

School-Based Approaches to Drug Abuse Prevention: Evidence for Effectiveness and Suggestions for Determining Cost-Effectiveness

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INTRODUCTION

Considerable effort has been expended over the past two decades to understand the causes of drug abuse and to identify effective prevention strategies. Much of this work has taken place in school settings, mainly because schools provide easy access to large numbers of individuals judged to be the primary target population for prevention efforts. They also provide a reasonably suitable environment for conducting prevention research studies. Despite their traditional educational mission, schools have been increasingly directed by State and local governments to assume responsibility for addressing an array of social and health problems. While not enthusiastic about mandates that some may see as distracting schools from their primary mission, many educators have a growing recognition that problems such as drug abuse are a significant barrier to achieving basic educational objectives. On a Federal level, for example, the U.S. Department of Education has included drug-free and safe schools as one of its goals for improving the quality of education in this country.

Although the focus of this monograph is on the important issue of cost-effectiveness as it relates to drug abuse prevention, a necessary precondition for a meaningful discussion of cost-effectiveness is the existence of evidence concerning the effectiveness of existing approaches to drug abuse prevention. This chapter will briefly review the evidence for the effectiveness of contemporary school-based drug abuse prevention programs. By and large this research literature and the authors' review focus on microlevel interventions targeting individuals. Not discussed in this chapter are macrolevel efforts such

as those relating to legislation or policy changes. The authors also offer some suggestions concerning how cost-effectiveness might be determined with respect to school-based drug abuse prevention.

CLASSIFICATION OF PREVENTION APPROACHES

A wide range of prevention approaches has been developed and conducted in school settings over the past few decades. While schools and the communities within which they are located have long been concerned about the problem of tobacco, alcohol, marijuana, and other forms of drug abuse, the passage of the 1986 Drug-Free Schools and Communities Act by the U.S. Congress served as a major stimulus for schools to adopt drug abuse prevention programs. However, despite the proliferation of prevention programs, they mainly represent different permutations of only a few different prevention models. Most of these prevention approaches have never been properly evaluated in their current forms and are of questionable effectiveness. Some were based on prevention approaches that previous research has consistently demonstrated to be ineffective. Some were grounded in theory; most, however, were not. Notwithstanding these limitations of school-based prevention programs, there is a considerable body of high-quality research demonstrating the effectiveness of prevention approaches that are theoretically based, are well conceptualized, and have been subjected to extensive evaluation over the past 15 years. Following similar classification schemes used in prior reviews of the prevention literature (e.g., Botvin and Botvin 1992; Dielman 1994; Ellickson 1993; Hansen 1992; Perry and Kelder 1992), contemporary school-based prevention has been divided into four general categories: (1) information dissemination approaches, (2) affective education approaches, (3) social influence approaches, and (4) comprehensive or expanded social influences approaches, which include the teaching of generic skills training. In view of the evidence from past research studies, previous literature reviews, and the results of meta-analyses, the primary focus of this chapter will be on the last two categories of prevention approaches, since they provide the strongest results both in terms of methodological rigor and impact on drug use behavior. However, before discussing these approaches, the findings of studies evaluating information dissemination and affective education approaches will be briefly summarized.

Information Dissemination Approaches

Growing out of an educational tradition, the most common approach to drug abuse prevention found in most schools has had a singular focus, that is, providing information about drugs and the consequences of drug abuse. The focus of tobacco, alcohol, and drug education programs (as they are frequently called by school personnel) involves factual information about the adverse health, social, and legal consequences of drug use without providing any skill training relevant to drug prevention. Fear arousal strategies are frequently incorporated into these programs in an effort to dramatize the deleterious effects of drug use and motivate (i.e., scare) adolescents into remaining abstinent. Other topics usually covered in informational programs include patterns of drug use, the pharmacology of various drugs of abuse, and methods of using drugs. While most programs have a distinctly antidrug use orientation, some programs endeavor to present the facts in a balanced and neutral manner. Such approaches to the problem of drug abuse rest on an implicit assumption that drug use and even drug abuse are the end result of a logical decisionmaking process. It is further assumed that if adolescents were better informed about the dangers of using drugs they would make a rational and informed decision to remain drug free. There are several inherent dangers in programs that simply present the facts. These programs may be ineffective because they are based on a faulty conceptualization of the causes of drug use and/or abuse, adolescents may be unable to easily weigh the pros and cons of using drugs, discussions of drug pharmacology may arouse curiosity, and providing information on how drug addicts use drugs may be giving program participants more information about using drugs than about not using them.

To increase the credibility of the antidrug message and to make programs more relevant, many schools recruit community leaders, law enforcement officers, or health professionals to administer part of the prevention program. For example, some programs have police officers come into the classroom and discuss law enforcement issues including drug-related crimes and penalties for buying or possessing illegal drugs. Other programs have used doctors or nurses to talk about the adverse health effects of using drugs. Still others invite former drug addicts into the classroom to discuss the problems they have encountered as the result of drug abuse.

According to previous reviews of the drug abuse prevention literature (Botvin and Botvin 1992; Dielman 1994; Dryfoos 1993; Ellickson

1993) and the results of meta-analytic studies (e.g., Bangert-Drowns 1988; Tobler 1986), evaluation studies have consistently shown that prevention approaches that rely exclusively or primarily on the information dissemination model do not prevent, reduce, or deter drug use. Although virtually all information-based prevention programs are able to demonstrate an increase in knowledge, and some studies have demonstrated an impact on attitudes in a direction consistent with nondrug use, there is little evidence indicating that they can have any meaningful impact on drug use behavior. The results of these studies should not be taken to mean that knowledge or information does not have a role in prevention programs. Rather, they underscore the fact that there are multiple factors promoting adolescent drug use and that prevention approaches based on more complex models of drug initiation are required in order for prevention efforts to be effective.

Affective Education Approaches

During the 1970s, the nature of drug education began to change in some quarters. This change grew out of a dissatisfaction with the information approach and a recognition that some individuals were more likely to become involved with drugs than others. While drug education efforts based on teaching facts focused largely on drugs and their effects, affective education involved a change in perspective and focus from drugs to the psychosocial needs of the individual. Implicit in the affective education model of drug initiation was the underlying belief that individuals with a certain constellation of characteristics were at risk for becoming drug users and that the solution was to be found in programs promoting affective development. In contrast to information-based approaches, affective education emphasizes personal and social development in order to either overcome personal deficiencies believed to increase risk for using drugs or provide individuals with characteristics hypothesized to be associated with decreased risk of using drugs such as high self-esteem, personal insight, and self-awareness. Thus, the emphasis is on the affective rather than the cognitive.

An interesting feature of affective education is that it was more comprehensive than information dissemination approaches and recognized the role of psychosocial factors in the etiology of drug abuse. It also foreshadowed the expanded social skills training approach to drug abuse prevention, which has demonstrated significant reductions in both the incidence and prevalence of drug use. For example, components of affective education approaches

that are used in some of the most successful prevention programs include decisionmaking, effective communication, and assertiveness. However, studies evaluating the effectiveness of affective education have produced disappointing results. Some affective education approaches have demonstrated an impact on one or more of the correlates of drug use, while others have not produced the expected effects on drug-related variables. More important, they have not demonstrated an impact on drug use itself (Kearney and Hines 1980; Kim 1988).

Despite several strengths (i.e., emphasis on psychosocial variables and a more comprehensive intervention approach), the affective education model has several major weaknesses. These include a focus on a narrow and incomplete set of etiologic determinants, the use of ineffective methods to achieve their stated program goals (such as the use of experiential games and classroom activities rather than skills training methods), a lack of domain-specific information related to drug abuse, and the inclusion of “responsible use” norm-setting messages that may be counterproductive (Botvin 1995*a, b*).

Social Influence Approaches

In response to the disappointing findings of studies testing the effectiveness of information dissemination and affective education approaches to prevention, researchers began testing a prevention model based in social psychology. From this perspective, adolescent cigarette smoking, for example, was conceptualized as being the result of social influences (persuasive messages) from peers and the media in the form of peer offers to smoke cigarettes, of advertising appeals, or of exposure to smokers who may serve as role models for these students.

The prevention approaches based on this model have typically contained two or more of the following components: psychological inoculation, correcting normative expectations, and resistance skills training. Early research with approaches based on this model emphasized psychological inoculation and modifying normative expectations. More recent approaches have tested variations on this model, emphasizing resistance skills training. Some approaches have added other components such as having students make a public commitment not to use drugs.

For the most part, the various permutations of the social influence model are similar in that they are based on social cognitive theory

(Bandura 1977) and a conceptual model that stresses the fundamental importance of social factors in promoting the initiation of adolescent drug use. Although this model includes social influences coming from the family, peers, and the media, the focus of most preventive interventions is on the last two of these, with the primary emphasis being placed on peer influences.

Psychological Inoculation. Social psychological research in persuasive communications (McGuire 1964, 1968) led prevention researchers (Evans 1976; Evans et al. 1978) to attempt to prevent cigarette smoking by “psychologically inoculating” adolescents against prosmoking messages coming from their social environment. These messages were conceptualized as the equivalent of “germs” with the potential for infecting adolescents with prosmoking attitudes. In order to build up resistance to these germs, adolescents were exposed initially to weaker forms of these messages and then to gradually stronger prosmoking messages.

Adolescents were trained in critical techniques to refute these prosmoking messages. These techniques included recognizing a persuasive prosmoking message, analyzing the message and its source, and developing tactics for coping with these situations. For example, adolescents are taught skills for dealing with situations involving an offer by a peer to smoke cigarettes. It was hypothesized that, by being prepared for the situation and having a counterargument ready before the offer is made, the adolescent would be better able to resist the pressure to try a cigarette. Although this foreshadowed the use of refusal skills, it focused more on cognitions and attitudes with little or no focus on skills training. Thus, the primary goal of this prevention approach was to prepare adolescents for eventual exposure to persuasive prosmoking influences from peers and/or the media.

Correcting Normative Expectations. A second component of social influence approaches to drug abuse prevention was based on a social psychological principle called the “false consensus effect” (Ross et al. 1977). The false consensus effect helps explain the observation that adolescents who believe that cigarette smoking is a behavior that nearly everyone engages in are more likely to smoke cigarettes. Providing students with accurate information about the actual smoking rates or having them conduct their own survey to discover the information themselves alters their perceptions of smoking norms.

Resistance Skills Training. The third major component of social influence approaches, which has become a central feature of such

approaches over the past decade, is to provide adolescents with the skills needed to identify and resist common social influences to use drugs—influences coming from the media and especially influences from peers. However, an important difference in these approaches is the focus on teaching students the skills needed to resist these influences.

The resistance skills dealing with the media are intended to make students aware of the media influences they will be exposed to, with a particular emphasis on the techniques used by advertisers to influence consumer behavior. Students are taught to recognize advertising appeals designed to sell tobacco products or alcoholic beverages as well as how to formulate counterarguments to those appeals. Resistance skills are also taught to combat both subtle and more direct (and at times coercive) pressure from peers to smoke, drink, or use illicit drugs. These skills typically include refusal skills, which are a subset of general assertive skills. Using behavioral training techniques, skills for refusing offers to use drugs are modeled and practiced in the classroom. Students are taught to identify high-risk situations (such as parties or hanging around after school) where they are the most likely to experience peer pressure to smoke cigarettes, drink, or use illicit drugs. They are shown how to handle these situations through a repertoire of verbal (refusal) responses. They are also taught how to use these verbal responses in an effective (assertive) manner (i.e., with an appropriate tone of voice, making eye contact, using “I” statements, maintaining an assertive body position, speaking clearly and confidently).

TARGET POPULATION AND PROGRAM PROVIDERS

The target population for most of the research conducted with resistance skills training approaches has been middle school or junior high school students (grades six to nine). Some studies have targeted younger populations, such as fourth or fifth graders (Flynn et al. 1992). The length of prevention approaches based on the resistance skills training model has ranged from as few as 3 or 4 sessions to as many as 11 or 12 sessions conducted over a 2-year period. Different types of program providers have also been used in various research studies. Some programs have been implemented by research staff members, others have been implemented by regular classroom teachers.

Many prevention programs teaching resistance skills have done so with the assistance of peer leaders serving as program providers.

These students are either older (e.g., 7th graders may be taught by 9th or 10th graders) or the same age as the students participating in the prevention program. A common argument for using peer leaders as program providers is that they have greater credibility with junior high school age students with respect to lifestyle issues than do adults, since adolescence is a time characterized by some degree of rebellion against parents and other adult authority figures. In addition to providing students with information concerning rates of drug use and skills for resisting offers to use drugs, a potentially powerful benefit of peer leader programs is that they may help alter school norms regarding drug use and its social acceptability. To the extent that peer leaders are viewed by students as being credible sources of information and influential role models who do not regard drug use as being socially acceptable, peer-led prevention programs may have an important impact on normative beliefs supportive of nondrug use.

EFFECTIVENESS

After more than 15 years, there is an impressive literature of studies testing interventions based on the social influence approach. These studies have been published in high-quality peer-reviewed journals and have documented its effectiveness in both small- and large-scale studies (Arkin et al. 1981; Donaldson et al. 1994; Ellickson and Bell 1990; Hurd et al. 1980; Luepker et al. 1983; Pentz et al. 1989*a, b*; Perry et al. 1983; Snow et al. 1992; Sussman et al. 1993; Telch et al. 1982). The focus of most of these studies has been on smoking prevention with some studies reporting results in terms of smoking onset (preventing the transition from nonsmoking to smoking), others reporting results in terms of overall smoking prevalence, and still others reporting results with respect to an index measure or scale of smoking involvement.

Although there is considerable variability across studies in terms of methods and the magnitude of effects, these studies have generally indicated that this type of prevention approach is capable of reducing drug use by 30 to 50 percent after the initial intervention (based on a comparison of the proportion of smokers in the experimental group with the proportion of smokers in the control group). Studies reporting results in terms of smoking incidence have shown reductions ranging from approximately 30 to 40 percent (comparing the proportion of new smokers in the experimental group with the proportion of new smokers in the control group). Several studies have demonstrated reductions in the overall prevalence of cigarette smoking in terms of both occasional smoking (one or more cigarettes

per month) and/or regular smoking (one or more cigarettes per week). Those reductions have ranged from approximately 40 to 50 percent. Although there are fewer studies assessing the impact of social influence approaches to substances other than tobacco, such as for alcohol or marijuana use (Donaldson et al. 1994; Ellickson and Bell 1990; McAlister et al. 1980; Pentz et al. 1989*a*; Shope et al. 1992), the magnitude of the reductions reported has generally been similar to that found for smoking.

Over the years, several followup studies have been published that report positive behavior effects lasting for up to 3 years (Luepker et al. 1983; MacKinnon et al. 1991; McAlister et al. 1980; Pentz et al. 1989*b*; Shope et al. 1992; Sussman et al. 1993; Telch et al. 1982). However, data from several longer term followup studies have shown that these effects gradually decay over time (Bell et al. 1993; Ellickson et al. 1993; Flay et al. 1989; Murray et al. 1988), suggesting the need for ongoing intervention or booster sessions. Because little is known about the nature and timing of booster interventions, additional research is needed. Also, because relatively little research has been conducted with substances other than tobacco, data concerning the durability of prevention effects on other substances are not available.

The studies testing social influence approaches have been similar in most respects. There are, nonetheless, some differences. In order to gain a better understanding of the underlying mechanism of these programs, and to develop more effective interventions, the various intervention components of these programs deserve closer scrutiny. A common component of several resistance skills training approaches has been a procedure through which individuals make a public commitment not to smoke, drink, or use drugs. However, a study by Hurd and colleagues (Hurd et al. 1980) suggests that this component may not contribute to any observed prevention effects. Another common component is the use of videotaped or filmed prevention materials similar to those utilized by Evans and colleagues (Evans et al. 1978). Still, it is not yet clear what type of media material is the most effective or the extent to which it is a necessary component of these prevention programs. Similarly, little is known about the optimal time of intervention (age or grade level), program length, program structure, type of provider, type of booster intervention and its timing, or the characteristics of the individuals who are the most affected by these interventions.

Finally, nearly all of the studies testing resistance skills training approaches have used peer leaders. Moreover, some studies have

attempted to determine the effectiveness of peer leaders relative to other program providers. By and large, the existing evidence supports the use of peer leaders for this type of prevention approach (Arkin et al. 1981; Perry et al. 1983). Yet it is not altogether clear from the available evidence that peer leaders are either necessary or better than other providers. More work is necessary to determine the most appropriate kind of program provider and the optimal mix of responsibilities between adult and peer providers.

INTEGRATED SOCIAL INFLUENCE/COMPETENCE ENHANCEMENT APPROACHES

The underlying conceptual framework for social approaches is that adolescents begin to smoke, drink, or use drugs either because they succumb to the persuasive messages targeted at them or because they lack the necessary skills to resist social influences to use drugs. Although social influence approaches are important because they recognize the role social factors play in the etiology of drug abuse, they have been criticized because they do not pay sufficient attention to the intrapersonal factors involved in the etiology of drug use and abuse (Botvin and Botvin 1992). More comprehensive than either informational or affective education approaches, they still may be based on an understanding of drug abuse etiology that is too narrow and fails to fully appreciate the array of etiologic factors not subsumed under the social influence model. These approaches also largely ignore the fact that there may be multiple developmental pathways leading to drug abuse. While it may be the case that social influences may be the most potent factors promoting drug use for some individuals, intrapersonal factors may be more important for others. For example, using drugs may not be a simple matter of yielding to peer pressure for some adolescents, but it may be instrumental in helping them deal with anxiety, low self-esteem, or a lack of comfort in social situations. To the extent that this is correct, prevention approaches need to go beyond the social influences model to interventions, which are broader based and more comprehensive.

Studies concerning the etiology of tobacco, alcohol, and drug use indicate that a variety of cognitive, attitudinal, social, personality, pharmacological, and developmental factors promote and help maintain drug use (Baumrind and Moselle 1985; Blum and Richards 1979; Jessor and Jessor 1977; Jones and Battjes 1985; Kandel 1978; Meyer and Mirin 1979; Newcomb and Bentler 1988; Wechsler 1976). It therefore seems logical to conclude that the most effective

prevention strategy would be one that is comprehensive, targeting a broad array of etiologic determinants.

Research has been conducted over more than 15 years with broader based prevention approaches that emphasize the teaching of generic personal and social skills either alone (Caplan et al. 1992) or in combination with components from the social influence model (Botvin et al. 1980, 1983, 1984*a, b*, 1990*b*; Gilchrist and Schinke 1983; Schinke and Gilchrist 1983, 1984). This type of prevention strategy is more comprehensive than traditional cognitive/affective approaches or social influence training approaches. Moreover, unlike affective education approaches, which rely on experiential classroom activities, these approaches emphasize the use of proven cognitive-behavioral skills training methods.

The theoretical foundation for these approaches is Bandura's social cognitive theory (Bandura 1977) and Jessor's problem behavior theory (Jessor and Jessor 1977). Drug abuse is conceptualized as a socially learned and functional behavior, which is the result of the interplay between social (interpersonal) and personal (intrapersonal) factors. Drug use behavior is learned through a process of modeling/imitation and reinforcement and is influenced by an adolescent's cognitions, attitudes, and beliefs.

Although these approaches have several features that they share with social influence approaches, a distinctive feature of these approaches is an emphasis on the teaching of generic personal self-management skills and social skills. These skills are taught in a systematic fashion using a combination of instruction and demonstration, feedback, reinforcement, behavioral rehearsal (in-class practice) and extended (out-of-class) practice through behavioral homework assignments.

Examples of the skills typically included in this prevention approach are decisionmaking and problemsolving skills, cognitive skills for resisting interpersonal and media influences, skills for enhancing self-esteem (goal setting and self-directed behavior change techniques), adaptive coping strategies for dealing with stress and anxiety, general social skills (complimenting, conversational skills, and skills for forming new friendships), and general assertive skills (requests and refusals). Most variations on this prevention approach teach generic skills along with their application to situations related directly to tobacco, alcohol, or drug use. An added benefit of this type of program is that it teaches students a repertoire of generic skills that can be used to deal with many of the challenges confronting adolescents in their everyday lives.

The purpose of programs based on this model is to provide students with the kind of generic skills for coping with life that will have broad application. This contrasts markedly with social influence approaches that focus exclusively on information and skills relating to the problem of drug abuse. Although the problem-specific social influence approaches are most easily contrasted with the generic skills training model, the most effective approaches appear to be ones that integrate features of both. In fact, there is some evidence to suggest that generic skills training or competence enhancement approaches are not effective unless they also contain domain-specific material (Caplan et al. 1992).

TARGET POPULATION AND PROVIDERS

The target population for most of the studies conducted with the personal and social skills training approach has been middle school and junior high school students. The vast majority of published studies have involved students who were in the seventh grade during the first year of intervention. Multiyear studies and followup studies have involved students during the 8th and 9th grades, and some more recent studies have followed students up to the 12th grade (Botvin et al. 1995*a, b*). On the other end of the age spectrum, very little work has been done with younger populations, although some studies have been conducted with sixth graders (Kreutter et al. 1991). The reason for this is that researchers have generally avoided younger populations because of the difficulty in demonstrating statistically significant behavioral effects because the base rates of drug use are too low.

Most of the studies conducted with approaches that emphasize the teaching of personal self-management skills and generic social skills have been implemented with adults as the primary program provider. In many cases these adults were regular classroom teachers; in some cases they were outside health professionals (i.e., members of the research project staff). Some studies used college students as program providers, while others used either same age or older peer leaders. Peer leaders, when used, frequently had clearly delineated responsibilities and worked under the direction and supervision of an adult primary provider. Some studies have actually used peer leaders who had sole responsibility for conducting these interventions and who did so on their own and without the help of adult providers. Studies testing this prevention strategy have shown that it can be

successfully implemented by peer leaders, outside health professionals, and teachers.

EFFECTIVENESS

The effectiveness of the expanded social influence/competence enhancement approaches has been tested in a number of research studies, from small studies involving a few schools to large-scale, randomized clinical trials. These studies have consistently demonstrated behavioral effects as well as effects on hypothesized mediating variables. Importantly, the magnitude of reported effects of these approaches has typically been relatively large. These studies have generally produced 40 to 80 percent reductions in drug use behavior. One criticism of contemporary prevention programs is that even though they have been able to demonstrate impressive reductions in the incidence and prevalence of drug use behavior, these reductions have generally occurred with respect to experimental or occasional use. Although it is important to demonstrate reductions in the early stages of drug use, critics argue that what matters most is demonstrating reductions in more frequent levels of use—i.e., the kind of regular use that eventuates in addictive or compulsive patterns of use. Data from two studies of a prevention program called Life Skills Training (LST) deal directly with this issue by demonstrating reductions of 56 to 67 percent in the proportion of pretest nonsmokers becoming regular smokers 1 year after the conclusion of the prevention program without any additional booster sessions (Botvin and Eng 1982; Botvin et al. 1983). For those students receiving booster sessions, these reductions have been as high as 87 percent (Botvin et al. 1983). Equally important is the finding from several studies that produced initial reductions of 50 percent or more for regular cigarette smoking (Botvin and Eng 1982; Botvin et al. 1983, 1990b).

Another important issue concerns the durability of prevention effects. Long-term followup data from a large-scale randomized trial involving students from 56 schools in New York State found reductions in smoking, alcohol, and marijuana use 6 years after the initial baseline assessment (Botvin et al. 1995a). The magnitude of these reductions ranged up to 44 percent in drug use and 66 percent in polydrug use (defined as adolescents who used all three gateway substances during the past week).

Results of studies utilizing generic skills training approaches such as the LST program have also demonstrated an impact on other forms

of drug use. Several studies have demonstrated an impact on the use of alcohol (Botvin et al. 1984*a, b*, 1990*a*, 1994*b*) and marijuana (Botvin et al. 1984*a, b*, 1990*b*, 1995*a, b*). These reductions have generally been of a magnitude equal to that found with cigarette smoking.

A gap in the drug abuse prevention field that has only recently begun to be addressed concerns the lack of high-quality research with racial/ethnic minority populations. Although there are only limited data concerning the etiology of drug abuse among minority populations, existing evidence suggests that there is substantial overlap in the factors promoting and maintaining drug use/abuse among different racial/ethnic groups (Botvin et al. 1993*a, b*, 1994*b*; Dusenbury et al. 1992).

Research has shown that the LST approach is effective in preventing cigarette smoking with Hispanic youth (Botvin et al. 1989, 1992) and African-American youth (Botvin and Cardwell 1992). Followup data with Hispanic youth have demonstrated the continued presence of prevention effects through to the end of the 10th grade (Botvin 1994). Although most of the research with minority populations has focused on smoking prevention, some recent evidence indicates that it may also be effective in reducing alcohol and marijuana use (Botvin et al. 1994*a*, 1995*b*) and that tailoring the intervention to the target population can enhance its effectiveness (Botvin et al. 1995*b*).

ASSESSING COST-BENEFIT AND COST-EFFECTIVENESS

Economic Assessments of Program Impact

In general, most economic assessments in the healthcare field utilize cost-effectiveness rather than cost-benefit analyses. The difference between these two techniques is that cost-effectiveness studies report outcomes in noneconomic units, whereas cost-benefit analyses monetize outcomes and as a result focus only on those types of outcomes that can be readily expressed in dollars. The broader outcome scope of cost-effectiveness studies is believed to be more amenable to capturing the full scope of clinical benefits (Russell 1986; Weinstein and Stasson 1977). Critics of the use of cost-benefit analysis point to the following drawbacks associated with its use. It does not account for pain and suffering; its valuation of human life based on a person's labor market earnings is open to biases due to race- and sex-related discrimination in the marketplace; and it

overlooks issues regarding the equitable distribution of benefits among the various groups in society (Scheffler and Parringer 1980; Sindelar 1991).

Nevertheless, when done well cost-benefit analysis aids in the complete enumeration of costs and benefits as well as in the explicit consideration of assumptions and underlying quantitative benefits (Swint and Nelson 1977). In the authors' opinion it should be used as a key measure of an intervention's success.

The authors' suggested emphasis on cost-benefit analysis is based on two considerations. First, noneconomic benefits normally highlighted in a cost-effectiveness study are usually included in traditional program evaluations. Second, the results of a cost-effectiveness analysis do not directly reflect on the economic gain; rather, they indicate the cost to attain important life enhancing, quality-of-life, or psychosocial gains. The results of a cost-benefit analysis explicitly indicate whether costs are being recouped (Eisenberg 1989; French 1993). Without advocating that cost recovery should be the sole criterion upon which policy is set, it is desirable to know if the value of the economic benefits exceeds the costs incurred. Cost-benefit studies provide this type of information.

Evaluating an Intervention's Economic Impact: A Cost-Benefit Approach

This methodology entails comparing the incremental (marginal) cost of the intervention with the savings achieved through a different overall resource utilization pattern associated with participation in the study

intervention. Represented in simplified equation form, program benefits (savings) are defined as follows:

$$B = MCC_c - MCC_i$$

where

B = discounted (i.e., constant dollar) program benefits

MCC_c = discounted expenditures of clients in the control group

MCC_i = discounted expenditures of clients in the intervention group

Overall program benefit is estimated by the use of either of two statistics: a benefit-cost ratio (B/C) and net present value (NPV). Representing program cost (in constant dollars) by C, the benefit-cost ratio is the value obtained by dividing benefits by costs. If this quotient exceeds 1, benefits exceed costs; a value less than 1 indicates that costs exceed benefits; and a value of 1 indicates that benefits equal costs. As the B/C does not indicate the actual magnitude of the savings, an NPV statistic should also be reported. NPV is calculated by subtracting C from B (i.e., $NPV = B - C$), and it indicates the actual amount saved.

As interventions span multiyear periods, all costs should be discounted to a base-year period. A 5 percent discount rate is traditionally used; alternate rates are then used as part of the sensitivity analysis.

Two types of cost savings should be included in the benefit calculations: savings arising from reduced direct costs and savings arising from reduced indirect costs. The analysis should adopt a societal perspective, recognizing all relevant direct and indirect costs incurred by patients and their families in the intervention and control groups (Eisenberg 1989).

Direct costs are usually divided into three categories: the first focuses on medical care costs; the second on costs arising from criminal activity, violence, and accidents; and the third on community-based social services. Criminal activity, violence, and accident-associated costs, although not emphasized in traditional cost-of-illness studies, are a major component of the expected benefits in the substance abuse area as previously noted. These activities have also been recognized in other studies (Apsler and Harding 1991; French 1993; Goldsmidt 1976; Hayashida et al. 1989; Plotnick 1994; Saxe et al. 1983; Walsh et al. 1991). Indirect costs consist of any out-of-pocket costs incurred by the patient and her/his family in connection with participating in the intervention, lost earnings due to absence from work, and other productivity losses related to restricted activity days.

A third cost category, informal care, can also be included. Informal care refers to unpaid assistance given by friends and/or relatives.

Evaluating the Intervention's Economic Impact: A Cost-Effectiveness Approach

Each project traditionally evaluates its impact in noneconomic terms. These outcome measures can then be combined with estimates of program cost to derive a cost-effectiveness measure. Investigators in each project should select the most important single evaluation statistic to be compared to cost. If a single statistic is inadequate to capture the full scope of the intervention's accomplishments, then a tabular-display approach will be used (Doherty and Hicks 1977). Under this approach all outcome and cost measures form rows in a cost-outcome table and the experimental and control groups constitute the columns in the table. The reader can thus see the costs associated with each array of outcomes. If all of the study outcomes are superior for one group, then cost-effectiveness assessment is straightforward. If the direction of outcome measures differs across groups, the study investigators subjectively value the outcomes and offer their assessment of the overall cost-effectiveness of the intervention. Under this approach the reader is free to adopt a different valuation scheme and reach her/his own conclusion.

SUMMARY AND CONCLUSIONS

This chapter has briefly summarized the major work conducted over the past 15 years in school-based approaches to drug abuse prevention. During this time, it has become clear that some of the most widely used prevention approaches are ineffective and many other approaches are untested. Notable among those approaches found ineffective are traditional prevention approaches that rely on teaching information concerning the adverse consequences of drug abuse and affective education. Other research has demonstrated the efficacy of prevention approaches that focus on psychosocial factors associated with drug use initiation and/or drug abuse. These approaches emphasize the teaching of social resistance skills and correcting normative expectations. Some of the most effective approaches also include the teaching of generic personal and social skills. Studies testing the efficacy of these approaches have shown that they are capable of reducing drug use for up to 6 years. Although most of this research has been conducted with white youth, evidence from several studies also shows that these approaches are effective

with inner-city, minority youth. However, beyond the issue of effectiveness are the related issues of cost-effectiveness and cost-benefits, which are the subject of this monograph. Other chapters have addressed these issues in more detail; this chapter provides a brief discussion concerning how the cost-effectiveness and cost-benefit of school-based drug abuse prevention programs may be determined.

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