

## Immunizations in Pregnancy

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Vaccinations are an important topic to address with pregnant women for maternal and neonatal health reasons, and pregnancy provides a unique time during which physicians have close, regular contact with the patient. Inactivated vaccines can be given before, during, and after pregnancy. Based strictly on theoretical concerns, live vaccines preferably should be given at least one month before pregnancy and avoided during pregnancy.<sup>1</sup> There is no evidence that any vaccination is harmful to the developing fetus, and inadvertent vaccination during pregnancy is never an indication to recommend a therapeutic abortion.<sup>2</sup> Some common and controversial vaccines that pregnant women may want to discuss with their family physician are listed below; however, this is not an exhaustive list of all available vaccines. Family physicians, even if not providing prenatal care, can play a critical role in maintaining current vaccinations in pregnant women.

### Immunizations to Target

#### PREPREGNANCY

Rubella infection in pregnancy is likely to cause fetal infection, which can result in miscarriage, fetal demise, and serious birth defects (e.g., cataracts, heart disease, deafness, intellectual disability). Therefore, it is key to determine a patient's immunity and, if indicated, provide vaccination before pregnancy. Rubella vaccination is typically provided with the measles-mumps-rubella (MMR) vaccine, which is a combination live vaccine.

Although the effects of varicella virus on the fetus are unknown, there are theoretical concerns, and the risk of severe varicella virus infection may be higher in pregnant women. Therefore, vaccinating nonimmune women before pregnancy is recommended.

#### PREGNANCY

Influenza infection increases the risk of serious complications in pregnant women and their newborns, as well as the risk of premature labor and delivery. A recent randomized study of 340 women also showed a higher incidence of small-for-gestational-age infants when the mother had not been vaccinated.<sup>3</sup> Because the influenza vaccine is safe in pregnancy, vaccinating all pregnant women during any trimester should be a priority to

minimize these risks. In a Centers for Disease Control and Prevention (CDC) study analyzing data from the 2009 to 2010 Pregnancy Risk Assessment Monitoring System, influenza vaccination coverage during pregnancy was considerably higher when the physician recommended or offered it (median of 53.1%) compared with when the physician did not (median of 14.4%).<sup>4</sup>

Tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis (Tdap) vaccine should be provided during each pregnancy, preferably between 27 and 36 weeks of gestation.<sup>5</sup> This timing recommendation is based on the maternal immune response, which peaks two weeks after administration. If not given during pregnancy (and for the protection of the newborn), the Tdap vaccine should be administered immediately postpartum in any woman who has not previously received it. If Tdap vaccination history cannot be confirmed through written records, the patient should be considered unvaccinated and should receive a Tdap vaccine.

### Immunizations to Consider

The hepatitis B vaccine has not been shown to cause any harm to the developing fetus.<sup>6</sup> Based on current data, the hepatitis B vaccine should be provided to any pregnant woman at higher risk of exposure to hepatitis B (e.g., multiple sex partners, recent injection drug use).<sup>7</sup>

Adequate safety data do not exist for the hepatitis A vaccine, but the theoretical risks are low because it is produced from an inactivated virus. Women who are thought to be at high risk of exposure to hepatitis A should be considered for vaccination during pregnancy (e.g., travel to endemic countries, chronic liver disease).

### Immunizations to Avoid

Live, attenuated influenza; MMR; and varicella vaccines are not recommended in pregnant women based on theoretical concerns for live virus exposure. Despite these concerns, the CDC found that between 1971 and 1989, no cases of congenital rubella syndrome occurred in the offspring of 226 rubella-susceptible women receiving the individual rubella vaccine three months before or three months after conception.<sup>8</sup> Although the MMR vaccine was not studied in this review, the safety profile and theoretical concern regarding congenital rubella has been extrapolated to the combination MMR vaccine.

Human papillomavirus (HPV) and herpes zoster vaccines are not recommended because of a lack of safety data in pregnant women. ▶

## Editorials

Registries for reporting inadvertent immunization during pregnancy have been established for the varicella, HPV, and herpes zoster vaccines:

- Merck for the varicella (Varivax), herpes zoster (Zostavax), and quadrivalent HPV (Gardasil) vaccines: 800-986-8999
- GlaxoSmithKline for the bivalent HPV vaccine (Cervarix): 888-452-9622

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