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Cost-Effectiveness Analysis of a Statewide Media Campaign to Promote Adolescent Physical Activity

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A cost-effectiveness analysis of a statewide social marketing campaign was performed using a statewide surveillance survey distributed to 6th through 12th graders, media production and placement costs, and 2000 census data. Exposure to all three advertisements had the highest impact on both intent and behavior with 65.6% of the respondents considering becoming more active and 58.3% reporting becoming more active. Average cost of the entire campaign was \$4.01 per person to see an ad, \$7.35 per person to consider being more active, and \$8.87 per person to actually become more active, with billboards yielding the most positive cost-effectiveness. Findings highlight market research as an essential part of social marketing campaigns and the importance of using multiple marketing modalities to enhance cost-effectiveness and impact.

Keywords: *cost-effectiveness; social marketing; physical activity*

In the past decade, social marketing has grown as a successful method to promote behavior change to a large number of people. The Centers for Disease Control and Prevention (CDC), the U.S. Department of Agriculture (USDA), the U.S. Department of Health and Human Services (USDHHS), and other governmental and nonprofit organizations have used social marketing to increase fruit and vegetable consumption, promote breastfeeding, decrease fat consumption, promote physical activity, and influence a wide variety of other preventive health behaviors (Coreil, Bryant, & Henderson, 2000).

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Social marketing of physical activity has been shown to play an important role in the public's understanding of the relationship between health and physical activity. A national program coordinated by the CDC called VERB encourages "tweens" (young people ages 9-13) to be physically active every day (Wong et al., 2004). Social marketing of the program combined mass-media advertising, public relations, guerilla (i.e., interpersonal) marketing, partnership efforts with professional sports leagues and athletes, and well-known sporting goods suppliers and retailers to reach the distinct audiences of tweens and adult influencers. After 1 year, the program resulted in a 34% increase in weekly free-time physical activity sessions among 8.6 million children ages 9 to 10 in the United States (Grier & Bryant, 2005). Other large-scale social marketing campaigns have been successful in promoting awareness and interest in physical activity. For example, the "ParticipACTION" program in Canada has demonstrated increased awareness of, and interest in, exercising during the time the campaign has been running (Edwards, 2004), and the "Life—Be in It" program in Australia found high levels of awareness of the campaign, reports of increased participation in exercise, and frequent endorsement of beliefs about the health benefits of exercising (Marcus, Owen, Forsyth, Cavill, & Fridinger, 1998).

Physical activity promotion campaigns have become more salient because the daily lives of many Americans are dominated by sedentary behaviors and, in effect, physical activity is slowly being removed as a natural component of everyday life. Physical activity is now considered as important for population health as other traditional issues such as tobacco consumption and cholesterol levels (Bauman, 2004). Improved physical activity behaviors is also a national health objective in *Healthy People 2010* (Delaware Department of Health and Human Services, 2000). Unlike previous sets of national health

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objectives, *Healthy People 2010* included 10 high-priority public health areas for enhanced public attention. The fact that the first leading health indicator is physical activity and the second is overweight and obesity clearly illustrates the importance of the issue (USDHHS, 2000). A physically inactive population is at an increased risk for many chronic diseases including heart disease, stroke, colon cancer, diabetes, and osteoporosis. Physical inactivity has also contributed to a national epidemic of childhood obesity, with the percentage of young people who are overweight doubling since 1980 (National Center for Health Statistics, 2000). Of children aged 5 to 10 who are overweight, 61% have one or more cardiovascular disease risk factors, and 27% have two or more (Freedman, Dietz, Srinivasan, & Berenson, 1999). Childhood obesity is also a strong predictor of obesity in adulthood and is associated with health problems in adulthood independent of adult weight status (Whitaker, Wright, Pepe, Seidel, & Dietz, 1997).

In addition to the health-related repercussions, surges in the prevalence of these diseases could lead to significant increases in our national health care expenditures. A study performed by Jones and Eaton (1994) estimated that \$5.6 billion could be saved from the cost of coronary artery disease alone if 10% of adults began a regular walking program. Another study performed on the cost benefit of physical activity using bike and pedestrian trails showed a \$564.41 direct health benefit of using the trail. The cost-benefit ratio was found to be 2.94, indicating that every \$1 investment in using the trails led to \$2.94 in direct medical benefits. The sensitivity analysis showed that even in the worst-case scenario, the direct medical benefit outweighed the cost by more than 65% (Wang et al., 2005).

Recent best practice recommendations suggest that the lack of physical activity in today's youth must be confronted at both the societal and the environmental

levels. In this effort, there is a role for social marketing strategies and media campaigns to change community-level perceptions about physical activity and concomitant behaviors. *Social marketing* is defined as the "application of commercial marketing technologies to the analysis, planning, execution, and evaluation of programs designed to influence the voluntary behavior of target audiences in order to improve their personal welfare and that of their society" (Andreasen, 1995). Common social marketing communication strategies used to motivate and facilitate behavior change include mass-reach broadcast media advertising such as television and radio spots, billboards/bus boards, print-based materials, audiovisual materials, and Web sites. These mass media campaigns can reach large populations or targeted audiences and influence awareness, knowledge, and beliefs through intention and promotion of behavior change.

For example, a mass media campaign to promote healthy eating and physical activity in New Orleans stimulated improvements in attitude toward walking and healthy diet (Beaudoin, Fernandez, Wall, & Farley, 2007). In another smaller study ($N = 295$), an Arkansas paid radio campaign to promote physical activity among tweens was found to promote a greater desire and likelihood to get involved in physical activity (Balamurugan, Oakleaf, & Rath, 2005).

Social marketing campaigns can be an asset to health promotion professionals seeking to modify behaviors, yet many groups have limited resources to fund a large-scale social marketing campaign. Often, health promotion campaign developers are forced to create marketing campaigns on a conservative budget and determine which avenue will be most cost-effective. Although there have been some cost-effectiveness assessments of social marketing campaigns (e.g., a media campaign to promote lowfat milk consumption in four small West Virginia communities; Wootan, Reger-Nash, Booth-Butterfield, & Cooper, 2005), there is a general lack in the area of cost-effectiveness analysis (CEA) in relation to different social marketing modalities and to the promotion of physical activity. According to a meta-analysis conducted by Hagberg and Lindholm (2005), there have only been eight economic evaluations of community-promoted physical activity interventions, of which three were purely theoretical and none addressed social marketing. There is a need for economic assessment information to help health promotion professionals make educated choices about marketing options, especially if funding is limited. A CEA of social marketing efforts can provide professionals with information helpful in their campaign planning and identify what approach may be most effective given any budgetary constraints. Economic assessments

are important to social marketing interventions because policy makers and program strategists need to know not only what works and what the program's impact is but also what the best choice of intervention is (CDC, 2007).

A CEA is an analysis used to compare the cost of alternative interventions that produce a common health effect. A CEA divides the net cost of a program by the outcomes produced by the program (CDC, 2007). Results are expressed as the net cost per unit of outcome. As this relates to health, outcome is defined as the health effects targeted by the program. Effectiveness can be measured using intermediate outcomes (e.g., number of people who stop smoking) or final outcomes (e.g., cases of disease prevented or years of life saved) (CDC, 2007). In social marketing, outcomes could be defined as a change in cognition (e.g., belief or intent) and/or behavior, especially when the behavior is clearly linked to final outcomes (CDC, 2007). When evaluating different interventions with the same benefit, a CEA is preferred over a cost-benefit analysis, especially if the ability to measure benefits is unnecessary or impractical (White House, 2007).

In 2004, based on Behavioral Risk Factor Surveillance System data (Delaware Department of Health and Human Services, 2001) that identified an adult overweight and obesity rate of 59% and a sedentary lifestyle rate of 58% (i.e., no leisure-time activity), the State of Delaware allocated tobacco settlement funds to address this problem through the development and implementation of a social marketing campaign to promote physical activity among adolescents aged 12 to 17 years. The program was marketed using two television spots and one billboard design located in five high visibility areas spanning the state. The purpose of this study was to conduct a CEA of Delaware's 2004 "Get Up and Do Something" media campaign to determine relative impact and cost-effectiveness of social marketing modalities on adolescent physical activity levels. Three research questions were used to guide this study:

1. How effective was each advertisement modality (i.e., television, billboards) in persuading adolescents to consider being active and actually becoming active?
2. How does media campaign exposure impact intent and physical activity?
3. What is the cost-effectiveness for each marketing modality (i.e., television, billboards)?

► METHOD

The CEA was performed using data obtained from the 2004 Youth Tobacco Survey (YTS). The survey included questions pertaining to the physical activity

levels of 6th- through 12th-grade students. The survey was disseminated to middle and high schools occupying all three Delaware counties with equal demographic distributions. A total of 4,882 surveys was completed. To create a more valid data set, results were delimited by a self-reported weight of less than 300 pounds and a self-reported body mass index between 12 and 40, resulting in a final sample of 3,782. The cross-sectional sampling method was approved by the CDC. Results only included students who were currently attending public school. Questions related to the reach and impact of the Get Up and Do Something campaign were included in the survey.

The Get Up and Do Something media campaign ran for 6 weeks during the months of February and March in the calendar year 2004. Get Up and Do Something is a program developed by the Delaware Department of Health and Social Services and the Delaware Coalition to Promote Physical Activity and Healthy Nutrition in accordance with the goals set forth in the *Healthy Delaware 2010* report (Delaware Department of Health and Human Services, 2000). The Get Up and Do Something program's aim is to increase regular physical activity of Delawareans with the target market being adolescents. The program was advertised using two television spots and one billboard design located in five high visibility areas spanning the state. The emphasis of the campaign was to positively affect the target market's perception of physical activity and to motivate them to get up and do something physically active. Although promoting physical activity was the main emphasis of the campaign, it was done with a socially fun and upbeat style. The goal was to get the audience to consider being more active, to associate physical activity with things they already value (friends, socializing, looking good), and to convey a negative association with common behaviors such as sitting around watching television, but in a nonthreatening, nonauthoritative, motivational manner (Peterson, Abraham, & Waterfield, 2005).

The first advertisement to air involved a man who pops out of the TV and then takes two people sitting on the couch to the park so they can "get up and do something." The advertisement contained an African American main character, a Caucasian couch potato male and female couple, and an ethnically diverse mix of background characters. The second television advertisement involved the same African American main character at a sporting goods store where he helps people find their "thing to do" by logging on to getupanddosomething.org.

The billboard advertisement was placed in three high traffic areas in New Castle County, because it is the most populated county, containing 64% of the total

state population, and one was placed in a high traffic area in each of the other two counties in Delaware.

A CEA was performed using the YTS responses, production and placement costs for the Get Up and Do Something campaign, and Delaware 2000 census data. The production and placement costs for the television and billboard advertisements were obtained from the marketing firm assisting with the campaign. 2000 Census data for Delaware residents, ages 10 to 19 years, were obtained from the U.S. Census Bureau (2006). The impact of the campaign was measured using yes/no responses on the YTS. *Campaign reach* was defined as the number of individuals who were exposed to one or more of the campaign ads. *Campaign impact* was defined as the number of individuals who self-reported considering to be more active or becoming more active as a result of exposure to the campaign. Questions related to campaign impact and reach were as follows:

Impact

1. As a result of the TV ads and billboards with the slogan "Get Up and Do Something," have you considered being more active?
2. As a result of the TV ads and billboards with the slogan "Get Up and Do Something," have you become more active?

Reach

3. In the past month, have you seen the television ads with the man who pops out of the TV and takes two people sitting on the couch to a park so that they can "get up and do something"?
4. In the past month, have you seen the television ads with the man at the sporting goods store who helps people find their "thing" by logging on to getupanddosomething.org?
5. In the past month, have you seen billboards with the slogan "Get Up and Do Something"?

► TREATMENT OF DATA

A CEA was performed for each advertisement modality using the formulas listed below. Total population refers to 2000 Census data for the 10- to 19-year-old age group ($N = 110,906$).

Cost-effectiveness for individuals who saw the ad ($C = \text{cost}$; $I = \text{impact}$):

$$\frac{C}{I} = \frac{[\text{cost of development} + \text{cost of placement}]}{[\% \text{ sample who saw ad} \times \text{total population}]}$$

Cost-effectiveness for individuals who considered being more active:

$$\frac{C}{I} = \frac{[\text{cost of development} + \text{cost of placement}]}{[(\% \text{ sample who saw ad} \times \% \text{ sample who had intent to change}) \times \text{total population}]}$$

Cost-effectiveness for individuals who became more active:

$$\frac{C}{I} = \frac{[\text{cost of development} + \text{cost of placement}]}{[(\% \text{ sample who saw ad} \times \% \text{ sample who had become more active}) \times \text{total population}]}$$

Responses were sorted into groups as follows:

- Those who only saw television ad #1
- Those who only saw television ad #2
- Those who only saw television ads #1 and #2
- Those who only saw the billboards
- Those who reported seeing television ads #1 and #2 and billboards

Cost-effectiveness was determined for each of the five different media exposure categories listed above and overall for the entire campaign (cumulative cost-effectiveness for all five separate media exposure categories).

► RESULTS

As illustrated in Table 1, TV ad #1 had a higher recall percentage than ad #2. The percentage of survey respondents who only saw ad #1 was more than 3 times greater than those who only saw #2, suggesting that ad #1 may have been of better quality than ad #2, given that they had equal air time. When looking at the cumulative impact of TV ad exposure only, as seen in Figure 1, there was no noticeable increase in intent or adoption of physical activity behaviors from seeing only one TV ad. However, the cumulative impact of TV ads and billboards was noticeably higher than TV ads alone.

Billboard ads had an impact on more than half of the survey respondents who reported seeing the billboards, with 53.2% considering being more active but only 44.1% reporting becoming more active. However, fewer adolescents saw billboards than TV ads #1 and #2, indicating that television provides greater exposure, although its impact may be less. Exposure to all three ads—ad #1, ad #2, and billboards—had the highest

TABLE 1
Impact of Social Marketing Campaign by Media Exposure Category

Media Exposure Category	Survey Respondents (n)	% Who Saw Ad	Total ^a Population Who Saw Ad (estimated)	% Considering Being More Active	% Who Became More Active
No ads	1119	29.6	32,814	13.0	10.1
Ad #1 only	455	12.0	13,343	39.1	27.9
Ad #2 only	113	3.0	3,314	46.9	31.0
Billboards only	363	9.6	10,645	53.2	44.1
Ads #1 and #2 only	1285	34.0	37,682	42.4	32.5
Ads #1 and #2 and billboards	1648	43.6	48,327	65.6	58.3
Television total	1077	28.5	31,583	43.0	31.7
Entire campaign	2895	76.5	84,895	54.5	45.2

a. According to the 2000 Census data, the total population of 12- to 19-year-olds in Delaware is 110,906.

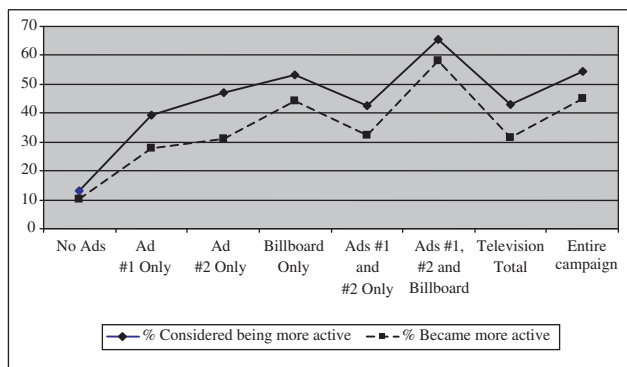


FIGURE 1 Relative Impact as a Function of Campaign Exposure

impact on both intent and behavior, with 65.6% of the respondents who saw all three ads considering becoming more active and 58.3% reporting becoming more active. When looking at the cumulative impact of the entire campaign, 54.5% of the respondents considered becoming more active and 45.2% reported becoming more active. Results suggest that different health communication modalities have a diverse effect on intent and behavior. Data also indicated that 10.1% reported that the ad campaign had affected their intent or behavior despite having no exposure to the campaign. These respondents were excluded from the CEA.

The CEA of the Get Up and Do Something campaign (see Table 2) indicated that the modality with the best cost-effectiveness was billboards, costing only \$2.25 per person to see the ad, \$4.24 per person to consider being more active, and \$5.11 per person to have them

actually become more active. The average cost of the campaign as a whole had the second best cost-effectiveness, costing \$4.01 per person to see the ad, \$7.35 per person to have them consider being more active, and \$8.87 per person to have them actually become more active. The next most cost-effective modality was the accumulation of the television and billboards together, costing \$7.03 per person to see the ad, \$10.72 per person to have them consider being more active, and \$12.06 per person to have them actually become more active.

Results showed a notable difference between the cost-effectiveness for TV ads #1 and #2. TV ad #1 cost \$11.87 per person to see the ad, \$30.36 per person to have them consider being more active, and \$42.55 per person to have them actually become more active. In comparison, TV ad #2 cost \$47.49 per person to see the ad, \$101.25 per person to have them consider being more active, and \$153.19 per person to have them actually become more active.

► DISCUSSION

Results related to the impact of the Get Up and Do Something campaign are much higher than what previous research has shown. Other physical activity campaigns have reported that 19% of their sample shifted from inactive to active following their evaluated campaign (Miles, Rapoport, Wardle, Afuape, & Dunman, 2001), and more than a quarter from a different campaign moved from a level of activity insufficient for health benefits to an appropriate threshold (Bauman, Bellew, Owen, & Vita, 2001). One study found no evidence, although this might

TABLE 2
Cost-Effectiveness to See, Intend, and Become More Active by Media Campaign Exposure

<i>Media Exposure Category</i>	<i>Cost per Person to See Ad</i>	<i>Cost per Person to Intend to Be Active</i>	<i>Cost per Person to Become More Active</i>
TV ad #1 only	\$11.87	\$30.36	\$42.55
TV ad #2 only	\$47.49	\$101.25	\$153.19
Billboards only	\$2.25	\$4.24	\$5.11
TV ads #1 and #2 only	\$8.38	\$19.76	\$25.79
TV ads #1 and #2 and billboards	\$7.03	\$10.72	\$12.06
Television total	\$10.00	\$23.25	\$31.54
Entire campaign	\$4.01	\$7.35	\$8.87

be expected given that there were no significant changes in knowledge by awareness of the campaign advertisement (Hillsdon, Cavill, Nanchahal, Diamond, & White, 2001).

The impact of anti-tobacco advertising on Californians who had quit smoking during the early years of one of the state's campaigns was investigated by Popham et al. (1993), who found that 288 of a sample of 417 past-year quitters (69%) said that they had seen or heard the ads, and 143 said that the ads played a role in their decision to quit, for an impact estimate of 34%. In this study, the advertisement modality that created the least impact was TV ad #1, with 43% considered being more active whereas only 31.7% reported becoming more active. This advertisement's impact, however, was still higher than previous research has revealed.

Cost-effectiveness data illustrated that the advertisement modality that had the best economic value was billboards. They were the most cost-effective method for reaching the adolescent target market, having a positive effect on both intent and action at a relatively low cost. However, there were more adolescents who saw the TV ads than those who saw the billboards. Other research has shown similar findings. For example, results of a social marketing campaign on public awareness of hypertension showed a significant difference in the frequency of response to television and billboards. Television was most frequently observed with 58.9% of the test respondents noting advertisement about high blood pressure compared to only 25.9% seeing billboards (Petrella, Speechley, Kleinstiver, & Ruddy, 2005). Study results showed that billboards had less of a reach than the TV ads but impact was more positive, with more than half of the adolescents who only saw the billboard considering to be more active and 44.1% reporting becoming more active.

The TV ads in total had slightly less of an effect, with 43% considering being more active and 31.7% actually becoming more active. One reason that TV ads did not have as much of an impact as the billboards may be due to them appearing only a few times a day on specific channels for a 6-week period. They could have been lost in the plethora of media messages that adolescents are exposed to every day. In contrast, the billboards in this study were placed in high-visibility locations for a 6-week period. Because many adolescents in Delaware commute to school, they may have seen the billboards on a daily basis.

Results demonstrated that TV ad #1 had a more positive impact and was more cost-effective than TV ad #2. The percentage of survey respondents who only saw ad #1 was more than 3 times greater than those who only saw #2. Given that TV ad #1 was developed using extensive market research whereas TV ad #2 was not, findings point to the value of doing market research prior to ad or market development. Although not directly assessed in this study, these results may suggest that in the long-term, market research costs are rewarded with increased campaign effectiveness.

As illustrated in Figure 1, TV ads in this study had a consistent effect on behavior change even when more than one commercial was seen. The average percentage of adolescents becoming more active after seeing either TV ad #1 only, TV ad #2 only, or TV ads #1 and #2 only was 30.8% (± 2.5). This result suggests that even if a campaign adds more commercials, there may not necessarily be a greater effect on behavior change. This could be due, in part, to the theory of diminishing returns, defined as benefits that, beyond a certain point, fail to increase in proportion to extended efforts. Because the market is saturated with advertisements, the information may seem repetitive, creating little impact on knowledge

or intention to become more physically active. This study's results suggest that an approach using multiple modalities may be more effective than using multiple ads in one modality.

When looking at the entire campaign, there was a high impact on both intent and behavior, with 54.5% of the respondents considering becoming more active and 45.2% actually becoming more active. The CEA showed that the campaign as a whole cost only \$4.01 per person to see the ad, \$7.35 per person to have them consider being more active, and \$8.87 per person to have them actually become more active. These costs are comparable to those found by Wootan et al. (2005), who reported an impact cost ranging from \$0.57 to \$11.85 for a lowfat milk consumption campaign. Results suggest that using different modalities may provide the most reach and impact on both cognition and behavior in the most cost-effective manner. When faced with a decision to add another television commercial or another communication medium, these results support the latter. It is also important to note that campaign costs will reduce over time because the same advertisements can be used repeatedly year after year.

► LIMITATIONS

All results were based on self-report and may be subject to error due to recall bias. Population estimates also assume that all survey respondents had similar viewing behaviors of television commercials and exposure to the billboard ads. Given that 10.1% of respondents reported a positive impact without seeing a single ad also suggests that impact measures may have been influenced by a possible "Hawthorne" effect. Health promotion professionals must consider these results with these limitations in mind. However, results do illustrate a difference in cost-effectiveness between various advertisement modalities, the relative impact of television ads, and the cumulative impact of a multimodality campaign. In addition, data analysis only included the population of 10- to 19-year-olds. However, the Get Up and Do Something campaign was available to the general public. Subsequently, cost-effectiveness findings may be underestimated and should be viewed as relative rather than absolute results.

► CONCLUSIONS AND RECOMMENDATIONS

Study results suggest the following conclusions: (a) Billboards have a more favorable cost-effectiveness than television ads when placed in high traffic areas. (b) Multiple media modalities (e.g., billboard and television)

increase target audience reach and impact and improve cost-effectiveness. (c) Television increases reach but has a comparatively lower impact than billboards.

Based on the results of this study, the following recommendations are provided to health promotion professionals who wish to provide social marketing efforts to adolescents:

- When working with a limited budget, billboards may have a more positive cost-effectiveness than television, provided they are located in high traffic areas.
- When funding is available, the use of multiple modalities is more effective than using a single modality. Campaign impact is enhanced through the repetition of the message through a variety of communication channels (i.e., television and billboards).
- Additional research into social marketing cost-effectiveness as it relates to current and emerging media modalities is recommended. Although this study focused on traditional marketing mediums, the assessment of Internet and viral-marketing campaigns to promote healthy behavior is an emerging area for social marketing research and program development and assessment.

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