well-publicized successful examples, smoking bans are rare and not widely supported by public opinion. Only 6 percent of companies with smoking policies (2 percent of all respondents) in a 1986 survey totally banned smoking (BNA 1986). Only 12 percent of adults (4 percent of smokers) agreed that "companies should totally ban smoking at work" in a 1985 Gallup poll. In spite of this hesitancy, smoking bans are gaining momentum among large employers such as Boeing, who recently announced an upcoming ban that will cover its 90,000 employees (Iglehart 1986).

Smoking bans provide the maximum protection for nonsmokers, at the cost of greater inconvenience for smokers. They send a clear message that nonsmoking is the company norm. They can reduce ventilation needs and maintenance costs due to smoking, but pose potential problems with enforcement and loss of employees who smoke. Thus, how a ban is planned, prefaced and introduced, and implemented and enforced is very important. Through a concern for employee well-being, assistance for smokers who wish to quit should be implemented along with bans (Orleans and Pinney 1984).

*Preferential Hiring of Nonsmokers*

The most restrictive workplace smoking policy, preferential hiring of nonsmokers, was not even discussed several years ago. Explicit policies favoring nonsmokers are still uncommon. According to the 1986 report of the Bureau of National Affairs, Inc., 1 percent of businesses hire only nonsmokers, 5 percent give nonsmokers preference, and 10 percent permit supervisors to exercise a nonsmoking preference (BNA 1986). The majority either have no policy (43 percent) or do not permit such a preference (39 percent). On the other hand, data from small surveys indicate that personnel managers, the majority of whom are themselves nonsmokers, may preferentially hire nonsmokers (Weis 1981; Iglehart 1986). In a unionized setting, selective hiring of nonsmokers may need to be the subject of collective bargaining (Eriksen, in press).

Hiring only nonsmokers ensures a smoke-free work environment without conflicts over smoking and makes it clear that nonsmoking is the company norm. Since the nonsmoking workforce should be healthier, lower health insurance premiums may also result. On the other hand, such a policy limits the potential pool of new employees, raises the issue of what to do about currently employed smokers, and may present problems with verification of smoking status. Employers may be reluctant to adopt a policy in which off-the-job activity is a condition of employment (Walsh 1984).

Assuring compliance with workplace smoking policies is complex. Model policies usually include three enforcement provisions: (1) identifying who is responsible for policy enforcement, (2) designating penalties for noncompliance, and (3) ensuring the protection of an

employee bringing a complaint. These provisions are often not included in practice. Only 23 percent of the policies stipulated penalties for noncompliance and only 32 percent specified procedures for resolving disputes in the 1986 BNA survey. Approximately half of the policies outlined in two other business surveys had provisions for disciplining violators (Petersen and Massengill 1986; NICSH 1980a,b).

### Implementation of Smoking Policies

Worksites that have adopted smoking policies have differed in the ease with which policy was implemented. To aid employers, the American Lung Association and the Office of Disease Prevention and Health Promotion of the U.S. Department of Health and Human Services have developed guides with specific recommendations on how to adopt and implement worksite smoking policies (ALA 1985b; US DHHS 1985a). These are based on the experience of companies and can be extremely helpful even though they are not based on research.

The experiences of 12 corporations that considered smoking policies are described in a report of the Bureau of National Affairs, Inc. (1986). Case reports are also included in the guide from the Office of Disease Prevention and Health Promotion (US DHHS 1985a). According to these case reports, strong support from top management and having an advisory committee composed of a wide variety of employees (including both smokers and nonsmokers, managers, and employee representatives) are common to successful policies. Surveys of employees can assess distress caused by involuntary smoking and support for policy changes. As a rule, such surveys have generally documented widespread support for smoking restrictions from employees, the majority of whom are nonsmokers.

Another correlate of success is a well thought out and clearly articulated communication of the policy. A written document should give the rationale for the policy implementation, specify where smoking will be allowed or prohibited, and define responsibility and procedures for policy enforcement and penalties for violation. Successful policies avoid criticizing smokers or setting up an antagonistic situation between smokers and nonsmokers. They make it clear that the company is not requiring that employees quit smoking and will help smokers in adjusting to the new regulations. Giving smokers advance notice of the policy and providing help for those who want to quit smoking can help gain their support.

Careful plans for implementation are recommended. Allowing several months between the announcement of the policy and its effective date gives smokers time to prepare for the change and to attend smoking cessation programs if they wish to quit. This also provides time for the posting of adequate numbers of signs and for

making any structural alterations that may be necessary. After policy implementation, an advisory committee should monitor its effectiveness and enforcement. A followup survey is helpful to determine what, if any, adjustments need to be made.

## Impact of Policies Restricting Smoking in Public Places and in the Workplace

Policies that regulate where smoking is permitted may have a number of direct and indirect effects. In the short term, a policy that is adequately implemented and enforced will alter the behavior of smokers in areas where smoking is prohibited and should result in a reduced concentration of tobacco smoke in that area. Beyond these direct effects, there is the potential for smoking restrictions to have broader, indirect effects on smoking behavior and on public attitudes about tobacco use. This section outlines the possible impacts of smoking policies, addresses methodologic considerations, and reviews existing data that bear on these hypotheses.

### Potential Impacts of Smoking Policies

*Policy Implementation and Approval*

The degree to which a smoking policy or law has been implemented as written is an essential consideration in evaluating its effects on attitudes, behavior, and air quality. Successful *implementation* involves public awareness of the policy, compliance with its regulations, and enforcement of violations. Compliance requires not only that smokers refrain from smoking where prohibited from doing so, but also that appropriate decisionmakers develop written policies, designate areas as no-smoking, and post signs as stipulated. Enforcement requires that policy violations be dealt with, either by peer action or by penalties defined by the policy. Because smoking policies and laws are approved by the majority of individuals whose behavior they affect, they are generally held to be self-enforcing, obviating the need for active policing (Hanauer et al. 1986). When enforcement is needed, smoking policies and legislation rely primarily on peers, assuming that the nonsmoking majority of the population will enforce the policy or statute because it is in their best interest.

Nonsmokers can be expected to favor smoking restrictions, which offer the benefits of cleaner air and reduced health risks and require no change in their behavior. The opinions of smokers are expected to be less favorable because they stand to be inconvenienced. Some smokers may support the policy to assure themselves of having a location where smoking is clearly permitted, because of a desire to quit smoking, or because of concerns about the health hazards of involuntary smoking. The degree of smokers' support for a policy

may also depend on other factors, such as the degree of smoking restriction or the adequacy of policy implementation.

*Direct Effects: Air Quality and Smoking Behavior*

The evaluation of a specific policy or piece of legislation must address whether the policy achieved its stated goals and must also screen for other effects. The primary goal of policies regulating smoking in public places or in the workplace is the reduction of individuals' *exposure to environmental tobacco smoke.* Measures of air quality directly assess how well a policy meets this goal. Air quality also indirectly reflects the behavior of smokers and the degree of policy compliance.

Smoking policies may have both direct and indirect effects on smoking behavior. The direct effect of adequately implemented smoking restrictions is to limit where smoking is permitted, altering the behavior of smokers in those settings. Smoking policies may have indirect effects on smoking behavior if they influence the behavior of smokers outside these settings.

*Indirect Effects: Knowledge, Attitudes, Social Norms, and Smoking Behavior*

Policies that restrict or ban smoking in public places or the worksite convey potentially powerful messages about the role of cigarettes in society and help to reinforce nonsmoking as the normative behavior. Restricting smoking to protect nonsmokers may increase public *knowledge* of the health risks of smoking and of involuntary smoking. Smoking restrictions may also alter *attitudes* about the social desirability of smoking and the acceptability of smoking in public. Changes in the knowledge or acceptance of health risks combined with attitude shifts contribute to changing *social norms* about where smoking should and should not occur, as well as whether it is an acceptable social behavior.

Changes in social norms may influence *smoking behavior* by reducing pressures to smoke and increasing social support for nonsmoking and cessation. The combination of altered social norms and reduced opportunities to smoke may encourage smokers to quit and discourage experimentation among nonsmoking youth. Changing social norms may have their greatest impact on teenagers and young adults, who might be less inclined to experiment with a socially undesirable substance. Current smokers are likely to be prompted by changing social norms to move further through the stages of self-change that precede cessation (Prochaska et al. 1985).

Smoking restrictions may influence smoking behavior apart from their influence on social norms. By reducing opportunities for smoking, restrictions may decrease a smoker's daily cigarette

consumption. By reducing the range of settings where smoking occurs, they reduce the cues and alter the stimulus–response patterns that help to maintain smoking behavior and that contribute to relapse among ex-smokers (Orleans 1986). This could increase the success of quit attempts. Smoking restrictions, especially those at the workplace, may also help smokers to discover alternatives to smoking as a stress reduction tool. Likewise, new entrants into the workforce may not as easily learn to rely on cigarettes to cope with work-related stressors. This might blunt the increase in smoking prevalence that occurs at the time of workforce entry, especially among blue-collar workers (O'Malley et al. 1984; US DHHS 1985c).

Thus, the widespread adoption of smoking restrictions may have a profound impact on smoking behavior at many points in its natural history. Hypothesized consequences include reduced cigarette consumption, increased motivation and progress through the stages of self-change, increased rates of smoking cessation, and decreased rates of smoking initiation.

Smoking policies may have additional impacts beyond their effects on attitudes and smoking behavior, such as positive economic effects for employers by reversing the excess costs associated with employees who smoke. It is generally agreed that employees who smoke cost their employers more than nonsmoking employees because of excess absenteeism, increased health care utilization, and reduced productivity (OTA 1986; Fielding 1986; Eriksen, in press). This leads to greater use of sickness, disability, and health care benefits and ultimately, higher health insurance costs to business. Productivity losses to business are attributed not only to the individual smoker's time lost owing to on-the-job smoking, but also to increased maintenance costs due to cigarette-related damage and refuse. Estimates of the excess annual cost per smoking employee vary by an order of magnitude, but even conservative estimates are substantial: $300 to $600 (Kristein 1983, 1984; Solomon 1983; Weis 1981).

Reductions in health care costs are partly dependent on whether policies lead smokers to quit smoking. Even if smokers quit, the reduction in health care costs may not be seen in the short term. Some employers have been concerned that strict smoking bans may unfavorably alter employee turnover patterns or productivity. Smokers' productivity could decrease if, for example, they are permitted to take extra breaks away from their work stations in order to smoke (OTA 1986; Michigan Tobacco and Candy Distributors and Vendor Association 1986). Costs involved in adopting a smoking policy should also be considered. Assessment of these endpoints is useful because employers may consider them in deciding whether to implement smoking policies.

## Methodologic Considerations in Policy Evaluation

*Study Design*

Evaluating a new smoking policy in a defined population is similar to evaluating a smoking cessation intervention, with the addition of nonsmokers. Impacts on beliefs and attitudes, as well as on behavior, can be assessed in the population at baseline and at intervals after implementation. Because smoking policies may influence smoking behavior gradually, designs must be able to measure delayed effects.

Simultaneous assessment of outcomes in a control population strengthens confidence in the validity of conclusions. With uncontrolled pretest/posttest designs, there is the possibility that changes in smoking behavior and attitudes are confounded by outside influences. Worksites, for example, may have concurrent smoking cessation programs that can affect attitudes and behavior. Populationwide trends in smoking behavior are another source of confounding. In practice, random assignment of whole populations will rarely be feasible, since researchers are rarely in a position to "assign" the intervention and must rely on natural experiments. Quasi-experimental designs, which include natural comparison groups, are the best alternative. Identifying and accessing such appropriate comparison populations may be difficult in practice.

Either longitudinal or cross-sectional sampling can be employed. Longitudinal designs, in which the same individuals are interviewed at two or more points in time, provide the best measure of changes in outcome measures, but depend on high rates of followup, which may be practically difficult. Furthermore, individuals' behavior or attitudes may be influenced by repeated assessments in such studies. On the other hand, when attitudes and behavior are evaluated by repeated assessments of independently chosen cross-sectional samples, the possibility exists that smokers and nonsmokers will enter or leave the population at different rates as a consequence of smoking restrictions. Turnover needs to be followed to assure that changes in behavior or attitudes are a result of changes in individual behavior and not changes in the composition of the population.

One-time comparisons of populations with and without policies can provide suggestive but not conclusive data about impact. The validity of differences detected in attitudes and behavior is dependent on the degree of similarity between the policy group and the control group. Uncontrolled one-time assessments done before or after policy adoption do not permit conclusions about the policy effects, although they may provide hypotheses for further work. Postimplementation surveys of a population can, however, provide useful information about the degree of policy approval, awareness, compliance, and enforcement.

Assessment of the impact of legislation on smoking behavior is more difficult because the unit of study is larger and more diverse.

Consequently, detailed behavioral or attitudinal data and repeated assessments are more difficult to obtain. Evaluations are often limited to analyses of aggregate measures such as smoking prevalence and tobacco consumption, which are collected for other purposes. This approach does not control for potentially confounding influences on tobacco use or smoking behavior, such as price fluctuations. Identifying and assessing control groups not subject to smoking legislation or regulation can strengthen the confidence in conclusions for the same reasons as above, but is often difficult to achieve in practice.

*Assessing the Effects of Smoking Policies*

Ideally, *air quality* should be measured objectively, but current technology for measuring the concentration of tobacco smoke in indoor air is expensive and cumbersome. There is also uncertainty about which constituent of smoke is best to measure (See chapters 3 and 4 of this volume). Air quality can also be assessed subjectively. Ratings made by occupants of smoke-free areas can be compared with those of a control area or to ratings made prior to the ban. Measurement of an individual nonsmoker's actual exposure to secondhand smoke, using biochemical measures, is not a specific measure of the concentration of this smoke in a single area because an individual may have other sources of smoke exposure. Such measures might be useful for assessing the concentration of smoke in areas, like the worksite, that represent a primary source of exposure. They cannot be used to measure air quality in other places, like an auditorium, where an individual spends only a few hours.

Many markers of *smoking behavior* need to be examined in order to understand the multiple effects of smoking restrictions on behavior. In a defined population, a new policy may increase smokers' motivation to quit, confidence in their ability to quit, or the number, duration, and success of quit attempts. It may also reduce cigarette consumption among continuing smokers. Workplace policies may have different impacts on cigarette consumption at work and outside work. These variables should be separately assessed. As in other research in smoking behavior, biochemical verification of self-reported smoking status is desirable.

Public *knowledge* about the health risks of involuntary smoking and *attitudes* about smoking can be assessed by surveys. Data on *social norms* can be construed from survey items such as those measuring the social acceptability of smoking in public places or in the presence of nonsmokers, the rights of nonsmokers to smoke-free air, the perceived prevalence of smoking in the environment, and the perceived social support for cessation or nonsmoking.

The adequacy of a policy's *implementation* can be assessed by surveys that measure individuals' knowledge and compliance with a

policy. The degree of noncompliance and enforcement can also be assessed by observations of behavior in public places subject to smoking restrictions.

## Review of Current Evidence on Impact

### *Workplace Smoking Policies*

In 1982, Orleans and Shipley concluded that the evaluation of worksite smoking policies was limited to a few public opinion polls. Since then, many policies have been adopted, but evaluation remains rare. Most common are baseline surveys done by companies considering smoking policies. The best surveys utilize random or probability samples and achieve high rates of completion; they provide useful one-time data on attitudes and behavior prior to policy implementation. Unfortunately, few companies adopting smoking policies have done postimplementation surveys to assess impact. To date, the best evaluations of worksite smoking policies have been done in the health care setting. There are two controlled and two uncontrolled studies assessing the effects on employees of adopting a smoking policy for a hospital (Rigotti et al. 1986; Biener et al. 1986; Andrews 1983; Rosenstock et al. 1986).

One uncontrolled study was reported by Andrews (1983). He described the process by which the New England Deaconness Hospital in Boston adopted a restrictive smoking policy in 1977. Patients and employees were surveyed prior to the policy. Employees were surveyed again 20 months after the policy took effect. The survey method and response rate were not specified; presumably it was not a random sample. Policy approval and smoking behavior were assessed.

The second uncontrolled study (Rosenstock et al. 1986) evaluated the impact of a near-total smoking ban adopted in April 1984 by the Group Health Cooperative of Puget Sound, Washington, the fourth largest health maintenance organization in the Nation. Four months after the policy was adopted, they surveyed a systematic probability sample of 687 employees, assessing smoking behavior, attitudes toward the policy, and its effect on work performance. Employees were asked retrospectively about attitudes and behavior prior to the policy. The response rate was 65 percent.

The two controlled studies of the impact of adopting a restrictive hospital smoking policy are similar in design. Both involve prepolicy and postpolicy measurements of intervention and control groups and assess similar outcomes. Rigotti and colleagues (1986) studied the impact of a total ban on smoking adopted in November 1984 by the pediatric service at Massachusetts General Hospital in Boston. All nurses employed by the service were surveyed at baseline and at 4 and 12 months. Nurses working on the hospital's medical service, where no policy change occurred, were surveyed concurrently as

controls. Response rates to the surveys ranged from 55 to 75 percent; the prevalence of smoking among respondents and nonrespondents did not differ. Surveys assessed smoking behavior, attitudes about smoking, and perceived air quality in both groups. The pediatric nurses answered additional questions about approval, compliance, and awareness of the policy. Employment records were reviewed to assess employee turnover before and after the policy.

Biener and colleagues (1986) studied employees at two Providence, Rhode Island, hospitals where self-help smoking cessation programs were being introduced. At one, the Miriam Hospital, there was a concurrent change in smoking policy. Smoking was prohibited hospitalwide except in three locations as of August 1985. Separate random probability samples of 85 employees at each hospital were surveyed by telephone at baseline (2 to 4 weeks before the policy) and at 1, 6, and 12 months after the policy. Data were collected in both hospitals on smoking behavior, attitudes about smoking, and air quality. Information on policy awareness, compliance, and approval was obtained at the intervention hospital.

Results of these studies are included in the subsequent sections, which address the outcomes of workplace smoking policies.

*Policy Implementation*

According to case reports, organizations that have adopted smoking control policies generally develop careful plans to introduce the policy, but rarely evaluate how effectively the policy has been implemented. The findings of Rosenstock and colleagues (1986) indicate that even careful implementation plans may fall short of their goals. In their survey of the Group Health Cooperative employees, only half of the respondents knew of the existence of the advisory group whose role was to provide information to employees. Only 36 percent of the smokers and 76 percent of the nonsmokers felt that they had had an adequate opportunity to express their views. Not all smokers knew that the decision to prohibit smoking was an irrevocable one.

Rigotti and colleagues (1986) found that awareness of the smoking ban on the pediatric service was high; at 4- and 12-month followups, over 90 percent of employees knew where smoking was not permitted. Employees noted smoky air or smoking in restricted areas on approximately 20 percent of days worked. Two-thirds of the employees who smoked admitted at least one personal episode of noncompliance during the year after the policy took effect. Although nonsmokers perceived themselves to be more assertive in enforcing smoking rules after the smoking ban, many were reluctant to confront a smoker, especially if the smoker was a coworker.

Biener and colleagues (1986) found a similar high level of policy awareness and better compliance among the employees of Miriam

Hospital in Providence. Six months after the adoption of a policy prohibiting smoking in all but three areas, 95 percent of the employees were aware of the policy and half had noted no evidence of noncompliance. There was no evidence that smokers perceived more pressure to abstain in the form of increased assertiveness by nonsmokers; the policy may have reduced the need for assertive behavior. Rigotti and colleagues (1986) reported that nurses in the control group described themselves as having to be more assertive about asking people not to smoke than nurses in the policy group.

Dawley and colleagues (Dawley et al. 1980; Dawley, Carrol et al. 1981; Dawley, Morrison et al. 1981; Dawley and Baldwin 1983; Dawley and Burton 1985) addressed the question of compliance with smoking restrictions at the New Orleans Veterans' Administration Medical Center. Their technique was to unobtrusively observe the smoking behavior of individuals occupying areas designated as smoking or no-smoking. In a series of 10-minute periods, an observer noted the proportion of people smoking among all individuals occupying a no-smoking area, which served as the measure of noncompliance. Posting no-smoking signs in a hospital lobby reduced the prevalence of smoking to one-third of its previous level (from 29 percent to 5 to 11 percent, $p < 0.01$). There was a nonsignificant trend for better compliance with positively worded signs (e.g., "Please do not smoke") compared with negatively worded signs (e.g., "No smoking—Offenders subject to fine") (Dawley, Morrison et al. 1981). Posting signs designating a no-smoking area in a cafeteria resulted in a similar decline in smoking prevalence in the area. The combination of signs and enforcement (polite reminders from staff to noncompliant patients) achieved greater reductions in smoking prevalence than were achieved with signs alone; however, the incremental value of enforcement was not directly assessed in the study (Dawley and Baldwin 1983). Following a change to a more restrictive smoking policy (smoking prohibited except in designated areas, with provisions for enforcement), the noncompliance rate dropped to under 2 percent (Dawley and Burton 1985). Another study demonstrated that smoking models reduce compliance with smoking restrictions. The noncompliance rate doubled when a smoker was experimentally introduced into the no-smoking area (Dawley, Carrol et al. 1981).

These studies indicate that there has been good employee compliance with smoking policies in health care facilities, even though there may be some reluctance by employees to enforce restrictions. The implementation of smoking policies in other types of worksites has not been systematically evaluated. Descriptions of the adoption of policies in a number of worksites do not report major problems with compliance (BNA 1986).

*Air Quality*

Three studies assessed air quality before and after hospitals adopted restrictive smoking policies. Both Rigotti and colleagues (1986) and Biener and colleagues (1986) used a subjective measure, the frequency that an employee was bothered by smoke at work. In the Rigotti group's study, perceived air quality was similar in the intervention group and the control group at baseline. It improved significantly at 4- and 12-month followup on floors where smoking was banned and did not change on control floors. At 12 months, 79 percent of the nurses on floors with the smoking ban reported noticing less smoke, and none noted an increase; in contrast, 87 percent of control nurses noted no change in air quality. Biener and colleagues found a similar pattern; there was a significant difference in employee assessments of perceived air quality between hospitals with and hospitals without a smoking policy.

At the New England Baptist Hospital in Boston, the distribution of respiratory particulates (RSP) was measured before and 1 year after the adoption of a restrictive smoking policy (Bearg 1984). At followup, RSP were lower in many hospital areas where smoking was restricted, most notably in patient care areas and an employee lounge, but remained high in the cafeteria. Because same-day measurements of outside air revealed low ambient RSP levels, Bearg concluded that the high levels inside the building were attributable to smoking rather than air pollution.

These studies suggest that hospital policies result in less smoking in work areas designated no-smoking, but that no-smoking areas in cafeterias may provide little protection from secondhand smoke exposure because of ventilation problems and the increased smoking in the few smoking-permitted areas.

*Policy Approval*

A number of private and public sector organizations considering a smoking policy have assessed employee attitudes prior to implementation. Pacific Northwest Bell, Pacific Telephone, New England Telephone, Texas Instruments, and StrideRite are among businesses that have done employee surveys (R. Addison, personal communication, July 21, 1986; Pacific Telephone 1983; Robert Finnegan Associates 1985; BNA 1986; Ziady 1986). Public sector employers include the Hawaii and Massachusetts Departments of Public Health (Marvit et al. 1980; Naimark 1986). The findings of these surveys are remarkably similar. Over 60 percent of employees report being at least occasionally bothered by smoke at work (Robert Finnegan Associates 1985; Pacific Telephone 1983; Ziady 1986; R. Addison, personal communication, July 21, 1986). There is broad support for adopting a smoking policy, even among smokers (Pacific

Telephone 1983; Robert Finnegan Associates 1985; Marvit et al. 1980, Sorensen and Pechacek 1986).

Assessment of employees' approval of policies after implementation have been done primarily in health care settings. High rates of approval are the uniform finding, with smoker–nonsmoker differences. In the Rigotti group's study (1986), the overall approval of a smoking ban increased from 72 percent at baseline to 85 percent at 4 and 12 months. Most of the increase was a result of the improved opinions of the smokers. Only 35 percent of smokers supported the ban at baseline, but by 1 year this nearly doubled, to 67 percent. High rates of policy approval at followup by both smokers and nonsmokers were also reported by Biener and colleagues (1986) (69 percent smokers, 89 percent nonsmokers) and Andrews (1983) (83 percent smokers, 93 percent nonsmokers). Rosenstock and colleagues (1986) found high overall policy approval at 4 months (85 percent), but less support by smokers (36 percent). These data indicate that smoking policies in hospitals are well accepted by employees, and that smokers' initial reluctance diminishes as they gain experience with the policy. Generalization from these studies is limited by the nature of the population studied—health care workers. Followup surveys in industrial setting would be valuable.

Sorensen and Pechacek (1986) have examined correlates of smokers' approval of smoking restrictions. They surveyed smokers in eight Minnesota businesses without smoking policies, sampling a broad cross-section of employees, from blue-collar workers to professionals. Over three-fourths of the 378 respondents agreed that employers should establish separate smoking and no-smoking areas at work. Smokers who favored worksite smoking policies had greater interest in quitting and more concern for the health risks of smoking and saw their social environment as supportive of nonsmoking, as measured by a higher perceived coworker support for quitting and a greater perceived prevalence of nonsmokers.

*Smoking Behavior*

Many smokers anticipate that their smoking behavior will change after a smoking policy is adopted at their worksite. At Pacific Telephone, 51 percent of the smokers expected that the policy would lead them to alter their smoking habits, either by cutting down (38 percent) or quitting (13 percent) (Pacific Telephone 1983). In the Rigotti group's study (1986) of a hospital smoking ban, 72 percent of the smokers expected the policy to change their habits. All expected to smoke less at work and most to smoke less outside work.

A successfully implemented smoking policy will provide a smoker fewer opportunities to smoke. Of course, the smoker may compensate for reduced smoking opportunities at work by more intense smoking (number of cigarettes, inhalation, puff topography) on

breaks or with increased smoking outside work to maintain a constant overall daily consumption. This is consistent with the addictive model of smoking behavior (Gritz 1980; US DHEW 1979). But if compensation does not occur, the smoker's lower rate at work would reduce overall daily smoking. Studies at present differ on which of these alternatives occurs. The results reported below are entirely self-reports; thus, they suffer from a lack of biochemical validation of smoking status as well as from an inability to detect compensation through altered smoking topography (US DHHS 1985c).

Compensation did not appear to occur in the Biener group's hospital study (1986). Among smokers in the "policy" hospital, the number of cigarettes smoked daily while at work fell from a baseline of 8.1 to 4.5 at 1 month and 4.0 at 6 months. Over the same time period, the at-work cigarette consumption in the control hospital rose slightly (7.6 to 8.1 cigarettes). The difference in smoking rates between baseline and 1-month followup in the "policy" group was significant ($p=0.02$). At 6 months, the difference in smoking rates at work between hospitals (8.2 vs. 4.0) was also significant ($p=0.01$). There were no significant changes in the smoking rate outside work. Smokers in the hospital study by Rosenstock and colleagues (1986) reported smoking a mean of 15.6 cigarettes daily, 2 fewer than before the policy ($p<0.003$). These data suggest that smokers did not compensate for reduced smoking opportunities at work by increasing their smoking at home.

Rigotti and colleagues (1986) found indirect evidence for compensation. The nurses' self-reported cigarette consumption at work decreased in the policy group, but did not change in the control group. However, overall cigarette consumption in the policy group did not change. Both the degree of change and the number of smokers in the study were small.

In an earlier study, Meade and Wald (1977) compared the smoking behavior of three British employee groups. Smoking was prohibited at work for two groups. Smokers who were allowed to smoke at work had a somewhat higher self-reported average daily cigarette consumption. The maximum rate of smoking occurred at work in the afternoon, but for workers prohibited from smoking at work, the maximum rate occurred in the interval between leaving work and retiring at night.

There has been much speculation that smoking policies will increase the smoker's motivation and success in quitting. In the study by Biener and colleagues (1986), the percentage of smokers considering quitting in the next 6 months increased from 71 percent at baseline to 91 percent at followup, but there was no change in motivation in the control hospital group. Two-thirds of the smokers in Rosenstock and colleagues' uncontrolled study (1986) had a

definite desire to quit. However, Rigotti and colleagues (1986) found no difference in the motivation of nurses between the control group and the policy group.

Smokers' use of worksite smoking cessation programs before and after policies go into effect have been used as an index of their motivation to quit smoking. The results are mixed. In the 6 months after Pacific Northwest Bell adopted a smoking ban in October 1985, 1,044 employees, representing 25 percent of all smokers, enrolled in programs reimbursed by the company. This compared with 331 who attended free onsite programs in the previous 26 months. The cost to the company per smoker was $142 (Martin 1986; K. Rowland, memorandum for Len Beil, April 25, 1986). At Texas Instruments (R. Addison, personal communication, July 21, 1986), 486 smokers enrolled in cessation classes within the first year after the announcement of a smoking policy; this compares with only 11 in 1982, the last year for which statistics were kept. In both cases, this enthusiastic response may in part be due to the employers' new willingness to pay for the classes, as well as to the incentive provided by a new policy. For example, only 8 of 148 smokers at the New England Deaconness Hospital who said they were interested in a smoking cessation program on their own time actually showed up (Andrews 1983). Even company sponsorship is not a guarantee of popularity. At the Group Health Cooperative, only two smokers aware of the company-sponsored cessation programs had participated within 4 months of policy adoption (Rosenstock et al. 1986). The signup rate for worksite-based self-help smoking cessation programs was no greater at a Rhode Island hospital with a new smoking policy than at one without (Biener et al. 1986).

It is not known whether the cessation rate of smokers who enroll in worksite programs is affected by the presence of a smoking policy at the worksite. Only uncontrolled studies with self-report measures are currently available. At Texas Instruments (R. Addison, personal communication, July 21, 1986), 34 percent of 354 employees enrolled in the first round of company-sponsored cessation classes quit smoking by the end of the program; in the second round of classes, 17 percent of 132 enrollees quit. At Pacific Northwest Bell, 44 percent of 639 respondents quit smoking in a survey of the 1,200 participants in a company-sponsored program. If nonrespondents are included as smokers, the cessation rate was 23 percent (Shannon 1986).

There is as yet no conclusive evidence that smoking policies are associated with increases in smoking cessation attempts or reductions in smoking prevalence. All reports are based on self-reported smoking behavior. There are anecdotal reports of smokers quitting in case reports of company policies (StrideRite, cited in BNA 1986) and in uncontrolled surveys (Rosenstock et al. 1986; Andrews 1983). Supporting evidence comes from the New England Deaconness

Hospital, where a two-part survey, before and 20 months after the adoption of a strict smoking policy, demonstrated a reduction in the prevalence of smoking among employees from 32 to 24 percent, along with an increase in the prevalence of ex-smokers (27 to 34 percent) (Andrews 1983). However, methodologic problems prevent an unequivocal conclusion. The first survey included both employees and patients, but the followup covered only employees; smoking rates for employees only are not provided. The survey method was not specified, but it did not appear to be a probability sample, thereby limiting generalizability of the finding to the entire group. Finally, because the same group of employees was not surveyed at followup, an alternate interpretation for the change in smoking prevalence is that the policy influenced employee turnover rates so that smokers left and were replaced by ex-smokers. The study did not assess employee turnover.

Controlled studies by Biener and colleagues (1986) and Rigotti and colleagues (1986) did not detect an increase in smoking cessation by employees of hospitals that adopted smoking policies. In the study by Rigotti and colleagues, nurses in the policy group did not differ from controls in their motivation to quit, or their expectation of doing so, or in the number or success of quit attempts. The prevalence of smoking in the policy group and in the control group was similar at baseline and did not change in the year after policy adoption. Similarly, employees in a Rhode Island hospital with a smoking policy were no more likely to try to quit or to succeed in quitting than were employees in a control hospital (Biener et al. 1986). The number of smokers in these two studies was small, and it is possible that the studies lacked adequate power to detect changes in behavior. Followup periods of greater than 1 year may also be required.

### *Attitudes About Smoking*

There has been little assessment of the impact of worksite smoking policies on attitudes about smoking. The two controlled studies of hospital smoking policies assessed attitudes about the health risks of smoking and about involuntary smoking (Biener et al. 1986; Rigotti et al. 1986). There was no significant change in the smokers' beliefs about the health risks of smoking or about environmental tobacco smoke exposure.

### *Management Issues*

There is only sketchy evidence about the impact of worksite smoking policies on absenteeism, health care costs, productivity, or employee turnover. No systematic analysis of economic impact has been done. There is an anecdotal report of cost saving by the Merle

Norman Cosmetics Company, which reported lower absenteeism and housekeeping costs and increased productivity in the year after it adopted a ban on smoking (ALA of San Diego 1984). In the 6 months after Pacific Northwest Bell adopted a total smoking ban, no employees left because of it (Martin 1986). Rigotti and colleagues (1986) reported no change in employee turnover in the year after the adoption of a hospital smoking ban. Rosenstock and colleagues (1986) found that self-reported work performance was unaffected in 75 percent of employees and improved in 21 percent. Costs involved in implementing a smoking policy have not been systematically measured, but appear from case reports to have been small (BNA 1986). Adverse impacts of worksite smoking policies have not been reported.

*Legislation Restricting Smoking in Public Places*

Legislation restricting smoking in public places has been less well evaluated than worksite smoking policies. Opinion polls in States and communities that have passed smoking control regulations provide some information on attitudes about smoking and smoking policies. There are no controlled studies of the impact of legislation on smoking behavior or attitudes.

*Policy Implementation and Enforcement*

Evaluation of the implementation of State or local smoking control statutes has been limited. In general, enforcement is delegated to a State or local agency, such as the department of public health. Enforcement is handled passively rather than actively; the responsible agency responds to complaints, but does not actively monitor policy compliance by surveying worksites, restaurants, or public places. Nonsmokers rights groups and individual activists are a major force for informing the public and aiding enforcement by bringing complaints (Sandell 1984).

The experience of cities like San Francisco and States like Minnesota contradicts tobacco industry estimates of the expense and intrusiveness required to enforce a smoking law (Martin 1986, New York Times 4/13/86; Sandell 1984). In the first year after San Francisco implemented a strict workplace smoking law in March 1984, only 124 complaints were processed and 1 citation was issued; there were no legal actions. No new employees were hired and no additional funds were required for enforcement. Policy enforcement required progressively less of a single employee's time over a 1-year period (Martin 1986). Minnesota enforces its 1975 State smoking law in a fashion similar to San Francisco's. State public health department officials estimate that they handle 1,200 to 1,400 complaints per year, with costs of enforcement estimated to be under $5,000 per

year (Sandell 1984). A survey of 10 California cities with workplace smoking laws documented that complaint rates were low and enforcement of these laws was a low priority for all city governments. Officials indicated that they would spend any additional funds available for enforcement on a public education campaign to increase awareness of the law rather than initiate active surveillance (Linson 1986).

Because active monitoring of policy compliance is not done, a low complaint rate is often taken as evidence of a high compliance rate. Data from Minnesota suggest that this is not always true. In 1976, 1 year after the comprehensive Clean Indoor Air Act was enacted, 43 percent of respondents to a statewide poll felt that the law was not very effective in reducing smoking in public places; 38 percent found it somewhat effective and 12 percent, very effective (Minneapolis Tribune 1976). Six years after the law took effect, a survey of Minnesota businesses with 200 or more employees documented that only 46 percent of businesses had such a policy. Restaurants, however, had nearly uniformly conformed to the law within a year of implementation (Sandell 1984). A statewide opinion poll in 1978 demonstrated that over 70 percent of both smokers and nonsmokers felt that the Clean Indoor Air Act should be strictly enforced (Minneapolis Tribune 1978). Two years later, Minnesotans were of mixed opinion about the law's enforcement: fewer than half (43 percent) considered it very well enforced, 42 percent felt it was not so well enforced, and 10 percent said it was not enforced at all (Minneapolis Tribune 1980).

Randolph (1982) studied factors associated with compliance and enforcement of local ordinances regulating smoking. She assessed the implementation of a recently enacted San Rafael, California, smoking ordinance by interviewing proprietors of randomly selected businesses. Less than 1 year after the ordinance went into effect, 68 percent of 25 proprietors were aware of the policy, but only 44 percent of 30 businesses had complied with the requirement to post no-smoking signs. The major variable associated with compliance by businessmen was the type of business; restaurants, retail food stores, drug stores, banks, and movie theaters were generally posting signs as required, but department stores and small retail stores were not. City residents were less well informed. Fewer than half (45 percent) of 200 randomly selected residents surveyed by telephone were aware of the ordinance, and only 11 percent could describe its provisions.

Randolph's study (1982) of implementation also included a 1980 telephone survey of 600 randomly selected residents of three northern California cities, two with smoking ordinances and one without. Smokers were classified as compliers or noncompliers according to whether they refrained from smoking in supermarkets,

which was required by State law. Characteristics of smokers who complied were (1) lower daily cigarette consumption, (2) less perceived need to smoke, (3) greater perception of others' disapproval for tobacco smoking in public, (4) and greater support for policies restricting smoking in public places. Smokers' perception of pressures to refrain from smoking in public, awareness of the presence of a local smoking law, and the duration of the ordinance were not associated with compliance. Enforcement of smoking laws was studied in nonsmokers. The best predictor of enforcement behavior was a nonsmoker's degree of annoyance with tobacco smoke. Other characteristics associated with enforcement behavior were more negative attitudes about smoking in public places, greater intolerance of noncompliance, and higher educational level.

*Policy Approval*

National and regional polls have surveyed public opinion about where smoking should be restricted or banned. Regional polls have often been taken when legislation is being considered. There are little data about public opinion on legislation after its enactment.

Nationwide public opinion about smoking in public places was assessed by Roper polls in 1976 and 1978 (1978), two Gallup polls (1978, 1983), and the Harris Prevention Index 85 (Harris 1985). The Roper polls asked separate questions about preferences for a smoking restriction or a total ban; the Gallup and Harris polls offered a choice between the two in the same question. In both Roper polls, a majority of respondents favored restricting smoking in all places mentioned: transportation vehicles (airplanes, buses, and trains), restaurants, workplaces, and indoor arenas. By 1978 three-fourths of the respondents favored restrictions in all places except the worksite. Total smoking bans were less popular but still the choice of at least one-fourth of the respondents.

The 1983 Gallup poll documented increased public support for smoking restrictions, particularly in restaurants. More than 80 percent of smokers and 90 percent of nonsmokers favored either banning or restricting smoking in airplanes, buses, and trains and restaurants. Over half of both smokers and nonsmokers favored restrictions in motels and at the worksite. Although bans were less popular than restrictions, they were twice as popular with nonsmokers as with smokers. In 1985, 80 percent of the respondents to the Harris poll supported restrictions or bans in public places in general. Regional polls generally support the conclusions of nationwide surveys.

Minnesota is one State where public opinion of existing legislation has been measured. Five years after enactment, public opinion of Minnesota's 1975 Clean Indoor Air Act remained high. Ninety-two percent of the 1,200 respondents to a statewide poll favored the act,

including 87 percent of heavy smokers (two packs per day) and a larger fraction of lighter smokers (Minneapolis Tribune 1980).

During the first year of the San Rafael, California, smoking ordinance, nearly 70 percent of 200 randomly selected residents agreed that there should be laws about smoking in public places and 77 percent said they would have voted for the ordinance had they had the opportunity (Randolph 1982). The reaction of local businesses was less favorable. Over half (52 percent) did not like the ordinance, but only 41 percent favored rescinding it. The most common reason for support was concern for smoking-related damage to property. Concerns about invading personal rights and fear of losing business were the major reasons for opposition.

*Attitudes and Social Norms*

It has been suggested that smoking restrictions will alter public attitudes and norms about smoking behavior. There are few data addressing this hypothesis.

Randolph (1982) reported on attitudinal differences between residents of California communities with and without smoking ordinances. Smokers in two cities with laws had more negative attitudes about smoking in public places and were more likely to feel that there should be laws regarding tobacco smoking in public. However, there was no difference in smokers' perceptions of social pressures to refrain from smoking. Nonsmokers in cities with laws were more likely to believe that tobacco smoke should be regulated in public, but they were no more annoyed by tobacco smoke, intolerant of noncompliance, or disapproving of smoking in public places than residents of the city without a law. Although residents of communities with and without smoking ordinances did not differ in their personal support of smoking laws, residents of communities with laws perceived greater support for these laws by other residents of their communities. This cross-sectional study cannot differentiate whether these attitudinal variations were a cause or consequence of differences in community smoking ordinances.

Data from opinion polls demonstrate that negative attitudes about smoking generally preceded rather than followed legislation to restrict smoking in public places. The four Adult Use of Tobacco Surveys, a series of nationwide surveys conducted between 1964 and 1975, measured attitudes in the decade after the health hazards of smoking were first widely appreciated (US DHEW 1969, 1973, 1976). As early as the first survey in 1964, a majority of nonsmokers agreed with these statements: "It is annoying to be near a person who is smoking cigarettes" and "Smoking should be allowed in fewer places than it is now." By 1970, a majority of all respondents agreed with these statements. By 1975, a majority of smokers agreed with the idea of further restricting smoking, suggesting that there was wide

public support for restricting smoking well before the first comprehensive Clean Indoor Air Act was passed in Minnesota in 1975. As early as 1973, 73 percent of the nonsmokers in a Minnesota poll felt that they had the right to a smoke-free environment, and 65 percent wanted to ask others not to smoke (Minneapolis Tribune 1973). More recent opinion polls document that negative attitudes about smoking in public continue to grow. In a 1985 Gallup poll, 75 percent of the respondents (including 62 percent of the smokers) felt that smokers should refrain from smoking in the presence of nonsmokers.

However, nonsmokers' attitudes do not translate directly into action. A smaller proportion of nonsmokers are willing to confront a smoker whose smoke is bothersome. In three successive Roper polls between 1974 and 1978, fewer than 10 percent of the nonsmokers indicated that they would ask an individual smoking indoors to stop (Roper 1978). Only 32 percent of the nonsmokers in a 1974 Minnesota poll would complain when bothered by another person's smoking, although an additional 31 percent would take nonconfrontational action such as moving away or opening windows (Minneapolis Tribune 1974). These data suggest that in the mid-1970s, despite strong preferences, many nonsmokers did not perceive that asking a smoker to stop was socially sanctioned behavior.

Smokers, on the other hand, report an awareness of nonsmokers' concerns and a willingness to comply with restrictions. Over 90 percent of the smokers in a 1981 Iowa poll (Des Moines Register 1981) extinguished tobacco when they saw a no-smoking sign. Sixty percent of the smokers in a 1973 Minnesota poll (Minneapolis Tribune 1973) had at least some misgivings about smoking in the presence of nonsmokers, and 90 percent would not have been offended if asked not to smoke. Only 29 to 36 percent of smokers in three Roper polls (1974–1978) lit a cigarette without looking around, asking others, or refraining from smoking (Roper 1978).

There may be, therefore, an interaction between attitudes and policy development. These survey data suggest that attitudes about smoking in public preceded and may have contributed to the development of a public policy (Breslow 1982). At the same time, publicity surrounding campaigns for legislation may increase public awareness of an issue such as the hazards of involuntary smoking and therefore contribute to further changing attitudes.

*Smoking Behavior*

The impact of legislation on smoking behavior has received little formal attention. There are no controlled studies in which smoking behavior has been tracked over time in the States or communities that have enacted smoking legislation. In Randolph's one-time assessment (1982) of smoking behavior in California communities with and without smoking control ordinances, there was no differ-

ence in smoking prevalence or mean daily cigarette consumption between the residents of a city with a recent ordinance and one without. A lower prevalence of smoking in one community with a longstanding ordinance was probably explained by demographic differences between that community and the other areas.

Uncontrolled reports of declining smoking prevalence or cigarette consumption in a State or community with a smoking law cannot establish a causal relationship. This was particularly the case during the 1970s, when both smoking prevalence and per capita cigarette consumption were declining nationally. Warner (1981a; Warner and Murt 1982) conducted a series of analyses of this decline. In separate analyses, he estimated the levels of smoking prevalence and cigarette consumption that would have been achieved if previous trends in these indicators had continued unabated through the 1960s and 1970s. Cigarette consumption in 1978, for example, would have been 36 to 41 percent higher had previous patterns continued. He ascribed the difference between observed and modeled values to the impact of the so-called antismoking campaign, defined as the combination of public events, legislative activity, and Federal regulations that affected cigarette price, counter-advertising, and the circumstances in which smoking was allowed.

To assess the relative contributions of components of the antismoking campaign to the decline in adult per capita cigarette consumption, Warner (1981a) developed a multivariate analysis that included independent variables to account for price fluctuations, adverse publicity about smoking, antismoking activities, and the effectiveness of the nonsmokers' rights movement. The percentage of adults residing in States restricting smoking in public places was used as an index of the strength of the nonsmokers' rights movement. This variable was strongly associated ($p < 0.0001$) with decreases in consumption from 1973 to 1978.

In Warner's view, the temporal relationship between the growth in legislation restricting smoking in public places and the decline in cigarette consumption is so close that a causal relationship is unlikely. He attributed the decline in consumption to the changes in attitudes and social norms about smoking that were an earlier consequence of the entire antismoking campaign. He regarded the legislation as another reflection of changing social norms rather than the creator of them (Warner 1981b).

### Recommendations for Research

Policies restricting the circumstances in which smoking is permitted have been adopted by a broad range of institutions, mostly in the last decade. Smoking regulations affect the daily lives of a large and growing number of Americans. Consequently, these policies are of

interest to many individuals and groups. For instance, public health officials are concerned about the health effects of both active and involuntary smoking; they are most interested in whether these policies actually reduce a population's exposure to environmental tobacco smoke and whether they will alter the prevalence of smoking. Behavioral scientists, primarily concerned with smoking behavior and attitudes, are chiefly interested in how smoking policies alter these variables and how this knowledge can increase our understanding of the dynamics of smoking behavior. Businesses, unions, and government policymakers have different perspectives. They are faced with deciding whether to adopt smoking restrictions and how to improve the implementation and acceptability of existing ones. Information about the determinants of policy approval and compliance will be of most interest to them. Businesses may also be concerned about the economic and managerial impacts of smoking restrictions.

Understanding the effect of policies on smoking behavior is of widest interest and deserves attention. Policies may affect the natural history of smoking behavior at several points, and detailed behavioral information should be collected to distinguish among effects on rates of initiation, cessation, and relapse. Studying how smokers cope with enforced abstinence may provide additional insights into the maintenance of smoking behavior. Detailed studies of the influence of policy may advance the state of knowledge about the determinants of smoking behavior in general. The relationship between interventions at the social and individual levels is also of interest. Researchers should consider whether the effectiveness of individual treatment is enhanced by the presence of a smoking policy, and whether the impact of a policy is enhanced by the availability of individual treatment. Concurrent collection of information on attitudes about smoking may help to clarify the nature of the relationships among attitudes, smoking behavior, and smoking policies.

In addition to considering a variety of outcome measures, researchers should address the determinants of these outcomes. Characteristics of the policy, the institution, and the population should be considered. The components of a smoking policy and its implementation (such as restrictiveness, degree of advance notice, degree of support for the policy by affected groups, access to smoking cessation programs) that contribute to its effect—be it on behavior, attitudes, air quality, acceptability, or compliance—have generally not been analyzed. Because smoking policies vary widely in their provisions and implementation, they cannot be evaluated as a unitary intervention; i.e., better operationalization of "policy" interventions is needed. The relative strength of policy components on each outcome measure should be assessed in order to make informed

policy recommendations. For example, the degree of protection from involuntary smoke exposure afforded by policies of different degrees of stringency in not empirically known. To acquire this knowledge, researchers will need to develop and validate measures of such concepts as restrictiveness. The index described in the appendix to this chapter is a preliminary attempt to do that. The components of a policy that are most powerful in reducing cigarette consumption, inducing cessation attempts, preventing relapse, or reducing smoking initiation need to be identified.

Similarly, the components of a policy associated with maximal acceptability and compliance have been addressed only cursorily. Dawley and colleagues (Dawley, Morrison et al. 1981; Dawley and Burton 1985), for example, have examined variables such as the wording of signs or the presence of active enforcement. Guidelines for the implementation of smoking policies have not been experimentally derived. Research could empirically support or refute recommendations on the basis of experience. Interventions such as the training of managers to handle implementation problems might then be developed to increase policy acceptability and compliance.

Different types of organizations have presented different climates for the adoption of smoking regulations. In assessing policy impact, there may also be substantial interactions between the policy and type of facility in which it is adopted. Even within a single type of facility, there may be considerable variability in social norms, social supports, and characteristics of the population using it. Sorensen and colleagues (1986) have pointed out these differences among worksites. Policy evaluations should consider these variables.

Because smoking policies represent a recent social phenomenon, there is at present relatively little information about their impact. New policies are being adopted at a growing rate, providing researchers with the opportunity to study natural experiments that, up to now, have largely gone unevaluated. The variety of potential outcomes, number of interested parties, and current lack of information make efforts to collect systematic data on new public and private sector smoking policies a high priority for research. Controlled studies are desirable and permit the firmest conclusions, but with the current knowledge base, even limited efforts may yield valuable information. Uncontrolled case studies, for example, can provide suggestive data and generate hypotheses for further testing. In some cases, data are already partially collected. For example, many businesses considering smoking policies survey employees at baseline, but few repeat the survey after policy adoption. At the aggregate level, it may be possible to estimate the impact of legislation on smoking prevalence or cigarette consumption by relating national survey data on smoking behavior to smoking restrictions in geographic areas.

## Conclusions

1. Beginning in the 1970s, an increasing number of public and private sector institutions have adopted policies to protect individuals from environmental tobacco smoke exposure by restricting the circumstances under which smoking is permitted.
2. Smoking in public places has been regulated primarily by government actions, which have occurred at Federal, State, and local levels. All but nine States have enacted laws regulating smoking in at least one public place. Since the mid-1970s, there has been an increase in the rate of enactment and in the comprehensiveness of State legislation. Local governments have enacted smoking ordinances at an increasing rate since 1980; more than 80 cities and counties have smoking laws in effect.
3. Smoking at the workplace is regulated by a combination of government action and private initiative. Legislation in 12 States regulates smoking by government employees, and 9 States and over 70 communities regulate smoking in the private sector workplace. Approximately 35 percent of businesses have adopted smoking policies. The increase in workplace smoking policies has been a trend of the 1980s.
4. Smoking policies may have multiple effects. In addition to reducing environmental tobacco smoke exposure, they may alter smoking behavior and public attitudes about tobacco use. Over time, this may contribute to a reduction of smoking in the United States. To the present, there has been relatively little systematic evaluation of policies restricting smoking in public places or at the workplace.
5. On the basis of case reports and a small number of systematic studies, it appears that workplace smoking policies improve air quality, are met with good compliance, and are well accepted by both smokers and nonsmokers. Policies appear to be followed by a decrease in smokers' cigarette consumption at work and an increase in enrollment in company-sponsored smoking cessation programs.
6. Laws restricting smoking in public places have been implemented with few problems and at little cost to State and local government. Their impact on smoking behavior and attitudes has not yet been evaluated.
7. Public opinion polls document strong and growing support for restricting or banning smoking in a wide range of public places. Changes in attitudes about smoking in public appear to have preceded legislation, but the interrelationship of smoking attitudes, behavior, and legislation are complex.

# APPENDIX