

Take home point: Tdap should be administered with every pregnancy, regardless of immunization history

Tdap Vaccination Recommendations

- Tdap vaccination recommended during every pregnancy, preferably at 27 to 36 weeks
- For non-pregnant adults, Tdap needs to be given only once:
 - Td every 10 years
 - Substitute Tdap for Td if Tdap never given
- Family members and caregivers (fathers, grandparents, and babysitters) should be up-to-date with their Tdap vaccine

Pertussis & Pregnancy

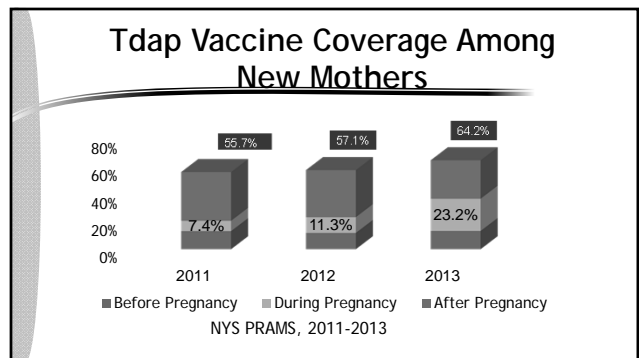
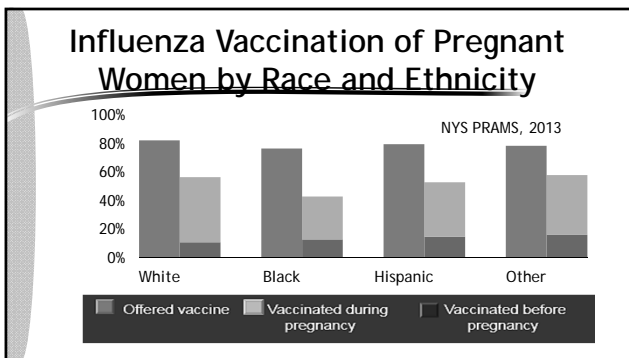
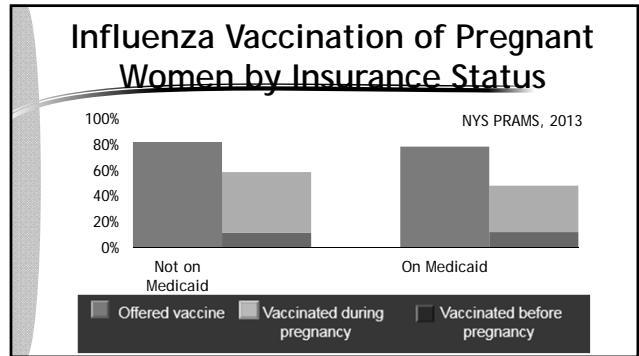
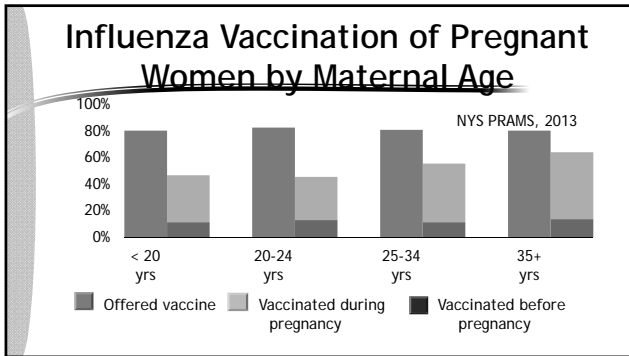
- Why Tdap vaccination each and every pregnancy?
- Why 27-36 weeks?
 - Antibody levels decline after immunization
 - Maternal immunization timed in order to have peak transplacental passage of IgG antibodies

Efficacy & Safety Updates


- Efficacy: Recent UK experience
- Policy of maternal vaccination during every pregnancy has led to a reduction in infant pertussis
 - Success attributed to both transplacental antibody protection and cocooning
- Safety: *Journal of the American Medical Association* (11/11/14)
- Researchers used administrative and electronic health record data from two CA Vaccine Safety Datalink sites
 - Found Tdap vaccination during pregnancy not associated with increased risk for hypertensive disorders of pregnancy, preterm birth, or having a baby who is small for his or her gestational age

Influenza and Tdap Vaccination of Pregnant Women in New York State

- In general, pregnant women and new mothers report higher influenza and Tdap vaccination coverage than the general adult population
- Less than half of new mothers in NYS report having received influenza and Tdap vaccines during their most recent pregnancy
- Disparities in maternal influenza vaccination persist by maternal age, race and ethnicity, and socio-economic status



Benefit to the Fetus/Newborn




Maternal Immunization Benefit

- To boost maternal levels of pathogen-specific antibodies
- To provide the young infant with sufficient concentrations of antibodies
- To protect against infections occurring during a period of increased vulnerability, until able to adequately respond to active immunization or infectious challenge

Recommendations & Resources

- American College of Obstetricians and Gynecologists Web Resources for Incorporating Immunizations into Routine Practice: www.immunizationforwomen.org
- Immunization Action Coalition: www.immunize.org
- CDC Guidelines for Vaccinating Pregnant Women: www.cdc.gov/vaccines/
- New York State Department of Health Vaccinating Women of Reproductive Age: www.health.ny.gov/prevention/immunization/vaccinating_women_of_reproductive_age_guidelines.htm
- Direct Questions to: Immunize@health.ny.gov



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