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WOMEN'S HEALTH CARE PHYSICIANS

ACOG COMMITTEE OPINION

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Committee on Obstetric Practice
Immunization and Emerging Infections Expert Work Group
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Update on Immunization and Pregnancy: Tetanus, Diphtheria, and Pertussis Vaccination

ABSTRACT: The overwhelming majority of morbidity and mortality attributable to pertussis infection occurs in infants who are 3 months and younger. Infants do not begin their own vaccine series against pertussis until approximately 2 months of age. This leaves a window of significant vulnerability for newborns, many of whom contract serious pertussis infections from family members and caregivers, especially their mothers, or older siblings, or both. In 2013, the Advisory Committee on Immunization Practices published its updated recommendation that a dose of tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis (Tdap) should be administered during each pregnancy, irrespective of the prior history of receiving Tdap. The recommended timing for maternal Tdap vaccination is between 27 weeks and 36 weeks of gestation. To maximize the maternal antibody response and passive antibody transfer and levels in the newborn, vaccination as early as possible in the 27–36-weeks-of-gestation window is recommended. However, the Tdap vaccine may be safely given at any time during pregnancy if needed for wound management, pertussis outbreaks, or other extenuating circumstances. There is no evidence of adverse fetal effects from vaccinating pregnant women with an inactivated virus or bacterial vaccine or toxoid, and a growing body of robust data demonstrate safety of such use. Adolescent and adult family members and caregivers who previously have not received the Tdap vaccine and who have or anticipate having close contact with an infant younger than 12 months should receive a single dose of Tdap to protect against pertussis. Given the rapid evolution of data surrounding this topic, immunization guidelines are likely to change over time, and the American College of Obstetricians and Gynecologists will continue to issue updates accordingly.

Recommendations

The American College of Obstetricians and Gynecologists (ACOG) makes the following recommendations:

- Obstetric care providers should administer the tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis (Tdap) vaccine to all pregnant patients during each pregnancy, as early in the 27–36-weeks-of-gestation window as possible.
- Pregnant women should be counseled that the administration of the Tdap vaccine during each pregnancy is safe and important to make sure that each newborn receives the highest possible protection against pertussis at birth.
- Obstetrician–gynecologists are encouraged to stock and administer the Tdap vaccine in their offices.
- Partners, family members, and infant caregivers should be offered the Tdap vaccine if they have not previously been vaccinated. Ideally, all family members should be vaccinated at least 2 weeks before coming in contact with the newborn.
- If not administered during pregnancy, the Tdap vaccine should be given immediately postpartum if the woman has never received a prior dose of Tdap as an adolescent, adult, or during a previous pregnancy.
- There are certain circumstances in which it is appropriate to administer the Tdap vaccine outside of the 27–36-weeks-of-gestation window. For example, in cases of wound management, a pertussis outbreak, or other extenuating circumstances, the need for protection from infection supercedes the benefit of

administering the vaccine during the 27–36-weeks-of-gestation window.

- If a pregnant woman is vaccinated early in her pregnancy (ie, before 27–36 weeks of gestation), she does not need to be vaccinated again during 27–36 weeks of gestation.

The overwhelming majority of morbidity and mortality attributable to pertussis infection occurs in infants who are 3 months and younger (1). Infants do not begin their own vaccine series against pertussis (with the diphtheria and tetanus toxoids and acellular pertussis [DTaP] vaccine) until approximately 2 months of age (the earliest possible vaccination is at 6 weeks of age) (2). This leaves a window of significant vulnerability for newborns, many of whom contract serious pertussis infections from family members and caregivers, especially the mother, or older siblings, or both (3–5). Starting in 2006, the Advisory Committee on Immunization Practices (ACIP) of the Centers for Disease Control and Prevention recommended an approach to combat neonatal pertussis infection referred to as "cocooning" (6). Cocooning is the administration of Tdap to previously unvaccinated family members and caregivers, and women in the immediate postpartum period, in order to provide a protective cocoon of immunity around the newborn. The Advisory Committee on Immunization Practices and ACOG continue to recommend that adolescent and adult family members and caregivers who previously have not received the Tdap vaccine and who have or anticipate having close contact with an infant younger than 12 months should receive a single dose of Tdap to protect against pertussis (7). However, the cocooning approach alone is no longer the recommended approach to preventing pertussis disease in newborns (and mothers) (8).

In June 2011, ACIP recommended that pregnant women receive a dose of Tdap if they have not previously received it (7). The Advisory Committee on Immunization Practices continued to reconsider this topic in the face of persistent increases in pertussis disease, including infant deaths (9) in the United States. Issues that were considered included an imperative to minimize the significant burden of disease in vulnerable newborns, the reassuring safety data (10, 11) on use of Tdap in adults, and the evolving immunogenicity data that demonstrate considerable waning of immunity after immunization (12). In 2013, ACIP published its updated recommendation that a dose of Tdap should be administered during each pregnancy, irrespective of prior history of receiving the Tdap vaccine (7). The recommended timing for maternal Tdap vaccination is between 27 weeks and 36 weeks of gestation. To maximize the maternal antibody response and passive antibody transfer and levels in the newborn, vaccination as early as possible in the 27–36-weeks-of-gestation window is recommended. However, the Tdap vaccine may safely be given at any time during pregnancy if needed in the case of wound management, pertussis outbreaks, or other extenuating circumstances in which the need for protection from infection supercedes the benefit of administering the vaccine during the 27–36-weeks-of-gestation window. Additional data available since 2013 increasingly demonstrate that administration of Tdap during the late second or early third trimester (with at least 2 weeks from the time of vaccination to delivery) is highly effective in protecting against neonatal pertussis (13–16). In addition, even when maternal vaccination is not completely protective, infants with pertussis whose mothers received Tdap during pregnancy had significantly less morbidity, including risk of hospitalization and intensive care unit admission (13). Safety data also continue to be reassuring, including when women receive successive Tdap immunizations over a relatively short time because of short-interval pregnancies. New data demonstrate that immunizing against Tdap early within the 27–36-weeks-of-gestation window maximizes the maternal antibody response and passive antibody transfer to the fetus (17). Therefore, giving the Tdap vaccine as early as possible in the 27–36-weeks-of-gestation window appears to be the best strategy (18, 19). Linking the Tdap vaccination to screening for gestational diabetes will allow this to be implemented easily. For women who are Rh negative, another strategy worth consideration is to administer Tdap vaccination during the same visit as Rho(D) immune globulin administration.

Receipt of Tdap between 27 weeks and 36 weeks of gestation in each pregnancy is critical. For women who have never received a prior dose of Tdap, if Tdap was not administered during pregnancy, it should be administered immediately postpartum in order to reduce the risk of transmission to the newborns (7). A woman who did not receive the Tdap vaccine during her most recent pregnancy, but received it previously as an adolescent, adult, or during a prior pregnancy should not receive Tdap postpartum. Additionally, adolescent and adult family members and planned caregivers who have not received the Tdap vaccine also should receive Tdap at least 2 weeks before planned infant contact, as previously recommended (sustained efforts at cocooning) (6). The American College of Obstetricians and Gynecologists' Immunization and Emerging Infections Expert Work Group and Committee on Obstetric Practice support these recommendations. Pregnant women should be counseled that Tdap vaccination during each pregnancy is safe and important to make sure that each newborn receives the highest possible protection against pertussis at birth. Since protection from previous vaccination is likely to decrease over time, a Tdap vaccination is necessary during every pregnancy to give the best possible protection to the newborn.

Data consistently demonstrate that when a physician recommends and offers a vaccine on site the rate of vaccine acceptance is significantly higher than when physicians either do not recommend, or recommend but do not offer the vaccine (20). The American College of

Obstetricians and Gynecologists encourages obstetrician–gynecologists and other obstetric care providers to strongly recommend and offer Tdap vaccination to all pregnant women between 27 weeks and 36 weeks of gestation in each pregnancy. Additionally, efforts to stock the Tdap vaccine in the obstetrician–gynecologist's or other health care provider's office and administer it as early in the recommended window as possible offers the best chance of vaccine acceptance and neonatal protection. Depending on the size of a practice and services provided, there may not be the means to supply and offer the Tdap vaccine in the office. If the Tdap vaccine cannot be offered in a practice, patients should be referred to another health care provider when possible. For example, pharmacists are well equipped to give immunizations, and the Tdap vaccine is available at most major pharmacies. If patients receive the Tdap vaccine outside of the obstetrician–gynecologist's office, it is important for them to provide proper vaccine documentation so a patient's immunization record can be updated. Given the rapid evolution of data surrounding this topic, immunization guidelines are likely to change over time, and ACOG will continue to issue updates accordingly.

General Considerations Surrounding Immunization During Pregnancy

The American College of Obstetricians and Gynecologists recommends routine assessment of each pregnant woman's immunization status and administration of indicated immunizations. Importantly, evolving data demonstrate maternal and neonatal protection against an increasing number of aggressive newborn pathogens through the use of maternal immunization, suggesting pregnancy is an optimal time to immunize for disease prevention in women and newborns (13–16, 21, 22). There is no evidence of adverse fetal effects from vaccinating pregnant women with an inactivated virus or bacterial vaccines or toxoids, and a growing body of robust data demonstrate safety of such use (11). Concomitant administration of indicated inactivated vaccines during pregnancy (ie, Tdap and influenza) is also acceptable, safe, and may optimize effectiveness of immunization efforts (10). Furthermore, no evidence exists that suggests that any vaccine is associated with an increased risk of autism or adverse effects due to exposure to traces of the mercury-containing preservative thimerosal (23–26). The Tdap vaccines do not contain thimerosal. The benefits of inactivated vaccines outweigh any unproven potential concerns. It is important to remember that live attenuated vaccines (eg, measles–mumps–rubella [MMR], varicella, and live attenuated influenza vaccine) do pose a theoretical risk (although never documented or proved) to the fetus and generally should be avoided during pregnancy. All vaccines administered during pregnancy as well as health care provider-driven discussions about the indications and benefits of immunization during pregnancy should be fully documented in the patient's prenatal record. In addition, if a patient declines vaccination, this refusal should be documented in the patient's prenatal record, and the health care provider is advised to revisit the issue of vaccination at subsequent visits.

Special Situations During Pregnancy

Ongoing Epidemics

Pregnant women who live in geographic regions with new outbreaks or epidemics of pertussis should be immunized as soon as feasibly possible for their own protection in accordance with local recommendations for nonpregnant adults. In these acute situations, less emphasis should be given to targeting the proposed optimal gestation window (between 27 weeks and 36 weeks of gestation) given the imperative to protect the woman from locally prevalent disease. Newborn protection will still be garnered from vaccination earlier in the same pregnancy. Importantly, a pregnant woman should not be revaccinated later in the same pregnancy if she received the vaccine in the first or second trimester (7).

Example case: A pregnant woman at 8 weeks of gestation with one kindergarten-aged child at home calls the office and mentions that pertussis has recently been diagnosed in four different children by their pediatricians in her neighborhood. She is not sure what to do and has heard that she is supposed to get a Tdap vaccination in the third trimester. How should you best manage this patient?

Answer: Advise her to come that day and receive the Tdap vaccine in your office. She should be reassured that Tdap vaccination is safe to give at any point in pregnancy and that getting the vaccine now will directly protect her, indirectly protect her fetus, and also will offer some protection for her newborn from pertussis. She will only need to receive the Tdap vaccine once during pregnancy. All other adolescent and adult family members also should be advised to make sure they are up-to-date with their Tdap vaccine to ensure protection for themselves and the newborn.

Wound Management

As part of standard wound management care to prevent tetanus, a tetanus toxoid-containing vaccine is recommended in a pregnant woman if 5 years or more have elapsed since her previous tetanus and diphtheria (Td) vaccination. If a Td booster vaccination is indicated in a pregnant woman for acute wound management, the obstetrician–gynecologist or other health care provider should administer the Tdap vaccine, irrespective of gestational age (7). A pregnant woman should not be revaccinated with Tdap in the same pregnancy if she received the vaccine in the first or second trimester.

Example case: An emergency department (ED) physician calls you about a patient, gravida 4, para 3, at 13 weeks of gestation who is being seen after accidentally stepping on a rusty nail. The patient cannot remember when she last received a tetanus booster and the ED physician is confused about when to administer the indicated

tetanus booster because the Centers for Disease Control and Prevention guidelines recommend the administration of Tdap between 27 weeks and 36 weeks of gestation. How should you advise the ED physician?

Answer: The ED physician should be advised that the appropriate acute wound management strategy for the patient is to receive a dose of Tdap now. This vaccine replaces the solitary tetanus booster vaccine, and administering it now as part of acute wound management is the most important factor. The patient should be told that getting Tdap now will preclude her getting it again between 27 weeks and 36 weeks of gestation in this pregnancy. She and her fetus will still receive pertussis prevention benefits from receipt at 13 weeks of gestation.

Indicated Tetanus and Diphtheria Booster Vaccination

If a Td booster vaccination is indicated during pregnancy (ie, more than 10 years since the previous Td vaccination) then obstetrician–gynecologists and other health care providers should administer the Tdap vaccine during pregnancy within the 27–36-weeks-of-gestation window (7). This recommendation is because of the nonurgent nature of this indication and the desire for maternal immunity. It also will maximize antibody transfer to the newborn.

Unknown or Incomplete Tetanus Vaccination

To ensure protection against maternal and neonatal tetanus, pregnant women who have never been vaccinated against tetanus should begin the three-vaccination series, containing tetanus and reduced diphtheria toxoids, during pregnancy. The recommended schedule for this vaccine series is at 0 weeks, 4 weeks, and 6–12 months. The Tdap vaccine should replace one dose of Td, preferably given between 27 weeks and 36 weeks of gestation (7).

Vaccination of Adolescents and Adults in Contact With Infants

The Advisory Committee on Immunization Practices recommends that all adolescents and adults who have or who anticipate having close contact with an infant younger than 12 months (eg, siblings, parents, grandparents, child care providers, and health care providers) who previously have not received the Tdap vaccine should receive a single dose of Tdap to protect against pertussis and reduce the likelihood of transmission (7). Ideally, these adolescents and adults should receive the Tdap vaccine at least 2 weeks before they have close contact with the infant (6).

For More Information

The American College of Obstetricians and Gynecologists has identified additional resources on topics related to this document that may be helpful for ob-gyns, other health care providers, and patients. You may view these resources at: www.acog.org/More-Info/Tdap.

These resources are for information only and are not meant to be comprehensive. Referral to these resources does not imply the American College of Obstetricians and Gynecologists' endorsement of the organization, the organization's website, or the content of the resource. The resources may change without notice.

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