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CLINICAL PRACTICE GUIDELINE

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Viral Hepatitis in Pregnancy

Committee on Clinical Practice Guidelines–Obstetrics. This Clinical Practice Guideline was developed by the ACOG Committee on Clinical Practice Guidelines–Obstetrics in collaboration with Brenna L. Hughes, MD, MSc; and Denise J. Jamieson, MD, MPH; with consultation from Kathleen F. Brookfield, MD, PhD; Gweneth B. Lazenby, MD, MSCR; and Rhoda S. Sperling, MD.

PURPOSE: The purpose of this document is to describe the specific types of viral hepatitis, their implications during pregnancy, the risk of perinatal transmission, and issues related to both treatment and prevention of infection.

TARGET POPULATION: Pregnant or postpartum women and individuals who screen positive for viral hepatitis infection. The onset of these conditions may have predated the perinatal period or may have occurred for the first time in pregnancy or the first year postpartum.

METHODS: This guideline was developed using an a priori protocol in conjunction with a writing team consisting of one specialist in obstetrics and gynecology appointed by the ACOG Committee on Clinical Practice Guidelines–Obstetrics and one external subject matter expert. ACOG medical librarians completed a comprehensive literature search for primary literature within Cochrane Library, Cochrane Collaboration Registry of Controlled Trials, EMBASE, PubMed, and MEDLINE. Studies that moved forward to the full-text screening stage were assessed by two authors from the writing team based on standardized inclusion and exclusion criteria. Included studies underwent quality assessment, and a modified GRADE (Grading of Recommendations Assessment, Development, and Evaluation) evidence-to-decision framework was applied to interpret and translate the evidence into recommendation statements.

RECOMMENDATIONS: This Clinical Practice Guideline includes recommendations on hepatitis B virus and hepatitis C virus screening in pregnancy; prepregnancy, antepartum, intrapartum, and postpartum management for patients with hepatitis B virus infection or hepatitis C virus infection; management of accidental and occupational exposure to hepatitis B virus or hepatitis C virus in pregnant health care workers; and hepatitis A virus and hepatitis B virus vaccination in pregnancy. Recommendations are classified by strength and evidence quality. Ungraded Good Practice Points are included to provide guidance when a formal recommendation could not be made because of inadequate or nonexistent evidence.

INTRODUCTION

Viral hepatitis is one of the most common and potentially serious infections that can occur in pregnancy. Five types of viral hepatitis (A, B, C, D, and E) have now been identified, two of which—hepatitis A and hepatitis B—can be prevented effectively through vaccination.

SUMMARY OF RECOMMENDATIONS

Hepatitis B and Hepatitis C Virus Screening in Pregnancy

ACOG recommends early universal prenatal screening for hepatitis B surface antigen (HBsAg) of all pregnant patients in each pregnancy regardless of history of testing or vaccination status. **(STRONG RECOMMENDATION, MODERATE-QUALITY EVIDENCE)**

ACOG recommends triple panel screening (HBsAg, anti-HBs, and total anti-HBc) for all pregnant patients who do not have a documented negative triple screen result after age 18 years or who have not completed a HepB vaccine series, or in patients with ongoing known risks for hepatitis B infection, regardless of vaccination status or history of testing. **(STRONG RECOMMENDATION, LOW-QUALITY EVIDENCE)**

ACOG recommends that all patients be screened for hepatitis C virus antibodies in each pregnancy. **(STRONG RECOMMENDATION, LOW-QUALITY EVIDENCE)**

ACOG recommends prepregnancy screening for hepatitis C virus infection and treatment, when possible, before pregnancy. **(STRONG RECOMMENDATION, MODERATE-QUALITY EVIDENCE)**

Prepregnancy Counseling and Care for Patients with Hepatitis B Virus or Hepatitis C Virus Infection

Prepregnancy counseling for women with hepatitis B virus or hepatitis C virus infection includes the effect that pregnancy will have on maternal disease as well as risks to the fetus and neonate. **(GOOD PRACTICE POINT)**

Management of Hepatitis B Virus Infection for Pregnant, Intrapartum, and Postpartum Patients

ACOG recommends that all pregnant patients who are HBsAg-positive be tested for hepatitis B virus DNA quantitatively to guide the use of maternal antiviral therapy during pregnancy for the prevention of perinatal hepatitis B virus transmission. **(STRONG RECOMMENDATION, LOW-QUALITY EVIDENCE)**

ACOG recommends that antivirals be used during pregnancy for patients with hepatitis B virus infection and viral load greater than 200,000 international units/mL to decrease the risk of vertical transmission. **(STRONG RECOMMENDATION, MODERATE-QUALITY EVIDENCE)**

The risk of vertical transmission of hepatitis B virus associated with amniocentesis is generally low. Shared decision making should be used when counseling patients regarding risk of vertical transmission. **(GOOD PRACTICE POINT)**

STRENGTH OF RECOMMENDATION

STRONG

ACOG recommends

Benefits clearly outweigh harms and burdens. Most patients should receive the intervention.

ACOG recommends against

Harms and burdens clearly outweigh the benefits. Most patients should not receive the intervention.

CONDITIONAL

ACOG suggests

The balance of benefits and risks will vary depending on patient characteristics and their values and preferences. Individualized, shared decision making is recommended to help patients decide on the best course of action for them.

QUALITY OF EVIDENCE

HIGH

Randomized controlled trials, systematic reviews, and meta-analyses without serious methodologic flaws or limitations (eg, inconsistency, imprecision, confounding variables)
Very strong evidence from observational studies without serious methodologic flaws or limitations
There is high confidence in the accuracy of the findings and further research is unlikely to change this

MODERATE

Randomized controlled trials with some limitations
Strong evidence from observational studies without serious methodologic flaws or limitation

LOW

Randomized controlled trials with serious flaws Some evidence from observational studies

VERY LOW

Unsystematic clinical observations
Very indirect evidence from observational studies

GOOD PRACTICE POINTS

Ungraded Good Practice Points are incorporated when clinical guidance is deemed necessary in the case of extremely limited or nonexistent evidence. They are based on expert opinion as well as review of the available evidence.

ACOG suggests that cesarean delivery be reserved for obstetric indications in patients with hepatitis B virus infection. **(CONDITIONAL RECOMMENDATION, LOW-QUALITY EVIDENCE)**

ACOG recommends that neonates of individuals who are HBsAg-positive or whose status is unknown at the time of

delivery receive both HBIG and hepatitis B virus vaccine within 12 hours of birth. (STRONG RECOMMENDATION, MODERATE-QUALITY EVIDENCE)

ACOG recommends that individuals with hepatitis B virus infection be encouraged to breastfeed in the absence of other contraindications. (STRONG RECOMMENDATION, LOW-QUALITY EVIDENCE)

Management of Hepatitis C Virus Infection for Pregnant, Intrapartum, and Postpartum Patients

The risk of vertical transmission of hepatitis C virus associated with amniocentesis is generally low. Use shared decision making when counseling patients regarding risk of vertical transmission. (GOOD PRACTICE POINT)

The risk of vertical transmission of hepatitis C virus associated with chorionic villus sampling is generally low. Use shared decision making when counseling patients regarding risk of vertical transmission. (GOOD PRACTICE POINT)

Breastfeeding is not discouraged among individuals with hepatitis C virus infection. (GOOD PRACTICE POINT)

Management of Accidental or Occupational Exposure to Hepatitis B Virus or Hepatitis C Virus in Pregnant Health Care Workers

ACOG recommends that pregnant health care workers with an accidental or occupational exposure to hepatitis B virus or hepatitis C virus be managed in a similar way to those who are not pregnant. (STRONG RECOMMENDATION, LOW-QUALITY EVIDENCE)

Hepatitis A and B Vaccination in Pregnancy

ACOG recommends vaccination for hepatitis A virus, hepatitis B virus, or both during pregnancy for recommended groups. (STRONG RECOMMENDATION, MODERATE-QUALITY EVIDENCE)

METHODS

ACOG Clinical Practice Guidelines provide clinical management recommendations for a condition or procedure by assessing the benefits and harms of care options through a systematic review of the evidence. This guideline was developed using an a priori protocol in conjunction with a writing team consisting of one specialist in obstetrics and gynecology appointed by the ACOG Committee on Clinical Practice Guidelines–Obstetrics and one external subject matter expert. A full description of the Clinical Practice Guideline methodology has been published separately (1). The following description is specific to this Clinical Practice Guideline.

Literature Search

ACOG medical librarians completed a comprehensive literature search for primary literature within the Cochrane Library, Cochrane Collaboration Registry of Controlled Trials, EMBASE, PubMed, and MEDLINE. Parameters for the search included human-only studies published in English. The search was restricted to studies from 2005 to 2018. The MeSH terms and keywords used to guide the literature search can be found in Appendix A. Updated literature searches were completed in February 2022 and December 2022, and both were reviewed by two members of the writing team using the same systematic process as the original literature search. A final supplemental literature search was performed in April 2023 to ensure that any newly published high-level sources were addressed in the final manuscript.

Study Selection

A title and abstract screen of all studies was completed by ACOG research staff. Studies that moved forward to the full-text screening stage were assessed by two authors from the writing team based on standardized inclusion and exclusion criteria. To be considered for inclusion, studies had to be conducted in countries ranked very high on the United Nations Human Development Index (2), published in English, and include participants identified as female or women. Although systematic reviews, randomized controlled trials, and observational studies were prioritized, case reports, case series, and narrative reviews were considered for topics with limited evidence. A PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow diagram of the included and excluded studies can be found in Appendix B. All studies that underwent quality assessment had key details extracted (study design, sample size, details of interventions, outcomes) and descriptions included in the summary evidence tables (Appendix C).

Recommendation and Manuscript Development

A modified GRADE (Grading of Recommendations Assessment, Development, and Evaluation) evidence-to-decision framework was applied to interpret and translate the evidence into draft recommendation statements, which were classified by strength and evidence quality (3, 4). Ungraded Good Practice Points were incorporated to provide clinical guidance in the case of extremely limited or nonexistent evidence. They are based on expert opinion as well as review of the available evidence (5). The recommendations and supporting evidence tables then were reviewed, revised as appropriate, and affirmed by the Committee on Clinical Practice

Guidelines–Obstetrics at a meeting. The guideline manuscript then was written and subsequently reviewed and approved by the Committee on Clinical Practice Guidelines–Obstetrics and other internal review bodies before continuing to publication.

Use of Language

ACOG recognizes and supports the gender diversity of all patients who seek obstetric and gynecologic care. In original portions of this document, the authors seek to use gender-inclusive language or gender-neutral language. When describing research findings, this document uses gender terminology reported by the investigators. ACOG's policy on inclusive language can be reviewed at https://www.acog.org/clinical-information/policy-and-position-statements/statements-of-policy/2022/inclusive-language.

CLINICAL OVERVIEW

Hepatitis A

Hepatitis A is a small (27 nm) RNA virus that produces either symptomatic or asymptomatic infection in humans after an average incubation period of 28 days (range 15–50 days). Hepatitis A virus replicates within the liver and is excreted in bile. The highest fecal viral concentrations occur late in the incubation period, which represents the window of greatest infectivity.

Person-to-person transmission through fecal–oral contamination or exposure to contaminated food or water are the primary means of hepatitis A virus infection in the United States, most often in travelers returning from countries where hepatitis A is common or as part of foodborne outbreaks. Ingestion of uncooked or undercooked foods contaminated with hepatitis A virus can cause infection. Heating foods to above 185°F for 1 minute or disinfecting surfaces with a dilute solution of household bleach can inactivate the virus, which can be otherwise stable in the environment for months. In addition, food can be contaminated after cooking, as commonly occurs in outbreaks associated with food handlers with hepatitis A virus infection whose hygiene practices are substandard (6). Waterborne outbreaks are rare in the United States due to well-developed and maintained water supplies and sanitation systems. Because children usually have asymptomatic or unrecognized infections, they can play a key role in transmitting the infection others. Studies have demonstrated that up to 40% of adults without an identifiable source of infection had close contact with a child younger than age 6 years (7), which underscores the importance of primary hepatitis A virus prevention within families of women of reproductive age.

Serious complications of hepatitis A virus infection are uncommon; the overall case-fatality ratio among reported cases is less than 1% but reaches 2% among adults older than age 50 years. Hepatitis A virus does not lead to chronic infection, although 10–15% of symptomatic individuals can have prolonged or relapsing disease lasting up to 6 months (8). One series of 13 patients with acute hepatitis A virus infection during the second and third trimesters found that the median gestational age at delivery was 34 weeks of gestation (range 31–40 weeks). Although perinatal transmission was not found in this series (9), cases of perinatal transmission of hepatitis A virus infection have been reported (10).

Hepatitis B

Hepatitis B is a small (40–42 nm) DNA virus with an average incubation period of 60 days (range 40–90 days). The intact virus is termed the Dane particle. Hepatitis B virus contains three principal antigens. Hepatitis B surface antigen is present on the surface of the virus and circulates freely in the serum in spherical and filamentous forms. The middle portion of the Dane particle contains hepatitis B core antigen (HBcAg). The core antigen is present only in hepatocytes and does not circulate in the serum. Hepatitis B e antigen (HBeAg) is encoded by the same portion of the viral genome that codes for the core antigen. The presence of HBeAg indicates an extremely high viral inoculum and active virus replication.

Hepatitis B virus is highly pathogenic and infectious. Perinatal transmission of hepatitis B virus infection represents the single largest cause of chronic infection in individuals worldwide. In the United States, the prevalence of infection among foreign-born persons is 3.5%, accounting for 95% of newly reported chronic infections. Perinatal transmission risk varies widely by individual disease activity and still accounts for a significant prevalence of disease in some areas of the world. The use of prophylaxis and antiviral treatments significantly decreases the risk of perinatal transmission to less than 5%, but transmission can be as high as 90% without maternal antiviral treatment or neonatal prophylaxis (11). Hepatitis B virus, which has been detected in a large variety of body fluids including semen and vaginal fluids, is efficiently transmitted by parenteral and sexual contact (12). Individuals at greatest risk of contracting infection are those who have unprotected sex with multiple sexual partners, inject drugs percutaneously, or have sexual partners who engage in these risk-taking behaviors. All blood donors are screened routinely for HBsAg. Transmission of hepatitis B virus from transfusion of blood or blood products is rare as a result of both donor screening and blood banking viral inactivation procedures (12). Hepatitis B virus can also be transmitted

perinatally and is a major source of infection in highly endemic areas.

The mortality associated with acute hepatitis B virus infection is approximately 1%. Of adult patients who contract infection, 85–90% experience complete resolution of their physical findings and develop protective levels of the anti-HBs antibody. The other 10–15% of patients develop chronic infection. They continue to have detectable serum levels of HBsAg but are asymptomatic, and most have no biochemical evidence of hepatic dysfunction. In a small subgroup (15–30%) of those with chronic infection, viral replication continues and is manifested by persistence of the e antigen and active viral DNA synthesis.

Hepatitis C

Hepatitis C is a small, enveloped virus with a positive-sense, single-stranded RNA genome. Multiple distinct hepatitis C viral genotypes have been identified, with broad geographic variation and widely ranging prognoses for both disease progression and response to therapy.

Hepatitis C virus is the most commonly reported bloodborne infection in the United States (13). In 2014 there were an estimated 30,500 acute infections, and in 2020 there were an estimated 66,700 acute infections in the United States (14). National standardized surveillance for perinatal hepatitis C virus infection began in 2018. Although there were only 217 perinatal hepatitis C virus infection cases reported to the Centers for Disease Control and Prevention in 2019 (15), it is anticipated that the number of reported cases will increase over time as surveillance efforts improve.

The principal risk factor for hepatitis C virus transmission is use of intravenous drugs (15, 16). Since the initiation of screening of the blood supply for hepatitis C virus in 1992, transmission of hepatitis C virus infection by transfusion of blood or blood products has become rare. Because the risk of hepatitis C virus infection from blood transfusions has decreased, the proportion of hepatitis C virus infections attributable to drug use has increased significantly (13). Hepatitis C virus infection can be transmitted sexually, primarily through anal sex; the risk of transmission from unprotected vaginal–penile intercourse is low.

Acute hepatitis C virus infection occurs after an incubation period of 30–60 days. Asymptomatic infection occurs in 75% of patients, and at least 50% of individuals with infection progress to chronic infection, regardless of the mode of acquisition or severity of initial infection. Although at least 20% of chronic hepatitis C virus infections lead to chronic active hepatitis or cirrhosis, whether a link to hepatocellular carcinoma exists is controversial and may vary by geographic region (17). Hepatitis C virus and human immunodeficiency virus (HIV) share common transmission routes, and concomitant infection has been reported to accelerate the progression and severity of hepatic injury (13).

Hepatitis D

Hepatitis D is an incomplete viral particle that causes disease only in the presence of hepatitis B virus, from which it acquires a viral envelope consisting entirely of excess HBsAg produced by the hepatitis B virus. Infection with hepatitis D virus occurs either simultaneously with hepatitis B virus infection (co-infection) or may be acquired after hepatitis B virus infection (superinfection). Transmission of hepatitis D virus is primarily through blood; approximately 20–25% of chronic hepatitis B virus carriers also have evidence of hepatitis D virus infection (18, 19).

Chronic hepatitis D virus infection produces severe disease more often than other forms of chronic hepatitis. Of patients with chronic hepatitis D virus infection, 70–80% ultimately develop cirrhosis and portal hypertension, 15% of whom develop an unusually rapid progression to cirrhosis within 2 years of the initial onset of acute illness. Mortality as a result of hepatic failure approaches 25%. In contrast, only 15–30% of patients with chronic hepatitis B virus infection develop cirrhosis and portal hypertension, and the disease progression typically is much slower (19).

Hepatitis E

Hepatitis E is a small, single-stranded RNA nonenveloped virus and is known to have a severe effect on pregnant individuals in endemic regions. The epidemiologic features of hepatitis E virus infection are similar to those of hepatitis A virus, with fecal–oral transmission. The disease has been reported only rarely in the United States, and the highest rates of infection occur in regions of the world where inadequate sanitation promotes transmission of the virus. Hepatitis E virus infection is primarily a waterborne disease; epidemics have been reported in areas where fecal contamination of drinking water is common. The ingestion of raw or undercooked shellfish also has been a source of sporadic cases of hepatitis E virus infection in endemic areas (20).

In general, hepatitis E virus produces a self-limited viral infection followed by recovery. The incubation period is 3–8 weeks, with a mean of 40 days. Among pregnant women, however, a higher risk of fulminant hepatitis E virus infection has been reported, with maternal and fetal mortality as high as 20–30% and 35%, respectively, in Asia and Africa (21, 22). In a study of cases in industrialized nations, there were no deaths, but 5 of the 15 women in the study required liver transplantation (23). Although rarely seen in the United Sates, vertical hepatitis E virus transmission of nearly 50% has been reported elsewhere in the world (24).

The Clinical Manifestations of Hepatitis

The usual symptoms in patients with acute viral hepatitis are malaise, fatigue, anorexia, nausea, vomiting, diarrhea

(hepatitis A and E), and right upper quadrant or epigastric pain. Physical examination findings may include jaundice, upper abdominal tenderness, and hepatomegaly. The patient's urine usually is darkened, and the stool may be gray or acholic. In cases of fulminant hepatitis, signs of coagulopathy and encephalopathy may be present.

The evolution of acute clinical illness in patients with hepatitis D virus infection often follows a biphasic course. In the initial phase of infection, patients with hepatitis D virus infection are indistinguishable from individuals with acute hepatitis B virus infection. Two to four weeks after apparent resolution of symptoms, patients typically have a relapse, which usually is of a milder nature and is associated with a second episode of elevation in serum transaminases. At this time, serologic assay results for hepatitis D virus usually are positive.

In some patients with acute hepatitis B, C, or D virus infection, symptomatic infection resolves and they become chronic carriers of viral infection. Once cirrhosis ensues, patients have the typical signs of end-stage liver disease, such as jaundice, muscle wasting, ascites, spider angioma, palmar erythema, and, ultimately, hepatic encephalopathy.

Management of Acute Hepatitis

Treatment of acute hepatitis is similar for pregnant and nonpregnant individuals. Pregnant patients with acute hepatitis should be hospitalized if they have encephalopathy, coagulopathy, or severe debilitation. Nutritional needs should be addressed within the context of the severity of the disease. Fluid and electrolyte abnormalities should be corrected. If a coagulopathy is present, administration of erythrocytes, platelets, and clotting factors such as fresh frozen plasma or cryoprecipitate may be necessary.

Pregnant women who are less severely ill may be treated as outpatients. Individuals with hepatitis infections should use condoms with intercourse and avoid sharing household items that could be contaminated with blood (25).

CLINICAL RECOMMENDATIONS AND EVIDENCE SUMMARY

Hepatitis B and Hepatitis C Virus Screening in Pregnancy

Hepatitis B Screening

ACOG recommends early universal prenatal screening for hepatitis B surface antigen (HBsAg) of all pregnant patients in each pregnancy regardless of history of testing or vaccination status. (STRONG RECOMMENDATION, MODERATE-QUALITY EVIDENCE)

ACOG recommends triple panel screening (HBsAg, anti-HBs, and total anti-HBc) for all pregnant patients who do not have a documented negative triple screen result after age 18 years or who have not completed a HepB vaccine series, or in patients with ongoing known risks for hepatitis B infection, regardless of vaccination status or history of testing. (STRONG RECOMMENDATION, LOW-QUALITY EVIDENCE)

Pregnant patients should be screened for hepatitis B virus infection at the first prenatal visit of each pregnancy (12, 26–28). The HBsAg test should always be performed regardless of prior vaccination. Additionally, a triple panel screen (HBsAg, anti-HBs, and total anti-HBc) can be offered to pregnant patients aged 18 years and older, if not previously completed (27, 29). Screening with the three tests (triple panel) is recommended at least one time for all adults to help identify persons who have an active hepatitis B virus infection and could be linked to care, have resolved infection and might be susceptible to reactivation (eg, immunosuppressed persons), are susceptible and need vaccination, or are successfully vaccinated (27).

For those patients who have not previously had a triple panel in their adult life, a triple panel optimally would be performed at a prepregnancy appointment to inform health care decisions and any need for vaccination (27). However, for those patients who did not have a triple panel performed at a prepregnancy visit, it can be incorporated into routine antepartum testing. Hepatitis B virus vaccine is recommended for all pregnant adults who were not previously vaccinated (30) (see "Hepatitis A and B Vaccination in Pregnancy" section).

At the time of admission for delivery, women with unknown HBsAg status and those with new or continuing risk factors for hepatitis B virus infection (such as injection drug use or recent sexually transmitted infections) should be screened (12, 31, 32). Although screening recommendations are long-standing, 12–18% of pregnant women still do not receive HBsAg screening during pregnancy in the United States (33).

For pregnant women with a positive HBsAg test result, additional testing (ie, total anti-HBc, immunoglobulin [Ig] M anti-HBc, anti-HBs, HBV DNA) is recommended to determine viral load and to distinguish acute from chronic infection (Table 1) (12). The appearance of HBsAg predates clinical symptoms by 4 weeks on average (range 1–9 weeks) and remains detectable for 1–6 weeks. The chronic carrier state for hepatitis B virus is defined by persistence of HBsAg and the absence of hepatitis B surface IgG antibody (anti-HBs), which is the protective antibody that defines immunity. Titers of anti-HBs (in noncarriers) increase slowly during clinical recovery and continue to increase for up to 10–12 months after HBsAg has been cleared. In most patients with self-limited acute hepatitis B virus infection,

anti-HBs and HBsAg do not co-exist detectably in serum, and anti-HBs is seen only after HBsAg has been cleared. The chronic carrier state usually can be predicted by HBsAg seropositivity for more than 20 weeks (Fig. 1) (25, 34).

A serologic "window" has been described for hepatitis B virus infection when, despite clinical symptoms, HBsAg is clearing and undetectable but anti-HBs is not yet detectable either. In this period, hepatitis B virus infection can still be diagnosed by detection of hepatitis B core IgG antibody (anti-HBc), which appears 3–5 weeks after HBsAg. Hepatitis B core IgG antibody is present only in the context of natural hepatitis B virus infection and is not a protective antibody. It does not distinguish acute resolving infections from the chronic infection state, which is done only by persistence or clearance of HBsAg. An IgM antibody to the hepatitis B core antigen (IgM anti-HBc) appears during acute or after recent hepatitis B virus infection and is present for approximately 6 months. In contrast, vaccinated individuals will have only anti-HBs detectable in serum and not HBsAg or anti-HBc. Hepatitis B core antigen is not detectable outside of research laboratory assays, and tests for it should not be ordered clinically (25,34). With the variety of hepatitis B virus–specific antigens and antibodies identified, interpretation of hepatitis B serologies is complex (Table 1).

Hepatitis C Screening

Hepatitis C virus infection prevalence is increasing in the United States. There is a national effort to identify cases of hepatitis C virus infection because of the availability of emerging therapies with direct-acting antivirals that essentially result in cure of the disease. There are published national guidelines recommending therapy for people with

Table 1. Interpretation of Screening Test Results for Hepatitis B Virus Infection and Recommended Actions

Clinical State	HBsAg	Anti-HBs	Total anti-HBc*	IgM anti-HBc	Action[†]
Acute infection	Positive	Negative	Positive	Positive	Link to HBV infection care
Chronic infection	Positive	Negative	Positive	Negative[‡]	Link to HBV infection care
Resolved infection	Negative	Positive	Positive	Negative	Counsel about HBV infection reactivation risk
Immune (immunity inferred from receipt of previous vaccination)	Negative	Positive[§]	Negative	Negative	Reassure if history of HepB vaccine series completion; if partially vaccinated, complete vaccine series per ACIP recommendations
Susceptible, never infected	Negative	Negative[‖]	Negative	Negative	Offer HepB vaccine per ACIP recommendations
Isolated core antibody positive[¶]	Negative	Negative	Positive	Negative	Depends on cause of positive result

Abbreviations: ACIP, Advisory Committee on Immunization Practices; anti-HBs, antibody to hepatitis B surface antigen; HBcAg, hepatitis B core antigen; HBsAg, hepatitis B surface antigen; HBV, hepatitis B virus; HepB, hepatitis B; IgG, immunoglobulin G; IgM anti-HBc, immunoglobulin M antibodies to hepatitis B core antigen; total anti-HBc, total antibody to hepatitis B core antigen.

*Total anti-HBc is a measure of both IgM and IgG antibodies to HBcAg.

[†]Source: Abara WE, Qaseem A, Schillie S, McMahon BJ, Harris AM, Abraham GM, et al. Hepatitis B vaccination, screening, and linkage to care: best practice advice from the American College of Physicians and the Centers for Disease Control and Prevention. High Value Care Task Force of the American College of Physicians and the Centers for Disease Control and Prevention. Ann Intern Med 2017; 167:794–804. doi: 10.7326/M17-1106.

[‡]IgM anti-HBc also might be positive in persons with chronic infection during severe HBV infection flares or reactivation.

[§]Immune if anti-HBs concentration is >10 mIU/mL after vaccine series completion.

[‖]Anti-HBs concentrations might wane over time among vaccine responders (Source: Schillie S, Vellozzi C, Reingold A, Harris A, Haber P, Ward JW, et al. Prevention of hepatitis B virus infection in the United States: recommendations of the Advisory Committee on Immunization Practices. MMWR Recomm Rep 2018; 67:1–31. doi: 10.15585/mmwr.rr6701a1).

[¶]Can be the result of a past infection when anti-HBs levels have waned, occult infection, passive transfer of anti-HBc to an infant born to an HBsAg-positive gestational parent, a false positive, or mutant HBsAg strain that is not detectable by laboratory assay.

Modified from Conners EE, Panagiotakopoulos L, Hofmeister MG, Spradling PR, Hagan LM, Harris AM, et al. Screening and testing for hepatitis B virus infection: CDC recommendations — United States, 2023. MMWR Recomm Rep 2023;72:1–25. doi: 10.15585/mmwr.rr7201a1

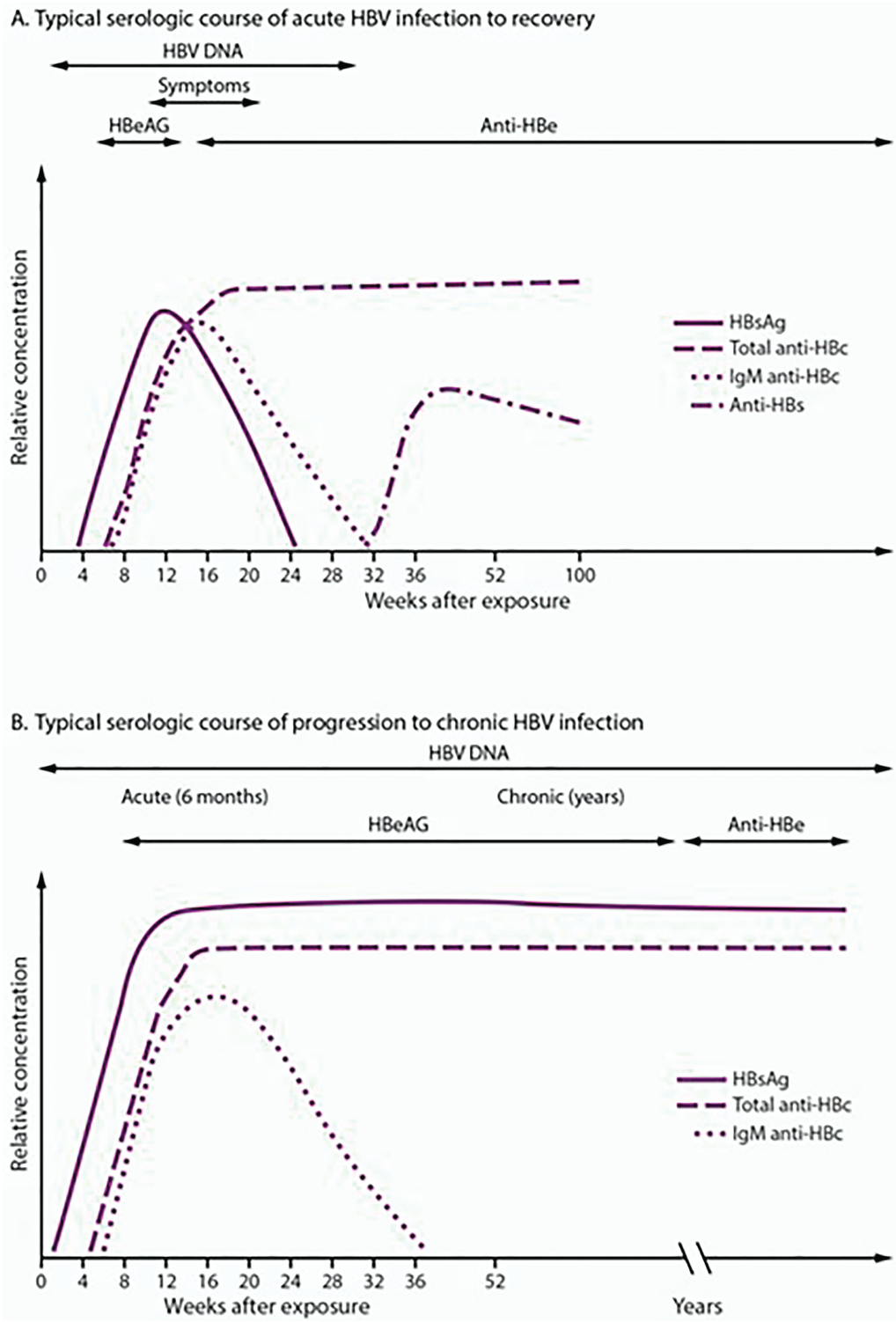

Fig. 1. Typical Serologic Courses of Acute and Chronic Hepatitis B Virus Infection. Abbreviations: anti-HBc, antibody to hepatitis B core antigen; anti-HBe, antibody to hepatitis B e antigen; anti-HBs, antibody to hepatitis B surface antigen; HBeAg, hepatitis B e antigen; HBsAg, hepatitis B surface antigen; HBV, hepatitis B virus; IgM, immunoglobulin M. Reprinted from Connors EE, Panagiotakopoulos L, Hofmeister MG, Spradling PR, Hagan LM, Harris AM, et al. Screening and testing for hepatitis B virus infection: CDC recommendations — United States, 2023. Accessed June 2, 2023. https://www.cdc.gov/mmwr/volumes/72/rr/rr7201a1.htm?s_cid=rr7201a1_w

hepatitis C virus infection depending on the disease severity and genotype of the virus (13, 35–37). Curing hepatitis C virus infection will not only lead to improved health outcomes for people with chronic infection but also could curb the ongoing epidemic. However, these therapies are not yet well studied in pregnancy, and their use is not recommended during pregnancy (38). As research progresses and therapies are tested in pregnancy, more wide-scale therapy may be available, with the possibility of decreasing the risk of perinatal transmission (39).

ACOG recommends prepregnancy screening for hepatitis C virus infection and treatment, when possible, before pregnancy. (STRONG RECOMMENDATION, MODERATE-QUALITY EVIDENCE)

Ideally, pregnant women should be screened for hepatitis C virus infection at the first prenatal visit of each pregnancy (13). If the antibody screen result is positive, hepatitis C virus RNA polymerase chain reaction testing is done to confirm the diagnosis. If the polymerase chain reaction test result is negative, the antibody test should be confirmed on a separate platform to differentiate a false-positive antibody test result from an infection with suppressed or cleared viral load.

Currently, there are no treatment options for hepatitis C virus infection diagnosed during pregnancy. Additionally, there are currently no recommended interventions to decrease the risk of perinatal hepatitis C virus transmission. Obstetrician–gynecologists are encouraged to connect pregnant patients who screen positive for hepatitis C virus infection and those who have chronic hepatitis C virus infection during pregnancy with hepatitis care so that these individuals may begin direct-acting antiviral treatment postpartum and after completion of breastfeeding.

Prepregnancy Counseling and Care for Patients with Hepatitis B Virus or Hepatitis C Virus Infection

Prepregnancy counseling for women with hepatitis B virus or hepatitis C virus infection includes the effect that pregnancy will have on maternal disease as well as risks to the fetus and neonate. (GOOD PRACTICE POINT)

The stability of maternal disease should be assessed, and a multidisciplinary approach with input from a hepatitis specialist, such as a gastroenterologist or infectious disease specialist, is recommended. Degree of maternal disease, such as viral burden, genotype, and presence of cirrhosis, is an important consideration for patients considering pregnancy (40). Patients with hepatitis C virus infection should be counseled about an increased risk of fetal growth restriction, preterm birth, and intrahepatic cholestasis of pregnancy (41–43). All patients with hepatitis B virus or hepatitis C virus infection, including those who are pregnant, should be counseled to abstain from alcohol; recommended vaccinations should be discussed.

For hepatitis B virus infection, pregnant patients may require therapy for their own health. In addition, for patients with elevated viral loads (greater than 200,000 international units/mL hepatitis B virus DNA; 1 million copies/mL), antiviral therapy is recommended to reduce the risk of perinatal transmission (44, 45). Patients with chronic hepatitis B virus infection should be educated that there is a risk of postpartum viral flare. Antiviral treatment to prevent perinatal hepatitis B virus infection may reduce the risk of postpartum hepatitis flare.

Ideally, eligible patients with hepatitis C virus infection should complete therapy before pregnancy. A 12- to 24-week course of direct-acting antiviral medications has been shown to achieve virologic cure in a large proportion of patients (37). When ribavirin is given with direct-acting antivirals to women or their male partners, couples should wait 6 months after completion of therapy to become pregnant due to the reported teratogenic effects of ribavirin.

Management of Hepatitis B Virus Infection for Pregnant, Intrapartum, and Postpartum Patients

Although pregnancy is generally well-tolerated by individuals with hepatitis B virus infection without evidence of advanced liver disease, patients should be monitored closely during pregnancy and postpartum. Due to immunologic changes during pregnancy, there is a risk of hepatitis flare, particularly postpartum. Because there is no specific treatment for acute hepatitis B virus infection, supportive care is recommended, including during pregnancy. Individuals with chronic hepatitis B virus infection should be monitored and antiviral therapy initiated for those who are likely to respond to treatment and who are at high risk for liver-related morbidity (46). Depending on factors such as indications for treatment, patients may be treated for chronic hepatitis B virus infection during pregnancy for their own health. In addition, pregnant patients who are HBsAg-positive with high viral loads should receive antiviral treatment in the third trimester to reduce the risk of perinatal transmission.

ACOG recommends that all pregnant patients who are HBsAg-positive be tested for hepatitis B virus DNA quantitatively to guide the use of maternal antiviral therapy during pregnancy for the prevention of perinatal hepatitis B virus transmission. (STRONG RECOMMENDATION, LOW-QUALITY EVIDENCE)

To reduce the risk of transmission, all neonates born to women who are HBsAg-positive should receive postexposure prophylaxis (ie, hepatitis B virus vaccination, hepatitis B immunoglobulin) initiated within 12 hours of birth. With neonatal postexposure prophylaxis, about 1% of neonates

exposed to hepatitis B virus will develop hepatitis B virus infection (47). Maternal viral load has been demonstrated to have a dose-dependent association with congenital transmission of hepatitis B virus (48). Additionally, maternal antiviral therapy has been shown to decrease the risk of neonatal transmission of hepatitis B virus.

ACOG recommends that antivirals be used during pregnancy for patients with hepatitis B virus infection and viral load greater than 200,000 international units/mL to decrease the risk of vertical transmission. (STRONG RECOMMENDATION, MODERATE-QUALITY EVIDENCE)

Current recommendations are to start therapy for patients with elevated viral loads (greater than 200,000 international units/mL hepatitis B virus DNA) at the beginning of the third trimester in conjunction with an expert in hepatitis (for example an infectious disease specialist or gastroenterologist) (12, 32, 46, 49). Tenofovir disoproxil fumarate is recommended as the first-line therapy for eligible pregnant women due to multiple studies demonstrating efficacy and the low risk of viral resistance (32, 50–54). Tenofovir alafenamide, an antiviral commonly used to treat HIV infection during pregnancy, appears to be a safe alternative in the prevention of perinatal hepatitis B virus infection. The use of maternal hepatitis B virus hyperimmune globulin to decrease the risk of neonatal infection has also been studied and was not found to be effective and is therefore not recommended (55).

The risk of vertical transmission of hepatitis B virus associated with amniocentesis is generally low. Shared decision making should be used when counseling patients regarding risk of vertical transmission. (GOOD PRACTICE POINT)

Amniocentesis may increase the risk of in utero transmission among women with elevated viral load (more than 7 log10 copies), and the potential for increased transmission risk should be discussed with such patients when they are deciding about whether to proceed (56, 57). Although there are some reports of increased risk of perinatal transmission when the neonate comes in contact with infected vaginal blood and secretions during delivery, there is insufficient evidence to suggest that invasive obstetric procedures be routinely avoided (eg, internal monitoring, episiotomy, operative vaginal delivery).

ACOG suggests that cesarean delivery be reserved for obstetric indications in patients with hepatitis B virus infection. (CONDITIONAL RECOMMENDATION, LOW-QUALITY EVIDENCE)

There are a variety of obstetric interventions that have been considered in an effort to decrease the risk of neonatal transmission. There are not well-designed trials demonstrating efficacy of cesarean delivery in decreasing the risk of neonatal transmission (58, 59). Therefore, cesarean delivery is not recommended solely for the purpose of decreasing neonatal transmission of hepatitis B virus.

ACOG recommends that neonates of individuals who are HBsAg-positive or whose status is unknown at the time of delivery receive both HBIG and hepatitis B virus vaccine within 12 hours of birth. (STRONG RECOMMENDATION, MODERATE-QUALITY EVIDENCE)

Universal active immunization of all neonates (weighing at least 2,000 g) is recommended within 24 hours of birth. Neonates weighing less than 2,000 g and those born to patients who are HBsAg-negative should have their first vaccine dose delayed to the time of hospital discharge or age 1 month, whichever comes first (even if weight is still less than 2,000 g) (12).

Neonates of patients who are HBsAg-positive or whose status is unknown at the time of delivery should receive both HBIG and hepatitis B virus vaccine within 12 hours of birth. Thereafter, the standard childhood immunization schedule should be followed by the pediatric team. The physician responsible for the care of a newborn of a patient with chronic hepatitis B virus infection should be informed of her carrier status so that the appropriate doses of hepatitis B virus vaccine and HBIG can be given as soon as possible after delivery (12).

ACOG recommends that individuals with hepatitis B virus infection be encouraged to breastfeed in the absence of other contraindications. (STRONG RECOMMENDATION, LOW-QUALITY EVIDENCE)

Multiple studies have demonstrated that breastfeeding does not confer an increased risk of vertical transmission among women with chronic hepatitis B virus infection (32, 49, 60–62). Breastfeeding should be encouraged as it is in women without hepatitis B virus infection, and neonatal immunoprophylaxis should be provided as it would be for all neonates exposed to hepatitis B virus (12, 32, 49). For women taking antiviral therapy such as tenofovir to prevent vertical transmission or for their own health, breastfeeding is safe (49, 63).

Management of Hepatitis C Virus Infection for Pregnant, Intrapartum, and Postpartum Patients

The risk of vertical transmission of hepatitis C virus associated with amniocentesis is generally low. Use shared decision making when counseling patients regarding risk of vertical transmission. (GOOD PRACTICE POINT)

There are no preventive measures available to lower the risk of vertical transmission of hepatitis C virus infection in the fetus or neonate as there are for hepatitis B virus (64). Although there are some reports of increased risk of perinatal transmission when the neonate comes in contact

with infected vaginal blood and secretions during delivery, there is insufficient evidence to suggest that invasive obstetric procedures be routinely avoided (eg, internal monitoring, episiotomy, operative vaginal delivery) (36, 64).

The risk of vertical transmission of hepatitis C virus associated with chorionic villus sampling is generally low. Use shared decision making when counseling patients regarding risk of vertical transmission. (GOOD PRACTICE POINT)

Use of prelabor cesarean delivery has not been found to be associated with a reduction in vertical transmission, even in the setting of maternal viremia, and is therefore not recommended for the purpose of decreasing transmission risk (36, 64, 65, 66).

Breastfeeding is not discouraged among individuals with hepatitis C virus infection. (GOOD PRACTICE POINT)

A number of studies have been conducted to evaluate the effect of breastfeeding on the risk of infant hepatitis C virus transmission. A meta-analysis of 14 prospective studies found no association between breastfeeding and transmission risk, but the quality of the studies varied, with most being poor-quality (64). The overall body of evidence does not support an increased risk of transmission related to breastfeeding, although a small risk cannot be excluded (36, 67). There is, however, inadequate information on risk related to cracked and bleeding nipples (64, 68, 69).

Management of Accidental or Occupational Exposure to Hepatitis B Virus or Hepatitis C Virus in Pregnant Health Care Workers

ACOG recommends that pregnant health care workers with an accidental or occupational exposure to hepatitis B virus or hepatitis C virus be managed in a similar way to those who are not pregnant. (STRONG RECOMMENDATION, LOW-QUALITY EVIDENCE)

The vaccination status of the health care worker and the hepatitis B virus infection status of the source patient should

Table 2. Hepatitis B Virus Postexposure Management of Health Care Personnel*

	Postexposure testing		Postexposure prophylaxis		
HCP status	Source patient (HBsAg)	HCP testing (anti-HBs)	HBIG	Vaccination	Postvaccination serologic testing
Documented responder after complete series	No action needed				
Documented nonresponder after two complete series	Positive/ unknown	—†	HBIG ×2 separated by 1 month	—	N/A
	Negative	No action needed			
Response unknown after complete series	Positive/ unknown	<10 mIU/mL	HBIG ×1	Initiate revaccination	Yes
	Negative	<10 mIU/mL	—	Initiate revaccination	Yes
	Any result	≥10 mIU/mL	No action needed		
Unvaccinated/ incompletely vaccinated or vaccine refusers	Positive/ unknown	—	HBIG ×1	Complete vaccination	Yes
	Negative	—	None	Complete vaccination	Yes

Abbreviations: anti HBs, antibody to hepatitis B surface antigen; HBIG, hepatitis B immune globulin; HBsAg, hepatitis B surface antigen; HCP, health care personnel; N/A, not applicable.

*Postexposure management of health care personnel after occupational percutaneous or mucosal exposure to blood or body fluids, by health care personnel Hepatitis B vaccination and response status.

†Not indicated.

Modified from Schillie S, Vellozzi C, Reingold A, Harris A, Haber P, Ward JW, et al. Prevention of hepatitis B virus infection in the United States: recommendations of the Advisory Committee on Immunization Practices. MMWR Recomm Rep 2018;67:1–31. doi: 10.15585/mmwr.rr6701a1

be evaluated to assess the need for postexposure prophylaxis according to the criteria from the Centers for Disease Control and Prevention (Table 2) (12). For a health care worker who completed a full hepatitis B virus vaccination series (ie, has written documentation of a complete HepB vaccine series) with subsequent documented anti-HBs 10 milli-international units/mL or higher (ie, a "documented responder"), testing the source patient for HBsAg is unnecessary. No postexposure prophylaxis for hepatitis B virus is necessary, regardless of the source patient's HBsAg status. For all others, evaluation of the source patient is necessary. HepB vaccine may be administered simultaneously with HBIG at a separate anatomic injection site (12).

Postexposure prophylaxis against hepatitis C virus infection is not effective and not recommended. However, early antiviral therapy for the individual with infection may be effective in reducing the risk of progression to chronic hepatis C virus infection (70).

Hepatitis A and B Vaccination in Pregnancy

ACOG recommends vaccination for hepatitis A virus, hepatitis B virus, or both during pregnancy for recommended groups. **(STRONG RECOMMENDATION, MODERATE-QUALITY EVIDENCE)**

Both hepatitis A virus infection and hepatitis B virus infection are vaccine-preventable illnesses. Hepatitis A virus and hepatitis B virus vaccines are not live vaccines and are not contraindicated in pregnancy. Therefore, if a pregnant patient is in one of the risk groups recommended to receive hepatitis A virus vaccine, it should be administered (Table 3) (71). Hepatitis B virus vaccine is recommended for all pregnant adults who were not previously vaccinated (30).

The new single-antigen hepatitis B virus vaccines, HEPLISAV-B (HepB-CpG) and PreHevbrio (Hepatitis B Vaccine [Recombinant]), do not have sufficient data to inform vaccine-associated risks in pregnancy (30). Although these are recombinant vaccines and are theoretically safe in pregnancy, until safety data are available for these two vaccines, clinicians should continue to vaccinate pregnant patients needing hepatitis B virus vaccination with a vaccine from different manufacturers. For pregnant patients who inadvertently receive HepB-CpG or Hepatitis B Vaccine (Recombinant), health care professionals should report this administration to the manufacturers' pregnancy registry.

There is a combined hepatitis A virus and hepatitis B virus vaccination that is approved for use in adults. If a pregnant individual is eligible for both hepatitis A virus and hepatitis B virus vaccination, the combination vaccine is an option (30).

Table 3. Hepatitis A Virus Vaccine Recommendations

Persons at increased risk for hepatitis A virus infection
• International travelers
• Men who have sex with men
• Persons who use injection or noninjection drugs (ie, all those who use illegal drugs)
• Persons with occupational risk for exposure
• Persons who anticipate close personal contact with an international adoptee
• Persons experiencing homelessness
Persons at increased risk for severe disease from hepatitis A virus infection
• Persons with chronic liver disease
• Persons with human immunodeficiency virus infection
Other persons recommended for vaccination
• Pregnant women at risk for hepatitis A virus infection or severe outcome from hepatitis A virus infection
• Any person who requests vaccination
Vaccination during outbreaks
• Unvaccinated persons in outbreak settings who are at risk for hepatitis A virus infection or at risk for severe disease from hepatitis A virus

Modified from Nelson NP, Weng MK, Hofmeister MG, Moore KL, Doshani M, Kamili S, et al. Prevention of hepatitis A virus infection in the United States: recommendations of the Advisory Committee on Immunization Practices, 2020 [published erratum appears in MMWR Morb Mortal Wkly Rep 2021;70:294]. MMWR Recomm Rep 2020;69:1–38. doi: 10.15585/mmwr.rr6905a1

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Appendices

Supplemental Digital Content

A. Literature search strategy: http://links.lww.com/AOG/D266
B. PRISMA diagram: http://links.lww.com/AOG/D267
C. Evidence tables: http://links.lww.com/AOG/D268

CONFLICT OF INTEREST STATEMENT

All ACOG committee members and authors have submitted a conflict of interest disclosure statement related to this published product. Any potential conflicts have been considered and managed in accordance with ACOG's Conflict of Interest Disclosure Policy. The ACOG policies can be found on acog.org. For products jointly developed with other organizations, conflict of interest disclosures by representatives of the other organizations are addressed by those organizations. The American College of Obstetricians and Gynecologists has neither solicited nor accepted any commercial involvement in the development of the content of this published product.

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