

# 371 Nicotine and Tobacco Use

## Definition/Cut-off Value

Any use of products that contain nicotine and/or tobacco to include but not limited to cigarettes, pipes, cigars, electronic nicotine delivery systems (e-cigarettes, vaping devices), hookahs, smokeless tobacco (chewing tobacco, snuff, dissolvables), or nicotine replacement therapies (gums, patches).

## Participant Category and Priority Level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Postpartum Women	III, IV, V, VI, VII

## Justification

Tobacco products, made with the dried leaves of the tobacco plant, contain a variety of harmful chemicals. The use of tobacco can lead to serious illnesses, including cancers, lung disease, and heart disease. Nicotine, one of the chemicals in tobacco, is highly addictive and associated with additional health risks (1). During pregnancy, the use of nicotine and/or tobacco products is harmful to both the mother and fetus, with potential consequences including low birth weight or even miscarriage (2). Nicotine can be found in breastmilk, therefore, the use of nicotine products may directly impact breastfed infants (3). Women, infants, and children living in a smoking environment also face adverse health outcomes that are outlined in risk #904 Environmental Tobacco Smoke Exposure.

## Tobacco Smoking

Tobacco smoke is a toxic mix of more than 7,000 chemicals that cause immediate damage to the body. According to the Centers for Disease Control and Prevention (CDC), smoking remains the single largest preventable cause of death and disease in the United States. Cigarette smoking kills more than 480,000 Americans each year. (2)

According to 2018 CDC data, 14.1% of adult women in the US use tobacco products (4). In 2016, one in fourteen women who gave birth smoked cigarettes during pregnancy. The women most likely to smoke during pregnancy were aged 20-24, identified as non-Hispanic American Indian or Alaska Native, and whose highest level of educational attainment was high school or less (5). Additionally, CDC data from 2014 indicated that women who received WIC benefits were more likely to smoke before and during pregnancy than women who did not receive WIC benefits (6). There are no CDC data that report on the incidence of smoking among breastfeeding women.

## Electronic Nicotine Delivery Systems (ENDS)

Vapes, vaporizers, vape pens, hookah pens, electronic cigarettes (e-cigarettes or e-cigs), and e-pipes are some of the many terms used to describe electronic nicotine delivery systems (ENDS) (7). ENDS are noncombustible tobacco products used to smoke or “vape” a solution that often contains nicotine. The solution, or “e-liquid”, is heated to create an aerosol that the user inhales (7). An individual’s level of

exposure to nicotine depends on the amount of nicotine in the ENDS product, as well as on product characteristics, device operation, and the user's inhalation pattern. Exhaled ENDS vapor has been shown to contain chemicals that can cause cancer, can harm the fetus, and are a source of indoor air pollution (8, 9, 10).

Data from the CDC's 2015 Pregnancy Risk Assessment Monitoring System (PRAMS) for Oklahoma and Texas indicated that maternal use of ENDS was 10% before pregnancy and 7% around the time of conception. Among the women who reported using ENDS during the last 3 months of their pregnancy, over one-third said that the ENDS used contained nicotine while about a quarter said they were unsure of the nicotine content. Reported reasons for ENDS use around the time of pregnancy included curiosity, the perception that ENDS might help with quitting or reducing smoking, and the perception of reduced harm to the mother when compared to cigarette smoking. (11)

The CDC has stated that ENDS use is not safe for pregnant women (12). The continual innovation of novel ENDS makes health risk assessments difficult, and additional research is needed to fully understand ENDS' safety, health effects, and cessation efficacy (13). Women who are pregnant or trying to become pregnant should consult with their health care provider on the risks that ENDS pose for both maternal and neonatal health (14, 15).

### Smokeless Tobacco

According to the CDC, 0.5% of females 18 years and over used smokeless tobacco in 2016 (16). Smokeless tobacco products are either chewed or placed in between the cheek and gum or teeth. The tobacco can come as loose dried leaves or finely ground. While these products are meant to be alternatives to cigarettes, no form of smokeless tobacco is a safe substitute.

The following table summarizes the conditions associated with increased risk from nicotine and/or tobacco use for the mother and infant:

Substance	Effects on Mother	Effects on Birth Outcomes	Effects on Infant
Smoking Tobacco	<p><u>Respiratory Conditions (2):</u></p> <ul style="list-style-type: none"> <li>Chronic obstructive pulmonary disease (COPD)</li> <li>Emphysema</li> <li>Chronic bronchitis</li> <li>Asthma</li> </ul> <p><u>Heart Conditions (2):</u></p> <ul style="list-style-type: none"> <li>Cardiovascular disease</li> <li>Increased heart rate and blood pressure</li> <li>Blood clots</li> </ul> <p><u>Cancers (2):</u></p>	<ul style="list-style-type: none"> <li>Ectopic pregnancy (2, 17)</li> <li>Miscarriage (2, 17)</li> <li>Placental abruption (2,17)</li> <li>Early delivery* (2)</li> <li>Low birth weight† (2)</li> <li>Preeclampsia‡ (18)</li> </ul>	<ul style="list-style-type: none"> <li>Sudden Unexpected Infant Death (SUID) (2, 19)</li> <li>Brain and lung damage (2)</li> <li>Cleft lip and/or cleft palate (2)</li> <li>Asthma (20)</li> <li>Respiratory illnesses (19)</li> <li>Potential for nicotine use later in life (21)</li> </ul>

Substance	Effects on Mother	Effects on Birth Outcomes	Effects on Infant
Smoking Tobacco (continued)	<ul style="list-style-type: none"> <li>• Bladder</li> <li>• Blood</li> <li>• Cervix</li> <li><u>Cancers (2) (continued):</u></li> <li>• Colon and rectum</li> <li>• Esophagus</li> <li>• Kidney and ureter</li> <li>• Larynx and throat</li> <li>• Liver</li> <li>• Lung</li> <li>• Pancreas</li> <li>• Stomach</li> <li><u>Other Conditions (2):</u></li> <li>• Stroke</li> <li>• Poor oral health</li> <li>• Diabetes</li> <li>• Weaker bones</li> <li>• Inflammation and decreased immune function</li> </ul>		
Electronic Nicotine Delivery Systems (ENDS)	<p><u>Limited data, but potential association with (13):</u></p> <ul style="list-style-type: none"> <li>• Cardiovascular disease</li> </ul>	<p><u>Nicotine exposure effects (13):</u></p> <ul style="list-style-type: none"> <li>• Preterm birth*</li> <li>• Stillbirth</li> </ul>	<p><u>Nicotine exposure effects (13):</u></p> <ul style="list-style-type: none"> <li>• Sudden Unexpected Infant Death (SUID)</li> <li>• Impaired brain development</li> <li>• Deficits in auditory processing</li> <li>• Attention and cognition problems</li> <li>• Potential for nicotine use later in life (21)</li> </ul>
Smokeless Tobacco	<ul style="list-style-type: none"> <li>• Cancer of the mouth, esophagus, and pancreas (22)</li> </ul>	<ul style="list-style-type: none"> <li>• Stillbirth (2, 21, 22)</li> <li>• Early delivery* (2, 22)</li> </ul>	<ul style="list-style-type: none"> <li>• Impaired brain development (22)</li> <li>• Apnea, which is associated with</li> </ul>

Substance	Effects on Mother	Effects on Birth Outcomes	Effects on Infant
Smokeless Tobacco (continued)	<ul style="list-style-type: none"> <li>Gum disease, tooth decay, and tooth loss (22)</li> <li>Death from heart disease and stroke (22)</li> </ul>	<ul style="list-style-type: none"> <li>Low birth weight† (2, 21)</li> </ul>	increased risk of Sudden Unexpected Infant Death (2)

\*See risk #142 *Preterm or Early Term Delivery* for more information about early delivery.

†See risk #141 *Low Birth Weight and Very Low Birth Weight* for more information about low birth weight.

‡See risk #345 *Hypertension and Prehypertension* for more information about preeclampsia.

### Nutrition

The research on tobacco use and its impact on nutritional status has focused on cigarette smoking. Cigarette smoking causes a generalized upward shift in hemoglobin concentration and hematocrit, which lowers the effectiveness of anemia screening tools. Therefore, pregnant women who smoke may require additional iron supplementation even if their hemoglobin/hematocrit results show they are not anemic. (See risk #201 *Low Hematocrit/Low Hemoglobin* for more information about cut-offs for determining iron deficiency for women who smoke.) Smoking also increases oxidative stress and affects metabolism. Vitamin C is the only micronutrient with a Dietary Reference Intake (DRI) specific to individuals who smoke, with the recommendation of consuming an additional 35 mg per day compared to those who do not (23). Research indicates that those who smoke have lower concentrations of certain nutrients (i.e., B-carotene, vitamin B-12, vitamin B-6 and folic acid), but due to the observational nature of the research, the exact cause remains unclear (24). Additional research is needed to determine smoking's effect on micronutrients and if additional DRI recommendations for other micronutrients are needed for those who smoke.

### Smoking Cessation

Pregnancy offers an opportunity to quit smoking because pregnant women are highly motivated to take actions to protect the health of their babies. Around 50% of women who smoked during the three months before they conceived quit during pregnancy. However, of those who did quit during pregnancy, about 50% of them returned to smoking after the baby was born. (25)

Research has shown that both dosage (number of cigarettes smoked in a day) and timing of maternal smoking (during particular trimesters) are associated with neonatal birth weight. Women who stopped smoking before their third trimester gave birth to infants with similar weights to those infants who were never exposed to smoking. Therefore, efforts for smoking cessation should not only be made in the early stages of pregnancy, but should continue throughout pregnancy with an emphasis on the health benefits for the infant if smoking stops before the third trimester. (26)

Nicotine replacement therapy (NRT) is used as an aid for smoking cessation. NRT delivers small doses of nicotine, most commonly using nicotine gum or transdermal nicotine patches. Little research has been conducted to prove the effectiveness and safety for pregnant or postpartum women who engage in NRT (27).

The optimal cessation intervention for a pregnant tobacco user is behavioral, as the safety and efficacy of neonatal nicotine exposure while using NRT has not been established. If a behavioral smoking cessation

intervention alone is unsuccessful, the American College of Obstetricians and Gynecologists recommends that NRT only be considered in conjunction with a behavioral intervention and with close monitoring by a health care provider (27).

ENDS are often marketed as smoking cessation devices. However, due to the differences between products (e.g. tank sizes, nicotine amounts, etc.), it is difficult for health organizations and researchers to determine how effective all ENDS are for helping people to quit smoking (25). The FDA does not approve of using ENDS to help people quit smoking (28).

### Breastfeeding

In 2001, the American Academy of Pediatrics removed nicotine from its list of contraindicated substances during breastfeeding, indicating that the benefits of breastfeeding while smoking outweigh the alternative of smoking and formula feeding (29). Therefore, maternal use of nicotine and tobacco should not prohibit a mother from breastfeeding her child (30-31). Breastfeeding while smoking may help reduce some of the harmful effects of prenatal smoking on infants, including acute respiratory illness and asthma (32, 33). However, women who smoke cigarettes are less likely to initiate breastfeeding than those who do not, possibly revealing that there is a psychosocial factor responsible for lower rates of breastfeeding among women who smoke cigarettes (31, 34). This is an opportunity for WIC staff to inform participants of the health benefits and to encourage them to breastfeed despite their use of tobacco.

Nicotine has been found to have multiple effects on breastmilk. Nicotine can transfer to an infant through breastmilk (3). Nicotine lowers prolactin levels (35, 36), which has been associated with reduced breastmilk supply (37, 38) and reduced milk fat content (3). Additional changes in milk composition and flavor due to maternal smoking may contribute to an infant's early weaning from breastmilk (39).

Smoking in the presence of an infant or child can expose them to secondhand smoke, which has negative health outcomes (30). (See risk #904 *Environmental Tobacco Smoke Exposure* for more information.) If a woman chooses to continue her nicotine and tobacco use while breastfeeding, she should not do it in the presence of the infant (30, 31). Additionally, it is recommended that a breastfeeding woman who uses nicotine should first breastfeed her infant and then use the product (8, 30, 40). This timing will help minimize the amount of nicotine in her breastmilk the next time she breastfeeds (8, 30, 40).

### Implications for WIC Nutrition Services

WIC staff can provide the following nutrition services to women who use nicotine and/or tobacco:

- Administer State or local agency substance use screening methods. For more information, please see: *WIC Substance Use Prevention* resource, Chapter 5: <https://wicworks.fns.usda.gov/resources/wic-substance-use-prevention-guide>
- Provide a safe and supportive environment when discussing nicotine and/or tobacco use. For more information on techniques for delivering effective messages, please see: *WIC Substance Use Prevention* resource, Chapter 6: <https://wicworks.fns.usda.gov/resources/wic-substance-use-prevention-guide>
- Consider all potential nicotine and/or tobacco delivery methods participants may be using.
- Explain the importance of eliminating or reducing the amount of tobacco and/or nicotine use, especially before the third trimester if pregnant.
- Explain that ENDS have variable amounts of nicotine and are not safer alternatives to cigarettes.

- Encourage fruit and vegetables that are high in vitamin C intake to achieve adequate antioxidant and vitamin C consumption.
- Highlight WIC foods, especially 100% juice that are good sources of vitamin C and other important nutrients.
- Encourage high iron fruits and vegetables. If the participant is taking an iron supplement, provide recommendations for minimizing gastro-intestinal side effects and foods that can improve iron bioavailability. For more information, please see: <https://ods.od.nih.gov/factsheets/Iron-HealthProfessional/>.
- Offer the following suggestions to minimize secondhand smoke exposure to the infant (30, 35):
  - Avoid smoking in infant's presence.
  - Smoke outside.
  - Ask other smokers to avoid smoking around the infant or other children.
  - Have smoke-free rules for the car and home.
  - Change clothes and wash hands after smoking and prior to handling the infant.
- Refer to a state quit line (1-800-QUIT-NOW), text-based program (text QUIT to 47848) or a local in-person smoking cessation program.
- Refer to their health care provider to discuss the health implications of using NRT while pregnant or breastfeeding.

WIC staff can provide the following nutrition services to breastfeeding women who use nicotine and/or tobacco:

- Provide breastfeeding promotion and support and inform participants of the health benefits of human milk for infants of mothers who smoke.
- Utilize the participant-focused WIC Breastfeeding Support website topic articles that can be found at: <https://wicbreastfeeding.fns.usda.gov/breastfeeding-and-alcohol-drugs-and-smoking>.
- Recommend mothers to refrain from smoking/vaping until right after a feeding so that nicotine level will have time to decrease before the next feeding.
- Counsel women who use NRT to time its use for after breastfeeding and to not use at night.
- Provide anticipatory guidance about the possible effect of nicotine on breast milk supply.

**Additional Resources available to WIC Staff:**

- See risk #904 *Environmental Tobacco Smoke Exposure* for more information.
- WIC participant handbook: <https://wicworks.fns.usda.gov/resources/give-your-baby-healthy-start-tips-pregnant-women-and-new-mothers>
- WIC Infant Nutrition and Feeding Guide: <https://wicworks.fns.usda.gov/resources/infant-nutrition-and-feeding-guide>
- FDA Tobacco Products Labeling: <https://www.fda.gov/TobaccoProducts/Labeling/ProductsIngredientsComponents/ucm456610.htm>.

- WIC Substance Use Prevention resource: <https://wicworks.fns.usda.gov/resources/wic-substance-use-prevention-guide>
- Centers for Disease Control and Prevention – Electronic Cigarettes: [https://www.cdc.gov/tobacco/basic\\_information/e-cigarettes/index.htm](https://www.cdc.gov/tobacco/basic_information/e-cigarettes/index.htm)
- American Academy of Pediatrics - Resources on E-cigarettes: <https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/Pages/Resources-on-E-cigarettes.aspx>
- Smoking & Your Baby: <https://women.smokefree.gov/pregnancy-motherhood/quitting-while-pregnant/smoking-your-baby>

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### Clarification

Self-reporting of a diagnosis by a health care provider should not be confused with self-diagnosis, where a person simply claims to have or to have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis (“My doctor says that I have/my son or daughter has...”)

should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.

