

# The association between advertising and calls to a tobacco quitline

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*Tobacco Control* 2007;16(Suppl 1):i24-i29. doi: 10.1136/tc.2007.020222

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Received 24 January 2007  
Accepted 13 August 2007

**Objective:** This study assessed the cost effectiveness of different types of television and radio advertisements and the time of day in which advertisements were placed in generating calls to the Oregon tobacco quitline. **Design:** Cost effectiveness was measured by cost per call, calculated as the cost of advertising divided by the number of quitline calls generated by that advertising. Advertising was bought in one-week or two-week blocks and included 27 daytime television buys, 22 evening television buys and 31 radio buys. **Results:** Cost effectiveness varied widely by medium, time of day and advertisement used. Daytime television was seven times more cost effective than evening television and also more cost effective than radio. The most effective advertisements at generating quitline calls were real life testimonials by people who lost family members to tobacco and advertisements that deal practically with how to quit. **Conclusions:** Placement of television advertisements during the day versus the evening can increase an advertisement's effectiveness in generating calls to a quitline. Some advertising messages were more effective than others in generating calls to a quitline. Quitline providers can apply findings from previous research when planning media campaigns. In addition, call volume should be monitored in order to assess the cost effectiveness of different strategies to promote use of the quitline.

More than 25 countries now have tobacco quitlines, sometimes operated at the state or province level.<sup>1</sup> A 1996 meta-analysis concluded that, "While difficult to evaluate, [tobacco quitlines] appear to be efficacious and useful as a public intervention for large populations."<sup>2</sup> More recent reviews have bolstered the conclusion that telephone support increases tobacco cessation.<sup>3-4</sup> Previous studies have shown that mass media advertising increases calls to tobacco quitlines<sup>5-15</sup> and to helplines for other public health concerns.<sup>16-22</sup>

Only a few studies have been published addressing the relative effectiveness of alternative advertising strategies in generating calls to a quitline. Most of these studies looked at the number of quitline calls relative to the number of target rating points (TRPs), essentially a measure of the number of people who watched the advertisement. An Australian study showed that the number of quitline calls varied by advertisements used and by the type of shows during which the ads were aired.<sup>5</sup> In another Australian study, an advertisement that showed a person calling the quitline was more effective in generating quitline calls than advertisements with graphic images of tobacco damaged body organs.<sup>7</sup> Two recent studies showed that placing advertisements at the beginning of the week generated more quitline calls than advertisements placed towards the end of the week or at the weekend.<sup>8-14</sup>

A study from New Zealand showed that certain television channels and certain shows were better for generating calls to a quitline and daytime placement was more effective than evening placement.<sup>14</sup> The New Zealand study looked at both quitline calls per TRP as well as cost effectiveness, defined as money spent on airing an advertisement divided by the number of calls generated by the advertisement. Cost effectiveness studies are more useful for deciding how to spend advertising dollars to most efficiently drive calls to a quitline.

For this study, we assessed the cost effectiveness of different advertising strategies in prompting tobacco users to call the Oregon tobacco quitline (OTQL). The OTQL is one component of the comprehensive tobacco control programme run by the Oregon Department of Human Services (ODHS).

## METHODS

Data were collected on advertising buys and calls to the OTQL from November 1998, when the OTQL became operational, to March 2002. Generally, media buy decisions were made for programmatic reasons and not for the purpose of this study of cost effectiveness.

### Data on advertising buys

In this study, we assessed the effectiveness of television and radio ads at generating calls to the OTQL. Most advertisements have a "quitline tag" at the end that includes a short description of the OTQL and its telephone number. Data describing each advertising buy were collected from PacWest Communications, the media contractor for ODHS. Information collected for each ad buy included cost of buying advertising time, dates aired, advertisement(s) aired, broadcast medium (television or radio) and air times for television (daytime or evening). For this study, the advertising costs included only the cost of the air time and not the costs of producing the advertisement or obtaining the rights to an advertisement. Oregon mostly used advertisements created by other state tobacco programmes (the advertisements in this study can be viewed at <http://apps.nccd.cdc.gov/MCRC>); the costs for obtaining rights to these advertisements were small compared to media placement costs.

Ad buys were usually one or two weeks in duration, starting on a Monday and ending on a Sunday. For any given television buy, advertisements were placed throughout the week, either exclusively in the daytime (5 am–4 pm) or in the evening (6:30 pm–1 am). There were 27 daytime television buys, with media placement costs ranging from \$7000–\$15 000 per week. There were 22 evening television buys with media placement costs ranging from \$25 000–\$35 000 per week. There were 31 radio buys, with costs ranging from \$20 000–\$35 000 per week.

**Abbreviations:** BRFSS, Behavioural Risk Factor Surveillance System; ODHS, Oregon Department of Human Services; OTQL, Oregon tobacco quitline; TRPs, target rating points

Television buys usually included two advertisements and radio buys always included two advertisements. When there were two advertisements, broadcast stations rotated the advertisements so that half the air time was used for each advertisement. In these cases, the two different advertisements did not air during the same commercial breaks.

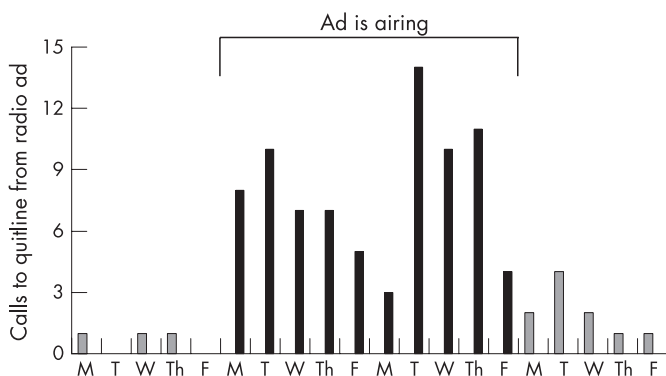
### Data on OTQL callers

Calls to the OTQL were answered by the staff of Group Health Cooperative (now Center for Health Promotion) under a contract with the ODHS. The OTQL was generally open weekdays 8 am–8 pm and Saturdays 8 am–1 pm and closed Sunday. People who called when the OTQL was closed were not counted unless they left a message and were called back (86% of all OTQL calls occurred during open hours). The following data were available on OTQL callers: date of call, type of tobacco used, stage of change, sex, birth date, race/ethnicity, highest level of education and county of residence. In addition, callers were asked, “How did you hear about the quitline?” Callers were not asked which particular advertisement, if any, they saw. All data were self reported by the caller, except for date of call.

### Assigning callers to ad buys

When there was a week without ads followed by an ad buy and then another week without ads, callers during the buy and the one week following were assigned to that buy. However, almost all of the television buys (42 of 49) and some of the radio buys (4 of 31) were aired directly before or after another buy. In these cases it was more difficult to know how many of the callers during the second buy were responding to ads aired in the previous buy. To calculate the percentage of “delayed callers” (callers during an ad buy that should be assigned to the previous ad buy) we assessed the pattern of calls for buys that ran without another buy directly following.

Figure 1 shows the pattern for one radio buy that is typical of the buys in this study—an immediate response that dissipated quickly. This pattern is consistent with other studies of “direct response advertisements” (that is, advertisements intended to get viewers to take an immediate action, such as making a telephone call or accessing a website) for retail product sales<sup>23 24</sup> and for soliciting charitable donations.<sup>25</sup> The week before the ad aired, an average of less than one caller per day said they heard about the quitline from radio. During the two weeks of radio ads, 77 people called from the radio ads. The following week, when no radio ads were airing, 10 callers had heard about the quitline from radio. The number of callers returned to baseline levels the second week after the ad stopped airing. In this



**Figure 1** Number of callers who heard about the quitline from radio before, during and after a typical radio ad buy (22 Oct 2001–18 Nov 2001).

example, the percentage of delayed callers was 11%, calculated as  $10/(10+77)$ .

In the six television buys followed by no ads, the percentages of delayed callers averaged 10% (95% CI: 7% to 13%). For the 27 radio buys, the percentages of delayed callers averaged 14% (95% CI: 12% to 17%). We used these percentages (10% for television and 14% for radio) to assign delayed callers to the appropriate ad buy.

### Calculating cost per call

The costs and number of callers for similar buys (that is, same advertisements, broadcast medium and air times for television ads) were aggregated for analysis. Cost effectiveness was measured by cost per call, calculated as dollars spent on advertising divided by the number of tobacco users who called the quitline from that advertising. However, all radio buys and most television buys used two advertisements aired in a 50/50 rotation. In many cases, one of the ads was never aired alone and thus the cost per call for that ad had to be derived. In these cases, the calls generated by the advertisement that never aired alone were calculated using the following formula:

Actual calls from advertising using ads A and B (known) = estimated calls from advertising costing D/2 using ad A (known) + calls from advertising costing D/2 using ad B (derived)

The cost per call for ad A is known, so “estimated calls from advertising costing D/2 using ad A alone” was calculated as  $(D/2)/(\text{cost per call for ad A})$ . The number of calls attributable to ad B was then derived and cost per call for ad B was calculated. An ad that does not mention the quitline was assumed to generate zero calls.

### Analyses

Costs per call were compared among all ad buys within three different media: daytime television, evening television and radio. p Values for statistical significance were calculated using the goodness of fit  $\chi^2$  statistic to test the null hypothesis that costs per call were equal using the critical value of 0.05.<sup>26</sup> When comparisons were made among three or more buys, the critical p value for statistical significance was calculated using the Bonferroni adjustment, the most conservative adjustment generally recommended for use when multiple comparisons are being tested.<sup>27</sup>

Three television advertisements were aired by themselves in both a daytime buy and an evening buy. For each of these three advertisements, cost per call was compared for daytime versus evening buys.

Characteristics of quitline callers were compared with the general adult population of tobacco users in Oregon (only 2% of quitline callers were under 18 years old). Data for adult tobacco users were derived from the 2000 Oregon Behavioural Risk Factor Surveillance System (BRFSS), which included 1606 respondents who identified themselves as smokers and 187 as smokeless tobacco users.

## RESULTS

### Tobacco use characteristics

Among callers from television buys, the percentage of smokers who planned to quit in the next 30 days was 92.0% (95% CI: 91.2% to 92.8%) and among callers from radio buys it was 91.2% (95% CI: 89.9% to 92.5%). Among BRFSS respondents who were smokers, 24.4% (95% CI: 21.2% to 27.9%) planned to quit in the next 30 days.

In response to television advertisements that deal with smoking, 4.3% (95% CI: 3.6% to 4.9%) of callers were smokeless tobacco users. In response to television buys that have smokeless tobacco messages, 39.1% (95% CI: 34.6% to 43.6%)

**Table 1** Cost per call for television ad buys

Advertisements (message)	Calls	Cost	Cost per call
<b>Daytime television ad buys</b>			
<i>Ad aired alone</i>			
"Quitting Takes Practice" (how to quit smoking)	1318	\$91 906	\$70
"Funeral" (reasons to quit smoking)	260	\$23 324	\$90
"Cigarette Pack" (reasons to quit smoking)	246	\$35 250	\$143
"Tina Cary" (family testimonial smokeless)	400	\$57 796	\$144
"Bedroom" (secondhand smoke)	52	\$8568	\$165
"Debi-Voicebox" (smoker testimonial)*	98	\$33 613	\$343
<i>Ads aired in pairs</i>			
"Quitting Takes Practice" and "Funeral"	332	\$34 636	\$104
"Quitting Takes Practice" and "Cigarette Pack"	716	\$106 866	\$149
"Debi-Voicebox" and "Cigarette Pack"	333	\$67 225	\$202
<b>Evening television ad buys</b>			
<i>Ad aired alone</i>			
"Krystell Memorial" (family testimonial smoking)*	196	\$47 787	\$244
"Quitting Takes Practice" (how to quit smoking)*	346	\$115 957	\$336
"Debi-Voicebox" (smoker testimonial)	63	\$31 858	\$503
"Funeral" (reasons to quit smoking)	56	\$35 099	\$623
"Tina Cary" (family testimonial smokeless)	48	\$34 048	\$716
"Cigarette Pack" (reasons to quit smoking)*	67	\$54 449	\$815
"Bedroom" (secondhand smoke)	22	\$34 048	\$1530
<i>Ads aired in pairs</i>			
"Quitting Takes Practice" and "Krystell Memorial"	338	\$95 574	\$283
"Baby Smokers" (no QL)† and "Quitting Takes Practice"	346	\$231 914	\$671
"Baby Smokers" (no QL)† and "Cigarette Pack"	67	\$108 898	\$1629

\*Figures calculated from ads aired in pairs.  
†Advertisement does not mention the quitline.

of callers used smokeless tobacco. From the Oregon BRFS, 12.8% (95% CI: 11.0% to 14.9%) of all tobacco users were smokeless tobacco users.

### Cost effectiveness of advertisements aired on daytime television

Five television advertisements were aired by themselves during daytime television buys (table 1). "Quitting Takes Practice" is a cartoon advertisement showing smokers how to quit, including calling the quitline. "Funeral" and "Cigarette Pack" are advertisements describing reasons to quit. "Tina Cary" is a testimonial advertisement by a woman who lost her husband to cancer caused by smokeless tobacco. "Bedroom" shows a man smoking in bed, exposing his wife to secondhand smoke.

"Quitting Takes Practice" had the lowest cost per call among advertisements that ran during daytime television. The next most effective advertisement was "Funeral," which had a cost per call that was 22% more than "Quitting Takes Practice" ( $p = 0.0002$ ). Cost per call for each of these two advertisements was significantly different from the other advertisements ( $p < 0.0001$  for each comparison). The next most effective advertisements were "Cigarette Pack," "Tina Cary" and

"Bedroom," which did not vary significantly from each other ( $p = 0.36$  or greater for each comparison). Cost per call for "Debi-Voicebox," an ad where a smoker smokes through a hole in her throat, was significantly higher than each of the other ads ( $p < 0.0001$  for each comparison).

### Cost effectiveness of advertisements aired on evening television

"Krystell Memorial," a testimonial advertisement by a girl who lost her mother to smoking, had the lowest cost per call among evening television buys ( $p < 0.0004$  for each comparison). "Quitting Takes Practice" had the next lowest cost per call, significantly lower than the other ads ( $p < 0.0025$  for each comparison). "Bedroom" had the highest cost per call among advertisements aired on evening television ( $p < 0.0077$  for each comparison). The costs per call for "Debi-Voicebox," "Funeral," "Tina Cary" and "Cigarette Pack" were not significantly different from each other ( $p = 0.24$  or greater for each comparison).

### Cost effectiveness of radio advertisements

The radio advertisements with the lowest costs per call were "Raspy," which talks about the benefits of quitting smoking

**Table 2** Cost per call for radio buys

Advertisements (message)	Calls	Cost	Cost per call
<b>Ad aired alone</b>			
"Raspy" (reasons to quit smoking)*	320	\$106 407	\$332
"Tina Cary-Graft" (family testimonial smokeless)*	410	\$146 335	\$357
"Just a Pinch" (reasons to quit smokeless)*	127	\$65 367	\$514
"Lucky Rick" (smokeless user testimonial)*	172	\$90 578	\$527
<b>Ads aired in pairs</b>			
"Secondhand Sound" (no QL)† and "Lucky Rick"	172	\$181 156	\$1053
"Secondhand Sound" (no QL)† and "Tina Cary-Graft"	234	\$153 166	\$655
"What Is a Voice" (no QL)† and "Tina Cary-Graft"	176	\$139 504	\$793
"Raspy" and "Lucky Rick"	522	\$212 813	\$408
"Raspy" and "Just a Pinch"	324	\$130 734	\$404

\*Figures calculated from ads aired in pairs.  
†Advertisement does not mention the quitline (QL).



and “Tina Cary-Graft,” a testimonial advertisement by the woman who lost her husband to smokeless tobacco (table 2). The costs per call for these two ads were significantly lower than the cost per call for “Just a Pinch,” a slightly humorous advertisement about the dangers of smokeless tobacco and “Lucky Rick,” a tobacco user’s testimonial about the dangers of smokeless tobacco ( $p < 0.0002$  for each comparison). “Secondhand Sound” and “What Is a Voice” do not mention the quitline and were assumed to generate no calls.

### Cost effectiveness of daytime versus evening television

Three television advertisements were aired in separate buys in both daytime and evening—“Tina Cary,” “Funeral” and “Bedroom.” For each of these three advertisements, the cost per call was significantly higher when the advertisement ran during the evening versus daytime ( $p < 0.0001$ ). The ratio of the cost per call for an evening buy versus the cost per call for a daytime buy was 5.0 for “Tina Cary,” 6.9 for “Funeral” and 9.3 for “Bedroom,” averaging 7.1.

### Evaluating assumptions

To test the assumption that ads that do not mention the quitline generate few, if any, calls, we looked at data from January 1999 through March 2000. During this time period, television advertisements were aired periodically, but none of the ads mention the quitline. The number of callers who heard about the quitline from television was small and did not vary significantly between weeks when advertisements were running and when advertisements were not running (average calls per week: 2.0 versus 2.1,  $p = 0.99$ ).

In assigning delayed callers to ad buys, it was assumed that 10% or 14% (for television and radio, respectively) of callers called the week after the ad stopped airing. Additional analyses were done assuming that the percentages of delayed callers were at either the high or low end of the 95% confidence interval for the average delayed callers (7%–13% for television buys and 12%–17% for radio buys). Under these assumptions, the cost per call changed an average of 2% but did not affect the conclusions of this study.

Costs per call for some advertisements were derived from a formula which assumed that two ads airing in the same time period did not interact either synergistically or negatively. This study, however, indicated that the interaction may be negative. For example, the cost per call for a buy with “Quitting Takes Practice” and “Funeral” airing together (\$104) was higher than both the cost per call for “Quitting Takes Practice” (\$70) and the cost per call for “Funeral” (\$90) (table 1).

## DISCUSSION

The results of this study suggest that the cost effectiveness of advertising to generate calls to a tobacco quitline varies greatly by media used and by advertisement.

### Cost effectiveness of different media

Daytime television was more cost effective than evening television by an average multiple of 7.1, after adjusting for advertisements used. Some of the difference in cost effectiveness between daytime and evening television can be attributed to the cost per viewer. In this study, cost per viewer for evening television buys was twice that for daytime television. Thus, given the same number of viewers seeing an ad in daytime and evening, the daytime ad would generate 3.5 times as many calls as the evening ad. The cost per viewer was higher for evening television buys because evening television viewers are generally paying more attention to the television broadcast than daytime viewers. This may help explain why daytime television generates more calls—viewers who are more engaged in a

programme may be less likely to stop watching and make a telephone call.<sup>5</sup> A previous study of quitline calls<sup>14</sup> and studies of retail product sales<sup>24 25 28</sup> have shown that direct response advertisements were more cost effective during the daytime versus the evening. Approximately 35%–40% of the evening advertisements were shown after 8 pm, when the quitline was closed. Callers after 8 pm could leave a message and get called back, but it is likely that the quitline’s hours reduced the effectiveness of evening buys.

An accurate cost effectiveness comparison cannot be made between television and radio because identical ads cannot be aired on radio and television. But, the most effective television advertisement had a cost per call of \$70, while the cost per call for the most effective radio advertisement was \$332.

### Cost effectiveness of specific advertisements

Generally, ads targeting smokers generated more quitline calls than ads targeting smokeless tobacco users, since only 12.8% of Oregon tobacco users are smokeless tobacco users. The advertisements in this study can be further grouped into five basic categories: testimonials by people who lost family members to tobacco; testimonials where a tobacco user talks about the dangers of tobacco; actors who speak about reasons to quit tobacco; an advertisement that models how to quit; and secondhand smoke messages. Among ads aired during evening television, “Krystell Memorial,” an affected family testimonial, was the most cost effective. “Tina Cary-Graft,” another affected family testimonial, was the most cost effective radio advertisement among the ads that dealt with smokeless tobacco. In each of these testimonial advertisements, a real person talks about the emotional impact of a family member’s illness and eventual death by tobacco. The emotions are real and powerful, but the advertisements are understated in that they do not ask someone to quit tobacco, except for the quitline tag at the end of the advertisements.

These ads were more cost effective than testimonials by tobacco users that described the health consequences of tobacco. In tobacco users’ testimonials, real people who have suffered greatly from a tobacco related illness give the message: “I used tobacco and look what it did to me; you should quit so this doesn’t happen to you.” It may be more difficult for tobacco users to deny the message of the affected family testimonials, as opposed to advertisements that show tobacco users suffering. Tobacco users may think that their health is their concern alone, but the family testimonials may help them understand the huge impact their death or serious illness would have on people they love.

The only advertisement that deals practically with how to quit was “Quitting Takes Practice,” which when shown during daytime was the most cost effective advertisement. “Quitting Takes Practice” was more effective than the advertisements that used actors to deliver messages about reasons to quit. Among ads that mention the quitline, secondhand smoke ads were the least effective at generating calls. Ads that do not mention the quitline generated few, if any, calls.

### Study limitations

This study has several limitations. The assigning of callers to ad buys was not completely accurate because the number of delayed callers had to be estimated. These estimates assumed that the pattern of delayed callers was the same for buys aired directly before another buy and for those without subsequent ad campaigns. In addition, when calculating costs per call from buys that used two advertisements, it was assumed that the two advertisements did not affect each other. Data from this study indicate that two ads airing in the same time period may have a negative interaction.

## What this paper adds

- Clinical trials as well as population based studies have shown that use of tobacco quitlines increased the quit rate of tobacco users. A number of studies have shown that advertising increases calls to quitlines or other types of helplines. But only a few limited studies have analysed the relative effectiveness of different advertising strategies in generating calls to a quitline.
- The objective of this study was to assess the cost effectiveness of different advertising strategies in generating calls to a quitline. Daytime television was far more cost effective than evening television and also more cost effective than radio. The most effective advertisements at generating quitline calls were real life testimonials by people who lost family members to tobacco and advertisements that deal practically with how to quit.
- Quitline providers should consider trying multiple advertising strategies at the beginning of a campaign in order to determine the most cost effective strategies and then plan their campaign accordingly.

The pattern of advertising in this study did not allow for a complete analysis of how an advertisement's effectiveness is influenced by advertising in the preceding weeks. Multiple advertisements could have a cumulative effect on the likelihood of a viewer calling the quitline or could have a lesser effect because of viewer wearout, as was the case in one study of retail product advertising.<sup>23</sup> Among the 19 ad buys that had multiple airings, cost per call averaged 4% higher in the later placements. Adjusting for this 4% difference would not affect the conclusions of this study, however.

This study's methodology required measuring the number of quitline calls generated by an ad buy that spanned two weeks. Thus, this study could not assess the effects of characteristics of individual ad placements such as type of programme, day of the week and exact time of day. Other studies have assessed the effectiveness of single ad placements by measuring the number of quitline callers within one hour of an ad placement.<sup>5 14</sup> Studies that assign callers to single ad placements may be more difficult to implement, but that methodology allows for analyses of additional factors that may influence the number of quitline callers.

## CONCLUSION

Calls to a quitline may be the most easily measured outcome of an ad campaign, but not necessarily the most important outcome of a campaign. Studies have shown that anti-tobacco advertising can have multiple beneficial effects for tobacco control.<sup>3</sup> Secondhand smoke ads were least effective at generating quitline calls, but messages about the dangers of secondhand smoke are very important. Exposure to secondhand smoke increases a person's risk for many serious diseases,<sup>29</sup> and advertising about the dangers of secondhand smoke may increase support for smoking restrictions at home and in workplaces.

The results of this study may be helpful for organisations designing direct response advertising campaigns in the public health arena. An organisation promoting a helpline should continually assess the effectiveness of their outreach efforts. Callers to a helpline should be asked how they heard about the helpline and accurate records should be kept about helpline promotions, including costs. Organisations should consider trying multiple advertising strategies at the beginning of a

campaign in order to determine the most cost effective strategies and then plan their campaign accordingly.

## ACKNOWLEDGEMENTS

We are grateful for the support and guidance from the staff of the Oregon Tobacco Prevention and Education Program and staff from Program Design and Evaluation Services, especially Julie Maher, Barbara Pizacani and Kristen Rohde. We would also like to acknowledge Richard Leman, Jane Moore and Mel Kohn from the Oregon Department of Human Services for their contributions to this work. We received important information and insights from Center for Health Promotion, PacWest Communications and Darcey Price, media buyer for Cappelli Miles Wiltz Kelly.

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Funding: This work was funded by the Oregon Tobacco Prevention and Education Program.

Competing interests: The authors do not have any competing interests to report.

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