Tobacco Industry Promotion of Cigarettes and Adolescent Smoking

John P. Pierce, PhD; Won S. Choi, PhD; Elizabeth A. Gilpin, MS; Arthur J. Farkas, PhD; Charles C. Berry, PhD

Context.—Whether tobacco advertising and promotion increases the likelihood that youths will begin smoking has important public policy implications.

Objective.—To evaluate the association between receptivity to tobacco advertising and promotional activities and progress in the smoking uptake process, defined sequentially as never smokers who would not consider experimenting with smoking, never smokers who would consider experimenting, experimenters (smoked at least once but fewer than 100 cigarettes), or established smokers (smoked at least 100 cigarettes).

Design.—Prospective cohort study with a 3-year follow-up through November 1996.

Setting and Participants.—A total of 1752 adolescent never smokers who were not susceptible to smoking when first interviewed in 1993 in a population-based random-digit dial telephone survey in California were reinterviewed in 1996.

Main Outcome Measure.—Becoming susceptible to smoking or experimenting by 1996.

Results.—More than half the sample (n=979) named a favorite cigarette advertisement in 1993 and Joe Camel advertisements were the most popular. Less than 5% (n=92) at baseline possessed a promotional item but a further 10% (n=172) were willing to use an item. While having a favorite advertisement in 1993 predicted which adolescents would progress by 1996 (odds ratio [OR] =1.82; 95% confidence interval [CI], 1.04-3.20), possession or willingness to use a promotional item was even more strongly associated with future progression (OR=2.89; 95% CI, 1.47-5.68). From these data, we estimate that 34% of all experimentation in California between 1993 and 1996 can be attributed to tobacco promotional activities. Nationally, this would be over 700 000 adolescents each year.

Conclusion.—These findings provide the first longitudinal evidence to our knowledge that tobacco promotional activities are causally related to the onset of smoking.

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A NUMBER of studies have implicated tobacco industry advertising and promotional activities as possible causal agents in the stimulation of demand for cigarettes among adolescents.[1-3] The effectiveness of promotional activities over the past 10 years has been postulated as a major reason for the recent increases in adolescent smoking behavior.[4-6] There is abundant evidence that adolescents are exposed to and have high recall of tobacco industry promotional messages.[2,7,8] Studies of smoking initiation rates in population samples demonstrate that sharp increases in adolescent smoking coincide with the conduct of effective tobacco promotional campaigns.[9,10] Since the first Surgeon General's report on smoking and health in 1964,[11] these increases appear to be specific to adolescents aged 14 to 17 years; there were no similar increases among adults.[6,9,10]

A summary of over 2 decades of psychological research on audience receptivity to persuasive communications identifies 3 elements: (1) exposure to the message, (2) attendance to and understanding of the message, and (3) development of a cognitive or affective response to the message.[12] The first goal of any persuasive communication is to ensure that a target audience is effectively exposed. This audience needs to both attend to and understand the message before it can have persuasive impact. To characterize individuals as receptive to the communication, however, requires evidence that they have internalized positive affect or cognitions related to the communication. While these internalizations may facilitate the purchase of a product that is the subject of the persuasive communication, an additional incentive (such as a promotional item or free sample) is often needed to maximize the likelihood that the persuasive communication will lead to actual consumer behavior.[13]

Using this conceptual framework, we previously found measures of adolescent receptivity to tobacco industry promotional activities to be associated with susceptibility to smoking among adolescent never smokers.[5,14,15] This longitudinal study addresses whether the receptivity to tobacco advertising and promotional activities actually precedes the first steps in the smoking uptake process.

See also pp 516 and 550.

The concept of susceptibility to smoking comes from previous research, which showed an increased likelihood of future smoking among never smokers who do not adamantly rule out the possibility of smoking a cigarette in the near future.[16] During the elementary and early middle school years, most children have not yet tried a cigarette and strongly assert that they will not be future smokers.[17,18] Then, as they get older, many change and are no longer prepared to rule out this possibility. When the opportunity presents itself, some young adolescents might respond "why not? " and begin to experiment. While not all adolescents who experiment with smoking will go on to become addicted, experimentation is a necessary step and is a key early marker of eventual smoking uptake.[17-21] To prevent addiction to smoking it is necessary to understand the influences encouraging adolescents to take these early steps in the smoking uptake process.

In this article, which reports on the findings from a longitudinal study, we consider adolescents who were nonsusceptible never smokers at baseline in 1993. As our outcome measure, we use any progression in the smoking uptake process by follow-up in 1996, and investigate the independent influence of

From the Cancer Prevention and Control Program, Cancer Center, University of California, San Diego, La Jolla, Calif.

Reprints: John P. Pierce, PhD, Cancer Prevention and Control Program, Cancer Center, University of California, San Diego, La Jolla, CA 92093-0901 (e-mail: jppierce@ucsd.edu).

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receptivity to tobacco industry promotional activities on movement toward addiction to smoking.

METHODS

Data Sources

We report data on a representative sample of California adolescents who were 12 to 17 years old at baseline in 1993. These adolescents were identified using a random-digit dialed computer-assisted telephone interviewing (CATI) method as part of the California Tobacco Surveys, which are designed to provide population data on tobacco use in California, as part of the evaluation of the Statewide Tobacco Control Program funded from a voter-initiated constitutional amendment (Proposition 99).[22] In 1993, Westat, Inc, enumerated the members of a total of 30 910 households in California, and identified 6892 adolescents who represent the baseline sample. With parental permission, in-depth interviews on tobacco issues were completed for a total of 5531 (response rate, 80.3%) of these adolescents. Initially, there was no funding support for a follow-back survey and parents were informed only that we might contact them again in the future. When separate funding was obtained, we attempted to contact the parents of all adolescent respondents to the 1993 survey. Those who were not at the same telephone number were traced through online directory assistance, the national change of address database, and national credit reference services using information provided by the parent in 1993. Even with these tracing methods, we were unable to locate 26.5% of the 1993 respondents. Of those we did locate, we completed detailed follow-up interviews on 3376 (response rate, 85%), with 1.2% of parents and 5.8% of adolescents refusing to participate, for a total 7% refusal rate. Accounting for both the initial and follow-up response rates, the overall response rate for the longitudinal study was 61.5%. Considering only the subgroup of this research, the nonsusceptible never smokers at baseline, the overall response rate was 66%, for a total sample of 1752 adolescents.

Measures of Smoking Initiation

Based on our previous research,[16,18] we categorize adolescents into 4 mutually exclusive categories: nonsusceptible never smokers, susceptible never smokers, experimenters, and established smokers. An established smoker is defined as an adolescent giving a positive response to the question, "Have you smoked at least 100 cigarettes in your life?" An experimenter is defined as an adolescent giving an affirmative response to either of the following 2 questions: (1) "Have you ever smoked a cigarette?" or (2) "Have you ever tried or experimented with cigarette smoking, even a few puffs?" A negative response to both of these questions categorizes an adolescent as a never smoker. A nonsusceptible never smoker is distinguished from other never smokers by responses to the following 3 questions about future smoking: (1) "Do you think that you will try a cigarette soon?" (response choices: yes or no), (2) "If one of your best friends were to offer you a cigarette, would you smoke it?" and (3) "At any time during the next year do you think you will smoke a cigarette?" The response choices to the latter 2 questions were: "definitely yes," "probably yes," "probably not," or "definitely not." To be classified as a nonsusceptible never smoker, the adolescent needed to respond in the negative to the first question and "definitely not" to the other 2. Any other response led to the adolescent being categorized as susceptible to smoking. Previous findings from a national longitudinal survey[16] and the results of the current one have validated this measure by showing that susceptible never smokers have about twice the risk of future smoking as nonsusceptible never smokers.

Receptivity to Tobacco Promotional Activities

In the persuasive communication theoretical framework, receptivity to tobacco industry advertising and promotional activities involves a basic exposure to a communication and a cognitive response entailing an understanding of the communication and agreement with the message. The development of a positive affective response to the communication (eg, having a favorite advertisement or being willing to use a promotional product) indicates a greater degree of receptivity.[12,13,23] We defined the highest level of receptivity as having or being prepared to use a tobacco promotional item, and accordingly asked: (1) "Some tobacco companies provide promotional items to the public that you can buy or receive for free. Have you ever bought or received for free any product which promotes a tobacco brand or was distributed by a tobacco company?" and (2) "Do you think that you would ever use a tobacco industry promotional item, such as a t-shirt?" Those who had an item or who would be willing to use one were considered highly receptive to tobacco promotional activities. To characterize a minimal level of receptivity among the remaining respondents, we asked for unaided recall of tobacco advertising with the question: "Think back to the cigarette advertisements you have recently seen on billboards or in magazines. What brand of cigarettes was advertised the most?" Respondents who did not name a brand were considered minimally receptive to tobacco advertising and promotional activity.

To define intermediate levels of receptivity among those not in either the highly or minimally receptive categories, we asked: "What is the name of the cigarette brand of your favorite advertisement?" For the few respondents who hesitated in their response, we probed with the question: "Of all the cigarette advertisements you have seen, which do you think attracts your attention the most?" Naming a brand as most advertised (see previous paragraph) but not having a favorite advertisement classified a respondent as having low receptivity, whereas having a favorite advertisement classified a respondent as having moderate receptivity.

Exposure to Peer and Family Smokers

Adolescents were queried about smokers in the family with the questions: "Do any of your parents, stepparents or guardians now smoke cigarettes?" and "Do you have any older brothers or sisters who smoke cigarettes?" Negative responses to both questions classified an adolescent as having no family exposure to smokers. To determine exposure to peer smokers, respondents were asked: "About how many best friends do you have who are male?" and "Of your best friends who are male, how many of them smoke?" The same 2 questions were asked concerning female best friends. Those who indicated that none of their male or female best friends smoke were classified as unexposed to peer smokers.

Analytic Procedures

All percentages are weighted to represent the population of California according to age, sex, race or ethnicity, and education. We derived variance estimates and 95% confidence intervals (CIs) using the jackknife procedure[24] contained in the WesVar PC program.[25] This program provides an estimate of variance in the setting of large-scale population surveys that are not completely random. We used the WesVarPC χ^2 procedure to evaluate differences in the demographic distribution of who progressed to various levels in the uptake continuum among adolescents who had never tried a cigarette at baseline and who were nonsusceptible to smoking. Then, we used the logistic regression procedure to identify the independent predictors of any progression in the uptake process by follow-up. Demographic variables, exposure to other smokers, the tobacco promotional activities receptivity index, and interactions between exposure to smokers and the index were the independent variables.

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Table 1.—Baseline (1993) Distribution of Adolescent, Nonsusceptible Never Smokers and Progression Through the Smoking Uptake Continuum by 1996

		Level on Uptake Continuum in 1996			
Demographics, 1993	1993, %*	Susceptible, % (95% CI)*	Experimenters, % (95% CI)*	Established, % (95% CI)*†	Total Progressed, % (95% CI)*
Overall	1752	16.6 (14.1-19.1)	29.5 (25.8-33.2)	3.6 (2.5-4.7)	49.7 (45.9-53.5)
Sex					
Male	48.5	17.3 (13.4-21.2)	28.6 (23.0-34.2)	4.1 (2.4-5.8)	50.0 (44.6-55.3)
Female	51.5	16.1 (12.6-19.6)	30.3 (26.0-34.6)	3.1 (1.7-4.5)	49.5 (44.4-54.6)
Age group, y					
12-13	45.5	21.2 (17.2-25.2)	29.4 (23.5-35.3)	3.3 (1.8-4.8)	53.9 (48.9-58.9)
14-15	31.3	15.9 (10.5-21.3)	26.3 (20.6-32.0)	4.8 (2.4-7.2)	47.0 (39.7-54.3)
16-17	23.1	8.9 (5.3-12.5)	33.9 (25.9-41.9)	2.5 (1.2-3.8)	45.3 (37.7-52.9)
Race/ethnicity					
White	48.7	12.4 (10.1-14.7)	28.6 (24.4-32.8)	5.8 (3.7-7.9)	46.8 (42.3-51.3)
African American	10.2	22.4 (10.5-34.3)	25.8 (13.6-38.0)	1.9 (0.0-4.2)	50.1 (33.3-66.9)
Hispanic	28.9	18.9 (12.8-25.0)	34.2 (26.7-41.7)	1.3 (0.3-2.3)	54.4 (47.7-61.1)
Asian/other	12.2	23.5 (16.1-30.9)	24.5 (16.2-32.8)	1.6 (0.3-2.9)	49.8 (40.6-59.0)
School performance					
Much better	25.4	15.6 (10.8-20.4)	26.8 (18.8-34.8)	2.0 (0.0-4.2)	44.4 (36.9-51.9)
Better than average	40.5	17.4 (12.8-22.0)	29.5 (24.6-34.4)	3.0 (1.3-4.7)	49.9 (44.7-55.1)
Average/below	34.1	16.6 (11.8-21.4)	31.4 (25.1-37.7)	5.5 (3.4-7.6)	53.5 (46.9-60.1)

*Weighted percentages; CI indicates confidence interval.
†Smoked at least 100 cigarettes.

The attributable risk is a standard epidemiological index for assessing the strength of association between 2 measures.[26] In the current setting, the attributable risk can be interpreted as the proportionate excess risk of future experimentation that is associated with receptivity to tobacco promotional activities. The formula used to calculate the attributable risk percent for receptivity to tobacco promotional activities is: $AR\% = [(I_e - I_o) / I_e] \times 100$, where I_e is the incidence rate of experimentation among those receptive to tobacco promotional activities and I_o is the incidence rate of experimentation among those minimally receptive to tobacco promotional activities.

RESULTS

Characteristics of the Study Population

Table 1 presents the baseline demographic distribution of the nonsusceptible never smokers (left column of data) as well as the proportion of each group who progressed toward smoking by the 1996 follow-up survey. The sample contained slightly more girls than boys and almost half (45%) of the nonsusceptible never smokers were aged 12 to 13 years. Minority groups make up more than half the sample, and two thirds of the sample considered their performance in school better than average.

A total of 49.7% of these nonsusceptible never smokers progressed toward smoking within the 3-year follow-up period: 16.6% by becoming susceptible to smoking, 29.5% by experimenting, and 3.6% by reaching a lifetime consumption level of at least 100 cigarettes.

There were no sex differences for becoming susceptible, experimenting, or becoming an established smoker. Although the percentage experimenting did not vary much by age, the percentage becoming susceptible did; 16- to 17-year-olds were about half as likely to become susceptible by follow-up than the younger adolescents. In African Americans and in the Asian or other group, the rate of susceptibility was higher, but the rate of experimentation was lower than for whites. Perceived school performance was related to future experimentation (but not to susceptibility), with those who reported much better than average school performance showing a lower rate of future cigarette use than those who reported average or below average school performance.

Cigarette Advertisements and Tobacco Promotional Items

Overall, 8.9% of nonsusceptible never smokers in 1993 were at the minimal level of the receptivity index (could not name a brand as most advertised). The percentage at this level did not vary much with age; 9.8% of those aged 12 to 13 years, 7.1% of 14- to 15-year-olds, and 9.3% of 16- to 17-year-olds were at this level.

Over half (56.5%) of nonsusceptible never smokers in 1993 had a favorite cigarette advertisement, and 83% of those who did nominated either Camel (R. J. Reynolds) or Marlboro (Phillip Morris) as the brand of their favorite advertisement. Camel was the clear favorite of young adolescents aged 12 to 13 years (67.8% for Camel vs 16.8% for Marlboro), but Marlboro was named almost as frequently as Camel by older adolescents aged 16 to 17 years (46.6% for Camel vs 33.9% for Marlboro).

The percentage of adolescents who had a tobacco promotional item increased with age among the nonsusceptible never smokers in 1993 from a low of 2.9% among 12- to 13-year-olds to 8.5% among 16- to 17-year-olds; overall, less than 5% (n=92) possessed an item. However, about 10% (n=172) of each age group responded that they would be willing to use a promotional item. It is of interest that among those without a promotional item in 1993, those who were willing to use an item were twice as likely to have obtained one by 1996 than those who were not willing to use a promotional item.

Predicting Future Experimentation

The results of the logistic regression analysis of predictors of which adolescents progressed toward smoking are presented in Table 2. This model included the demographic variables (see Table 1), and the odds ratios (ORs) presented are adjusted for any effects of these variables and the others in the model. Both exposure to family or peers who smoke appeared to increase the probability that a nonsusceptible never smoker would progress toward smoking by approximately 20%; however, the sample size was not sufficient to demonstrate this level of difference to be statistically significant.

The baseline receptivity to tobacco industry promotional activities was strongly related to which adolescents progressed toward smoking. Among those who were assessed as having a minimal level of receptivity, 37.7% progressed toward smoking. Compared with this group, those who had a favorite advertisement but who were not willing to use a promotional item (the moderate level) were 82% more likely to progress toward smoking, which is a statistically significant increase compared with those at the minimal level. Those with a high level of receptivity (at least willing to use a promotional item) were almost 3 times more likely to progress toward

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Table 2.—Logistic Regression Predicting Progression Along the Uptake Continuum by 1996 Among Nonsusceptible Never Smokers in 1993 (n=1752)

Independent Variables	Progressed Toward Smoking, % (95% CI)*	Adjusted Odds Ratios (95% CI)†
Exposure to familial smoking		
No	48.0 (43.5-52.6)	1.00
Yes	53.5 (47.1-59.9)	1.19 (0.88-1.59)
Exposure to peer smoking		
No	48.7 (44.2-53.2)	1.00
Yes	52.7 (45.8-59.5)	1.19 (0.85-1.66)
Exposure to tobacco promotions/advertising		
Minimal (no brand, not willing)	37.7 (25.8-49.6)	1.00
Low (brand, not willing)	43.9 (37.2-50.6)	1.32 (0.73-2.41)
Moderate (favorite advertisement, not willing)	51.7 (46.3-57.1)	1.82 (1.04-3.20)
High (willing/has item)	62.1 (52.6-71.6)	2.89 (1.47-5.68)

*Weighted percentages; CI indicates confidence interval.
†Adjusted for age, sex, race or ethnicity, and school performance.

smoking, which was highly statistically significant. Preliminary analyses showed no significant interactions between the index of receptivity and the exposure to smoking variables and these interactions were not retained in the final model.

Percentage of Experimentation Attributable to Tobacco Promotional Activities

From our representative sample survey in 1993, we estimate that there were about 1.18 million 12- to 17-year-old adolescents in California who were nonsusceptible never smokers. The incidence rate of experimentation among those receptive to tobacco advertising and promotion activities was 34%. The incidence rate among those who were minimally receptive was 22%. Thus, using the standard formula, the percentage of experimentation attributable to tobacco advertising and promotional activities is 34.3%. Over half (50.7%) of the 17-year-old California adolescents in the full 1993 cross-sectional sample had already experimented with cigarettes, which represents a total of 158 758 adolescents. Using our attributable risk calculation, we estimate that tobacco promotional activities influenced 54 454 (34.3%) of 158 758 of these adolescents (or 17% of the total population of this age) to experiment with cigarettes before they reached the age of 18 years. This translates to over 700 000 adolescents nationally.

COMMENT

This longitudinal study provides clear evidence that tobacco industry advertising and promotional activities can influence nonsusceptible never smokers to start the process of becoming addicted to cigarettes. The strength of this association is consistent with estimates from other cross-sectional studies[5,8,27] and with previous studies that have demonstrated a coincidence of increases in the incidence of addiction with the conduct of effective promotional campaigns.[6,9,10,28] Our data establish that the influence of tobacco promotional activities was present before adolescents showed any susceptibility to become smokers.

Exposure to other smokers in this analysis does not appear to significantly influence which adolescents begin the smoking uptake process, which is somewhat contradictory to previous studies.[5,29] Although theories of how adolescents become smokers have included a stage prior to experimentation,[20,30-32] most analyses of smoking uptake use smoking within the last month before follow-up as the outcome. This measure underestimates the proportion of people who are in the early stages of the smoking uptake process. The influence of other smokers in facilitating and possibly encouraging adolescents to smoke may be most apparent after first experimentation,[18] rather than influencing the adolescent to experiment for the first time.[5]

We used a communication persuasion framework to assess adolescent receptivity to tobacco promotional activities.[12] This generally accepted framework postulates that the higher the level of receptivity to a persuasive communication, the higher the likelihood that it will have an effect on behavior. Our findings are consistent with this hypothesis. Progress toward smoking by follow-up among these nonsusceptible never smokers was significantly associated with receptivity to tobacco industry advertising and promotional activities at baseline. Indeed, each higher level on the receptivity index was associated with a greater degree of movement toward smoking over the study period.

The results presented here support findings from previous studies showing R. J. Reynold's advertising of their Camel brand to be very effective with children and adolescents throughout the 1990s.[1,4,7,27] Camel advertising was clearly the favorite among adolescents, particularly those aged between 12 and 15 years. Since the popularity of Camel advertisements was highest in the youngest age group, the peak effect of this advertising probably occurs at an even younger age than has previously been suggested.[33,34]

Our findings that willingness to use a promotional item is more effective in predicting progression than having a favorite advertisement is consistent with Ray's theory of how promotion works to build consumer behavior.[13] The majority of the progression that we observe involves actual experimentation with cigarettes. Ray[13] hypothesizes that advertising creates a structure of attitudes and beliefs about a product that will facilitate its purchase. But a promotional item or a free sample is often needed to maximize the probability that the behavior will be performed. We have previously reported that the majority of adolescents who purchase cigarettes buy Marlboros.[14] The most common promotional item possessed by adolescents was for the Marlboro brand. Hence, even though Camel advertising may be the most influential in getting adolescents interested in smoking, the success of Phillip Morris promotional activities would appear to have reduced substantially the potential market share achieved by R. J. Reynolds in young people.

The demographic differences that we observed in progression toward smoking deserve comment. First of all, in this 3-year period, over 16% of adolescents had started on the uptake continuum but had not yet experimented with cigarettes. This was particularly the case in the youngest age groups, suggesting that the duration of the smoking uptake process for many adolescents may be much more extended than previously believed.[20,35] Minority youth were much more likely to only progress to susceptibility than non-Hispanic whites. This suggests that the duration of the uptake process among minority groups is more extended, or that they begin the process at a later age. The decline in the proportion of older adolescents who were at the susceptible stage of the uptake process at baseline is consistent with other studies suggesting that there may be a time window during which adolescents begin the smoking uptake process.[20] Once people are old enough to rationally evaluate the well-known health risks of smoking, they choose not to start smoking.

One limitation of our study is that not all of the 1993 sample were contacted again in 1996. We compared the nonsusceptible never smokers in 1993 with a follow-up interview to the nonsusceptible never smokers in 1993 who were not interviewed again. The group contacted again in 1996 had slightly more males (49% contacted vs 45% not recontacted), and the oldest age group was less represented (23% vs 27%). African Americans and Hispanics were less successfully followed, so that whites comprised 49% of those followed and only 35% of those not inter-

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viewed again. The group followed had about a 4% higher rate (56% vs 52%) of naming a brand of cigarette as most advertised or having a favorite advertisement, but the rates for possession or willingness to use promotional items were nearly identical, regardless of follow-up status. The sample weights are constructed to adjust for demographic disparities in the population, so bias from these differences should be minimal. The potential bias from the slight difference in advertising recall rates is difficult to assess but should be minimal.

Our study estimates that tobacco industry promotional activities in the mid 1990s will influence 17% of those who turn 17 years old each year to experiment with cigarettes. We feel that this is a conservative estimate, as there was a 3-year period between the 2 surveys that offered a considerable time period for adolescents who were not receptive to these tobacco industry activities at baseline to become receptive prior to progressing toward smoking. However, the finding that one third of the nonsusceptible never smokers with minimal receptivity at baseline in 1993 did progress, suggests influences other than tobacco advertising and promotions are likely acting to cause smoking as well. It is important to note that not all adolescents who experiment with cigarettes go on to become addicted smokers. Previous national data suggest, very conservatively, that 30% of experimenters become established smokers.[18] We have previously estimated that it will take an average of 16 to 20 years of addicted smoking before the average adolescent, who reaches a lifetime consumption of 100 cigarettes or 5 packs, will be able to successfully quit.[36]

This study only considered the influence of tobacco promotional activities on nonsusceptible never smokers. It is possible that these influences also encourage experimenters to continue smoking until they become addicted and act to prevent addicted adolescent smokers from quitting. These potential influences of tobacco industry advertising and promotions need to be investigated further.

In conclusion, this longitudinal study adds a crucial piece of evidence to the contention that tobacco industry advertising and promotional activities are causally associated with young people starting to smoke. The 5 criteria for assessing causality of a suspected agent from epidemiological studies[37] are that (1) it must clearly precede the hypothesized effect; (2) the association should be strong, (3) consistent, and (4) specific; and (5) it should be expected from theory. From this study it is clear that the effect of advertising and promotional activities precedes the development of susceptibility to smoking. The effect is strong and specific, with at least 34% of experimentation with cigarettes attributed to these activities. The association is consistent with other studies.[5,8,15,27] Finally, such a causal effect is expected from theoretical considerations of how persuasive communications work.

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additional antibiotics were given. In October, the patient continued to be ill with boils on his legs, arm, abdomen, and hip, and brought his 10-year-old son, who had similar abscesses on his nostril, ear lobe, and elbow. A culture of a draining leg abscess taken from the patient and cultures taken from the elbow and nose of the child were positive for MRSA. The patient was treated with ciprofloxacin and rifampin, while his son was treated with oral erythromycin. Lesions resolved for both individuals with treatment. Neither patient had any known underlying risk factor for MRSA. The county health department was contacted for consultation.

Family history revealed that, since 1993, other children in the household were affected periodically with lesions that had spontaneous, untreated remissions, while the patient's wife had abscesses that resolved when she took an unknown oral antibiotic. She alone had visited her 70-year-old stepfather in a community hospital in March 1997. His medical records indicated that he was treated for MRSA-positive leg lesions. Anecdotally, the family said that other Samoan community members, both in California and in Samoa, frequently had similar skin infections.

Frequently, staphylococcal infection is preceded by mucosal or skin colonization of the same strain.[2] Since the ecological niche of *S aureus* is the anterior nares,[3] we recommended obtaining culture specimens from all family members to show familial transmission of the same strain of MRSA. However, only the patient agreed to have skin and anterior nasal cultures taken. His October 1997 posttreatment nasal culture was still MRSA positive. The isolates from the son and the stepfather were unavailable for comparison.

Hollis et al[4] reported intrafamilial transmission of a single strain of MRSA to demonstrate that family members can serve as reservoirs of MRSA. These authors treated carriers with intranasal mupirocin but cautioned against its routine use for decolonization because of concerns about resistance. In our investigation, since none of the family members had any known risk factors, we recommended that the patient obtain follow-up care with his primary care physician if similar infections recurred.

Tropical pyomyositis, a disease characterized by skeletal muscle abscesses usually associated with isolation of *S aureus*, is endemic in Samoa but has been reported from temperate regions as well.[5] Further investigation of treatment of abscesses in this population should be pursued. We are concerned about the public health impact of possible spread of drug-resistant disease to susceptible populations and advocate that standard protocols be implemented by health care providers to contain and control MRSA.

Sandra Gross-Schulman, MD, MPH, RN
David Dassey, MD, MPH
Laurene Mascola, MD, MPH
County of Los Angeles
Department of Health Services
Los Angeles, Calif

Carlos Anaya, MD
Talbert Medical Group
Compton, Calif

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Efficacy of Treatment for Ulcerative Colitis

To the Editor.—In discussing the treatment of ulcerative colitis, Dr Peppercorn[1] states, "Sulfasalazine, mesalamine, and olsalazine have been proven to be effective in active ulcerative colitis," and he cites 3 studies. The first was a double-blind, placebo-controlled study by Dick et al[2] using sulfasalazine and placebo pills. Clearly, it is impossible to blind a study using a placebo for sulfasalazine since nausea and headache are common early in the treatment when using sulfasalazine, and urine becomes a deep yellow-brown. The second study[3] evaluated olsalazine against sulfasalazine. If sulfasalazine has not been proven effective, it hardly makes sense to compare it with olsalazine, unless one considers the former a placebo. The third study[4] compared a coated oral 5-aminosalicylate agent preparation with a placebo. However, the adverse effects for the 4.8-g daily dose occurred in 55% of patients compared with 73% at a dose of 1.6 g daily and 61% for placebo. At best, the lack of dose response by rate of adverse effects, together with the high incidence of placebo adverse effects, raises questions about study validity.

Herman Steinberg, MD
New York, NY

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This letter was shown to Dr Peppercorn, who declined to reply.–ED.

CORRECTION

Error in Table.—In the Original Contribution entitled "Tobacco Industry Promotion of Cigarettes and Adolescent Smoking," published in the February 18, 1998, issue of THE JOURNAL (1998;279:511-515), there was an error in a table. On page 513, Table 1, the second entry in the last column should read "50.0 (44.6-55.3)" [not 50.5 (45.1-55.9)].

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