

# AN EXAMINATION OF CIGARETTE BRAND SWITCHING TO REDUCE HEALTH RISKS<sup>1,2,3</sup>

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## ABSTRACT

*This study examined cigarette brand switching to reduce health risks in a population of young smokers (N = 7,998) entering United States Air Force Basic Military Training. Because of a comprehensive tobacco ban during training, all smokers were abstinent during the study. Results from this investigation suggested that brand switching to reduce health risks was common among current smokers (31.3% of males; 32.3% of females). Brand switchers smoked fewer cigarettes, were more likely to smoke low-yield brands, had lower scores on a measure of nicotine dependency, and were more confident they could remain abstinent following training. Other discriminators of smokers who had switched brands from other smokers included using smoking to control appetite, greater proclivity to attempt smoking cessation, engaging in fewer safety risks, and healthier dietary composition. Finally, brand switchers quit smoking at a higher rate than other smokers (12.5% versus 11.1%) during the year following basic military training. However, a multivariate logistic regression model that controlled for demographic factors and smoking history suggested that brand switching was not a statistically significant predictor of smoking cessation during the follow-up period.*

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## INTRODUCTION

Tobacco use is the leading public health concern today, with smoking being the most preventable cause of death and chronic disease and an enormous, unnecessary expense to society (1-3).

Currently tens of thousands of studies have linked cigarette smoking to increased morbidity and mortality from cardiovascular disease, various forms of cancer, and chronic obstructive pulmonary disease (3). Moreover, smoking is a potent risk factor for heart disease, malignant neoplasms, and stroke, the three leading causes of death in the United States (4,5). Approximately 26% of adults in the United States smoke (3), and alarmingly, smoking rates among high school students have increased by nearly a third since 1991 (6).

Despite the well-advertised health risks associated with smoking, many smokers are unable or unwilling to quit (6-8). For instance, even among smokers who have lost a lung due to cancer or have experienced major cardiovascular surgery, only about 50% maintain abstinence for more than a few weeks (9,10). Also, nearly one-third of individuals who quit and maintain abstinence for 1 year will relapse and return to regular smoking (3). Why do smokers find it difficult to quit? Smoking cessation efforts are impeded by the fact that many of the advantages of continuing to smoke are immediate, while the disadvantages of smoking are delayed and probabilistic. In addition, smoking cessation initiates a constellation of noxious symptoms known as the nicotine withdrawal syndrome (10). Thus, smokers face trying to stop a highly over-learned habit at the same time they are attempting to withdraw from a highly addictive drug. Further, smokers who would like to quit often face limited financial resources or a lack of medical benefits with which to seek effective treatment (11). Even smokers with adequate economic resources may not seek treatment as a result of demoralization resulting from past unsuccessful quit attempts (11).

When confronted with the difficulties involved in overcoming nicotine addiction, smokers may turn to strategies designed to reduce the health risks from smoking which fall short of abstinence. These strategies include reducing the number of cigarettes smoked (12,13), using nicotine replacement products for nicotine maintenance rather than smoking cessation (14,15), increasing physical activity (16,17), reducing unhealthy eating practices and taking vitamins (18), and using less hazardous cigarette-like products (19). However, one of the most prevalent strategies used to reduce the health risks from smoking involves switching cigarette brands to one the smoker believes is "healthier."

Smokers may believe that switching to another brand of cigarettes will reduce their health risks for many reasons, including that it is lower in tar and nicotine, contains a filter, or is "additive

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free." Switching to healthier cigarettes has been widely promoted by tobacco companies as a method of reducing the health risks of smoking (19,20). For example, an advertisement for the Lorillard Tobacco Company's Kent cigarettes suggests that its micronite filter "put Kent in a class all by itself where health protection is concerned" (21). Also, medical professionals sometimes recommend switching to healthier cigarette brands for their patients who do not wish to quit smoking (16,19). In *The Smoker's Book of Health*, for instance, a physician suggests that smokers who do not wish to quit should switch to low-yield brands and claims that "such brands will supply you with your required level of nicotine while exposing you to less of the most harmful constituents of tobacco smoke" (16, p. 210). As a result, surveys have indicated that some smokers believe that moderate use of low-yield cigarettes results in minimal health risks (22,23).

Unfortunately, scientific evidence that there are relatively safe cigarette brands that significantly reduce health risks is lacking. For instance, a National Cancer Institute sponsored review of the benefits of low-yield (i.e. lower tar/nicotine) cigarettes suggested these products result in a small reduction in cancer risk, no effect on cardiovascular risk, and an uncertain effect on pulmonary disease risk (24). The unimpressive reduction in health risks found for low-yield cigarettes is likely due to compensation behaviors by smokers (e.g. smoking more deeply, filter blocking) which increase biological exposure (25). This explanation is consistent with a large literature which demonstrates that biological exposure levels in smokers of low-yield cigarettes is higher than would be predicted by Federal Trade Commission low-yield ratings (26-29). Furthermore, there is little evidence that filtered cigarettes or brands claiming to be additive free significantly reduce the risks associated with smoking (30).

Another concern that has been raised about cigarette brand switching for health is its effect on the probability of future smoking cessation (31). Health-related cigarette brand switching may lead to at least two possible outcomes. First, brand switching may increase the likelihood of abstinence since the smoker has a "success experience" (i.e. they believe they have successfully reduced their health risk) to draw on for motivation. Alternatively, a smoker who believes they have reduced their health risks by switching brands may feel they have made an adequate health change and therefore will be less likely to quit in the future.

Unfortunately, little data exist on the relationship between cigarette brand switching for health and the propensity to quit smoking. In one of the few investigations to date, Giovino and colleagues (20) found that individuals who had switched to low-yield cigarette brands to reduce health risks were more likely to acknowledge the health risks of smoking than other smokers and more likely to have tried quitting smoking than other smokers. However, data from ever-smokers (i.e. current smokers and ex-smokers) suggested that smokers who had switched to low-yield cigarettes to reduce their health risks were less likely to be an ex-smokers than smokers of higher-yield cigarettes. Thus, the limited evidence that exists concerning the effect of switching to low-yield cigarettes on the probability of cessation is not definitive.

The purpose of this study is to examine smokers who have switched cigarette brands, based on tar/nicotine content, specifically to reduce their health risks. This study extends previous research by comparing brand switchers to other smokers on a broad range of health factors, including smoking demographics, smoking exposure, indicators of proclivity to quit smoking, and other health and safety factors. Examining cigarette brand switching should provide useful data on this large group of health

conscious smokers and may prove informative in the debate regarding the use of interventions other than abstinence (i.e. harm reduction strategies) (31-35) as an alternative to cessation for recalcitrant smokers. Most importantly, this study will provide the first prospective data examining the effects of brand switching for health on subsequent smoking behavior.

## METHODS

### Participants

All individuals who entered the enlisted ranks of the United States Air Force (USAF) from August 1995 to August 1996 were screened for participation in this study. From the population of 32,144 trainees, 24.9% ( $n = 7,998$ ) smoked regularly up to Basic Military Training (BMT). A rigorously monitored tobacco use ban is part of BMT; therefore, all smokers were abstinent during the study. Average age of the smokers was 19.7 ( $SD = 2.1$ , range = 17-35). The USAF has the highest rate of participation by women of all the military services. Among trainees who smoked, 24.3% were female. Individuals from minority ethnic backgrounds constituted 16.2% of the smokers (4.9% African-American). Analyses of income revealed that smokers were well-represented with individuals from low-income backgrounds as evidenced by 22% reporting lower than a \$20,000 total household income (i.e. income of household where recruit lived in year prior to BMT) and another 48.2% reporting a family income between \$20,000 and \$50,000.

### Assessment Procedures

In the first week of BMT, trainees completed the baseline assessment questionnaire. Administration was in a group setting in flights of approximately 50 individuals. Instructions were read and participants completed all items using a scanable questionnaire. Questions were answered and all questionnaires were checked for thoroughness prior to the flight departing. Obtaining follow-up data regarding the participants' smoking status was challenging because they were stationed around the world. Participants were located via the military World Wide Locator by the Air Force Survey Branch, an organization dedicated to conducting Air Force approved surveys. Once addresses were obtained for the study participants, they were mailed a project follow-up survey. Those not responding to the follow-up survey were contacted by phone. Those available for the follow-up assessment included those who completed BMT but did not enter the Air Force (e.g. National Guard or Air Force reserve members), those who completed BMT but dropped out of the Air Force by the 1-year follow-up, those who were deceased, and those who were unreachable (e.g. on covert assignments, in remote locations such as Bosnia, and assessible only by secured radio communication). A total of 5,228 smokers were contacted at the 1-year follow-up and were included in this study. This represents 65% of all baseline smokers or 96% of available smokers.

### Measure

A 53-item questionnaire was developed for use in this study. This measure collected information from four general domains. First, basic demographics were assessed, including gender, ethnic status, age, education, and household income. Second, history of tobacco use was assessed. Third, questions thought to be associated with smoking onset/relapse were asked (e.g. the percent of friends who smoked, perceived social attractiveness of smoking, rebelliousness, risk-taking). Finally, other health risk factors were measured, such as alcohol use, dietary intake, physical activity, and opinions regarding drug use. Admission of drug use, former or

current, is grounds for immediate dismissal in the U.S. military. Since data sets collected on military personnel could be potentially seized or subpoenaed, we did not want to collect data that could potentially jeopardize the participants' careers. Thus, opinions regarding drug use (and other behaviors that might potentially end participants' military careers) rather than actual behavior were measured. Due to numerous quality control checks and the fact that the questionnaire was given as part of BMT, adherence was extremely high with virtually no missing data. At the 12-month follow-up, the survey asked participants to report their smoking status. All questionnaires were then scanned into a computer using an NCS OpScan 5 Model #25 Scanner.

Cigarette brand switching for health reasons was assessed using a question phrased, "In the 12 months prior to Basic Military Training, had you ever switched to a lower tar/nicotine cigarette just to reduce your health risk?" to which participants answered either in the affirmative or negative. This item was designed to identify smokers who had switched cigarette brands specifically to reduce their health risks rather than for other reasons. This item was based on an item used to examine cigarette brand switching for health in the 1987 National Health Interview Survey (20,36). Individuals who reported switching cigarettes for health reasons were categorized as "Switchers" while those who had not switched brands were termed "Nonswitchers." As in previous studies based on this population, smoking status was defined by smoking behavior prior to BMT (37). Current smokers were defined as those individuals who reported smoking regularly (at least one cigarette per day) up to the point they entered BMT, "I smoked regularly (at least one per day), and smoked up to the point I entered Basic Military Training."

Because of the very large sample size and limited available assessment time, self-reports of smoking were obtained. Self-reports of smoking, even in intervention studies, generally are highly valid, with agreement rates to biochemical indices averaging well over 90% (38). Self-reports of smoking are particularly valid in large surveys. Further, research has demonstrated that if confidentiality is assured, participants accurately report smoking status (39). Therefore, given the large-scale nature of this study and the fact that confidentiality was strongly stressed during the assessment, the validity of the smoking data is expected to be high.

### Approach to Data Analysis

First, univariate demographic and smoking history characteristics of Switchers and Nonswitchers were examined for descriptive purposes. Demographic variables included age, ethnic status, income, and education. For ease of interpretation, income was dichotomized into low (i.e. <\$20,000) versus other income brackets, while education was categorized into high school diploma or less versus at least some college. However, all parametric tests were conducted with the original metric used to assess income and education. Three indicators of smoking exposure were collected. Trainees reported the number of cigarettes they smoked each day (10 or fewer, 11–20, 21–30, or more than 30) and the usual type of cigarette smoked (regular, light, ultra light, or no usual brand). Also, recruits completed the Fagerstrom Test for Nicotine Dependence (FTND). The FTND (40) is a 6-item scale that assesses factors related to nicotine dependence. The FTND is psychometrically sound and is correlated with biochemical measures of smoking exposure (40–43). Finally, recruits were asked to rate their confidence in remaining abstinent following BMT.

Next, we examined smoking history and health behavior differences between Switchers and Nonswitchers using multivari-

ate logistic regression modeling (44). Demographic variables (i.e. age, gender, ethnicity, family income, and education) were first entered into the model to control for these factors. Next, factors identified in previous research as important correlates of smoking initiation or maintenance were entered into the model. These factors included health behaviors and substance use (i.e. self-assessed physical activity level, intake of fruits and vegetables, intake of high-fat foods, alcohol use, attitudes toward illicit drug use, risk-taking, seat belt use), instrumental uses for smoking (i.e. smoking to suppress appetite, smoking when bored instead of snacking, fear of weight gain after cessation), and indicators of smoking dependence and intentions (i.e. Fagerstrom nicotine dependence level, history of a successful 24-hour quit attempt, confidence in remaining abstinent following BMT). Assessment of smoking-related factors was conducted using standard items in the smoking literature (e.g. Fagerstrom Test of Nicotine Dependence) (29), while other health-related behaviors (e.g. dietary intake, physical activity) were measured using single-item questions similar to ones commonly used in large epidemiological surveys (e.g. 45–47). Finally, interactions between gender, minority status, and predictor variables were created and considered for inclusion in the final model.

The final analysis examined the relationship between cigarette brand switching for health and smoking cessation during a 1-year period following the 6-week tobacco ban. A logistic regression analysis was used to assess whether brand switching altered the odds of quitting while controlling for demographic factors, nicotine dependence, and confidence of staying quit following BMT. Next, interactions between gender, ethnicity, brand switching, and cessation rates were explored and considered for inclusion in the logistic model.

### Study Hypotheses

It was predicted that Switchers would report engaging in better health practices (e.g. higher physical activity, lower dietary fat intake) than Nonswitchers in the cross-sectional analyses. Also, Switchers were predicted to be more ready to quit, less nicotine dependent, and more likely to have attempted to quit smoking in the past year than Nonswitchers. In the prospective analysis, Switchers and Nonswitchers were predicted to have similar quit rates over a 1-year period. No specific hypotheses were made regarding other factors examined in this study.

## RESULTS

### Univariate Comparisons of Switchers and Nonswitchers

Approximately 31.3% of male and 32.3% of female smokers reported switching cigarette brands in order to reduce associated health risks of smoking. Demographic and cigarette use differences between Switchers and Nonswitchers are presented in Table 1. Switchers did not significantly differ from Nonswitchers in terms of age, family income, or education, regardless of gender. In terms of ethnicity, male Switchers did not differ from Nonswitchers in terms of the likelihood of being from ethnic minority backgrounds. However, female Switchers were more likely to be from an ethnic minority background than female Nonswitchers (OR = 1.36,  $p = 0.014$ ). Hispanic-American females and females in the "Other" ethnic category demonstrated the highest prevalence of brand switching. In contrast, both male and female African-American participants had the lowest rates of brand switching.

For both males,  $t(1, 6050) = 5.49, p < .001$ , and females,  $t(1, 1942) = 3.71, p < .001$ , Switchers smoked fewer cigarettes per day than Nonswitchers. Male,  $t(1, 6049), p < .001$ , and female,

TABLE 1  
Univariate Comparisons of Cigarette Brand Switchers for Health Versus Other Smokers

	Males			Females		
	Brand Switcher <i>n</i> = 1,893	Nonswitcher <i>n</i> = 4,160	<i>p</i> -value <sup>3</sup>	Brand Switcher <i>n</i> = 627	Nonswitcher <i>n</i> = 1,317	<i>p</i> -value <sup>3</sup>
Age (mean/SD)	19.65/1.99	19.67/1.99	0.651	19.84/2.47	19.97/2.51	0.264
Ethnic Background <sup>1</sup>			0.596			0.014
Euro-American	31.1%	68.9%		31.1%	68.9%	
African-American	25.3%	74.7%		28.3%	71.7%	
Hispanic-American	32.6%	67.4%		45.3%	54.7%	
Other	36.6%	63.4%		38.5%	61.5%	
Family Income—% < 20K <sup>2</sup>	22.3%	20.2%	0.059	22.3%	24.1%	0.392
Education—% ≤ high school <sup>2</sup>	70.7%	70.5%	0.889	59.5%	59.0%	0.837
Cigarettes Per Day Smoked			<0.001			<0.001
10 or less	28.7%	25.6%		40.2%	33.4%	
11–20	49.2%	45.4%		45.3%	46.5%	
21–30	18.1%	22.0%		12.7%	16.9%	
31 or more	4.0%	7.0%		1.8%	3.2%	
Fagerstrom Dependence Level			<0.001			0.003
Very Low	38.0%	33.0%		43.4%	40.0%	
Low	30.7%	27.3%		30.8%	27.2%	
Medium	12.6%	13.7%		10.5%	13.1%	
High	14.2%	18.8%		13.2%	15.1%	
Very High	4.5%	7.2%		2.1%	4.6%	
Cigarette Type			<0.001			<0.001
Regular	42.6%	59.6%		28.9%	57.2%	
Light	48.7%	36.2%		61.7%	38.3%	
Ultra Light	2.7%	0.8%		6.1%	2.9%	
No Usual Brand	6.0%	3.4%		3.3%	1.7%	
I am confident that I will stay quit after BMT <sup>4</sup>			<0.001			<0.001
Strongly Agree	17.3%	15.1%		13.2%	11.4%	
Agree	24.3%	19.4%		26.5%	18.9%	
Neutral	45.9%	42.8%		47.4%	49.4%	
Disagree	7.9%	12.2%		9.1%	14.2%	
Strongly Disagree	4.6%	10.5%		3.8%	6.1%	

Notes: <sup>1</sup> *p*-value associated with ethnic background refers to within-gender differences in the percentage of Switchers versus Nonswitchers who were from a minority ethnic background. <sup>2</sup> These factors were dichotomized for ease of presentation. <sup>3</sup> *p*-value refers to the within-gender differences in the percentage of Switchers versus Nonswitchers who smoked regular cigarettes. <sup>4</sup> BMT = basic military training. Original question worded "Once I get out of Basic Military Training, I am confident that I will be able to stay quit permanently."

$t(1, 1942)$ ,  $p = .003$ , Switchers also reported lower Fagerstrom nicotine dependence scores than Nonswitchers. Male Nonswitchers were twice as likely (OR = 2.00,  $p < .001$ ) and female Nonswitchers were 1.5 times as likely (OR = 1.52,  $p < .001$ ) to smoke regular cigarettes compared to their brand switching counterparts. Finally, for both males,  $t(1, 6051) = -8.20$ ,  $p < .001$ , and females,  $t(1, 1942) = -4.36$ ,  $p < .001$ , Switchers were more confident they could maintain abstinence from smoking following BMT than Nonswitchers.

### Predictors of Cigarette Brand Switching

Table 2 presents a logistic regression model of the relationship between demographic factors, smoking history, health behaviors, and cigarette brand switching. In the logistic model, controlling for other demographic and health factors, decreasing age, and Euro-American ethnic status increased the odds of brand switching. One exception to the findings was that individuals in the "Other" ethnic classification were more likely to have switched cigarette brands than Euro-American participants. Further, women were slightly less likely to have switched cigarette brands for health than men. Neither income nor education level were significant predictors of brand switching in the multivariate model.

Four of the seven health and safety factors significantly discriminated Switchers and Nonswitchers. Switchers reported a more healthy diet than Nonswitchers. That is, Switchers had a higher intake of fruits and vegetables and a lower consumption of high-fat foods compared to Nonswitchers. Also, two measures of risk-taking, participant's self-rating of their fondness for risk-taking and frequency of seat belt use, both suggested that Switchers were less likely to take safety risks than Nonswitchers.

All three variables measuring the instrumental use of smoking distinguished Switchers from Nonswitchers. Specifically, Switchers were more likely to use smoking to suppress their appetite, to avoid snacking when bored, and to be fearful of weight gain following smoking cessation. Switchers and Nonswitchers also differed on all three smoking dependence/intention variables. Switchers reported slightly less nicotine dependence, a greater likelihood to have experienced a successful 24-hour quit attempt, and more confidence that they would remain abstinent following the BMT tobacco ban compared to Nonswitchers.

As can be seen in Table 2, seat belt use significantly interacted with ethnicity in its effect on brand switching status. Follow-up tests indicated that the relationship between seat belt use and brand switching was stronger for African-Americans (OR = 1.87,

TABLE 2

Comparison of the Smoking History and Health Behaviors of Switchers and Nonswitchers

Variable	Odds Ratio	95% CI		p-value
		Low	High	
<b>Demographic Factors</b>				
Age	0.97	0.94	0.99	0.018
Gender	0.89	0.79	0.99	0.046
Ethnic Status (versus Euro-American)				<0.001
African-American	0.16	0.06	0.43	<0.001
Hispanic-American	0.43	0.18	1.04	0.062
Other Ethnic Groups	1.38	0.65	2.94	0.040
Income	0.97	0.92	1.03	0.361
Education	0.95	0.86	1.04	0.239
<b>Health and Safety Factors</b>				
Physical Activity	1.04	0.99	1.09	0.100
Fruit and Vegetable Intake	1.05	1.01	1.08	0.009
High-Fat Food Intake	0.91	0.88	0.94	<0.001
Risk-Taking	0.94	0.90	0.99	0.011
Seat Belt Use	1.35	1.21	1.50	<0.001
Alcohol Use	0.97	0.92	1.02	0.289
Attitude Toward Illicit Drugs	0.99	0.93	1.05	0.723
<b>Reasons For Smoking</b>				
Smoke to Suppress Appetite	1.21	1.04	1.41	0.014
Smoke When Bored Instead of Snacking	1.25	1.12	1.38	<0.001
Fear of Weight Gain After Cessation	1.16	1.03	1.31	0.013
<b>Smoking Dependence/Intentions</b>				
Nicotine Dependence	0.98	0.95	0.99	0.044
Past Year 24-hour Quit Attempt	1.48	1.32	1.64	<0.001
Quit Confidence After BMT	1.15	1.10	1.21	<0.001
<b>Significant Interactions</b>				
Ethnic Status × Seat Belt Use				0.001

Notes: CI = Confidence Interval. Odds Ratios greater than 1.0 indicate that individuals scoring higher on the factor were more likely to be a brand switcher.

$p < .001$ ) and Hispanic-Americans (OR = 1.54,  $p < .001$ ) than Euro-Americans (OR = 1.18,  $p < .001$ ) and was not significant for individuals in the "Other" category (OR = 1.17, ns).

### Cigarette Brand Switching and Prospective Smoking Cessation

A total of 5,228 current smokers (1,681 Switchers, 3,547 Nonswitchers) were contacted 1 year after the 6-week BMT smoking ban to assess their smoking status. At the 1-year follow-up assessment, 12.5% of Switchers and 11.1% of Nonswitchers reported quitting smoking. Thus, there was a 1.4% difference in 1-year quit rates between Switchers and Nonswitchers. Table 3 presents relationships between demographics, number of cigarettes smoked, cigarette brand, whether one switched cigarette brands to reduce health risks, and 1-year smoking cessation rates. Females, African-Americans (compared to Euro-Americans), and individuals with lower FTND nicotine dependency scores demonstrated a greater likelihood of abstinence from cigarettes at 1 year. However, controlling for other factors in the logistic model, cigarette brand switching for health was not significantly related to the odds of quitting and this relationship was not significantly moderated by either gender or ethnicity. Furthermore, there were no significant interactions between brand switching, gender, ethnicity, and the likelihood of quitting.

TABLE 3

Brand Switching and One-Year Smoking Cessation Rates

Variable	Odds Ratio	95% CI		p-value
		Low	High	
Age	0.96	0.92	1.01	0.093
Gender (1 = Female, 0 = male)	1.24	1.05	1.45	0.011
Ethnicity (versus Euro-Americans)				0.012
African-American	1.51	1.10	2.06	0.010
Hispanic-Americans	1.39	1.04	1.85	0.025
Other	0.99	0.74	1.33	0.966
Income	1.01	0.93	1.10	0.853
Educational Level	1.16	1.01	1.33	0.036
Nicotine Dependence	0.88	0.85	0.91	<.001
Confidence in Quitting After BMT	1.31	1.22	1.41	<.001
Brand Switching (1 = Switcher, 0 = Nonswitcher)	1.04	0.89	1.21	0.658

Notes: CI = Confidence Interval. BMT = Basic Military Training. Dependent variable coded: 1 = abstinent, 0 = smoking.

### DISCUSSION

This study examined cigarette brand switching to reduce health risks in a population of smokers entering USAF BMT. Approximately 32% of smokers reported switching cigarette brands specifically to reduce their health risks, a rate similar to that found in the National Health Interview Survey (36). African-Americans, older participants, and females were the least likely to have switched cigarette brands to reduce health risks. Neither income nor education level distinguished Switchers and Nonswitchers.

Consistent with study hypotheses, current smokers who were Switchers reported smoking significantly fewer cigarettes each day, smoking more low-yield brands, and lower Fagerstrom nicotine dependence scores. However, because this study did not directly measure exposure (i.e. cotinine, inhalation depth), these results do not necessarily imply that Switchers had a lower exposure to tobacco smoke than Nonswitchers. Furthermore, Switchers were more confident that they could maintain abstinence following the forced smoking ban during BMT, which suggests that cigarette brand switching for health does not necessarily lower the desire of smokers to quit.

Switchers reported using smoking instrumentally to control appetite and weight at a higher rate than Nonswitchers. Results of this study also indicated that Switchers have a greater proclivity to quit smoking than Nonswitchers. That is, Switchers reported a higher prevalence of successful 24-hour quit attempts in the previous year and a higher level of confidence that they could remain abstinent following the BMT tobacco ban. Finally, Switchers reported greater concern regarding safety risks on two items: their penchant for risk-taking (e.g. driving fast, doing something dangerous) and frequency of seat belt use. This finding was particularly strong for ethnic minorities. Also, Switchers reported a higher intake of fruits and vegetables and a lower intake of high-fat foods than Nonswitchers. Thus, individuals who switch cigarette brands to reduce health risks may be a particularly approachable audience for safety and health promotion efforts.

The prospective analysis of smoking cessation found that the 1-year quit rates for Switchers was 1.4% greater than for Nonswitchers. However, a logistic regression model suggested that the odds of quitting in the 1-year period after BMT was not significantly related to cigarette brand switching for health. Therefore, consistent with the study hypothesis, the results of the prospective

analysis suggest that Switchers do not have a lower likelihood of quitting than Nonswitchers. These findings may provide useful data for the debate over whether harm reduction strategies should be suggested for recalcitrant smokers. Harm reduction, as an approach to drug policy, recognizes abstinence as an ideal outcome but acknowledges that many individuals will continue to use a substance despite its negative consequences (32). Thus, the goal of harm reduction is to minimize the hazards associated with drug use rather than drug use per se (32–34). Applied to smokers, harm reduction would advocate strategies such as long-term use of nicotine replacement therapies or cigarette-like devices such as Eclipse (19,31,35). Some researchers have argued that harm reduction strategies should not be targeted for smokers since these strategies could lure smokers into a false sense of safety and could actually lower the chances of eventual cessation (31). This study suggests that, at least for smokers who believe (however accurately) they have reduced their health risks by switching cigarette brands, the likelihood of subsequent cessation is not diminished by harm reduction attempts.

Although this study provides the first prospective analysis of cigarette brand switching to reduce health risks in an entire population of young adults, certain limitations should be noted. First, since all subjects were military recruits, the generalizability of these findings to the larger population of smokers is unknown. The smokers included in this study were young, had smoked for a limited time period, and were likely less nicotine dependent than many mature smokers. Replication of the study findings with older, more addictive smokers is necessary before general conclusions about brand switching for health can be offered. Second, this study could not verify that smokers had actually switched cigarette brands specifically to reduce health. It is possible that some smokers switched brands primarily for other reasons (e.g. taste, price), yet reported that they had switched brands to reduce health risks. Third, assessment of health behaviors (e.g. dietary intake, activity) was generally based on single-item measures commonly used in large epidemiological studies. Therefore, data presented based on these items should be considered tentative until research using more comprehensive methodologies replicate the conclusions of this study. Similarly, due to the large population surveyed, indicators of biological exposure (e.g. number of cigarettes smoked, nicotine dependency scores) rather than actual measures of exposure were obtained in this study. Studies using biochemically verified indicators of tobacco exposure should be conducted to confirm the findings of this study.

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