
Smoker Awareness of and Beliefs About Supposedly Less-Harmful Tobacco Products

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Background: Cigarette manufacturers in the United States have begun marketing cigarette brands claiming to reduce smokers' exposure to selected toxins in tobacco smoke. Little data exist on smokers' awareness, use, and beliefs about these products.

Methods: Data from the U.S. arm of the International Tobacco Control Policy Four-Country Survey (ITC-4), a telephone survey of 2028 adult current cigarette smokers in the United States conducted between May and September 2003, were analyzed. Respondents were asked to report their awareness, beliefs, and use of products marketed as less harmful than traditional cigarettes and of smokeless tobacco (SLT) products.

Results: Close to 39% of smokers were aware of "less-harmful" cigarettes, but only 27% of them could name a specific brand of such cigarettes. The brand named most often was Quest (25.7%), followed by Eclipse (7.6%), Winston (5.7%), herbal cigarettes (3.3%), "smoke-free" cigarettes (2.9%), Marlboro Blend #27 (1.9%), and Omni (1.9%). Of those who named a brand, 25% believed such products were less harmful than "ordinary cigarettes." In contrast, 82% of cigarette smokers were aware of SLT products, but only 10.7% of these believed that SLTs were less harmful than ordinary cigarettes.

Conclusions: Smokers hold beliefs about the relative safety of supposedly less-harmful tobacco products that are opposite to existing scientific evidence. These results highlight the need to educate smokers about the risks of alternatives to conventional cigarettes, and the need to regulate the advertising and promotion of such alternatives.

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Introduction

In the past decade, cigarette manufacturers in the United States have introduced and marketed a variety of so-called "reduced exposure" products.¹⁻³ For example, in 2000, Vector Tobacco introduced Omni[®], which promised exposure to fewer carcinogens than conventional cigarette brands. In 2001, Brown and Williamson Tobacco Company began marketing Advance[®], which touted a new filter and different type of tobacco that reduced exposure to harmful chemicals in tobacco smoke. In 1996, RJ Reynolds Tobacco Company (RJR) introduced Eclipse[®], initially marketed with claims of less secondhand smoke, and later with claims of reduced cancer risk. Philip Morris USA test marketed Accord[®],⁴ an electrically heated cigarette that allegedly reduced exposure to toxins found in conven-

tional cigarettes. Finally, in 2002, Vector introduced Quest[®], a new line of cigarettes with varying levels of nicotine. The Institute of Medicine (IOM)⁴ reviewed the scientific evidence regarding these products and labeled them "potential reduced exposure products" (PREPs). The IOM committee expressed concern that PREPs could encourage smokers to continue smoking, entice former smokers to return to tobacco use, and even recruit nonsmokers to use these supposedly safer products.⁴

The IOM's concerns underscore the importance of consumers' perceptions in the overall evaluation of PREPs. To date, however, there have been relatively few efforts made to document consumer awareness, beliefs, and use of PREPs. Shiffman et al.⁵ surveyed 1000 current cigarette smokers to ascertain their opinions about RJR's Eclipse product. Respondents were read descriptions of the product based on advertisements and asked to rate their interest in purchasing Eclipse, and the perceived risk from Eclipse compared to smoking regular cigarettes. Respondents were also asked whether Eclipse might affect their decision to stop smoking. After hearing the description of the product, 57% of smokers said that they were at least somewhat

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likely to purchase Eclipse in the next 6 months. Nearly all current smokers (91.4%) believed that Eclipse was safer than smoking regular cigarettes, with 24% believing that Eclipse was completely safe based on the description from the advertisement. Although most smokers (60.3%) said Eclipse would not change their plans about quitting, 21.4% of those smokers contemplating quitting in the next 6 months lost interest in quitting after hearing about Eclipse.

Hamilton et al.⁶ conducted a mall intercept survey of 600 adult smokers to assess their reactions to advertisements for PREPs (Eclipse, Advance, Omni), light cigarettes, and regular cigarettes. Since none of the PREPs were being marketed in Massachusetts at the time of the study, respondents' ratings about the relative health risks of PREPs were based solely on the advertising they were exposed to in the study. Respondents consistently rated the PREPs as having lower health risks and lower carcinogens compared to light and regular cigarettes.

Data from a 2002 U.S. national survey⁷ of smokers found that one third of smokers had heard of at least one supposedly less-harmful product when read the names of a series of such products. However, little is known about whether smokers who are not prompted with product names or given product information are aware of supposedly less-harmful products or have beliefs concerning their safety compared to smoking. Additionally, no surveys have compared knowledge of modified cigarettes and cigarette-like products to knowledge of smokeless tobacco (SLT), another class of products that could potentially reduce smoking-related health risks.

This paper reports data from the U.S. arm of the 2003 wave of the International Tobacco Control Policy Evaluation Project Four-Country Survey (ITC-4), a nationally representative sample telephone survey of 2028 adult smokers. This study reports data from questions that measured awareness of and beliefs about the risks of supposedly less-harmful tobacco products (including SLT). Smokers' beliefs about alternatives to conventional cigarettes were examined.

Methods

Survey Description

The random-digit-dial (RDD) telephone survey of current smokers in the United States has been described in detail elsewhere.⁸ In brief, a sample of phone numbers in the United States was obtained from Survey Sampling International, which uses Random Digit Dialing B (RDD-B) methodology to generate number banks. The survey conducted in the United States was part of a larger international study involving parallel surveys conducted in the United Kingdom, Canada, and Australia. However, because supposedly less-harmful products are being marketed primarily in the United States, analysis was restricted to the U.S. survey data. At Wave 1 (October–December 2002), 2115 smokers were interviewed, a response rate of 77.0%.⁸ The current analyses rely on data

from Wave 2 of the survey ($n = 2028$), conducted from May to September 2003. During Wave 2, a total of 1344 respondents from Wave 1 were reinterviewed (62.9% of the original sample), and a “replenishment” sample of 684 were recruited from the same sampling frame to replace respondents lost to attrition. For both the baseline survey and the replenishment, the next-birthday method was used to select respondents from multismoker households. The study protocol was approved by the Institutional Review Boards/Research Ethics Boards of the Roswell Park Cancer Institute (United States), University of Waterloo (Canada), University of Illinois at Chicago (United States), University of Strathclyde (United Kingdom), and The Cancer Council Victoria (Australia).

Measures

Basic demographic information (gender, age, ethnicity, level of education and smoking behavior information (cigarettes per day, time to first cigarette of the day) was available. (Education was at three levels. Low education is high school graduate or less, moderate education indicates trade/vocational school or some college, and high education indicates college graduate or higher.) Cigarettes per day and time to first cigarette were recoded and combined to form the Heaviness of Smoking Index (HSI).⁹ Questions also probed thoughts about danger and harms from smoking in the past month, beliefs about smoking, causing cancer, filters reducing harm from smoking, and light cigarettes being less harmful than regular cigarettes.

Knowledge of Supposedly Less-Harmful Products

To assess knowledge of products promoted as less harmful than ordinary cigarettes, respondents were asked the following question: “Tobacco companies are developing new types of cigarettes or cigarette-like products that are supposed to be less harmful than ordinary cigarettes. Have you heard of such products?” Those who said “Yes” were asked whether they could name any of these products. Respondents were not prompted with specific brand names. These respondents were also asked about current and past 6-month use of such products. Finally, those respondents who were aware of “less-harmful” products were asked, “As far as you know, are any of these new products less harmful than ordinary cigarettes?”

Knowledge of Smokeless Tobacco

All respondents were asked, “Are you aware of any smokeless tobacco products, such as snuff or chewing tobacco, which are not burned or smoked but instead are usually put in the mouth?” Those answering “Yes” were asked about SLT use in the past 30 days. Finally, those respondents who were aware of SLT were asked, “As far as you know, are any smokeless tobacco products less harmful than ordinary cigarettes?”

Data Analysis

Analyses of unweighted data were conducted in 2004 using SPSS, version 12.0 (SPSS Inc., Chicago, 2003). Cross-tabulations with chi-square, *t*-tests, and logistic regression were used to assess relationships between and among variables. All key

variables (e.g., gender, age, race/ethnicity, education level, awareness of products, beliefs about harmfulness) were compared on cohort versus replenishment respondents. No significant differences between cohort and replenishment respondents were observed on age, education level, awareness of supposedly less-harmful products, awareness of SLT, and believing supposedly less-harmful products or SLT were safer than conventional cigarettes ($p > 0.10$). Replenishment participants were more likely to be male (47.8% vs 41.6%, $p < 0.008$) and to be nonwhite (24.4% vs 20.4%, $p < 0.05$). It was determined that cohort and replenishment sample data could be pooled into a single analysis. However, logistic regression models included sampling status as a covariate.

Results

Awareness and Beliefs About Relative Safety of Supposedly Less-Harmful Cigarettes

Of the 2028 respondents, 784 (38.7%) said that they had heard about supposedly less-harmful products being marketed by cigarette manufacturers. Awareness of these products did not vary by respondent gender, but varied significantly with age. Of those aged ≥ 55 , 51.0% were aware of such products, compared to 41.5% of 40- to 54-year-olds, 31.7% of 25- to 39-year-olds, and 23.7% of 18- to 24-year-olds ($\chi^2[3] = 68.26$, $p < 0.001$). Level of education was also associated with awareness of supposedly less-harmful products—47.1% of those with high education were aware, compared to 34.3% of those with low education ($\chi^2[2] = 16.42$, $p < 0.001$). Whites were more likely than nonwhites to be aware of supposedly less-harmful products (42.6% vs 26.2%, $\chi^2[1] = 38.41$, $p < 0.001$). Those who were aware of supposedly less-harmful products had significantly higher HSI scores (2.8 vs 2.5, $t[1872] = 4.34$, $p < 0.001$).

General awareness that cigarette companies were marketing supposedly less-harmful products did not translate directly into being able to name a specific product—26.8% ($n = 210$) of those aware of these products could name one. The most commonly cited, supposedly less-harmful products are shown in Figure 1. Quest was, by far, the most commonly named product. Overall, only 10% of those who could name a brand named a product discussed as a PREP by the IOM (i.e., Eclipse, Omni, Advance); this rises to 35.7% if Quest is considered to be a PREP. Two percent of those naming a product mentioned medicinal nicotine products (gum, inhaler) as less harmful than conventional cigarettes.

Self-reported usage rates were extremely low for most named products. Only one respondent each reported trying Eclipse and Advance in the last 6 months. Two respondents reported currently using Quest, and two others reported using American Spirit. By comparison, 5.5% ($n = 43$) of respondents reported currently using Winston cigarettes, and 52.8% were currently smoking a light or ultra-light brand.

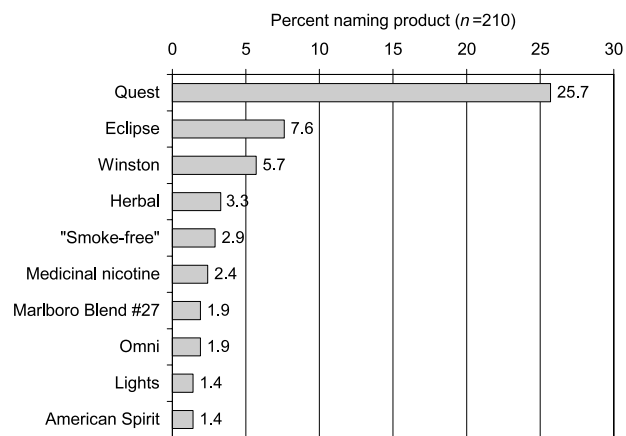


Figure 1. Percentage naming specific products as supposedly less-harmful cigarettes, International Tobacco Control Policy Evaluation Project 4-Country Survey, Wave 2, United States, 2003.

Note: "Medicinal nicotine" included responses such as nicotine gum, nicotine patch, nicotine inhaler, and nicotine lozenge.

The question about relative safety was asked only of those who reported being aware of supposedly less-harmful products. Of those respondents, 24.3% said that these products were less harmful than ordinary cigarettes, 52.8% said supposedly less-harmful products were not less harmful, and 22.9% were not sure. A number of putative predictors of believing supposedly less-harmful products are less harmful than ordinary cigarettes were examined, shown in Table 1. Gender, level of education, and HSI scores were not significantly associated with risk beliefs, nor was survey sample status.

Those who believed that lights reduced harm and believed filters reduced harm were more likely to believe that supposedly less-harmful products also reduced harm. Those aged 18 to 24, 25 to 39, and 40 to 54 were all more likely than people aged ≥ 55 to believe that supposedly less-harmful products were less harmful. Whites were more likely than nonwhites to believe that supposedly less-harmful products were safer. Finally, those who had thought about the dangers of smoking rarely or sometimes in the past month were more likely than those who never thought about the dangers to believe supposedly less-harmful products were safer, but this effect did not hold for those who thought about the dangers often or very often.

Awareness of and Beliefs About Smokeless Tobacco

Awareness of SLT was much higher than for supposedly less-harmful cigarette-like products. Of the 2028 respondents, 81.9% ($n = 1661$) were aware of SLT products. Awareness of SLT was not significantly related to sex. Older respondents were somewhat less likely to be aware of SLT products ($\chi^2[3] = 21.4$, $p < 0.001$). Among

Table 1. Predictors of beliefs about relative safety of supposedly less harmful cigarettes versus ordinary cigarettes

	% agree products less harmful	Adjusted OR (95% CI)
Age category (years)		
18–24 (<i>n</i> = 59)	42.4	4.80 (2.50–9.21)
25–39 (<i>n</i> = 165)	31.2	2.82 (1.70–4.66)
40–54 (<i>n</i> = 301)	24.6	1.95 (1.23–3.08)
≥55 (<i>n</i> = 233)	14.9	Referent
Ethnicity		
White (<i>n</i> = 648)	25.6	1.87 (1.07–3.26)
Nonwhite (<i>n</i> = 110)	16.7	Referent
Believe filters reduce harm		
Yes (<i>n</i> = 388)	28.6	1.46 (1.00–2.15)
No (<i>n</i> = 370)	19.3	Referent
Believe light cigarettes are less harmful		
Yes (<i>n</i> = 197)	34.7	1.73 (1.16–2.58)
No (<i>n</i> = 561)	21.0	Referent
Thought about danger from smoking in past month		
Never (<i>n</i> = 83)	14.0	Referent
Rarely/sometimes (<i>n</i> = 325)	28.0	2.15 (1.08–4.26)
Often/very often (<i>n</i> = 350)	23.4	1.84 (0.92–3.65)

CI, confidence interval; OR, odds ratio.

those aged ≥55, 76.5% were aware of SLT, compared to 82.4% of 40- to 54-year-olds, 85.1% of 25- to 39-year-olds, and 88.8% of 18- to 24-year-olds. Whites were more likely than nonwhites to be aware of SLT (85.5% vs 72.2%, $\chi^2[1]=42.21$, $p<0.001$); and those with low education were less likely to report awareness of SLT (78.2% vs 85% for moderate or high education, $\chi^2[2]=17.95$, $p<0.001$). HSI score was not related to awareness of SLT, nor was survey sample status.

Respondents who were aware of SLT were asked whether they believed that any SLT products were less harmful than smoking. Overall, 10.7% (*n* = 178) agreed, 82.9% disagreed, and 6.4% did not know. Seventy-seven persons (4.6%) had used SLT products

in the past month. Given the much lower percentage believing that SLT was safer than conventional cigarettes (compared to beliefs about cigarette-like products), person-level factors that might account for differences in beliefs about SLT were examined and are shown in Table 2.

Results showed that believing lights reduced harm was a significant independent predictor of believing that SLT reduced harm. Men were more likely to believe that SLT was less harmful than smoking. Those aged 25 to 39 and those aged 40 to 54 were significantly more likely than those aged ≥55 to believe that SLT was less harmful. Low and moderate education were associated with a lower likelihood of believing that SLT

Table 2. Predictors of beliefs about relative safety of smokeless tobacco products versus ordinary cigarettes

	% agree smokeless tobacco products less harmful	Adjusted OR (95% CI)
Age category (years)		
18–24 (<i>n</i> = 219)	9.0	1.28 (0.68–2.42)
25–39 (<i>n</i> = 453)	12.3	1.93 (1.16–3.20)
40–54 (<i>n</i> = 605)	12.5	1.90 (1.17–3.09)
≥55 (<i>n</i> = 355)	7.0	Referent
Gender		
Male (<i>n</i> = 726)	13.1	1.63 (1.18–2.26)
Female (<i>n</i> = 906)	8.8	Referent
Level of education		
Low (<i>n</i> = 612)	10.1	0.64 (0.41–1.02)
Moderate (<i>n</i> = 783)	9.8	0.60 (0.39–0.92)
High (<i>n</i> = 237)	15.4	Referent
Believe light cigarettes are less harmful		
Yes (<i>n</i> = 421)	15.6	1.86 (1.33–2.61)
No (<i>n</i> = 1211)	9.0	Referent
Thought about harm to self from smoking in past month		
Never (<i>n</i> = 158)	4.2	Referent
Rarely/sometimes (<i>n</i> = 649)	12.2	2.59 (1.16–5.78)
Often/very often (<i>n</i> = 825)	10.7	2.47 (1.11–5.48)

CI, confidence interval; OR, odds ratio.

What This Study Adds . . .

Cigarette manufacturers are marketing cigarette and smokeless tobacco brands that claim to reduce smokers' exposure to toxins.

This study, conducted in 2003 among smokers in the U.S., found that almost 40% were aware of these brands and that a smaller but substantial number believed them to be less harmful than regular cigarettes.

was less harmful than cigarettes. Finally, those who thought at all about harms to themselves from smoking in the last month were much more likely to believe that SLT was less harmful than smoking.

Among those who were aware of both supposedly less-harmful cigarette-like products and SLT ($n=668$), 24.6% believed supposedly less-harmful cigarette products were safer than ordinary cigarettes, while 11.1% believed that SLT was safer than ordinary cigarettes.

Discussion

Approximately four in ten smokers said that they had heard about supposedly less-harmful products being manufactured by cigarette companies. However, only 27% of those aware of supposedly less-harmful products could name a specific product, and only 10% of the named products would be considered PREPs by the IOM.⁴ Smokers seem to be aware of the concept of "safer" cigarettes, although what they consider to be "safer" products was generally incorrect. Farrelly et al.⁷ found a similar identification rate for PREPs, particularly Eclipse.

Belief in the safety of supposedly "safer" cigarettes was related to believing that filtered and light cigarettes are less harmful than ordinary cigarettes. Incorrect beliefs about the safety of tobacco products appeared to cluster. Those who believed the false promises of filters and of lights appeared more likely to believe in the presumed benefits of a new generation of "safer" products.

Quest was the most commonly recalled as a "less-harmful" product, despite the fact that its marketing appears to focus on stepping down nicotine, rather than on reducing harm. This suggests that smokers equate nicotine with harm, which may explain why smokers are mistakenly attracted to low-tar and nicotine cigarettes and not nicotine medications.

Over 5% of those naming a product named Winston as less harmful than ordinary cigarettes. In the late 1990s, RJR's Winston brand was promoted as having "no additives."¹⁰ Since 1999, the Federal Trade Commission has required that Winston advertisements to carry the warning, "No additives in our tobacco does NOT mean a safer cigarette." The disclaimer was added to the advertising after several state attorneys general threatened lawsuits against RJR for deceptive advertising.¹⁰ Despite the disclaimer, at least some smokers in the current survey believed that no additives does mean safer.

A much greater proportion of smokers (82%) were aware of SLT products than were aware of modified cigarettes and cigarette-like products. However, only 10.7% of smokers believed that SLT is less harmful than smoking ordinary cigarettes. Here, smokers are misinformed in the opposite direction. Epidemiologic data

suggest that SLT products sold in the United States are significantly less dangerous than cigarettes.^{11,12} Reservations remain about promoting SLT products for harm reduction in the United States, given the wide range of toxic constituents from brand to brand and concerns about marketing to youth.⁶ But smokers are clearly more apt to believe that cigarette-like products, with modest potential to reduce risk at best (e.g., Breland et al.¹³ and Hatsukami et al.¹⁴), are safer than SLT, which actually holds much greater potential for reductions in risk. In short, this U.S. national sample of adult smokers holds beliefs about the relative harm-reduction potential of modified cigarettes and SLT that are contrary to the available scientific evidence.

Future research should focus on methods of communicating relative risk information to smokers, so that smokers are not misled by comparative claims for either modified cigarettes or cigarette-like products or SLT products. Future research is also needed to assess the reliability of the items used in this study to measure smokers' risk perceptions about different tobacco products. Of particular interest is a need to explore what smokers really mean when they say a product is "less harmful" or "safer" than another.

There is little doubt that the tobacco industry, especially the cigarette industry, will continue to develop and market supposedly less-harmful products with claims—explicit or implied—that such products will reduce the health risks of smoking.³ In an environment in which tobacco products—and the advertising and marketing that accompany them—are only loosely regulated or unregulated, these claims will continue to lull smokers into a false sense of security concerning health risks. The findings presented in this paper clearly demonstrate that smokers are confused about relative safety claims of reduced exposure tobacco products. More smokers believe that so-called reduced exposure cigarette products were safer than standard cigarettes than believed SLT was safer, even when awareness of products was controlled for. These data suggest that smokers are confused and misled by cigarette marketing, even when such marketing does not include overt health messages. Companies looking to market reduced-exposure tobacco products should be required

to demonstrate convincingly that smokers will not be confused or misled by the marketing claims.

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References

1. Fairchild A, Colgrove J. Out of the ashes: the life, death, and rebirth of the "safer" cigarette in the United States. *Am J Public Health* 2004;94:192-204.
2. Shiffman S, Gitchell JG, Warner KE, Slade J, Henningfield JE, Pinney JM. Tobacco harm reduction: conceptual structure and nomenclature for analysis and research. *Nicotine Tob Res* 2002;4(suppl 2):S113-29.
3. Warner KE. Tobacco harm reduction: promise and perils. *Nicotine Tob Res* 2002;4(suppl 2):S61-72.
4. Stratton K, Shetty P, Wallace R, Bondurant S, eds. *Clearing the smoke: assessing the science base for tobacco harm reduction*. Washington DC: National Academy Press, 2001.
5. Shiffman S, Pillitteri JL, Burton SL, DiMarino ME. Smoker and ex-smoker reactions to cigarettes claiming reduced risk. *Tob Control* 2004;13:78-84.
6. Hamilton WL, diStefano Norton G, Ouellette TK, Rhodes WM, Kling R, Connolly G. Smokers' responses to advertisements for regular and light cigarettes and potential reduced-exposure products. *Nicotine Tob Res* 2004;suppl3:S353-62.
7. Farrelly MC, Hund LM, Davis K, Haviland L. Awareness and use of potentially reduced-exposure products in a national sample. Abstract presented at the National Conference on Tobacco or Health, Boston MA, December 2003.
8. Fong GT, Hammond D, Laux FL, et al. The near-universal experience of regret among smokers in four countries: findings from the International Tobacco Control Policy Evaluation Survey. *Nicotine Tob Res* 2005 suppl3: S341-51.
9. Heatherton TF, Kozlowski LT, Frecker RC, Rickert W, Robinson J. Measuring the heaviness of smoking: using self-reported time to the first cigarette of the day and number of cigarettes smoked per day. *Br J Addict* 1989;84:791-9.
10. Arnett JJ. Winston's "No Additives" campaign. "Straight up"? "No bull"? *Public Health Rep* 1999;114:522-7.
11. Levy DT, Mumford EA, Cummings KM, et al. The relative risks of a low-nitrosamine smokeless tobacco product compared to smoking cigarettes: estimates of a panel of experts. *Cancer Epidemiol Biomarkers Prev* 2004;13:2035-42.
12. Critchley JA, Unal B. Health effects associated with smokeless tobacco: a systematic review. *Thorax* 2003;58:435-43.
13. Breland AB, Acosta MC, Eissenberg T. Tobacco specific nitrosamines and potential reduced exposure products for smokers: a preliminary evaluation of Advance. *Tob Control* 2003;12:317-21.
14. Hatsukami DK, Lemmonds C, Zhang Y, et al. Evaluation of carcinogen exposure in people who used 'reduced exposure' tobacco products. *J Natl Cancer Inst* 2004;96:844-52.