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Immunization, Infectious Disease, and Public Health Preparedness Expert Work Group

This Committee Opinion was developed by the American College of Obstetricians and Gynecologists' Immunization, Infectious Disease, and Public Health Preparedness Expert Work Group, in collaboration with member Kevin A. Ault, MD and Laura E. Riley, MD.

Maternal Immunization

ABSTRACT: Immunization is an essential part of care for adults, including pregnant women. Influenza vaccination for pregnant women is especially important because pregnant women who contract influenza are at greater risk of maternal morbidity and mortality in addition to fetal morbidity, including congenital anomalies, spontaneous abortion, preterm birth, and low birth weight. Other vaccines provide maternal protection from severe morbidity related to specific pathogens such as pneumococcus, meningococcus, and hepatitis for at-risk pregnant women. Obstetrician–gynecologists and other obstetric care providers should routinely assess their pregnant patients' vaccination status. Based on this assessment they should recommend and, when possible, administer needed vaccines to their pregnant patients. There is no evidence of adverse fetal effects from vaccinating pregnant women with inactivated virus, bacterial vaccines, or toxoids, and a growing body of data demonstrate the safety of such use. Women who are or will be pregnant during influenza season should receive an annual influenza vaccine. All pregnant women should receive a tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis (Tdap) vaccine during each pregnancy, as early in the 27–36-weeks-of-gestation window as possible.

Recommendations

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

- Obstetrician–gynecologists and other obstetric care providers should routinely assess their pregnant patients' vaccination status.
- Obstetrician–gynecologists and other obstetric care providers should recommend and, when possible, administer needed vaccines to their pregnant patients.
- Women who are or will be pregnant during influenza season should receive an annual influenza vaccine.
- All pregnant women should receive a tetanus toxoid, reduced diphtheria toxoid and acellular pertussis (Tdap) vaccine during each pregnancy, as early in the 27–36-weeks-of-gestation window as possible.
- Other vaccines may be recommended during pregnancy depending on the patient's age, prior immunizations, comorbidities, or disease risk factors.

Background

Immunization is an essential part of care for adults, including pregnant women. Influenza vaccination for pregnant women is especially important because pregnant women are at greater risk of maternal morbidity and mortality in addition to fetal morbidity, including congenital anomalies, spontaneous abortion, preterm birth, and low birth weight (1). Vaccines such as Tdap provide fetal and neonatal benefit through passive transfer of protective antibodies across the placenta. Other vaccines provide maternal protection from severe morbidity related to specific pathogens such as pneumococcus, meningococcus, and hepatitis for at-risk pregnant women. There is no evidence of adverse fetal effects from vaccinating pregnant women with inactivated virus, bacterial vaccines, or toxoids, and a growing body of data demonstrate the safety of such use (2, 3). Therefore, all pregnant women should receive an influenza vaccination during influenza season and Tdap with each pregnancy. Additional vaccines are indicated during pregnancy for women with certain conditions, as noted in this

document. Other vaccines should be reserved for use in the postpartum period.

The Ob-Gyn Role

Obstetrician–gynecologists and other obstetric care providers play a critical role in ensuring pregnant women receive recommended vaccines. Studies consistently demonstrate that when the recommendation and availability of vaccination during pregnancy comes directly from a woman’s obstetrician or other obstetric care provider, the odds of vaccine acceptance and receipt are 5-fold to 50-fold higher (4–8). As such, obstetrician–gynecologists and other obstetric care providers should routinely assess their pregnant patients’ vaccination status. Based on this assessment they should recommend and, when possible, administer needed vaccines to their pregnant patients. Table 1 provides an easy-to-use reference to quickly assess which vaccines a pregnant woman needs and when she should receive those vaccines (note: Table 1 can be reproduced free of charge). Women who are or will be pregnant during influenza season should receive an annual influenza vaccine. Any of the licensed, recommended, age-appropriate inactivated influenza vaccines can safely be given during any trimester (7). All pregnant women should receive a Tdap vaccine during each pregnancy, as early in

the 27–36-weeks-of-gestation window as possible (2). Other vaccines may be recommended during pregnancy depending on a patient’s age, prior immunizations, comorbidities, or disease risk factors (Table 1).

Table 1 summarizes recommended immunizations during pregnancy based on the Centers for Disease Control and Prevention’s (CDC) *Recommended Immunization Schedule for Adults Aged 19 Years or Older, United States* and *Recommended Immunization Schedule for Children and Adolescents Aged 18 Years or Younger, United States* (9, 10). In addition to Tdap and influenza vaccines, this table outlines the additional recommended vaccines to protect pregnant women who have either high-risk conditions or practices that place them at greater risk of acquisition of these vaccine-preventable diseases. After evaluating your patient’s immunization history and medical and social histories, determine if your patients are appropriate candidates for other vaccines noted in Table 1. Vaccines that may be required for travel are not included here. For information on travel vaccines during pregnancy, see <https://wwwnc.cdc.gov/travel/>.

For More Information

The American College of Obstetricians and Gynecologists has identified additional resources on topics related

Table 1. Summary of Maternal Immunization Recommendations

Vaccine*	Indicated During Every Pregnancy	May Be Given During Pregnancy in Certain Populations	Contraindicated During Pregnancy	Can Be Initiated Postpartum or When Breastfeeding or Both
Inactivated influenza	χ ^{†,1,2}			χ [‡]
Tetanus toxoid, reduced diphtheria toxoid and acellular pertussis (Tdap)	χ ^{†,3,4}			χ [‡]
Pneumococcal vaccines		χ ^{§,5,6}		χ ^{§,5,6}
Meningococcal conjugate (MenACWY) and Meningococcal serogroup B		χ ^{,7}		χ ^{,7}
Hepatitis A		χ ^{¶,8}		χ ^{¶,8}
Hepatitis B		χ ^{#,9,10}		χ ^{#,9,10}
Human papillomavirus (HPV)**				χ ^{**,,11,12}
Measles–mumps–rubella			χ ^{††,13,14}	χ ^{††}
Varicella			χ ^{††,13,15,16}	χ ^{††}

*An “X” indicates that the vaccine can be given in this window. See the corresponding numbered footnote for details.

[†]Inactivated influenza vaccination can be given in any trimester and should be given with each influenza season as soon as the vaccine is available. The Tdap vaccine is given at 27–36 weeks of gestation in each pregnancy, preferably as early in the 27–36-week window as possible. The Tdap vaccine should be given during each pregnancy in order to boost the maternal immune response and maximize the passive antibody transfer to the newborn. Women who did not receive Tdap during pregnancy (and have never received the Tdap vaccine) should be immunized once in the immediate postpartum period.^{1–3}

¹Vaccination during every pregnancy is preferred over vaccination during the postpartum period to ensure antibody transfer to the newborn.^{3,4}

⁵There are two pneumococcal vaccines: 1) the 23-valent pneumococcal polysaccharide vaccine (PPSV23) is recommended in reproductive-age women who have heart disease, lung disease, sickle cell disease, and diabetes as well as other chronic illnesses; 2) the 13-valent pneumococcal vaccine (PCV13) is recommended for reproductive-aged women with certain immunocompromised conditions, including human immunodeficiency virus (HIV) infection and asplenia. The PCV13 vaccine should be deferred in pregnant women, unless the woman is at increased risk of pneumococcal disease and after consultation with her health care provider the benefits of vaccination are considered to outweigh the potential risks.^{5,6}

¹¹Quadrivalent conjugate meningococcal vaccine is routinely recommended for adolescents aged 11–18 years, along with individuals with HIV infection, complement component deficiency (including eculizumab use), functional or anatomic asplenia (including sickle cell disease), exposure during a meningococcal disease outbreak, travel to endemic or hyperendemic areas, or work as a microbiologist routinely exposed to *Neisseria meningitidis*. If indicated, pregnancy should not preclude vaccination. The serogroup B vaccine should be deferred in pregnant women, unless the woman is at increased risk of serogroup B meningococcal disease⁷ and, after consultation with her health care provider, the benefits of vaccination are considered to outweigh the potential risks.⁷

¹Pregnant women with any of the conditions that increase the risk of either acquiring or having a severe outcome from hepatitis A infection (eg, having chronic liver disease, clotting-factor disorders, traveling, using injection and noninjection drugs, and working with nonhuman primates) should be vaccinated during pregnancy if not previously vaccinated. Pregnant women at risk of hepatitis A infection during pregnancy should also be counseled concerning all options to prevent hepatitis A infection. Any woman who wants to be protected from hepatitis A or has an indication for use may receive the vaccine during pregnancy or during the postpartum period.⁸

[#]Hepatitis B vaccination is recommended for women who are identified as being at risk of hepatitis B infection during pregnancy (eg, women who have household contacts or sex partners who are hepatitis B surface antigen–positive; have more than one sex partner during the previous 6 months; have been evaluated or treated for a sexually transmitted infection; are current or recent injection-drug users; have chronic liver disease; have HIV infection; or have traveled to certain countries). Any woman who wants to be protected from hepatitis B or has an indication for use may receive the vaccine during pregnancy and the postpartum period. Pregnant women at risk of hepatitis B infection during pregnancy should be counseled concerning other methods to prevent hepatitis B infection.^{1,9}

^{**}The HPV vaccination in pregnancy is not recommended, however, inadvertent HPV vaccination during pregnancy is not associated with adverse events for the woman or her fetus. The HPV vaccine can be given to postpartum and breastfeeding women. The HPV vaccine should be administered to women through age 26 years who were not previously vaccinated. Vaccination timing and number of doses should follow Centers for Disease Control and Prevention and American College of Obstetricians and Gynecologists' guidance.^{11,12}

^{††}Live attenuated vaccines including, measles–mumps–rubella, varicella, and live-attenuated influenza vaccine are contraindicated for pregnant women. If indicated (ie, among seronegative women), the measles–mumps–rubella vaccine and the varicella vaccine should be given during the postpartum period. Inadvertent administration during pregnancy has not been associated with congenital rubella or congenital varicella syndromes.^{13–16}

¹Influenza vaccination during pregnancy. Committee Opinion No. 732. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2018;131:e109–14.

²Centers for Disease Control and Prevention. Pregnant women and influenza. Atlanta (GA): CDC; 2017.

³Centers for Disease Control and Prevention. Pregnancy and whooping cough. Atlanta (GA): CDC; 2017.

⁴Update on immunization and pregnancy: tetanus, diphtheria, and pertussis vaccination. Committee Opinion No. 718. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2017;130:e153–7.

⁵Centers for Disease Control and Prevention. Use of 13-valent pneumococcal conjugate vaccine and 23-valent pneumococcal polysaccharide vaccine for adults with immunocompromising conditions: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Morb Mortal Wkly Rep* 2012;61:816–9.

⁶Updated recommendations for prevention of invasive pneumococcal disease among adults using the 23-valent pneumococcal polysaccharide vaccine (PPSV23). Centers for Disease Control and Prevention, Advisory Committee on Immunization Practices. *MMWR Morb Mortal Wkly Rep* 2010;59:1102–6.

⁷Folaranmi T, Rubin L, Martin SW, Patel M, MacNeil JR. Use of serogroup B meningococcal vaccines in persons aged ≥10 years at increased risk for serogroup B meningococcal disease: recommendations of the Advisory Committee on Immunization Practices, 2015. Centers for Disease Control [published erratum appears in *MMWR Morb Mortal Wkly Rep*. 2015;64:806]. *MMWR Morb Mortal Wkly Rep* 2015;64:608–12.

⁸Fiore AE, Wasley A, Bell BP. Prevention of hepatitis A through active or passive immunization: recommendations of the Advisory Committee on Immunization Practices (ACIP). *Advisory Committee on Immunization Practices. MMWR Recomm Rep* 2006;55(RR-7):1–23.

⁹Viral hepatitis in pregnancy. ACOG Practice Bulletin No. 86. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2007;110:941–56.

¹⁰Mast EE, Weinbaum CM, Fiore AE, Alter MJ, Bell BP, Finelli L, et al. A comprehensive immunization strategy to eliminate transmission of hepatitis B virus infection in the United States: recommendations of the Advisory Committee on Immunization Practices (ACIP) Part II: immunization of adults [published erratum appears in *MMWR Morb Mortal Wkly Rep*. 2007;56:1114]. *MMWR Recomm Rep* 2006;55(RR-16):1–33; quiz ce1–4.

¹¹Human papillomavirus vaccination. Committee Opinion No. 704. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2017;129:e173–8.

¹²Petrosky E, Bocchini JA Jr, Hariri S, Chesson H, Curtis CR, Saraiya M, et al. Use of 9-valent human papillomavirus (HPV) vaccine: updated HPV vaccination recommendations of the advisory committee on immunization practices. *MMWR Morb Mortal Wkly Rep* 2015;64:300–4.

¹³American Academy of Pediatrics, American College of Obstetricians and Gynecologists. Guidelines for perinatal care. 8th ed. Elk Grove Village (IL): AAP; Washington, DC: American College of Obstetricians and Gynecologists; 2017.

¹⁴McLean HQ, Fiebelkorn AP, Temte JL, Wallace GS. Prevention of measles, rubella, congenital rubella syndrome, and mumps, 2013: summary recommendations of the Advisory Committee on Immunization Practices (ACIP). Centers for Disease Control and Prevention [published erratum appears in *MMWR Recomm Rep*. 2015;64:259]. *MMWR Recomm Rep* 2013;62(RR-4):1–34.

¹⁵Centers for Disease Control and Prevention. Updated recommendations for use of VariZIG—United States, 2013. *MMWR Morb Mortal Wkly Rep* 2013;62:574–6.

¹⁶Marin M, Guris D, Chaves SS, Schmid S, Seward JF. Prevention of varicella: recommendations of the Advisory Committee on Immunization Practices (ACIP). *Advisory Committee on Immunization Practices, Centers for Disease Control and Prevention. MMWR Recomm Rep* 2007;56(RR-4):1–40.

to this document that may be helpful for obstetrician-gynecologists, other health care providers, and patients. You may view these resources at: www.acog.org/More-Info/MaternalImmunization.

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.

References

1. Omer SB. Maternal immunization. *N Engl J Med* 2017;376:1256–67.
2. Update on immunization and pregnancy: tetanus, diphtheria, and pertussis vaccination. Committee Opinion No. 718. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2017;130:e153–7.
3. Polyzos KA, Konstantelias AA, Pitsa CE, Falagas ME. Maternal influenza vaccination and risk for congenital malformations: a systematic review and meta-analysis. *Obstet Gynecol* 2015;126:1075–84.
4. Swamy GK, Heine RP. Vaccinations for pregnant women. *Obstet Gynecol* 2015;125:212–26.
5. Centers for Disease Control and Prevention. Flu vaccination coverage among pregnant women—United States, 2015–16 flu season. Atlanta (GA): CDC; 2016.
6. Ahluwalia IB, Jamieson DJ, Rasmussen SA, D'Angelo D, Goodman D, Kim H. Correlates of seasonal influenza vaccine coverage among pregnant women in Georgia and Rhode Island. *Obstet Gynecol* 2010;116:949–55.

7. Influenza vaccination during pregnancy. ACOG Committee Opinion No. 732. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2018;131:e109–14.
8. Shavell VI, Moniz MH, Gonik B, Beigi RH. Influenza immunization in pregnancy: overcoming patient and health care provider barriers. *Am J Obstet Gynecol* 2012;207(3 suppl):S67–74.
9. Kim DK, Riley LE, Hunter P. Advisory Committee on Immunization Practices Recommended Immunization Schedule for Adults Aged 19 Years or Older, United States, 2018. *MMWR Morb Mortal Wkly Rep* 2018;67:158–60.
10. Robinson CL, Romero JR, Kempe A, Pellegrini C, Szilagyi P. Advisory Committee on Immunization Practices Recommended Immunization Schedule for Children and Adolescents Aged 18 Years or Younger, United States, 2018. *MMWR Morb Mortal Wkly Rep* 2018;67:156–7.

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Maternal immunization. ACOG Committee Opinion No. 741. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2018;131:e214–7.

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