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# Awareness of FDA-mandated cigarette packaging changes among smokers of ‘light’ cigarettes

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## Abstract

Previous research has clearly demonstrated that smokers associate cigarette descriptors such as ‘light’, ‘ultra-light’ and ‘low tar’ with reduced health risks, despite evidence showing that cigarettes with these descriptor terms do not present lower health risk. In June 2010, regulations implemented by the US Food and Drug Administration went into effect to ban the use of ‘light’, ‘mild’ and ‘low’ on cigarette packaging. We surveyed smokers participating in human laboratory studies at our Center in Philadelphia, PA, USA shortly after the ban went into effect to determine the extent of awareness of recent cigarette packaging changes among smokers of light cigarettes. In our sample of 266 smokers, 76 reported smoking light cigarettes, but fewer than half of these smokers reported noticing changes to their cigarette packaging. Simple removal of a few misleading terms may be too subtle of a change to register with consumers of so-called ‘low tar’ cigarettes; more comprehensive regulation of cigarette packaging design may be necessary to gain smokers’ attention and minimize misperceptions associated with tobacco pack design characteristics and color.

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## Introduction

As cigarette advertising restrictions become more widespread, cigarette packaging has become one

of the last available venues for tobacco manufacturers to convey product information to the consumer [1]. Some of the most compelling evidence on the effects of cigarette packaging is from the tobacco industry in their efforts to utilize the cigarette pack as an effective and direct communication vehicle [2]. In 2009, the Family Smoking Prevention and Tobacco Control Act (FSPTCA) gave the US Food and Drug Administration (FDA) the authority to regulate the manufacture, marketing and distribution of tobacco products [3]. Regulations included a ban on use of the terms ‘light’, ‘mild’, ‘low tar’ and similarly misleading descriptors on cigarette packaging based on research indicating that these terms are misleading to consumers—many smokers believe that cigarettes with these descriptors (hereafter ‘light cigarettes’) offer lower health risks and are easier to quit than regular cigarettes despite no scientific evidence to support these perceptions [4–7]. At this time, the FDA has not specified additional terms for removal beyond the specified ‘light’, ‘mild’ and ‘low’. Manufacturers were required to stop distributing cigarette packages with these descriptors to retailers by 22 July 2010 [3]. We surveyed smokers participating in human laboratory studies at our center shortly after the ban on misleading descriptors went into effect to determine the percentage of light cigarette smokers who noticed changes to their preferred brand, and to explore factors that might influence whether or not a smoker was aware of the packaging changes. We also surveyed smokers of Full Flavor cigarettes (which were

not affected by the descriptor ban) to provide a comparison group.

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## Materials and methods

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Data were drawn from two ongoing human laboratory studies between September 2010 and December 2011 [8, 9]. This time period was chosen to allow time for retailers to sell off existing stock after 22 July 2010, when the predescriptor ban packages could no longer be distributed for retail. Recruitment across these two studies provided a diverse array of non-treatment seeking daily smokers in a critical timeframe after the implementation of the descriptor ban. Both studies were approved by the University of Pennsylvania Institutional Review Board. Smokers responding to flyers and mass media completed telephone screening to determine initial eligibility. Eligible smokers for the first study were ages 21–65, reported smoking  $\geq 5$  cigarettes per day (CPD) for  $\geq 6$  months and were not planning to quit smoking [8]. Eligible smokers for the second study were ages 18–65, reported smoking  $\geq 10$  CPD for  $\geq 5$  years, currently smoked menthol cigarettes  $\geq 90\%$  of the time, and were not planning to quit smoking in the next 2 months [9]. We recruited from these non-cessation-focused studies so that the results would best represent the inveterate smoker who had no plans to quit smoking.

Participants provided written informed consent and completed questionnaires on demographics, smoking history and the Fagerström Test for Nicotine Dependence (FTND) [10] at the beginning of the first laboratory session. Smoking status was biochemically confirmed by exhaled carbon monoxide reading, and research staff examined the participant's current cigarette pack in order to verify the usual brand. Brands were classified as full flavor, medium, light or ultra-light based on the predescriptor ban categorization. This categorization was conducted with input from the Tobacco Pack Image Library, a comprehensive database of images of US tobacco packs, directed and maintained by Dr Bansal-Travers. This database includes a longitudinal evaluation of the top 20 cigarette

brands and associated varieties sold in the United States since 2004. Research staff was trained to recognize formerly 'light' and 'ultralight' cigarettes based on known changes to brand design, and completed standardized forms recording cigarette packaging features. All forms were reviewed for accuracy by a second staff member.

The smoking history questionnaire included an open-ended item assessing smokers' perceptions of recent changes to their cigarette packaging: 'Have you noticed a change to your cigarette packaging recently?' Responses from both studies were pooled prior to analysis. Answers to the open-ended question were classified as follows: 0 = no changes; 1 = change in descriptors such as light, ultra-light, 100s; 2 = change in color/logo; 3 = removal of the word 'menthol' from the packaging; and 4 = changes to text explicitly related to health or safety. Descriptive statistics were obtained for the overall sample, and for the subsets of smokers who reported smoking (i) full flavor or medium cigarettes (Full Flavor subset), and (ii) light or ultra-light cigarettes (Light subset). Logistic regression was employed to examine whether Light smokers were more likely to report a change in cigarette packaging than Full Flavor smokers, controlling for age, sex, education, nicotine dependence, smoking quantity, menthol versus non-menthol and time since the descriptor ban went into effect; non-significant covariates were allowed to drop from the model. In an exploratory analysis, we used logistic regress to examine whether individual differences were associated with noticing changes in cigarette packaging. Terms were included for age (standardized); sex (0 = male, 1 = female); smoking quantity (0 =  $< 10$  CPD, 1 = 10 or more CPD); nicotine dependence (0 = below median FTND score, 1 = above median FTND score); education (0 = HS or below, 1 = some college or college graduate); use of menthol cigarettes (0 = smokes non-menthol cigarettes, 1 = smokes menthol cigarettes); and number of months since the ban on misleading descriptors took effect. To avoid potential confounds due to demographic factors associated with smoking Light versus Full Flavor cigarettes, and because not all Full Flavor brands did enact

changes to package design during this time period, the exploratory analysis was performed separately within each subset.

## Results

A total of 266 smokers (148 female) completed the questionnaires. The mean length of time passed since the descriptor ban went into effect was 10.7 months (SD 4.9, range 2–18). Table I lists demographic characteristics of the participants. Consistent with previous research [11, 12], Light smokers were significantly more likely to be female ( $P = 0.003$ ), Caucasian ( $P < 0.0001$ ), have some higher education ( $P < 0.001$ ), and be less nicotine dependent ( $P < 0.0001$ ) than Full Flavor smokers.

In the logistic regression model, Light smokers were significantly more likely to report noticing a change compared with Full Flavor smokers (OR 7.4,  $P < 0.0001$ ); 34 out of 76 (44.7%) Light smokers noticed a change in their cigarette packaging recently, compared with 28 out of 190 Full Flavor smokers (13.7%). Among Light cigarette smokers, 28 noticed a change in descriptors, and 6 noticed a change in the color or logo. Reported changes to descriptors were generally consistent with known changes for each participant's preferred brand (e.g. 'They stopped calling them Camel Lights and began calling Camel Blue'; 'They were Marlboro Lights but then they got changed to Marlboro Gold'). Also among Light cigarette smokers, menthol smokers were more likely to report noticing a change (OR 3.3,  $P = 0.041$ ; Table II), whereas older smokers were less likely to report noticing a change (OR 0.42 for standardized age,  $P = 0.006$ ). In comparison, 7 Full Flavor smokers reported a change in descriptors, 11 reported a change in the color or logo, 4 reported removal of the word 'menthol', and 4 reported changes to text explicitly related to health or safety (Surgeon General's warning or Fire Safety Compliance). Full Flavor smokers with at least some college education were more likely to report noticing a change (OR = 3.0;  $P = 0.03$ ). There were no effects of age or smoking

**Table I.** Demographic characteristics are presented for the overall sample as well as for the subsets of Full Flavor and Light smokers

	Overall sample	Full Flavor smokers	Light smokers
<i>n</i> (% female)	266 (55.6)	190 (50.0)	76 (69.7)
Age (SD)	34.4 (10.8)	35.0 (10.7)	33.1 (11.1)
CPD (SD)	15.0 (6.8)	15.0 (7.1)	15.0 (6.2)
FTND score (SD)	4.7 (2.1)	5.2 (1.9)	3.6 (2.1)
Race:			
Caucasian	148	82	66
African American	103	95	8
Asian	3	1	2
Other	11	11	0
Not reported	1	1	0
Education:			
Some high school	18	16	2
High school graduate	72	68	4
Some college	110	78	32
College graduate	66	28	38

menthol on noticing a change in the Full Flavor subset, and there were no effects of sex, smoking quantity, nicotine dependence or months since the ban on misleading descriptors went into effect in the either subset (all  $P$  values  $> 0.05$ ).

## Discussion

Tobacco companies have become increasingly reliant on cigarette packaging as a marketing tool as other avenues of marketing have been restricted [1, 13], and many companies rely on package design to convey implicit messages about the cigarettes contained within [14]. Effective marketing regulations are a key component of an effective tobacco control policy; however, in our sample of cigarette smokers in the greater Philadelphia area, fewer than half of individuals who smoked light cigarettes were aware of the removal of misleading descriptor words from the packaging of their preferred brands.

The limited awareness of the effects of tobacco regulation changes among Light smokers in our sample is similar to another study, which surveyed smokers in the United States shortly after the

**Table II.** Summary of logistic regression models predicting whether participants reported a recent change to their cigarette packaging (1) or not (0)

	Odds ratio	$\chi^2$	95% Confidence Interval
Overall sample ( $n = 266$ )			
Cigarette type*** (Lights versus Full Flavor)	7.4	28.5	3.5–15.4
Light smokers ( $n = 76$ )			
Age**	0.42	7.6	0.22–0.78
Sex	2.4	1.8	0.67–8.4
CPD	4.7	3.7	0.97–22.5
FTND	1.2	0.13	0.40–3.7
Education	0.28	1.8	0.04–1.8
Smokes menthol cigarettes*	3.3	4.2	1.1–10.1
Time	1.0	<0.01	0.89–1.1
Full Flavor smokers ( $n = 190$ )			
Age	0.81	0.81	0.51–1.3
Sex	1.4	0.69	0.61–3.5
CPD	5.6	2.6	0.70–45.4
FTND	1.7	0.93	0.57–5.1
Education*	3.0	4.8	1.1–8.1
Smokes menthol cigarettes	1.5	0.45	0.44–5.4
Time	0.97	0.50	0.88–1.1

\* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$ ; CPD, cigarettes per day; FTND, Fagerström Test for Nicotine Dependence; Time, number of months since ban on misleading descriptors took effect.

FSPTCA was passed to assess general knowledge and awareness of the regulation itself [15]. This study found that less than one-third of smokers who completed the survey were aware of the new laws allowing the FDA to regulate tobacco products. In the United States, these events were not accompanied by a public education or outreach program to ensure that smokers were informed of the regulations or the reasoning behind them. In contrast, similar bans in the United Kingdom and Australia were accompanied by public campaigns intended to correct misperceptions about light cigarettes [16, 17]. These educational campaigns were successful in reducing misperceptions for a time, although beliefs about light cigarettes eventually rebounded after the campaigns ended. Together, these studies suggest that a sustained public outreach effort accompanying tobacco regulation changes may be warranted in order to maximize awareness among the population they are intended to protect.

Low awareness of packaging changes among light cigarette smokers in this sample may also support an idea put forth by other tobacco policy

researchers: that tobacco companies may have blinded consumers to the implementation of the descriptor ban by emphasizing alternative packaging characteristics meant to convey the same information [18–20]. Many brands already employed specific color schemes to distinguish cigarette flavors within the brand, associating red with full flavor, gold or blue with light and silver or orange with ultra-light. Studies have shown that smokers associate lighter or whiter colors with reduced harm [19, 21, 22]; substituting light color words for the banned descriptors may allow cigarette marketers to convey the same impression. On most cigarette brands, the only change to the package was the simple replacement of the banned descriptor term with the name of the color associated with that packaging (e.g. ‘Marlboro Light’ became ‘Marlboro Gold’, ‘Camel Light’ became ‘Camel Blue’), with no other color or design change. In many instances, the color that was included in the name (e.g. Marlboro Gold) was not actually displayed on the front of the pack; rather it was only visible on the top and bottom of the pack. Therefore, to a consumer

looking at a typical retail display, the only noticeable difference was the removal of 'Light' with no other significant change. Some brands incorporated changes to full flavor packaging in order to bring package design into alignment across the brand, which may have helped to mask the purpose of changes to light cigarette packaging within a larger context of changes to the brand design. Indeed, some Full Flavor smokers in our sample reported recent changes to their cigarette packaging as well, including changes to coloring and logos. A few Full Flavor smokers reported removal of the word 'menthol' from their cigarette packaging, a change which was not required by the new FDA regulations, and others reported noticing variations to the standard text of the Surgeon General's warning or new Fire Safety Compliance indicators. However, the odds of noticing a change were  $\sim 7$  times greater for Light cigarette smokers than for Full Flavor smokers, suggesting that the changes reported in our survey do largely reflect the mandated changes to light cigarette packaging. Finally, some cigarette manufacturers heralded upcoming packaging changes with package inserts reassuring smokers that although the packaging was going to change, the cigarettes would remain the same [23]. Although these inserts to consumers were soon banned by the FDA, this message was also part of a large scale retailer education program that educated retailers on how to direct tobacco consumers to the packs and varieties that they are accustomed to, despite the packaging change. These messages may have helped consumers and retailers overlook the new packaging that, for the most part, underwent a minimal redesign.

These data were drawn from a convenience sample of individuals who were participating in human laboratory studies at our center shortly after the regulation went into effect, which may or may not be representative of the general smoking population. However, this approach allowed us to examine responses shortly after the ban on misleading descriptors went into effect, and surveyed a diverse sample of current daily smokers who were not intending to quit smoking. Further study strengths include requiring participants to produce their cigarette pack to a

trained research technician to verify cigarette brand type, and smoking status was biochemically verified. It is possible that smokers noticed changes but quickly became accustomed to the new packaging, and thus did not remember a difference when we asked the question. However, if that were the case, we would expect to see more smokers reporting changes in the early months and tapering off as time progressed; we saw no such effect. Finally, smokers in this study were asked only whether they had noticed any changes to their cigarette packaging recently; the study did not assess awareness of the regulation itself, or changes in smoking behavior or perceptions of the harmfulness of their cigarettes relative to other brands. Future studies targeting changes in health perceptions and smoking behavior are necessary in order to understand the full impact of the ban on misleading descriptors.

It is imperative that future regulations related to tobacco packaging design characteristics take into account both implicit and explicit messages conveyed by the pack, particularly those that can be manipulated to alter consumer perceptions.

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### Conflict of interest statement

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None declared.

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