**Joseph W. Cullen Memorial Award Lecture**

**Paving the Road from Basic Research to Policy: Cigarette Smoking as a Prototype Issue for Cancer Control Science**

Ellen R. Gritz

Division of Cancer Control, Jonsson Comprehensive Cancer Center, University of California, Los Angeles 90024

The American Society of Preventive Oncology's Joseph W. Cullen Memorial Award was created to memorialize Dr. Cullen's unparalleled contributions to national tobacco control, particularly as Program Coordinator for the National Cancer Institute's Smoking, Tobacco, and Cancer Program from 1982 to 1989. The award was created to recognize distinguished achievement in continued national tobacco control efforts through research, the development of prevention and cessation programs with wide-ranging public health impact, and public policy and advocacy initiatives. Ellen Gritz received the first Joseph W. Cullen Memorial Award on March 15, 1992, at the American Society of Preventive Oncology's annual meeting in Bethesda, Maryland.

Dr. Gritz's curriculum vitae is extensive and impressive and a testament to her phenomenal energy, hard work, productivity, and breadth of vision and expertise. It includes almost 100 publications and over 75 papers and presentations. From 1980 to 1986, Dr. Gritz served as Behavioral Editor for six annual Surgeon General's Reports—reports which served not only to summarize but also to shape the tobacco control research and accomplishments of the past decade. She has served as consultant or expert advisor to a range of federal agencies and voluntary organizations, including the American Cancer Society; the National Institute on Drug Abuse; the National Cancer Institute; the National Heart, Lung, and Blood Institute; the Center for Disease Control's Office on Smoking and Health; the Kennedy Institute for the Study of Smoking Behavior and Policy; and the Advocacy Institute's Women versus Smoking Network. She is a member of the Cancer Control Research Committee of the Southwest Oncology Group and Chair of its Behavioral Science Subcommittee. She is an Associate Editor of Cancer Epidemiology, Biomarkers & Prevention, a consulting editor for Health Psychology, and a reviewer or editorial advisory board member for 10 other journals. She is currently Director of the Division of Cancer Control at the Jonsson Comprehensive Cancer Center and Professor in Residence in UCLA's Department of Surgery, Head and Neck Division.

Dr. Gritz's research over the past 20 years spans the whole field of tobacco control, from biology to community. And in each area, she has been a leader, a catalyst, and a mentor for others. Her earliest work was in the area of the psychopharmacology of smoking—clarifying the role of biobehavioral factors in smoking initiation, maintenance, and cessation. Dr. Gritz was one of the seminal proponents of smoking as nicotine addiction and participated in some of the earliest research conducted in this country on nicotine replacement as a pharmacological aid to cessation. Her 1979 landmark paper on women and smoking defined the major questions in this area and paved the way for the 1980 Surgeon General's Report on Women and Smoking, a report which she coauthored. She remains the foremost authority on women's smoking in the United States, with research addressing a range of topics from understanding onset among teenaged girls to developing and evaluating innovative cessation treatments for pregnant women and for nurses. She has done similar pioneering work in smokeless tobacco use, unaided smoking cessation, smoking among hospitalized medical and psychiatric patients, and in the development of community-based interventions to reach minority populations as well as innovative work to develop smoking cessation programs for head and neck cancer patients.

I am deeply touched and honored to be the first recipient of the Joseph W. Cullen Memorial Award. Joe was the critical figure who drew me into cancer control research at UCLA, where he was the first director of the Division of Cancer Control in the Jonsson Comprehensive Cancer Center. He exercised a strong mentoring role, even after he became the Deputy Director of the Division of Cancer Prevention and Control at the National Cancer Institute. Joe went for the heart of what was important—what would...
make a difference in controlling cancer. He singled out smoking as his first and most formidable target, building the Smoking, Tobacco and Cancer Program of intervention research. Honoring Joe’s vision, this program will culminate with ASSIST, the Phase V demonstration trial projected to produce an impact upon the smoking behavior of over 50 million Americans.

In the year 1992, cigarette smoking represents the quintessential cancer control challenge. The etiological agents in tobacco smoke responsible for over 434,000 deaths from all causes in 1988 and for approximately 30% of the 1 million deaths from cancer alone in 1991 are well specified. The epidemiological criteria have been met for the causal association between smoking and cancers of the lung, oral cavity, larynx, and esophagus (1). Smoking has been identified as a contributory factor for cancers of the pancreas, kidney, and bladder. Furthermore, an association has been noted with cancers of the stomach and cervix.

Over this same time period many hundreds of studies have been devoted to undoing the behavioral and pharmacological ramifications of smoking via a multiplicity of treatment techniques and approaches. Numerous models of individual behavior have been developed to predict the determinants of cessation.

In the past decade the social setting for smoking behavior has been intensively analyzed in order to understand the extraintidividual factors underlying initiation, maintenance, and cessation. Developmental processes, familial and peer group influences, and cultural and societal norms interact in complex ways to facilitate or discourage smoking.

Finally, under the rubric of environmental influences fall a number of disparate forces. Among the most important are economic (including profits derived from tobacco sales, the effects of taxation, and pressures that can be brought to bear on the media, business institutions, and political processes directly or indirectly by the tobacco conglomerates); political, legislative, and regulatory forces; the educational system; the health care system; and the mass media and communications.

Given this complex set of potential influences on smoking, multiple pathways must be implemented to strive for the goal of reducing smoking prevalence in the United States to 15% by the year 2000. Dr. William Roper, Director of the Centers for Disease Control, has called for national behavioral, social, and environmental strategies (2).

I cannot envisage a more exciting time to be engaged in smoking control research. This astounding breadth has drawn many of us, including myself, from a more narrowly focused concentration on pharmacological and behavioral mechanisms and on clinical strategies to multidisciplinary collaborations, community interventions, coalition building, and activism.

Lessons from Research

In preparing for this address, I have pondered what lessons for the national smoking control effort can be summarized from the experiences of our smoking prevention and cessation research group in the Division of Cancer Control at the UCLA Jonsson Comprehensive Cancer Center.

In Los Angeles, we have studied the process of unaided smoking cessation and have developed and tested tailored self-help programs for various populations, such as registered nurses, women members of a prepaid health plan who were not volunteering to stop smoking, patients with newly diagnosed squamous cell carcinomas of the head and neck, and persons from racial/ethnic minority groups, many of whom are socioeconomically disadvantaged. The self-help programs differed in terms of the salient needs and concerns of each target population and the level of literacy assumed.

There are three interrelated issues that I would like to briefly address. The first is the principal of readiness. Those of you who work in smoking are well aware of the stages of change theory (3). This model portrays smoking cessation as a continuum extending from precontemplation through contemplation, action, and long-term maintenance or relapse. The model allows a researcher or clinician to “stage” a subject according to a simple series of questions combining intention to quit with recent cessation attempts. The stages of change model is being successfully applied to a range of cancer control behaviors, including dietary modification, mammography screening, radon exposure, and sun exposure (4, 5). Numerous studies have demonstrated the predictive value of this simple assessment of readiness to change (5, 6).

When our group recruited, and followed without any intervention, 554 smokers in Los Angeles who had selected either the Great American Smokeout or New Year’s Day as target quit dates, we observed quit rates of 25% point prevalence abstinence and 11% continuous abstinence after 1 year (7). At baseline, the entire sample fell within the contemplation and ready-for-action stages, since all subjects were about to quit and almost 60% had made a serious attempt within the last year. Only 21% did not abstain for a minimum of 2 consecutive days during the study, demonstrating a high level of commitment to behavioral change. Of course, there were other variables associated with cessation, including lighter dosage, less dependence, higher level of motivation, self-efficacy and commitment to quitting, and knowledge of the dangers associated with smoking. In a comparison of ten prospective studies of self-quitting, the California sample’s quit rate stood out above the others (8). The only influence that we could associate with our subjects’ exceptional success (aside from the usual aspersions cast upon Californians’ health orientation) was the temporally contiguous debate and passage of a city ordinance requiring nonsmoking areas in workplaces. While this observation falls within the realm of rank speculation, environmental factors undoubtedly have a substantial influence on readiness to change and on sustaining quit efforts.

Readiness also figured in the self-help intervention study we conducted on healthy women members of a Los Angeles area health maintenance organization (9). We attempted the ultimate application of the public health model, to target nonvolunteer smokers with artistically designed materials, tailored to women’s concerns and oriented toward precontemplators. In contrast to the unaided quitters of the Great American Smokeout and

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New Year's Day, almost one-half (47.4%) of the women smokers belonging to the health maintenance organization were in the precontemplation stage at baseline, 31% were contemplators, and only 22% were ready for action. Women in the contemplation stages were most likely to have quit by the end of the study. This study also introduces the second issue I wish to highlight, that of adherence. No intervention will work if people fail to utilize it. In one sense, adherence is most among nonvolunteers who have not, by definition, sought assistance. While high utilization rates of self-help materials by volunteer participants have been reported, evidence also exists of lesser usage and a higher dropout rate in self-help trials.

Despite the general responsiveness of the health maintenance organization membership to interactive contacts, mailing a self-contained series of self-help smoking cessation booklets constituted an insufficient intervention to produce group differences in smoking cessation outcomes. However, within the intervention condition, utilization of the “stop smoking” materials was positively related to smoking cessation.

We believe that, at the very least, some form of introductory personal contact such as physician advice will be necessary with nonvolunteers. The self-help booklets did produce a significant cessation effect with a sample of pregnant women in the same health maintenance organization. In that study the women were given the initial booklet by a health educator at their first prenatal visit. Readiness in this sense is conceptualized as a result of being pregnant and the associated pressures to quit. These pregnant women may have been much more motivated to utilize cessation aids than a generally asymptomatic population perusing their mail, even if those booklets came 6 weeks in a row, with an introductory letter and a folder for convenient storage.

In order to capitalize on the concept of readiness, we need to better understand what kinds of internal and external events move individuals from one stage to another. In order to maximize adherence, we need to understand the multiplicity of factors that lead people to intend to change and then to follow through on those intentions. These issues are the subject of much ongoing research and point to important public health issues in allocating scarce resources. Which resources in smoking prevention and control are to be directed at what groups, and when? This is a major ingredient of policy formation as well.

The final concept I wish to discuss is the dramatic effect of serious illness on smoking behavior, an effect closely associated with sudden changes in readiness. In general, higher quit rates are associated with more severe illness. However, we are made painfully aware of figures believed by the public who have been notable exceptions. The great composer and conductor Leonard Bernstein, who had a history of asthma and chronic emphysema, died on October 14, 1990, at the age of 72 of a fatal heart attack precipitated by a malignant pleural tumor. He ignored a lifetime of physicians’ warnings regarding his 2-pack-a-day smoking addiction until it was too late (15). In the quotation that follows, Bernstein refers to a severe flu that preceded his cancer diagnosis by 4 months, a diagnosis that he apparently had an intuitive inklng about, since he told people he had cancer prior to its discovery.

“I’m lucky. Somebody up there must love me an awful lot,” he said. “I shouldn’t be living at all, according to the wisest doctors. When I was in my late twenties, I was told to stop smoking that minute or I’d be dead by the time I was thirty. At thirty-five, they told me I’d be dead by forty-five. And so on. And now they’re all dead. And new doctors tell me the same thing, and they’re right. It has caught up with me.” Bernstein was rationing his energy. “I’ve been feeling simply wonderful. Never felt so young in my life. I’ve reduced—remarkably—the amount of smoking. I’m chewing this horrible substance called Nicorette, which is full of nicotine, and this week I was hit with the plague” (Ref. 15, p. 106).

In another recent example, Lauren Bacall, whose first husband Humphrey Bogart died of lung cancer in 1957, only stopped smoking in 1986 on tour in Australia as an “unintended” action, one cigarette-less day at a time. She cited two “examples” at a conference in New York promoting an anti-smoking device: (a) “Bette Davis was my heroine. . . . She used cigarettes so dramatically and I wanted to be like her.” and (b) The line, “Have you got a match?” was the first uttered by her in her first movie. “It was very effective; it made an impression at the time” (16).

If only we could control what “makes an impression” on people. So far, the most potent event our group has studied is lethal disease—early-stage cancer of the lung and cancer of the head and neck. The diagnosis and treatment of a smoking-related cancer which has a potentially curable outcome catapults individuals into a state of readiness to quit and immediate action. This time period is often referred to as the teachable moment or moment of opportunity. The likelihood of change is greatly facilitated, I believe, by the words and behaviors of physicians and the physical effects of hospitalization, treatment, and recovery period.

We were able to analyze prospectively the smoking behavior of 840 patients with resected Stage I non-small cell lung cancer who were participants in several clinical trials of the Lung Cancer Study Group. In contrast with the dismal 13% 5-year relative survival rate for all lung cancer cases, the prognosis for Stage I non-small cell lung cancer is currently 55–65% (19). Thus, patients may anticipate the great benefit of potential prolonged survival as an incentive for cessation while at the same time understanding the severity of their disease. These patients were long-term addicted smokers, the 526 current smokers averaging almost 30 cigarettes/day with a 40-year smoking history. The proportion of heavy smokers (≥25 cigarettes/day) was 62%, twice that of the general population. Yet, despite this adverse dosage and dependence profile for cessation, at 1 year only 17% continued to smoke (of the 317 current smokers at baseline who were followed for 2 years or longer). Eighty-three percent of patients quit either permanently (53%) or for some time period (30%). Continuous abstinence rates stabilized at over 40% by 2 years of follow-up. Among those patients who we called noncontinuous abstain-

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ers—that is, neither continuous abstainers nor continuous smokers—we distinguished seven different patterns of mixed cessation and abstinence behavior. Because the patients were followed on protocol at frequent intervals, we were able to examine these patterns in greater detail. Disparate examples include: “quit for surgery,” meaning an initial report of abstinence (first visit) followed by sustained smoking; and “very late quitters,” three or more visits reporting smoking followed by sustained abstinence until end of follow-up. Interestingly, the largest subcategory was of patients who reported multiple intermittent episodes of abstinence and smoking, suggesting a continuing struggle to give up cigarettes. These patients would likely be classified as relapsers when research methodology limits measurement to 6- or 12-month intervals. This continuing effort may reflect a combination of factors related to patients’ cognitions about their health status, their addiction to smoking, physician advice, and social pressures not to smoke. It certainly suggests that health care providers should provide ongoing support for cessation.

A group of patients who have often been considered even less likely candidates for stopping smoking are those with tumors of the upper aerodigestive tract, infamous for their combined histories of heavy smoking and drinking. With the availability of definitive treatment and 5-year survival rates of at least 50%, smoking cessation offers real benefit to these patients by avoiding further insult to the oral mucosa by carcinogens. An additional reason to focus upon these tumor sites was the strong reason to focus upon these tumor sites was the strong collaboration forged between behavioral scientists in cancer control and the highly specialized medical and dental health professionals caring for the patients. In this study, head and neck surgeons and maxillofacial prosthodontists first became involved in formal smoking cessation trials, thus presenting a novel opportunity for professional education (20).

Preliminary results on the Vanguard cohort who completed a 1-year follow-up (n = 108) revealed an ever-quit rate of 92% and an overall continuous abstinence rate of 71.3%. Ninety-four percent of the self-reported quits were verified by cotinine analysis. Readiness to change, measured at diagnosis, was a significant predictor of continuous abstinence. Fewer than one-half of the precontemplators, almost two-thirds of the contemplators, and over 90% of the action and maintenance subjects became continuous abstainers. Another very important predictor of continuous abstinence was medical treatment. Patients who received radiation therapy alone had a 38% continuous abstinence rate at 12 months, versus approximately double that or higher (74%, 90%) for patients in the two surgical procedure groups.

Participating surgeons and dentists entered the trial strongly affirming the importance of smoking cessation for the patients but acknowledging little confidence in their ability to assist patients in quitting. Provider training included models and algorithms for simple delivery of advice and role play sessions. Without doubt, the nature of the diagnosis and the severe reinforcing effects of hospitalization, surgery, and extended recovery reinforce physician advice and lead to dramatic changes in smoking behavior. The positive relationship between invasiveness of treatment and smoking cessation rates has recently been observed in cardiac patients, with those undergoing coronary bypass surgery more likely to report cessation than patients undergoing other cardiac procedures (angiography and angioplasty) (21).

How do we as health professionals capitalize on this information and heighten the salience of our smoking cessation messages to clientele? That is the $64,000 question of the 1990s.

One of the most prominent developments of the past 10 years has been the increased “medicalization” of the treatment of smoking. While many of us labored long and hard in the 1970s and early 1980s to establish that nicotine was a powerful dependence-producing drug which rewarded and sustained the self-administration of tobacco, the majority of medical and public health professionals continued to see smoking as a “bad habit,” whose initiation, maintenance, and cessation were governed by such elusive and nasty concepts as personality, will power, and strength of character. We stopped “blaming the victim” officially with the publication of the 1988 Report of the Surgeon General, titled “The Health Consequences of Smoking: Nicotine Addiction” (22). The full power of Surgeon General C. Everett Koop was launched in a stunning antismoking war, complete with public health uniform.

Simultaneously, we had been building a series of stepped interventions to guide physicians in smoking cessation advice. The Smoking, Tobacco and Cancer Program of the National Cancer Institute supported five randomized controlled intervention trials of brief training and intervention protocols for physician-guided smoking cessation, involving over 1000 physicians and 30,000 patients (23). Results from these trials and consensus development were used to create recommendations and the manual “How to Help Your Patients Stop Smoking” (24). At the same time, the American Medical Association was developing a strong antismoking stance; the National Heart, Lung, and Blood Institute manual “Clinical Opportunities for Smoking Intervention: A Guide for the Busy Physician” (25) was published; many of the medical specialty organizations, such as the American Academy of Family Physicians (26), were developing kits for their membership; and the voluntary health organizations were supporting professional education efforts as well.

Strongly facilitating the extension of smoking cessation treatment into everyday medical practice was the development of a specific pharmacotherapy. For the first time, physicians had a prescription agent, nicotine polacrilex (Nicorette, nicotine embedded in a gum resin), demonstrated in clinical trials to enhance cessation rates up to 100% when used in combination with behavioral techniques (22). But Nicorette remains conceptualized as a “chewing gum” to physicians and patients, even if that rubric misdirects its proper use, and has led to continuing problems with acceptance and adherent use. Within the past few months, the Food and Drug Administration has approved four (24-h) transdermal nicotine patches for marketing in the United States (Nicoderm, Marion Merril Dow/Alza; Habitrol, Ciba-Geigy; Nicolant, American Cyanamid/Elan; and Nicotrol, Parke-Davis/Kabi Pharmacia/Cygnus). The literature that has emerged

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to date shows that such systems have considerable promise as smoking cessation aids (e.g., Refs. 26–29). Just as important as their pharmacological properties is their “user friendliness” to both physicians and patients and compatibility with the “environmental” impact of emerging medical technology. Thus, both physicians and patients will be further motivated and “empowered” to pursue smoking cessation. This phenomenon is reflected in the astounding initial sales of transdermal nicotine patches, amounting to over $200 million in the first 3 months of 1992 alone.

While we arm our health care system with new and enticing pharmacotherapeutic guns, we must remember to be clear about our goals. Success rates resulting from intensive efforts with high-risk individuals or desperately ill patients should not be compared directly with public health approaches aimed at population groups. We all know that a small effect in a large population may still result in many more ex-smokers than a large effect in a very small group. Manipulations of the environmental influences on smoking are primarily directed at the societal level, although they may still have a profound impact on given individuals in groups at varying levels of risk. I will return to the topic of environmental issues in a few moments, but first I would like to explore some speculations on our expanding abilities as cancer control scientists to reach and intervene in groups at high risk for smoking-related cancers.

The field of molecular cancer epidemiology is expanding rapidly; indeed, we have heard many exciting reports at meetings of the American Society of Preventive Oncology of efforts to identify sensitive and specific markers that can be used in genetic and family screening (30) as well as those that appear later in the exposure or disease process. Examples of these findings include:

1. The link between active cigarette smoking and CYP1A1 gene expression in normal human lung tissue. The gene stimulates enzyme production that transforms aromatic hydrocarbons in smoke into carcinogens which damage DNA and set the stage for lung cancer (31).

2. Genetic predisposition to lung cancer (32) and specific investigations, such as analysis of the genetics of the Arnt gene to identify the genetic susceptibility of individuals to developing lung cancer (33).

3. Identification of elevated levels of DNA and hemoglobin adducts of tobacco-specific nitrosamines in some smokers, potentially indicating an increased risk for lung cancer (34).

4. The search for smoking-related DNA adducts in the sperm cells of smokers using 32P postlabeling assays, potentially providing evidence of mutagenic insults to DNA (35).

5. The prediction of the later development of lung tumors at least 2 years prior to clinical recognition through sputum cytology, utilizing immunohistochemical staining for monoclonal antibodies directed against lung cancer antigens (36). This technique is currently being evaluated in individuals curatively treated for one malignancy who are at high risk for another (37, 38).

6. A link between a specific genetic mutation (in K-ras) and the prognosis of patients with adenocarcinoma of the lung (39, 40).

Weinstein has devised a blueprint for cancer prevention, which summarizes approaches “linked together by novel methods involving molecular epidemiology and biomarkers” (Ref. 41, p. 5084s). These approaches include: identifying new causes through epidemiology and laboratory studies; intervention via risk factor reduction, chemoprevention, and vaccination; and early detection and screening. Smoking figures in almost every item on this list. Let me develop the link to chemoprevention for a moment.

A very exciting opportunity for cancer control researchers is to combine smoking prevention or cessation interventions with chemoprevention, the use of agents which inhibit the carcinogenic process. A number of these agents are found naturally in foods, and some can act at more than one step in the carcinogenic process (41, 42). Diets high in fruits and vegetables offer significant protection against the development of epithelial cancers, including lung and head and neck cancer (43–46). Smokers, as well as lung and head and neck cancer patients, appear to have lower levels of some of these protective phytochemicals in their blood (47–50). Biomarkers being developed for etiological studies can also be used as intermediate end points to evaluate the efficacy of dietary and chemoprevention interventions (41). Several cancer chemoprevention clinical trials for the lung, upper aerodigestive tract, and cervix are utilizing β-carotene, retinoids, 13-cis-retinoic acid, folic acid, and various vitamins as intervention agents and have end points of dysplasia and micronuclei as intermediate markers, as well as first or second primary cancers (41).

Moon (51) has created a conceptual framework illustrating how the multidimensional matrix interrelationship of behavioral, epidemiological, and laboratory sciences is applied to the development of cancer prevention and control interventions. Such interventions can relate to all dimensions of the behavioral, epidemiological, and laboratory interrelationship, as follows. Cancer prevention and control interventions vary according to environmental or genetic exposures and are associated with different biomarkers and different stages of carcinogenesis (51). Also, interventions may vary by stage of behavioral change (6). Optimally, an intervention will be selected after taking into account: (a) human carcinogenic exposures used to identify the target population; (b) the potential biomarkers to identify high-risk participants or to provide an intermediate end point; and (c) the readiness of subjects to adopt behavioral change and sustain adherence. We have applied this framework to interventions to prevent lung, head and neck, and cervical cancers, combining tobacco prevention/cessation with chemopreventive agents such as retinoids or antioxidants (52).

Thus, we are at the threshold of a powerful series of multidisciplinary cancer prevention and control studies requiring sophisticated experimental design and methodology, diligent efforts at implementation and maintaining regimen adherence, and powerful analytical techniques to evaluate effects. Fascinating as these speculations are, I could not conclude this overview without returning to the critically important topic of the climate for tobacco control and the expression of that climate in our societal environment.
Smoking Prevention: Research and the Path to National Policy

A most extraordinary example of the evolution from research findings to activism and policy formulation is taking place as I speak. It is the Old Joe Camel controversy. Prevention of smoking initiation remains the most challenging issue in smoking control. No matter how refined our basic science techniques may become at identifying susceptibility to lung cancer, what screening techniques we may develop to identify early disease, how effective our cessation methods are, or what new breakthroughs in oncological treatment we may discover—the scourge of tobacco-related diseases will not be halted until we can effectively prevent children and adolescents from starting to smoke.

A great deal has been written about the purported effects of cigarette advertising upon women's smoking (53-57), about how the tobacco industry has been relentlessly building the market of women smokers since the 1930s with themes of success, independence, beauty,sexiness, and, always, thinness—some recent ads portray women so slender that they look like the exaggerated and ghostly figures of an El Greco masterpiece. The remainder could go to medical care or the above areas.

However, no single campaign has attracted as much attention or stimulated so much outrage as the cartoon figure of Old Joe Camel, R. J. Reynolds Tobacco Company's egregious advertising and promotional campaign for its Camel cigarettes. With the publication in the December 11, 1991 issue of the JAMA (devoted entirely to smoking control) of three articles specifically addressed to the effect of tobacco advertising on youth, we have documented evidence that:

1. Children as young as 3-6 years of age "see, understand, and remember [cigarette] advertising" (58).
2. "Old Joe Camel cartoon advertisements are far more successful at marketing Camel cigarettes to children than to adults . . . a finding consistent with tobacco industry documents that indicate that a major function of tobacco advertising is to promote and maintain tobacco addiction among children," with sales estimates of $476 million/year to children (Ref. 59, p. 3149).
3. The Camel advertising campaign was most recognized by the youngest age group (ages 12-13 years) examined in a California teen and adult survey, with level of recognition inversely related to age (60). The influence of specific brand advertising upon prospective new smokers in the 12-13-year-old age group was demonstrated by the particularly high recall of advertisements among nonsmokers contemplating smoking. The authors state, "[O]ur results suggest that tobacco advertising is causally related to young people becoming addicted to cigarettes" (p. 3158).

These three scientific articles were accompanied by powerful editorials by Representative Henry Waxman, former Office on Smoking and Health Director Dr. Ronald Davis, and Dr. William Roper, calling for:

1. strict controls on cigarette advertising (61);
2. tight controls on tobacco sales, including "prohibiting vending machine sales and free samples, and strictly enforcing minimum-age laws" (Ref. 61, p. 3185; Ref. 62);
3. curbing "continuing violations of federal restrictions against tobacco advertising on television" (Ref. 61, p. 3185);
4. continuing support for the development of further tobacco access legislation, citing the comprehensive model bill proposed by HHS Secretary Dr. Louis Sullivan (62); and
5. "the coordination of supportive tobacco prevention and cessation programs among health care agencies, businesses, policymakers, educational institutions, and other influential groups" (Ref. 2, p. 3189).

The storm generated by this issue of JAMA and the coalition of many scientists, clinicians, prominent public health figures, antismoking groups in the public sector, and powerful politicians led to the resounding thunderbolt of a press conference on Monday, March 9, 1992, in which Surgeon General Antonia Novello, M.D., and Dr. James S. Todd, executive vice president of the American Medical Association, demanded that the R. J. Reynolds Tobacco Company stop using Joe Camel in advertisements and promotions, that retailers remove Joe Camel ads and signs from their stores, and that magazines and newspapers refuse to run Joe Camel ads. Never before has a Surgeon General singled out and urged a halt to a continuing campaign for an existing cigarette brand. The negative response of R. J. Reynolds was stereotypical: "No link has been made between advertising and the consumption of cigarette products, and the campaign is intended solely to persuade adult smokers to switch to Camel from competing brands" (63).

These kinds of antismoking publicity, calls for action, and joining together of a broad spectrum of prominent and powerful individuals are the bases for changes in societal norms regarding the prevention of smoking.

Another splendid example of antismoking advocacy was the passage of the California Tobacco Tax Initiative in 1988, led by citizens and unsuccessfully opposed by a $21 million media counterattack by the tobacco industry, enacted as the Tobacco Tax and Health Promotion Act of 1988 (64). Proposition 99 increased taxes on cigarettes from 10 to 35 cents/pack, earmarking the revenues for tobacco use control, medical care, and research activities. The statewide anti-tobacco use campaign included a $28.6 million media campaign, authorized to use paid advertising. Proposition 99 specified that at least 20% of the money go to the Health Education Account (for school and community-based smoking control), 5% to research, and 5% to environmental protection. The remainder could go to medical care or the above areas.

Unfortunately, California politics interfered with the public's expressly voted wishes. The first (AB 75) and subsequent (AB 99) appropriations bills allocated more monies to medical services than permitted by the law, whittling away funds from the Health Education Account and the Research Account. Recent developments include: suspension of a new series of television ads, the most controversial component of the Proposition 99 campaign; and the imminent threats of reducing the research budget by one-half, eliminating funding for tobacco control education through the Department of Education, and cutting the allocations for the Department of Health (65, 66). As put by Assemblyman Phil Isenberg, chair of the special legislative committee on spending

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cigarette tax money. “The Governor’s [Pete Wilson’s] recommendation basically concedes to the tobacco industry [its] single biggest legislative priority of the last two years” (67, 68). These proposed cuts are occurring in the face of a 17% decline in smoking prevalence in California since 1987 (prior to the campaign) from 26.8% of adults to 22.2% in 1991; the comparable national decline was only 8% (69).

So the battle continues, and although we believe that the good guys will come out on top eventually, the stakes increase with each round. The good fight must include efforts outside the ivory tower of everyone in tobacco control.

A true grass-roots illustration of smoking prevention efforts appears in the posters created by children in the “Kids Say Don’t Smoke” Contest, part of the New York City Smoke-Free Contest, now expanded into the Smokefree America Ad Contest (70). These posters deliver the antismoking message in a clear and forceful a manner as ever devised. Let us hope our nation becomes ever more responsive.

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Joseph W. Cullen Memorial Award Lecture. Paving the road from basic research to policy: cigarette smoking as a prototype issue for cancer control science.

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