Vaccinations for Pregnant Women

Geeta K. Swamy, MD and R. Phillips Heine, MD

(Obstet Gynecol 2015;125:212-26)

Question 1:

It can be difficult to establish a verified history of previous varicella vaccination or infection, as patients have to rely on their own or parental recollection. Should all women be screened for immunity before pregnancy to determine if they should be vaccinated? Should all pregnant women who do not have records of status or vaccination be tested for immunity or only those with concern about exposure during pregnancy?

Response from Dr. Swamy:

All nonpregnant women of childbearing age and pregnant women should be queried about their history of chicken pox as self-reported history of varicella infection is 97–99% predictive of past infection and life-long immunity. A nonpregnant woman with no history of chicken pox and no history of prior varicella vaccination should be offered vaccination with the 2-dose regimen. Conception should be delayed for 3 months following the last dose based on the theoretical risks associated with live-attenuated vaccines in pregnancy. Pregnant women with no reported history of varicella infection or prior vaccination should undergo serologic testing with varicella IgG. The presence of varicella IgG is indicative of past infection and life-long immunity. Pregnant women who are IgG negative should be counseled to avoid varicella exposure and to contact her obstetrician immediately if an exposure occurs.

Question 2:

In addition to group B streptococcus immunization for pregnant women as a means to prevent neonatal late-onset septicemia, is there potential for vaccines against other pathogens (eg, Escherichia coli, Mycoplasma hominis, and Ureaplasma urealyticum) that cause neonatal infections?

Response from Dr. Swamy:

While there is potential, vaccines against other important neonatal pathogens such as Escherichia coli are in very early development and not ready for trials in pregnancy.
Question 3:

There is substantial evidence that patients will be more inclined to accept vaccination if their health care provider recommends it. Many patients report that they were never counseled regarding immunizations. For many of these practitioners, the pressures to see high numbers of patients makes effective counseling difficult and can be an obstacle for them to educate reluctant patients regarding vaccines in pregnancy. Are there any innovations such as EMR prompts or “apps” that have been shown to improve compliance with recommendations for immunizations in women?

Response from Dr. Swamy:

While provider recommendation is one of the most influential factors in vaccine acceptance, having an efficient, automated process for vaccine administration within your office is equally important. Klatt and Hopp demonstrated a significant increase in influenza vaccine administration during pregnancy (61% versus 42%, P<.001) following the addition of a best practice alert to the electronic prenatal record and improved documentation of discussions regarding influenza vaccination (89.5% versus 49.5%, P<.001).2 Another highly successful intervention is the use of standing orders for vaccination. As thoroughly detailed by the Immunization Action Coalition (see http://www.immunize.org/handouts/adult-vaccination.asp#standingorders), standing orders are reviewed and approved by providers, which allows nurses to follow approved guidelines and orders to administer vaccines. Removing the provider from this routine process improves efficiency for patients, office staff, and providers, and gives a unified message for patients about vaccine recommendations.

Question 4:

Given the concerns in the community about the association between immunizations and autism spectrum disorder, it is expected that many pregnant women will refuse vaccinations. What are realistic expectations for optimal vaccination rates for pregnant women for influenza, for example? Are there resources that busy physicians can use to increase the rate of vaccination for their patients?

Response from Dr. Swamy:

Given the significant risks for maternal, fetal, and infant morbidity and mortality associated with influenza infection during pregnancy, we should continue to strive to administer the influenza vaccine to all women who will be pregnant during the influenza season. About 50% of pregnant women in the United States received the influenza vaccine during the 2012–2013 influenza season.3 The HealthyPeople2020 goal for influenza vaccination of non-institutionalized high-risk adults aged 18–64 years is 90%, which is far from the rate of 38.6% in 2008. The Centers for Disease Control and Prevention (CDC) and the Immunization Action Coalition have numerous resources readily available on their web sites for providers and patients on the evidence demonstrating no link between vaccines and autism (see http://www.cdc.gov/vaccinesafety/Concerns/Autism/antigens.html, http://www.cdc.gov/vaccinesafety/00_pdf/CDCStudiesonVaccinesandAutism.pdf, and http://www.immunize.org/catg.d/p4028.pdf).
Question 5:

What is the postulated mechanism of the improvement in neonatal outcomes (increased birth weight, lower incidence of low birth weight infants, preterm delivery, and fetal death) associated with influenza vaccination during pregnancy? Is the improvement in outcomes primarily due to reduced rates of maternal infection or is there another mechanism that is postulated to be the cause? Is there any evidence to suggest that timing of the influenza vaccination during pregnancy should be adjusted in patients with a risk of preterm labor or low birth weight?

Response from Dr. Swamy:

Improved pregnancy and neonatal outcomes following influenza vaccination are presumed to be the result of preventing influenza infection during pregnancy. The influenza vaccine can be administered at any time during pregnancy irrespective of gestational age. Based on cost-effectiveness modeling, pregnant women should be vaccinated as early as possible following seasonal influenza vaccine availability in order to impart the greatest population benefit for mother and infant.

Question 6:

The discussion on administration of the tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis (Tdap) vaccine to all pregnant women regardless of immunization status suggests that the recommendations were devised from consensus based upon our knowledge of other immunizations during pregnancy and perceptions of improvement in care. However, the evidence is not as strong as it appears to be with other immunization recommendations for pregnant women. In your opinion, which of the current research efforts directed at timing, safety of re-dosing, and effectiveness will provide the greatest value of information?

Response from Dr. Swamy:

Donegan et al recently published their study of 20,074 pregnant women who received pertussis vaccination and found no evidence of an increased risk of adverse pregnancy outcome. While reassuring, this does not provide any safety data on re-dosing, particularly closely spaced dosing of Tdap, as would occur when women have very short interconception intervals. We are currently conducting a CDC-sponsored study on the safety of Tdap during pregnancy (n=375) as compared to nonpregnant women (n=125; NCT02209623). Within the pregnant group, we will compare outcomes between women who are receiving their first dose of Tdap to those who have a history of prior Tdap receipt. Additional CDC-sponsored analyses are ongoing through the Vaccine Adverse Event Reporting System (VAERS) and the Vaccine Safety Data Link.

Question 7:

Given the recommendation for use of the 23-valent pneumococcal polysaccharide (PPSV 23) vaccine in adults with chronic conditions such as asthma and cigarette smoking, do the authors suggest that all pregnant women who have these conditions receive the vaccine, or only those with an additional factor to consider (eg, asthma with recent flare up). What are the possible explanations for why obesity is a risk factor for pneumococcal pneumonia?

Response from Dr. Swamy:

We routinely offer the PPSV23 vaccine to pregnant women with at least one chronic condition or risk factor based on current recommendations from the CDC’s Advisory Committee on Immunization Practice. Obesity as a risk factor for pneumonia is likely multifactorial. Obesity causes many changes in respiratory physiology,
including airway resistance, breathing patterns, and gas exchange, that are theorized to be a result of the increased elastic load from excess weight on the torso, increased pulmonary blood volume, and ventilation-perfusion mismatch.\textsuperscript{7,8} Further, obesity is often associated with additional chronic conditions, such as diabetes and hypertension, which may contribute to overall health status and susceptibility to infection.

**Question 8:**

Given the risk of vertical transmission, what are the recommendations for treatment for women who acquire primary, acute hepatitis B infection during the third trimester of pregnancy? What are the criteria for a newborn to be considered “high-risk” for acquiring hepatitis B infection perinatally?

**Response from Dr. Swamy:**

The risk of perinatal transmission from acute hepatitis B infection during pregnancy increases from 10% in early pregnancy to 60% if infection occurs more proximate to delivery.\textsuperscript{9,10} Initial treatment should focus on supportive care for the mother, with monitoring of liver enzymes and coagulation factors. Antiviral treatment is reserved for patients with acute liver failure or protracted disease. However, antivirals should be considered as an adjunct to newborn immunization with hepatitis B vaccine and immunoglobulin for prevention of perinatal transmission. Candidate antivirals, including lamivudine, tenofovir, and telbivudine, are usually offered to women with high hepatitis B DNA viral loads (approximately 6–7 log\textsubscript{10} international units/mL) in the third trimester. Although a meta-analysis of lamivudine demonstrated a significant reduction in perinatal transmission,\textsuperscript{11} tenofovir may be preferred due to its high barrier to drug resistance. High maternal hepatitis B viral load is the most significant risk factor for perinatal transmission. Obstetric procedures are much less frequent causes and breastfeeding is not considered to be a substantial risk factor.

**References**


