

## Letter

# Preference for Flavored Noncombustible Nicotine Products Among Smokers Motivated to Switch From Cigarettes

Ellen Meier PhD<sup>1</sup>, Rachel Isaksson Vogel MS<sup>2</sup>, Richard J. O'Connor PhD<sup>3</sup>,  
Herb H. Severson PhD<sup>4</sup>, Peter G. Shields MD<sup>5</sup>, Dorothy K. Hatsukami PhD<sup>1,2</sup>

<sup>1</sup>Tobacco Research Programs and Department of Psychiatry, University of Minnesota, Minneapolis, MN; <sup>2</sup>Masonic Comprehensive Cancer Center, University of Minnesota, Minneapolis, MN; <sup>3</sup>Department of Health Behavior, Roswell Park Cancer Institute, Buffalo, NY; <sup>4</sup>Department of Psychology, Oregon Research Institute, Eugene, OR; <sup>5</sup>Department of Medicine, Ohio State University, Columbus, OH

Corresponding Author: Dorothy K. Hatsukami, PhD, Tobacco Research Programs and Department of Psychiatry, University of Minnesota, 717 Delaware St. SE, Minneapolis, MN 55414, USA. Telephone: 612-626-2121; Fax: 612-624-4610; E-mail: [hatsu001@umn.edu](mailto:hatsu001@umn.edu)

With passage of the Family Smoking Prevention and Tobacco Control Act in 2009, the US Food and Drug Administration (FDA) was assigned the responsibility of regulating the manufacturing, marketing and distribution of cigarettes, cigarette tobacco, smokeless tobacco and roll your own tobacco products.<sup>1</sup> As stipulated in this law, the FDA banned the sale of cigarettes with characterizing flavors, with the exception of menthol. The goal of this rulemaking was to reduce the appeal of cigarettes among youth. To date, no action has been taken on the characterizing flavorings of any other tobacco products.

Of particular interest are the oral tobacco products, such as snus, which in the United States have been marketed towards smokers to be used in situations that do not allow smoking or as a substitute for smoking.<sup>2</sup> The debate in the scientific and public health community has been whether these products would serve as a harm reduction tool for those smokers who want to switch to these products<sup>3</sup> and whether the availability of flavored products would facilitate this switch.<sup>4,5</sup> For example, Sweden observed decreased rates of smoking and smoking-related illnesses following wide-spread use of snus among smokers during the past few decades<sup>6</sup>; however, whether this could replicate to other countries where snus has only recently become available is unclear.

Although we cannot directly answer the latter question, we aim to test whether smokers willing to switch to an alternative product would prefer flavored versus nonflavored products. We analyzed data from a clinical trial in which we recruited smokers from the Minneapolis/ St Paul, Minnesota and Eugene, Oregon areas who were interested in completely switching from cigarettes to an alternative product. Participants were allowed to have previously tried the study product, but could not be currently using snus or any other tobacco product more than 2 times/wk. They were randomized to either medicinal nicotine (4-mg nicotine gum,  $N = 195$ ) or snus (Camel Snus,  $N = 196$ )<sup>7</sup> for 12 weeks. We offered a variety of

flavors of the assigned product to the participants and they were free to choose any flavor of their assigned product during the intervention period. Participants completed questionnaires assessing demographic variables and smoking history. Switching between flavored and nonflavored tobacco was also measured.

Participants included mostly non-Hispanic white (81.8%), males (52.9%), and had a mean age of 43.9 ( $SD = 12.5$ ) years. Average cigarettes per day was 18.0 ( $SD = 6.5$ ), average age of first tobacco use of 14.3 ( $SD = 4.2$ ), and 76.5% of participants reported smoking non-menthol cigarettes. A total of 67 participants (17.4%) reported trying snus prior to the study, 31 (16.0%) in the nicotine gum group and 36 (18.8%) in the snus group. Among those assigned to nicotine gum, only 1 (0.5%) participant chose original flavor and 78 (40.0%) chose mint, 69 (35.4%) fruit and 47 (24.1%) chose cinnamon. Of these individuals, 25 (12.8%) switched from one flavored product to another and none from flavored to a nonflavored gum during the treatment period. For those assigned to snus, 140 (71.4%) chose Winterchill, 15 (7.7%) Frost, 9 (4.6%) Mellow (no flavor) and 32 (16.3%) Robust (no flavor). Of these participants, 26 (13.3%) switched from one flavored product to another, 5 (2.6%) switched from flavored to nonflavored, 10 (5.2%) switched from nonflavored to flavored and 12 (6.1%) made multiple switches during the treatment period. No significant differences were observed between those who chose flavored and nonflavored products for smoking history, cigarettes per day, number of quit attempts, dependence as measured by the Fagerstrom Test for Nicotine Dependence,<sup>8</sup> and demographic variables (sex, age, race, education).

These results demonstrate that more flavored oral tobacco and medicinal nicotine products are chosen among smokers who are switching to a noncombusted product. It is important to weigh the extent to which characterizing flavors such as mint should be retained in noncombusted nicotine products to facilitate switching

behavior in smokers versus the extent to which their appeal to youth may lead to uptake of the product in nonusers. Flavored tobacco is often perceived more positively than nonflavored potentially influencing initial experimentation with tobacco.<sup>9</sup> Similarly, in a previous study, we observed that over half the population of intervention seeking smokeless tobacco users reported first use and regular use with a flavored smokeless tobacco product.<sup>4</sup> Although menthol cigarettes (and smokeless tobacco) may not be different in toxicity from their nonflavored equivalents,<sup>10</sup> it appears that there are important differences in tobacco use behaviors (eg, initiation) that may warrant additional concern compared to regular tobacco-flavored cigarettes.

It is important to understand how menthol/mint flavored tobacco may differentially affect smoking and noncombusted tobacco use. Individuals who smoke menthol cigarettes tend to be less successful in quitting and experience greater nicotine dependence than smokers of nonflavored cigarettes.<sup>10</sup> In regards to smokeless tobacco, previous research suggests that there is no difference in dependence between users of mint and non-mint flavored smokeless tobacco.<sup>2</sup> Given the findings from our study, mint flavored snus/nicotine replacement options seem to appeal to smokers looking to quit using combusted tobacco, and possibly without the deleterious effects observed with mentholated cigarettes. However, in one survey of current smokers more than half of menthol smokers report that they would quit smoking before switching to non-menthol cigarettes.<sup>11</sup> Only 7.7% reported that they would switch to another tobacco product and 15.1% reported they would switch to menthol e-cigarettes. Therefore, the effects of flavored options for cigarette smokers may depend on the product and the population in question.

Perhaps, the compromise lies in banning any flavors in recreational use of nicotine that has a direct and particular appeal to youth (eg, candy-like flavors), yet retaining flavors such as mint that might appeal to smokers unable to quit as an option to switch to a non-combusted nicotine containing product. Future studies will need to compare flavored versus nonflavored products in a within subject design to determine differential appeal and effects. Additionally, research is needed to determine how mint specifically may impact experimentation and uptake of noncombustible tobacco products in novice tobacco users.

## Funding

National Institutes of Health (R01CA135884 and U19CA157345).

## Declaration of Interests

PS provides expert support and testimony in tobacco-related litigation on behalf of plaintiffs. No other competing interests.

## References

1. U.S. Congress. Family Smoking Prevention and Tobacco Control Act. In: Congress US, ed. *H.R. 1256 Vol Public Law 111-31*. Washington, DC: U. S. Government Printing Office; 2009.
2. Timberlake DS, Pechmann C, Tran SY, Au V. A content analysis of Camel Snus advertisements in print media. *Nicotine Tob Res.* 2011;13(6):431-439. [www.ncbi.nlm.nih.gov/pubmed/21385907](http://www.ncbi.nlm.nih.gov/pubmed/21385907). Accessed November 30, 2009.
3. Melikian AA, Hoffmann D. Smokeless tobacco: a gateway to smoking or a way away from smoking. *Biomarkers.* 2009;14(suppl 1):85-89. [www.ncbi.nlm.nih.gov/pubmed/19604066](http://www.ncbi.nlm.nih.gov/pubmed/19604066). Accessed November 30, 2009.
4. Oliver AJ, Jensen JA, Vogel RI, Anderson AJ, Hatsukami DK. Flavored and nonflavored smokeless tobacco products: rate, pattern of use, and effects. *Nicotine Tob Res.* 2013;15(1):88-92. [www.ncbi.nlm.nih.gov/pubmed/22529222](http://www.ncbi.nlm.nih.gov/pubmed/22529222). Accessed November 30, 2009.
5. Brandon TH, Goniewicz ML, Hanna NH, et al. Electronic nicotine delivery systems: a policy statement from the American Association for Cancer Research and the American Society of Clinical Oncology. *J Clin Oncol.* 2015;33(8):952-963. [www.ncbi.nlm.nih.gov/pubmed/25572671](http://www.ncbi.nlm.nih.gov/pubmed/25572671). Accessed November 30, 2009.
6. Foulds J, Ramstrom L, Burke M, Fagerstrom K. Effect of smokeless tobacco (snus) on smoking and public health in Sweden. *Tob Control.* 2003;12(4):349-359. [www.ncbi.nlm.nih.gov/pubmed/14660766](http://www.ncbi.nlm.nih.gov/pubmed/14660766). Accessed November 30, 2009.
7. Hatsukami DK, Severson H, Anderson A, et al. Randomized clinical trial of snus vs. medicinal nicotine among smokers interested in product switching. *Tob Control.* 2015. In Review.
8. Heatherton TF, Kozlowski LT, Frecker RC, Fagerstrom KO. The Fagerstrom Test for Nicotine Dependence: a revision of the Fagerstrom Tolerance Questionnaire. *Br J Addict.* 1991;86(9):1119-1127. [www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list\\_uids=1932883](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=1932883). Accessed November 30, 2009.
9. Feirman SP, Lock D, Cohen JE, Holtgrave DR, Li T. Flavored tobacco products in the United States: a systematic review assessing use and attitudes [published online ahead of print August 26, 2015]. *Nicotine Tob Res.* doi:10.1093/ntr/ntv176.
10. U.S. Food and Drug Administration. Preliminary scientific evaluation of the possible public health effects of menthol versus nonmenthol cigarettes. 2013. [www.fda.gov/downloads/ScienceResearch/SpecialTopics/PeerReviewofScientificInformationandAssessments/UCM361598.pdf](http://www.fda.gov/downloads/ScienceResearch/SpecialTopics/PeerReviewofScientificInformationandAssessments/UCM361598.pdf). Accessed November 30, 2009.
11. Wackowski OA, Delnevo CD, Pearson JL. Switching to e-cigarettes in the event of a menthol cigarette ban. *Nicotine Tob Res.* 2015;17(10):1286-1287. [www.ncbi.nlm.nih.gov/pubmed/25634935](http://www.ncbi.nlm.nih.gov/pubmed/25634935). Accessed November 30, 2009.