

## RESEARCH PAPER

## The temporal relationship between advertising and sales of low-tar cigarettes

Mark B Reed, Christy M Anderson, David M Burns

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See end of article for authors' affiliations

Correspondence to: D M Burns, Department of Family and Preventive Medicine, University of California, San Diego, 9500 Gilman Drive, La Jolla, CA 92093-0824, USA; dburns@ucsd.edu

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**Objective and hypothesis:** To determine whether a temporal relationship exists between the advertising and sales of low-tar cigarettes. It was hypothesised that increases in the advertising of low-tar cigarettes would precede increases in sales for these cigarettes.

**Methods:** The themes of cigarette advertisements were reviewed and coded for 20 low-tar cigarette brands advertised in 13 widely read magazines in the US between 1960 and 1996. These 20 brands represented most of the low-tar cigarette advertisements and cigarette sales from 1967 to 1996. Cigarette sales data were obtained from the 1994 Maxwell report that summarises all cigarette sales from 1925 to 1990. If the advertisement referred to the low-tar attributes of the cigarette advertised, the advertisement was coded as having a low-tar theme and was included in the analysis.

**Results:** Five different graphical presentations of the relationship between the advertising and sales of the 20 low-tar cigarette brands showed a temporal relationship between low-tar advertising and sales for these brands. This relationship was observed for brands that introduced a low-tar alternative into an existing brand family (eg, Marlboro Light) and for new exclusively low-tar brands (eg, Carlton). Despite large increases in the advertising for the exclusively low-tar brands, sales of these brands remained low relative to sales of the low-tar alternative brands.

**Conclusions:** Increases in print advertising of 20 of the most popular low-tar cigarette brands were followed by increases in sales for these cigarettes. Despite increases in the advertising of exclusively low-tar brands in the mid-1970s and early 1980s, the sales of these brands never matched the sales of the low-tar alternative brands. This suggests that it may have been easier to get smokers to switch to low-tar brands within a brand family compared with entirely new low-tar brands. Over the past 30 years, the marketing of low-tar cigarettes as a healthier alternative to higher-tar cigarettes has resulted in these brands dominating the market, and may have kept concerned smokers from quitting.

The introduction and marketing of filtered and low-tar cigarettes has resulted in a >60% reduction in the sales-weighted average of machine-measured tar deliveries of cigarettes in the US over the past 50 years.<sup>1</sup> In 2002, almost 85% of the cigarettes sold in the US had machine-measured tar levels of  $\leq 15$  mg.<sup>2</sup> In the mid-1970s, the cigarette companies began marketing low-yield products to smokers concerned about the risks of smoking and to smokers who were thinking about quitting.<sup>1,3</sup> As a result, many smokers switched to low-tar brands in an effort to reduce smoking-related disease risks.<sup>4–6</sup>

The print advertising for low-tar brands often emphasises the low machine-measured tar yields of the cigarettes (ie, “Carlton is the lowest”) and often has advertising themes with deceptive health-related claims.<sup>7,8</sup> Many of the low-tar brands also include product descriptors such as “light”, “lite” or “ultralight” to convey to smokers that these brands are safer and less addictive than regular, high-tar brands.<sup>1,3,7,9</sup> Despite the belief of these cigarettes being safer, there is no convincing evidence that brands with low machine-measured tar yields decrease the risks of tobacco-related diseases.<sup>10,11</sup>

It is clear from tobacco industry documents that the cigarette companies intentionally used deceptive advertising to sell low-tar cigarettes,<sup>3,7,12</sup> but there has been no public acknowledgement of this deception. Cigarette manufacturers maintain that the introduction and sale of low-tar cigarettes was in response to consumer demand, and switching to these brands was not driven by advertising campaigns. To date, to our knowledge, no studies have examined whether increases in the advertising of low-tar cigarettes preceded increases in the sales of low-tar brands, or whether advertising of these

brands increased after sales increases, as suggested by the cigarette manufacturers. As previous research has shown a large increase in the advertising of low-tar cigarettes during the mid-1970s,<sup>8,13</sup> we hypothesised that increases in the advertising of low-tar brands preceded increases in the sales of these cigarettes.

## METHODS

## Study overview

To test our hypothesis, we examined the advertising and sales for select brands of cigarettes. The advertising data on low-tar cigarettes were obtained from a much larger database of 59 837 cigarette advertisements that spanned 97 years of advertising from 13 widely read periodicals in the US (table 1). We restricted the analysis of low-tar cigarette advertising to the 20 cigarette brands that were advertised the most between 1967 and 1996 (table 2). These cigarette brands included higher-yield brands that introduced a low-tar brand (eg, Marlboro), as well as brands that were exclusively low tar (eg, Carlton). From 1967 to 1996, these 20 brands represented 78% of the cigarette advertising in the magazines included in our study, and accounted for 85% of cigarette sales during this 30-year period. This was a period that saw tremendous growth in the sales of low-tar cigarettes.<sup>14</sup>

Data on cigarette sales were obtained from the 1994 Maxwell report.<sup>15</sup> The Maxwell report is a historical description of cigarette sales trends for 69 years (1925–93). We subdivided the top 20 low-tar brands into two major low-tar brand categories (table 2): (1) brands that introduced low-tar

**Table 1** General readership periodicals reviewed for cigarette advertisements between 1900 and 1996

Magazine	Inception	Years reviewed
<i>Better Homes and Gardens</i>	1922	1922–96
<i>Cosmopolitan</i>	1886	1900–96
<i>Fortune</i>	1930	1930–96
<i>Ladies' Home Journal</i>	1883	1900–96
<i>Life</i>	1936	1937–96
<i>Look</i>	1937	1937–71
<i>Newsweek</i>	1933	1933–96
<i>People</i>	1974	1974–96
<i>Playboy</i>	1953	1953–96
<i>Saturday Evening Post</i>	1821	1900–96
<i>Sports Illustrated</i>	1954	1956–8, 1960–96
<i>Time</i>	1923	1923–96
<i>Vogue</i>	1892	1900–96

cigarettes within a brand family of full-flavour high-tar brands (eg, Marlboro, Camel); and (2) brands consisting entirely of low-tar cigarettes (eg, Carlton, Merit). The second category of low-tar brands contains cigarette brands that were introduced after 1963. As these cigarettes were new products rather than alternatives of existing brands, the advertising patterns for these exclusive brands may differ from those of low-tar alternatives within existing brand families. We will refer to the brands in the first category as “low-tar alternatives” and the brands in the second category as “exclusively low-tar brands”.

**Data sources**

**Cigarette advertisements**

Three research assistants reviewed Cigarette advertisements from 13 of the highest circulating periodicals in the US that accepted tobacco advertising from 1900 to 1996. We based the selection of these 13 periodicals on readership information obtained from the *World almanac and book of facts*,<sup>16</sup> years 1949–96. As the period examined for this study spanned nearly 100 years, it was not possible choose a set of the same magazines that consistently had the top readership year after year. Additionally, as we wanted a sample of magazines read by diverse segments of the population (ie, men, women and adolescents), we could not adhere to strict quantitative criteria for selection of periodicals. Thus, we used a more qualitative approach to the process of magazine selection for this study.

We selected periodicals with large general readerships (*Life*, *Look*, *Newsweek*, *People*, *Time* and *Saturday Evening Post*), large male readerships (*Fortune*, *Sports Illustrated* and *Playboy*) and large female readerships (*Better Homes & Gardens*, *Cosmopolitan*, *Ladies Home Journal* and *Vogue*). The research assistants reviewed the magazines at local county and university libraries, and on occasion travelled to libraries in a neighbouring county to locate issues of periodicals not available locally.

For each cigarette advertisement reviewed, the research assistants recorded several elements that comprised the advertisement, such as the brand advertised, the slogan used, and the size and thematic content of the advertisement. Advertisements that implied a health advantage from smoking low-tar cigarettes, referred to the tar level of the cigarette (eg, only 1 mg of tar, the lowest in tar) or compared tar levels with those of another low-tar brand were coded as having a “low-tar and nicotine” theme. Advertisements that only reported the tar and nicotine content of the cigarette advertised, as mandated by the Federal Trade Commission, were not considered to have a low-tar and nicotine theme. We included only advertisements in our analyses that were

**Table 2** Top 20 cigarette brands advertised between 1967 and 1996

Low-tar alternative brands		Exclusively low-tar brands
Belair	Newport	Barclay
Benson & Hedges	Pall Mall	Carlton
Camel	Salem	Merit
Kent	Tareyton	Now
Kool	Viceroy	True
Marlboro	Winston	Vantage
More	Virginia Slims	

coded as having a low-tar and nicotine theme. From 1960 to 1996, 15 002 advertisements were coded as having a low-tar and nicotine theme. We did not track distinct and particular advertisements; thus, it was not possible to determine the number of unique occurrences of a particular advertisement in our sample of low-tar advertisements.

A detailed quality-control process was established to ensure that all the research assistants used the same criteria when coding the advertisements. This process relied on the reclassification of a sample of 10 recently reviewed advertisements by each of the three research assistants every 2 weeks. The assistants reviewed 20 of their peers’ advertisements and recorded the same elements in the advertisement that were recorded when the advertisement was originally reviewed. This reclassification procedure was used to track the reliability of the advertisement coding process. Measures of inter-rater reliability ( $\kappa$  statistic) were calculated for coding the theme of the advertisements. The  $\kappa$  values show good reproducibility of the application of the low-tar and nicotine theme classification criteria across the three reviewers ( $\kappa = 0.80–0.94$ ).

**Cigarette sales**

The 1994 Maxwell report was used to obtain cigarette sales data.<sup>15</sup> This report summarises the annual cigarette sales for each major cigarette subspecies from 1925 to 1990; however, from 1991 to 1993 only the sales for each brand family were reported. Our analyses include sales data only from 1960 to 1990. Thus, we report advertising only during this period. A brand’s cigarette sales were classified as “low tar” if the subspecies brand name of the cigarette contained a low-tar designation such as “light”, “mild”, “lite”, “lts”, “ultralite” or “low tar”. All the sales for Carlton, True, Vantage, Merit, Now and Barclay were classified as low tar because these are exclusively low-tar brands.

**Data analysis**

We graphed the annual proportion of advertising and sales for low-tar alternative and exclusively low-tar cigarettes in different ways to yield slightly different perspectives on the patterns of advertising and sales for these brands from 1960 to 1990. To examine the relationship between low-tar advertising and sales for the top 20 brands, we calculated the proportion of advertising with a low-tar theme from all advertising for the top 20 brands, including advertising for other higher-tar siblings within the same brand family such as Marlboro or Camel Regular. The proportion of sales was calculated similarly, with the numerator of the proportion being sales for the top 20 low-tar brands with a low-tar theme designation and the denominator being complete sales for these 20 brands.

For the second analysis, we decomposed the results of fig 1 into two graphs showing the relationship between advertising and sales separately for the alternative and exclusively low-tar brands. Figure 2 shows the relationship between

low-tar advertising and sales for only the low-tar alternative brands. To minimise the influence of dominant brands such as Marlboro Light on the results of this analysis, we averaged for each year the brand-specific proportions of advertising and sales for the low-tar alternative brands. By calculating the mean proportion of advertising and sales of low-tar cigarettes, each of the low-tar alternative brands was given equal weight in the analysis. The numerators for the proportions of advertising and sales are the number of advertisements with a low-tar theme and sales for each of the 14 low-tar alternative brands. The denominators for these proportions are the number of advertisements and sales for each of these 14 brand families. We did not perform this analysis on the exclusively low-tar brands, because these brands do not have higher-tar siblings within the same brand family, and the proportion of low-tar sales for these brands is thus 100%.

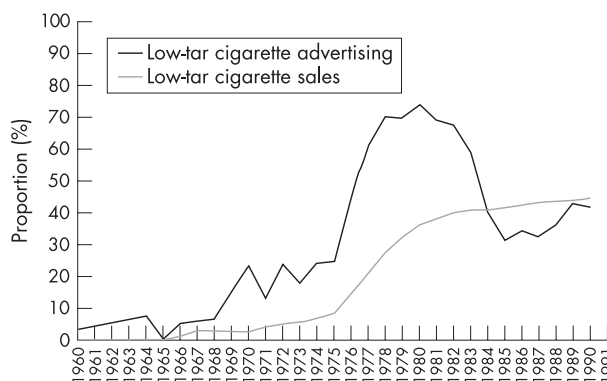
The third analysis yielded the mean proportion of low-tar advertising and sales for the 14 low-tar alternative brands by the number of years, since low-tar cigarette advertising for these brands began regardless of the year in which the brand was introduced (eg, the proportion plotted for the value of 5 on the x axis of this graph represents the average proportion of advertising and sales of all 14 brands after 5 years of advertising for these brands; fig 3). Plotting the data using this analytical approach allowed us to examine the relationship between the advertising and sales for these brands simultaneously without considering the year in which the brand was introduced. As increases in low-tar advertising and sales could be attributed to the different trends occurring when these brands were introduced, it was important to control for this possibility by graphing the data in this manner. The method of calculating the proportion of advertising and sales for this analysis was the same as that used for the proportions in fig 2, except that we calculated these proportions for the number of years the cigarettes were advertised as opposed to calculating them annually as we did for figs 1 and 2.

The purpose of the last two analyses was to compare low-tar cigarette advertising and sales more directly between the low-tar alternative and exclusively low-tar brands. Figure 4 shows the annual proportion of advertisements for the exclusively low-tar brands among all advertisements and the proportion of sales for those exclusively low-tar brands among sales for all brands. Figure 5 shows the proportion of low-tar advertisements of the low-tar alternative brands among all advertisements and the proportion of sales for the low-tar alternative brands among sales of all brands. Thus, the denominator is the total number of advertisements included in our advertising database and the total sales for all cigarette brands during this period. Using these analyses, we examined the relationship between advertising and sales for both categories of low-tar brands in the context of advertising and sales for all cigarette brands during the study period.

Although the use of time-series modelling would provide statistical support to show a temporal relationship between the advertising and sales over time for the low-tar brands examined in this paper, we could not perform this type of analysis because of the limited number of data points ( $n = 31$ ) available. Ideally, a minimum of 50 data points are required to yield robust results for a time-series analysis.<sup>17</sup>

## RESULTS

Figure 1 shows the advertising and sales of the top 20 low-tar brands with a low-tar advertising theme as a proportion of all advertising and sales for these brands. The proportion of advertising devoted to low-tar themes increased slowly from the late 1960s to 1975, and then increased dramatically after 1975. Between 1960 and 1975, increases in the sales of

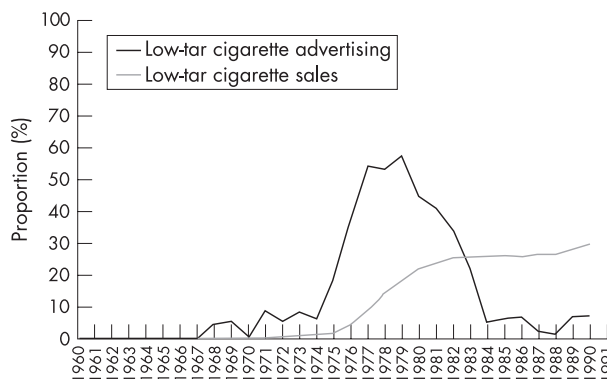


**Figure 1** Advertising (with a low-tar theme) and sales for the top 20 cigarette brands, by calendar year.

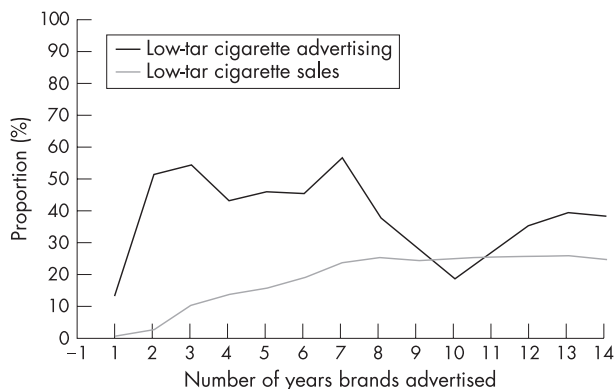
low-tar brands were modest and lagged behind the rise in advertising that featured low-tar themes during this period. This pattern is particularly pronounced during the first 4 years of advertising for these brands. From 1975 to 1980, the advertising of these 20 low-tar brands increased steeply, reaching a peak in 1980. Of all the advertising for these 20 brands in 1980, 73.75% were advertisements with a low-tar advertising theme. Sales of these 20 low-tar brands also increased sharply between 1975 and 1980; however, after 1980, although low-tar advertising that included a low-tar theme decreased considerably, the sales of these brands continued to increase.

Figure 2 shows the relationship between low-tar advertising and sales for the low-tar alternative brands. The mean proportion of brand-specific advertising and sales for these brands remained low (<10%) between 1967 and 1974; however, similar to the data shown in fig 1, the increase in advertising for these brands preceded the increase in sales during this period. In fact, the sales for these brands were negligible until after 1975. From 1974 to 1977, the mean proportion of low-tar alternative advertising rose steeply and was followed after 1975 by a sharp increase in the mean proportion of sales for these brands. The mean proportion of sales of these brands steadily increased through 1990, whereas the mean proportion of advertising with a low-tar theme for these brands decreased more extremely after 1980 than the decrease in advertising shown in fig 1.

Figure 3 shows the relationship between the mean proportion of advertising and sales for the low-tar alternative brands, by the number of years since the brand was first advertised. When the mean proportions of low-tar advertising and sales are compared by the number of years since



**Figure 2** Advertising (with a low-tar theme) and sales for the 14 low-tar alternative brands, by calendar year.



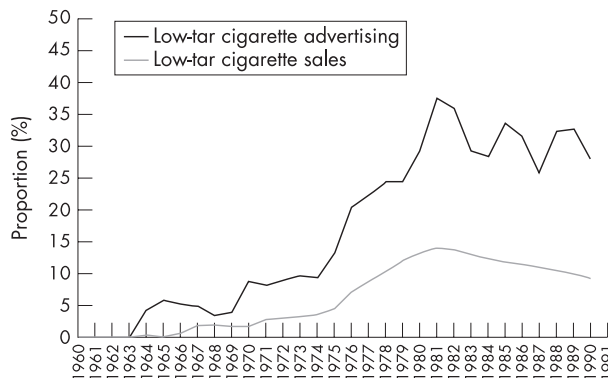
**Figure 3** Advertising (with a low-tar theme) and sales for the 14 low-tar alternative brands, by the number of years advertised.

advertising for these brands began, the rise in advertising is even more dramatic and clearly precedes the rise in sales, particularly between the first and second years of advertising for these 14 brands. After the first year of marketing these products, advertising with a low-tar theme for these brands was slightly >13%, whereas sales made up <1% of the cigarette market for all brand families within these 14 brands. Sales for these brands did not increase appreciably until after these products had been advertised for >2 years.

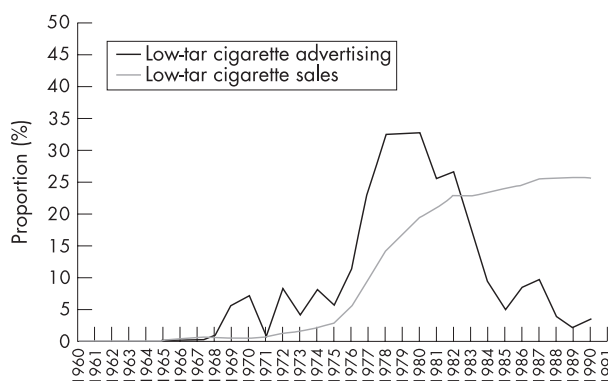
This pattern of results was shown for 11 of the 14 low-tar alternative brands; however, sales preceded advertising for three brands (Winston, Pall Mall and Newport). A possible explanation for this finding is that these brands were advertised in magazines other than the 13 we reviewed for this study, and therefore we could not capture the low-tar advertising for these brands. By the third year of advertising for the low-tar alternative brands, >50% of all advertisements for these brands had a low-tar theme. Advertising with a low-tar theme peaked 7 years after the advertising for these brands began (56.44%). The mean proportion of sales for low-tar alternative brands with a low-tar theme increased steadily for the first 7 years after these brands were first advertised, and remained stable at about 25% for the next 6 years.

Figures 4 and 5 show the proportion of advertising using low-tar themes and the proportion of sales for the exclusively and alternative low-tar brands out of all cigarette advertising and all cigarettes sales, by calendar year between 1960 and 1996. Figure 4 shows a modest increase in advertising for the exclusively low-tar cigarettes between 1963 and 1974, which preceded increases in sales. Small increases in sales are observed for the exclusively low-tar brands after 1965. Not surprisingly, the pattern of advertising and sales in fig 5 is similar to that in fig 2, with one exception: in 1966 and 1967, sales of these brands preceded increases in advertising with a low-tar theme. Again, it is possible that the early advertising for three of these brands was in periodicals not included in this study. After 1968, advertising increased (with the exception of 1971), which was followed by a gradual increase in sales between 1971 and 1975. After 1975, advertising and sales increased steeply.

Both figs 4 and 5 show very different patterns of advertising and sales for the exclusively and alternative low-tar cigarettes brands. Despite an increase in sales for both types of low-tar cigarettes before 1980, the rise in advertising with a low-tar theme for the exclusively low-tar brands was more gradual than the steep rise observed for the low-tar alternative brands between 1975 and 1977. Furthermore, the rise in sales of the low-tar alternative brands was much steeper than that of the exclusively low-tar



**Figure 4** Proportion of exclusively low-tar cigarette advertising (with a low-tar advertising theme) and sales out of all cigarette advertising and sales, by calendar year.



**Figure 5** Proportion of alternative low-tar cigarette advertising (with a low-tar advertising theme) and sales out of all cigarette advertising and sales, by calendar year.

brands. After 1981, both the advertising and the sales for the exclusively low-tar brands declined. By contrast, after 1980, the advertising for the low-tar alternative brands declined, whereas sales continued to rise until 1990. From 1987 to 1990, slightly more than one quarter of all cigarettes sold were low-tar alternative brands.

**DISCUSSION**

These results show a temporal relationship between the advertising and sales of low-tar cigarettes. For the most popular cigarette brands, increases in cigarette advertising with a low-tar theme preceded increases in low-tar cigarette sales, and this temporal relationship was seen for both the alternative and exclusively low-tar brands. This effect persisted for the first several years immediately after the introduction of these brands. Low-tar cigarette advertising has a similar leading temporal relationship with sales for exclusively low-tar brands, but does not seem to have an effect of the same magnitude on sales. In addition, the sales of low-tar alternative brands continued to increase after the low-tar advertising for these brands waned (fig 5), whereas the decline in advertising with a low-tar theme for the exclusively low-tar brands was accompanied by a decline in sales as well (fig 4). Between 1981 and 1990, the sales of exclusively low-tar brands decreased by 36%, and represented <10% of all cigarette sales in 1990. These results suggest that it may have been easier to get smokers to switch to low-tar alternatives within a brand family (eg, switching from



Marlboro to Marlboro Light) than it was to get smokers to try an entirely new low-tar brand such as Carlton or Merit.

Although the relationships shown in figs 1–5 visually demonstrate a temporal relationship between advertising and sales of low-tar cigarettes, we could not statistically model this relationship using time-series modelling techniques; therefore, we are limited in our ability to make definitive statements about the cause of the temporal lag between increases in advertising and sales of low-tar cigarettes. It is possible that increases in sales were coincident with rises in advertising using low-tar themes, and this possibility could not be ruled out as we did not have sufficient data points to analyse the data using time-series modelling. Alternatively, aggregating the data by year in figs 1–5 may have obscured stronger temporal relationships between advertising and sales. Disaggregating the data into quarterly or monthly rates would perhaps have provided stronger evidence for a lagged relationship between advertising and sales (ie, an increase in advertising in month *x* was followed by increases in sales in months *y* and *z*). Unfortunately, only the advertising data could be disaggregated into quarterly or monthly rates, as the sales data are reported only yearly in the Maxwell report.<sup>15</sup>

Despite the fact that we could not use time-series modelling techniques to statistically test for a temporal lag between advertising and sales, these results support our hypothesis that increases in advertising preceded increases in sales. As observed in figs 1, 2 and 4, appreciable increases in sales of these cigarettes did not occur until several years after the initial advertising for these brands. Also, a sharp increase in advertising in 1974 was followed in 1975 by sharp increases in sales (fig 2). After the first year of advertising of the low-tar alternative brands, increases in sales for these brands were negligible and made up <1% of all sales for all cigarettes within these 14 brand families (fig 3). Finally, with the exception of fig 5, no evidence shows that increases in sales of these brands preceded increases in advertising with low-tar themes.

For this study, we predicted that increases in advertising with a low-tar theme would precede increases in sales for these brands; however, as observed in figs 1, 2 and 5, decreases in advertising with a low-tar theme were not followed by corresponding decreases in sales for these brands. Once the low-tar alternative brands established a strong market presence after 1980, the cigarette companies that produced these 14 brands may have used advertising campaigns that emphasised themes similar to those used for the other higher-tar sibling brands within the same brand family (eg, the theme of individualism often used in the Marlboro cowboy advertisements). The average proportion of advertising with a low-tar theme for the alternative brands peaked at nearly 60% (fig 2); thus, 40% of the advertising of these brands used different themes, suggesting that the cigarette companies were not exclusively marketing these cigarettes with an implied message of the health benefits of smoking low-tar cigarettes and were possibly using other successful marketing themes that had been used to market the higher-tar siblings of these brands.

By contrast, nearly 90% of the advertising for the exclusively low-tar brands advertised between 1960 and 1990 had a low-tar theme. As advertising for exclusively low-tar brands dipped after 1980, sales for these brands decreased as well (fig 4). Nearly all of the print advertising for the exclusively low-tar brands used a low-tar theme, and thus, the decrease in advertising observed after 1981 (fig 4) is possibly a result of a reduction in print advertising for these brands rather than a change in advertising themes for the exclusively low-tar brands. As a clear lag between decreases in advertising and sales cannot be discerned from these data,

it is not possible to conclude that sales decreased as a result of decreasing advertising, or conversely, that advertising decreased as a result of decreasing sales.

### Study limitations

Potential limitations of this study include the inability to make definitive causal statements about the relationship between the advertising and sales of low-tar cigarettes at the level of the individual smoker, as well as the limitation of using ecological analyses to define causality in temporal trends. Additionally, as our data were not amenable to time-series analysis, we could not quantify the lag between advertising and sales. However, the relationships observed in figs 1–5 suggest that advertising preceded sales during the earliest years of marketing of these brands. In epidemiological studies, one component of showing causality is to establish the temporal relationship between two phenomena.<sup>18</sup>

An additional limitation relates to the fact that we included only advertisements for low-tar brands that had a low-tar advertising theme. As not every advertisement for a low-tar cigarette has a low-tar theme, we may have underestimated the proportion of low-tar advertisements. Although we limited our examination of low-tar advertising to 13 highly circulating periodicals, it is also important to acknowledge that large differences in circulation between these magazines may exist that could have affected the amount of exposure readers had to these advertisements. Furthermore, we cannot assume that all demographic segments of the population were exposed equally to this advertising, given the demographic differences in the readership of magazines in the US. Lastly, print advertising is only one form of marketing used by the tobacco industry. Thus, other forms of marketing and

### What this paper adds

- Results of qualitative studies examining tobacco industry documents have shown that cigarette companies intentionally used deceptive advertising to sell low-tar cigarettes that could be as dangerous as higher-tar brands.
- Quantitative studies on cigarette advertising have also shown a large increase in the advertising of low-tar cigarettes during the mid-1970s.
- To date, the question of whether the advertising of low-tar cigarettes influenced the sales of these brands remains unanswered.
- This paper describes the relationship between low-tar advertising and sales. Using cigarette advertising data collected from 13 popular general readership magazines and sales data collected from the 1994 Maxwell report, we found that increases in the advertising of low-tar cigarettes preceded increases in sales of low-tar cigarette sales. These results suggest that the deceptive advertising used to sell low-tar cigarettes translated to large increases in sales for these brands.
- With low-tar cigarettes accounting for almost 85% of the US cigarette market in 2002, the influence of advertising with low-tar themes on sales is undeniable.
- As the tobacco industry develops and promotes new “reduced-harm” cigarettes into the world, the international public health community will need to be vigilant in monitoring the advertising claims of these new products.

advertising such as billboards, television or radio commercials (before the broadcast ban), point-of-sale advertising and promotional items also probably had considerable effects on the sales of the low-tar brands examined in this paper.

The influence of the advertising of these brands is unambiguous; the use of themes emphasising the health advantages of low-tar cigarettes is likely to have resonated with smokers. As a result, sales of these brands increased through the mid-1970s, with the largest increases observed for the low-tar alternative brands. Qualitative reviews of tobacco industry documents disclose the intentionally deceptive marketing tactics used by the cigarette companies to market low-tar cigarettes.<sup>3 19</sup> Low-tar cigarettes are often marketed as having technologically advanced filters or as containing "natural" tobaccos with no additives.<sup>3</sup> The low machine-measured tar yields of these cigarettes are often touted in the advertising for these products, despite the fact that the tar yields do not correspond to the actual higher levels of tar experienced by smokers because of smoker compensation and the elasticity of delivery of these cigarettes.<sup>1 20</sup>

The cigarette companies knew that low-tar cigarettes could deliver as much or more tar and nicotine than full-flavour cigarettes,<sup>12 21</sup> yet the industry chose to portray these products in advertising as having reduced health risks.<sup>3 22</sup> As shown in this study, the success of the advertising campaigns of these brands resulted in dramatic increases in sales of the low-tar cigarette and has probably served to keep concerned smokers from quitting.<sup>23</sup> As many smokers switch to low-tar brands for health reasons,<sup>4 24 25</sup> the effect of the advertising of these products on public health in the US is an important public policy issue.

## CONCLUSIONS

The marketing of low-tar cigarettes as low-risk cigarettes has misled smokers and contributed to the marked rise in sales for low-tar brands over the past 30 years. The results of this study show how the intent of the tobacco industry to market a known dangerous product as "healthier"<sup>2 26</sup> translated into increases in advertising, which ultimately led to the market domination of low-tar cigarettes. With the recent entrance of reduced-harm tobacco products in the US tobacco market, it will be imperative for the public health community to monitor the advertising claims of these products so that another generation of smokers is not misled into believing that using these products is safer than quitting.

### Authors' affiliations

**M B Reed**, San Diego State University, San Diego, California, USA  
**C M Anderson, D M Burns**, University of California, San Diego, La Jolla, California, USA

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