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## Screening practices and attitudes of obstetricians-gynecologists toward new and emerging tobacco products

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### Abstract

**OBJECTIVE**—We examined screening practices and attitudes of obstetricians-gynecologists toward the use of noncombustible tobacco products (chewing tobacco, snuff/snus, electronic cigarettes, and dissolvables) during pregnancy.

**STUDY DESIGN**—The authors mailed a survey in 2012 to 1024 members of the American College of Obstetricians and Gynecologists, including Collaborative Ambulatory Research Network (CARN) and non-CARN members. Stratified random selection was used to generate CARN and non-CARN samples.

**RESULTS**—Response rates were 52% and 31% for CARN and non-CARN members, respectively. Of 252 total eligible respondents (those currently providing obstetrics care) 53% reported screening pregnant women at intake for noncombustible tobacco product use all or some

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of the time, and 40% reported none of the time. Respondents who reported that noncombustible products have adverse health effects during pregnancy, but are safer than cigarettes, ranged from 20.2% (dissolvables) to 29% (electronic cigarettes) and that the health effects are the same as those of cigarettes from 13.5% (electronic cigarettes) to 53.6% (chewing tobacco). Approximately 14% reported that electronic cigarettes have no adverse health effects; <1% reported no health effects for the remaining products. Two-thirds of the respondents wanted to know more about the potential health effects of noncombustible tobacco products; only 5% believed themselves to be fully informed.

**CONCLUSION**—A large proportion of obstetrician-gynecologists reported never or inconsistently screening their pregnant patients for the use of noncombustible tobacco products. Responses regarding the harms of these products relative to cigarettes were mixed and most respondents wanted more information. Development and dissemination of guidance for providers is needed to improve decision-making regarding noncombustible tobacco products.

### Keywords

electronic cigarette; obstetrician-gynecologist; pregnancy; smokeless tobacco

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Maternal smoking is one of the most prevalent modifiable risk factors for poor birth outcomes. The American College of Obstetrics and Gynecologists recommends that smoking cessation strategies should be integrated into routine prenatal care for every pregnant woman.<sup>1</sup> Maternal smoking causes ectopic pregnancy, fetal growth restriction, preterm delivery, placenta previa, placental abruption, and sudden infant death syndrome.<sup>2,3</sup> The roles of individual tobacco components underlying these relationships, such as nicotine, are not understood fully.

For more than a decade, the public health community has debated whether access to smokeless tobacco products such as chewing tobacco and snus (moist snuff packaged in pouches that resemble small tea bags) could reduce tobacco-related morbidity and death.<sup>4</sup> Unlike cigarette smoking, smokeless tobacco does not expose the user to products of combustion. This means smokeless products are inherently less hazardous overall than cigarettes, although not without risk.<sup>5</sup> Recently, the introduction of novel, noncombustible products has added momentum to the debate because of their purported low toxicity.<sup>6,7</sup> These products include dissolvable tobacco (finely milled tobacco pressed into tablets, strips, or sticks) that slowly dissolves in the user's mouth<sup>8,9</sup> and electronic cigarettes or electronic cigarettes (electronic nicotine delivery systems that utilize a heating element that aerosolizes a liquid solution such as propylene glycol frequently combined with nicotine and flavorings).<sup>10</sup> The implications of the increasing availability of smokeless tobacco and other noncombustible tobacco products for pregnant women are unclear.

The US Food and Drug Administration (FDA) has the authority to allow companies to market products with a claim to reduce risk of tobacco-related disease (modified-risk tobacco products) if the company can demonstrate that the product, as used by consumers, will reduce significantly the risk of tobacco-related disease to individuals as well as benefit the health of the population as a whole.<sup>11</sup> To date, no applications for noncombustible tobacco products have been approved by the FDA for harm reduction claims. However,

messages that imply product safety frequently appear in the media, through direct advertising, product placement in television and movies, and the internet by personal testimonials, especially for electronic cigarettes.<sup>12-15</sup>

Research on the health effects of noncombustible tobacco product use during pregnancy is limited; however, adverse outcomes, which include preterm delivery, stillbirth, and infant apnea, have been reported for smokeless tobacco.<sup>16-21</sup> Data regarding the effects of nicotine on the developing fetus are sufficient to have resulted in the classification of nicotine as a reproductive toxicant by the California Environmental Protection Agency.<sup>22</sup> Subsequently, the 2014 Surgeon General's Report on the Health Consequences of Smoking concluded that the evidence is sufficient to infer that nicotine exposure during fetal development has lasting adverse consequences for brain development and contributes to adverse pregnancy outcomes.<sup>3</sup> Therefore, the effects of nicotine on fetal health from maternal use of noncombustible tobacco products are of great concern.

Behavioral counseling is an effective strategy for smoking cessation during pregnancy,<sup>23</sup> and the 2011 College Committee Opinion on tobacco use includes instructions in the "Ask" portion of the 5 As (Ask, Assess, Advise, Assist, and Arrange) that the provider should inquire about tobacco use in any form in the past year, which includes cigarettes, cigars, smokeless tobacco, hookah, or electronic cigarettes.<sup>1</sup> In this study, we explored screening practices and attitudes of obstetricians-gynecologists toward smokeless tobacco products (chewing tobacco, snuff/snus, dissolvable tobacco products, and electronic cigarettes). Because it has been suggested that noncombustible products may be beneficial as a way to cut down the number of cigarettes smoked,<sup>24,25</sup> we also assessed whether physicians believed that reducing the number of cigarettes smoked per day has health benefits for pregnant women who do not quit completely.

## Materials and Methods

### Study population and survey administration

Data were collected by the College Research Department of the American College of Obstetricians and Gynecologists with a self-administered survey mailed in February 2012 to 1024 American College of Obstetricians and Gynecologists Fellows, 425 of whom were members of the College Collaborative Ambulatory Research Network (CARN) and 599 were non-CARN members. CARN members are practicing College Fellows or Junior Fellows who have volunteered to participate in the College Research Department surveys and are sent four-to-five surveys per year. The non-CARN group was comprised of practicing obstetricians-gynecologists who are College Fellows but not CARN members. Stratified random selection was used for both samples. The total memberships for each group were divided into groups of approximately 100 individuals that were similar in age, sex, and geographic distribution; the samples were then randomly selected from each membership list.

The College Research Department maintains membership on an ongoing basis to inform and evaluate the College's efforts to provide guidance on clinical practice to its Fellows.<sup>26</sup> All potential participants received in the mail an introductory cover letter, the questionnaire, and

a postage-paid return envelope. Those who did not respond were sent up to 3 reminder mailings through June 2012. Eligible participants were those who returned completed questionnaires and who confirmed that they were currently providing obstetrics care.

The cover letter outlined the purpose of the study and informed participants that their responses were anonymous and confidential. Response to the survey served as informed consent. This project was deemed exempt from review by the Institutional Review Board at American College of Obstetricians and Gynecologists.

Survey questions that were relevant to the current analysis assessed screening practices and attitudes toward the use of noncombustible tobacco products during pregnancy and toward reduction of the number of cigarettes smoked by women who do not quit completely (Table 1). Other survey questions that were used in this analysis included year of completion of obstetrics/gynecology residency, type of primary employment site, estimated percentage of patients enrolled in Medicaid, sex, practice type (obstetrics only, gynecology only, or both), provision of comprehensive primary care, ethnicity, race, employment setting (urban or rural), and personal smoking history. Other questions not used in this analysis addressed smoking cessation counseling practices and barriers to the provision of counseling.

## Analysis

We calculated frequencies of responses to survey questions and included nonresponses in the denominator for each question. We quantified nonresponses to provide additional insight into clinicians' knowledge.  $\chi^2$  tests were used to assess relationships between selected clinician characteristics (sex, provision of comprehensive primary care, and years since completing residency) and whether respondents screened their pregnant patients at intake for noncombustible tobacco product use. A 2-tailed probability of  $< .05$  was considered statistically significant. Data were analyzed with SAS software (version 9.2; SAS Institute Inc, Cary, NC).

## Results

One thousand twenty-four surveys were mailed; 405 members (40%) returned completed surveys, of whom 221 respondents were CARN members (52% response rate) and 184 respondents were non-CARN members (31% response rate). Two hundred fifty-two respondents practiced obstetrics and were included in the final analysis; 157 respondents were CARN members, and 95 respondents were non-CARN members. CARN and non-CARN respondents in the final analysis did not differ by sex, race, practice location, practice type, or percentage of patients enrolled in Medicaid.

Respondents' characteristics are summarized in Table 2. Briefly, 81.7% were white; 55.6% were female; 78.2% had never smoked; 15.5% were former smokers, and 2.4% were active smokers (the remainder did not answer the question); 46% practiced in a group practice/health maintenance organization; 78.6% practiced in an urban/suburban area, and 30.6% provided comprehensive primary care. The mean number of years since completion of residency was 19.4.

### Attitudes toward smoking cessation and reduction

Nearly all respondents (94%) reported that they believed it was very important or important for their patients to stop smoking. Approximately one-third of the respondents (31%) reported that they believed it was likely or very likely that they/their practice could help pregnant patients to quit smoking; approximately one-half of them (49.6%) reported that they believed it was somewhat likely, and 12.7% of them reported that it was unlikely. These findings did not vary by the sex of the respondent, whether the respondent provided comprehensive primary care, or by years since residency was completed (>30, 20-30, or 10-19 or <10 years;  $P > .05$ ). Eighty-six percent of respondents said that they believed it was very important for their patients who did not quit smoking to at least cut down of the number of cigarettes smoked; only 4% said it was somewhat important to cut down. Zero respondents said it was not important.

### Screening practices and attitudes toward noncombustible tobacco products

Forty percent of respondents reported that they never ask patients at intake about their noncombustible tobacco use; 29.0% of the respondents reported that they ask sometimes, and 24.2% of them reported that they always ask; 6.8% of the respondents did not answer the question. These findings did not vary by sex, percentage of pregnant patients covered by Medicaid (<25% vs 25%), employment setting (urban/suburban vs rural), whether the respondent provided comprehensive primary care, or by years since residency was completed ( $P > .05$ ). The percentage of respondents who reported that noncombustible products have adverse health effects but are safer than cigarettes ranged from 20.2% (dissolvable tobacco products) to 29% (electronic cigarettes). The percentage who reported the health effects are the same as those of cigarettes ranged from 13.5% (electronic cigarettes) to 53.6% (chewing tobacco). Zero percent reported that chewing tobacco, snuff/snus, or dissolvable products have no health effects; 13.5% reported that electronic cigarettes have no health effects. A high percentage of respondents answered “don’t know” or did not respond to questions about relative safety (19.5-44.4%; Table 3).

Two-thirds of respondents (67.5%) reported wanting to know more about the potential health effects of noncigarette tobacco products. Eighteen percent did not want more information because (1) their patients were not using these products (11.9%), (2) they did not believe these products affected their patients’ health (0.8%), or (3) they already believed that they were informed fully about the health risks (5.2%). The remaining reported that they did not know whether they wanted more information (9.5%) or did not answer the question (5.2%). The percentage of respondents who indicated that they wanted more information about the health effects of noncombustible products did not vary by reported screening practices for noncombustible product use.

### Comment

The tobacco product landscape is changing rapidly and now includes many new, noncombustible products. Although the prevalence of smokeless tobacco product use in US women is currently low,<sup>27</sup> tobacco companies actively are marketing noncombustible products, such as Camel Snus, to women.<sup>28-30</sup> Numerous electronic cigarette advertisements

feature young or even pregnant women, and electronic cigarettes are becoming increasingly popular among both men and women.<sup>31,32</sup> Pregnant smokers who seek to reduce harm to their babies or to avoid that stigma associated with smoking could be especially vulnerable to the allure of noncombustible products.

Smokeless tobacco does not expose the user to products of combustion, such as carbon monoxide. Carbon monoxide is a known fetal teratogen and is believed to contribute to adverse pregnancy outcomes such as fetal growth restriction.<sup>33</sup> However, all smokeless tobacco products and most electronic cigarette products contain nicotine, which has been associated with a number of adverse effects on reproductive health. These effects include impaired oviduct function, decreased fetal and infant lung weight, volume, and function<sup>3,34</sup>; effects on fetal brain development include cell damage, reduced cell number, impaired synaptic activity, premature change from cell replication to differentiation, and the initiation of apoptosis.<sup>3,35-37</sup> Reports of associations between smokeless tobacco and adverse outcomes suggest that exposure to nicotine-containing products during pregnancy could have substantial health consequences, even in the absence of combustion.<sup>16-21</sup> In Sweden, for example, snus use and smoking during pregnancy were both associated with increased risks of preterm birth, and the magnitude of the associations were similar (adjusted odds ratios, 1.29 and 1.30, respectively).<sup>16</sup> In a separate analysis, the risk of stillbirth was significantly increased in snus users compared with tobacco nonusers (adjusted odds ratio, 1.6); the risk was higher for preterm stillbirth (adjusted odds ratio, 2.1).<sup>20</sup> No epidemiologic studies to date have assessed the effects of smokeless tobacco use on offspring neurodevelopment or risk of sudden infant death syndrome.

There have been no studies that have examined pregnancy outcomes associated with dissolvable tobacco products or electronic cigarettes. A 2012 report to the FDA by the Tobacco Products Scientific Advisory Committee concluded that exclusive use of dissolvable tobacco products by an individual would reduce greatly the risk for smoking-caused disease compared with regular use of cigarettes,<sup>38</sup> but the report did not address health risks in pregnant women.

Electronic cigarettes currently are unregulated and are available widely in the United States. Recent product modifications include large, refillable cartridges to hold more nicotine solution (also called “tank” systems). Products vary widely in their nicotine concentration, in their actual nicotine delivery, and in quality control.<sup>39</sup> There have been no studies published that assess pregnancy outcomes in electronic cigarette users. However, calls to poison control centers in the United States regarding exposure to electronic cigarette products/components in children and young adults have sky-rocketed in recent years and now account for >40% of combined electronic cigarette and cigarette exposure calls.<sup>40</sup>

Although switching from conventional cigarettes to noncombustible products may reduce exposure to many toxins, it is unclear whether pregnant women who choose to use noncombustible products will stop smoking cigarettes entirely in favor of these new products or will use these products in combination with cigarettes. There is a paucity of data on whether smokeless tobacco and electronic cigarettes are effective smoking cessation aids,<sup>41</sup> and adult electronic cigarette use appears to be highest among active smokers.<sup>42</sup> The

potential for dual use of cigarettes and noncombustible products remains a major concern for the general population and for pregnant women.

Previous studies have demonstrated that a very high percentage of obstetricians screen pregnant women for tobacco use.<sup>43,44</sup> In our study, nearly all respondents reported that it was very important or important for their patients to stop smoking, and over threefourths of the respondents reported that they believed it was somewhat likely, likely, or very likely that they/their practice could help pregnant patients to quit. This supports previous studies that found that obstetricians-gynecologists view smoking cessation as a priority for them and/or their practice.<sup>43,44</sup> Although >50% of providers reported screening pregnant women at intake for noncombustible tobacco product use at least some of the time, 40% reported that they never ask. This could reflect a lack of awareness of the availability and/or the adverse health effects of these products. For example, the recent College Committee Opinion on Tobacco Use does not address directly cessation interventions for smokeless tobacco use or the relative harms of noncombustible and combustible tobacco products.<sup>1</sup>

Our finding that 42% of respondents believed that electronic cigarettes are safer than conventional cigarettes or have no health effects was in contrast to beliefs about other noncombustible products that were often reported to be as hazardous as cigarettes. This finding could be the result of publicity regarding electronic cigarettes as a safe alternative to smoking on television, in movies, and on the internet.<sup>11,13</sup> In contrast, most noncombustible tobacco products (chewing tobacco, snuff, and snus) are regulated by the FDA and must carry package warning labels; companies are prohibited from making or implying reduced harm claims.<sup>45,46</sup> Media messages implying reduced harm from electronic cigarettes may be reaching providers as well as the general public.

Most respondents in the current study reported that they would like to know more about the potential health effects of noncombustible tobacco products; only 5% of respondents reported that they already believed themselves to be fully informed. Although nicotine is a known reproductive toxicant,<sup>3,22</sup> 13.5% of respondents reported that electronic cigarettes have no health effects. In addition, a high percentage of respondents either reported that they did not know what the health effects of the noncombustible products were (13-40%) or did not answer the question (6-7%). These finding could reflect the increasing visibility of these products and a concurrent paucity of educational messages that target providers.

Most respondents (85%) in our study reported that it was “very important” for their patients who did not quit to cut down on the number of cigarettes smoked. However, there is little evidence to support that reducing the number of cigarettes smoked per day without quitting results in substantial improvements in health<sup>47,48</sup> or pregnancy outcomes.<sup>48</sup> Although data support that reducing the number of cigarettes smoked without cessation can result in improvements in birthweight,<sup>49,50</sup> little is known about other outcomes. Although it is unlikely that reducing the number of cigarettes increases harm (unless compensatory smoking actually increased the exposure to toxicants), it is possible that improvements in outcomes are less than clinicians and patients might anticipate. Therefore, the benefits of reducing the number of cigarettes smoked without quitting should not be overstated to pregnant women, particularly if it undermines cessation efforts. In addition, some data

suggest that women must reduce to a low level of exposure to cigarettes before substantial benefits in birthweight are observed.<sup>51</sup> There are currently no recommendations from the College as to whether and how much women should cut back to experience improved outcomes.

This study has several limitations; the sample size is small, and the results were not validated by a review of medical records or other clinical data. We cannot confirm that reported practice reflects actual practice, and the response rates to this survey (31-52%) are not sufficient to exclude the possibility of nonresponse bias. Therefore, our results may not be generalizable to the overall College membership. However, the response rate is consistent with those of previous College surveys, and studies have shown that nonresponse bias tends to be less problematic among physicians than among other groups.<sup>52</sup> Selection bias because of the use of the CARN for part of the sample is not likely to be problematic, because there were few differences in demographic characteristics or responses to questions (similar to previous studies).<sup>53-55</sup>

In conclusion, a large proportion of obstetrician-gynecologists reported never or inconsistently screening their pregnant patients for the use of noncombustible tobacco products, and most respondents reported a desire to know more about the health effects of these products. The risks of the use of noncombustible products during pregnancy have not been quantified fully, and existing information about the relative harms of noncombustible tobacco products for the general population should not be generalized to pregnant women. Currently, there are limited data to support the use of noncombustible tobacco products as cessation aids, and evidence suggests that the use of noncombustible products such as snus during pregnancy can result in adverse pregnancy outcomes. Development and dissemination of guidance for providers could improve decision-making regarding noncombustible tobacco products.

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**TABLE 1**

Questionnaire items from the survey of American College of Obstetricians and Gynecologists members, 2012  
(n = 241)

Theme	Questions and answer options
Smoking cessation	How important do you personally believe that it is for women who smoke to stop smoking during pregnancy? Very important, Important, Somewhat important, Not very important, Not at all important.
	In your opinion, how likely is it that you/your practice can help your pregnant patients to stop smoking? Very likely, Likely, Somewhat likely, Unlikely, Don't know.
Reduction of cigarette use	In your opinion, how important is it to your patients' health during pregnancy that your patients who can't stop smoking at least cut down on the number of cigarettes smoked per day? Very important, Somewhat important, Not important.
Noncombustible tobacco products	Do you ask you pregnant patients at intake if they use noncigarette tobacco products such as chewing tobacco, snuff, snus, electronic cigarettes, or dissolvable tobacco products? Always, Sometimes, Never.
	How would you rate the health effects of the following tobacco products in pregnant women? For each product (chewing tobacco/snuff/snus, electronic cigarettes, dissolvable tobacco products): No health effects, Adverse effects but safer than cigarettes, Adverse effects the same as cigarettes, I don't know.
	Would you like to know more about potential health effects of noncigarette tobacco products such as chewing tobacco, snuff, snus, electronic cigarettes, or dissolvable tobacco products? No, because no one in my practice uses these products; No, because I don't believe these products would affect my patients' health; No, because I already believe that I am fully informed; Yes; Not sure.

TABLE 2

Characteristics of obstetrician-gynecologist physician participants

Physician characteristics	Measure
Years since residency completed <sup>a</sup>	19.4 ± 9.3
Sex female, %	55.6
Racial group white, %	81.7
Hispanic ethnicity, %	3.2
Provides comprehensive primary care, %	30.6
>25% of patients receiving Medicaid, %	54.4
Practice location, %	
Urban/suburban	78.6
Rural	15.4
Missing	6.0
Smoking status, %	
Never smoked regularly	78.2
Former smoker	15.5
Current smoker, trying to quit	0.8
Current smoker, not trying to quit	1.6
Missing	3.9
Practice type, %	
Solo practice/2-clinician practice	21.0
Hospital or clinic	15.9
Group practice/staff model health maintenance organization	46.0
Community health center	3.6
Medical school/university	8.7
Other	2.0

From the survey of American College of Obstetricians and Gynecologists members, 2012 (n = 252 respondents).

<sup>a</sup>Data are given as mean ± SD.

**TABLE 3**

Clinician assessment of health effects of noncigarette products

Product	Respondent rating of health effects, n (%)				
	No health effects	Adverse effects, safer than cigarettes	Same as cigarettes	Don't know	Missing
Chewing tobacco	1 (0.4)	67 (26.6)	135 (53.6)	33 (13.1)	16 (6.4)
Snuff/snus	0	60 (23.8)	125 (49.6)	50 (19.8)	17 (6.8)
Electronic cigarettes	34 (13.5)	73 (29.0)	34 (13.5)	92 (36.5)	19 (7.5)
Dissolvable tobacco	0	51 (20.2)	89 (35.5)	93 (36.9)	19 (7.5)

From the survey of American College of Obstetricians and Gynecologists members, 2012 (n = 252 respondents).