Viral Disease in Pregnancy

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Objective: Review of viruses commonly encountered in pregnancy

- Cytomegaolvirus
- Parvovirus
- Influenza
- (ZIKA)

Cytomegalovirus

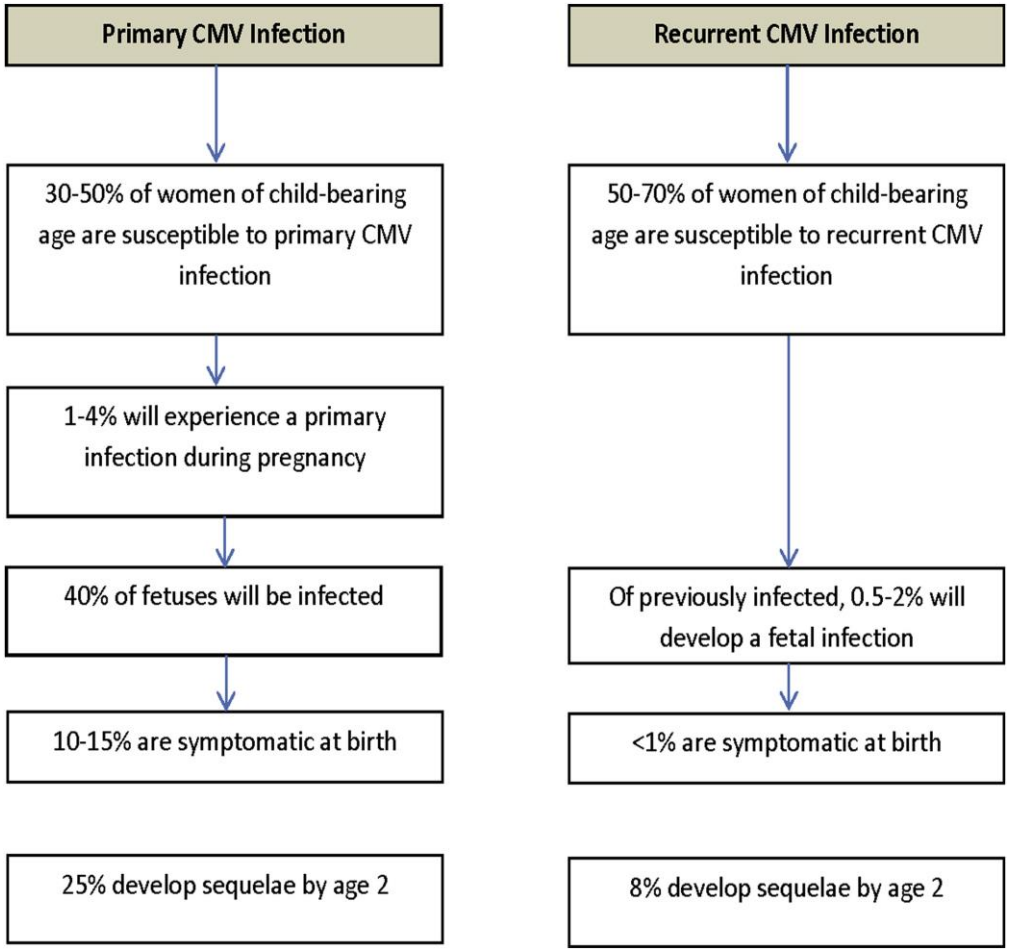
- Most common perinatal viral infection that results in major neonatal / childhood morbidity
- 40,000 infants in U.S. are affected each year
  - 1-1.3% birth prevalence
- Wide range of outcomes
  - Asymptomatic Infection
  - Hearing loss
  - Death

Cytomegalovirus

- Previous expsoure: 40-80% pregnant women
- Susceptible to primary infection: 20-60%
- 1-4% of seronegative women will acquire a primary infection during pregnancy
- **CONGENITAL INFECTION CAN OCCUR WITH BOTH PRIMARY AND RECURRENT CMV INFECTIONS**

Risks for maternal and neonatal infection

(NEJM 1992)



CMV Symptoms

- Neonatal
  - Jaundice
  - petechial rash
  - Hepatomegaly
  - death
- Childhood
  - hearing loss
  - developmental delay
  - Seizures
  - Death

(NEJM 1992)

Diagnosis: Ultrasound Findings

Cerebral calcifications (15%)

Microcephaly (15%)

Echogenic bowel (15%)

Fetal growth restriction (13%)

Ventriculomegaly (10%)

Ascites (8%)

Pericardial effusion (7%)

Hyperechogenic kidneys (4%)

Hepatomegaly (4%)

Placentomegaly (4%)

Hepatic calcifications (1%)

Diagnosis: Maternal Serology

- IgM: High false + rate
  - EBV
  - IgM may persist for months
- IgG with Avidity testing
  - Low avidity
    - primary infection vs non-primary infection
    - Early in response (16-18 weeks after primary infection)

Amniocentesis

- Performed:
  - > 6 weeks after maternal infection
  - > 21 weeks gestation
    - Specificity of 97-100%
- False negative
- Repeat amniocentesis >21 weeks
- **SEVERITY OF INFECTION CANNOT BE DETERMINED BY AMNIOCENTESIS**

CMV: To screen or not? To treat or not?

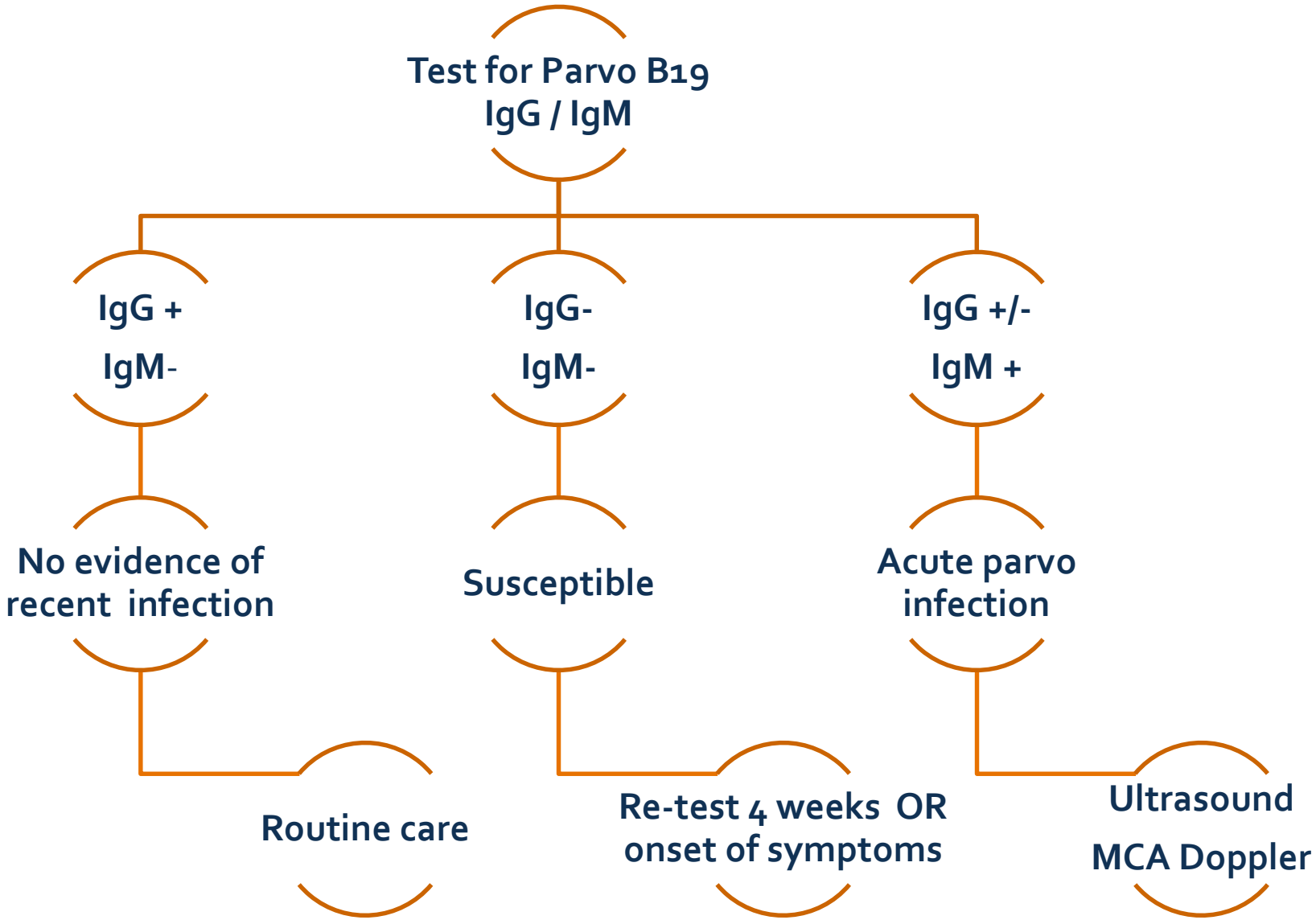
- Not recommended
  - No well define disease process
  - No effective early intervention
- "A Randomized Trial of Hyperimmune Globulin to Prevent Congenital Cytomegalovirus" (NEJM 2014:370:1316-26)
  - No benefit of treatment compared to placebo
  - Expensive
  - Adverse events recorded in treatment group (13% vs 2%)
- Anti-viral therapy
  - Case reports suggest decrease viral load
  - Currently not recommended

Human Parvovirus B19

- Common Childhood Illness (1983)
- Adverse pregnancy outcomes
  - Miscarriage
  - Fetal anemia
    - Cytotoxic to erythroid progenitor cells
  - Hydrops
    - Anemia
    - P-antigen on fetal cardiac myocytes
- Fetal death
  - 10% if infected <20weeks

Diagnosis: Suspected exposure

- Maternal serology
  - IgG
  - IgM
- Ultrasound
  - MCA Doppler studies
  - Fetal hydrops


Test for Parvo B19
IgG / IgM
IgG +
IgM-
IgG-
IgM-
IgG +/-
IgM +
No evidence of recent infection
Susceptible
Acute parvo infection
Routine care
Re-test 4 weeks OR onset of symptoms
Ultrasound
MCA Doppler

Management

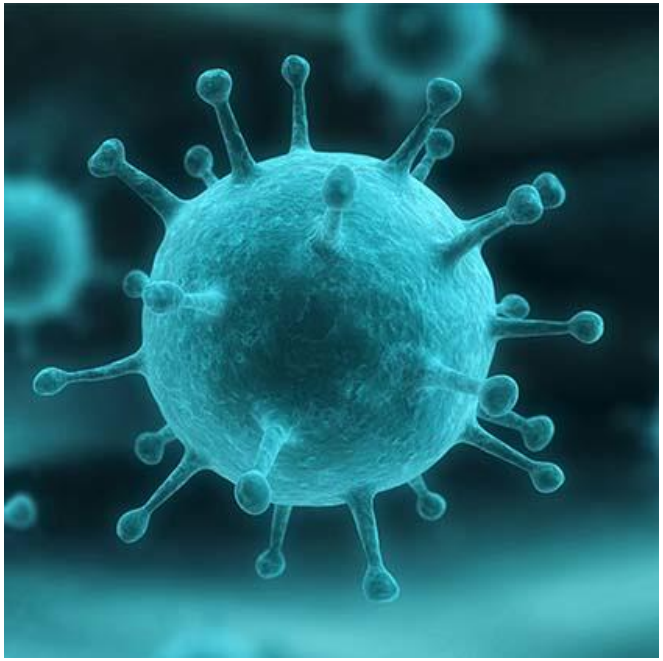
- Weekly sonographic evaluation of fetus for 8-12 weeks post exposure
- MCA Doppler Studies to evaluate the risk of fetal anemia
- In-utero transfusion

Prognosis

- Good
  - Case reports: 1-10 year follow up
- No evidence of long term sequelae
- Normal neurologic development
- Virus not teratogenic

Influenza A and B

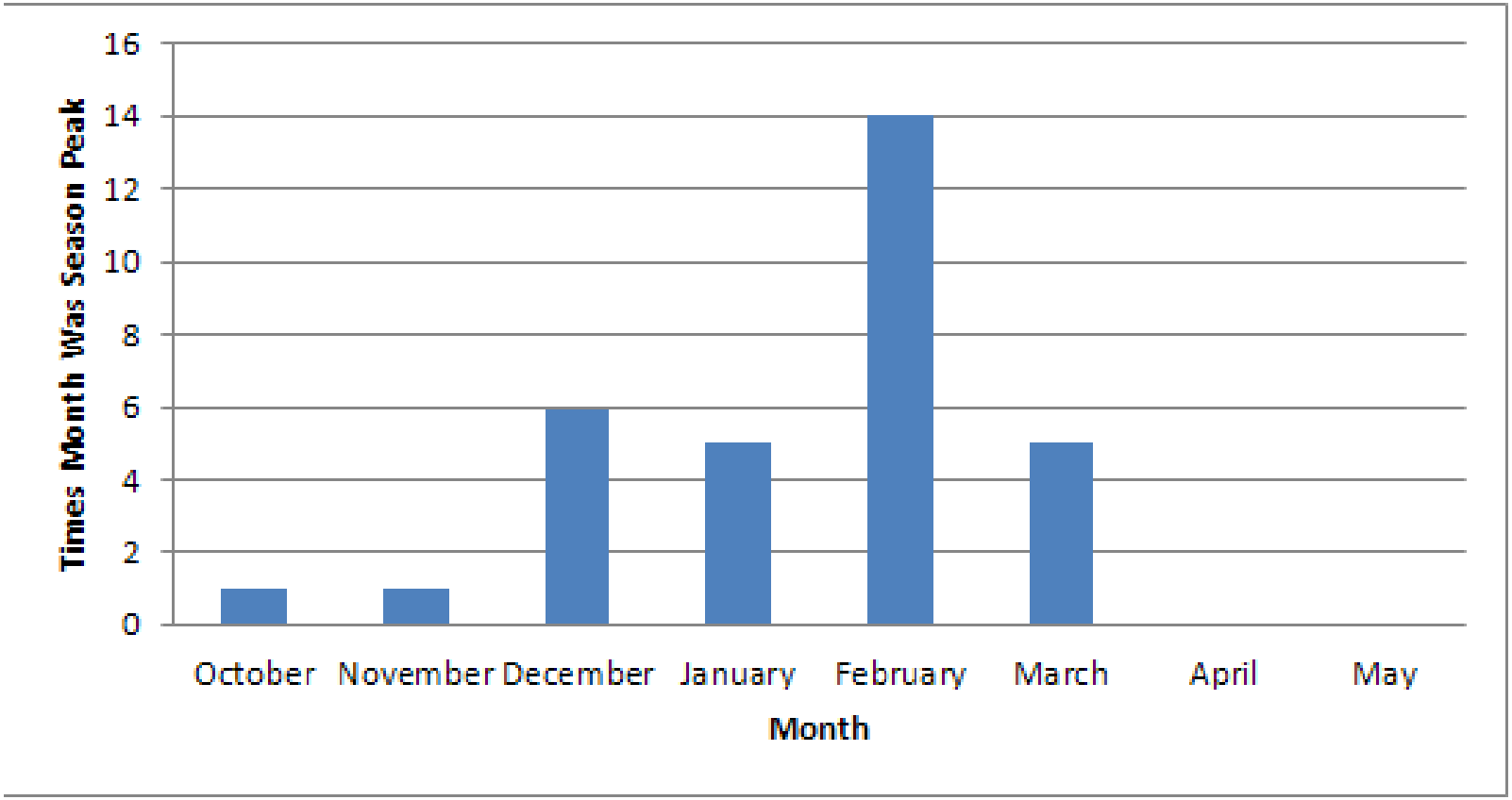
- Acute respiratory illness
- Seasonal (Fall-Early Spring)
- Worldwide epidemics
  - Up to 20% US population
  - 5-50,000 flu related deaths



Influenza A and B

- Increased morbidity and mortality in pregnancy
  - Shift from cell mediated immunity
  - Decreased lung capacity
- 2009: pregnant women 5% of all flu related deaths but only 1% of all cases of flu.
- Reports of 25% maternal mortality related with severe influenza

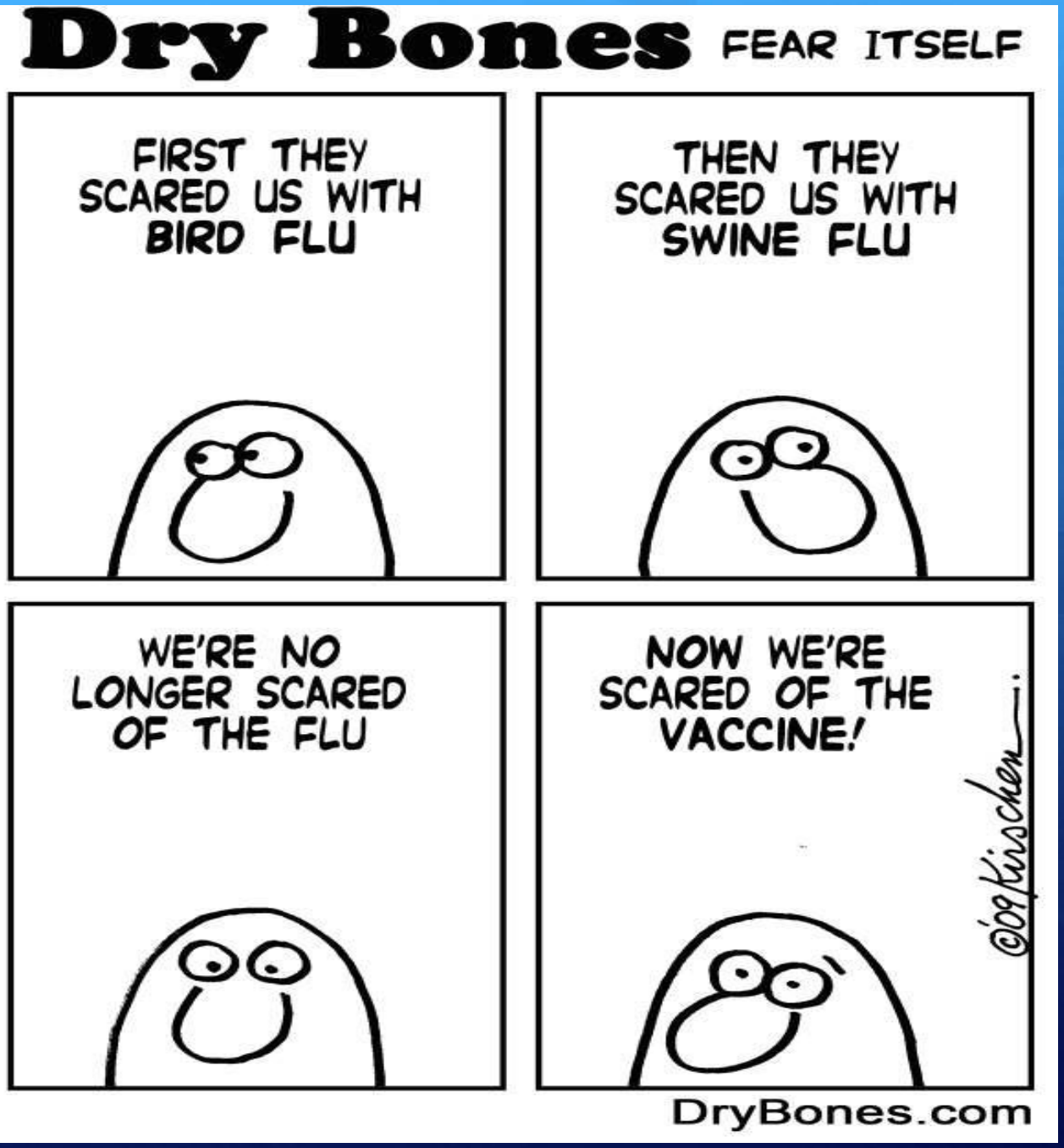
Peak Month of Flu Activity 1982-2014



Vaccination

- 2004: Inactivated vaccination for all pregnant women recommended by CDC, ACOG
- 2014-15: CDC survey indicates that **only 50%** of pregnant women are vaccinated.
- 60% providers recommend AND offer vaccination
- 15% providers recommend NOT offer vaccination
- **20% providers NEITHER recommend NOR offer vaccination**
- Benefit both mother and newborn

Dry Bones FEAR ITSELF



Anti-viral therapy

- Prophylaxis for significant exposure

vs

- Early treatment based on symptoms
  - Oseltamivir (TAMIFLU)
  - Treat within 48 hours of symptoms

Flu Shots and Pregnancy: What Doctors Might Learn

Flu-shot data may be useful in talks on the importance of childhood vaccines.

By Ann Lukits

Women who decline to get a flu shot during pregnancy are more likely, after they give birth, to ignore guidelines for vaccinating their babies—presenting an early clue for doctors who may want to discuss the importance of childhood immunizations, according to a study in the journal Preventive Medicine.

Recent research has shown that many pregnant women get no advice regarding infant vaccinations or advice that contradicts current recommendations, the study said. Outbreaks of measles and other preventable diseases have occurred in recent years in children who aren't up to date on their immunizations, but efforts to boost vaccination rates have had little effect, the researchers said.

RESEARCH REPORT

The latest study, at the University of Minnesota, found that 73.5% of children whose mothers reported having a prenatal flu shot got the full slate of recommended vaccines by age 3, compared with 62.6% of children born to mothers who didn't get a prenatal flu shot.

The Centers for Disease Control and Prevention recommends pregnant women be vaccinated against the flu, tetanus, diphtheria and pertussis, but prenatal vaccination rates are low, the study said.

The study used a state registry to obtain immunization data for 4,022 children born in Minnesota between 2009 and 2011. Infants were considered fully immunized if they had been vaccinated for diphtheria, tetanus, polio, pertussis (whooping cough), measles, mumps, rubella, Haemophilus influenzae type b (bacterial meningitis), hepatitis B, varicella (chicken pox) and pneumococcal conjugate (various bacterial infections), by 36 months of age. Prenatal flu shots were self-reported by mothers as part of a larger study.

About two-thirds of the mothers had received prenatal flu shots. Among all offspring, 69% had completed the full vaccination series by age 3, and 90% had received one or two of the vaccines. About 2%, or 86 children, didn't have any vaccinations.

Caveat: The study was limited to Minnesota and used self-reported prenatal influenza vaccine data.

ZIKA Virus

Questions and Answers for Healthcare Providers Caring for Pregnant Women and Women of Reproductive Age with Possible Zika Virus Exposure

"CDC has updated its interim guidelines for US health care providers caring for pregnant women…"

http://www.cdc.gov/zika/hc-providers/qa-pregnant-women.html

Summary

- CMV: IgM and IgG with avidity testing
  - No screening or treatment outside research protocol (Stay Tuned!)
  - Outcome of infected infants highly variable
- Parvovirus B19: IgM
  - Patient education
  - Overall outcome is good
- Influenza A and B: clinical diagnosis
  - Early treatment
  - VACCINATE!
- ZIKA:http://www.cdc.gov/zika/hc-providers/qa-pregnant-women.html