

DRIVE CANCER OUT: A PHYSICIAN-LED ANTI-SMOKING PROGRAM DIRECTED AT TEENS AND ADOLESCENTS

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Kentucky is among the states with the highest smoking-related mortality and youth smoking rates. Drive Cancer Out is a physician-led program that assesses and attempts to influence health literacy among Kentucky adolescents. Surveys on fifth-grade students identify social risk factors for smoking initiation and propose methods to decrease the rate of smoking among teenagers.

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INTRODUCTION

Four hundred and forty thousand Americans die annually from smoking. They comprise the largest subset of preventable deaths in our country by a wide margin.¹ The facts are most astounding and untenable with respect to lung cancer. Ninety percent of lung cancer is caused by smoking. Ninety percent of lung cancer patients die of their disease, and most abhorrently, 90% of these patients began smoking before they were 21.^{2,3} Addicted to nicotine, they began their path to early mortality before they were mature adults. Contrary to euphemistic predictions, a cure for lung cancer is not around the corner or even a decade or two away. In 1975 the five-year survival rate for lung cancer was 12.7%. In 2002 the rate was 15.5%.⁴

In Kentucky we "lead" the nation in lung cancer mortality. The number of lung cancer deaths among persons 40-60 years of age is almost double the national rate.⁵ This phenomenon is likely related to the fact that Kentucky has an alarmingly high rate of youth smoking, one of the highest in the nation.⁶ Early exposure to smoke carcinogens results in malignancy at a disproportionately younger age because the risk of developing lung cancer from smoking is exponentially related to the duration of consumption.^{7,8,9}

The CDC has made recommendations for funding and implementation of tobacco prevention and cessation programs.¹⁰ Unfortunately, Kentucky spends less than 8% of the CDC-recommended minimum amount on these efforts, and only a small portion of this allocation is used to educate our youth and dissuade them from smoking. Given this legislative failure, our community needs physicians to augment existing anti-smoking programs or to institute their own initiatives with the collaboration of public health officials. United States and Canadian preventive health services assign an "A rating" to such clinical interventions.¹¹

To this end, Drive Cancer Out (DCO) was established. It is an organization led and supported by physicians, medical students, healthcare providers, and cancer survivors. Recognizing that there have been many attempts to curb youth smoking, DCO has implemented a program to increase the health literacy of youths. Pre- and post-educational tests were performed to gain an understanding of the target audience and to assess changes that were made as a result of the Drive Cancer Out program.

DCO PROGRAM

The DCO program begins with a 15 to 20-minute slide presentation, delivered by a physician or medical student. An emphasis is placed on pathology caused by smoking and on basic disease mechanisms. Smaller student groups are then formed. Smoking and disease statistics are demonstrated with student participation (eg, nine of ten students lie down to demonstrate the



Figure 1. Medical student volunteers setting up display with operation photos and actual human organs affected by smoking

death rate from lung cancer). Students rotate through several stations for small group education. Here they see and handle preserved lungs with emphysema and cancer (Figure 1). A cancer surgery survivor reviews a slide show of a lobectomy along with the surgical stapling devices used for their operation. The harmful chemicals in smoke are related through various displays of toxic agents. At another station students shake the hand of a cancer survivor after signing a pledge never to smoke and receive a DCO wrist band to commemorate their promise.

Recognition and excitement related to the program are fostered through several strategies. Sports cars are emblazoned with anti-smoking decals to highlight the message. This approach mimics the tobacco industry's sponsorship of motor racing without its malignant consequences. Students sit in the cars and classes are photographed in and around the vehicles provided they make a solemn promise never to smoke. These photos are developed and combined with the student promises to create a lasting reminder of their commitment. Positive reinforcement is also provided by the participation of college student athletes. They engage in sports activities with their pupils and discuss with them the importance of self-health. After the program, students are referred to DCO's Web site, www.drivecancerout.org where they can play interactive games, take a quiz, or view a fast-

paced video of DCO cars on a closed race course. Tee-shirts, bumper stickers, and a Drive Cancer Out calendar are distributed. Additionally, DCO public service announcements have aired emphasizing our "drive" theme. The effect has been to permeate local youth society with the smoke-free message. We believe that these rewards and the attraction to a tobacco-free lifestyle are an important piece to a program that would otherwise use a primarily negative message.

ASSESSMENT

Two types of tests were administered to the student population: an anonymous assessment consisting of eighteen questions which gathered information on student demographics, exposure to smoking, attitude/behavior toward smoking, knowledge of the medical costs of smoking, and perception of social pressures to smoke. It was administered three times: 1 week before program, 1 week after program, and 3 months after program.

The second test was a student-specific assessment of medical knowledge related to smoking referred to as Medical Knowledge, which contained ten questions and provided a profile of the students' awareness of the physical consequences of smoking. The Medical Knowledge test was administered two times: 1 week before, and 1 week after the program.

Students who were unsure of their future plans to smoke were considered "At Risk." Influence ratios for various factors thought to predispose to smoking initiation were calculated. The influence ratio is defined as the proportion of persons "At Risk" in the population positive for the study variable divided by the proportion of persons "At Risk" in the population negative for the study variable.

Medical Knowledge results were analyzed by the paired Student's *t* test. Assessment of social influences on the "At Risk" population employed a two-tailed student's *t* test.

Student impressions of the program were assessed one to six months after program delivery (n=307). They rated the overall program,

the contribution of the cars to the program, and the role of the physicians, medical students, and cancer survivors as educators on a zero to five scale (0 poor; 5 outstanding).

DCO RESULTS

The DCO program has attended 22 schools in Kentucky and has interacted with over 3000 students. Fourth and fifth-grade students were addressed most often, although grades six through nine were occasionally taught. The 2007 DCO program was assessed in a subpopulation of 473 fifth-grade students from six Jefferson County Elementary Schools. A total of 294 students completed pre- and post-program Medical Knowledge tests to form paired data.

Only 1% of students had smoked a cigarette in the last month. Among the fifth-graders, 97% recognized smoking as a dangerous behavior before the DCO program, and 98.5% did so after the program; 92% did not intend to smoke when they were older. This proportion increased to 93.5% after the program (p=NS). Only one person stated they intended to smoke when they were older pre-program, and none did post-program. Of these fifth-grade students, 7.6% (pre) and 6.5% (post) were unsure of their future plans to smoke ("At Risk"). Social influences possibly affecting this group were analyzed and are presented in table 1.

Of the social influences tested, four were significant with p<.02. "A lot of famous people smoke" was not influential, but this may have been because the vast majority of students held this view.

A small minority of students (3% to 4%) held the perception that smoking is "cool," but it was a strong risk factor for future smoking consideration. Conversely, 46% of students had one or two parents who smoked and they demonstrated an influence ratio of 2.14. Students with smoking parent(s) comprised 71% of the "at risk" population. Students with friends who smoke also comprised a significant minority, and this proportion increased from pre- to post-test times: 9.8% pre-, 12.5% post, and 14.6% at end of year assessment.

At one to six months follow-up, students rated the program positively and their impressions remained vivid. Many favorable comments and letters were received. The program was rated a 4 or 5 by 88% of respondents. The contribution of the car(s) was regarded as a positive factor at the 4-5 level by 82%. Eighty-nine percent of students also rated the educators at this level.

Basic medical knowledge of smoking was better than expected. Test scores improved from 86% to 89% (p=NS). Incorrect answers were rectified on follow-up examination at a proportion of 40% to 80%.

Table 1. Social Influences of "At Risk" smoking attitudes.

Social Influence	Yes	At Risk	No	At Risk	Influence Ratio
Siblings smoke	11.73% n=55	16.36%	88.27% n=414	6.76%	2.42*
Friend smokes	9.79% n=46	21.74%	90.21% n=424	6.36%	3.41*
Parent smokes	46.27% n=217	11.06%	53.73% n=252	5.16%	2.14*
	Agree	At Risk	Do not agree	At Risk	Influence Ratio
"A lot of famous people smoke"	73.75% n=340	8.82%	26.25% n=121	5.79%	1.52
"People who smoke are cool"	3.44% n=16	43.75%	96.56% n=449	6.68%	6.54*

*P <.02

DISCUSSION

The Drive Cancer Out anti-smoking educational program addressed 5th graders in a preemptive fashion. With only 1% of students currently smoking and 97% recognizing that smoking is unhealthy, there was little room to document a change in practices or perceptions related to smoking. However, the program reinforced healthy viewpoints and gave these views substance through a multitude of visual and participatory experiences. We were surprised to learn that the children had a high awareness of the harmful effects of smoking. Further, the consistently low retention rates for incorrect responses on the medical knowledge exam indicated that students most in need learned and retained information from the DCO program.

In our study population only 6% to 7% of students were considering smoking when older ("At Risk" group). In contrast, 24% of high school students in the same community do not view smoking as "wrong."¹² As adolescents move into the teen years, smoking becomes more acceptable or desirable. Experimentation, risk-taking behavior, searching for an identity, fitting in with friends, and modeling smoking behavior of parents and celebrities are all factors affecting smoking initiation.¹³ Our study indicated that these factors are likely beginning to take hold in the "At Risk" group. The perception that smoking is "cool" had the highest influence ratio. Conversely, the influence ratio of the perception that famous people smoke was relatively weak at 1.52, but the attitude was pervasive—73.7% thought it true.

Television and cinema deliver hundreds of millions of smoking impressions to our youth annually. Sergeant et al provide persuasive evidence that this is a significant factor behind smoking initiation in our current culture.¹⁴ The tobacco industry also continues to market to the young consumer, in turn enticing early teens to pick up the habit. Tobacco ads invariably employ young, fit, attractive actors who belie the reality of tobacco consumption. Teens and adolescents view tobacco products through this ob-

fuscating lens and are enticed to try smoking at a young age.

The goal of DCO is to leave our own lasting impression through delivery of a dramatic, interactive program and to reinforce the initial experience with durable reminders. DCO hopes to affect the baseline mind set of the pre-teen against tobacco use by showing them the facts. Seeing and touching lungs riddled with cancer, handling surgical stapling instruments, and watching a slide show of cancer surgery allow children to view first hand the internal effects of tobacco. Participation in group demonstrations of social norms and lung cancer death rates appear to make a strong impression on the students. Through the involvement of student athletes, cool sports cars, Web interaction, television spots, and community events, DCO creates a positive theme with multiple foci of reinforcement. DCO plans to institute extracurricular activities including picnics, autocross races, road rallies, and athletic events to make the program appealing to older students.

Previous experience with intervention programs indicate that a single exposure often does not provide a measurable change in the target population.^{15, 16, 17} Addressing this issue, DCO and the Jefferson County Public School system are instituting a district wide anti-smoking educational curriculum to be administered by school teachers in grades 4, 7, and 9. Six hours of education in each of these grades will be provided in health classes. The program will be assessed annually. Recognizing that 42% of students come from smoking households, information will be sent home to parents about the DCO visit and the curriculum. Parents will be encouraged to quit if they smoke and will be provided with quit hotline numbers to assist in the process.

The authors advocate the inception of similar programs around the state. The template of physicians, older students, and patients working together to create an exciting educational event can be duplicated. Working with health department officials and student volunteers provides both staff and material support. Collaboration with high ranking school ad-

ministrators facilitates implementation of the program across a school district

Of course, success requires time and commitment from already busy individuals. But given the lack of progress in treating smoking related diseases, especially lung cancer, our profession has an obligation to society beyond our individual patient duties. The community respects physician input on health matters particularly when delivered for altruistic reasons. The process is effective with a team approach. The involvement of students and patients also serves to empower the younger and older generations in a common cause.

Undoubtedly, the task is immense. Currently our profession is not addressing America's number one preventable killer with either alacrity or forcefulness. Let's change that!

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