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Committee on Obstetric Practice

This Committee Opinion was developed by the American College of Obstetricians and Gynecologists' Committee on Obstetric Practice in collaboration with committee member Amy M. Valent, DO, and the American Academy of Family Physicians' liaison member Beth Choby, MD.

Tobacco and Nicotine Cessation During Pregnancy

ABSTRACT: Pregnant women should be advised of the significant perinatal risks associated with tobacco use, including orofacial clefts, fetal growth restriction, placenta previa, abruptio placentae, preterm prelabor rupture of membranes, low birth weight, increased perinatal mortality, ectopic pregnancy, and decreased maternal thyroid function. Children born to women who smoke during pregnancy are at an increased risk of respiratory infections, asthma, infantile colic, bone fractures, and childhood obesity. Pregnancy influences many women to stop smoking, and approximately 54% of women who smoke before pregnancy quit smoking directly before or during pregnancy. Smoking cessation at any point in gestation benefits the pregnant woman and her fetus. The greatest benefit is observed with cessation before 15 weeks of gestation. Although cigarettes are the most commonly used tobacco product in pregnancy, alternative forms of tobacco use, such as e-cigarettes or vaping products, hookahs, and cigars, are increasingly common. Clinicians should advise cessation of tobacco products used in any form and provide motivational feedback. Although counseling and pregnancy-specific materials are effective cessation aids for many pregnant women, some women continue to use tobacco products. Clinicians should individualize care by offering psychosocial, behavioral, and pharmacotherapy interventions. Available cessation-aid services and resources, including digital resources, should be discussed and documented regularly at prenatal and postpartum follow-up visits.

Recommendations and Conclusions

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

- Obstetrician–gynecologists and other obstetric care professionals should inquire about all types of tobacco or nicotine use, including cigarette smoking, use of e-cigarettes or vaping products, hookahs, snus, lozenges, patches, and gum, during the prepregnancy, pregnancy, and postpartum periods. Health care professionals should be aware that patients may not intuitively equate alternative forms of nicotine use (ie, e-cigarettes and vaping products) with tobacco use. Further, health care professionals should advise cessation of tobacco products used in any form and provide motivational feedback.
- Pregnant women should be advised of the significant perinatal risks associated with tobacco use, including orofacial clefts, fetal growth restriction, placenta previa, abruptio placentae, preterm prelabor rupture of membranes, low birth weight, increased perinatal mortality, ectopic pregnancy, and decreased maternal thyroid function.
- Screening and intervention for alcohol and other drug use are recommended for all pregnant women. Because smoking continuation during pregnancy is associated with the likelihood of other substance use, screening for alcohol and other substance use is an important component of care.
- Clinicians should individualize care by offering psychosocial, behavioral, and pharmacotherapy interventions. Available cessation-aid services and resources, including digital resources, should be discussed and documented regularly at prenatal and postpartum follow-up visits.
- Providing continual support and addressing psychosocial stressors in the postpartum period are necessary to ensure continued cessation success.

Epidemiology

Increased community education measures and public health campaigns in the United States have led to a decrease in smoking among pregnant women and women in the postpartum period (1). Pregnancy influences many women to stop smoking, and approximately 54% of women who smoke before pregnancy quit smoking directly before or during pregnancy (1). Although reported rates of tobacco smoking during pregnancy in the United States decreased from 13.2% in 2006 to 7.2% overall in 2016, actual smoking prevalence varies widely by geographic locale, age, education, and race (1–3). Women in certain demographic cohorts are more likely to smoke during pregnancy, including women aged 20–24 years (10.7%), women with a high school education or less (12.2% and 11.7%, respectively), and non-Hispanic American Indian or Alaska Native women (16.7%) (3, 4).

Pregnant women should be advised of the significant perinatal risks associated with tobacco use, including orofacial clefts, fetal growth restriction, placenta previa, abruptio placentae, preterm prelabor rupture of membranes (5, 6), low birth weight, increased perinatal mortality (7), ectopic pregnancy (7), and decreased maternal thyroid function (7, 8). An estimated 5–8% of preterm deliveries, 13–19% of term infants with low birth weight, 22–34% cases of sudden infant death syndrome, and 5–7% of preterm-related infant deaths have been attributed to prenatal maternal smoking (9, 10). In addition, secondhand prenatal exposure to tobacco smoke is associated with as much as a 20% increase in risk of a low birth weight infant (11).

The risks of smoking during pregnancy extend beyond pregnancy-specific complications. Children born to women who smoke during pregnancy are at an increased risk of respiratory infections, asthma, infantile colic, bone fractures, and childhood obesity (12–16). Researchers also have reported that infants born to women who use smokeless tobacco during pregnancy have increased levels of nicotine exposure and rates of low birth weight, shortened gestational age, stillbirth, and neonatal apnea that are as high as those in infants born to women who smoked during pregnancy (5, 17–19).

Alternative Forms of Nicotine Delivery

Although cigarettes are the most commonly used tobacco product in pregnancy, alternative forms of tobacco use, such as e-cigarettes or vaping products, hookahs, and cigars, are increasingly common (4) (Table 1). Data regarding the health effects of these agents in humans are limited in the general population and in pregnant women specifically. Whereas there is an incorrect perception that vaping represents a safer alternative to cigarette smoking because users are not inhaling tobacco combustion products, these products often contain nicotine or nicotine salts. Even if nicotine is not present in the e-liquid, exposure to flavorants and combustion products from the heating mechanism occurs.

Nicotine crosses the placenta and intake in any form has considerable health risks with known adverse effects on fetal brain and lung tissue (20–22). Hookah (water pipe) tobacco smoking is more commonly used by adolescents and young adults because many perceive it to be a safer alternative to conventional cigarettes (23–25). However, users are exposed to nicotine and charcoal briquette combustion products, including carbon monoxide, particulates, oxidants, heavy metals, phenols, and flavorants, through inhaling tobacco smoke from heated coal (24). Short-term effects may include increased heart rate, increased blood pressure, and impaired pulmonary function, whereas long-term use may increase risk of nicotine dependence, chronic bronchitis, emphysema, and coronary artery disease (23, 25). Although studies of hookah use during pregnancy are lacking, animal data suggest an increased risk for low birth weight, neonatal death, and growth restriction (26).

Noncombustible products, such as snus, dissolvable tobacco, and electronic nicotine delivery systems (ENDS) (ie, e-cigarettes or vaping products, e-hookahs, mods, and pods), have nicotine-related risks and an increased risk for oral cancer similar to that of chewing tobacco (27–31). Studies demonstrate an increased risk of altered fetal autonomic cardiac regulation and nicotine withdrawal in neonates born to women who used snus during pregnancy, effects that are similar to those found in women who smoke tobacco (32, 33). Although more research is needed to quantify the perinatal effects with use of these products in pregnancy, the risks of noncombustible product use should be discussed.

Electronic nicotine delivery systems are noncombustible products, which include e-cigarettes and vaping products, vaporizers, hookah pens, vape pens, mod or pod systems, and e-pipes. Health effects from heating liquid flavorants are unknown and likely vary depending on the combination of flavorants and solvents in the products inhaled (34, 35). Carbonyl compounds (formaldehyde, acetaldehyde, acetone, and acrolein); volatile organic compounds (benzene and toluene); nitrosamines; particulate matter; and heavy metals such as copper, lead, zinc, and tin have been isolated from the aerosol (36). Although much of the data on nicotine-delivery in pregnancy are derived primarily from animal studies, e-cigarettes appear to have similar effects on lung development and offspring lung health when compared with cigarette smoking (22). Recently, the Centers for Disease Control and Prevention (CDC) issued an advisory notice investigating a multistate outbreak of noninfectious severe pulmonary disease associated with e-cigarette and vaping product use (37). With the recent CDC advisory and the effects of e-cigarette and vaping product use on offspring health, immediate discontinuation of e-cigarette and vaping products should be advised among all pregnant and postpartum women.

Electronic nicotine delivery systems are used by smokers who commonly believe that they are a safer and

Table 1. Nicotine Delivery Products and Amount of Nicotine

Method	Description of Nicotine Intake	Amount of Nicotine* [†]
Cigarette	Cut tobacco rolled in paper that is smoked	16 mg/g of tobacco [‡] ; much of the nicotine is burned off as the cigarette burns (average intake 1 mg/cigarette)
Hookah (water pipe)	Tobacco smoke is generated from a piece of lit coal located on top of a head piece and filters through a water bowl and hose before being inhaled through a mouthpiece.	Variable; 1 hour session equal to 10 cigarettes
Snus	Moist ground or pulverized tobacco leaves packaged in small tea bags are placed against the buccal mucosa.	Variable; 4 mg/g to 43 mg/g of tobacco
Dissolvable tobacco	Finely milled tobacco is pressed into lozenges, tablets, candy, sticks, or strips that are placed on the tongue.	Variable; 0.6 to 3.1 mg of nicotine each piece
ENDS (e-cigarettes and vaping products, vaporizers, hookah pens, vape pens, mod or pod systems, and e-pipes)	Devices heat an “e-liquid” that contains flavorings, additives, nicotine, and varying levels of contaminants (vegetable glycerin, diethylene glycol, carcinogens, and antifreeze) to create an aerosol that is inhaled.	Variable; 0 mg/mL to 36 mg/mL of liquid
Nicotine gum	Chewing gum provides a steady supply of nicotine that is absorbed from the mucous membranes in the mouth.	2 mg, 4 mg (max 24 pieces/day or 15 pieces/day if using other nicotine replacement or tobacco products)
Nicotine lozenge	Nicotine containing tablet that slowly dissolves in the mouth	2 mg, 4 mg (max 20 lozenges/day)
Nicotine inhaler	A nicotine inhaler looks like a cigarette and consists of a mouthpiece and a nicotine-containing cartridge. Nicotine vapor is inhaled and absorbed into the mouth and throat area.	10 mg cartridge (max 16 cartridges/day)
Nicotine nasal spray	An aqueous solution of nicotine that is administered as a metered spray to the nasal mucosa.	0.5 mg/spray or 10 mg/mL of nicotine in the bottle (max 5 doses/hour or 40 mg/day=80 sprays/day)
Nicotine patch	An adhesive that provides a steady supply of nicotine absorbed from the skin and will continue to be absorbed several hours after the patch is removed.	21 mg, 14 mg, or 7 mg patch (max 1 patch/day)

Abbreviation: ENDS, electronic nicotine delivery systems.

*Data from Caruthers DD, Albrecht SA. Smoking cessation. In: Brucker MC, King TL, editors. *Pharmacology for women’s health*. 2nd ed. Burlington, MA: Jones & Bartlett Learning; 2017. p. 171–90.

[†]Data from Baraona LK, Lovelace D, Daniels JL, McDaniel L. Tobacco harms, nicotine pharmacology, and pharmacologic tobacco cessation interventions for women. *J Midwifery Womens Health* 2017;62:253–69.

[‡]Data from Donny EC, Denlinger RL, Tidey JW, Koopmeiners JS, Benowitz NL, Vandrey RG, et al. Randomized trial of reduced-nicotine standards for cigarettes. *N Engl J Med* 2015;373:1340–9.

healthier alternative to cigarettes that will aid their smoking cessation efforts (38, 39). A survey of pregnant women who smoked found that 14% reported using e-cigarettes to help with smoking cessation (40). However, nearly two thirds of adults who use e-cigarettes continue smoking cigarettes (known as “dual use”) (41). Standardization of e-liquid and heating mechanisms is needed to better describe and understand the health effects of these products on pregnant women, fetuses, and offspring and to understand their role, if any, in smoking cessation.

Intervention

Obstetrician–gynecologists and other obstetric care professionals should inquire about all types of tobacco or nicotine use, including cigarette smoking, use of e-cigarettes or vaping products, hookahs, snus, lozenges, patches, and gum, during the prepregnancy, pregnancy, and postpartum periods. Clinicians should be aware that patients may not intuitively equate alternative forms of nicotine use (ie, e-cigarettes and vaping products) with tobacco use. Further, health care professionals should

advise cessation of tobacco products used in any form and provide motivational feedback. Tobacco cessation, avoidance of secondhand smoke exposure, and relapse prevention are key clinical intervention strategies. Inquiry into tobacco use and smoke exposure should be a routine part of the prenatal visit. The U.S. Preventive Services Task Force recommends that clinicians ask all pregnant women about tobacco use, advise tobacco cessation at all gestational ages, and provide behavioral interventions for those who smoke (42). The U.S. Public Health Service recommends that clinicians offer effective tobacco cessation interventions to pregnant women who smoke at the initial prenatal visit and throughout the course of pregnancy (43).

Addiction to and dependence on cigarettes is physiologic and psychologic, and cessation techniques should include psychosocial interventions and pharmacologic therapy. Two counseling techniques with positive effects on smoking and nicotine cessation in pregnant women include motivational interviewing and cognitive behavioral therapy. Specific aspects of cognitive behavioral therapy shown to benefit pregnant women include developing a sense of self-monitoring and control, learning to manage cravings, managing situations of stress and anxiety, promoting self-efficacy, and goal setting and action planning (44). Counseling, financial incentives, and feedback-based interventions such as cognitive behavioral therapy are associated with a reduction in smoking during pregnancy and decreased risk for infants with low birth weight. Intervention context and strategies should be individualized (45, 46). Women who indicate that they are not ready to quit smoking can benefit from consistent motivational approaches provided by their health care professionals as outlined in the American College of Obstetricians and Gynecologists' Committee Opinion No. 423, Motivational Interviewing (47).

Identifying patients and individualizing interventions based on a woman's interest in tobacco cessation begins with a brief counseling session. The 5A's intervention (Box 1) is effective when initiated by health care professionals (43). With appropriate training, obstetrician-gynecologists, family physicians, other clinicians, or auxiliary health care professionals can perform these five steps with pregnant women who smoke (43). Referral to a tobacco quit line may further benefit the patient. Quit lines offer information, direct support, and ongoing counseling that help women quit smoking and remain smoke free (48). Most states offer pregnancy-specific services, focusing on the pregnant woman's motivation to quit and providing postpartum follow-up to prevent relapse to smoking. When dialing the national quit line network (1-800-QUIT NOW) a caller is immediately routed to her state's tobacco quit line. Many states offer facsimile referral access to their quit lines for prenatal health care professionals. Health care professionals can call the national quit line to learn about

the services offered within their states. Examples of effective smoking cessation interventions delivered by a health care professional are listed in Box 2. Although counseling and pregnancy-specific materials are effective cessation aids for many pregnant women, some women continue to use tobacco products (42). These women often are heavily addicted to nicotine and have greater psychosocial challenges. Clinicians should individualize care by offering psychosocial, behavioral, and pharmacotherapy interventions. Available cessation-aid services and resources, including digital resources (49), should be discussed and documented regularly at prenatal and postpartum follow-up visits (50). There currently is insufficient evidence to determine the effect of mindfulness (51), hypnosis (52), or acupuncture (53) for smoking cessation (43).

Screening and intervention for alcohol and other drug use are recommended for all pregnant women. Because smoking continuation during pregnancy is associated with the likelihood of other substance use, screening for alcohol and other substance use is an important component of care (54).

Women's efforts to reduce the amount they smoke should be reinforced and congratulated. The benefits of reduced smoking are difficult to quantify or verify during pregnancy. Women should be reminded that quitting outright best affects the long-term health of herself, her offspring, and her family (55). The greatest benefit is observed with cessation before 15 weeks of gestation (42, 56). Although smoking of any duration during pregnancy is associated with an increased risk of fetal growth restriction, the risk is reduced the earlier in gestation that cessation occurs (57). Still, smoking cessation at any point in gestation benefits the pregnant woman and her fetus. Pregnant women exposed to family members or coworkers who smoke should be given advice on how to address these situations and avoid exposure.

Approximately 50–60% of women who quit smoking during pregnancy return to smoking within 1 year postpartum, resuming the risk to their health, their infant's health, and future pregnancies (58). Therefore, providing continual support and addressing psychosocial stressors in the postpartum period are necessary to ensure continued cessation success. During the third trimester, determining a woman's intention to return to smoking is useful to target the potential need for smoking relapse interventions (59). Factors associated with the highest risk for postpartum smoking recidivism include living with a partner or family member who smokes, not breastfeeding, intending to quit only during pregnancy, and exhibiting low confidence in remaining tobacco-free postpartum (60). Encouraging close follow-up, promotion of postpartum health and overall well-being, review of tobacco use prevention strategies, recognition of psychosocial challenges, and identification of social support systems in the third trimester and postpartum are helpful in decreasing recidivism (59, 61).

Box 1. Five A's of Tobacco and Nicotine Cessation

1. ASK the patient about all types of tobacco or nicotine use* at the first prenatal visit and follow up with her at subsequent visits. The patient should choose the statement that best describes her tobacco or nicotine use status:
 - A. I have never used tobacco or nicotine or have minimal amounts of tobacco or nicotine in my lifetime (for example, less than 100 cigarettes in my lifetime).
 - B. I stopped using tobacco or nicotine before I found out I was pregnant, and I am not using tobacco or nicotine now.
 - C. I stopped using tobacco or nicotine after I found out I was pregnant, and I am not using tobacco or nicotine now.
 - D. I use some tobacco or nicotine now, but I have cut down on the amount of tobacco or nicotine I use since I found out I was pregnant.
 - E. I use tobacco or nicotine regularly now, about the same as before I found out I was pregnant.

If the patient stopped using tobacco or nicotine before or after she found out she was pregnant (B or C), reinforce her decision to quit, congratulate her on success in quitting, and encourage her to stay tobacco and nicotine free throughout pregnancy and postpartum. If the patient is still using tobacco or nicotine (D or E), document tobacco and nicotine status in her medical record, and proceed to Advise, Assess, Assist, and Arrange.

2. ADVISE the patient who uses tobacco or nicotine to stop by providing advice about quitting with information about the risks of continued tobacco and nicotine use to the woman, fetus, and newborn.
3. ASSESS the patient's willingness to attempt to quit using tobacco or nicotine at the time. Quitting advice, assessment, and motivational assistance should be offered at subsequent prenatal care visits.
4. ASSIST the patient who is interested in quitting by providing pregnancy-specific, self-help tobacco and nicotine cessation materials. Support the importance of having tobacco and nicotine-free space at home and seeking out a quitting buddy such as a former tobacco or nicotine user. Encourage the patient to talk about the process of quitting. Offer a direct referral to the national tobacco quit line (1-800-QUIT NOW) to provide ongoing counseling and support.
5. ARRANGE follow-up visits to track the progress of the patient's attempt to quit using tobacco and nicotine. For current and former tobacco and nicotine users, use status should be monitored and recorded throughout pregnancy, providing opportunities to congratulate and support success, reinforce steps taken towards quitting, and encourage those still considering a cessation attempt.

*Includes smoking, and use of e-cigarettes and vaping products, hookahs, snus, lozenges, patches, and gum.

Adapted from Fiore MC, Jaén CR, Baker TB, Bailey WC, Benowitz NL, Curry SJ, et al. Treating tobacco use and dependence: 2008 update. Clinical Practice Guideline. Rockville, MD: U.S. Department of Health and Human Services, Public Health Service; 2008. Available at: <https://www.ahrq.gov/prevention/guidelines/tobacco/index.html>. Retrieved November 7, 2019; and data from (for supplemental information in number 1) Ershoff DH, Mullen PD, Quinn VP. A randomized trial of a serialized self-help smoking cessation program for pregnant women in an HMO. *Am J Public Health* 1989;79:182-7.

Box 2. Examples of Effective Tobacco and Nicotine Cessation Interventions for Pregnant Patients

- Physician advice regarding tobacco or nicotine-related risks (2–3 minutes)
- Videotape with information on risks, barriers to cessation, and tips for quitting; counseling in one 10-minute session; self-help manual; and follow-up letters
- Pregnancy-specific self-help manual and one 10-minute counseling session with a health educator
- Counseling in one 90-minute session plus twice monthly telephone follow-up calls during pregnancy and monthly telephone calls after delivery

Pharmacotherapy

The U.S. Preventive Services Task Force has concluded that current evidence is insufficient to assess the balance of benefits and harms of nicotine replacement products or other pharmaceuticals for tobacco cessation during pregnancy (42). Recent reviews have suggested nicotine replacement therapy is associated with increased rates of smoking cessation during pregnancy (62). However, efficacy of nicotine replacement therapy in supporting cessation during pregnancy has been inconsistent and likely explained by low adherence rates and the increased metabolism of nicotine in pregnancy (44). Trials studying the use of nicotine replacement therapy in pregnancy have been attempted, but many of those conducted in the United States have been stopped by data and safety monitoring committees because of either adverse pregnancy effects or failure to demonstrate effectiveness (42, 63, 64).

Use of nicotine replacement therapy should be considered only after a detailed discussion with the patient of the known risks of continued smoking, the possible risks of nicotine replacement therapy, and need for close supervision. If nicotine replacement therapy is used, it should be with the clear resolve of the patient to quit smoking.

Pharmacotherapeutic smoking cessation agents used in the nonpregnant population include varenicline and bupropion. Varenicline is a partial agonist for nicotinic receptors in the brain. Several small studies that evaluated its safety in pregnancy have not shown teratogenicity (65, 66) but, overall, data are limited. Bupropion is an antidepressant with limited data on its use in pregnancy, but there is no known risk of fetal anomalies or adverse pregnancy effects with its use (67, 68).

The U.S. Food and Drug Administration (FDA) mandated a product warning about the risk of psychiatric symptoms and suicide associated with varenicline and bupropion in 2015; however, a December 2016 update removed the boxed warning (69–71). Individuals attempting smoking cessation with or without the use of pharmacotherapeutic agents may experience new or worsening adverse effects on mood, behavior, or thinking, particularly among women with a preexisting mental health disorder. Although the quality of research regarding the safety profiles for varenicline and bupropion use is not robust, a recent systematic review of 18 studies of bupropion and varenicline use in pregnancy did not demonstrate an increased risk of congenital anomalies, low birth weight, or preterm birth (67). Obstetrician-gynecologists and other obstetric care professionals should counsel women about the risks of smoking and the benefits of cessation and discuss the resources available to help with smoking cessation, which may include the use of varenicline and bupropion. If these medications are prescribed, familiarity with the risks, benefits, and updated FDA Drug Safety Communications is prudent. Although cumulative data are limited, maternal bupropion doses of up to 300 mg are associated with low levels of detection in breastmilk that are unlikely to cause adverse effects in infants (72). Because no published information is available regarding the use of varenicline during lactation, an alternative drug is preferable, especially with newborn or preterm infants (73).

Coding

Office visits that specifically address smoking cessation should be coded as such, but benefits are subject to specific plan policies. The Patient Protection and Affordable Care Act expanded tobacco cessation coverage for the Medicaid pregnant population for at least all FDA-approved tobacco cessation medications as well as individual, group, and phone counseling with no cost sharing for the patient. Most private health plans are required to cover screening for tobacco use and to provide evidence-based tobacco cessation counseling

and interventions to all adults and pregnant women in accordance with the recommendations by the United States Preventive Services Task Force and the U.S. departments of Health and Human Services, Labor, and Treasury. Depending on the tobacco services provided, the counseling may merit a separate code or time-based evaluation and management service code. Health care professionals are encouraged to consult coding manuals regarding billing and reimbursement variation from insurance carriers.

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