

# **Vaccinating to Protect Mother and Child**

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# Disclosure

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- I have no affiliation (financial or otherwise) with a pharmaceutical, medical device or communications organization.

# Outline

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- Maternal & fetal/neonatal benefits
- Tetanus/Pertussis/Influenza
- Vaccines under development
- Adverse Events

# Maternal Immunization

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- vaccine-preventable diseases can cause significant morbidity and mortality in pregnant women & infants
- immunization in pregnancy protects both mothers and fetuses by activation and transplacental transport of IgG

# Maternal Immunization

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- pregnant women generally healthy and immunocompetent
- expect full response to vaccines
- present for regular visits
- good opportunity to review immunization status and make recommendations

# Immunization- Fetal/Infant Effects

- passive transfer of maternal antibody after 18-20 weeks' GA
- passive antibody present for 6-12 mos
- maternal IgG provides passive immunity for infants at a time when they can't mount effective immune response (first 6 months)
- maternal immunization in pregnancy an ideal strategy to protect young infants

# Live/Live Attenuated Vaccines

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- contraindicated in pregnancy
- theoretical risk to fetus
- no actual teratogenicity demonstrated
- measles, mumps, rubella
- varicella
- yellow fever

# Inactivated Vaccines

- inactivated viral vaccines, bacterial vaccines and toxoids safe in pregnancy
- no evidence to suggest risk to fetus
- influenza
- tetanus, pertussis
- HAV, HBV
- Pnc, Mgc



# Criteria to Assist with Vaccine Decision Making

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- Is the vaccine recommended for the adult woman?
- Risk/likelihood of disease exposure
- Risk from disease
- Risk of vaccine

# Tetanus

# Tetanus Vaccine

- neonatal tetanus more common in developing countries
- high mortality without treatment
- mortality reduced by 92% with universal TT in pregnancy in developing world
- has been given to millions of women globally with no identified risks
- in developed countries, given as Tdap

# Pertussis

# Pertussis

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- can be serious/fatal infection in infancy
- outbreaks in last several years
- highest hospitalization and death rates among infants <2 months

# Pertussis Vaccine

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- **USA**
  - Recommended for all pregnant women in T3 in every pregnancy since 2012
- **UK**
  - Routine immunization for all pregnant women from 28-38 weeks since 2012

# Pertussis Vaccine

- **Basis for Recommendations & Outcomes**
  - inadequate vaccination histories
  - antibody levels not high enough if vaccinated prior to T3 of current pregnancy
  - in UK, 12 deaths 2012, 2 deaths 2013

# Pertussis Vaccine

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- **Canada**
  - currently no recommendation for routine vaccination in pregnancy
  - study ongoing to evaluate maternal and infant outcomes, and immunogenicity



Influenza

# Influenza Vaccine

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- risks of complications, hospitalizations, and deaths from influenza higher in pregnant women & young children
- NACI 2007 → vaccine recommended for all women pregnant during flu season
- reflects increased risk to mother, and to baby as a household contact of mother

# Risk of Seasonal Influenza to Pregnant Women

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- consistent evidence for higher risk
- risk exists for pregnant women in general and is even greater if comorbidities
- North American studies show admission rates in pregnancy similar to elderly adults
- hospitalization rates 4-18X greater

# Risk of Pandemic Influenza to Pregnant Women

- risk higher in pandemics (27-50% death)
- systematic review of 120 H1N1 studies, pregnant women 6% of serious cases
- Canadian data: higher rates of hospitalization, ICU admission, death
- similar data from USA, Australia, Europe

# Influenza Vaccine Efficacy

- **Clinical Illness in Mothers & Babies**
- high seroconversion rates (?lower GMT)
- RCT: 36% lower rates of URI/fever
- 41%-63% lower infant influenza rates
- 45%-91% decrease in infant hospitalization rates

# Influenza Vaccine Efficacy

- **Adverse Neonatal Outcomes**
- Canadian study of 9781 pregnant women: lower rates SGA (OR 0.80) & LBW (OR 0.74) in infants of vaccinated women
- Canadian study of >55,000 women: lower rates of SGA (RR 0.90), PTB (RR 0.73) & fetal death (RR 0.66) after H1N1 vaccine

# Influenza Vaccine Safety

- decades of use- no harmful outcomes in mothers or babies
- observational and RCT
- VAERS data: reports from 1990-2009 (>11 million women) and 2000-2003 (~2 million women) show no increase in rates of adverse pregnancy outcomes

# Influenza Vaccine Uptake

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- actual rates in pregnancy low (10%-40%)
- rates have increased slightly post-H1N1
- **Main barriers**
  - Lack of endorsement/recommendation by HCP
  - Poor knowledge of recommendations by women
  - Poor factual knowledge of efficacy and safety



# Vaccines Under Development

# Group B Streptococcus (GBS)

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- monovalent polysaccharide vaccine showed safety/immunogenicity and transplacental transfer
- current trial of trivalent polysaccharide conjugate vaccine of Ia, Ib, III
- cause >70% of early onset GBS disease
- Europe/Africa, results pending

# Respiratory Syncytial Virus

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- leads to high morbidity in infants <6mos
- maternal vaccination would be ideal strategy to protect young infants
- several vaccines currently in development

# Adverse Reactions

# Side Effects

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- immediate/early
- local
- systemic
- allergic
- long-term

# Side Effects- Immediate/Early

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- fainting
- vasovagal
- monitor post-vaccine for 5-10 minutes prior to leaving office

# Side Effects- Local

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- most common category of side effects
- usually mild
- soreness
- erythema
- swelling

# Side Effects- Systemic

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- less common than local
- malaise
- fever



# Side Effects- Allergic

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- usually mild
- in reaction to exposure to proteins (egg, neomycin)
- anaphylactic reactions very rare

# Side Effects- Long-Term

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- Guillan-Barre
- very rare
- usually occur at rates lower than for spontaneous disease

# Strategies to Increase Vaccination Acceptance

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- provider education
- patient education
  - printed materials
  - online
  - media
  - public health
  - innovative technologies

# Summary & Conclusions

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- maternal vaccination decreases disease burden in pregnant women and infants
- pertussis may be routine in future
- influenza recommended for all women pregnant during influenza season
- adverse reactions rare
- safety & efficacy data very compelling