



## Relation between newspaper coverage of 'light' cigarette litigation and beliefs about 'lights' among American adolescents and young adults: the impact on risk perceptions and quitting intentions

Sally M Dunlop and Daniel Romer

*Tob Control* published online June 7, 2010

doi: 10.1136/tc.2009.032029

---

Updated information and services can be found at:

<http://tobaccocontrol.bmj.com/content/early/2010/06/05/tc.2009.032029.full.html>

---

*These include:*

**References**

This article cites 31 articles, 16 of which can be accessed free at:  
<http://tobaccocontrol.bmj.com/content/early/2010/06/05/tc.2009.032029.full.html#ref-list-1>

**P<P**

Published online June 7, 2010 in advance of the print journal.

**Email alerting service**

Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

---

**Notes**

---

Advance online articles have been peer reviewed and accepted for publication but have not yet appeared in the paper journal (edited, typeset versions may be posted when available prior to final publication). Advance online articles are citable and establish publication priority; they are indexed by PubMed from initial publication. Citations to Advance online articles must include the digital object identifier (DOIs) and date of initial publication.

---

To order reprints of this article go to:

<http://tobaccocontrol.bmj.com/cgi/reprintform>

To subscribe to *Tobacco Control* go to:

<http://tobaccocontrol.bmj.com/subscriptions>

# Relation between newspaper coverage of 'light' cigarette litigation and beliefs about 'lights' among American adolescents and young adults: the impact on risk perceptions and quitting intentions

Sally M Dunlop, Daniel Romer

Adolescent Risk Communication Institute, Annenberg Public Policy Centre, University of Pennsylvania, Philadelphia, PA, Pennsylvania, USA

## Correspondence to

Dr Sally M Dunlop, Adolescent Risk Communication Institute, Annenberg Public Policy Centre, University of Pennsylvania, 202 S 36th Street, Philadelphia, PA 19104, USA;  
[sdunlop@asc.upenn.edu](mailto:sdunlop@asc.upenn.edu)

Received 5 June 2009

Accepted 3 November 2009

## ABSTRACT

**Aim** To investigate the impact of newspaper use in a year of increased coverage of litigation against the tobacco industry on youths' beliefs about the health risks of 'light' cigarettes, and examine relations between inaccurate beliefs about 'lights', perceptions of risk and intentions to quit smoking.

**Participants** The data come from the 2004 National Annenberg Survey of Youth, a representative random digit dial telephone survey of youths aged 14–22 years in the USA (n=1501; current smokers, n=305; 'lights' smokers, n=112).

**Design** All youths were asked about newspaper use and beliefs regarding 'light' cigarettes (riskiness, addictiveness, ease of quitting). Smokers reported on risk perceptions and quitting intentions. We also examined changes in newspaper coverage related to 'lights' from January 2001 to April 2004.

**Results** Newspaper coverage related to 'lights' increased in the first months of 2003, and continued into 2004. Logistic regression analyses suggest that 'lights' smokers with lower levels of newspaper use were most likely to hold inaccurate beliefs about 'lights' (OR=5.93, 95% CI 1.48 to 23.77). Smokers of 'lights' with inaccurate beliefs were less likely to perceive their smoking as risky (OR=0.29, 95% CI 0.11 to 0.87), and smokers with inaccurate beliefs were less likely to have strong quitting intentions (OR=0.52, 95% CI 0.28 to 0.96).

**Conclusions** Inaccurate beliefs about the risks of 'lights' were negatively related to youth smokers' perceptions of risk and intentions to quit smoking. News coverage surrounding the tobacco industry's failure to disclose these risks might help reduce these inaccurate, and potentially dangerous, beliefs.

In March 2003, an Illinois judge found Philip Morris USA liable in a class-action consumer fraud lawsuit and ordered the company to pay \$10.1 billion for failing to inform consumers that its 'light' cigarettes were no less harmful than full-tar cigarettes. Philip Morris made an appeal against the verdict on the basis that this settlement, in combination with the 1998 Master Settlement Agreement, would lead the company into bankruptcy, and they won the appeal in 2005. This lawsuit was the first 'light' cigarette case to reach trial, and it garnered significant attention in the national media. To date, no research has investigated the role of news media coverage of such litigation cases in informing public

understanding of the health risks associated with smoking 'light' or low-tar cigarettes (hereafter referred to as light cigarettes or lights).

Light cigarettes are manufactured with a series of small holes in the filter tipping paper that dilute tobacco smoke and, as a result, yield lower amounts of tar and nicotine when tested by machines.<sup>1</sup> Following their introduction in the 1950s, from the late 1960s, lights were marketed to the health-concerned smoker,<sup>2</sup> using advertisements that were designed to implicitly reassure smokers that they could continue to smoke with less risk.<sup>3</sup> Using advertising that targeted the 'intelligent' and health-concerned smoker,<sup>4</sup> lights had captured 69% of the market by 1992.<sup>5</sup> Despite the marketing of light cigarettes as less risky, epidemiological data indicate that smoking light cigarettes compared to regular cigarettes has negligible or no health benefit.<sup>6–9</sup> This is largely due to compensatory smoking, in which smokers block the ventilation holes and modify their inhalation patterns, yielding the same levels of nicotine from lights and regular cigarettes.<sup>10</sup>

In early research, it was apparent that, congruent with the marketing of light cigarettes, smokers had dangerous misunderstandings about the health risks associated with smoking lights. In 1993, more than half of both smokers and non-smokers thought that the message conveyed by advertising for low yield cigarettes was that of a health benefit.<sup>11</sup> Smokers believed that cigarettes labelled 'low tar', 'low nicotine' or 'light' were less addictive and less harmful than regular cigarettes,<sup>12</sup> and less than 10% of smokers knew that one light cigarette can be equivalent to one regular cigarette in terms of tar intake.<sup>13</sup> More recent research has shown that, despite the increase in expert knowledge about the risks of light cigarettes, smokers remain ill-informed, with smokers of both light and regular cigarettes continuing to endorse the belief that lights are less harmful than other cigarettes.<sup>14–17</sup> Particularly concerning is evidence that some individuals smoke light cigarettes as an alternative to quitting smoking or as a means to reducing health risks.<sup>15 17–19</sup>

Studies investigating beliefs about lights have primarily focused on adults, despite the fact that many young smokers prefer light cigarettes.<sup>20</sup> Evidence suggests, however, that youths similarly misperceive the health risks of smoking lights. In early 2003, 40% of a sample of adolescent smokers thought that regular cigarettes delivered more

nicotine than lights, and approximately 30% agreed that lights would be easier to quit and less addictive than regular cigarettes.<sup>21</sup> These young smokers also thought they would be less likely to get lung cancer, have a heart attack or die from smoking-related disease if they smoked lights versus regular cigarettes.

Research suggests that efforts to debunk the myths about light cigarettes may be effective in reducing misperceptions about their health benefits. In 1993, two advertisements warning smokers of the dangers of light cigarettes were broadcast in Massachusetts. After this campaign, compared with the rest of the USA, Massachusetts smokers were less likely to think that lights had a chance of reducing the risks of health problems, and within Massachusetts, smokers who saw the campaign were less likely to believe that lights decreased the risk of health problems.<sup>22</sup> In the United Kingdom, following a policy change regarding the labelling of lights and an associated public information campaign, there was a substantial decline in reported beliefs about the benefits of light cigarettes.<sup>23</sup> However, by 2005, these beliefs rebounded slightly and the change in beliefs was no greater than in the USA, where there was no policy change. Experimental studies have also suggested that beliefs can be changed, at least in the short term, by messages with correct information about lights.<sup>24 25</sup>

To date, research investigating the potential for media to inform individuals' beliefs about light cigarettes has focused on mass media campaigns and messages, rather than news media. Tobacco control scholars recognise that news reportage and commentary is often neglected as a significant influence on beliefs and attitudes about smoking.<sup>26 27</sup> Tobacco control efforts in the USA often attract significant news media attention,<sup>28 29</sup> with the aggregate of unpaid media coverage outweighing even the most intensive antismoking advertising coverage.<sup>30</sup> Specifically, US news media coverage of tobacco issues often focuses on litigation events,<sup>31</sup> such as the light cigarette case. Although there is much evidence about the ways in which the media can influence youth smoking by way of anti-smoking advertising,<sup>32 33</sup> the role of news in shaping youth smoking-related attitudes and beliefs has been under-researched. Evidence, however, is beginning to show that newspaper coverage of tobacco control efforts can have an impact on youth smoking-related cognitions and behaviours.<sup>34 35</sup>

In the current study, the primary objective was to explore whether newspaper use in a time of increased coverage of the lights litigation case was associated with adolescent and young adults' beliefs about the health benefits of light cigarettes. In order to quantify the level of newspaper coverage about light cigarettes around the time of the case against Philip Morris, we first conducted a search of major US newspapers for any articles referencing light cigarettes and their health effects. Newspapers were the news media chosen because recent research has shown that tobacco stories are most frequently found in newspapers.<sup>29</sup> In fact, during the period from 2002 to 2003, Long *et al* found only four stories on TV news related to litigation against the tobacco industry. While youths are likely to use a variety of sources for news, data from the 2001 Monitoring the Future survey indicate that 36% of 8th graders read newspapers at least weekly, and that 52% of 12th graders use newspapers this frequently.<sup>36</sup>

In considering smoking in youth samples, public health practitioners are not only concerned with encouraging quitting among smokers, but also with preventing uptake among non-smokers. For this reason, we consider beliefs about the health benefits of light cigarettes for both smokers and non-smokers. We expected that youths with higher levels of newspaper use

would show more accurate beliefs about the health risks associated with smoking light cigarettes. The second aim of the current study was to explore the ways in which smokers' beliefs about the health benefits of light cigarettes relate to their perceptions of personal risk from smoking and intentions to quit. It was expected that smokers of lights who believe that light cigarettes provide some health benefit would be less likely to (a) perceive their smoking as risky, and (b) have strong intentions to quit smoking. We also explored whether beliefs about light cigarettes might be related to intentions to quit for smokers of regular cigarettes.

## METHODS

### Newspaper coverage analysis

We conducted a quantitative analysis of the level of newspaper coverage afforded to light cigarettes and their health risks from the period of January 2001 to April 2004. The Lexis-Nexis online database was used to search for relevant news articles. As we were interested in describing changes in the coverage of this topic over time—rather than capturing total coverage—we searched the highest circulating newspapers in the major regions of the USA in order to represent the national media environment.<sup>i</sup> To be included in the analysis, articles had to refer to the health risks associated with light cigarettes.<sup>ii</sup>

### Survey

#### Participants and procedure

Interviews were conducted with 1501 adolescents and young adults aged 14 to 22 as part of the 2004 National Annenberg Survey of Youth (NASY). This survey is conducted annually by the Annenberg Public Policy Center at the University of Pennsylvania, using random digit dialling telephone procedures to obtain a nationally representative sample (for a description of the development of NASY, see Romer<sup>37</sup>). The size of the sample ensured that it would include at least 300 smokers for our analyses. The survey was approved by the institutional review board of the University of Pennsylvania. For youths under the age of 18, parents or guardians were asked for permission to interview their child. The interview was given in Spanish for those households with Spanish-speaking youths (5%). Respondents were not compensated for their time. The overall response rate, taking into account the households which could not be screened (but may have had an eligible respondent) was 52%, comparable to other national telephone surveys with adults conducted by the Centers for Disease Control and Prevention.<sup>38</sup>

### Measures

The survey included information on age, gender, racial-ethnic identity, region of the country and urban/rural/suburban residence. As a measure of socioeconomic status, neighbourhood household income was computed from the average income for the participant's zip code and was coded into three categories (low=\$35 000 or less, moderate=\$35 000 to \$50 000, or high=US \$50 000 or above). Three per cent of respondents were missing zip code data and were assigned to the moderate category. Education level was coded into three categories (low=some high school, moderate=finished high school no college, high=some

<sup>i</sup> These newspapers were *USA Today*, *The New York Times*, *The LA Times*, *The Washington Post*, *The Chicago Tribune*, *The Houston Chronicle* and *The Arizona Republic*.

<sup>ii</sup> This inclusion criterion eliminated some articles that were summaries of the stock market and briefly mentioned the effect of the light cigarettes lawsuits on the share price of a tobacco company.

college). Respondents were asked how often they read a newspaper with responses in three categories to indicate newspaper use (1=never or less than weekly, 2=weekly, 3=most days).

All respondents were asked the following questions regarding their beliefs about light cigarettes; 'Some cigarette companies sell light versions of cigarettes, for example, Marlboro Lights. Do you think a light cigarette is more likely, less likely, or about as likely as a regular cigarette to be: (a) risky for your health, (b) addictive, (c) easy to quit smoking. These three questions were combined into an index of beliefs about the health benefits of light cigarettes. Responses that indicated beliefs that light cigarettes were less likely to be risky, less likely to be addictive, or more likely to be easy to quit were classified as a health benefit belief. Responses were then categorised into a dichotomous variable indicating light health benefit beliefs (0=no health beliefs, 1=at least one health belief).

To identify smokers, respondents were first asked, "Have you ever smoked a cigarette, even one or two puffs?" If they had, they were then asked on how many of the last 30 days they had smoked cigarettes, and classified as current smokers if they had smoked within the last 30 days. Two items were used as measures of level of smoking (a) the number of days in the last month on which they smoked (mean=21.11, SD=15.24), and (b) the average number of cigarettes that they reported smoking on average on the days on which they smoked (mean=7.94, SD=6.85). All smokers were asked "Do you currently smoke a brand of light or ultra-light cigarettes?" (0=no, 1= yes).

As a measure of perceived personal risk from smoking, all smokers were asked "In your opinion, is your smoking very risky for your health, somewhat risky, a little risky, or not at all risky for your health?" Responses were given on a 4-point scale (1=not at all risky, 4=very risky), but this scale was highly skewed in the negative direction (skewness=-2.05) and was therefore recoded into a dichotomous variable (1=very risky, 0=not risky - risky). All smokers were also asked "Do you plan to quit smoking cigarettes?" and if they answered yes, they were asked to indicate if they planned to quit within the next 6 months (strong intention) or the next year (weak intention). This variable was also dichotomised (1=strong intention to quit; 0=weak/no intention to quit).

### Statistical analyses

The statistical package SPSS 15.0 was used for all analyses. All percentages reported are based on data weighted according to US

census data,<sup>39</sup> and all multivariate analyses were conducted with unweighted data. The small proportion of respondents with missing data for any analysis were removed from that analysis, resulting in sample sizes which differ slightly for each analysis. Preliminary  $\chi^2$  and independent sample t tests were conducted to determine any differences between light cigarette smokers and smokers of regular cigarettes at the univariate level. Following this, a series of binary logistic regression analyses were conducted to predict the outcomes of interest from the relevant independent variables while adjusting for other demographic and smoking characteristics. Only data from respondents who had no missing data on the variables of interest were included in each analysis. The outcomes of interest were (a) having beliefs about the health benefits of light cigarettes, (b) perceived personal risk from smoking, and (c) strong intention to quit within the next 6 months. Given that certain demographic variables are consistently associated with smoking lights,<sup>15 17-19</sup> the control variables entered in each regression model were age, gender, race, income and education. The analysis to predict perceived personal risk was conducted only for smokers of light cigarettes. The analysis to predict intentions was conducted with the full sample, in order to test if beliefs about lights had effects on intentions for smokers of both light and regular cigarettes, and this model therefore included an interaction between smoking lights versus regular cigarettes and health benefit beliefs. These models also included the two measures of smoking (days/week and cigs/day) as control variables.

## RESULTS

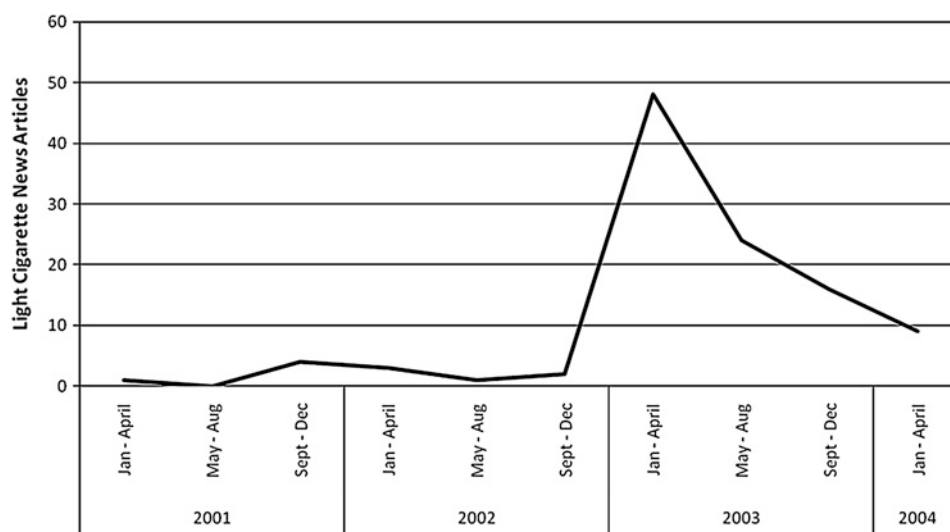
### Newspaper coverage analysis

A total of 108 news articles were retrieved. As depicted in figure 1, coverage of light cigarettes in these newspapers increased greatly in the first 4 months of 2003. During this time, there were 48 articles on light cigarettes, compared to two in the previous 4 months. The level of coverage continued to remain above the previous level for the remainder of the year (see figure 1).

### Survey

Of the 1501 participants, 305 were current smokers (20%), and of these, 40% reported that they smoked lights (n=112). Demographic characteristics of non-smokers, lights smokers and non-lights smokers are shown in table 1. Light smokers were older than non-lights smokers, and were more likely to be female. They were also more likely to perceive their smoking as very risky.

**Figure 1** News coverage of light cigarettes from January 2001 to April 2004.



## Research paper

Independent samples t tests showed that, on average, smokers of lights smoked on more days of the last 30 days than smokers of regular cigarettes (lights: mean=26.42, SD=16.81; non-lights: mean=17.75, SD=13.14,  $t=5.03$ ,  $p<0.001$ ), but that there was no difference in the number of cigarettes smoked per day (lights: .59, SD=6.33; non-lights: mean=7.52, SD=7.15,  $t=1.33$ ,  $p>0.05$ ).

Among the full sample of youths, 22% held at least one inaccurate belief about the health benefits of light cigarettes. Logistic regression analysis was conducted to predict having at least one lights health benefit belief (compared to having none),  $\chi^2(15, 1495)=32.64$ ,  $p<0.01$  (results presented in table 2). There was a significant interaction between newspaper use and smoking, such that those youths who smoked light cigarettes and had low newspaper use were more likely to hold a health benefit belief than those who smoked light cigarettes and had high newspaper use. This interaction can be seen in figure 2. Racial-ethnic identity was also a significant predictor of having a health benefit belief, such that white youths were less likely than other groups to have at least one health benefit belief.

Logistic regression analyses were conducted to predict light smokers' perceptions that their smoking was very risky,  $\chi^2(12, 117)=36.53$ ,  $p<0.001$  (see table 3). Light smokers who held at least one health benefit belief about light cigarettes were less likely to perceive their smoking as very risky than those who

held no such beliefs. Education and level of smoking were also predictors of perceived risk, such that smokers with moderate education were more likely to perceive their smoking as very risky than those with low education, and those who smoked more cigarettes per day were more likely to perceive their smoking as very risky.

To examine the predictors of quitting intentions, logistic regression analyses were conducted using the full sample of smokers,  $\chi^2(14, 300)=39.15$ ,  $p<0.001$  (see table 4). As hypothesised, smokers who believed that light cigarettes had some health benefit were less likely to have strong quitting intentions, and this was true for both light and regular cigarette smokers (no significant interaction). Smokers who thought that their smoking was very risky were more likely to have strong quitting intentions than those who did not think it was very risky. Gender and smoking levels were also significant predictors of intentions, such that males were more likely to have strong intentions and those who smoked more frequently or more cigarettes were less likely to have strong quitting intentions.

## DISCUSSION

In this study, we found that, following a period of high levels of newspaper coverage of the lights cigarettes case against Philip

**Table 1** Sample characteristics and smoking-related variables among smokers (lights and non-lights) and non-smokers

	Smokers (lights) (n = 118)	Smokers (non-lights) (n = 187)	$\chi^2$	Non-smokers (n = 1196)
Age				
14–17 years	14 (12%)	42 (20%)	4.39*	677 (54%)
18–22 years	104 (88%)	145 (80%)		519 (45%)
Sex (female)	71 (57%)	77 (41%)	10.49**	604 (50%)
Racial-ethnic identity				
Non-Hispanic white	97 (79%)	138 (67%)	3.24	826 (66%)
Non-Hispanic black	6 (5%)	16 (14%)		137 (15%)
Hispanic	12 (14%)	22 (15%)		158 (15%)
Asian	0	2 (1%)		22 (1%)
Other	3 (2%)	5 (2%)		44 (3%)
Neighbourhood income				
Low	39 (35%)	61 (32%)	.22	314 (25%)
Moderate	45 (37%)	69 (39%)		526 (46%)
High	34 (27%)	57 (29%)		356 (29%)
Region				
Northeast	20 (20%)	39 (19%)	6.78	242 (19%)
Midwest	26 (22%)	49 (25%)		300 (24%)
West	18 (16%)	39 (26%)		253 (24%)
South	54 (42%)	60 (29%)		401 (33%)
Residence				
Urban	27 (26%)	57 (35%)	3.12	319 (28%)
Suburban	60 (50%)	92 (48%)		619 (51%)
Rural	31 (24%)	38 (17%)		258 (21%)
Education				
Low	35 (30%)	80 (43%)	4.78	783 (66%)
Moderate	25 (21%)	35 (19%)		74 (6%)
High	57 (49%)	72 (39%)		337 (28%)
Newspaper use				
Low	36 (29%)	75 (42%)	3.96	472 (36%)
Moderate	47 (40%)	55 (27%)		420 (36%)
High	35 (31%)	56 (31%)		302 (26%)
Lights health beliefs	29 (25%)	41 (24%)	.12	252 (22%)
Smoking risk perception (very risky)	73 (61%)	89 (47%)	6.45*	
Intentions to quit				
No plan	17 (14%)	35 (18%)	4.66	
Weak (>6 months)	48 (40%)	54 (29%)		
Strong (<6 months)	54 (46%)	100 (54%)		

Percentages based on weighted data, and therefore may not add up to 100%;  $\chi^2$ =chi-square tests for difference between lights smokers and non-lights smokers; \* $p<0.05$ , \*\* $p<0.01$ .



**Table 2** Logistic regression models to predict light cigarette health benefit beliefs

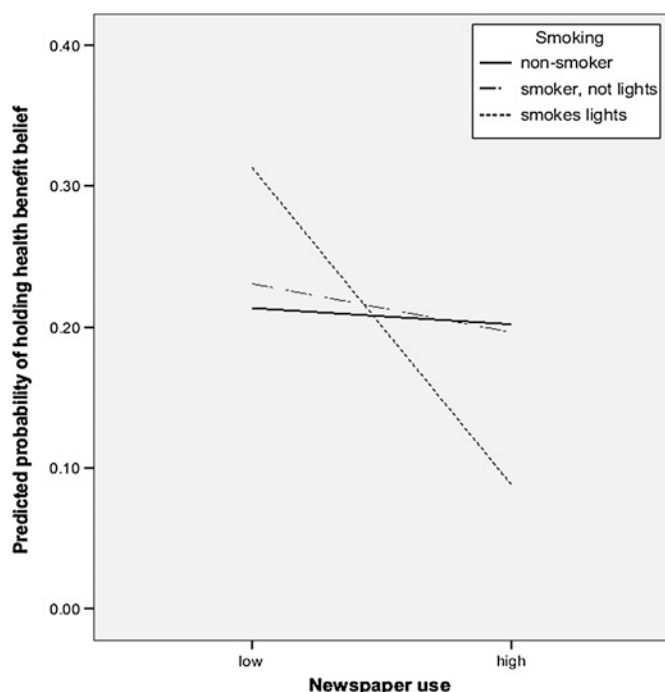
Predictors	All respondents (n=1495)	
	OR	95% CI
Age	1.01	0.94 to 1.08
Gender (male)	0.87	0.67 to 1.15
Race-ethnic identity (white)	0.64**	0.49 to 0.84
Income (low)	1	
Moderate	0.79	0.58 to 1.07
High	1.15	0.83 to 1.58
Education (low)	1	
Moderate	1.50	0.87 to 2.56
High	1.35	0.81 to 2.26
Smoke (non-smoker)	1	
Smoke non-lights	1.03	0.50 to 2.12
Smoke lights	0.41	0.12 to 1.41
Newspaper use (high)	1	
Low	1.13	0.78 to 1.63
Moderate	0.93	0.64 to 1.34
Newspaper use (low) X Smoke (lights)	5.93*	1.48 to 23.77

CI, confidence interval for odds ratio.

\*p&lt;0.05;\*\*p&lt;0.01.

Morris, adolescent and young adult smokers of light cigarettes with frequent newspaper use were less likely to hold inaccurate beliefs about the health benefits of lights than those with less frequent newspaper use. Further, the results of this study suggest that youth smokers' inaccurate beliefs about the health benefits of lights are related to lower perceptions of risk and reduced intentions to quit smoking.

Despite the fact that Philip Morris won their appeal against the ruling of the light cigarette case, the media attention that it garnered appears to have had some influence, at least among light cigarette smokers. Only 9% of the lights smokers who read the newspaper most days (approximately one-third) held any health benefit beliefs, compared to 30% of those who read the newspaper less frequently. The level of misperception among

**Figure 2** Interaction between newspaper use and smoking on beliefs about health benefits of light cigarettes.**Table 3** Logistic regression model to predict lights cigarette smokers' perception that their smoking was very risky

Predictors	Light cigarette smokers (n=117)	
	OR	95% CI
Age	1.13	0.87 to 1.46
Gender (male)	2.28	0.84 to 6.17
Race (white)	1.62	0.49 to 5.33
Income (low)	1	
Moderate	0.48	0.16 to 1.49
High	0.58	0.16 to 2.08
Education (low)	1	
Moderate	7.29*	1.50 to 35.41
High	2.11	0.63 to 7.13
Smoke days/month	1.00	0.98 to 1.03
Cigs/day	1.11*	1.01 to 1.22
Newspaper use (high)	1	
Low	1.11	0.29 to 4.25
Moderate	0.70	0.22 to 2.25
Light health benefit beliefs	0.29*	0.11 to 0.87

CI, confidence interval for odds ratio.

†p&lt;0.10;\*p&lt;0.05;\*\*p&lt;0.01.

those who did not frequently read the newspaper, as well as the regular cigarette smokers and non-smokers, was comparable to the levels reported by adolescents in Kropp *et al's* earlier study,<sup>21</sup> conducted prior to the bulk of media coverage found in the current study. These findings lend support to previous research which emphasises how litigation against big tobacco, when reported in the media, may influence public opinion.<sup>27</sup> In the present research, it appears to also have the potential to influence beliefs about risk. Even if litigation is not always successful, the fallout of its application in increasing media coverage about a particular topic can be a powerful tool in building awareness of the hazards of a tobacco product, and this appears to be the case for adolescent and young adults as well the older public. Public health scholars have emphasised the importance of developing counter-marketing to the tobacco industry's marketing of light cigarettes.<sup>40</sup> The results of the current study suggest that media advocacy might also be well suited to the task of informing the public about the hazards of lights. The newly passed Family

**Table 4** Logistic regression model to predict intentions to quit smoking within the next 6 months

Predictors	All smokers (n=300)	
	OR	95% CI
Age	1.03	0.89 to 1.18
Gender (male)	2.21**	1.33 to 3.68
Race (white)	1.00	0.55 to 1.82
Income (high)	1	
Low	0.96	0.53 to 1.73
Moderate	1.39	0.73 to 2.63
Education (low)	1	
Moderate	0.66	0.31 to 1.40
High	0.54	0.28 to 1.02
Smoke days/month	0.98*	0.96 to 0.99
Cigs/day	0.94**	0.90 to 0.99
Light smoker	1.07	0.62 to 1.84
Newspaper use (high)	1	
Low	0.80	0.43 to 1.50
Moderate	0.69	0.37 to 1.28
Light health benefit beliefs	0.52*	0.28 to 0.96
Perceived risk from smoking	1.75*	1.04 to 2.95

CI, confidence interval for odds ratio.

†p&lt;0.10;\*p&lt;0.05;\*\*p&lt;0.01.

## Research paper

Smoking Prevention and Tobacco Control Act (HR 1256) will restrict the sale of cigarettes labelled light or low tar in the USA. Future research may investigate whether media coverage related to this legislation might also help to educate the public about the risks of 'reduced risk' tobacco products.

We found that newspaper reading appeared to have a beneficial and protective effect against misperceptions only among smokers of light cigarettes. While this result is not surprising, given the relevance of the news to smokers of lights, we also found that beliefs about the benefits of lights were associated with reduced intentions to quit smoking in smokers of both light and regular cigarettes. Possibly, for smokers of regular cigarettes who are concerned about the health risks of smoking, the belief that lights can offer some protective benefits against those risks might deter them from making strong intentions to quit, as they may opt instead to switch to light cigarettes. For this reason, it is important that all youth smokers, as well as non-smokers, are alerted to the risks associated with smoking lights. Given the demonstrated association between newspaper use and more accurate beliefs about lights in this study (at least for smokers of lights), public health practitioners might be encouraged to pursue a media advocacy strategy that targets youth-oriented media in order to reach a larger proportion of youths.

A number of limitations in this study could be addressed in future research. First, we measured newspaper use in general, rather than asking specifically about exposure to light cigarette-related content. Despite controlling for socioeconomic and educational differences, general newspaper use might reflect some underlying individual difference that could have influenced beliefs about lights. One such difference could be academic ability. Although we had no measure of this in the 2004 survey, a report of school grade point average was included in the 2005 NASY. However, GPA was uncorrelated with newspaper use in that sample. Our use of a general measure of newspaper exposure may also have captured exposure to news coverage related to the tobacco industry in general, which might be associated with greater scepticism towards industry claims, and therefore influenced beliefs about lights. The cross-sectional nature of this

study does not allow us to make any causal conclusions about the directionality of effects, particularly with regard to the association between beliefs about lights and perceptions of risk or intentions to quit. While we have interpreted these relations as demonstrating the influence of those beliefs on risk perceptions or intentions, it is also possible that those smokers who perceive their smoking to be very risky, or those that do not have intentions to quit smoking, prefer to believe that light cigarettes have some health benefits.

Other scholars have noted that tobacco control is highly newsworthy, and the ways in which the media frame issues for public consumption can have a powerful influence on public perception, if not behaviour.<sup>26</sup> This study suggests that, in fact, news reports about the hazards of smoking may have the potential to not only influence beliefs about the risks of smoking, but also to indirectly influence youth's quitting intentions via its impact on such beliefs.

**Competing interests** None.

**Ethics approval** This study was conducted with the approval of the University of Pennsylvania.

**Contributors** SD was responsible for the analysis and interpretation of the data and the drafting of the article. DR contributed to the study conception and design, the interpretation of data and critically revised the article for important intellectual content. Both authors gave final approval of the version for publication.

**Provenance and peer review** Not commissioned; externally peer reviewed.

## REFERENCES

- National Cancer Institute (NCI).** *Risks associated with smoking cigarettes with low machine-measured yields of tar and nicotine.* Washington, DC: National Cancer Institute; U.S. National Institutes of Health; 2001.
- Cataldo JK, Malone RE.** False promises: the tobacco industry, "low tar" cigarettes, and older smokers. *J Am Geriatr Soc* 2008;**56**:1716–23.
- Anderson SJ, Pollay RW, Ling PM.** Taking ad-Vantage of lax advertising regulations in the USA and Canada: Reassuring and distracting health-concerned smokers. *Soc Sci Med* 2006;**63**:1973–85.
- Warner KE.** Tobacco industry response to public health concern: a content analysis of cigarette ads. *Health Educ Q* 1985;**12**:115–27.
- Federal Trade Commission.** Federal Trade Commission Report to Congress for 1992. Washington, DC: Federal Trade Commission, 1994.
- National Cancer Institute.** *The FTC cigarette test method for determining tar, nicotine, and other carbon monoxide yields of US cigarettes: report of the NCI Expert Committee.* Bethesda, Maryland: National Institutes of Health, 1996: NIH Publication No 96-4028.
- Thun MJ, Burns DM.** Health impact of "reduced yield" cigarettes: a critical assessment of the epidemiological evidence. *Tob Control* 2001;**10**:4–11.
- Sidney S, Tekawa IS, Friedman GD.** A prospective study of cigarette tar yield and lung cancer. *Cancer Causes Control* 1993;**4**:3–10.
- Harris JE, Thun MJ, Mondul AM, et al.** Cigarette tar yields in relation to mortality from lung cancer in the cancer prevention study II prospective cohort, 1982–8. *Br Med J* 2004;**328**:72.
- Benowitz NL.** *Compensatory smoking of low-yield cigarettes.* Washington, DC: National Institutes of Health, 2001. Report No.: NIH Publication No. 02-5074.
- Gallup Organization Inc.** *The public's attitudes toward cigarette advertising and cigarette tax increase.* Princeton, NJ: The Gallup Organization, Inc, 1993:22–4.
- Cohen JB.** Smokers' knowledge and understanding of advertised tar numbers: health policy implications. *Am J Public Health* 1996;**86**:18–24.
- Kozlowski LT, Goldberg ME, Yost BA, et al.** Smokers' misperceptions of light and ultra-light cigarettes may keep them smoking. *Am J Prev Med* 1998;**15**:9–16.
- Kozlowski LT, Pillitteri JL.** Beliefs about "Light" and "Ultra Light" cigarettes and efforts to change those beliefs: an overview of early efforts and published research. *Tob Control* 2001;**10**:i12–16.
- Etter J-F, Kozlowski LT, Perneger TV.** What smokers believe about light and ultralight cigarettes. *Prev Med* 2003;**36**:92–8.
- Cummings KM, Hyland A, Bansal MA, et al.** What do Marlboro lights smokers know about low-tar cigarettes? *Nicotine Tob Res* 2004;**6**(suppl 3):S323–32.
- Borland R, Yong H-H, King B, et al.** Use of and beliefs about light cigarettes in four countries: findings from the International Tobacco Control Policy Evaluation Survey. *Nicotine Tob Res* 2004;**6**:S311–21.
- Shiffman S, Pillitteri JL, Burton SL, et al.** Smokers' beliefs about "Light" and "Ultra Light" cigarettes. *Tob Control* 2001;**10**:i17–23.
- Giovino GA, Tomar SL, Reddy MN, et al.** *Attitudes, knowledge, and beliefs about low-yield cigarettes among adolescents and adults.* Washington, DC: National Cancer Institute; U.S. National Institutes of Health, 1994:39–57.

## What this paper adds

- ▶ In 2003, a class-action consumer fraud lawsuit was launched against Philip Morris USA for failing to inform consumers that its 'light' cigarettes were no less harmful than their full-tar cigarettes; however, little is known about the impact of this lawsuit and associated media coverage on public perceptions about 'lights', particularly for young smokers.
- ▶ A quantitative analysis of newspaper coverage afforded to light cigarettes and their health risks from 2001 to 2004 showed that coverage of these issues increased greatly in conjunction with the lawsuit.
- ▶ The current findings from a nationally representative survey of American youths conducted in 2004 showed that misinformation about the harms of 'lights' had declined in comparison to earlier surveys of youths. In addition, smokers of 'lights' with lower levels of newspaper use were more likely to hold inaccurate beliefs about the risks of 'lights' than those with higher levels of newspaper use.
- ▶ The current survey also indicated that these inaccurate beliefs about 'lights' were associated with a decreased perception of personal risk from smoking for smokers of lights, and with lower quitting intentions for all smokers.

20. **Soresi S**, Catalano F, Spatafora M, *et al.* "Light" smoking and dependence symptoms in high-school students. *Respir Med* 2005;**99**:996–1003.
21. **Kropp RY**, Halpern-Felsher BL. Adolescents' beliefs about the risks involved in smoking "light" cigarettes. *Pediatrics* 2004;**114**:e445–51.
22. **Kozlowski LT**, Yost BA, Stine MM, *et al.* Massachusetts' advertising against light cigarettes appears to change beliefs and behavior. *Am J Prev Med* 2000;**18**:339–42.
23. **Borland R**, Fong GT, Yong H-H, *et al.* What happened to smokers' beliefs about light cigarettes when "light/mild" brand descriptors were banned in the UK? Findings from the International Tobacco Control (ITC) Four Country Survey. *Tob Control* 2008;**17**:256–62.
24. **Shiffman S**, Pillitteri JL, Burton SL, *et al.* Effect of health messages about "Light" and "Ultra Light" cigarettes on beliefs and quitting intent. *Tob Control* 2001;**10**:i24–32.
25. **Shiffman S**, Burton SL, Pillitteri JL, *et al.* Test of "Light" cigarette counter-advertising using a standard test of advertising effectiveness. *Tob Control* 2001;**10**:133–40.
26. **Chapman S**. The news on tobacco control: time to bring the background into the foreground. *Tob Control* 1999;**8**:237–9.
27. **Wakefield M**, Clegg-Smith K, Chapman S. *Framing of news coverage about the Marlene Sharp legal judgement: a tipping point for smoke-free public places in Australia?* Research Paper Series, No. 28. Chicago: ImpacTeen 2003.
28. **Smith K**, Wakefield M, Edsall E. The good news about smoking: how are tobacco issues being covered in US press? *J Public Health Policy* 2006;**27**:166–81.
29. **Long M**, Slater M, Lysengen L. US news media coverage of tobacco control issues. *Tob Control* 2006;**15**:367–72.
30. **Stevens C**. Designing an effective counter advertising campaign—California. *Cancer* 1998;**83**:2736–41.
31. **Clegg-Smith K**, Terry-McElrath Y, Wakefield M, *et al.* Media advocacy and newspaper coverage of tobacco issues: a comparative analysis of 1 year's print news in the United States and Australia. *Nicotine Tob Res* 2005;**7**:289–99.
32. **Wakefield M**, Flay B, Nichter M, *et al.* Effects of anti-smoking advertising on youth smoking: a review. *J Health Commun* 2003;**8**:229–47.
33. **Farrelly MC**, Davis KC, Haviland ML, *et al.* Evidence of a dose-response relationship between "truth" antismoking ads and youth smoking prevalence. *Am J Public Health* 2005;**95**:425–31.
34. **Niederdeppe J**, Farrelly M, Thomas KY, *et al.* Newspaper coverage as indirect effects of a health communication intervention: the Florida Tobacco Control Program and youth smoking. *Communic Res* 2007;**34**:382–406.
35. **Clegg-Smith K**, Wakefield M, Terry-McElrath Y, *et al.* Relation between newspaper coverage of tobacco issues and smoking attitudes and behaviour among American teens. *Tob Control* 2008;**17**:17–24.
36. **Johnston LD**, Terry-McElrath Y, O'Malley PM, *et al.* Trends in recall and appraisal of anti-smoking advertising among American youth: National survey results, 1997–2001. *Prev Sci* 2005;**6**:1–19.
37. **Romer D**. Prospects of an integrated approach to adolescent risk reduction. In: Romer D, ed. *Reducing adolescent risk: toward and integrated approach*. Thousand Oaks, CA: Sage Press, 2003:1–8.
38. **Mokdad AH**, Stroup DP, Giles WH. Public health surveillance for behavioural risk factors in a changing environment. Recommendations from the Behavioural Risk Factor Surveillance Team. *MMWR Recomm Rep*. 2003 May 23;**52**:1–12.
39. **U.S. Bureau of the Census**. *Annual estimates of the resident population by sex, race, and hispanic origin for the United States: April 1, 2000 to July 1, 2008*. Washington, DC: U.S. Bureau of the Census, 2008.
40. **Kozlowski LT**, Goldberg ME, Sweeney CT, *et al.* Smoker reactions to a "radio message" that light cigarettes are as dangerous as regular cigarettes. *Nicotine Tob Res* 1999;**1**:67–76.