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Preventing Substance Abuse: The State of the Art

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SYNOPSIS ....

While drug abuse among adolescents and young adults has begun to decline from the epidemic levels of the late 1970s, it remains a serious national health problem.

Much information from research suggests that young people at the junior and senior high school levels are the most vulnerable to the social pressures that lead to experimental and then regular use of psychoactive substances. Well-designed prevention programs for youngsters in these age groups have the potential to prevent the onset and development of regular drug use.

Primary prevention strategies developed over the past two decades—media campaigns, school drug education programs, and "generic" programs—are reviewed, and evaluative research is discussed. The authors describe two additional prevention approaches—the "macro" approach (creating a climate of nondrug use) and positive peer pressure strategies—for which early data suggest genuine promise for the future.

D RUG ABUSE, particularly among adolescents and young adults—though beginning to recede from the epidemic levels observed in the late 1970s—remains a serious national health problem (1, 2). This con-

clusion is based upon data from epidemiologic surveys of drug use patterns supported by the National Institute on Drug Abuse.

One such survey—a national survey of high school seniors conducted by the Institute for Social Research, University of Michigan—has been implemented yearly, since 1975, under the direction of Dr. Lloyd Johnston (3). Information is gathered both on usage patterns and on attitudes toward the use of a number of drugs. This survey indicated a marked increase in drug usage by high school seniors each year until a peak was reached in 1978. Since then, a moderate tapering off has occurred.

In 1978, 37.1 percent of high school seniors described themselves as "currently using" marijuana (that is, they had used the drug within the 30-day period preceding the survey interview). Alcohol was the only drug more widely employed; 72.1 percent of high school seniors reported current use. Tobacco (in cigarettes) was used by 36.7 percent of the students, while the next most widely used category of drugs was stimulants, used by 8.7 percent. The statistic of greatest concern was the large number of "daily users" of marijuana (students who had used the drug 20 or more times in the month preceding the survey interview). In 1978, 10.7 percent of high school seniors reported "daily use" of marijuana, averaging between two and three joints per day.

Since 1978 there has been a statistically significant decline in the usage of marijuana and cigarettes by high school seniors (see table). The most significant decrease has been in the percentage of students who are daily users of marijuana, which has declined progressively from 10.7 percent in 1978 to 6.3 percent in 1982. While there has been a striking decrease since 1978 in the percentage of students who are daily users of cigarettes (from 27.5 percent in 1978 to 21.1 percent in 1982), there was a slight increase in this percentage between 1981 and 1982 (from 20.3 percent to 21.2 percent). The percentage of students who are daily users of alcohol appears to have returned to the 1978 level—5.7 percent—from a high of 6.9 percent in 1979.

These data document the continuing seriousness of the drug abuse problem and have prompted the National Institute on Drug Abuse to develop a strong research program on prevention of drug abuse by adolescents.

There is a great deal of data suggesting that young people at the junior and senior high school levels are the most vulnerable to the social pressures that lead to experimental and then regular use of psychoactive substances (alcohol, cigarettes, marijuana, pills). Well-designed prevention programs for youngsters in these age groups have the potential to prevent the onset and development of regular drug use.

The immediate and long-range health and social consequences of drug usage by these young people are of the utmost concern. The effect of marijuana,

Use of drugs by high school seniors, 1975–82

Substance	Ever used [1] (percent): Class of—								Daily users [2] (percent): Class of—							
	'75	'76	'77	'78	'79	'80	'81	'82	'75	'76	'77	'78	'79	'80	'81	'82
Marijuana	47	53	56	59	60	60	60	59	6	8	9	10.7	10.3	9.1	7	6.3
Inhalants	NA	10	11	12	13	12	12	13	NA	0.0	0.0	0.1	0.0	0.1	0.1	0.1
Amyl and butyl nitrites [3]	NA	NA	NA	NA	11	11	10	10	NA	NA	NA	NA	0.0	0.1	0.1	0.0
Hallucinogens	16	15	14	14	14	13	13	13	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
LSD	11	11	10	10	10	9	10	10	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
PCP [3]	NA	NA	NA	NA	13	10	8	6	NA	NA	NA	NA	0.1	0.1	0.1	0.1
Cocaine	9	10	11	13	15	16	17	16	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.2
Heroin	2	2	2	2	1	1	1	1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other opiates	9	10	10	10	10	10	10	10	0.1	0.1	0.2	0.1	0.0	0.1	0.1	0.1
Stimulants	22	23	23	23	24	26	32	36	0.5	0.4	0.5	0.5	0.6	0.7	1.2	1.1
Sedatives	18	18	17	16	15	15	16	15	0.3	0.2	0.2	0.2	0.1	0.2	0.2	0.2
Barbiturates	17	16	16	14	12	11	11	10	0.1	0.1	0.2	0.1	0.0	0.1	0.1	0.1
Methaqualone	8	8	9	8	8	10	11	11	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Tranquilizers	17	17	18	17	16	15	15	14	0.1	0.2	0.3	0.1	0.1	0.1	0.1	0.1
Alcohol	90	92	93	93	93	93	93	93	5.7	5.6	6.1	5.7	6.9	6.0	6.0	5.7
Cigarettes	74	75	76	75	74	71	71	70	26.9	28.8	28.8	27.5	25.4	21.3	20.3	21.1

[1] Ever used: used 1 or more times.
[2] Daily users: used 20 or more times in the month before survey.
[3] Separate questions about the use of PCP and amyl and butyl nitrites were not asked until 1979.
NOTE: These numbers were gathered in annual nationwide surveys conducted for the National Institute on Drug Abuse by the University of Michigan Institute for Social Research. The 8 surveys involved more than 100,000 high school seniors from public and private schools. NA indicates data not available.
SOURCE: National Institute on Drug Abuse.

in particular, on developing reproductive systems, as well as upon cognitive and emotional development in adolescents, is a serious hazard (4). When we stop to contemplate the fact that some 6 to 10 percent of high school seniors may be intoxicated every day, we must be distressed by the huge human waste involved. The effects of marijuana clearly preclude the capacity to learn and develop normally; the long-range costs to this nation are staggering. In addition, the patterns of psychoactive substance usage established in youth are carried forward, producing health and social costs for years to come. The data available suggest that the younger a child is when he or she begins to become involved with drugs on a regular basis, the more likely he or she is to develop serious problems related to drug usage (5).

Review of Prevention Strategies

At this point, let us summarize the various approaches to prevention that have evolved over the past two decades. For the sake of completeness, recognition must be given to the fact that the drug treatment network that has been developed in the United States is, in its conceptualization, in part a preventive network (6). Contributing to the thinking that led to development of this treatment network was an epidemiologic view of heroin abuse—a view that compares the spread of heroin usage to the spread of infectious diseases. From an epidemiologic perspective, it is theorized that the drug addict entices others to use drugs (heroin) and hence contributes to the increase in drug usage (7). The term "heroin epidemic" has been used frequently since the 1960s and indicates the acceptance of epidemiologic concepts with respect to drug abuse. And so the establishment of a treatment network in which addicts would be treated and removed from a position of creating increased heroin use could be viewed as one means of prevention.

Another important area often conceptualized as prevention is that which comprises the many outreach and early intervention programs—often directed at school populations—in which young people who manifest troublesome behavior and are suspected of drug usage are provided a variety of counseling, educational, and alternative experiences (8,9). However, extensive evaluation research has not been undertaken to determine the specific level of effectiveness of these various strategies.

Often, the criminal justice system has been used as a referral source for young delinquents who are

'There is a great deal of data suggesting that young people at the junior and senior high school levels are the most vulnerable to the social pressures that lead to experimental and then regular use of psychoactive substances . . .'

then exposed to early prevention programs. Although these programs are thought to have obvious value to troubled youth, they need to be assessed more carefully.

Primary prevention. In this paper we will focus on primary prevention, or those activities concerned with prevention of the onset and regularization of drug abuse by youth.

Media campaigns. One of the first approaches to prevention was development of public information and media campaigns. In the late 1960s and early 1970s, these efforts attempted to impress upon the populace the harmful effects of drugs; however, Federal leaders later thought that many of these efforts were counterproductive. The campaigns sometimes unrealistically exaggerated the harmful effects of drugs and thereby created a credibility gap. In fact, there was a concern in the White House that in some ways these campaigns may have been stimulating drug usage and contributing to polarization between the establishment, on the one hand, and youth and the pro-drug-use counterculture, on the other (10). In 1973, because of the potentially negative effects of media campaigns, a moratorium was imposed and special guidelines were established by the White House (Special Action Office for Drug Abuse Prevention) for the development of drug prevention campaigns and materials (10). This office concluded that the problem was not in the use of public information campaigns in themselves, but rather in the way in which the public information campaigns were designed and in the types of information transmitted. The primary importance of maintaining credibility was emphasized.

School programs. Another related approach has been the development of drug information and education programs for use in the schools. The quality of the evaluations of these programs has varied considerably, and the data we do have are not very

> '*Another very promising approach to changing the climate of drug usage is collaboration among parents who are concerned about their children's drug usage and who see that schools and other community agencies can be vehicles for change.*'

promising (*11*). A number of studies have suggested that though students in these programs do acquire more information about drugs, the programs do not have consistently positive effects on student attitudes toward drug usage or on actual use patterns (*12*). In certain subgroups, students actually seemed to have increased likelihood of drug usage after exposure to drug education programs (*13,14*). It has been argued that exposing children who have high anxiety levels regarding drugs to drug education programs may alleviate this anxiety and unwittingly promote drug use (*15*).

The prevailing impression of researchers in the field is that, on balance, drug information curriculums in the schools have had little or no discernible effect on intentions to use drugs and actual drug-using behavior. However, there are data suggesting that this may not be a valid generalization (*3*). The National Institute on Drug Abuse's survey of high school seniors indicates that an increase among adolescents in health concerns related to drugs has been accompanied by a decrease in drug use. This suggests that the efficacy of drug information programs may depend on the actual nature of the information and the context in which it is communicated.

There is reason to believe that many drug information programs have communicated information in a way that did not have much impact on the audience.

The smoking prevention techniques that will be discussed in more detail later indicate that smoking by adolescents can be prevented by the combination of communicating to youth the short-term social and health consequences of smoking and teaching them the social skills to say no to the offer of cigarettes by their peers.

The generic approach. A third significant approach to prevention, developed in the 1970s, evolved from humanistic educational techniques and has been described as a generic approach to drug abuse prevention (*16*).

Generic prevention programs are generally classified as either "affective education" or "alternatives." The rationale for these programs is fairly straightforward. Correlate research indicates that several behavioral, personality, and lifestyle risk factors—such as school failure, delinquent behavior, low self-esteem, a high degree of sensation seeking, and aggression (*17–19*)—are associated with drug abuse.

Researchers who have conducted studies of the antecedents of drug use behaviors have generally concluded that students who develop problems related to drug usage tend to have lower self-esteem, have greater evidence of alienation from their parents and from society in general, have deficits in interpersonal skills, and tend to have negative attitudes toward authority. The generic prevention programs have been designed to overcome some of the general problems of youth, with respect to their orientation to authority, their social interaction, and their self-esteem, without focusing directly on drug use per se. The hope was that these programs would then produce a substantial decrease in drug use as well as other problem behaviors.

The National Institute on Drug Abuse for a number of years has funded studies designed to determine whether generic prevention programs have had the desired effects at the individual, school, or community level. Research has shown that the efficacy of these programs has been somewhat disappointing.

One study of significance is Dusewicz and Martin's evaluation (*20*) of the State of Georgia's Life Skills for Mental Health Program, which was developed as a primary prevention program for alcohol and drug abuse by the prevention unit of the Division of Mental Health and Mental Retardation. This program was created in conjunction with the Georgia State Department of Education and implemented in cooperation with community mental health centers throughout the State. Consultative and educational staff from these centers trained school personnel in the development and implementation of the program's curriculum in selected school districts. The teachers in the schools were taught to work with children to increase basic intra- and interpersonal skills of importance in handling stress, making decisions, and developing satisfying and effective interpersonal relations. After carefully evaluating the results of the program, Dusewicz and Martin concluded that there had been a decrease in disruptive behavior and an increase in positive teacher and student affective

behavior, but that the program had had little effect on self-concept, interpersonal skills, classroom climate, and self-reported drug or alcohol use or related attitudes toward drugs and alcohol.

A second very important study was carried out in Napa, California. The principal investigator was Dr. Eric Schaps, who, in a well-controlled replication study in a matched random sample of schools and classrooms, tested affective education, alternatives, and drug education strategies. This recently completed study indicates certain observations that provide guidance for further action (21–26). The affective education theory and strategies that were being tested are quite well-known and generally accepted by those in the prevention field.

The Napa experiment tested seven prevention strategies, including four in-service teacher training programs, two alternatives programs, and an innovative drug education course (27). The strategies were:

• Magic Circle—provided to third and fourth graders via their teachers;
• Effective Classroom Management (ECM)—Elementary—delivered to fourth, fifth, and sixth graders via their teachers;
• Effective Classroom Management (ECM)—Junior High—delivered to seventh, eighth, and ninth graders via their teachers;
• Jigsaw—delivered to fourth, fifth, and sixth graders via their teachers;
• Cross-Age Tutoring—offered to eighth and ninth graders by project staff and school personnel;
• Operating a School Store—offered to eighth and ninth graders by project staff and school personnel;
• Drug Education—provided to seventh and eighth graders by project staff.

Approximately 6,000 students were involved in a series of outcome studies and schoolwide drug use surveys administered annually. Research focused upon the effects of individual strategies and certain combinations administered over multiple years. Outcome variables included drug knowledge, attitudes, intentions to use, and self-reported use levels. Other theoretically relevant variables, such as measures of school environment and student achievement, were also assessed.

Final analysis of the data indicates that only the drug education course produced some positive, short-term effects, but only with seventh grade girls. The results tend to support the growing consensus that nondrug-specific affective education approaches

'At this point, positive peer pressure strategies are developing into a well-researched technology that can have marked impact on the initiation and regularization of drug usage by adolescents.'

are not sufficient to prevent the onset of drug use by youth.

Indeed, the investigators collected very good process evaluation data to determine how well the curriculums were administered. They found that the teachers who were trained in these techniques were very interested in and enthusiastic about their training and about changing their classroom management; nevertheless, the extent of actual teacher behavior change in the classroom was less than had been anticipated.

The drug education course, which stressed communications skills, decision making, the analysis of advertising, and the pharmacology of drugs did produce limited positive effects on seventh grade girls. Program effects included positive change in drug knowledge and perception of peer attitudes toward soft drugs, as well as lower involvement with alcohol and marijuana usage. However, two replications of the same research paradigms with comparable Napa school populations did not reproduce these results, nor were these effects demonstrated in followup studies 1 year after the program experience.

In essence, the Napa experiment corroborates the conclusion that both generic prevention programs and certain information programs have little or no effect in producing desired changes in attitudes toward drugs and in actual drug usage patterns.

Outlook for the Future

Despite the data that have been summarized here, there is a more positive side to prevention research. At present, there are two prevention approaches that show genuine promise and for which there are at least early data suggesting that this promise can be realized.

The "macro" approach. The first of these approaches can be considered a "macro" approach to prevention, to emphasize its focus on the entire environ-

ment in which a child is living. To use the terminology that is now used in the tobacco smoking reduction field, it is essentially an effort to create a climate of nondrug use. Those interested in preventing cigarette smoking strongly suggest creating a climate of nonsmoking, rather than a climate of acceptance or tolerance for smoking. In fact, there is evidence to suggest that this strategy has had a great effect on smoking behavior by lowering per capita cigarette consumption (28) and decreasing the percentage of young people who begin regular cigarette smoking.

Increasingly, the National Institute on Drug Abuse is turning its attention toward efforts to create a community climate of nondrug use. This can be done in a number of ways. One technique is a public information campaign that not only communicates, in a straightforward way, the adverse effects of drugs but also utilizes what we know of the motivation for drug usage and attempts to counter these motivating factors. But beyond public information campaigns, NIDA is attempting to offset pro-drug messages that appear in the media. For example, the Institute is collaborating with the Scott Newman Foundation in the development of the Scott Newman award for television writers who create television shows that convey a strong drug prevention theme. In fact, the foundation will be awarded an "Emmy" this year for its distinguished contributions to broadcasting.

Another very promising approach to changing the climate of drug usage is collaboration among parents who are concerned about their children's drug usage and who see that schools and other community agencies can be vehicles for change. Concerned parents are working extensively to create community-wide concern about the extent of the drug usage problem and its adverse consequences and to establish parent groups to prevent drug abuse. At this point, there are several thousand organized groups of parents who are working actively in their communities to ban "head shops" and to promote various ways to counter the effect on their children of what they have come to call "do drugs" messages. The focus of their work is to create a climate in which children are getting "don't do drugs" messages from parents, schools, media, and the community at large. Most importantly, this movement is demonstrating to parents that they can and should become actively involved in preventing drug use by their own children and their children's community of friends.

Perhaps the first and most well-known of these attempts began in Atlanta, Ga. (29). As a result of development of a strong working relationship between the Unified Parents Groups of Atlanta and Northside High School's principal, the school initiated steps to tighten school discipline, particularly as it related to drug use infractions, and to raise educational standards. The parents credit this working relationship with a complete turnaround in student attitudes and behavior. Manatt (29) reported that within 3 years there was a dramatic reduction in drug and alcohol use on the school campus, a significant rise in Scholastic Aptitude Test (SAT) scores and math and reading skills, increased enrollment in advanced science and foreign language courses, and more student participation in athletic and extracurricular activities. In the beginning, however, these parents and the principal (who was new to his job at the time) had a difficult task before them. From Manatt's own description, one can obtain a clearer sense of this prevention process:

When he arrived as new principal at Northside in February 1977, Rudolph looked forward eagerly to the challenges the school presented. Located in a wealthy Atlanta neighborhood, Northside had a reputation as a good school with a healthy variety of students. Academic achievement ranged from illiterates to ninth-graders reading on a university level. As a magnet school with a large busing program, Northside reflected the racial makeup of Atlanta—a 50-50 black-white ratio, with a rich variety of ethnic and religious backgrounds. As Rudolph notes, "we had everybody from Baptists to Buddhists, atheists to warlocks." The school was viewed as a model of successful integration, and it had a loyal core of parent supporters committed to maintaining the public school system, despite "white flight," competitive schools, and changing demographics.

But Northside also reflected many of the social changes of the '60s for better or worse. Rudolph was dismayed by the sense of drift and carelessness as students wandered through halls and parking lots and scattered litter on the manicured grounds. In the cafeteria only about 200 of the 1,400 students ate school lunches, as students drove away to eat off campus—and often remained off campus for the afternoon. Teachers and staff seemed demoralized and frustrated, as though few students really cared about what they learned. Many bright students were opting for the easy courses among the smorgasbord of electives spread before them. As in other top-ranked schools, normative achievement tests and SATs revealed that students were not achieving at their highest potential. This mediocritization of excellence particularly bothered Rudolph, for he knew that there were many fine minds in his student body.

What shocked him most was the widespread, open use of marijuana, which often filled the halls and restrooms with clouds of pungent smoke. His own attitude about marijuana was ambivalent. In the 1950s his mother assured him that marijuana led immediately to "heroin,

madness, and suicide." In the 1960s he "began to doubt Mom" when his college friends smoked it and had fun. But he knew marijuana was illegal and that a school should never be a safe haven for lawbreakers. So he enforced the law in every case of dealing or possession. During his first day at school he called the police to arrest two ninth-graders who were smoking pot on the front steps. Within 18 months there had been almost weekly arrests, including many children of prominent citizens. More and more parents came to his office, feeling angry, confused, and hopeless about a problem they could not understand. Rudolph had little advice to offer them except to take their child to a physician. Then he had to drop that advice when he learned that a pediatrician had told the students, "There's nothing wrong with pot; just don't smoke it in that man's school."

Halfheartedly hoping that the drug conference [described earlier in the text] might achieve its pronounced aim of "parent awareness and parent action," he asked the PTSA to send two parents along with the school counselor. Laughing about it 4 years later, Rudolph says he had no idea of what he had unleashed. In May 1978 Northside High School was launched on an adventure.

Suffice it to say, "macro" prevention involves dedicated parents and professionals working together to change communities. Parents and schools have been able to work together to create a "no drugs" atmosphere and climate. Since programs of this sort have sprung up spontaneously, it has been exceedingly difficult to implement a rigorous evaluation of their efficacy. At present, we must depend upon the impressions of the participants that these programs have had impact. In no small way, this trend of greater parent and community involvement may partially account for the decrease in drug usage among students that has been observed since 1978.

Positive peer pressure strategies. A second very promising prevention approach is the "saying no" strategy, developed initially in the tobacco smoking prevention field. There is growing evidence from several university research laboratories that this type of strategy prevents the onset of smoking by junior high school students (30). These investigations apply social psychological and social learning theory to the prevention of cigarette smoking by adolescents. They focus on what motivates children to start using tobacco and on the pressure to conform that students are under with respect to smoking, and they train students to resist the subtle or explicitly persuasive seducements that emanate from their peers or the media. With the use of positive peer role models, both in the classroom and depicted on videotape, they have been able to train youngsters

that saying no to a cigarette is socially acceptable and is, in fact, the desirable thing to do.

A number of studies have shown that positive peer pressure techniques have produced a reduction of 50 percent in the rate of onset of tobacco smoking (30–35). These strategies have also demonstrated continued effects by influencing students to delay the onset of cigarette smoking for several years (36–38). Moreover, there are data to suggest that these approaches, even when primarily focused on cigarette smoking, result in a reduction in alcohol and marijuana usage as well (39,40).

Consistent with this research, a more generalized behavioral approach has been developed and tested by Botvin (40). This program, called "Life Skills Training," teaches adolescents general social skills, such as expression of one's rights, praise, disagreement, initiating meaningful conversation, assertiveness or resistance skills, and promotion of self-efficacy.

In Botvin's model, resistance training is but one of several social skills taught to sixth and seventh graders. Research on this technique for the prevention of cigarette smoking has been positive in that the program has been shown to reduce the percentage of new cigarette smokers by 50 percent or more among students who received the training, compared with control groups of students who did not (41,42).

In one of a series of studies involving 902 seventh grade students, Botvin (40) assessed the effects of two treatment variations of Life Skills Training (LST). LST, in hourly sessions, was delivered once a week for 15 weeks in the first variation, and several times a week for 5 weeks in the second. Two schools were randomly assigned to each of the two treatment conditions. Students of three comparable schools constituted the control group. A program booster was administered to treatment students during the second year of the study.

Overall, at the end of the first year, the project resulted in 50 percent fewer new smokers among treated students than among controls. While no differences were reported between the two experimental conditions at immediate post-test, at the end of the first year the more intensive LST program was shown to be more effective in that it yielded significantly fewer smokers on all measures. In effect, the intensive treatment program provided a 55 percent reduction in new smokers at that time. At the end of the second year of the study, the experimental program with booster sessions in the second year resulted in 87 percent fewer smokers among treated students than among controls.

In a separate study, Botvin (40) tested two levels of a 20-session LST program (one level, peer-led; the other, teacher-led) on seventh graders to assess changes in cigarette smoking and alcohol and marijuana use. Two schools were randomly assigned to each of four treatment conditions (peer-led with and without booster; teacher-led with and without booster), and two schools served as controls. Peers were selected from the tenth and eleventh grades, and both peers and teachers were trained by the researchers to implement the program.

First-year results reported by Botvin indicated that at post-test the peer-led training had achieved significant positive results. Students who had been in the peer-led sessions reported significantly less alcohol use per occasion. Seventy-one percent fewer of the treatment students than of controls used marijuana in the course of a month, and 83 percent fewer used marijuana daily or weekly. The percentage of students who smoked during the course of a month was also significantly reduced. Further research on this program continues, with booster sessions to be administered in the second program year.

At this point, positive peer pressure strategies are developing into a well-researched technology that can have marked impact on the initiation and regularization of drug usage by adolescents. As a result, the National Institute on Drug Abuse has devoted a large measure of its prevention research program resources to determining the efficacy and cost-effectiveness of this approach. NIDA has funded several large-scale projects in which researchers are testing the applicability and efficacy of positive peer pressure techniques in preventing drug abuse by adolescents and are attempting to refine the approaches to be more specific in identifying the most effective strategies for different ages and different subsets of adolescents. Of particular interest is research that combines school-based peer interventions with media programs targeted to prevention of substance abuse. These approaches offer new promise in the effort to reduce drug usage—a promise based upon research and community commitment.

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The Underreporting of Disease and Physicians' Knowledge of Reporting Requirements

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SYNOPSIS ....

Previous studies of underreporting of disease have mainly addressed the attitudes of physicians toward reporting of communicable disease to public health