

Methods for Stopping Cigarette Smoking

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THE IMPORTANCE OF quitting cigarette smoking cannot be overemphasized. Smoking is "a causal or facilitating factor in the development of lung and bladder cancer, coronary heart disease, cardiovascular disease, emphysema, and chronic bronchitis" (1) and is widely recognized as the greatest single cause of premature, preventable death (2). Yet, 30 years after the first widely published reports of the adverse impact smoking has on health, millions of Americans continue to smoke.

Ninety percent of smokers would like to quit (3), and an estimated 15% attempt to quit each year (4). Despite nicotine's powerful addictive properties (5-7), some smokers succeed in quitting. In fact, most persons (64%) who have quit smoking have done so on their own. Adult smoking rates have declined in recent years, resulting in an overall decrease in the per capita consumption of cigarettes (8, 9).

This decline is due to antismoking legislation, growing familial and societal pressure against cigarette smoking, increased awareness of health consequences, and the use of a vast array of smoking cessation methods. Research over the last 20 years has shown that cigarette smokers can successfully change their smoking habits. From an inauspicious start, when drug therapies and early behavior modification plans yielded low quit rates, many smoking cessation methods have improved: now, end-of-treatment quit rates of 40% to 90% are not uncommon (7, 10-19). Longer-term success has been—and remains—harder to achieve, but there has been improvement. In 1974 Hunt and Bepalec (20) reported an average quit rate of 20% for all smoking cessation methods and relapse rates of 70% to 80% within 1 year. These figures often appear as the standard by which success is measured. By the early 1980s, studies were reporting relapse rates of 40% to 50%, resulting in abstinence rates of 20% to 95% at 6 months to 1 year (7, 9, 13-15, 17, 21-31).

Unfortunately, there have been few randomized controlled trials of any methods. Most data are from studies using nonexperimental designs. In the absence of better evidence, no one single method can be recommended for all patients, and again it is important to note that most

people who have quit have done so largely on their own (7, 32, 33).

Recommendations

Physicians should take an active role in counseling patients to quit smoking. Personal encouragement has been shown to improve the success rates of those who try to quit on their own.

Continued research on smoking cessation methods should be encouraged.

EXECUTIVE SUMMARY

Many smokers—perhaps 10% of all who try to quit—seek advice and assistance from their physicians when attempting to quit (7). This position paper provides practical help to physicians by discussing in depth the reported effectiveness of six major smoking cessation methods: drug therapy; behavior modification; educational and commercial programs; hypnosis; acupuncture; and multiple risk factor reduction programs. However, the American College of Physicians cannot recommend one method over another because statistically valid data comparing these methods are not available.

Studies of the smoking cessation methods cited in this paper report the following highest immediate quit rates: behavior modification with self-management, contingency management, and aversive techniques (56% to 100%); acupuncture (78% to 95% after several treatments); and hypnosis (58% to 84%). However, after a 6- to 12-month period without adequate maintenance these success rates usually change to 14% to 61%, 30% to 34%, and 4% to 88%, respectively (Table 1). The most successful programs combine techniques to produce long-term cessation of the smoking habit with satisfaction of the psychological and physiological addiction. The key feature of these multicomponent methods is education. These methods are characterized by being intensive and of longer duration than one session, by emphasizing health enhancement and other benefits of quitting, and by offering a supportive and consistent plan for maintenance. Examples of these combined programs include group meetings with personal contracts and monetary incentives (success rate, 81% to 95%); weekly meetings on self-management behavior modification with education (success rate, 89%); and aversive techniques with behavior modification (success rate, 56%). It must be emphasized, however, that most of these studies were done using nonexperimental designs. Consequently, these figures cannot be relied upon as being representative of those that might be obtained from studies using strict scientific protocols.

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Table 1. Comparison of Six Methods Used for Smoking Cessation*

Author (Reference)	Quit Rate	Abstinence Rate			Comments
		6 Months	1 Year	5 Years	
←———— % —————→					
Drug therapy					
Lobeline					Successful short-term results; long-term results poor
Bernstein (34)	80	...	...	...
Ejrup (35)	60	...	18	...	Has contraindications; results in dependence; can effectively suppress withdrawal symptoms
Nicorette					
Malotte et al. (18)	72	53	23	...	
Scheider et al. (10)	...	48	30	...	
Behavior modification					Combines stimulus control and maintenance
Danaher et al. (13)	56	38	...	...
Lichstein and Stalgaitis (14)	74	61	...	...
Delahunt and Curran (36)	...	22†	...	...
	...	56‡	...	...
Lando (37)	...	76	...	...
Lando (19)	70-100	...	14-50	...	Education programs are often used in combination with behavior modification and other methods as part of a maintenance program
Education					
American Cancer Society (7)	...	...	25-50§	...
Shewchuck et al. (38)	33-49	...	17-21	...	
Kaiser Foundation					
1972 (7)	...	25	...	...
1973-1975 (7)	...	55	...	...
1979 (39)	...	57	47	...	
Five-Day Plan (7)	70	...	...	...
Dawley et al. (29)	...	53	...	...
Stachnik and Stoffelmayr (25)	...	81-95	...	...
SmokEnders (Unpublished)	...	89||	...	...
Schick (Unpublished)	...	...	53-57	...
Smoke Stoppers (27)	32-40	...	...	...
Hypnosis					Critical factors affecting success seem to include the motivation of the subject and the type of hypnosis
Nuland and Field (40)	...	25	...	...
Grosz (4)	58-59	31-34	...	...
Kline (41)	...	...	88¶	...
Schwartz and Rider (7)	16-19**	...	Most effective when used with other techniques; major weakness lack of follow-up data
Holroyd (21)	...	50	...	...
Acupuncture					
Cousin (42)	64-78	Part of a complex intervention involving follow-up medical evaluation and focusing on general health enhancement
Fuller (23)	95††	...	34	...	
Multiple risk factor reduction programs					Part of a complex intervention involving follow-up medical evaluation and focusing on general health enhancement
Hymowitz et al. (8)	...	...	...	30
Malotte et al. (18)	72	53	23	...	
Pallonen et al. (43, 46)	63	38	...	...
Hughes et al. (44, 45)	50‡‡	

* With the exception of the Multiple Risk Factor Intervention Trial (44, 45), North Karelia Project (46), and the Oslo study (8), none of these studies represent randomized controlled trials.

† Both aversive techniques and self-control procedures alone.

‡ Both aversive techniques and self-control procedures together.

§ Abstinence rates increase with ongoing maintenance.

|| Three months to 1 year.

¶ Sessions totaled 12 hours.

** Single session.

†† After three treatments.

‡‡ After 6 years.

Recent studies have shown the importance of physician counseling and role modeling (not smoking). Therefore, physicians should encourage patients to quit smoking and provide them with practical advice. Physicians should stress the known benefits to quitting smoking such as an increase in life expectancy; increase in lung capacity; sense of taste and smell returning to normal; decrease in heart attack and high blood pressure; and elimination of a "smoker's cough" (47). All patients who smoke should be given educational materials and referred to specific smoking cessation methods or programs. Physicians

should become familiar with the successful smoking cessation methods and programs within their communities (48, 49).

Physicians should advise employers to encourage smokers to quit by providing cessation programs or reimbursement for successful results when employees choose a program that requires payment. The operators and proponents of smoking cessation programs are encouraged, through research, to accumulate scientific data documenting the validity of their methods so as to allow third-party reimbursement.

METHODOLOGIC WEAKNESSES

Any discussion of smoking cessation methods must include a warning about the methodologic weaknesses of the studies in this area. In 1969 Bernstein (34) enumerated many deficiencies of studies of methods for quitting smoking, criticizing the failure to use control groups, simultaneous manipulation of more than one independent variable, and lack of control over experimenter variables. Although some of these weaknesses have been corrected in later research, major drawbacks still exist. Schwartz and Rider (7) pointed out four drawbacks: results sometimes are evaluated on reductions of cigarettes smoked rather than cessation of smoking; follow-up is often based only on persons who complete treatment; follow-up results are based only on persons who reply; and methods are not reproducible. There are further inconsistencies that hamper the ability to generalize from reported results. Different time periods are used in follow-up reports (some researchers start from the time the program started, and others count follow-up from the end of the program) (50). Studies rely on self reports of abstinence (some researchers have found that as many as 25% of subjects who claim abstinence have blood levels of carboxyhemoglobin consistent with smoking (7). There are a small number of subjects in some studies. There are no procedures for classifying people who smoke after treatment but are abstinent at follow-up (51). Studies do not always specify those abstaining include people who use substitutes for cigarettes, such as pipes or marijuana (51). Despite these weaknesses, a review of the literature of smoking cessation methods is valuable, and general conclusions may be drawn about the different methodologies.

ADDICTIVE PROPERTIES OF NICOTINE

Nicotine is a powerfully addicting drug (4-6). When measured by the percentage of users who lose control of their intake of it, nicotine is six to eight times more addictive than alcohol (6). Nevertheless, as a former director of the National Institute on Drug Abuse has stated, "with adequate motivation and appropriate therapeutic approaches, dramatic levels of success can be achieved in addictive disorders" (6). It is within this context that smoking cessation methods must be assessed. An understanding of the addictive properties of nicotine and the resultant withdrawal symptoms of many of those who quit is important also for physicians to be able to provide the most helpful advice to their patients.

Jaffe (52) has described the withdrawal syndrome that can follow smoking cessation: "The most consistent signs and symptoms (in addition to a 'craving' for tobacco, which subsides over a period of days to weeks) are irritability, anxiety, restlessness, and difficulty in concentrating. Drowsiness, headaches, increased appetite, sleep disturbances (insomnia), and gastrointestinal complaints are also common." These symptoms occur usually within the first 24 hours after quitting and are temporary. Increased appetite and decreased concentration appear to persist the longest, with some patients complaining that they last for months (52). The possibility of gaining

weight appears to be a primary excuse given by smokers who refuse to quit. However, physicians can advise patients how to modify food consumption to avoid or reduce weight gain. Physicians should emphasize that weight gain is common but not inevitable; the gain is due principally to increased appetite and food intake, which can be prevented or kept to a minimum; and the gain is usually not permanent. It can be helpful for smokers to realize that the craving for cigarettes often is highest in the evening, subsiding in the morning and that—unlike withdrawal from opioids—cutting down gradually may extend the withdrawal syndrome (52). Although the syndrome differs greatly from person to person, "there is some evidence that a higher intake of nicotine is associated with more severe withdrawal" (52).

Drug Therapy

Drugs, the mainstay of many early smoking cessation attempts, have been used for two purposes—to help overcome the smoking habit and to help overcome withdrawal symptoms. In the first category three types of products have been used: deterrents, vegetable-base products, and substitutes. Smoking deterrents (such as astringent mouthwashes prepared mainly from silver nitrate, copper sulfate, or potassium permanganate) and vegetable-base products have not been widely used, and their efficacy is doubtful (7).

The first drug used commonly as a substitute was lobeline sulphate. Bernstein (34) reports a 1955 trial using 2 mg of lobeline and 100 mg of fast- and slow-acting antacids that produced a quit rate of 80%. Later studies, however, found that lobeline was not an effective smoking deterrent. Although sometimes successful in the short term, long-term results were disappointing. For example, in 1960 Ejrup (35) reported an initial quit rate of 60%, but with 70% of subjects relapsing within 1 year, for an abstinence rate of only 18% at 1 year. Lobeline is no more effective than a placebo (20), probably due to the fact that it cannot mimic the full range of pharmacologic actions of nicotine (7).

It is speculated that only nicotine, delivered independently of cigarettes, can replace cigarette smoking (7). In 1981, Malotte and associates (18) reported a 72% quit rate using nicotine gum, decreasing to 23% abstinence at 1 year. The Food and Drug Administration (FDA) last year approved for marketing a gum containing 2 mg of nicotine bound to an ion-exchange resin, and Merrell Dow Pharmaceuticals (Cincinnati, Ohio) began selling Nicorette in March 1984. The nicotine is released during chewing and absorbed through the buccal mucosa.

For approval the FDA required two adequate and well-controlled prospective studies showing a statistically significant difference between users and nonusers of the gum. It has been argued that this requirement "allows considerable room for judgment as to what constitutes 'adequate'" (53) and that these studies did not adequately document Nicorette's benefits (53, 54). Although the gum has been used for 15 years in Sweden (and for a shorter time in Germany, Austria, England, Ireland, and Canada), there are few data on its long-term

safety (54) and some considerations about its short-term safety in the general population. Because chewing the gum can cause "release of catecholamines and the expected cardiovascular effects, the drug is contraindicated or must be used with caution in patients with recent myocardial infarction, serious arrhythmias, or vasospastic disease" (52). Merrell Dow lists the following contraindications: pregnancy, lactation, recent myocardial infarction, arrhythmias, severe angina, and temporal mandibular joint disease. In addition there may be certain complications in persons with peptic ulcer and cardiovascular diseases, hypertension, insulin-dependent diabetes, and hyperthyroidism (3). Some common side effects include hiccoughs, nausea, and vomiting. Also reported are some instances of dependence on the gum (52).

Questions remain also about the degree to which there is any placebo component to the gum and whether it offers any greater efficacy than education and counseling. A 1983 study, not relied on by the FDA, compared nicotine gum with a placebo gum and found that nicotine gum produced a 48% abstinence rate at 6 months, decreasing to 30% at 1 year, compared with 20% abstinence at both times for the placebo gum (10). This study also compared the effectiveness of the gum plus counseling and the use of gum without counseling; results show that the gum was not effective without counseling (10, 53). A subcommittee of the Research Committee of the British Thoracic Society found that oral advice when reinforced by a pamphlet and either nicotine or placebo gum "did not produce greater success than verbal advice given alone" (54). Both of the studies upon which the FDA approval is based combined the use of nicotine gum with extensive counseling (53).

It has been concluded that "long term cessation may require extended maintenance procedures and/or an identification of optimal gum use" (10). Indeed, Merrell Dow (3) recommends that the gum be used "as a temporary aid to the cigarette smoker seeking to give up his or her smoking habit while participating in a behavior modification program under medical supervision" and "placebo-controlled, double-blind studies show nicotine gum to be effective in suppressing withdrawal symptoms (e.g., irritability, anxiety, difficulty concentrating, restlessness, impatience, drowsiness)."

Many drugs other than nicotine have been tried to ease the physiological and psychological withdrawal symptoms of cigarette smoking, but none have been found useful. These drugs have included amphetamine, benzedrine sulphate, methylphenidate, fenfluramine, diazepam, phenobarbital, hydroxyzine, and meprobamate (34, 55).

In conclusion, drug therapy has not been found useful in smoking cessation efforts. Some promise has been shown for nicotine gum as a substitute for smoking and, in conjunction with other therapies, as an aid to overcome withdrawal symptoms. Despite the general wisdom of not treating a drug habit with other addictive drugs (or, in this case, with the same drug in another form), further research may be warranted on Nicorette, particularly on its long-term safety and on optimal protocols for its dose, duration, and gradual withdrawal (3, 53, 54).

Behavior Modification

Cessation of smoking via various behavior modification techniques can be effected through educational courses, programs sponsored by professional or government organizations, commercial ventures, or physician counseling. The most successful programs combine various techniques, which can be divided into three basic categories: self-management, contingency management, and aversive conditioning.

The most widely used self-management technique is self-control, which consists of recording one's smoking habits, becoming aware of the environment and the cues preceding the smoking response, and breaking cue-elicited smoking patterns. Self-monitoring, the first component of self-control, is used widely in behavior management programs. It has become clear that "when an individual begins paying unusually close attention to one aspect of his behavior, it is likely to change" (7). However, an interesting result reported by Moss and associates (56) is that self-monitoring may increase drop-out rates for smoking cessation programs. These authors found drop-out rates of 40% and 60% for groups being treated with self-monitoring requirements compared with 10% for control groups without self-monitoring requirements. Stimulus control—the other component of self-control—is predicated on the "behavioral conception of smoking as a habit formed and maintained by a complex process of conditioning" (57). Stimulus control often emphasizes gradual reduction, not cessation of smoking. Thus, many self-control procedures combine self-monitoring with stimulus control or other behavior modifications, including contingency management. Contingency management attempts to obviate the goals of the smoker while enhancing motivation through commitment. Two common forms are partially refundable monetary deposits and contracts for self-reward and punishment.

There are a number of good self-help guides. The best known among these guides are the "Self-Testing Kit" (58) distributed by the Office on Smoking and Health; the American Lung Association's "A Lifetime of Freedom from Smoking" (59); the "Quit for Good" pamphlet (60) distributed by the National Cancer Institute; and the American Cancer Society's "I Quit Kit" (61). Glasgow and colleagues (62) compared self-administered and therapist-administered programs based on two self-help behavior therapy books (*Become an Ex-smoker* by Danaher and Lichtenstein [63] and *Break the Smoking Habit: A Behavioral Program For Giving Up Cigarettes* by Pomerleau and Pomerleau [64]) with self-administered and therapist-administered programs based on the American Cancer Society's kit. Glasgow and colleagues (62) found that under self-administered conditions, the American Cancer Society's program was "at least as effective" as behavior therapy books and that therapist contact was associated, on self-reports, with improved treatment outcome after use of the books but not for the American Cancer Society's program. These authors conclude that a two-stage process be used for smoking cessation, "starting with a self-administered program and followed, if

necessary, by behavior therapy administered by a therapist" (62). This recommendation is in accord with much of the research about smoking cessation, which suggests a need for education to help maintain the cessation produced by any single technique or combination of methods.

Aversive conditioning is based on two assumptions: "that the reinforcing aspects of almost any stimulus are reduced and may actually become aversive if that stimulus is presented at sufficiently elevated frequency or intensity and . . . that aversion based upon stimulus intrinsic to . . . smoking is more salient and generalized than that stemming from artificial sources" (65). There are generally five types of aversive behavior modification: electroshock; sensory deprivation; satiation; warm, smoky air; and rapid smoking. A sixth technique—covert sensitization, which asks a smoker to imagine he is receiving noxious stimulation while associating cigarettes with aversive thoughts—usually results in reduction of smoking, rather than abstinence (7), and is not reviewed in this statement.

Electroshock, although not widely used and studied, has been proved largely ineffective when used alone as a smoking cessation technique; there are some indications of its usefulness in the initial phase of a multi-treatment effort (66). Sensory deprivation is "an attitude change technique" (7) in which a person remains in bed in a dark, silent room for about 24 hours, sometimes hearing periodic messages on the dangers of cigarette smoking. Although a major review of smoking control methods published in 1978 called sensory deprivation "an excellent tool for producing changes of attitude and behavior . . . with effectiveness . . . in reducing smoking or causing cessation (that) justifies further study" (7), there are few studies of this technique.

Contingency management, aversive conditioning, and electroshock are closely related. Satiation treatments require that the smoker double or triple his or her ordinary amount of smoking in a short time period (usually 20 to 45 minutes). The technique using warm, smoky air consists of blowing air into a smoker's face while he or she smokes. Rapid smoking requires the smoker to inhale rapidly, perhaps once every 6 seconds, for the duration of the cigarette or until nauseated. All these methods have some inherent dangers, particularly for patients with coronary artery disease, including hypoxemia, increases in heart rate and blood pressure, and possible nicotine poisoning. However, Schwartz and Rider (7), while cautioning prudence with the use of rapid smoking, cite a number of studies that report rapid smoking and similar techniques are not "unduly hazardous to nonsymptomatic, young adults" (7, 67, 68; Hynd GW, Severson HH, O'Neal M. Cardiovascular stress during the rapid-smoking procedure. University of Northern Colorado. Unpublished manuscript, 1975; Shewchuk LA, Ruf J. The effect of rapid smoking on the cardiovascular system. American Health Foundation, New York. Unpublished manuscript, 1975).

When rapid smoking can be used, it appears to be a most promising technique (7, 13, 14, 65). Bernstein and

McAlister (65), reviewing the technique as reported through 1976, called rapid smoking "a powerful initial abstinence technique when combined with social support and positive expectations." In one study (13) done in 1980 comparing rapid smoking with regular-paced aversive smoking, rapid smoking was found to produce a 56% quit rate, declining to a 38% abstinence rate at 6 months; it was hypothesized that higher rates would have been achieved with more personal contact. Another 1980 study indicates promising results for a variation of rapid smoking, reciprocal aversion, in which each member of a partnership is required to smoke a cigarette every time the other does; for the six couples who participated, there was a 74% reduction in smoking at the end of treatment and 61% 6 months later (14).

Certain methods can eliminate smoking in the short term, and other methods seem to produce better long-term results; the most promising research in behavior modification combines various techniques. Delahunt and Curran (36) studied aversive techniques, self-control procedures, and a combination of both, finding a 22% success rate at 6 months for each technique alone compared with 56% success for the combination. In one study, Lando (37) reported a 76% abstinence rate at 6 months for subjects using satiation, 48 hours of rapid smoking upon any relapse, and contracted self-reward or punishment. In 1982 Lando (19) compared three techniques, used singly and in combination with one another: stimulus control (combined with educational material from the American Lung Association), rapid smoking (25 minutes of continuous smoking), and maintenance programs (based on self-rewards and punishments and 48 hours of rapid smoking used as "booster treatment"). Quit rates of 70% to 100% (for therapy combining stimulus control and maintenance) were reported, with 1-year abstinence rates ranging from 14% to 50% (19). The 50% abstinence rate was reported for a treatment plan combining all three techniques, leading Lando to conclude that "multistage treatment [is] consistently superior to single stage treatment" (19).

In summary, behavior modification can be used as a successful smoking cessation method. The key appears to be determining the person's reasons for smoking and motivations for quitting in order to develop individualized plans combining self-management, contingency management, and aversive behavior techniques. In general, aversive measures produce greater initial quit rates whereas management techniques complement aversive and other methods to achieve long-term maintenance of smoking cessation.

Education

Education, although strictly speaking not a smoking cessation method by itself, often is used in combination with behavior modification and other methods, particularly as part of a maintenance program. The Department of Health and Human Services has an Office on Smoking and Health (originally the National Clearinghouse for Smoking and Health) that provides educational materials. The American Cancer Society, American Lung Asso-

ciation, and American Heart Association have abundant educational materials they make available to antismoking programs.

Use of educational materials is based on the assumption that knowledge about the health effects of smoking can play an important role in motivating people to cease smoking. It is known that more public education is needed. Smoking, which causes about 300 000 deaths each year in the United States, is implicated as responsible for approximately one third of all deaths from coronary disease and an equal percentage of all cancer deaths, and three quarters of all deaths from chronic lung disease (69). Yet many people are unaware of these facts: a survey by the Federal Trade Commission found that half the respondents did not know that smoking causes most cases of lung cancer and two thirds did not identify smoking as a cause of heart attacks (70). In addition, the immediate and long-term health benefits of quitting smoking are known. These benefits include an increase in life expectancy; increase in lung capacity; normal sense of taste and smell; decrease in heart attack and high blood pressure; and elimination of a "smoker's cough" (47).

Because physicians must deal with the consequences of smoking, it is appropriate that they be part of a comprehensive program aimed at preventing the onset of smoking and facilitating cessation (71). Ockene and Ockene (71) suggest nine strategies a physician can use to assist patients to stop smoking. The physician must have the proper attitude and expectations; personalize the risk of smoking to the patient; stress the value of cessation; foster the smoker's belief in his or her ability to stop; urge smokers to stop smoking; use self-control strategies; forewarn smokers about the problems of cessation; use maintenance efforts; and help the person who can't stop.

The focus and content of educational materials are crucial. A review of methods that used fear-arousing education found that although fear facilitates persuasion, strengthens the intention to quit smoking, and even can cause reductions in smoking levels, it does not lead to quitting (7, 72). Focusing on the positive reasons for not smoking (such as better health and appearance, and financial savings) appears, however, to be a strong motivator leading to quitting. One thousand patients at an anti-smoking clinic in Warsaw, Poland, were randomized into five groups receiving either fear-arousing education, drug therapy, electroshock, education about the positive reasons for not smoking, or psychological techniques such as role-playing. Abstinence rates at 3 months were 7%, 14%, 21%, 62%, and 63%, respectively (11). Discussions of the physical effects of smoking should focus on the benefits to be gained from stopping.

Education is a key component of most programs sponsored by private organizations, religious groups, worksite clinics, and commercial firms. The American Cancer Society sponsors educationally oriented smoking clinics that use printed materials and films. These materials depict the stages of quitting and describe habit formation, motivation, health habits, stress smoking, reasons for not smoking, ability to listen, reinforcement, and the powers of advertising; all of these topics are designed to stimulate

group discussions (7). In 1977 the American Cancer Society claimed quit rates ranging from 25% to 35% at 1 year, increasing to as much as 50% when there is ongoing maintenance (7).

The American Health Foundation, a New York-based preventive medicine center, began a smoking cessation program in 1972 and by 1977 had treated over 5000 smokers with various educational approaches. Shewchuk and associates (38) reported a study with 520 participants who chose group counseling, individual counseling, or self-hypnosis in one session. Quit rates were 49%, 33%, and 38%, respectively, declining to 21%, 19%, and 17% at 1 year (38).

The Kaiser Foundation Health Plan conducted the Smoking Control Research Project from 1964 to 1968, and in 1970 started the Stop Smoking Clinic, an educational group relying on group counseling led by ex-smokers. The course runs 8 weeks and consists of 13 90-minute sessions. The early sessions are designed to help smokers prepare for quitting, and later sessions discuss self-management, addiction, and assertiveness training. Clinic officials reported an abstinence rate at 6 months of 25% in 1972, improving to a 55% rate for 1973 to 1975 (7). A 1979 study of 1128 subjects reported an abstinence rate at 1 year of 47% (39).

The Five-Day Plan, which has been used by many organizations, was originally developed by the Seventh-Day Adventist Church. It consists of five consecutive sessions (of 90 minutes or 2 hours), during which the physiologic effects of smoking are discussed. Cessation is begun at the first session, participants are required to forego coffee, tea, cola, and alcohol, and are encouraged to exercise, eat balanced diets, and force fluids. The director of the International Five-Day Plan in 1974 reported abstinence at the program end to be 70% (7). There have not been many independent assessments of the plan, providing follow-up abstinence rates.

Worksite smoking cessation clinics have attracted attention recently. Employers have begun noticing statistics such as those reported by Fielding (26): "smokers average two to three more days of absenteeism and a two-fold increment in work accidents yearly, and estimated \$190 per year in excess medical costs over a lifetime." Worksite programs often include, in addition to education, prohibitions on smoking in certain places and financial bonuses to employees who quit smoking.

Hospitals are thought to be especially promising sites for such clinics, partially because during hospitalization "patients are away from their usual environments and are more aware of the health implications of smoking" (29). Programs designed for patients may prove equally or more successful, however, with employees. The New England Deaconess Hospital, Boston, initiated a smoking cessation policy that reduced smoking among both employees and patients. The policy included establishment of nonsmoking areas throughout the hospital, banning the sale of cigarettes in the hospital, publicity about the health effects of smoking, and educational clinics. Twenty months after initiation of the policy 93% of nonsmokers and 83% of smokers approved the policy, and 26% of

smokers quit successfully (73). Dawley and associates (29) report an abstinence rate of 53% at 6 months for a small smoking cessation program conducted at a Veterans Administration hospital; all abstainers were employees. In addition to educational materials, the program used self-assessment and contingency management incentives during the ten 1-hour group sessions.

Stachnik and Stoffelmayr (25) report abstinence rates at 6 months of 81% to 95% for programs conducted at offices of a bank headquarters, a hospital service firm, and a manufacturing company. The 7-month program, which included monetary incentives and contracts, was based primarily on group meetings. Between 47% and 70% of smokers in each setting enrolled in the program, leading the researchers to conclude that "programs that appeal to all smokers in an organization, not just those who have stated an interest in achieving cessation, will attract a high percentage of smokers and assist an unusually high number to achieve and maintain abstinence" (25).

Perhaps the most publicized efforts using education—as well as other methods—are the commercial programs. These programs are difficult to assess because of the paucity of unbiased data; a few reports exist in the medical literature, and are summarized below.

The first commercial program in the United States was Smoke Watchers, which is based on gradual withdrawal and weekly goals assigned by a leader at group meetings and uses a book, published by Smoke Watchers, that discusses the smoking habit. Schwartz and Rider (7) report one independent evaluation of this program, which found a 45% quit rate, with follow-up abstinence rates ranging from 25% to 38% at different Smoke Watcher sites.

SmokEnders, the most widespread smoking cessation program, uses a highly structured program of education and positive reinforcement. The program consists of nine weekly meetings, using various self-management behavior modification techniques and education about smoking cessation. SmokEnders claim that 78% of participants complete the course (12% drop out during the first 5 weeks, before cessation is implemented) and that 89% of those who respond to follow-up at time periods from 3 months to 1 year remain abstinent (7; Rogers J. Personal communication). Kanzler and associates (74) have evaluated this method and, extrapolating from the sample of successful graduates they were able to contact, reported a 4-year abstinence rate of 39%. Interestingly, although women joined the program in greater numbers and were equally as successful as male participants at initial quit rates (70%), only 30% of the women graduates were still abstinent at the time of the study—compared with 57% of the male graduates.

The Schick method, developed at Shadel Hospital, Seattle, combines various aversive conditioning (shock treatments, satiation, and rapid smoking) with a maintenance program, composed of print and film educational material on nutrition, weight control, relaxation techniques, aerobic exercise, behavior modification, and goal achievement. The Schick staff has reported 1-year abstinence rates of 53% for 17 000 registrants from 1970

through 1973 and 57% for 518 persons who took the course between mid-1973 and mid-1976 and were located for follow-up (7; Schick Smoking Control Centers and Schick Laboratories. Personal communication).

Baseline data indicate a quit rate of 32% to 40% for the Smoke Stoppers program, which relies on education, desensitization, and behavior modification, and consists of four 90-minute sessions during 1 week. Kramer (27) did a follow-up study to determine the program's effectiveness and to identify characteristics of persons who remained abstinent. It was found that persons who stopped smoking "had attended significantly more classes and had a greater proclivity to gain weight than those who resumed smoking. . . . Characteristics not significantly correlated with success were age, education, number of attempts to stop smoking, total life stressors, moral support for quitting, companions with whom participants attended classes, number of cigarettes smoked, number of years smoking has continued, and reduced fees" (27).

Most of the other commercial programs follow an educational approach, combining print and film information with individual or group counseling by ex-smokers and behavior modification techniques developed by researchers.

Hypnosis

Reports regarding the effectiveness of hypnosis as a smoking cessation tool are contradictory, ranging from quit rates of a very low 4% to a very high 88% at 6 months (20, 21). Reasons for this wide range of success include various factors differentiating types of persons undergoing hypnosis and various kinds of hypnosis therapies. Additionally, the reporting of abstinence rates by hypnotherapists may be biased (75), and other methodologic weaknesses evident. Nevertheless, data show that, for some patients, hypnosis can be an effective smoking cessation method or a valuable adjunct to other methods. For example, Nuland and Field (40), in a study of 97 smokers, claim a 25% success rate at 6 months. In a second group of 84 smokers with whom they tried hypnosis and additional procedures such as mediation, self-hypnosis, and maintaining contact by telephone, they found a 60% abstinence rate after 6 months (40). Similarly, a 1977 study (76) found an 84% abstinence rate at the end of treatment with mutual group hypnosis and 68% of former smokers still abstinent at 10 months. In 1979 Grosz (4) reported a success rate of 59% (for men) and 58% (for women) 1 month after hypnosis therapy declining to 31% and 34%, respectively, at 6-month follow-up. Critical factors affecting success include the motivation of the subject and the type of hypnosis, including number of treatments, and individualization of suggestions.

Spiegel has found that patients who can be hypnotized easily have very high immediate quitting rates but also high rates of recidivism, and persons with low transcapacity (hypnotic induction profile) have lower rates of initial quitting and also lower rates of recidivism (Spiegel H. Personal communication). West (77) reports that about 10% of subjects can achieve a deep hypnotic trance

and that about 90% of these people will be able to abstain from smoking for 1 year; 5% of the 10% population who cannot be hypnotized will be able to quit through hypnosis. Further, 40% of the 50% of subjects who fall into a light trance can quit, and 70% of those who can be hypnotized into a moderate depth can succeed in quitting (7, 77).

A major factor is the number of hypnotic sessions needed for effective therapy. Hall and Crasilneck (78) report 66% abstinence (calculated from the 82% of patients who completed a follow-up check) for patients treated with three daily hypnotic sessions and a fourth nonhypnotic session 1 month later. Six years later good results were also reported with a study involving four hypnotic sessions (7). A study of 60 patients treated in sessions totaling 12 hours reported an 88% abstinence rate at 1 year (42). The researcher concluded that longer-term group therapy in which hypnosis is used "first to intensify deprivation behavior and then . . . to reduce the psycho-physiological manifestation of deprivation" produces significantly better results in smoking control than does individual hypnotherapy (42).

In contrast, a 1975 study using a single-session hypnosis treatment resulted in only a 16% to 19% abstinence rate at 8 to 12 months follow-up (7). Single-session treatment that includes self-hypnosis, which can be used as additional treatments or for maintenance, appears to be more effective. Spiegel (75, 79) reports a study of 615 smokers treated with a single 45-minute session of psychotherapy reinforced by hypnosis. At 6-month follow-up, 121 subjects (45% of the 271 respondents to a follow-up questionnaire and 20% of total subjects) were still abstaining. An additional 120 persons had reduced their smoking (75, 79). A later follow-up found 35% subjects abstinent at 1 year (7, 80).

Successful hypnosis programs need to include, in addition to several hours of treatment, supportive therapists, motivated clients, and—most importantly—individualized hypnotic suggestions (28). Nuland and Field (40) concurred that the individualized aspect of their treatment accounted for better results. Another review of hypnosis studies concluded that more than 50% of smokers remain abstinent at 6 months "in programs in which there were several hours of treatment, intense interpersonal interaction, suggestions capitalizing on specific motivations of individual patients, and adjunctive or follow-up contact" (21).

There are some hypotheses about why hypnosis succeeds. Orne (81), in his review of the literature on smoking and hypnosis, emphasized that hypnosis "is not a potent means of controlling behavior but is uniquely effective in helping individuals do what they want." Rabkin and associates (82) hypothesize that "[a]n individual who wishes to give up smoking may be helped by hypnosis because of the possibility that in a hypnotic trance, suggestion may change unconscious forces which are operative in maintaining the addictive nature of the smoking." Thus, in evaluating hypnosis as a treatment for smokers, physicians should consider the smoker's motivation and the type of hypnosis program being offered,

specifically whether it provides several hours of treatment, individualized suggestions, and follow-up contact.

Acupuncture

Although there is great interest in acupuncture as a smoking cessation method, there is little data on it in the scientific literature, and this data is further limited by the weaknesses of the studies, primarily regarding the lack of follow-up data. Acupuncture's effectiveness appears to be greatest as an adjunctive therapy, used in conjunction with other techniques.

The most promising report (42) on acupuncture did not report long-term results. This 1976 report from France found a 64% quit rate after one acupuncture treatment was found, rising to 78% (of 100 patients) after several treatments (42). The form of acupuncture studied consisted of needles being implanted in points on the surface of the nose to "decongest" the respiratory tract and generate a feeling of disgust toward tobacco; as such, it may be similar to aversive conditioning. Auriculopuncture, which is said to result in regulation of the neurovegetative system, was reported to produce an approximate 50% quit rate.

A 1979 study (83) reported that expectation for acupuncture to succeed has an effect on outcome. Fifty subjects, divided equally into high-expectancy and low-expectancy groups, received two weekly 20-minute acupuncture sessions. There were no statistical differences between the two groups regarding the number of persons who quit smoking, but the gains made by the high-expectancy group were more prolonged, suggesting that acupuncture may be more successful for those patients who believe in it.

An Australian study (15) found that acupuncture helped reduce the effects of smoking withdrawal and supported other smoking cessation treatments. Of 194 patients, 95% quit smoking after three acupuncture treatments, gradually decreasing to a 34% abstinence rate at 12 months and 30% at 24 months. Eighty-five percent of the patients reported that acupuncture had eased the symptoms of smoking withdrawal. In another report of the same study (23), the researchers concluded that acupuncture offers only temporary relief; then personal motivation must take over.

Multiple Risk Factor Reduction Programs

Statistics from 1975 list atherosclerotic cardiovascular disease as the leading cause of death in the United States, with cardiovascular diseases responsible for one million deaths each year, 600 000 of them due to coronary heart disease (2). Cigarette smoking is a major risk factor linked with the development of atherosclerotic cardiovascular disease. The fact that cigarette smoking acts both independently and synergistically with other major risks—notably high cholesterol and hypertension—has led to its inclusion in research trials to study the multiple risk factor phenomena (7, 20).

Although results of these trials sometimes are reported in terms of reduced smoking rates rather than cessation of smoking, the success rates appear to be promising (7,

8, 18, 43, 44). For example, about 50% of cigarette smokers who remained in the 7-year Coronary Prevention Evaluation Program of Chicago stopped smoking cigarettes or switched to pipes or cigars (7). Hymowitz and colleagues (8) have reviewed findings from recently completed prospective clinical trials for the prevention of heart disease and report abstinence rates of 30% after 5 years (Oslo Study), 50% after 3 years (for the intensive intervention group in the Stanford Program), and 55% (for the Randomized Trial of Antismoking Advice in London).

At the Center for Health Enhancement, Education, and Research (established in 1978 by the University of California, Los Angeles), all participants who smoke cigarettes have been encouraged to attend the smoking cessation program, which uses a behavioral self-management approach. Six 1-hour sessions are held, presenting the smoking cessation curriculum in three stages: preparing to quit, quitting, and maintenance of nonsmoking. In 1981 72% of the 43 smokers in the first 13 cohorts (which ranged in size from 17 to 25 participants) were abstinent at discharge, with a 53% abstinence rate at 6 months for the first 9 cohorts (18).

The North Karelia Project is a national pilot program launched in 1971 in Finland with the main objective of reducing mortality from cardiovascular diseases; an intermediate objective is the reduction of known cardiovascular risk factors, including smoking. The antismoking program includes systematic health education, maintaining a nonsmoking environment, and organizing systematic smoking cessation activities. A preliminary evaluation indicated that at course completion, 63% of the subjects stopped smoking; a 6-month follow-up showed a 38% success rate (43). This success rate resulted in a reduction in the percentage of male smokers, on whom special emphasis was placed, from 54% to 44% of the population (46); by 1977, it was 43% of the population. The proportion of female smokers did not change from the pre-survey level of 12% (46).

The largest preventive trial involving the reduction of cigarette smoking is the Multiple Risk Factor Intervention Trial (MRFIT) initiated in 1972 by the National Heart, Lung, and Blood Institute. In each city included in the project, about 20 000 men were screened for combinations of risk factors for cardiovascular diseases. About 300 men in each city were selected and randomized into either the usual care group or the intervention group. Antismoking therapy for the intervention group included 8 to 10 weeks of educational group sessions and individual treatment. After 6 years, close to 50% of the special intervention group who reported smoking at the start of the trial reported not smoking, and 56% of special intervention participants who quit smoking by the end of the initial 10-week program never relapsed through the first 4 years of the trial (44, 45).

It is important to analyze the variables that helped produce long-term cessation rates in preventive trials to determine if they can be incorporated into smoking cessation programs. These variables are hypothesized to include intensive and consistent follow-up, periodic medi-

cal evaluation, and emphasis on health enhancement. Participants in preventive trials thus are "better able to personalize the risk that smoking presents, to be more aware of the potential benefits of stopping, and to appreciate better the concept of disease prevention" (20).

Conclusion

Cigarette smokers can quit, and their physicians can be of tremendous assistance and support in their efforts. A variety of methods and programs exist for the potential former smoker, and it is often best to combine a number of methods for an individualized program. Some of the most successful "programs" are those conducted largely by the individual, motivated to quit because of increasing awareness of the risks of smoking and the benefits of stopping. Such awareness can be fostered by familial or societal pressures, or by example and educational counseling by physicians. The fact remains that despite the vast array of smoking cessation programs and methods, most people who have quit have done so largely on their own (7, 77, 79). All persons who wish to quit, whether involved in a formal program or on their own, can benefit from some assistance, such as education presented in lay literature or as part of professional counseling, self-help guides, and more structured educational programs.

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