

ALCOHOL, TOBACCO, AND DRUG ABUSE: PREVENTION AND SERVICES

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ALCOHOL, TOBACCO, AND DRUG ABUSE: PREVENTION AND SERVICES

Introduction

The use and abuse of alcohol, tobacco, and illicit drugs are currently of great concern to the American public (106,310,312). The abuse of alcohol and other psychoactive (mind-altering) substances is often seen as particularly dangerous for adolescents because it can interfere with the ‘developmental tasks’ of adolescence.^{1,2}

Box 12-A provides a general overview of alcohol and other major classes of psychoactive substances with the potential for abuse and/or dependence. The effects of psychoactive substances vary, depending on the specific substance used, on the quantity, frequency, and duration of use, on users’ expectations, on the mode of administration, and on whether other substances are used simultaneously (147, 156). It is beyond the scope of this chapter to delineate all of the possible effects of psychoactive substances. As discussed later, very little is known about the specific effects of psychoactive substances on adolescents.

This chapter discusses definitions of substance abuse and reviews available evidence on the use of alcohol, tobacco, and other psychoactive substances among U.S. adolescents. The chapter then examines family, peer related, personal, and other risk factors associated with the initiation and continuation of psychoactive substance use; the consequences of psychoactive substance use and abuse for adolescents; and the economic costs to society. It next considers the effectiveness of preventive and treatment interventions. The chapter concludes with a consideration of issues pertaining to relevant Federal programs and policies.

Background on Psychoactive Substance Use and Abuse

Definitions of Substance Abuse

There is considerable controversy about what constitutes substance abuse among adolescents (see box 12-B). Some would maintain that *any* use of alcohol and other drugs by an adolescent should be considered substance *abuse*. Others suggest that *experimentation*—particularly with such psychoactive substances as alcohol or tobacco that are available for purchase by adults of legal age—is part of normal late adolescent development and does not necessarily have harmful consequences (26,208,252,263).³ The Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) within the U.S. Department of Health and Human Services (DHHS) has expressed the view—through its Office for Substance Abuse Prevention (OSAP)—that *any drug* use by adolescents should be prevented (311). Another ADAMHA agency, the National Institute on Drug Abuse (NIDA), has defined drug abuse in other ways (302,303). The American Psychiatric Association, using clinical criteria specified in the *Diagnostic and Statistical Manual of Mental Disorders*, 3rd ed., revised (DSM-III-R), draws distinctions between psychoactive substance use, abuse, and dependence, with dependence being more serious than abuse (see box 12-B). The criteria in DSM-III-R make no distinctions between adults and adolescents (4).

In the discussion that follows, except where otherwise noted, the term ‘psychoactive *substance use*’ includes the entire range of experience with a psychoactive substance—from a single exposure to prolonged and habitual use. The term ‘*psychoactive substance abuse*’ is used whenever a more limited meaning (i.e., use that results in injury, incapacity,

¹This chapter uses the general term psychoactive substance to cover alcohol, nicotine (found in tobacco), and illicit drugs (e.g., heroin, cocaine, marijuana). Strictly speaking, all of these substances are drugs (i.e., chemical or biological substances that can be used to affect the structure or function of the body). However, the term drug is sometimes used to refer specifically to illicit drugs.

²For a discussion of some of the developmental tasks faced by adolescents, see ch.2, ‘‘What Is Adolescent Health?’’ in this volume.

³However, it should be noted that most researchers now believe that the use of psychoactive substances in childhood or in the first years of adolescence is *not* normal and may be predictive of serious behavioral problems in later adolescence (263).

Box 12-A-Overview of Alcohol and Some Other Psychoactive Substances

Class of psychoactive substance	Description	Examples
ALCOHOL (ethyl alcohol)	Alcohol, one of the most widely used of all drugs, is a central nervous system depressant with effects similar to those of sedative-hypnotic compounds (see below). At low doses, alcohol may be associated with behavioral excitation thought to be due to the depression of inhibitory neurons in the brain. Alcohol differs from sedative-hypnotic compounds in that it is used primarily for recreational or social rather than medical purposes.	<ol style="list-style-type: none"> 1. Beer 2. Wine 3. "Hard" liquor (e.g., whiskey, gin).
SEDATIVES, HYPNOTICS, OR ANXIOLYTICS	Sedative-hypnotics are drugs of diverse chemical structure that exert a nonselective general depressant action on the central nervous system. In addition, they reduce metabolism in a variety of tissues in the body, depressing any system that uses energy. Depending on the dose, any sedative-hypnotic compound may be classified as a sedative (an agent that allays excitement), a tranquilizer (an antianxiety agent), a hypnotic (a sleep-inducing agent), or an anesthetic (an agent that eliminates pain). Sedative-hypnotics are used medically as sedatives, anxiolytics (anti-anxiety agents), hypnotics, antiepileptics, muscle relaxants, and general anesthetics.	<ol style="list-style-type: none"> 1. Barbiturates ("downers" or "barbs"): pentobarbital sodium [Nembutal[®]], secobarbital sodium [Seconal[®]], amobarbital [Amytal[®]] —taken orally 2. Nonbarbiturate hypnotics: methaqualone [Quaaludes[®]] —taken orally 3. Tranquillizers: diazepam [Valium[®]], chlordiazepoxide hydrochloride [Librium[®]] —taken orally
CANNABIS (THC)	THC (tetrahydrocannabinol), the active agent in marijuana, alters perceptions, concentration, emotions, and behavior, though the mechanisms of action are not entirely clear. Researchers have found, however, that THC changes the way in which sensory information is processed by the brain. It can be used medically to relieve nausea and side effects of chemotherapy in cancer patients; it is very rarely used to treat glaucoma.	<ol style="list-style-type: none"> 1. Marijuana ("pot" or "grass")—smoked or eaten 2. Hashish ("hash")—smoked or eaten 3. Hashish oil ("hash oil")—smoked (mixed with tobacco) 4. Tetrahydrocannabinol (THC)—taken orally in capsules
NICOTINE (active ingredient in tobacco)	Nicotine, obtained naturally from tobacco, is a central nervous system stimulant. It exerts its action secondary to stimulation of certain cholinergic (excitatory) synapses both within the brain and in the peripheral nervous system.	<ol style="list-style-type: none"> 1. Cigarettes 2. Smokeless tobacco (i.e., snuff or chewing tobacco)

^aAccording to Julien, one could conceivably classify psychoactive drugs by at least three methods: 1) mechanism of action, 2) chemical structure, and 3) behavioral effects. Probably the most useful approach would be to classify them by mechanism of action, but knowledge of the brain's physiology is too limited for this approach to be comprehensive. A limitation of the second approach is that many drugs of apparently similar structure exert quite different effects, and many drugs of dissimilar structure exert quite similar effects. The classification in this table largely reflects the behavioral effects approach. The classification used here is based on the categories in the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders*, 3rd ed., revised. According to the American Psychiatric Association, all of the classes of psychoactive substances listed in this box except nicotine are associated with both abuse and dependence. Nicotine is associated with dependence but not abuse.

^bThe potential physiological, psychological, and behavioral effects of using the psychoactive substances shown are discussed in the sources listed below. The consequences depend in part on the specific drug used, the dosage level and mode of administration.

^cCentral nervous system stimulants are drugs that can elevate mood, increase alertness, reduce fatigue, provide a sense of increased energy, decrease appetite, and improve task performance. They can also produce anxiety, insomnia, and irritability. The drugs differ widely in their molecular structures and mechanisms of action.

COCAINE

Cocaine, obtained naturally from coca leaves, is a potent central nervous system stimulant.^d It stimulates the sympathetic nervous system, which regulates the activity of cardiac muscle, smooth muscle, and glands. It also produces bronchodilation in the lungs. It is used medically as a topical anesthetic for surgical procedures.

1. Cocaine hydrochloride powder (“coke” or “street cocaine”)-usually snorted or injected intravenously^d
2. Cocaine alkaloid (“freebase” or “crack”)-smoked^e

AMPHETAMINES AND RELATED STIMULANTS^f**1. Amphetamines**

Amphetamines are a group of three closely related compounds, all of which are potent central nervous system and behavioral stimulants.^g Some amphetamines are used medically to treat attention deficit disorder or minimal brain dysfunction in children, narcolepsy (recurrent, uncontrollable, brief episodes of sleep), or (rarely) depression.

1. Amphetamine (“speed” or “uppers”) [Benzedrine[®]]-taken orally, injected, or snorted
2. Methamphetamine (“speed” or “crystal meth” or “ice”) [Methadrine[®]]-taken orally, injected, or snorted^h
3. Dextroamphetamine [Dexedrine[®]]-taken orally, or injected

2. Nonamphetamine stimulants

Like amphetamines, nonamphetamine stimulants are central nervous system and behavioral stimulants. Some nonamphetamine stimulants (e.g., Preludin[®]) are used for weight control, and some (e.g., Ritalin[®] and Cylert[®]) are used medically to treat hyperactivity, minimal brain dysfunction, narcolepsy, or (rarely) depression.

1. Pheumetrazine hydrochloride [Preludin[®]]-taken orally or injected
2. Methylphenidate hydrochloride [Ritafin[®]] taken orally or injectedⁱ
3. Pemoline [Cylert[®]]-taken orally

HALLUCINOGENS

Hallucinogens, or psychedelics, are a heterogeneous group of compounds that affect a person’s perceptions, sensations, thinking, self-awareness, and emotions.^j

1. LSD (lysergic acid diethylamide) or “acid”-taken orally, put in the eyes
2. Mescaline (3,4,5-trimethoxyphenylethylamide) or “mesc,” and peyote—disks chewed, swallowed or smoked; tablets taken orally
3. Psilocybin (“magic mushrooms”)-chewed and swallowed
4. MDMA (methylene dioxymethamphetamine)-taken orally

^dAccording to the American Psychiatric Association, the route of administration of a psychoactive substance is an important variable in determining whether use will lead to dependence or abuse. In general, routes of administration that produce more efficient absorption of the substance in the blood stream (e.g., intravenous injection) tend to increase the likelihood of an escalating pattern of substance uses that leads to dependence. Routes that quickly deliver psychoactive substances to the brain (e.g., smoking or intravenous injection) are associated with higher levels of consumption and with an increased likelihood of toxic effects. Use of contaminated needles for intravenous administration of amphetamines, cocaine, and opiates can cause hepatitis, HIV infection, and other illnesses.

^eFreebase cocaine is a form of cocaine made by converting “street cocaine” (cocaine hydrochloride) to a purified base that is smoked. The effect of smoking freebase is similar to that of intravenous injection but smoking provides a shorter more intense high than sniffing or ingestion because of the rapid absorption of the drug through the lungs. “Crack cocaine” is the street name given to freebase cocaine that has been processed from cocaine hydrochloride to a chemical base by cooking it with baking soda and water. The term crack refers to the cracking sound that is heard when the mixture is smoked (heated), presumably due to the sodium bicarbonate.

^fDescribing a drug as a stimulant does not adequately describe its properties. Drug use surveys typically mean amphetamines when they use the word stimulants. Some surveys regard as stimulants both prescription (amphetamines) and nonprescription substances (e.g., caffeine-based compounds used in No-Doz, diet pills, and “fake pep pills”). Cocaine and nicotine (described above) are also central nervous system stimulants.

^gAccording to the National Institute on Drug Abuse, designer drugs are structural analogs of substances scheduled under the Controlled Substances Act that are prepared by underground chemists to mimic the psychoactive effects of controlled substances or produce other psychoactive effects. Because such analogs are not identical to their parent compound, their manufacture and distribution does not violate the law. As of June 1986, there were synthetic analogs of PCP, fentanyl and meperidine, and amphetamine and methamphetamine.

^hIn the past, abuse of methamphetamine had been in the form of tablets or intravenous injection. More recently, “ice” (one of the more common street names for α -methamphetamine hydrochloride) has gained popularity in a form suitable for smoking.

ⁱMost the agents included in this class of drugs can induce hallucinations if the dose is high enough. But the term hallucinogen does not adequately describe the range of pharmacological actions of the diverse group of substances usually included in the class. The term psychedelic was proposed by Osmond in 1957 to imply that these agents all have the ability to alter sensory perception and thus may be reconsidered “mind expanding.” The effects of hallucinogens are unpredictable and depend on the amount taken, the user’s personality, mood and expectations, and the surroundings in which the drug is used.

Continued on next page

Box 12-A—Overview of Alcohol and Some Other Psychoactive Substances—Continued

Class of psychoactive substance ^a	Description ^b	Examples
INHALANTS	Inhalants are chemicals that produce psychoactive vapors. Although different in makeup, nearly all of the abused inhalants produce effects similar to those of anesthetics, which act to slow down the body's functions or produce feelings of dizziness. At low doses, users may feel slightly stimulated. Amyl nitrite is used for heart patients because it dilates the blood vessels and increases blood supply to the heart. There are no medical indications for most of the inhalants.	<ol style="list-style-type: none"> 1. Solvents (model airplane glue, nail polish remover, lighter and cleaning fluids, and gasoline)—vapors inhaled 2. Aerosols (e.g., paints, hairsprays)—vapors inhaled 3. Some anesthetics (e.g., nitrous oxide)—vapors inhaled 4. Amyl nitrite ("snappers" or "poppers") and butyl nitrite ("rush")—vapors inhaled
OPIATES (NARCOTICS) AND RELATED ANALGESICS	Opiates are natural or synthetic drugs that, like morphine, a substance derived from the opium poppy, have analgesic (pain-relieving) properties. Heroin is not approved for medical uses in the United States. The major medical use of other opiates is for the relief of pain (i.e., as analgesics); some narcotics are used to relieve coughing (i.e., as antitussives) or to treat diarrhea. Methadone is used in the treatment of narcotic abstinence syndromes and as an analgesic in terminal illness.	<ol style="list-style-type: none"> 1. Heroin ("smack" or "horse")—injected, smoked, or inhaled^d 2. Codeine (codeine sulfate)—taken orally or injected^d 3. Morphine (morphine hydrochloride)—injected, smoked, or inhaled. 4. Synthetic opiates (e.g., methadone [Dolophine[®]]; hydromorphone hydrochloride [Dilaudid[®]], meperidine hydrochloride [Demerol[®]], oxycodone and aspirin [Percodan[®]])—taken orally or injected
PCP (PHENCYCLIDINE) AND SIMILARLY ACTING SYMPHATHOMIMETICS	Phencyclidine, commonly referred to as PCP, alters the functions of the neocortex and has been called a dissociative anesthetic. It was developed in the 1950s as an anesthetic but was subsequently taken off the market in 1967 when it was discovered that the drug caused hallucinations in some people. ¹ PCP is now used legally only in veterinary medicine as an immobilizing agent.	PCP ("angel dust" or "lovely")—taken orally, or smoked (sprayed on joints or cigarettes) ^d

¹PCP is considered a hallucinogen in some surveys of drug use.

SOURCES: Office of Technology Assessment, 1991, based on the following sources: American Psychiatric Association, *Diagnostic and Statistical Manual of Mental Disorders*, 3rd ed. revised (Washington, DC: 1987); R.M. Julien, *A Primer of Drug Action*, 5th ed. (New York, NY: W.H. Freeman and Co., 1988); J.F. Kauffman, H. Shafer, and M. Burglass, "The Biological Basics: Drugs and Their Effects," *Alcoholism and Substance Abuse: Clinical Interventions* (New York, NY: 1985); U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse, "Hallucinogens and PCP, Inhalants, Marijuana, Opiates, Sedative-Hypnotics, Stimulants, and Cocaine," Rockville, MD, 1983; U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse, "Designer Drugs," *NIDA Capsules*, Rockville, MD, June 1986; U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse, "Marijuana Update," *NIDA Capsules*, Rockville, MD, May 1989; U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse, "Methamphetamine Abuse," *NIDA Capsules*, Rockville, MD, January 1989; and U.S. Department of Education, *Growing Up Drug Free: A Parent's Guide to Prevention* (Washington, DC: 1989).

dysfunctionality, destruction, or danger to self or others) is intended.

Some substances associated with abuse or dependence—notably beverage alcohol and tobacco—are legally available in this country, but only to individuals over a certain age. The minimum age for the legal sale/purchase of beverage alcohol in all States and the District of Columbia is 21 (290). The legal

minimum age for the legal sale/purchase of cigarettes (which contain nicotine) varies by State (315). As of June 1990, 17-year-olds could buy cigarettes in four States (315). Inhalants such as airplane glue, paint thinner, typing correction fluid, and gasoline are generally legally available for purchase to individuals of all ages,⁴ but not for the purpose of inducing intoxication (183). In the United States, a number of substances associated with abuse or

⁴Some States and municipalities have enacted restrictions on the provision of these substances to minors below statutorily defined ages (159).

Box 12-B—What Constitutes Substance Abuse by Adolescents?

For the purpose of this chapter, the term drug or psychoactive substance use, unless otherwise noted, means drug use (including alcohol or tobacco use) that results in injury, incapacity, dysfunctionality, or destruction or damage to self and others. It is important to note, however that what constitutes drug or psychoactive substance abuse among adolescents—arty use at all or “problem use”—is a matter of controversy. As noted below, the U.S. Department of Health and Human Service’s Office for Substance Abuse Prevention (OSAP) is of the view that any use is abuse. The American Psychiatric Association’s *Diagnostic and Statistical Manual of Mental Disorders*, 3rd ed., revised (DSM-III-R), draws distinctions between substance use, substance abuse, and substance dependence.¹

office for Substance Abuse Prevention

OSAP’s view is that any drug use, including alcohol use, by those under 21 is to be prevented (310).

National Institute on Drug Abuse

In discussing the results of its 1988 Household Survey on Drug Abuse, NIDA argued that frequency of drug use in the last year might be the most appropriate indicator of drug abuse (303). A separate definition of abuse among adolescents was not offered.

For the purpose of emergency rooms and medical examiners reporting to MDA’s Drug Abuse Warning Network (DAWN) system, drug abuse is defined as “the nonmedical use of a substance for psychic effect, dependence, or suicide attempt/gesture” (302). According to NIDA’s 1988 DAWN report, nonmedical use includes the following:

- the use of prescription drugs in a manner inconsistent with accepted medical practice;
- the use of over-the-counter drugs contrary to approved labeling; or
- the use of any other substance (heroin, marijuana, peyote, glue, aerosols, etc.) for psychic effect, dependence, or suicide (302).

American Psychiatric Association, DSM-III-R

The American Psychiatric Association’s DSM-III-R notes that “In our society, use of certain substances to modify mood or behavior under certain circumstances is generally regarded as normal and appropriate” (4).² The DSM-III-R diagnostic class “Psychoactive Substance Use Disorders” deals with “symptoms and maladaptive behavioral changes associated with more or less regular use of psychoactive substances that affect the central nervous system” (4). DSM-III-R notes that the behavioral changes used as criteria ‘would be viewed as extremely undesirable in almost all cultures’ (4).

Listed below are the DSM-III-R criteria for diagnosing two categories of psychoactive substance use disorders as mental disorders: 1) “psychoactive substance abuse disorder, ’ and 2) “psychoactive substance dependence

¹It is important to note that the development of diagnostic criteria for mental disorders is a continuously evolving endeavor. The first edition of the American Psychiatric Association’s *Diagnostic and Statistical Manual of Mental Disorders* appeared in 1952; working groups of the American Psychiatric Association are currently working on DSM-IV (4). Classifications of mental disorders can also be found in the International Classification of Disorders (ICD) of the World Health Organization currently being revised for a 10th edition (4). According to the American Psychiatric Association: “The purpose of DSM-III-R is to provide clear descriptions of diagnostic categories in order to enable clinicians and investigators to diagnose, communicate about, study, and treat the various mental disorders. . . The specified diagnostic criteria for each mental disorder are offered as *guidelines* for making diagnoses, since it has been demonstrated that the use of such criteria enhances agreement among clinicians and investigators. . . These diagnostic criteria and the DSM-III-R classification of mental disorders reflect a consensus of current formulations of evolving knowledge. . . but do not encompass all the conditions that maybe legitimate objects of treatment or research efforts” (4, italics added).

²DSM-III-R also notes that there are wide cultural variations in the United States and that “in some groups even the recreational use of alcohol is frowned upon, whereas in other groups the use of various illegal substances for mood-altering effects has become widely accepted. In addition, certain psychoactive substances are used medically for the alleviation of pain, relief of tension, or to suppress appetite” (4).

³Just as no definition adequately specifies precise boundaries for the concepts “physical disorder” and “physical health,” there are no precise boundaries for the concepts “mental disorder” or “mental health” (4). Nevertheless, the American Psychiatric Association found it useful to present a definition of mental disorder that influenced the decision to include certain conditions in . . . DSM-III-R, as follows: “. . . a clinically significant behavioral or psychological syndrome or pattern that occurs in a person and that is associated with present distress (a painful symptom) or with a significantly increased risk of suffering death, pain, disability, or an important loss of freedom. In addition, this syndrome or pattern must not be merely an expectable response to a particular event, e.g., the death of a loved one. Whatever its original cause, it must currently be considered a manifestation of a behavioral, psychological, or biological dysfunction in the person. Neither deviant behavior, e.g., political, religious, or sexual, nor conflicts that are primarily between the individual and society are mental disorders unless the deviance or conflict is a symptom of a dysfunction in the person, as described above” (4).

Mental health and mental disorders in adolescents are discussed more generally in ch. 11, “Mental Health Problems: Prevention and Treatment,” in this volume.

Continued on next page

Box 12-B—What Constitutes Substance Abuse by Adolescents?-Continued

disorder.” (Dependence is deemed to be more serious than abuse, in part because it involves a longer-term and more pervasive behavioral pattern.)⁴

Separate DSM-III-R criteria are not available for adolescents.

DSM-III-R Diagnostic Criteria for Psychoactive Substance Abuse

A. A maladaptive pattern of psychoactive substance use indicated by at least one of the following:

- continued use despite knowledge of having a persistent or recurrent social, occupational, psychological, or physical problem that is caused or exacerbated by use of the psychoactive substance;
- recurrent use in situations in which use is physically hazardous (e.g., driving while intoxicated).

B. Some symptoms of the disturbance have persisted for at least 1 month or have occurred repeatedly over a long period

C. Never met the criteria for psychoactive substance dependence (see below) for this substance.

DSM-III-R Diagnostic Criteria for Psychoactive Substance Dependence

A. At least three of the following:

- substance often taken in larger amounts or over a longer period than the person intended;
- persistent desire or one or more unsuccessful efforts to cut down or control substance use;
- a great deal of time spent in activities necessary to get the substance (e.g., theft), taking the substance (e.g., chain smoking), or recovering from its effects;
- frequent intoxication or withdrawal symptoms when expected to fulfill a major role obligation at work, school, or home (e.g., does not go to work because hung over, goes to school or work “high,” intoxicated while taking care of his or her children), or when substance use is physically hazardous (e.g., drives when intoxicated);
- important social, occupational, or recreational activities given up or reduced because of substance abuse;
- continued substance abuse despite knowledge of having a persistent or recurrent social, psychological, or physical problem that is caused or exacerbated by the use of the substance (e.g., keeps using heroin despite family arguments about it, cocaine-induced depression, or having an ulcer made worse by drinking);
- marked tolerance, i.e., need for markedly increased amounts of the substance (at least 50 percent increase) in order to achieve intoxication or desired effect, or markedly diminished effect with continued use of the same amount.
- characteristic withdrawal symptoms (see specific withdrawal syndromes under psychoactive substance-induced organic mental disorders in DSM-III-R);⁵
- substance often taken to relieve or avoid withdrawal symptoms.⁵

B. Some symptoms of the disturbance have persisted for at least 1 month or have occurred repeatedly over a longer period of time.

In addition to criteria for diagnosing the presence of psychoactive substance dependence, DSM-III-R stipulates criteria for severity of psychoactive substance dependence from mild (few, if any, symptoms in excess of those required to make the diagnosis, and the symptoms result in no more than mild impairment in occupational functioning or in usual social activities or relationships with others) to severe (many symptoms in excess of those required to make the diagnosis, and the symptoms markedly interfere with occupational functioning or with usual social activities or relationships with others⁶). Clients may also be in partial remission (during the past 6 months, some use of the substance and some symptoms of dependence) or in full remission (during the past 6 months, either no use of the substance, or use of the substance and no symptoms of dependence).

⁴DSM-III-R distinguishes these behaviorally defined disorders from another set of mental disorders called “psychoactive Substance-induced Organic Mental Disorders,” a set of disorders caused by the direct effects of various psychoactive substances on the nervous system. “Psychoactive Substance-induced Organic Mental Disorders” include intoxication withdrawal, delirium, withdrawal delirium, delusional disorder, mood disorder, and other syndromes and differ depending on the substance used. Thus, the criteria for diagnosing these organic disorders are not described here. In most cases, according to DSM-III-R, “the diagnosis of these Organic Mental Disorders will be made in people who also have a psychoactive substance use disorder (4).

⁵DSM-III-R notes that these criteria may not apply to cannabis, hallucinogens, or PCP (phencyclidine).

⁶Because of the availability of cigarettes and other nicotine-containing substances and the absence of a clinically significant nicotine intoxication syndrome, impairment in occupational or social functioning is not necessary for a rating of severe nicotine dependence.

SOURCE: Office of Technology Assessment, 1991.

dependence are illegal for general sale, purchase, or consumption regardless of age—among them heroin, cocaine, and inhalants such as amyl and butyl nitrite, which are short-acting vasodilators.⁵

Trends in the Use of Psychoactive Substance Use by U.S. Adolescents

Sources of Data on the Incidence and Prevalence of Psychoactive Substance Use

Sources of data on the incidence and prevalence of psychoactive substance use by U.S. adolescents include self-report data from household and other surveys sponsored by NIDA and others and also include data from emergency rooms and data on arrests.

Surveys That Collect Self-Report Data on Psychoactive Substance Use—Various national and other surveys discussed below have asked adults and adolescents in the United States about their use of alcohol, tobacco, and other drugs:

- the NIDA Household Survey on Drug Abuse;
- the Monitoring the Future/High School Seniors Survey⁶ conducted by researchers at the Institute for Social Research at the University of Michigan with NIDA's support;
- the National Adolescent Student Health Survey conducted in 1987 by a consortium of groups funded partially by the Federal Government;
- the National PRIDE Survey sponsored by the National Parents' Resource Institute for Drug Education;
- the Youth Risk Behavior Surveillance System (YRBSS) of the Centers for Disease Control (CDC) within the Public Health Service of DHHS; and
- regional surveys such as those by the University of Minnesota's Adolescent Health Program.

NIDA's Household Survey on Drug Abuse has been conducted 10 times between 1971 and 1990 (303,306). The Monitoring the Future/High School Seniors Survey has been conducted every year since 1975 (288,300). Other survey s---g,,, the National

Adolescent Student Health Survey (5) and the National PRIDE Survey (206)-have been conducted only once.

Available data on the prevalence and incidence of substance use and abuse by adolescents have major limitations. For one thing, almost all estimates of the prevalence, incidence, and trends in substance use by U.S. adolescents rely on self-reports. Self-reports are inherently subject to both faking and unintended biases in reporting due to respondents' potential needs to provide socially desirable answers (13, 162, 184). Any reported changes in substance use over time, therefore, may be due in part to changes in the social acceptability of psychoactive substances in general or of any particular substance. On the other hand, Bachman and his colleagues have argued that declines in the social acceptability of drug use have had an impact on drug use, and that the declines seen in the 1980s are therefore "real" (11). Their argument is buttressed by the fact that there have been increases in the use of some drugs that have not been the target of recent public attention (e.g., inhalants [288,289]), that arrests of adolescents for drug violations have more or less tracked trends in drug use (322), and that there is some evidence that adolescents' emergency room visits for drug-related reasons are down (301,302,304).⁷ There remains, however, persistent discomfort with reliance on self-report data, and recognition of the need to use sources of information other than self-reports, in judging the prevalence of drug use in the United States. Two sources of such data are discussed following brief overview of available self-report surveys.

NIDA Household Survey on Drug Abuse—The NIDA Household Survey on Drug Abuse measures the prevalence of drug use among the American household population age 12 and over. Although local surveys and clinical experience have found that adolescents who are homeless or institutionalized typically have higher rates of psychoactive substance use than do adolescents living at home, homeless and institutionalized adolescents have not

⁵Vasodilators are agents that cause the dilation (enlargement) of the blood vessels.

⁶The Monitoring the Future/High School Seniors Survey is technically entitled "Monitoring the Future: A Continuing Study of the Lifestyles and Values of Youth. The survey studies a sample of all seniors in public and private high schools in the coterminous United States and also includes samples of young adults from previous graduating classes, who are administered followup surveys by mail.

⁷As discussed below, drug use data from the NIDA surveys of emergency rooms are notoriously difficult to compare over time because of methodological problems and frequent changes in methodology.

been systematically surveyed by NIDA.⁸ The NIDA Household Survey questions adolescents in their own homes; what impact this approach has on the results is not known. In addition, the NIDA Household Survey questions only 12- to 17-year-olds and does not include younger adolescents (e.g., 10- and 11-year-olds). Further, the sample of adolescents the NIDA Household Survey has surveyed has been quite small (3,095 in 1988; 2,177 in 1990); as a consequence, disaggregations of the data by adolescent age are not feasible, and only averages of 12- to 17-year-olds combined are possible. The number of Hispanics and nonwhites surveyed in the NIDA Household Survey is also small (747 black adolescents, 763 Hispanic adolescents, and 67 “other” nonwhite adolescents in 1988) (303). DHHS is planning to expand the number of individuals surveyed in the NIDA Household Survey on Drug Abuse (326,327).

Monitoring t/w Future/High School Seniors Survey—The Monitoring the Future/High School Seniors Survey (288,289) has long been criticized for having as its youngest respondents high school seniors. By not surveying younger students and students who are not in school, this survey has provided no information about drug use by students other than seniors or about adolescents who have dropped out of school prior to their senior year. There is some evidence that school dropouts are more likely than current students to use psychoactive substances.⁹ Another limitation of the Monitoring the Future/High School Seniors Survey is that it does not sample sufficient numbers of nonwhite students for distinctions by race and ethnicity to be made on a routine basis. An expansion of the Monitoring the Future/High School Seniors Survey is planned, in that future surveys will include younger adolescents as well as seniors (327).

National Adolescent Student Health Survey-In 1987, DHHS, in an attempt to ascertain the prevalence of a wide range of health-compromising

behaviors and attitudes among younger students, helped support a survey of 8th and 10th graders conducted by the American School Health Association, the Association for the Advancement of Health Education, and the Society for Public Health Education (5). Although the National Adolescent Student Health Survey sampled younger adolescents than does the Monitoring the Future/High School Seniors Survey, it too was limited to those adolescents still attending school.

National PRIDE Survey-- The National PRIDE Survey was based on a survey questionnaire devised by the parents' group, National Parents' Resource Institute for Drug Education (206). The validity of the questionnaire design is unknown. The National PRIDE survey, conducted in the 1988-89 school year, has the advantage of including adolescents in grades below the eighth grade, but the questionnaire was not distributed to a representative sample of schools. Only schools that were interested participated in the survey; further, participating schools had the option of not reporting results back to the National PRIDE office.

Youth Risk Behavior Surveillance System (YMSS)—Reports of averages from national surveys are controversial because they may seem to underestimate the use of drugs in particular locations. CDC is beginning to support the collection and reporting of data from cities and States (e.g., 314). Reporting of such local data suggests the wide variation in drug use across localities (314). Comparisons among localities are sometimes difficult, however, because these surveys also rely on school-based data and the voluntary participation of localities.¹⁰ The Division of Adolescent and School Health in CDC is now supporting YRBSS (318). YRBSS will be administered locally and will also generate national data. Questions about drug and alcohol use are included in the survey, which will be administered to students in 9th through 12th grades.¹¹

⁸For a further discussion of homeless adolescents, see ch. 14, “Homelessness: Prevention and Services,” in this volume. The health problems of adolescents in juvenile justice facilities are discussed in ch. 13, “Delinquency: Prevention and Services,” in this volume.

⁹For a discussion of school dropouts, see ch. 4, “Schools and Discretionary Time,” in this volume.

¹⁰Because of their focus on behaviors associated with infection with the human immunodeficiency virus (HIV)—the virus associated with the acquired immunodeficiency syndrome (AIDS)—early reports from these surveys focused only on certain aspects of drug use (e.g., intravenous drug use). Future YRBSS surveys will ask about a wider range of drugs (318). AIDS and HIV infection in U.S. adolescents are topics addressed in ch. 9, “AIDS and Other Sexually Transmitted Diseases: Prevention and Services,” in this volume.

¹¹In addition, the National Center for Health Statistics (NCHS) within DHHS is planning to implement a Youth Risk Behavior Supplement to the National Health Interview Survey (NHIS) in the years 1991, 1995, and 2000 (318). The NHIS Youth Risk Behavior Supplement will be administered to adolescents who attend school and adolescents who do not. NHIS is discussed further in ch. 6, “Chronic Physical Illnesses: Prevention and Treatment,” in this volume.

The Minnesota Adolescent Health Survey—In 1984, the Federal Office of Maternal and Child Health in DHHS' Health Resources and Services Administration awarded a grant to the Minnesota Department of Health to work with the University of Minnesota Adolescent Health Program (also funded by the Office of Maternal and Child Health) to establish a comprehensive adolescent health database in Minnesota for use by the State of Minnesota and local Minnesota communities (327c). As part of establishing such a database, the University of Minnesota Adolescent Health Program conducted a survey of over 36,000 public school students in grades 7 through 12 in 86 Minnesota school districts during the 1986-87 school year. As part of this broad-ranging health survey, questions were asked about the use of cigarettes, chewing tobacco, beer, wine, hard liquor, and illicit drugs (any illicit drugs, marijuana, cocaine, crack, amphetamines). This survey is limited by being a self-report survey representative only of Minnesota adolescents of approximately ages 12 (7th grade) through 18 (12th grade) who attend school, but its comprehensiveness and large sample size may make it a useful model for expansion into other groups of adolescents and communities.¹²

In general, local and national survey data would be more useful if they reflected the use of multiple drugs as well as the use of single drugs. Some studies of limited numbers of adolescents suggest that adolescents are likely to use more than a single drug, but these studies do not report frequency of use. For example, one Los Angeles County study reported that 60 percent of high school and first-year-post-high school respondents were multiple drug users, but it did not report frequency of use; thus, individuals who may have used multiple drugs only one time in the preceding 6 months would be included in the 60 percent (176).¹³

NIDA's Drug Abuse Warning Network (DAWN) System--NIDA's DAWN system is a source of information about alcohol and other drug use that is

potentially relevant to problem drug use by adolescents (302,304). NIDA's DAWN system supports the collection of data on emergency room visits and deaths related to drug use. A sample of hospital emergency rooms and medical examiner facilities report to the DAWN system data for each "drug abuse" patient or death encountered by medical examiners. The DAWN system is designed primarily as an early warning system to monitor drug abuse patterns and health hazards associated with drug use, and to detect new abuse entities and new combinations of drugs of abuse.

One problem with DAWN data prior to 1990 was that the data were collected from a nonrandom sample of hospital emergency rooms and medical examiner facilities in metropolitan areas selected *because* of a high probability of problem drug use.¹⁴ Beginning in 1990, DAWN data were collected from a national probability sample of emergency rooms (304,327). This change will make DAWN data more nationally representative, and make accurate national comparisons of data over time possible.

As noted in box 12-B, for the purpose of reporting to the DAWN system, drug abuse is defined as 'the nonmedical use of a substance for. . . psychic effect, dependence, or suicide attempt/gesture' (302). Some would agree that a limitation of the DAWN system (apart from its being based in the past it on a rather small and nonrandom sample of responding facilities) is its rather broad definition of nonmedical use of drugs. Nonmedical use of drugs is defined as the following:

- the use of prescription drugs in a manner inconsistent with accepted medical practice;
- the use of over-the-counter drugs contrary to approved labeling; or
- the use of any other substance (heroin, marijuana, peyote, glue, aerosols, etc.) for psychic effect, dependence, or suicide.

The first two uses could be accidental and might not be considered drug abuse by some definitions. To

¹²Variations of the Minnesota survey were administered by the University of Minnesota Adolescent Health Program to adolescents "number of American Indian and Alaska Native communities. Reports from the pilot phase of the Indian surveys can be found in OTA's 1990 report *Indian Adolescent Mental Health* (286).

¹³The National Adolescent Student Health Survey asked adolescents whether they had used alcohol in combination with other drugs, but it did not report responses to this question (5).

¹⁴In 1987, for example, data were collected from 610 emergency rooms and 75 medical examiner facilities in 27 large metropolitan areas (e.g., Atlanta, Baltimore, Boston, Buffalo, Chicago, Cleveland, New York, Oklahoma City, Seattle, Washington, DC); these areas accounted for one-third of the U.S. population (301). In addition, a "national panel" of 146 emergency rooms was newly added to the DAWN sample in 1987; the national sample was not randomly selected.

compensate, the DAWN system disaggregate episodes by motive (e.g., psychic effects, recreational use, dependence, suicide) and type of drug, but the breakdowns do not allow motives to be analyzed in relation to types of drugs. A further limitation of DAWN is that the drug mentions reported are not necessarily the cause of the medical emergency. Multiple drugs may be reported by a patient or detected by the health care provider in the emergency room. Similarly, only one drug motive is attached to an episode, and that motive is assigned to each separate drug mentioned in the episode. Thus, some caution must be exercised when attempting to relate drug mention patterns to specific motives.

Federal Bureau of Investigation Data on Arrest Rates—As discussed elsewhere in this Report, the Uniform Crime Reports program maintains arrest data reported by local law enforcement agencies to the Federal Bureau of Investigation in the U.S. Department of Justice (323).¹⁵ Uniform Crime Reports data offer several advantages—they cover more types of offenses than data from other sources, they cover offenses committed by individuals of all ages, and they are up-to-date and easy to interpret. One limitation of these data, however, is that they may be affected by underreporting by law enforcement officials, particularly, underreporting of less serious offenses (183). Another limitation is that they may be affected by law enforcement agencies' bias toward the detection and arrest of offenders from certain groups in society (e.g., black male adolescents), and for certain categories of offense (180a). Furthermore, the use of arrest rate data to detect trends over time remains problematic. One reason is that law enforcement agencies may focus on different types of offenses in different historical periods (e.g., a drug crisis may limit resources available for the detection of other types of

crimes); another reason is that changes may occur in the definitions of offenses.

A problem related to these limitations is that the category 'drug abuse violations' comprises a rather broad range of offenses. Drug abuse violations are State and local offenses related to the unlawful possession, sale, use, growing, and manufacturing of narcotic drugs (323). Because drug users may be a different population than drug dealers and drug dealers may sell to nonadolescents, arrest data are not good overall indicators of adolescent drug use.¹⁶

Current Estimates of the Prevalence of Psychoactive Substance Use Among U.S. Adolescents Based on Self-Report Data

"Lifetime Use" of Psychoactive Substances—Current data suggest that a substantial percentage of U.S. adolescents will use alcohol, nicotine in the form of cigarettes or smokeless tobacco, or some other psychoactive substance, at least once during adolescence. As shown in table 12-1, alcohol and cigarettes are the two substances that U.S. adolescents are most likely to report ever having used. About 50 percent of 12- to 17-year-olds responding to the 1988 NIDA Household Survey on Drug Abuse¹⁷ reported using alcohol at least once in their lives (303); 90 percent of high school seniors responding to the 1989 Monitoring the Future/High School Seniors Survey reported using alcohol at least once (288). Other than alcohol, tobacco is the substance most likely to be tried by U.S. adolescents, with about two-thirds of high school seniors in 1989 reporting having smoked cigarettes at least once in their lives (288). Forty-four percent of high school seniors in 1989 reported that they had tried marijuana at least once; 19 percent had used stimulants; 18 percent had used inhalants; 10 percent had used cocaine; and 10 percent had used hallucinogens, primarily LSD (lysergic acid diethylamide), (8.3 percent). Seven percent of high school seniors

¹⁵&x= ch.13, 'Delinquency: Prevention and Services,' in this volume.

¹⁶Only eight sites (Los Angeles, CA; San Diego, CA; San Jose, CA; Portland, OR; Indianapolis, IN; St. Louis, MO; Cleveland, OH; Washington, DC) in the U.S. Department of Justice, Office of Justice Programs, National Institute of Justice's Drug Use Forecasting system test juvenile arrestees and detainees for the presence of drugs in their systems (323a). Hence, national estimates of drug use by juvenile arrestees and detainees are not possible. In the period April through June 1990, from 8 percent (San Jose, CA) to 37 percent (Los Angeles, CA) of juvenile arrestee/detainees tested positive for at least one of the following drugs: cocaine, opiates, PCP, marijuana, amphetamines, methadone, methaqualone, benzodiazepines, barbiturates, and propoxyphene. Some sites do not test for methadone, methaqualone, and propoxyphene (323a). (Propoxyphene [Darvon®] is a prescription analgesic structurally similar to methadone (147).) Other data, discussed in ch. 13, "Delinquency: Prevention and Services," in this volume, suggest a high prevalence of alcohol and drug abuse problems, and nearly universal use of tobacco among adolescents incarcerated in juvenile justice facilities. It is important to note that drug use data from adolescents involved with the juvenile justice system pertain to arrests and incarcerations for many types of offenses, not just drug use or drug sales.

¹⁷OTA focused on adolescents ages 10 through 18. NIDA Household Survey on Drug Abuse data are not readily available for this age group and are therefore presented for individuals ages 12 to 17.

Table 12-1—Percentage of Surveyed U.S. Adolescents of Different Ages Reporting Ever Having Used Alcohol or Other Types of Psychoactive Substances

	Percentage of respondents reporting ever having used			
	NIDA Household Survey on Drug Abuse, 1988	National Adolescent Student Health Survey, 1987		Monitoring the Future/High School Seniors Survey, 1989
	12- to- 17 year-olds ^a	8th graders	10th graders	High school seniors
Alcohol	50.20/0	77.4%	88.8%	90.7%
Cigarettes	42.3	50.8	63.5	65.7
Marijuana/hashish	17.4	14.5	35.1	43.7
Smokeless tobacco/snuff	14.9	NA	NA	NA
Inhalants	8.8	20.6	20.6	17.6
Nonmedical use of stimulants	4.2	9.0 ^b	15.7 ^b	19.1
Nonmedical use of analgesics	4.2	NA	NA	NA
Hallucinogens (all forms)	3.5	2.6	6.7	9.9
Cocaine (all forms)	3.4	3.6	7.7	10.3
Nonmedical use of sedatives	2.4	NA	NA	7.4
Nonmedical use of tranquilizers	2.0	NA	NA	7.6
PCP	1.2	NA	NA	3.9
Crack cocaine	0.9	1.6	2.7	4.7
Heroin	0.6	NA	NA	1.3
LSD	NA	NA	NA	8.3
Needle use	0.4	0.9 ^c	0.5 ^c	NA

KEY: NA = not available.

^aSample size is too small to disaggregate by single year of age.

^bIncludes over-the-counter as well as prescription (e.g. amphetamines) drugs.
conformation collected on needle use for injection of cocaine only.

SOURCE: Office of Technology Assessment 1991, based on data from the following sources: **NIDA Household Survey on Drug Abuse**: U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse, *National Household Survey on Drug Abuse: Main Findings 1988*, DHHS Pub. No. (ADM) 90-1682 (Rockville, MD: 1989). **National Adolescent Student Health Survey**: American School Health Association, Association for the Advancement of Health Education, Society for Public Health Education, Inc., *The National Adolescent Student Health Survey: A Report on the Health of America's Youth* (Oakland, CA: Third Party Publishing, 1989). **Monitoring the Future/High School Seniors Survey**: U.S. Department of Health and Human Services, data from the 1989 "Monitoring the Future Survey" of drug abuse among U.S. high school seniors (conducted by the Institute for Social Research, University of Michigan, and funded by the National Institute on Drug Abuse), *HHS News*, Feb. 13, 1990.

reported that they had ever used sedatives and/or tranquilizers nonmedically (288).¹⁸

Information collected with the support of the CDC suggests that there may be considerable variation by locale in the percentage of U.S. adolescent students who have ever used drugs intravenously. As shown in table 12-2, in 1988 in the District of Columbia, for example, almost 5 percent of female students and 9 percent of male students ages 13 to 18 reported having administered drugs (cocaine, heroin, or other illegal drugs) intravenously at some point in their lives (314). The proportions were somewhat lower in schools in the other localities that permitted their data to be published. Because localities were permitted to administer questionnaires to whichever schools and

students they deemed appropriate, it is difficult to make comparisons among localities.

Frequent and Substantial Use of Psychoactive Substances—As noted at the beginning of this chapter, different segments of society differ with respect to their conceptualizations of what constitutes substance abuse for adolescents (see box 12-B). Unless one believes that *any* use of psychoactive substances by adolescents is problem use or abuse (310), it is important to determine when substance use becomes problem use or abuse. Such determinations are difficult. Typically, available survey data are not particularly helpful in distinguishing occasional substance use from problem use or abuse.

As shown in table 12-3, about one-third of high school seniors reporting to the 1989 Monitoring the

¹⁸The 1990 Monitoring the Future/High School Seniors Survey found some small, but statistically significant, decreases between 1989 and 1990 in the percentage of high school seniors reporting having ever used any illicit drug other than marijuana, marijuana/hashish, amyl and butyl nitrite, crack, stimulants, and sedatives (289).

Table 12-2—Percentage of U.S. Adolescent Students in Selected Cities and States Reporting Ever Having Used Drugs Intravenously, by Sex, Age Group, 1988

City/State	Percentage reporting ever having used drugs intravenously					
	Gender			Age group (yrs)		
	Total	Female	Male	13-14	15-16	17-18
California	4.1 %	2.6%	5.7%	2.8%	3.9%	4.3%
Washington,DC.....	6.3	4.6	8.7	*	4.0	8.9
Michigan	2.8	2.1	3.4	3.2	3.2	1.3
San Francisco,	3.7	2.4	5.1	1.4	3.9	2.4

*Less than 5 percent of subgroup in sample.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, "HIV-Related Beliefs, Knowledge, and Behaviors Among High School Students," *Morbidity and Mortality Weekly Report* 37:717-721, Dec. 2, 1988.

Table 12-3—Current Estimates of Heavy Use of Alcohol Among U.S. Adolescent Students^a

Number of times in the past 2 weeks had five or more drinks ^b	Percentage of respondents reporting			
	National Adolescent Student Health Survey, 1987			Monitoring the Future/High School Seniors Survey, 1989
	8th graders	10th graders	Total sample	High school seniors
0 times	73.8%	61.8%	67.6%	67.0%
1 time	12.5	15.8	14.3	11.1
2 times	6.4	7.8	7.2	8.3
3-5 times	4.1	8.5	6.4	9.0
6-9 times	1.4	3.0	2.2	2.7
10+ times	1.7	3.0	2.2	1.9

^aIn the 1988 National Household Survey on Drug Abuse, NIDA defined "heavy use of alcohol" as drinking five or more drinks on the same occasion (i.e., within a few hours) on 5 or more days in the past 30 days.

^bThe wording is had five or more drinks "on one occasion" in the National Adolescent Student Health Survey; it is having had five or more drinks "in a row" in the Monitoring the Future/High School Seniors Survey.

SOURCE: Office of Technology Assessment, 1991, based on data from the following sources: National Adolescent Student Health Survey: American School Health Association, Association for the Advancement of Health Education, Society for Public Health Education, Inc., *The National Adolescent Student Health Survey: A Report on the Health of America's Youth* (Oakland, CA: Third Party Publishing, 1989). Monitoring the Future/High School Seniors Survey: U.S. Department of Health and Human Services, data from the 1989 "Monitoring the Future Survey" of drug abuse among U.S. high school seniors (conducted by the Institute for Social Research, University of Michigan, and funded by the National Institute on Drug Abuse), *HHS News*, Feb. 13, 1990.

Future/High School Seniors Survey and a similar proportion of the 8th and 10th graders reporting to the 1987 National Adolescent Student Health Survey said that they had had five or more alcoholic drinks on at least one occasion in the 2 weeks prior to the survey period (5,304). Many of the students surveyed-7.2 percent of the 8th graders (5), 14.5 percent of 10th graders (5), and 13.9 percent of the high school seniors (304)-reported having had five or more drinks on *three or more* occasions in the previous 2 weeks. Apparently, such patterns of consumption have led some adolescents themselves to assert that alcohol use is the most prevalent problem among students (3).

Nicotine is used by a significant number of adolescents—most commonly in the form of ciga-

rettes. As shown in table 12-4, nearly 6 percent of 10th graders surveyed in the 1987 National Adolescent Student Health Survey reported smoking more than five packs of cigarettes a month. Nineteen percent of high school seniors surveyed in 1989 reported some cigarette smoking on a daily basis (from one cigarette per day [7.7 percent] to two packs or more per day [0.3 percent]).

Some adolescents use nicotine in the form of smokeless tobacco. Although the regular use of smokeless tobacco can have significant health consequences (320), national surveys such as NIDA's Household Survey on Drug Abuse and the Monitoring the Future/High School Seniors Survey do not request information about smokeless tobacco use. As shown in table 12-5, the one-time National

Table 12-4—Current Estimates of Heavy Cigarette Smoking Among U.S. Adolescent Students

Cigarettes smoked in past month	Percentage of respondents reporting			
	National Adolescent Student Health Survey, 1987			Monitoring the Future/High School Seniors Survey, 1989
	8th graders	10th graders	Total sample	High school seniors
None	83.9% ⁰	73.6%	78.60 ⁰	71.4% ⁰
1-4 total for month	7.7	9.1	8.4	NA
5-19 total for month	3.1	4.9	4.0	NA
1-5 packs total for month	2.9	6.5	4.8	NA
>5 packs total for month	2.4	5.9	4.2	NA
Less than 1 cigarette a day	NA	NA	NA	9.7
1-5 cigarettes per day	NA	NA	NA	7.7
About 1/2 pack/day	NA	NA	NA	5.4
About 1 pack/day	NA	NA	NA	4.4
About 1 1/2 packs/day	NA	NA	NA	1.1
Two packs or more/day	NA	NA	NA	0.3

KEY: NA = not available.

SOURCE: Office of Technology Assessment, 1991, based on data from the following sources: **National Adolescent Student Health Survey**: American School Health Association, Association for the Advancement of Health Education, Inc., *The National Adolescent Student Health Survey: A Report on the Health of America's Youth* (Oakland, CA: Third Party Publishing, 1989); **Monitoring the Future/High School Seniors Survey**: U.S. Department of Health and Human Services, data from the 1989 "Monitoring the Future Survey" of drug abuse among U.S. high school seniors (conducted by the Institute for Social Research, University of Michigan, and funded by the National Institute on Drug Abuse), *HHS News*, Feb. 13, 1990.

Adolescent School Health Survey found that an average of 4.4 percent of 10th grade males (2.4 percent of 10th grade males and females combined) used smokeless tobacco daily (5). The University of Minnesota's 1986-87 Adolescent Health Survey found that 15 percent of male students in the 12th grade were using smokeless tobacco daily (191).

Most U.S. adolescents do not use *illicit drugs*¹⁹ with great frequency. If one considers daily use of a psychoactive substance as an indicator of problem use, for example, one finds that less than 1 percent of adolescent students report using any *illicit drug other than marijuana* on a daily basis (see table 12-5).²⁰ For example, from 0.3 to 0.6 percent of respondents reported using *cocaine in any form* daily in the last month or year in various surveys during the 1987-89 period. In 1989, 2.9 percent of high school seniors reported using *marijuana* on a daily basis. The fact that less than 1 percent of adolescents appear to be using any specific illicit drug other than marijuana on a daily basis should not be dismissed lightly, however; 0.5 percent of 12- to

17-year-olds in 1988 was equal to 100,000 adolescents.

Not surprisingly, somewhat more U.S. adolescents report using an illicit drug less frequently than daily but more than "ever." For example:

- 3.9 percent of 12- to 17-year-old respondents to the 1988 NIDA Household Survey and 5.5 percent of respondents to the 1988-89 National PRIDE Survey reported having used *marijuana* once a week or more in the past year.
- Three-tenths of 1 percent of 10th graders and high school seniors had used *crack cocaine* 20 or more times in the past month.
- From 0.9 percent to 1.4 percent of respondents (depending on the survey) had used *crack cocaine* at least once in the month preceding the survey.
- From 0.6 to 2.2 percent of student respondents, depending on the survey, had used *hallucinogens* 10 to 12 or more times in the year preceding the surveys.

¹⁹For purposes of this Report, and to be consistent with usage in the NIDA Household Survey on Drug Abuse (303) and the Monitoring the Future/High School Seniors Survey (300), the term *illicit drugs* refers to drugs that are illegal for everyone in the United States and the nonmedical use of prescription drugs. Illicit drugs include marijuana, inhalants, cocaine, hallucinogens, heroin and the nonmedical use of psychotherapeutics (sedatives, tranquilizers, stimulants, or analgesics) (303).

²⁰It may be important to note that the data in table 12-5 come from surveys of adolescents in school. The NIDA Household Survey on Drug Abuse, which is population-based rather than school-based, does not ask respondents about daily use.

Table 12-5-Summary of Daily Use of Alcohol, Tobacco, and Illicit Drugs by U.S. Adolescent Students of Various Ages

Drug ^a	National Surveys ^b					Regional/local surveys	
	Junior high school		Senior high school		High school seniors only	Regional/local surveys	
	PRIDE ^c survey (1988-89)	NASHS ^{d,e} (1987)	PRIDE ^c survey (1988-89)	NASH SO ^f (1987)	Monitoring the Future/High School Seniors Survey (1989)	Minnesota Health Survey (1986-87)	Adolescent Survey (1986-87)
Alcohol	0.8	0.6%	1.1	2.0%	4.2	NA	NA
Cigarettes	5.70/0	NA	10.60/0	NA	18.90/oh	12.00/0	12.00/0
Marijuana/hashish	0.8	0.4	2.3	2.1	2.9	2.0	2.0
Smokeless tobacco/snuff	NA	1.31	NA	2.4 ^g	NA	3.8	3.8
Inhalants	0.6	0.6	0.6	0.6	0.3 ^h	NA	NA
Nonmedical use of stimulants ⁱ	0.5 ^m	0.3 ⁿ	0.8 ^m	0.4 ⁿ	0.3 ^b	NA	NA
		0.4 ^o		0.3 ^o			
		0.4P		0.6P			
Nonmedical use of analgesics ^k	NA	NA	NA	NA	NA	NA	NA
Hallucinogens (all forms)	0.4	0.4	0.5	0.3 ^l	0.3 ^l	NA	NA
Cocaine (all forms)	0.4	0.3	0.6	0.4	0.3	NA	NA
Nonmedical use of sedatives	0.4 ^l	NA	0.5 ^l	NA	0.1	NA	NA
Nonmedical use of tranquilizers ^k	— ^l	NA	— ^l	NA	0.1	NA	NA
PCP	NA	NA	NA	NA	0.2	NA	NA
Crack cocaine	NA	0.1	NA	0.3	0.2	NA	NA
Heroin	NA	NA	NA	NA	0.1	NA	NA
LSD	NA	NA	NA	NA	0.0	NA	NA
Amyl or butyl nitrite	NA	0.6	NA	0.4	NA	NA	NA
Combinations of alcohol and other drugs	NA	NA	NA	NA	NA	NA	NA
"Other drugs"	1.8	NA	2.0	NA	NA	NA	NA

KEY: NA = not available; PRIDE = Parents' Resource Institute for Drug Education; NASHS = National Adolescent Student Health Survey. ^aDrugs are listed in roughly the same order as in table 12-1, where drugs were listed to reflect the prevalence of their use by U.S. adolescents as determined in the 1988 NIDA Household Survey on Drug Abuse. The categories "Amyl or butyl nitrite," "Combinations of alcohol and other drugs," and "Other drugs" were not listed in table 12-1 and are therefore shown last in this table.

^b"Adjusted" figures are used. Adjusted figures are higher than unadjusted figures.

^cFigures shown are the average of grades 6 through 9. Interestingly, for almost all types of drugs, daily use in 6th grade appeared higher than use in 7th, 8th, or 9th grades. However, the number of respondents was lowest for 6th graders (half or less than in any other grade except 12th), a factor which could affect the statistical significance of any differences. In general, the survey method would not meet generally accepted standards, and no tests of statistical significance were conducted.

^dThe figures shown are for eighth graders only.

^eIn the National Adolescent Student Health Survey, respondents were not asked about daily use, but they were asked about the number of occasions particular drugs had been used in "the past month." The percentage reporting either 20 to 39 times or 40+ times are included here as daily use.

^fTenth graders only.

^gIn the Monitoring the Future/High School Seniors Survey, "daily use" means daily use in the past 30 days.

^hThis figure reflects any level of cigarette smoking on a daily basis. A total of 11.2 percent of high school seniors reported smoking half a pack of Cigarettes or more per day.

ⁱHighest frequency of use included in question was 20+ times in the past month.

^jThe National Adolescent Student Health Survey used the term "psychedelics," but the actual question included what the NIDA Household Survey on Drug Abuse and other surveys refer to as hallucinogens (i.e., LSD, PCP, mescaline, peyote, psilocybin).

^kThe National PRIDE survey did not, and the Monitoring the Future/High School Seniors Survey did, distinguish between medical and nonmedical use of drugs.

^lThe National PRIDE survey used the term "downers." Reported use is included here under sedatives. The Monitoring the Future/High School Seniors Survey asked about both sedatives and tranquilizers (nonmedical use only).

^mThe National PRIDE survey used the term "uppers." It did not ask respondents to distinguish between medical and nonmedical use of drugs.

ⁿThis figure is for prescription amphetamines for nonmedical use.

^oThis figure is for nonprescription look-alike stimulants and pep pills sold legally in most States without a prescription, usually by mail.

^pThis figure is for nonprescription stay-awake pills (e.g., No-Doz[®], Vivarin[®]).

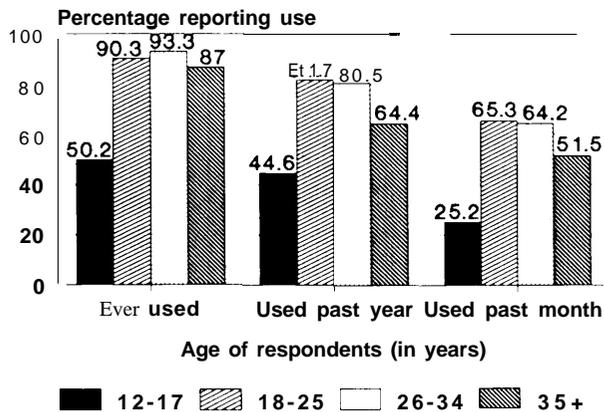
SOURCE: Office of Technology Assessment, 1991, based on data from the following sources: National PRIDE Survey: National Parents' Resource Institute for Drug Education, *The PRIDE Questionnaire for Grades 6-12, National Database, 1988-1989* (Atlanta, GA: July 24, 1989). Monitoring the Future/High School Seniors Survey: U.S. Department of Health and Human Services, data from the 1989 "Monitoring the Future Survey" of drug use among high school seniors (conducted by the Institute for Social Research, University of Michigan and funded by the National Institute on Drug Abuse), *HHS News*, Feb. 13, 1990. National Adolescent Student Health Survey: American School Health Association, Association for the Advancement of Health Education, Inc., and Society for Public Health Education, Inc. *The National Adolescent Student Health Survey: A Report on the Health of America's Youth* (Oakland, CA: Third Party Publishing, 1989).

- About 2 percent of high school seniors reported using LSD in the month preceding the 1989 Monitoring the Future/High School Seniors Survey, but less than 0.5 percent reported having used LSD 20 or more times in the month prior to the survey. Almost 5 percent of high

school seniors reported having used LSD at least once in the year prior to the survey.

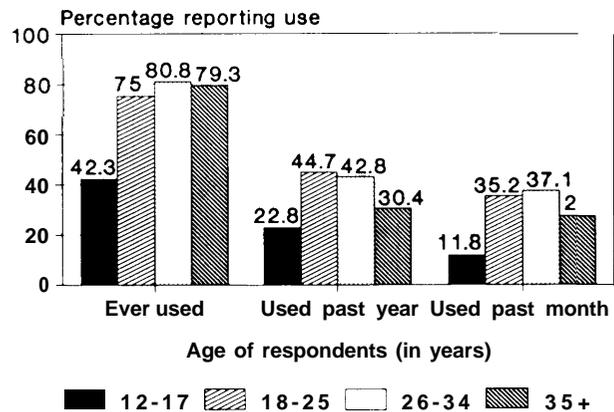
Comparison of Psychoactive Substance Use by Adolescents and Adults—There are few comparisons of adolescents' use of psychoactive substances

Figure 12-1—Use of Alcohol in the United States, by Age, 1988



SOURCE: Office of Technology Assessment, 1991, based on data from U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse, *National Household Survey on Drug Abuse: Main Findings 1988*, DHHS Pub No. (ADM) 90-1682 (Rockville, MD: 1989).

Figure 12-2—Use of Cigarettes in the United States, by Age, 1988



SOURCE: Office of Technology Assessment, 1991, based on data from U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse, *National Household Survey on Drug Abuse: Main Findings 1988*, DHHS Pub No. (ADM) 90-1682 (Rockville, MD: 1989).

with use of other age groups. Only the NIDA Household Survey on Drug Abuse collects information about substance use from a broad sample of age groups from age 12 and over.²¹

Comparing adolescent and adult drug use is complicated because of the need to take both cohort and contemporary effects into account. It is important to note that the age group 35 and over represents a very diverse group in terms of drug use experience and that an average for all those 35 and over is not a valid comparison to the 12- to 17-year-old age group.²² Further, the number of individuals in the population ages 35 and over (112 million in 1988 [287a]) is far greater than the number of individuals in the population ages 12 to 17 (20.5 million [287a]). Because the NIDA Household Survey on Drug Abuse does not report on age groups with equivalent population distributions, comparisons of rates of drug use in widely varying age groups should be made with caution.

Data from the 1988 NIDA Household Survey on the use of alcohol, cigarettes, and illicit drugs

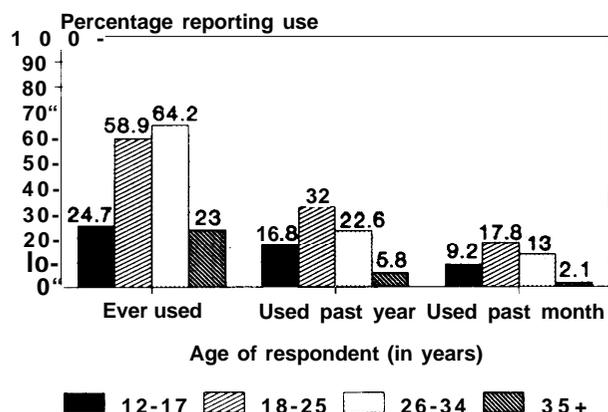
reported by U.S. adolescents ages 12 to 17 and by individuals in older population groups are summarized in figures 12-1, 12-2, and 12-3. The substance reportedly used by the most respondents in all age groups is alcohol, followed by cigarettes. As shown in figures 12-1 and 12-2, U.S. adolescents are less likely to report having used alcohol or cigarettes than adults, whether the time frame is ever, the past year, or the past month.

The 1988 NIDA Household Survey on Drug Abuse found that smaller percentages of individuals in all age groups reported use of *any illicit drug* than reported use of alcohol or cigarettes. As shown in figure 12-3, adolescents were far less likely than young adults ages 18 to 34 and about as likely as adults age 35 and over to report ever having used any illicit drug. About 25 percent of 12- to 17-year-olds reported ever having used an illicit drug, as compared with roughly 60 percent of 18- to 34-year-olds and 23 percent of those over age 34. When asked about illicit drug use in the past month, 12- to 17-year-olds reported less use than young adults ages 18 to 34 and more use than adults 35 and older.

²¹In 1991, the Monitoring the Future/High School Seniors Survey reported data on a sample of 19- to 28-year-olds who had been followed up from high school for 1986 through 1990 (289).

²²For example, 1988 DAWN data show that the distribution of *drug abuse* (as defined for the DAWN survey) associated with emergency room visits is very variable for those 30 and over, with the following distribution: ages 30 to 39, 23,615 encounters; ages 40 to 49, 6,651 encounters; ages 50 to 59, 1,380 encounters; and 60 and older, 371 encounters (302). Imputed "motives" for drug use resulting in an emergency room encounter also vary by age. For example, drug dependence as an inferred 'motive' for drug use rose with age from ages 10 through 39, and declined with age from age 40 on (302). If 6- to 9-year-olds are not included, drug dependence as a motive was lowest among those 10 to 17 (7.8 percent) and 60 and older (16.3 percent) (302).

Figure 12-3-Use of Any Illicit Drug^a in the United States, by Age, 1988



^aIn the NIDA Household Survey on Drug Abuse, the term “any illicit drug” is defined as marijuana, inhalants, cocaine, hallucinogens, PCP, heroin, or the nonmedical use of psychotherapeutics (i.e., prescription medications which can be used illicitly to get high or for other mental effects).

SOURCE: Office of Technology Assessment, 1991, based on data from U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse, *National Household Survey on Drug Abuse: Main Findings 1988*, DHHS Pub No. (ADM) 90-1682 (Rockville, MD: 1989).

Summary: Current Estimates of the Prevalence of Substance Use Among U.S. Adolescents Based on Self-Report Data—The majority of contemporary American adolescents report that they have tried the substances that are legally available to and widely used by adults—alcohol and cigarettes—at least once during adolescence. A substantial portion of adolescents appears to consume alcohol heavily and frequently, and 1 out of 10 smokes half a pack or more cigarettes a day. Available data from household and student surveys suggest that the illicit drug adolescents are most likely to try is marijuana, followed by stimulants, inhalants, cocaine, and hallucinogens. Few adolescents appear to use any substance—licit or illicit—daily, but those few represent a sizable minority of individuals.

Estimates of the Prevalence of Psychoactive Substance Use Resulting in Death or the Need for Emergency Medical Care

Extreme indicators of problem use of psychoactive substances are death or the need for emergency medical care from substance abuse. In 1988, 13,975

U.S. adolescents ages 10 to 17 visiting the emergency rooms participating in NIDA’s DAWN system tested positive for drugs (302). DAWN is not a very useful source of information on psychoactive substance abuse by adolescents, because alcohol, the most frequently used psychoactive drug among adolescents, is mentioned only when it is used in combination with another drug. The majority (61.8 percent) of these adolescents had used drugs to attempt suicide; less than 20 percent experienced an emergency as a result of using a drug for recreational purposes (302). About 8 (7.8) percent of the 13,975 10- to 17-year-olds who tested positive for drugs did so because of drug “dependence” (302).

Consistent with other evidence on suicide, DAWN data show that female adolescent patients (black, Hispanic, and white non-Hispanic) were much more likely than male patients to have used drugs to attempt suicide,²³ while male patients (black, Hispanic, and white non-Hispanic) were more likely to report having used the drugs for recreational purposes or because they were drug dependent (302).

Few U.S. adolescents die as a result of drug use that is not accidental or associated with suicide. In 1987, 3 adolescents ages 10 to 14 and 109 adolescents ages 15 to 19 in this country died as a result of drug poisoning not related to suicide (319).²⁴ NIDA reports that, of the 82 drug-related deaths among 10- to 17-year-olds reported to DAWN by medical examiners, approximately 45 percent were classified as suicides (307). The apparently nonsuicidal drug poisoning mortality rates (per 100,000 population) for 10- to 14-year-olds and 15- to 19-year-olds did not change between 1979 and 1987 (319).

As shown in table 12-6, DAW emergency room data by type of drug are reported for 6- to 17-year-olds in the aggregate, not for adolescents separately. Since children ages 6 to 9 accounted for only 0.5 percent (77 of the cases) on which the 1987 drug-by-drug analysis was based (302), however, most of the data pertain to adolescents. The majority of the substances used by adolescents seen in emergency rooms are licit substances like acetaminophen, alcohol in combination with other drugs, and aspirin, which together accounted for about 43 percent of the substances mentioned by emergency

²³Suicide and suicide attempts among U.S. adolescents are discussed in ch. 11, “Mental Health Problems: Prevention and Services,” in this volume.

²⁴These deaths include *International Classification of Diseases* E-Codes 980.0 to 980.5, “Death From Poisoning by Drugs, Medicaments, and Biological [not determined whether accidental or unintentional] and E-Codes 850 to 858, “Death From Poisoning by Drugs, Medicaments, and Biological: Accidental” (319).

Table 12-6-DAWN Emergency Room Data on Drug Use by Patients 6 to 17 Years of Age, 1987a

Drug name	Number of mentions ^b	Percentage of total episodes	Drug name	Number of mentions ^b	Percentage of total episodes
1 Acetaminophen	2,137	14.80	52 Trimethoprim/sulfamethox	57	0.39
2 Alcohol in combination with other drugs	2,084	14.44	53 Desipramine	53	0.37
3 Aspirin	2,057	14.25	54 Chlordiazepoxide	52	0.36
4 Marijuana/hashish	1,311	9.08	54 Phenylpro/Bromph/Phenyle	52	0.36
5 Cocaine	1,153	7.99	56 Hydrocodone	51	0.35
6 Ibuprofen	942	6.52	56 Indomethacin	51	0.35
7 PCP/PCP combinations ^c	681	4.72	56 Chlorpheniramine	51	0.35
8 LSD ^d	490	3.39	59 Chlorpromazine	49	0.34
9 Acetaminophen/codeine	387	2.68	59 Trazodone	49	0.34
10 Diazepam	376	3.60	61 Temazepam	47	0.33
11 Theophylline	336	2.33	61 Triamterene	47	0.33
12 Erythromycin	271	1.88	61 Brompheniramine maleate	47	0.33
13 Diphenhydramine	252	1.75	64 Cimetidine	44	0.30
14 OTC sleep aids ^e	245	1.17	65 Amitriptyline combinations	43	0.30
15 Caffeine	227	1.57	66 Chlorzoxazone/acetaminophen	41	0.28
16 Amitriptyline	181	1.25	66 Atrop/Scopo/Hyoscy/Pheno	41	0.28
17 d-Propoxyphene	172	1.19	68 Nortriptyline	40	0.28
18 OTC diet aids ^e	168	1.16	68 Methocarbamol	40	0.28
19 Pseudoephedrine	167	1.16	70 Methylphenidate	38	0.26
20 Alprazolam	154	1.07	71 Guaifenesin	37	0.26
21 Naproxen	150	1.04	72 Benzodiazepine (residual)	36	0.25
22 Imipramine	148	1.03	72 Carisoprodol	36	0.25
23 Speed	145	1.00	72 Phenylephr/chlorphen mal.	36	0.25
23 Ampicillin	145	1.00	75 Clorazepate	35	0.24
25 Amoxicillin	141	0.98	75 Dicyclomine	35	0.24
26 Tetracycline HCl	122	0.85	77 Metoprolol	34	0.24
27 Phenobarbital	113	0.78	77 Doxycycline	34	0.24
28 Amphetamine	110	0.76	79 Phenylpropanola/acetaminophen	33	0.23
29 Methamphetamine	105	0.73	80 Furosemide	32	0.22
30 Heroin/morphine	98	0.68	81 Metronidazole	31	0.21
30 Penicillin G potassium	98	0.68	82 Hydrochlorothiazide	30	0.21
32 Butalbital combinations	93	0.64	82 Metaproterenol sulf.	30	0.21
33 Hydantoin	91	0.63	84 Methadone	29	0.20
34 Oxycodone	87	0.60	85 Ferrous sulfate	28	0.19
35 Carbamazepine	84	0.58	86 Glues	28	0.19
36 Codeine	83	0.57	87 Phenylpropanolamine	26	0.18
37 Thioridazine	82	0.57	88 Meprobamate	25	0.17
38 Pseudoephed/triprolidine	78	0.54	88 Sulindac	25	0.17
39 Lorazepam	76	0.53	88 Diphenoxylate/atropine	25	0.17
39 Cyclobenzaprine	76	0.53	91 Benztropine	24	0.17
41 Triazolam	71	0.49	91 Aspirin/codeine	25	0.17
41 Hydroxyzine	71	0.49	93 Prednisone	23	0.16
43 Flurazepam	68	0.47	93 Fenoprofen calcium	23	0.16
43 Haloperidol	68	0.47	93 Dimenhydrinate	23	0.16
43 Penicillin V potassium	68	0.47	96 Meperidine HCl	22	0.15
46 Lithium carbonate	64	0.44	96 Prochlorperazine	22	0.15
47 Phenylpro/chlorphen mal.	63	0.44	98 Trifluoperazine	20	0.14
48 Propanolol HCl	62	0.43	98 Butabarbital combination	20	0.14
49 Cephalexin	59	0.41	98 Norgesic	20	0.14
50 Doxepin	58	0.40	98 Valproic acid	20	0.14
50 Mescaline	58	0.40			

^aThe data in this table are from the Drug Abuse Warning Network (DAWN) of the National Institute on Drug Abuse within the U.S. Department of Health and Human Services.

^bData are based on raw frequencies of drug mentions and a total raw emergency room episode count of 14,437 for patients 6 to 17 years of age. In using this table, the reader should be aware that individual drugs are frequently mentioned in combination with other drugs and that the population at risk of an adverse consequence relating to the abuse of any particular drug is unknown, i.e., the number of people abusing a particular substance, either alone or in any combination, is unknown. Thus the relative frequency of mentions of any drug pertains only to the DAWN system and not the larger population at risk.

^cpcp refers to phencyclidine.

^dLSD refers to lysergic acid diethylamide.

^eOTC drugs are drugs sold "over the counter," i.e., without a prescription.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse, Data From the Drug Abuse Warning Network DAWN: Annual Data 1987, DHHS Pub. No. (ADM) 88-15S4 (Rockville, MD: 1988).

Table 12-7—Arrest Rates for Drug Abuse Violations in the United States, by Age and Sex, 1965-88^a

Year	Number of arrests for drug abuse violations per 100,000 population					
	Under age 18			Age 18 and over		
	Total	Male	Female	Total	Male	Female
1965	11.7	20.2	2.9	50.4	90.7	13.2
1966	18.9	31.7	5.5	62.8	113.1	16.8
1967	44.6	73.5	14.6	91.5	166.5	23.4
1968	91.2	145.0	35.4	135.1	246.1	34.6
1969	122.4	189.9	52.4	199.1	361.6	52.2
1970	160.3	244.7	72.7	285.3	516.6	76.0
1971	177.1	271.3	79.2	319.4	575.1	87.6
1972	190.7	300.9	76.1	320.4	577.8	86.3
1973	263.2	423.2	96.7	355.6	648.9	88.9
1974	305.7	496.4	107.2	398.6	727.4	99.6
1975	245.0	401.0	82.7	339.9	621.9	83.6
1976	242.8	398.5	80.7	342.0	624.0	85.7
1977	237.2	388.6	79.4	334.1	608.0	85.1
1978	242.4	396.0	82.2	321.0	587.9	78.6
1979	202.3	330.9	67.9	289.3	530.7	69.9
1980	184.7	301.5	62.7	306.9	565.8	74.7
1981	173.6	285.1	56.9	332.8	610.5	80.2
1982	150.1	246.2	49.7	358.0	651.8	90.5
1983	135.4	222.0	44.9	370.2	670.2	96.8
1984	139.2	231.3	42.7	380.9	690.0	99.4
1985	153.1	255.4	45.8	423.3	766.1	110.0
1986	135.5	227.6	39.0	440.3	789.2	121.0
1987	143.9	244.3	38.6	491.6	872.6	142.6
1988	158.3	271.0	40.0	552.6	973.7	166.5

^aThe Federal Bureau of Investigation's Uniform Crime Reports defines *drug* abuse violations as State and local offenses related to the unlawful possession, sale, use, growing, and manufacturing of narcotic drugs (323).

SOURCE: U.S. Department of Justice, Federal Bureau of Investigation, *Age-Specific Arrest Rates and Race-Specific Arrest Rates for Selected Offenses 1965-1988* (Washington, DC: April 1990).

rooms as being used by 6- to 17-year-olds. Unfortunately, it is not possible to pair these substances with the motive or reason for the emergency room visit in this age group (301).

Arrests as an Indicator of Psychoactive Substance Use and Substance Use Problems

In general, sources of data on arrests related to drug abuse violations by U.S. adolescents have tracked declines in use. Arrests related to alcohol use have shown a more complicated pattern (182).

Arrests Related to Illicit Drugs—Arrest rates for drug abuse violations among individuals under age 18 rose somewhat steadily between 1965 and 1974, when they began to decline (see table 12-7).

Another increase in arrest rates for drug abuse violations occurred in 1985, a year when the use of cocaine increased among high school seniors.²⁵ Somewhat anomalously, arrest rates for drug abuse violations among individuals under age 18 increased in 1988, despite the fact that drug use was down,

Arrests Related to Alcohol—Federal Bureau of Investigation Part II offenses²⁶ related to the drinking of alcohol are categorized three different ways:

- . driving under the influence,
- . drunkenness (excluding driving under the influence), and
- . State and local liquor law violations.

²⁵As noted above, drug use among high school seniors is often taken as an indicator of drug use among all adolescents. DHHS plans to collect information on substance use from a broader range of adolescents (including nonstudents) in the future (326,327).

²⁶See ch. 13, "Delinquency: Prevention and Services," in this volume for explanation of different types of offenses.

Menard analyzed differences in arrests of adolescents for drunkenness and liquor law violations between 1976 and 1987 for OTA (182). While arrests for drunkenness declined from 1.36 to 0.69 per 1,000 11- to 17-year-olds between 1976 and 1987, arrests for liquor law violations rose from 3.74 to 4.55 per 1,000 11- to 17-year-olds. Menard suggested that these differences may reflect recent decreases in the availability of alcohol to minors (182).²⁷

Demographic Differences in Psychoactive Substance Use by Adolescents

Racial and Ethnic Differences in Substance Use—While a popular assumption may be that substance use is most prevalent among black adolescents in the United States, self-report data from recent NIDA Household Surveys on Drug Abuse indicate that black adolescents ages 12 to 17 are less likely than adolescents from any other racial or ethnic groups to report the use of any illicit drug—whether the measure is lifetime, annual, or past-30-days use (303). NIDA Household Survey on Drug Abuse data indicate that Hispanic adolescents are slightly less likely than non-Hispanic white adolescents (but more likely than black adolescents) to use illicit drugs. In the case of cocaine and crack cocaine, however, Hispanic adolescents report slightly more use than non-Hispanic white adolescents. Hispanic adolescents are also less likely than non-Hispanic white adolescents (but more likely than black adolescents) to report use of alcohol, cigarettes, and smokeless tobacco.

The NIDA Household Survey on Drug Abuse and the Monitoring the Future/High School Seniors Survey involve different populations (adolescents in households, high school seniors), but both are limited by having only small annual samples of adolescents in racial and ethnic minority groups. Bachman and his colleagues performed an analysis that sought to compensate for the Monitoring the Future/High School Seniors Survey's small annual sample sizes by combining data from 1976 through 1989 into three groups (1976-79, 1980-84, and

1985-89) (15). This analysis provided somewhat more information than the NIDA Household Surveys on Drug Abuse, because it allowed information on Native American and Asian American high school seniors, in addition to that for white, black, and Hispanic high school seniors, to be disaggregated. Bachman and his colleagues found results from the Monitoring the Future/High School Seniors Survey that were generally similar to those of the NIDA Household Surveys (15). Native American high school seniors had the highest prevalence rates for the use of cigarettes, alcohol, and most illicit drugs. White non-Hispanic high school seniors had the next highest prevalence rates for the use of most drugs; Hispanic high school seniors had the next highest prevalence rates (except for relatively high cocaine use among Hispanic males) (15). Asian American and black high school seniors had the lowest prevalence rates (15).

It may be important to note that NIDA and other self-report data on racial and ethnic differences in substance use by adolescents do not appear to be consistent with differences indicated by DAWN data or arrest rates for drug abuse violations (182,301, 303,306,322).²⁸ For example, black adolescents accounted for 20 percent, Hispanic adolescents accounted for 12 percent, and white non-Hispanic adolescents accounted for 55 percent of the DAWN episodes among 10- to 17-year-olds in 1988 (302). Arrests for drug abuse violations are disproportionately high among black adolescents (182).

Social Class and Income Differences in Substance Use—Only limited information is available about social class and income differences in psychoactive substance use by adolescents. In this chapter, social class refers to the socioeconomic status of adolescents' families of origin (most adolescents live with their families), and income refers to the adolescents' own income. These indicators may or may not be related. Both measures may be relevant to explaining adolescents' use of substances because both may make substances more

²⁷Of course, alcohol was not legally available to minors under age 18 in 1976, but presumably laws restricting alcohol to those ages 21 and over had an impact on its availability to those under age 18 as well.

²⁸Discrepancies between self-report data and arrest data are a topic addressed in ch.13, "Delinquency: Prevention and Services," in this volume.

available to an adolescent, but not necessarily in the same ways.

Further, the effect of income and social class may differ for different substances. For example, since crack is less expensive than powder cocaine, crack may be more likely to be available to low-income adolescents and powder cocaine to middle- and high-income adolescents.

Very little research has examined the relationship between substance use and income among adolescents, perhaps because adolescents do not typically have a regular substantial income (176). Current population-based surveys of self-reported substance use by adolescents cannot be used to disaggregate use by socioeconomic status. For example, the Monitoring the Future/High School Seniors Survey reports data by sex, college plans, region, and population density, but not by socioeconomic status (289). Similarly, the DAWN form does not require information related to income level to be reported (302).

Elliott and his colleagues analyzed data from the National Youth Survey²⁹ (a survey conducted on the same cohort of adolescents from 1976 to the present) and found that in 3 of the 4 years of their study, working class adolescents³⁰ were no more likely to use drugs than middle class adolescents (81,83).

Several other studies that have examined the availability of spending money and the use of psychoactive substances by adolescents have found that having disposable income is positively related to substance use (190). Maddahian, Newcomb, and Bentler also found that alcohol and cigarette use increased with greater earned income; money from allowances and other given income was related to nontherapeutic use of prescription drugs-but no relationship between income and other drugs was demonstrated (176). In another analysis, Maddahian, Newcomb, and Bentler found that earned income was a significant predictor of cigarette smoking and alcohol consumption (assuming equal availability), but availability (measured as friends having given the respondent the substance and

perceived ease of acquisition) “drastically” decreased the effects of earned income (and ethnicity) (175).

Age Differences in Substance Use-The detection of age differences in adolescent substance use is made difficult by the scarcity of national data on younger adolescents. Data such as those from the NIDA Household Survey on Drug Abuse that average information from a relatively wide range of adolescent ages should be interpreted with caution (306). Most available data do suggest that the tendency to use drugs, except for inhalants, generally increases with age (table 12-1, table 12-2, table 12-5). Inhalants (e.g., gasoline, airplane glue) may be easier for young adolescents to obtain and use.

As it is with other problem behaviors, the age at which an adolescent begins to use substances maybe an important indicator of the likely occurrence of problem or continued use. Hirschi and Gottfredson point out a very straightforward interpretation for this pattern: at ages when very few people have a given behavior, its appearance will be concentrated among those people who are most strongly disposed to that behavior (129). In other words, if 85 percent of high school seniors and 10 percent of seventh graders consume alcohol on a regular basis, then the fact that an individual consumes alcohol says more about a person who is a seventh grader than about a person who is a high school senior.

Several analyses have found that the earlier the use of psychoactive substances, the more likely it is to result in problem use (235,272). These studies have differed, however, in what they mean by “early” use-for example, one study considers use either before 15 or before 18 early (235), while another study considers use before age 12 early (272). Furthermore, it may be important to view findings about early use in terms of cohort effects. In recent years, substance use by Americans has been occurring earlier in life. In 1975, 47 percent of the high school seniors who reported smoking cigarettes daily reported that they had begun smoking before the 10th grade, but by 1984, the figure had risen to

²⁹The National Youth Survey used a probability sample of households in the continental United States. The 1976 sample included adolescents ages 11 to 17; participants were found to be representative of the total 11- to 17-year-old population in the United States at that time as established by the U.S. Census Bureau (81,83).

³⁰Working class adolescents were those whose parents were owners of small businesses, clerical workers, and persons in sales or skilled manual occupations with high school or some college completed; middle class adolescents were those whose principal wage-earning parent was in a professional or managerial occupation with a college education; and those whose parents were in semiskilled and unskilled manual occupations and had a high school or lower level of education were designated lower class.

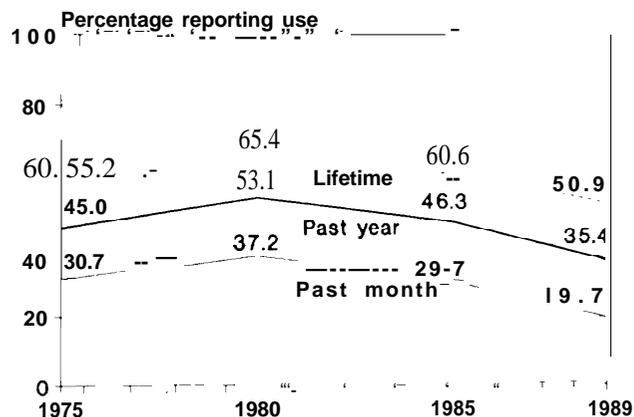
63 percent (145). What was “early onset” in one decade may become the norm in another. Nevertheless, the age of an adolescent or preadolescent’s initial use of alcohol or other drugs may be a predictor of future problem use.

Recent Trends in the Use of Psychoactive Substances by U.S. Adolescents

Few data are available on trends in the use of psychoactive substances by U.S. adolescents. As noted earlier in this chapter, the NIDA Household Survey on Drug Abuse has been conducted since 1971 (303).³¹ The Monitoring the Future/High School Seniors Survey has been conducted by the University of Michigan’s Institute for Social Research every year since 1975 (288). Other surveys, including the National Adolescent School Health Survey and the National PRIDE Survey, have been conducted on a one-time only basis (5,206). Recently, CDC within the Public Health Service of DHHS has begun to support the regular collection of data on drug use and other behavioral risk factors from students (316), but trend data are not yet available from those surveys.

The Monitoring the Future/High School Seniors Survey shows a net decline since 1975 in the lifetime, annual, and current use³² by U.S. adolescents of *any illicit drug* (see figure 12-4, table 12-8). Although the Monitoring the Future/High School Seniors Survey found that the lifetime, annual, and current use of any illicit drug reported by U.S. high school seniors rose somewhat in the late 1970s, these indicators declined quite steadily (except for an increase in 1985) throughout the 1980s to rates lower than those found in 1975 (300). The Monitoring the Future/High School Seniors Survey found that lifetime, annual, and current *cocaine* use by U.S. high school seniors increased between 1975 and 1979, then again between 1983 and 1985, and has

Figure 12-4—Use of Any Illicit Drug* by U.S. High School Seniors, 1975-89



*In the Monitoring the Future/High School Seniors Survey, the term “any illicit drug” is defined as marijuana, cocaine, heroin, or any use which is not under a doctor’s orders of other opiates, stimulants, sedatives, or tranquilizers.

SOURCE: U.S. Department of Health and Human Services, data from the 1989 “Monitoring the Future Survey” of drug abuse among U.S. high school seniors (conducted by the Institute for Social Research, University of Michigan, and funded by the National Institute on Drug Abuse), *HHS News*, Feb. 13, 1990.

steadily declined since then to approximately the 1975 levels (see figure 12-5).

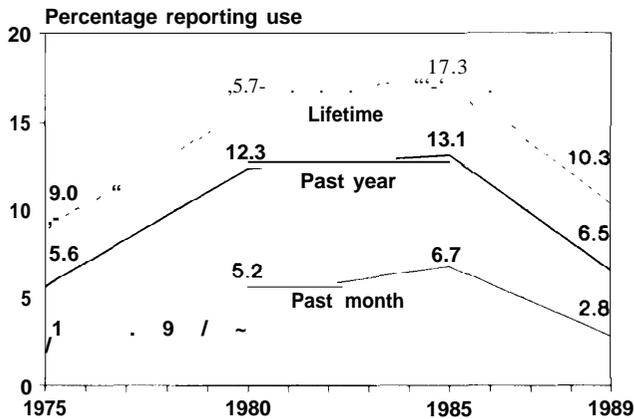
The Monitoring the Future/High School Seniors Survey found that U.S. high school seniors’ *daily use of marijuana, alcohol, and cigarettes* declined between 1975 and 1989 (see table 12-8). In 1975, for example, 6 percent of the high school seniors surveyed reported daily use of marijuana, and the number rose until 1982. Beginning with the class of 1983, daily use of marijuana fell slightly, until a slight (but not statistically significant) increase among the class of 1989. The only statistically significant difference between the classes of 1988 and 1989 was an increase of 0.2 percent in daily use of hallucinogens to 0.3 percent of respondents (about the same as it was in 1985 and 1986).³³

³¹According to the Office of National Drug Control Strategy (ONDCS), the NIDA National Household Survey on Drug Abuse was to be conducted annually beginning in 1990 (327).

³²Current use in this context means use within the past month.

³³Results of the 1990 High School Seniors/Monitoring the Future Survey (289) were reported too late to be included in detail in this Report. Nonetheless, the findings of the 1990 survey, like those of the 1990 NIDA National Household Survey on Drug Abuse, were encouraging. The 1990 survey of high school seniors found that 47.9 percent of high school seniors had used an illicit drug at least once in their lives (289). It found statistically significant declines between rates of use in 1989 and 1990 in *lifetime prevalence (ever used)* for any illicit drug, any illicit drug other than marijuana, amyl and butyl nitrites, crack, stimulants, and sedatives; *annual prevalence (use in the last year)* for any illicit drug, any illicit drug other than marijuana, marijuana/hashish, inhalants, PCP, cocaine, crack, stimulants, sedatives, and alcohol; for use *in the last 30 days* for illicit drug, any illicit drug other than marijuana, marijuana/hashish, inhalants, PCP, cocaine, crack, methaqualone, and alcohol; and for *daily use* of marijuana/hashish, cocaine, and crack (289). Of 20 types of drugs selected for analysis by NIDA, only one (inhalants) showed a statistically significant increase in use in the last years (i.e., use of *inhalants* in the last year [before adjustment] increased 1 percent).

Figure 12-5-Use of Cocaine by U.S. High School Seniors, 1975-89



SOURCE: U.S. Department of Health and Human Services, data from the 1989 "Monitoring the Future Survey" of drug abuse among U.S. high school seniors (conducted by the Institute for Social Research, University of Michigan, and funded by the National Institute on Drug Abuse), *HHS News*, Feb. 13, 1990.

Comparisons of NIDA Household Survey on Drug Abuse results over the most recent 10-year period show results consistent with the Monitoring the Future/High School Seniors Survey. Average use by 12- to 17-year-olds of almost all drugs *at least once in the last year* (so-called annual prevalence) declined between 1979 and 1988 (303).³⁴

Summary of Data on the Use of Psychoactive Substances by U.S. Adolescents

Self-report data indicate that most contemporary U.S. adolescents are likely to try alcohol at least once during their adolescence, and the majority are likely to try tobacco. A significant minority of adolescents are likely to try some illicit drug (most commonly marijuana). Some of the adolescents who try psychoactive substances go on to use them regularly or in large quantities. Alcohol and tobacco are the psychoactive substances that are most likely to be used regularly or in large quantities by U.S. adolescents (e.g., one-third of adolescent respondents to recent student surveys say they have had five or more drinks on at least one occasion in the previous 2 weeks). In recent years, the use of most illicit drugs has declined considerably among U.S.

adolescents (as it has among individuals in other age groups). National self-report data suggest that only a small percentage (between 0.3 and 3 percent) of today's U.S. adolescents use some illicit drug (e.g., cocaine, PCP, or marijuana) on a daily basis.

In general, white adolescents and adolescents with income (to whom substances are available) are most likely to report use of both illicit and licit substances, although there are differences by substance. Older adolescents are more likely to use psychoactive substances than younger ones, but a substantial number of very young adolescents do appear to be using substances such as alcohol, cigarettes, and inhalants. Unfortunately, few data have been collected on adolescents younger than 12; even the numbers of adolescents 12 and above who are surveyed regularly are quite small. There appear to be substantial regional variations in drug use by adolescents.

Factors Associated With Psychoactive Substance Use and Abuse by Adolescents

As discussed below, many American adolescents use alcohol, tobacco, or some other psychoactive substance at least once, but not all of these adolescents go on to use these substances heavily or frequently. Efforts to understand the psychological and social factors that lead adolescents to use psychoactive substances are fairly recent. Unfortunately, the fruits of these efforts are often difficult to interpret because of methodological limitations and differences among studies.

Methodological Issues

Studies of risk and protective factors in adolescent drug use exhibit methodological limitations and differences such as the lack of a uniform definition of the outcome variable (e.g., initiation of drug use, occasional use, frequent but low-quantity use, and chronic, heavy use); reliance on self-report data without biochemical validation; the use of cross-sectional surveys that cannot establish causality; the use of questionnaires that have not been validated or standardized for use with adolescents; and little

³⁴In 1990, NIDA conducted another National Household Survey on Drug Abuse (306), but the findings of the 1990 survey were not published in time to be included in detail in this Report. DHHS reports that the 1990 Household Survey on Drug Abuse generally found that recent declines in drug use among adolescents continued in 1990. The estimated number of U.S. adolescents ages 12 to 17 who reported ever having used any illicit drugs fell 13 percent between 1988 and 1990, from 1.866 million to 1.622 million (306).

Table 12-8—Trends in the 30-Day Prevalence of Daily Use of 18 Types of Drugs Among U.S. High School Seniors, 1975-89

Drugs	Approx. no=	Percentage who used daily in last 30 days								
		Class of 1975 (9,400)	Class of 1977 (17,100)	Class of 1979 (15,500)	Class of 1981 (17,500)	Class of 1983 (16,300)	Class of 1985 (16,000)	Class of 1987 (16,300)	Class of 1988 (16,300)	Class of 1989 (16,700)
Marijuana/hashish	6.0	9.1	10.3	7.0	5.5	4.9	3.3	2.7	2.9	+0.2
Inhalants ^a	NA	0.0	0.0	0.1	0.1	0.2	0.1	0.2	0.2	0.0
Inhalants adjusted ^b	NA	NA	0.1	0.2	0.2	0.4	0.4	0.3	0.3	0.0
Amyl and butyl nitrites ^c	NA	NA	0.0	0.1	0.2	0.3	0.3	0.1	0.3	+0.2
Hallucinogens	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0
Hallucinogens adjusted ^d	NA	NA	0.2	0.1	0.2	0.3	0.2	0.0	0.3	+0.2 ^j
LSD	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0
PCP ^d	NA	NA	0.1	0.1	0.1	0.3	0.3	0.1	0.2	+0.1
Cocaine	0.1	0.1	0.2	0.3	0.2	0.4	0.3	0.2	0.3	+0.1
Crack cocaine ^e	NA	NA	NA	NA	NA	NA	0.1	0.1	0.2	+0.1
Other cocaine ^e	NA	NA	NA	NA	NA	NA	0.2	0.2	0.1	-0.1
Heroin	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	+0.1
Other opiates ^f	0.1	0.2	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.0
Stimulants	0.5	0.5	0.6	1.2	1.1	NA	NA	NA	NA	NA
Stimulants adjusted ^g	NA	NA	NA	NA	0.8	0.4	0.3	0.3	0.3	0.0
Sedatives	0.3	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	+0.1
Barbiturates	0.1	0.2	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.0
Methaqualone ^g	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0
Tranquilizers	0.1	0.3	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.0
Alcohol										
Daily	5.7	6.1	6.9	6.0	5.5	5.0	4.8	4.2	4.2	0.0
Five or more drinks in a row in the last 2 weeks	36.8	39.4	41.2	41.4	40.8	36.7	37.5	34.7	33.0	-1.7
Cigarettes										
Daily	26.9	28.8	25.4	20.3	21.2	19.5	18.7	18.1	18.9	+0.8
Half-pack or more per day....	17.9	19.4	16.5	13.5	13.8	12.5	11.4	10.6	11.2	+0.6

KEY: NA = not available.

NOTE:

^aData are based on four questionnaire forms in 1975-1988; the number of respondents to this item (n) is four-fifths of the total sample size indicated at the top of the column (N). Data are based on five questionnaire forms in 1989; n is five-sixths of N indicated.

^bFigures are adjusted for underreporting of amyl and butyl nitrite.

^cData are based on a single questionnaire form; n is one-fifth of N indicated in 1979-1988 and one-sixth of N indicated in 1989.

^dQuestion text changed slightly in 1987.

^eFigures are adjusted for underreporting of PCP.

^fData are based on two questionnaire forms; n is two-fifths of N indicated in 1987-1988 and two-sixths of N indicated in 1989.

^gOnly drug use which was not under a doctor's orders is included here.

^hFigures are based on the data from the revised question, which attempts to exclude the inappropriate reporting of nonprescription stimulants.

ⁱAny apparent inconsistency between the change estimate and the prevalence estimates for the two most recent classes is due to rounding error.

^jDifference is statistically significant (p < .01).

SOURCE: U.S. Department of Health and Human Services, data from the 1989 "Monitoring the Future Survey" of drug abuse among U.S. high school seniors (conducted by the Institute for Social Research, University of Michigan, and funded by the National Institute on Drug Abuse), *HHS News*, Feb. 13, 1990.

attempt to correct for confounding effects (189).³⁵ Furthermore, because different drugs have different effects on the body, it is important to understand whether there are specific risk factors for individual drugs. Unfortunately, much of the research that has been conducted with adolescents does not allow such a fine-grained analysis. Drug use is often

approached globally, and heavy users and those for whom drug use is causing a problem typically are not separated from those who use substances less frequently. Because alcohol is the most frequently used drug, analyses that combine drug use of all kinds are unlikely to be informative about the risk factors for use of specific drugs. While there is

³⁵In addition, psychoactive substances of choice among users may change over time. When such changes occur, research normally lags behind the new use patterns. For example, the body of existing research literature is relatively rich with studies of drugs that have been in use in American culture for a considerable period of time (e.g., alcohol, tobacco, marijuana), while studies of the newer psychoactive substances such as "crack" or "ice" are uncommon.

considerable evidence that adolescents who use one substance are also likely to use another, use of any one substance does not inevitably mean that other substances are being used (216).³⁶

Several factors that are believed to lead to drug use among adolescents have been investigated more thoroughly than others. The more heavily researched factors include having a substance-abusing parent (163), other parental behavior as discussed under “family factors” below (25,26), associating with substance-using peers (189), and unconventionality (139,140). Most recently, considerable attention has been devoted to research on possible biological factors in addiction. The most interesting and valuable studies have investigated the influence of a variety of factors using a longitudinal design (e.g., 208). However, even the longitudinal studies are limited because they have relied on adolescents’ self-reports and have not examined biological propensities to addiction. Further, even the most advanced statistical methods are limited in the number of factors they can analyze simultaneously.

Much less research has been conducted on the impact of specific drugs themselves and on the impact of school, work, and other broader societal environments on adolescents’ use of psychoactive substances. A 1990 report by OSAP in DHHS recently listed 65 “widely identified” risk factors and 39 “widely identified” protective factors for adolescent drug abuse (312). A previous OSAP report summarized many of the most widely identified risk factors in a figure (see figure 12-6).³⁷

This section reviews evidence on the following risk and factors for substance use in general: family factors; factors related to peers; personal characteristics of adolescent substance users; school, work, and societal impacts; and appetitive drug effects. Then it reviews some of the evidence for factors associated with adolescents’ use of the specific substances tobacco/cigarettes and alcohol. Readers are advised that research into risk factors for adolescent drug use and abuse is deservedly a rapidly growing field

(312). Good evidence on risk factors is needed for the design of effective preventive interventions.

Family Factors Associated With Psychoactive Substance Use by Adolescents

Any examination of the influence of family (or any other social variable) on adolescent substance use must recognize that the factors under consideration usually are not determinative. Adolescents who, to all outward appearances, are at “high-risk” of becoming psychoactive substance users may never use such substances, while others theoretically isolated from significant “risks” may indulge heavily. Researchers are examining this phenomenon, which has been variously termed “invulnerability” or “resiliency,” in an effort to identify protective factors which help to immunize an individual against the risk of a negative life outcome (171,178,239,333).

Substance-Abusing Parents—Most of the research on having substance-abusing parents as a risk factor for adolescent drug use has focused on children of alcoholic parents and may not always be generalizable to parents who use other drugs. Still it appears that children of substance-abusing parents are more likely than other children to use psychoactive substances (163,285). Whether this finding reflects inherited biological factors or factors related to living with substance-abusing parents is an unresolved issue (100,163).

In a recent review for NIDA, Kumpfer drew the following conclusion:

Biomedical research in this area [children of substance abusers] is still in its infancy, and the few existing studies need additional replication; but a consistent picture is beginning to emerge of 1) differences in metabolism and reaction to alcohol and other drugs, 2) predisposing temperament and psychological characteristics, 3) neurological and biochemical differences, and 4) psychological and cognitive differences that could make a child more vulnerable to substance abuse (163).

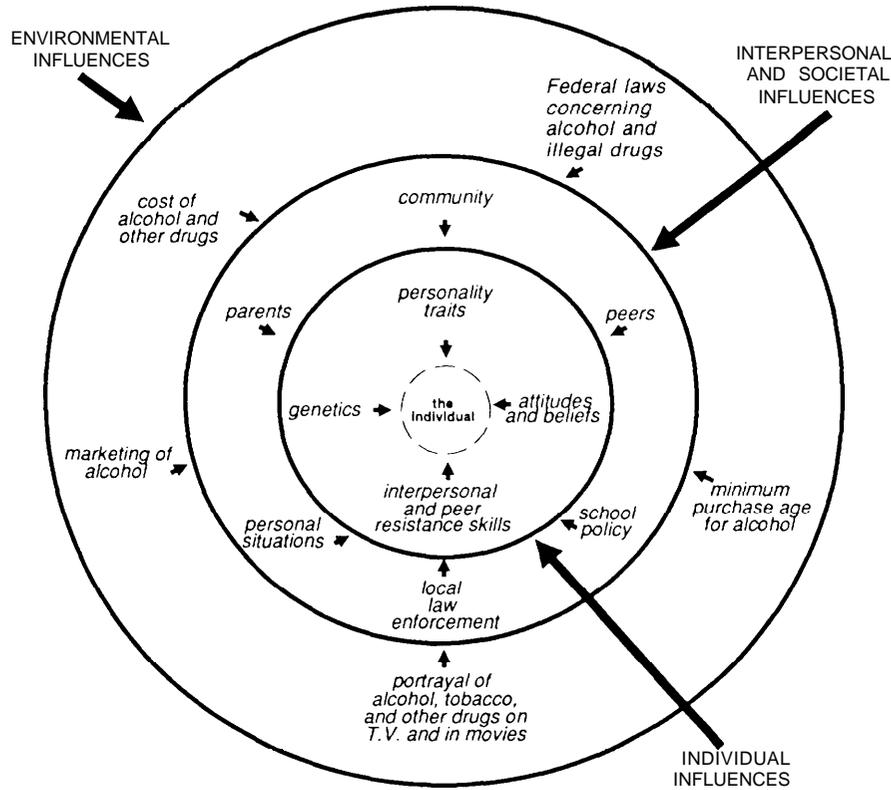
The strongest evidence of biological vulnerability has come from research on alcoholic fathers and

³⁶In a review of the literature on covariation in adolescents’ use of various substances, Osgood and Wilson found correlation coefficients ranging from 0.30 to 0.68 (216).

³⁷The terms used in the 1990 OSAP report (312) were somewhat different from those in the earlier OSAP report (310), although they can be made to correspond. The 1990 OSAP report used the terms ecological environment (e.g., poverty, living in an economically depressed area with high unemployment); family environment; constitutional vulnerability/strengths of the child; early behavior problems/personality of the child; adolescent problems (e.g., school failure and dropout); and negative adolescent behavior and experiences (e.g., resistance to authority, strong need for independence, hopelessness, vulnerability to peer pressure) (312).

³⁸Kumpfer notes there is some, but not much, research on heroin-abusing mothers and their children (163).

Figure 12-6—Factors That May Influence Alcohol, Tobacco, and Other Drug Use by Adolescents



SOURCE: U.S. Department of Health and Human Services, Public Health Service, Alcohol, Drug Abuse, and Mental Health Administration, Office for Substance Abuse Prevention, *Prevention Plus II*, DHHS Pub. No. (ADM) 89-1649 (Rockville, MD: 1989).

their sons.³⁸ Recent research on the effects of serotonin uptake inhibitors (fluoxetine and fluvoxamine) and norepinephrine uptake inhibitors (desipramine) on alcohol and food intake suggest that problem alcohol users (and overeaters) may be self-medicating for neurotransmitter deficiencies (163). Whether these neurotransmitter deficiencies are inherited is unknown.³⁹

Existing research on the *behavior* of substance-using parents is scanty and not systematic (163). Nevertheless, the work that has been done suggests that such a parent is typically self-involved and lacking in parenting and family management skills.

The lack of parental supervision and training in appropriate behavior often results in poor home and school behaviors (temper tantrums, crying, aggression, sadistic behaviors, lying, screaming, noncompliance, absence from school, lateness) and social isolation (163). Such children may be more vulnerable to the use of substances to self-medicate. This chain of events is more likely to occur if the child has special needs that may occur as a result of substance use during pregnancy or inherited biochemical deficiencies (163). In addition to being more vulnerable to deficits that may lead them to abuse substances, children of substance users are more

³⁹A complete review of the evidence for biological issues in psychoactive substance use and abuse among adolescents is beyond the scope of this Report.

likely to be directly exposed to substances and even to be encouraged or permitted by their parents to use substances (25).

Other Parental Behavior Associated With Substance Abuse Among Adolescents—A recently completed longitudinal study of children and their parents by Baumrind demonstrates the impact of parents on psychoactive substance use and abuse (26). Baumrind's study is impressive for its method and intensiveness: experienced psychologists made comprehensive ratings of both child and parent when the children were ages 4, 9, and 15. In addition, Baumrind examined different levels of substance use and assessed the relationships between substance use and other adolescent behaviors, both desirable and undesirable.⁴⁰

Baumrind found that a variety of family types protected their adolescents from problem use of substances, but in different ways and with different consequences. Her findings included the following:

- “Authoritative” (but not authoritarian) families, in which parents are firm and committed but also embrace some nontraditional beliefs, were able to protect their adolescents from problem drug use *and* generate competence.⁴¹
- Children from “democratic” homes, in which parents value freedom highly, were as competent as children from authoritative families during adolescence, but more (not all) of the children from democratic homes were heavy users of marijuana or alcohol.
- Children from directive homes, in which parents are considerate and supportive and value control highly, avoided drugs altogether but were not as competent as the adolescents from democratic and authoritative homes.

Unlike adolescents who *experimented* with psychoactive substances, Baumrind found that adolescents whose drug use indicated *dependence* had come from families that were quite dysfunctional (26). Similarly, a study by Newcomb and Bentler

suggested that there were relationships between family disruption in year 1 (junior high school), lack of social conformity in year 5 (high school), and problem drug use in year 9 (early twenties) (208).⁴²

Peer-Related Factors Associated With Psychoactive Substance Use by Adolescents

Use of drugs by peers has been the most consistent factor associated with adolescents' use of substances (189). Robinson and his colleagues found, for example, that perceptions of friends' use of marijuana (the only substance chosen for inclusion in the analysis) accounted for 41 percent of the total variance in a group of 10th graders' use of various substances (including tobacco, alcohol, marijuana, cocaine, LSD, and heroin) (237). However, findings of peer influence are typically confounded by researchers' use of cross-sectional research designs. In other words, at least some of the adolescents who use drugs may be choosing peers who also use drugs.

The importance of a longitudinal research design is shown in Stein, Newcomb, and Bentler's analysis of data collected over an 8-year period beginning when respondents were in junior high school (261). Analyses done *within any* particular year supported the findings of previous research on the importance of peer influences on adolescent substance use. In analyses of substance use done *across time*, however, only prior drug use and lack of social conformity⁴³ were found to be significantly related to adolescents' drug use. Among junior high school students, for example, the less the social conformity of the young adolescents, the more likely they were to think that their peers and adults they knew were using drugs or alcohol and that the community they lived in approved of drug use.

Stein, Newcomb, and Bentler, in contrast to Robinson and colleagues, examined the differential impact of adolescents' perceptions about adult and peer use of different drugs (261). The study found that adolescents' perceptions of adult drug use generally exerted an influence on their own alcohol

⁴⁰However, Baumrind's work was limited to an essentially white middle-class population and the findings may not apply to families from other ethnic, racial, or economic backgrounds.

⁴¹For further discussion of authoritative parenting and other family types, see ch. 3, “Parents and Families' Influence on Adolescent Health,” in this volume.

⁴²The potential impact of family disruption (measured as whether the parents were married to each other) was not measured until year 5 of the study. However, in their model, the researchers include family disruption as a variable present in year 1, apparently because they assume that if the parents were not married to each other in year 5, disruption was present in year 1. This may be a reasonable assumption, but it was not tested empirically in the study.

⁴³Social conformity was measured by obedience to law, conservatism, and religious commitment (261).

use, and perceptions of peer drug use exerted an influence on their marijuana and other drug use. Unfortunately, Stein, Newcomb, and Bentler did not take into account the difference between use and problem use until year 9 of their study, when respondents were in their early twenties. Nevertheless, they did find a statistically significant relationship between disruptive drug use in year 9 (defined as drinking or using drugs at school or at work) and any drug use in year 5. Stein, Newcomb, and Bentler's work is limited by their reliance on respondent self-reports, but the study's use of a longitudinal design and its interactionist perspective make it a model for future research.

Personal Characteristics of Adolescent Substance Users

Is there a type of adolescent who is more likely to become a substance user? While adolescent substance use cuts across age, gender, racial, ethnic, and geographic lines, some intriguing research has explored the possibility that there may be clusters of personality traits and ways in which some adolescents perceive their environments that indicate a heightened risk of problem use of psychoactive substances, as well as other "problem behaviors."

Starting from the premise that certain behaviors (including marijuana use, problem drinking, and cigarette smoking) are problem behaviors, Jessor and colleagues have developed a theory to account for such behaviors among adolescents (139,140).⁴⁴ In their model, personality factors combine with an adolescent's view of peers and adults to predict problem behaviors. The personality factors may be a function of antecedent or background variables (142). In testing problem behavior theory, Jessor and his colleagues have found that adolescents who are more likely to use marijuana or become involved with drinking place a high value on being critical of society, a low value on academic achievement, and a high value on independence; tolerate deviant behavior; and have lower religiosity (140).

Using both longitudinal and cross-sectional analyses, Jessor and colleagues found that such "psycho-social unconventionality" accounted for about a quarter of the variance in marijuana use (140). Another set of factors—lower perceived controls by friends, lower compatibility between what friends expect and what parents expect, greater influence from friends than parents, and (most strongly) greater perceived approval of and models for marijuana use and other problem behaviors among friends—accounted for about a third of the variance in marijuana use (140). Jessor found that problem drinking⁴⁵ had predictors markedly similar to those of marijuana use—an expected result given the high correlation between marijuana use and problem drinking (139).

Similar associations have been found with other behavioral factors. Robinson and his colleagues found that the use of unhealthful weight control practices (use of diet pills, laxatives, and diuretics for both boys and girls and self-induced vomiting for weight control among girls) were also significantly (although weakly) associated with substance use for both boys and girls (237).

These findings derived from problem behavior theory have been instrumental in advancing understanding of the covariation between substance use and other problems. Nonetheless, problem behavior theory suffers from several limitations. It provides only a partial accounting of problem behaviors, leaving many such behaviors without explanation. It does *not* empirically examine the restricted set of sociological and demographic factors that are its foundation. But most importantly, the focus on behaviors, perceived environment, and personality factors may result in victim blaming and the channeling of interventions too narrowly toward individuals and their behavior, to the exclusion of other possibilities.

Generally, Baumrind found that adolescent substance use was better predicted by parental behavior

⁴⁴Also see D.W. Osgood and J.K. Wilson, "Covariation of Adolescent Health Problems," 1990 (216).

⁴⁵Two measures of problem drinking were used for these analyses: frequency of drunkenness in the past year and drinking-related negative social consequences.

⁴⁶In addition, the term "problem behaviors" carries an unfortunate connotation and may in some respects be historically and culturally bound, as well as oriented to adult conceptions of adolescent problems. For example, "activist protest" was initially examined as a problem behavior (142); at other times, or by other analysts, student apathy might legitimately be considered a problem behavior, and activism an indicator of "social health" (96,224). It is interesting to note that activist protest was not found to fit the explanatory profile for problem behavior (142). Jessor sometimes uses the term "transition proneness" instead of "problem behavior" to connote that what are termed problem behaviors among adolescents are sometimes reflective of precocious transitions to adult behaviors, such as the initiation of drinking or sexual intercourse (139). Sometimes, of course, they are illegitimate or problem behaviors for all ages (e.g., marijuana use, problem drinking).

than by the personal characteristics and early behavior of the adolescents (26). Nevertheless, Baumrind found that some personal characteristics were associated with substance use. Characteristics of children that Baumrind found to be associated with later substance use included lack of social confidence (shyness), as well as problem behavior at age 9. Baumrind's findings concerning shyness are consistent with Kellam's earlier findings (26,157,158). Attributes of adolescents that Baumrind found to be related to substance use included low cognitive competence, concern about peer approval, and lack of concern about adult approval (26).

Relationship Between Mental Health Problems and Use of Psychoactive Substances by Adolescents

Do adolescents use and abuse alcohol and other drugs because they have emotional or other mental health problems? Little research has addressed this important question, and the results are inconclusive (26).

Observers of clinical populations have often reported a co-occurrence of drug use and other mental disorders among adolescents (e.g., 249). A 1979 review by Jessor concluded that adolescents' marijuana use was not related to psychopathology or maladjustment (136), but some studies have shown that substance use has been preceded by depressed mood (153,209). Data from the National Institute of Mental Health's Epidemiologic Catchment Area study suggest that individuals who had a depressive or anxiety disorder before age 20 were twice as likely to have a substance use disorder in young adulthood (60,230). Although this finding does not necessarily mean that adolescents who use substances have mental health problems, another analysis from the Epidemiological Catchment Area study found that individuals who reported having used drugs early (before age 15) also reported a number of mental health problems at an early age (237).

School, Work, and Societal Impacts on Psychoactive Substance Use by Adolescents

In comparison to the amount of research on families and personal characteristics of adolescents, there has been little empirical research to test the specific impacts of schools, work, and society on psychoactive substance use. However, reasonable hypotheses have been developed based on observa-

tions of how these environments affect other aspects of adolescent development, behavior, and health.

Schools-Schools exert both direct and indirect influences on patterns of drug and alcohol use (262). In particular, schools are influential in the kind of self-concept an adolescent develops.⁴⁷ Schools influence whom adolescents come into contact with and help structure the activities of the adolescent over the course of the week (262). Adolescents typically make at least two school transitions that may put them at risk for substance use and abuse: the elementary to junior or middle high school transition, and the junior or middle high school to high school transition. Each of these transitions is likely to take the adolescent from a more to a less personal and protected school environment (86,89,254). In addition, school environments differ in exposure to and acceptability of drugs and alcohol. Young adolescents who attend school with older teenagers are more likely than are young adolescents who are more segregated from older teenagers to be exposed at an early age to substance use (262).

Some adolescents (e.g., those with prior academic difficulties, prior psychosocial problems, or who lose a large number of friends during the school transition) are at increased risk for adaptational difficulties (30,240).

Work-Over the past 100 years, adolescents' access to legitimate adult roles has been increasingly constrained. Some substance use has been seen as behavior 'engaged in out of frustration or alienation from adult values' or as behavior "that affirms in a distinctively adolescent fashion, teenagers' desire to be adultlike" (262). Hence, one might expect working to decrease substance abuse by adolescents because it would help them feel more adultlike. The research evidence suggests that, in fact, work may increase substance abuse. Several studies indicate that teenagers who work, especially those who work long hours, are more likely than are their counterparts who do not work or who work fewer hours to use and abuse cigarettes, alcohol, and illicit drugs (121). No studies indicate that working deters drug and alcohol use by adolescents (96).

Steinberg suggests that some of the same factors that may increase adolescent substance use at school transitions-less adult supervision, increased exposure to older adolescents, and stress-may also

⁴⁷For further discussion of the evidence on how schools affect adolescent health, see ch. 4, "Schools and Discretionary Time," in this volume.

increase working adolescents' use of psychoactive substances (262). In addition, paid work provides increasing financial autonomy and income to buy alcohol and drugs, and it may diminish school involvement. It is important to note, however, that the number of hours worked maybe more predictive of substance use than whether the adolescent works or not. According to Steinberg, the evidence is fairly consistent in indicating that working in excess of 15 hours weekly for high school freshmen and sophomores, and in excess of 20 hours weekly for juniors and seniors, places adolescents at greatest risk for work-related problems such as drug abuse (262).

Society—It is ironic that at the same time adolescents are exposed to public service announcements deploring drug use, they are also exposed to advertisements and other media presentations that glorify the use of alcohol and other drugs (107). As Steinberg notes, ‘It is difficult indeed for program developers to persuade adolescents that using drugs and alcohol is undesirable when these same young people are bombarded daily with messages designed to persuade them that they are mood- and image-enhancing’ (262).

Other commentators have noted an overall trend of using more substances as society becomes more advanced and more complex (213).

Appetitive Effects of Drugs⁴⁸

Most studies of risk factors for adolescent substance use have addressed the *initiation* of drug use. Studies that have looked at what makes adolescents persist after first using drugs have tended to ignore the effects of the drugs themselves. A recent overview of research on models of addiction noted that theorists were beginning to recognize the appetitive effects of drugs as important motivators for drug use (17). This recognition departs from earlier models of drug motivation that stressed the reduction of aversive withdrawal symptoms as the core motivation for addictive drug use (17). Furthermore, it has potential implications for drug abuse treatment and possibly for prevention:

Conceivably, the person currently experiencing pleasurable drug effects may be relatively immune to concerns about potential untoward consequences, may be especially ‘primed’ to redose with the drug,

may attribute various positive events to the drug, and so on (17).

The appetitive effects of drugs have not been a particular focus of explanation for adolescent substance use.

Factors Associated With Adolescents' Use of Alcohol and Cigarettes

Factors Associated With Use of Alcohol—Using survey data collected from 499 10th, 11th, and 12th graders in four large suburban public high schools, Kline and his colleagues found several variables related to higher levels of drinking and to problem drinking behavior:

- adolescents' ratings of high levels of family disengagement and poor intrafamily communications;
- adolescents' ratings of peer approval of alcohol use;
- parental approval of alcohol use;
- poor social skills;
- positive expectancies for alcohol use (161a).

Despite the sophisticated model for statistical analysis Kline and his colleagues used, it is important to keep in mind that their data were collected in a cross-sectional survey. Thus, some or all of the variables—poor social skills, positive expectancies for alcohol use, peer approval, even poor family functioning and perceived parental approval—could have been effects of greater alcohol use rather than causes. Furthermore, the data were collected from a student population that was 96 percent white and may apply only to this population.

Jessor's research on initiation of drinking suggests that significant psychosocial risk factors (e.g., value on academic achievement) can be identified among adolescents who have not yet begun to drink (139).

Factors Associated With Use of Cigarettes—Miller and Slap recently reviewed evidence for the factors associated with cigarette smoking by adolescents (189). Although hundreds of associations have been reported in the literature, Miller and Slap's review found that the weight of the literature supported strong and consistent associations of smoking with only three variables:

⁴⁸*Appetitive effects* is the term for usually pleasurable sensations or feelings such as euphoria—instant a craving (or appetite) for continued use of a substance in order to prolong or re-create the desired effects.

- parental smoking,
- peer smoking, and
- sibling smoking (189).

The variables they found *not* to have strong and consistent associations with smoking by adolescents were knowledge and attitudes about smoking, demographic factors, school activities, and psychologic factors. Miller and Slap noted, however, that several flaws in the research methods used to investigate risk factors for smoking limit interpretation of all such data, and they concluded that the research evidence had little utility for the design of interventions.

Summary: Factors Associated With Psychoactive Substance Use and Abuse by Adolescents

The epidemiological evidence on the prevalence of psychoactive substance use by adolescents and the evidence on risk factors suggest that the use of alcohol or other drugs by adolescents cannot be considered a single behavior with a simple cause. To some extent, one-time use of some psychoactive substances (especially alcohol and tobacco, but perhaps even marijuana) is common among contemporary U.S. adolescents, but one-time use does not *necessarily* suggest the presence of some untoward risk factor. For very low levels of use of some substances, it would be difficult to distinguish between the characteristics and social circumstances of users and nonusers.

On the other hand, a number of risk factors have been associated with *frequent or heavy use* of psychoactive substances (with such use defined differently in different studies for different substances). These risk factors for frequent or heavy use include substance-abusing parents, dysfunctional families, placing a low value on academic achievement, having low cognitive competence, early problem behaviors, being shy, having non-drug-related mental health problems, and association with drug-using peers.

Much of what is known about risk factors for adolescents' abuse of alcohol and other drugs and the implications for the prevention of such abuse is

summed up by Steinberg, in his review for OSAP in DHHS (263). In that review, Steinberg concluded:

... the young person who approaches adulthood with a sense of confidence and purpose and with well-developed social and instrumental competencies; who associates with peers who value achievement and responsible behavior and who devalue **drug** and alcohol use; and who spends time in settings which are adequately supervised by adults is at relatively low risk for substance abuse. In contrast, the young person who has few present skills and little hope for the future; who associates with peers who embrace an antisocial or a pro-drug lifestyle; and who spends a large part of his or her day isolated from adults runs the risk of developing drug and alcohol problems (263).

One policy dilemma may lie in deciding how to allocate resources among different approaches to the problems of psychoactive substance use by adolescents. Alternatives include reducing the supply of drugs,⁴⁹ reducing the demand for drugs (e.g., by efforts to prevent any use of any psychoactive substance by any adolescent or to prevent use that results in injury, incapacity, dysfunctionality, destruction, or damage to self or others), and treating adolescents with substance use problems who appear to be in the most trouble. Unfortunately, as the preceding discussion on risk factors and the discussion below on consequences of adolescent drug use suggest, available research provides only partial guidance on this question.

Consequences of Psychoactive Substance Use by Adolescents

Given concerns about the harmful consequences of psychoactive substance use, it is surprising that the research literature on the short-term and longer term effects on adolescents is so sparse (25,152). As Newcomb and Bentler have stated, "Following the area of treatment, consequences of teenage drug use are the second least understood and researched area of child and teenage substance use" (208). The research literature on adolescent substance use is replete with studies on risk factors, age of onset, and incidence and prevalence, but the implications of use for the mental, physical, and social development of

⁴⁹*Supply side* prevention efforts have included legislative efforts to prohibit the sale and consumption of alcoholic beverages (e.g., the 18th amendment to the U.S. Constitution minimum **drinking** age laws); to restrict access to **pharmacologic** agents (e.g., **interdiction**, treaties on psychotropic drugs, the Uniform Controlled Substances Act [Public Law 91-513; 21 U.S.C. 800 *et seq.* and 21 U.S.C. 100 *et seq.*]); and to regulate the availability of tobacco products and alcohol (e.g., advertising codes, laws banning cigarette vending machines). Supply side prevention efforts have tended to be oriented toward law enforcement, regulation, and punitive measures imposed on violators (195). *Demand side* prevention has sought methods of deterring use through information, Persuasion development of alternatives, and the enhancement of individual and family resistance to potential abuse.

adolescents are only recently receiving the attention of serious investigators. Kandel notes:

Despite the initiation of a relatively large number of longitudinal studies in the last decade, more is known at this time about the antecedents of initiation of drug use than about the consequences of use either in adolescence or in young adulthood. Very little is known about how patterns of drug use affect health, psychological well-being, and adult participation in the labor force, marriage, or parenthood (152),

In addition, most of what is known establishes the coexistence of certain adolescent health problems (e.g., delinquent behavior, drug use, pregnancy [216]), but not that one problem causes another.⁵⁰ This section will examine briefly the association between adolescent substance use and subsequent physical and mental health problems, educational achievement and employment, adolescent sexual activity and pregnancy, marriage and divorce, and delinquency.

Physical Health Consequences

The pharmacologic⁵¹ effects of various psychoactive substances on the human body have been widely studied. Box 12-A, presented earlier in this chapter, notes some of the pharmacologic actions of major classes of psychoactive substances. Few studies have been done on the effects of psychoactive substances on adolescents.

In addition to the properties of drugs noted in box 12-A, the mode of ingestion clearly has health implications. For example, the ingestion of nicotine by smoking tobacco has different effects than the chewing of smokeless tobacco does (317,320). Similarly, the ingestion of cocaine by smoking freebase has effects that differ from the effects of snorting powder cocaine. The hazards to adolescents of human immunodeficiency virus (HIV) infection associated with the sharing of dirty needles or other

intravenous drug use equipment are well-established.⁵² Inhalation of solvents or aerosols can cause liver damage, cardiac arrest, or neurological damage (62,68).⁵³ Another mode of death is through suffocation due to inhalation of a solvent in a closed space (i.e., a plastic garment bag).

As noted above, relatively few adolescents die from unintentional drug poisoning. In 1988, the NIDA DAWN system reported that 9 adolescents between 10 and 14 years of age and 79 15- to 17-year-olds died as a result of drug toxicity (302). Suicide attempts, however, are a different story. Of the 13,975 adolescents between 10 and 17 years of age who were brought to emergency medical services responding to the DAWN survey in 1988, 61.8 percent were suicide-related drug cases (302). Thus, intentional overdose is a more serious threat to life than unintentional poisoning from a lethal dosage.

While alcohol has been extensively studied in connection with accidental injuries,⁵⁴ other drugs have not (202). No systematic epidemiological studies have been conducted to identify what role other drugs may play in various injury events. Nonetheless, it is likely that substances other than alcohol share some common traits which increase risk of accidental injury or death. Thus, it may be instructive for future research to examine what is known about the consequences of illicit and other drug use on adolescent accidents and injuries.

It is well established that alcohol use contributes to a significant number of adolescent accidents and injuries. The most obvious examples of alcohol's role in adolescent injuries are automobile accidents in which alcohol is a factor. Adolescents are at higher risk than adults of becoming involved in a motor vehicle accident if they have been drinking (167). In 1984, for example, 15- to 24-year-olds constituted 20 percent of the population but accounted for 35 percent of drinking driver deaths. In

⁵⁰For a fuller exploration of the significance of covariation among selected health compromising behaviors, see D.W.Osgood and J.T.Wilson, "Covariation of Adolescent Health Problems," 1990 (216).

⁵¹Pharmacologic means related to the nature, chemistry, effects, and uses of drugs.

⁵²For further information on transmission of the HIV virus, acquired immunodeficiency syndrome (AIDS), and AIDS-related complex, see ch. 9, "AIDS and Sexually Transmitted Diseases: Prevention and Services," in this volume.

⁵³According to Cohen (62), some of the volatile solvents are known poisons, including carbon tetrachloride, benzene, hexane, and leaded gasoline. Hexane and leaded gasoline can cause polyneuritis, and the latter can produce encephalopathy. Toluene has been linked to disorders of the kidney, nervous system, and bone marrow. Sudden sniffing death may result when a solvent or aerosol propellant is inhaled and the oxygen content of the blood is reduced. Ventricular fibrillation or other arrhythmia occurs and the person dies abruptly (62). Inhalants tend to be subject to "fad" use. Gasoline, vegetable oil spray, transmission fluid, liquid shoe polish, amyl nitrite, isobutyl nitrite, gold or bronze paint sprays, paint thinners, and model airplane glue have been used at various times.

⁵⁴For further discussion, see ch. 5, "Accidental Injuries: Prevention and Services," in this volume.

1988, 3,158 adolescents ages 15 to 19 died in alcohol-related crashes (324).

Alcohol is also involved in nearly 40 percent of adolescent drownings (132,215,217,259,335). And, when fatal pedestrian and bicycle accidents are evaluated, alcohol again assumes a major role. In 1988, nearly a third of the victims of fatal pedestrian or bicycle accidents had a blood alcohol content of 0.01 percent or more, and approximately a quarter of those victims had blood alcohol concentrations in excess of 0.10 percent (324). Thus, as discussed elsewhere in this Report, it appears to take less alcohol to precipitate accidents among young people than among older adults.⁵⁵

Mental Health Consequences

Just as mental health problems as predictors of adolescent drug use have not been studied extensively, the mental health consequences of adolescent drug use have received little attention. In a 1986 study by Kandel and her colleagues, adolescent smoking predicted elevated depressive mood scores among female young adults and elevated scores on a psychosomaticism scale among male young adults (152). Illicit drug use also predicted greater likelihood of consultation with a mental health professional (particularly among females). “Thus,” the authors conclude, “while use of cigarettes predicted dysphoric mood, only illicit drug use predicted discomfort severe enough to seek help from a professional” (152).

Newcomb and Bentler’s research also suggests that specific types of drugs produce different mental health consequences (208). For example, frequent use of cocaine among the adolescents they studied increased loneliness, suicidal thinking, and psychotic behavior, while decreasing the user’s social supports. On the other hand, alcohol (when used by itself) reduced loneliness, increased social support, and enhanced the drinker’s positive self-feelings (208).

Educational Consequences

In 1988, Mensch and Kandel examined the relationship between drug use and the likelihood an adolescent would drop out of school (184). Using event-history analysis (which specifies the dynamic relationship between the use of drugs and completion of one’s education), they examined data from the National Longitudinal Survey of Young Adults, which interviewed over 12,000 subjects aged 19 to 27 in 1984, 5 years after the initial survey. They found that prior use of cigarettes,⁵⁶ marijuana,⁵⁷ or other illicit drugs⁵⁸ increased the propensity of both sexes to drop out of school. The earlier an adolescent was initiated into use (of alcohol, marijuana, or other illicit drugs for males or cigarettes and marijuana for females),⁵⁹ the more likely it was that he or she would not have graduated from school by the time of the survey. In their multivariate analysis, Mensch and Kandel controlled for various factors (e.g., parental education, family intactness, self-esteem) that could influence both drug use and dropping out of school, leading them to the conclusion that dropping out is a partial function of drug use itself. At the same time, however, Mensch and Kandel found that early intercourse and pregnancy among females were both very highly related to dropping out of school and were more likely to lead to dropping out than was early drug use (184).⁶⁰

In an earlier analysis based on data from 1,004 men and women interviewed when they were 15 or 16 and then reinterviewed in 1980-1981 at age 25, Kandel and her colleagues found that substance use during adolescence⁶¹ had very little effect on the level of education attained by young adulthood (339). The most predictive factor related to eventual educational level was the educational aspiration of the adolescent.

Employment-Related Consequences

Using life and drug histories of 1,325 young adults aged 24 and 25 in 1980-1981, Kandel and Yamaguchi found that those interviewed who were

⁵⁵See ch. 5, “Accidental Injuries: Prevention and Services,” in this volume.

⁵⁶Measures of use: Ever, last year, or 100 or more times ever.

⁵⁷Measures of use: Ever, last year, or one or more packs per day in the last 30 days.

⁵⁸Measures of use: Ever, last year, or 40 or more times ever.

⁵⁹Mensch and Kandel attribute the gender differences to differences in the social implications of these substances for males and females (184).

⁶⁰Ch. 10, “Pre-cy and Parenting: Prevention and Services,” in this volume, considers risk factors for, and consequences of, adolescent sexual activity and pregnancy.

⁶¹Such use was defined as use of any of 12 classes of drugs 10 or more times in a lifetime.

ever illicit drug users in adolescence tended to have greater difficulty in obtaining and holding a job (155). These young adults also had a higher rate of unemployment and had experienced greater turnover than their cohorts who had not used drugs in the 10th and 11th grades. However, Kandel and Yamaguchi point out that the causal order between job turnover and drug use is far from clear (152,155). There may be preexisting differences among individuals who start using drugs, and the relationships among employment problems and drug use may be attributable to these underlying variables rather than to the drugs themselves.

Sexual Activity, Pregnancy, and Pregnancy Outcomes

The use of drugs—including cigarettes and alcohol—by adolescents has been associated with early sexual experimentation and permissive attitudes about sexual behavior (216,338).⁶² Various studies have revealed a clustering of the variables of early sexual behavior in adolescents and early onset of the use of alcohol and tobacco (137, 141 ,216). The Institute of Medicine cautions, however, that a causal link between alcohol use and early sexual activity has not been proven, despite the disinhibitory effects of alcohol (200).

Studies have varied as to whether there is a relationship between the use of illicit drugs and premarital pregnancy (216). A 1980-81 study of 706 New York women who had participated in an earlier adolescent survey in 1971-72 indicated that women currently or formerly using illicit drugs other than marijuana were about twice as likely as other women to become pregnant before marriage (338). Similarly, Elster and his colleagues found that male and female adolescents who used marijuana and other drugs were about twice as likely as nonusers to become parents during adolescence (84a). In reviewing these and other findings, Osgood and Wilson noted that the findings relating substance use to adolescent parenthood and pregnancy were roughly evenly divided between significant positive associations and statistically insignificant relationships

(216). Those relationships that were found (e.g., 84a,338) were generally weak (216). A more recent study by the U.S. General Accounting Office (GAO) came to the same conclusions (283).

Poor pregnancy *outcomes* have been associated with smoking and other drug use in several studies of adult mothers (185,210,226,328). For example, mothers who smoke risk preterm delivery, premature detachment of the placenta with adverse consequences for the mother, placenta previa,⁶³ bleeding during pregnancy, and prolonged premature rupture of membranes, as well as exposing their infants to low birthweight and impaired physical and intellectual development (185,317). The use of alcohol (286) and crack cocaine (283a) by pregnant women can have serious consequences for their infants.

In addition, some studies have found a relationship between drug use and the presence of a sexually transmitted disease (216).

Marriage and Divorce

Young adults aged 24 to 25 who used drugs as 10th and 11th graders were found, in two studies, to be more likely than nonusers to become separated or divorced from their spouses (152,339). Newcomb and Bentler ascribe these consequences to stunted maturation:

Childhood and adolescence are critical periods for the development of both personal and interpersonal competence, coping skills, and responsible decision-making. Drug use is a manner of coping that can interfere with or preclude the necessary development of these other critical skills if it is engaged in regularly at a young age. For instance, if a young teenager learns to use alcohol as a way to reduce distress, he or she may never learn other coping skills to ameliorate distress. Thus, teenage drug use may truncate, interfere with, or circumvent essential maturational processes and development that typically occur during adolescence. As one result, teenage drug users enter adult roles of marriage and work prematurely and without adequate socioemotional growth and often experience greater failure in these adult roles (208).

⁶²See ch. 9, "AIDS and Other Sexually Transmitted Diseases: Prevention and Services," and ch. 10, "Pregnancy and Parenting: Prevention and Services," both in this volume, for a discussion of U.S. adolescents' sexual behavior and issues related to pregnancy and parenting among U.S. adolescents.

⁶³*Placenta previa* is a condition in which the placenta develops in the lower uterine segment, in the zone of dilatation, so that it covers or adjoins the internal os. Painless hemorrhage may result.

Delinquency

The link between drug use and other forms of adolescent delinquent behavior⁶⁴ is well established (82,84,143,278), although far from every drug-using adolescent engages in other forms of delinquent behavior (216).⁶⁵ For example, in 1970, Robins and colleagues found that men who were marijuana users in adolescence were more likely as young adults to be violent, have police records, and to fail to graduate from high school (234). But the nature of that association is more elusive, despite the popular notion of the individual led into a life of crime by drugs. A basic question is whether drug use and delinquency are part of a single syndrome or whether developmental stages can be identified when each of these problems emerge (146,236). Examining a national sample of adolescents, Elliott and Huizinga found that delinquent activities preceded experimentation with illicit drugs in about half of the subjects involved with both substance use and delinquency (82). The question of a common etiology remained unresolved.

Kandel, Davies, and others looked into this issue in 1986 and found that there was a predictive association between adolescent involvement with illicit drugs and subsequent engagement in theft among both males and females (339). They did not find a similar correlation between drug use and interpersonal aggression (fighting). Yamaguchi and Kandel found that any marijuana use in the period from adolescence to early adulthood predicts interpersonal aggression (for women) and use of other illicit drugs predicts participation in theft (339).

What Level of Psychoactive Substance Use Is Harmful to Adolescents?

While the preceding review of research on psychoactive substance use suggests that there *are* potentially harmful consequences associated with adolescent use of alcohol and other drugs, some investigators have challenged the notion that *any* substance use, however limited, will typically produce negative effects. These researchers suggest that *experimental* use of psychoactive substances⁶⁶ by adolescents is not *necessarily harmful* (25,208,252).⁶⁷ In fact, Newcomb and Bentler argue, “Infrequent, intermittent, or occasional use of drugs by a basically healthy teenager probably has few short-term and no long-term negative or adverse consequences (25). Baumrind echoes a similar sentiment, seeing adolescent experimentation of various kinds as being more “health-enhancing” than are risk-avoidant behaviors that are phobic or sedentary (25).

For example, Baumrind cautions,

We have yet to subject to rigorous empirical tests the various hypotheses proposing that adolescent experimentation with psychoactive drugs has dysfunctional consequences. Thus, in my opinion, we still cannot show that regular marijuana use is implicated in a causal nexus which produces drug dependence or a dropout mentality, or lack of motivation to achieve and develop, or cognitive decrements relative to a previous level of functioning (25).

As evidence for this perspective, Baumrind points to studies that show that experimental or Light marijuana use in nondelinquent populations is associated with such positive attributes as independence, friendliness, self-confidence, and intelligence (25).⁶⁸ *New-*

⁶⁴See ch. 13, “*Delinquency: Prevention and Services*,” for a detailed discussion of delinquent behavior during adolescence.

⁶⁵In their review for OTA, Osgood and Wilson found correlation coefficients for the relationship between adolescent delinquency and the use of various substances ranging from 0.23 (tobacco and delinquency, males) to 0.53 (alcohol and delinquency, males) (216). While all correlation coefficients reported in the literature were statistically significant (that is, they were more likely to reflect a “real” relationship than to reflect a chance occurrence) and positive (that is, the more likely there was to be use of alcohol, other drugs, or tobacco, the more [rather than less] likely there was to be involvement in delinquent activities), the correlations were not perfect. A perfect correlation is reflected by a coefficient of 1.0. Correlation coefficients can be negative or positive.

⁶⁶*Experimental use* refers to the act of using a psychoactive substance and experiencing its effects as a novelty prompted by curiosity.

⁶⁷However, some researchers believe that there is a clear sequential order of progression from childhood or adolescent involvement with substances that are legal for adults (e.g., alcohol, tobacco) to illegal drugs (155). In their view, use of one substance opens the ‘gate’ to another. As Newcomb and Bentler explained:

“Past behavior is often the best predictor of future behavior, and in drug use this consistency extends to variants of the behavior in which similar but less serious types of drug use are good predictors of subsequent use of more serious drugs. A typical progression maybe starting with coffee and tea, beer or wine, or cigarettes, moving to hard liquor and marijuana, and subsequently moving on to other illicit drugs such as amphetamines, cocaine, or heroin” (153).

However, Newcomb and Bentler caution that the gateway drug theory should not be overinterpreted: “Involvement at one stage does not necessarily lead to involvement at the next stage; rather, involvement at the next stage is unlikely without prior involvement in the previous stage” (208).

⁶⁸These studies demonstrate covariance but not causation.

comb and Bentler found that in the quantities typically used by normal adolescents, cigarettes were more harmful to adolescent health than alcohol, marijuana, or most other drugs over a 4-year period (208).

Other researchers suggest that alcohol or other drug use during adolescence does not necessarily mean that drug use will be continued later in life (e.g., 139,208). For example, among the adolescents studied by Jessor, half (51 percent) of the males who were problem drinkers in 1972 were also problem drinkers in 1979 to 1981, while half (49 percent) were nonproblem drinkers (74,139). For females, the decline in problem drinking was more pronounced—26 percent of the problem drinkers in 1972 were problem drinkers in 1979 to 1981.

Similarly, the ‘sniffing’ of psychoactive solvents (many of which are extremely toxic) is an abusive behavior that also seems to be abandoned by most users as they grow older. Research suggests that users often ‘mature out’ of solvent inhalation (62,68).

The seeming contradiction between research showing that drug use can have harmful effects during adolescence and afterward and studies showing no harmful (and even some positive) effects may reflect, at least in part, the differential consequences of using different study populations, different levels of drug use, and different research designs in the available studies (216). For example, Baumrind generally uses a higher level of drug involvement than the “any use” standard employed by Kandel and her colleagues to define drug users (26). Similarly, Baumrind would remove such “heavy users” from the pool of research subjects when analyzing the effects of ‘experimental use’ on adolescents. Thus, design distinctions can profoundly alter the database and permit or prevent discrete analysis of selected categories—thereby giving rise to results which appear to be in conflict with related data developed through a different

approach. The lack of uniform definitions and consistent controlled variables, differences in populations (e.g., by age, geographic region, racial and ethnic composition), the inclusion or exclusion of particular substances—all combine to make analyses across studies exceedingly difficult and cloud efforts to measure the consequences of adolescent drug use.

Economic Costs of Drug Abuse by Adolescents

The economic costs to society of use and abuse of alcohol, tobacco, and drugs by U.S. adolescents ages 10 to 18 have not been estimated. The closest current estimates of some of the economic costs to society come from a report by Rice and her colleagues to ADAMHA’s Office of Financing and Coverage Policy in DHHS (233).

In their report, Rice and her colleagues were able to estimate 1985 *core* costs—i.e., “all costs directly related to the treatment and support of persons with [alcohol and drug abuse] disorders as well as the indirect costs associated with these disorders” —for alcohol and drug abuse problems for individuals under age 15 and ages 15 to 44 (233).⁶⁹⁷⁰⁷¹ Rice and her colleagues did *not* include the costs of smoking or other tobacco use in this study.

Rice and her colleagues estimated core costs related to *alcohol abuse* to be \$58.1 billion, of which \$796 million (1 percent) could be allocated to individuals under 15 and \$34.9 billion (60 percent) to individuals ages 15 to 44 (233). Core costs related to *illicit drug abuse* were estimated to be \$10.6 billion, of which \$98 million (1 percent) could be allocated to individuals under 15 and \$7.2 billion (68 percent) to individuals ages 15 to 44 (233). In addition to estimating core costs related to alcohol and drug abuse, Rice and her colleagues estimated *other related costs*. Other related costs included direct [related] costs of crime, motor vehicle crashes, social welfare program administrative costs, and costs associated with the destruction of property by

⁶⁹Direct costs included by Rice and colleagues were the amounts spent in 1985 for personal health care for persons suffering from alcohol and drug abuse disorders, including hospital and nursing home care, physician and other professional services, and prescription drugs. Also included indirect costs were support costs related to the treatment of alcohol and drug abuse disorders, such as expenditures for research, training costs for physicians and nurses, program administration, and net cost of private insurance. Indirect costs were the value of lost output resulting from reduced productivity, lost work and housekeeping days, and losses due to premature death from alcohol and drug abuse disorders. For all ages together, core costs accounted for 83 percent of total alcohol abuse costs and 24 percent of drug abuse costs (233).

⁷⁰Rice notes that the under age 15 group includes costs for 15- to 17-year-olds for several cost categories (including alcohol, drug abuse, and specialty institutions and Federal providers); thus, the costs of the under age 15 group are overstated, and the costs for the 15 to 44 age group are correspondingly understated in some instances (233).

[T] Total economic costs (including core and noncore costs) were estimated at \$70.3 billion for alcohol abuse and \$44.1 billion for drug abuse (233).

free. They also included indirect [related] costs of productivity losses for victims of crime, incarceration, crime careers, and time spent to care for family members because of their . . . illness” (233). Other related costs of alcohol and illicit drug abuse could not be estimated separately for individuals under 15 (233).

Prevention of Alcohol, Tobacco, and Drug Use and Abuse by Adolescents

Drawing from the common view that “an ounce of prevention is worth a pound of cure,” numerous strategies have been devised to prevent psychoactive substance abuse within American society.⁷²

Primary and secondary prevention efforts have included both efforts to reduce the supply of drugs (e.g., minimum drinking age laws, drug interdiction efforts, laws banning cigarette vending machines) and efforts to curb demand for drugs (e.g., educational efforts, alternatives programs, resistance skills training). The discussion that follows focuses primarily on demand side prevention approaches but also considers some supply side approaches.

Demand Side Prevention Efforts

Historical Perspectives

Some of the first demand side prevention efforts emphasized the harmful effects of substances of different kinds (197a). At the turn of the century, Carrie Nation popularized the “home-wrecking” potential of ‘Demon Rum.’ An anticigarette league was active in the 1920s, and films like “Reefer Madness” in the 1930s associated marijuana use with depravity. Scare tactics are still employed today, despite the fact that a considerable body of research has demonstrated they are ineffective and can sometimes stimulate experimentation (20,36,116,125,160,228, 241,266).

In large part, confidence in the fear-based appeals of the nascent prevention movement yielded to reliance on knowledge-based programs designed to disseminate factual information about drugs and their adverse consequences and “affective education” intended to clarify values and improve self-

esteem and interpersonal social skills. As public concern about adolescent substance use grew in the 1970s, combinations of information and affective education programs were increasingly employed as prevention measures (19).

More recently, approaches to prevention variously termed social influence (227), psychosocial (36), or risk factor (53a) models have been devised to counteract environmental messages and peer behaviors which promote adolescent substance use. These approaches seek to “inoculate” a person against the social pressures which lead to undesirable substance use. They stress techniques for “saying no” to inducements to use a substance (“resistance skills”) (113) and may also include more general life skills and social assertiveness training (36,40,128,220,221).

At the same time these individually targeted, psychosocial approaches are being developed and tested, informational approaches, such as those using mass media, have continued (e.g., 24,33,34). Most recently, so-called systemic, broad-based, or comprehensive approaches to prevent adolescent drug use have been implemented (e.g., 220,221,223, 311). In these approaches, multiple members of local communities (e.g., business, political, and other community leaders, parents, teachers) and multiple channels (e.g., media, school curricula) are used in the prevention effort (113,313).

Categorizing Contemporary Demand Side Prevention Programs

Substance use prevention programs for adolescents can be categorized in a number of different ways, and the absence of a uniform typology can be confusing. One way of categorizing demand side prevention programs is to examine what strategies are used to produce a desired outcome—the “how” of the programs. Another way is to distinguish among the kinds of sites where activities occur—the “where” of program delivery. A third way is to examine what groups are their intended participants—the “who” of the programs.

Prevention Strategies--Using the first approach—categorizing prevention programs by examining

⁷²Primary prevention strategies are efforts to stop or modify the initial use of substances like alcohol, tobacco, drugs, and inhalants. Secondary prevention strategies are efforts to shorten the course of an illness or condition, or end a behavior after it has been initiated, usually by early identification and rapid intervention. In the field of drug abuse prevention, primary and secondary prevention efforts are often difficult to distinguish in practice, because target groups (e.g., groups of adolescent students, communities) may include some drug users. Early intervention efforts, such as student assistance programs, are discussed in the treatment section, below.

what strategies are used to produce a desired outcome—one finds some of the major models of demand side prevention programs identified in the literature to be the following:

- *Knowledge/attitudes-based model*—This assumes that increased knowledge about the consequences of substance use will increase negative attitudes and thereby reduce the likelihood of use (195).
- *Normative education*—This aims to correct misperceptions about high levels of drug use by others (1 19).
- *Affective education model* (sometimes called a ‘values/decisionmaking model’)---This focuses on the individual and teaches self-examination and responsible decisionmaking consistent with one’s values (195).
- *Resistance skills model*—This helps adolescents identify sources of pressure to conform and teaches methods of countering negative influences (1 13,195,227).
- *Life skills training model*—This combines drug-specific resistance skills training with training in more generic personal and social skills (36,37).
- *Alternative program model*—This is designed to provide adolescents with constructive community activities and opportunities for recognition or to offer high-risk adolescents special opportunities to compensate for the environmental deficits in their lives (274).

Sites--Using the second approach-categorizing prevention programs by the kinds of sites where activities occur—one finds that schools frequently have served as delivery sites. Schools have been the most popular location of programs in part because they offer a ‘captive’ audience and convenience of administration.

One of the factors that may influence site location outside of a school setting is the target population. For example, if a program is intended to reach school dropouts, a school-based initiative may not be the most conducive to encouraging participation.

Family, peer, and community-based efforts have been less common than traditional school-based programs led by a teacher or primary prevention staff, although they are growing in acceptance (1 13,195). Family educational efforts may be provided in the school, home, or in a community

facility. These programs typically provide parent education and training. Similarly, peer-based programs (i.e., programs which emphasize peer interaction and are sometimes led by adolescent peer role models)--while often implemented in the school setting---an be based in adolescent recreational programs or other places where young people gather. Churches, mental health centers, social clubs, hospitals, and work sites are also used on occasion as community-based sites for adolescent primary prevention activities. On occasion, site selection also may be based on facilities used by ethnic social networks.

Media campaigns have been a popular means of disseminating information through television, radio, posters, and newspapers and magazines. While they are not site-specific in the same manner as school or community-based programs, media campaign materials may emphasize certain distribution channels over other available alternatives (e.g., posters on buses, pamphlets in certain locations frequented by adolescents, advertisements placed in selected publications or television time slots).

Target Populations----Using the third way—categorizing prevention programs through an examination of the groups who are their intended participants—one finds that some programs target all adolescents---either with or without specific age groupings. Others focus on adolescents they consider to be at “high risk” for substance use (frequently school dropouts, youth from disadvantaged homes, or minorities) or a particular peer group. Parents or families of adolescents may also become the focal points of prevention programs. And, finally, broad-based prevention programs may target an entire community for environmental or attitudinal change.

Summary—While these various methods of conceptualizing demand side prevention programs all provide some insights, the reality is that many programs, even those cited in the research literature, ‘mix-and-match’ components in permutations that defy categorization. One seldom finds a “pure” model. Analyzing the types of preventive interventions being used in schools and communities across the country is even more difficult, because of the variety of approaches being used. A review of recent innovative projects (see below) illustrates this point.

Effectiveness of Demand Side Substance Use Prevention Efforts

As noted above and in table 12-9, current demand side prevention programs targeting (for the most part) individual adolescents can be categorized as information-based approaches, programs with a resistance skills emphasis, life skills training programs, comprehensive community programming with an initial focus on school-based resistance skills training, comprehensive health education and alternatives approaches. In addition to programs targeting adolescents, noncoercive prevention programs have targeted parents of adolescents.

Mass Media Prevention Programs--Mass media has been one of the Nation's most predominant channels for antidrug messages in the late 1980s and early 1990s. Programs of this type are among the most difficult to evaluate systematically because there are few ways to control exposure to the message. Further, at the same time individuals are exposed to antidrug media campaigns, they may be receiving numerous other messages, both consistent and conflicting with antidrug themes. Perhaps for this reason, the evidence on the effectiveness of mass media campaigns in reducing or preventing drug use and abuse is—and will probably remain—inconclusive.

One example of a national mass media approach to prevention is the Partnership for a Drug-Free America (33,34). The Partnership has saturated the electronic and print media with negative messages about drugs in order to create an environment that is hostile to substance-abusing behavior by influencing community attitudes (33,34). Partnership ads are designed to reverse positive perceptions about marijuana, cocaine, and crack and to dispel the notion that drug users are popular. Many of the ads appear on prime time television, and many use scare tactics. According to Black, the Partnership for a Drug-Free America is the largest advertising effort ever undertaken in the United States (34).

There have been no rigorous tests of the effectiveness of the Partnership for a Drug-Free America campaign. An evaluation of the Partnership for a Drug-Free America campaign reported by Black attempted to distinguish between "high exposure" and other media markets, but there appear to have

been problems making this distinction (34). In addition, no tests of statistical significance were reported (34). Black did conclude, however, that 13- to 17-year-olds surveyed as part of the evaluation were the age group least likely to appear to have been influenced by Partnership ads (34).

Bauman and colleagues recently found that radio and television antismoking campaigns targeted towards adolescents in the Southeast United States were not successful in reducing smoking (24).

On the other hand, analyses by Bachman and his colleagues of trends in behavioral change (i.e., reported drug use) and perceptions related to drug use (i.e., perceived health risks, perceived social disapproval, availability of drugs) suggest that fear-based campaigns such as the Partnership's (which saturated many media from spring 1987 on) may be at least somewhat influential in reducing drug use (1 1,12). Bachman and his colleagues have found that as high school seniors' perceptions of risks associated with marijuana and cocaine use increased, their use of these drugs declined (1 1,12).

Adolescent Alcohol Prevention Trial (AAPT)- In addition to information delivered through the mass media, information-based approaches to prevention are delivered as part of classroom-based prevention strategies.⁷³ One example is AAPT, which was designed in part to test the effectiveness of an alcohol abuse prevention curriculum based on normative education (119). The AAPT curriculum is based on research indicating that adolescents overestimate the prevalence of substance use, and it consists of eight sessions devoted to correcting misperceptions about adolescents' use of alcohol and other drugs (with an emphasis on alcohol) and about the acceptability of drug use by adolescents.

Graham and colleagues performed a 1-year followup study designed to test AAPT's effectiveness with respect to seventh graders' use of alcohol, cigarettes, and marijuana. Defining success in terms of participants' probability of remaining in "no use" status, as compared to a comparison group, Graham and his colleagues found that the program was most successful with students who had not tried any of the study drugs at the beginning of seventh grade. It was least successful with students who had tried tobacco by the beginning of the seventh grade

⁷³As noted by Goodstadt and Mitchell, the provision of some kind of drug-related information is part of every school-based drug education program (113).

Table 12-9-Overview of Selected Substance Abuse Prevention Programs

Program ^a	Target population	Target substances	Approach/setting	Representative studies ^b
Information-based approaches				
1. Mass media	Community at large	Marijuana Cocaine Tobacco	Information/fear	Black, 1991; Bauman, 1991
2. AAPT	7th grade	Alcohol Tobacco	Normative education.	Graham, Collins, Wugalter, et al., 1991
Resistance skills emphasis				
Project SMART	7th grade	Alcohol Tobacco Marijuana	Resistance skills, affective education.	Hansen, Malotte, and Fielding, 1988; Graham, et al., 1990
DARE Program	5th & 6th grades	Drugs Alcohol Tobacco	Peer pressure resistance training delivered in classrooms by police officers.	DeJong, 1987; Aniskiewicz and Wysong, 1990; Clayton, Cattarello, Day, 1991
Project ALERT	7th grade	Tobacco Alcohol Marijuana	Information, normative education, resistance skills in a school setting.	Ellickson, Bell, Thomas, et al., 1988; Ellickson and Bell, 1990
Life skills training				
	7th to 10th grades	Tobacco Marijuana Alcohol	Personal and social skills (e.g., resistance skills, assertiveness, self-control, cognitive skills) taught through a combination of instruction, demonstration, feedback, reinforcement, behavioral rehearsal (practice during class), and extended practice.	Botvin and Eng, 1980; Botvin, Eng, and Williams, 1980; Botvin and Eng, 1982; Botvin and Dusenbury, 1989; Botvin, Batson, Witt-Vitale, et al., 1989; Botvin, Dusenbury, Baker, et al., 1989; Botvin, Baker, Dusenbury, et al., 1990; Botvin, Schinke, Orlandi, et al., 1989; Botvin, Baker, Filazzola, et al., 1990
Comprehensive community programming with an initial focus on school-based resistance skills training				
Project STAR	6th or 7th grade (grade of transition to middle or junior high school)	Tobacco Marijuana Cocaine	Psychological consequences, normative education, resistance skills training for adolescents, plus parent involvement in homework, plus media coverage.	Pentz, Dwyer, MacKinnon, et al., 1989; Pentz, MacKinnon, Dwyer, et al., 1989; Pentz, MacKinnon, Flay, et al., 1989; Johnson, Pentz, Weber, et al., 1990; Pentz, Trebow, Hansen, et al., 1990
Comprehensive health education				
	Kindergarten through 12th grade	All unhealthful life-styles including substance abuse	Information/affective education.	Connell, Turner, and Mason, 1985; Christenson, Gold, Katz, et al., 1985
Parent education				
	Parents	Varied	Varied	Shah, Suurvali, and Kilty, 1980; Grady, Gersick, and Steinberg, 1985

^aKEY: AAPT = Adolescent Alcohol prevention Trial; ALERT = Adolescent Experiences in Resistance Training; DARE = Drug Abuse Resistance Education;

STAR = Students Taught Awareness and Resistance; SMART = Self-Management and Resistance Training.

^bFull citations are listed at the end of this chapter.

SOURCE: Office of Technology Assessment, 1991.

(19). Graham and his colleagues suggested that adolescents who begin smoking in the seventh grade may be most rejecting of adult values and thus most resistant to drug prevention education (119).

Project SMART-Project SMART (Self-Management and Resistance Training) is a school-based

program that takes a resistance skills approach to drug abuse prevention. Project SMART includes a 12-session program intended primarily to give students social skills for resisting offers of alcohol, cigarettes, and marijuana (120). Social skills sessions include teaching students about the various

sources of social pressure to use drugs, techniques for resisting them, and role-play opportunities for practicing the resistance techniques. Affective education sessions focus more generically on personal decisionmaking, values clarification, and stress management techniques. Seventh graders have been the target population for Project SMART.

In a 1988 evaluation of Project SMART, Hansen, Johnson, Flay, Graham, and Sobel found that the social skills portion of the program—but not the affective part—was effective in reducing the onset of cigarette, alcohol, and marijuana use (123a). A subsequent evaluation by Graham and his colleagues investigated differential effects⁷⁴ of Project SMART by type of drug, gender, and racial/ethnic group (as compared to the usual school curriculum on drugs and alcohol) (120). Overall, the program was found to be effective for females, but not for males, and for Asians, but not for blacks, whites, or Hispanics (120).⁷⁵ As did Botvin's Life Skills Training programs and other prevention programs (see below), Project SMART had its strongest effects on cigarette use. It showed some statistically significant effects for alcohol use, but no effects on marijuana use.

Drug Abuse Resistance Education (DARE) Program—The DARE program is different from school-based interactive education programs such as Project SMART in that it uses specially trained police officers to teach fifth and sixth grade students about drug use (61). Police officers are believed to be an especially credible source of information for young adolescents. In addition, the training the police officers receive (80 hours) is more extensive than that given to many others who deliver prevention programs, such as peers or teachers (61). In 16 or 17 sessions, the DARE program teaches students self-management and refusal skills and instructs them in personal safety techniques. Graduates take an antidrug pledge during a formal graduation ceremony.

Evaluations of DARE have shown mixed results. According to DeJong, the program has some impact on boys, but not on girls, and only on the use of hard liquor and cigarettes (70). Clayton and colleagues found DeJong's evaluation to be seriously flawed, but one other evaluation reported in Clayton and his colleagues found no reductions in self-reported drug use or intentions to use drugs after the DARE program was implemented in 10 randomly chosen North Carolina schools (233a). Clayton et al.'s own evaluation of DARE among Kentucky sixth graders was also noteworthy for using random assignment to conditions (61). However, consistent with previous evaluations, Clayton and colleagues found no differences in self-reported cigarette, alcohol, or marijuana use shortly after completion of the DARE program, although DARE did achieve some small changes in students' attitudes towards drug use (61).⁷⁶ A fourth evaluation of a DARE program in Kokomo, Indiana, found reason to be "cautiously optimistic," but the Kokomo evaluation did not measure actual drug use (7).

Project ALERT—Project ALERT (Adolescent Experiences in Resistance Training) was a 7-year longitudinal resistance skills training study involving 30 Oregon and California schools (78,79). Teachers in Project ALERT led eight once-a-week sessions with seventh graders—including minorities, economically disadvantaged children, and children from disrupted families—with the intention of preventing alcohol, tobacco, and drug use. Three booster sessions were provided in the eighth grade.

In an evaluation of Project ALERT published in 1990, Ellickson and Bell reported that the outcome of the program differed somewhat depending on the drug evaluated (78). For example, Ellickson and Bell found modest short-term effects, but no effects at a 15-month followup, for alcohol use (78). Students who were experimenting with cigarette smoking at the beginning of the seventh grade intervention were more affected by the program (in a health-enhancing direction) than were nonsmokers or heavier users.

⁷⁴As in many other evaluations, methodological considerations make it impossible to discern the proportion of students who resisted drug use **entirely** as a result of Project SMART. Effectiveness in Graham et al.'s 1990 study was measured in terms of differences between program and **control** students on an index of average drug use.

⁷⁵Graham et al. suggested several **possible** reasons that Project SMART may have been more effective **with** females, **including**: 1) **seventh grade** females may be more receptive to **antidrug** messages; 2) seventh grade females may **find** social skills training more relevant to them; 3) the project health educators were all female; and 4) females had lower pretest drug use to begin with (120). Ethnic minority students also had lower pretest drug use (120).

⁷⁶The evaluators hypothesized **that the finding of no differences could be** due to **an initially low base** rate of drug use among the students, but it **could** also be a result of the comparison group also receiving some drug education as part of the existing science curriculum. The evaluation reported by Clayton and his colleagues was the first phase of a 5-year evaluation, so the opportunity exists to test for long-term effects on drug use behavior (61).

But students who were not users of marijuana or cigarettes at the beginning of the project were most affected in terms of subsequent marijuana use. There were no consistent differences in effectiveness of programs led by older adolescents v. adult health educators. There also were no consistent differences in effectiveness of programs for racial and ethnic minorities v. whites.

Ellickson and Bell's evaluation report is particularly useful because it permits detection of the fact that, despite the program, substance use in both the experimental and control groups did increase on average; reported "reductions" or "effects" were relative to the substance use experience of students in the control group (78). For example, by month 15 (after the three booster sessions in eighth grade), about 57 percent of experimental group students had "ever" drunk alcohol, 30 percent had at least tried cigarettes, and 8 percent had used marijuana at least once (78). In addition, some potentially important changes (such as the percent of 'alcohol experimenters' who had used alcohol in the past month) were not in the desired direction. For example, the benefits of changes in the desired directions (e.g., the greater proportion in the experimental condition of moderate cigarette smokers who had apparently "quit" smoking) would have to be weighed against apparent "boomerang" effects to obtain a net benefit (92). The differences between experimental and control group students that were statistically significant were small, and their practical significance would require additional analysis.

Life Skills Training Programs--The programs known widely as life skills training have also been referred to by Botvin as "personal and social skills training" (36) and "generic cognitive-behavioral drug abuse prevention" (37). According to Botvin, the programs' distinguishing feature is their emphasis on the acquisition of generic personal and social skills.⁷⁷ These generic skills are applied specifically to drug-related situations; the skills are generally taught using a combination of instruction, demonstration, feedback, reinforcement, behavioral rehearsal (practice during class), and extended prac-

tice through behavioral homework assignments (36).

Life skills training programs have differed in the age group targeted (mostly 7th graders, but some 6th, 8th, 9th, and 10th graders), program length (from as few as 7 to as many as 20 sessions), frequency of sessions (from 1 to 2 class sessions per week), providers (mostly adults, but some peers), and the inclusion or not of booster sessions.

Early studies of the life skills training approach focused on prevention of smoking among young (e.g., seventh grade) white adolescents and generally found statistically significant--but generally small--reductions, particularly when booster sessions were employed (37,39,40,41,42,43,44,45). Some observers, however, questioned whether the results of this early research were generalizable to other substances, to nonwhite students, and in nonresearch settings (37). Further, life skills training (and other prevention research) had been criticized on methodological grounds, including the exclusive use of self-report data, inappropriate research designs, inappropriate statistical analysis, lack of demonstrated pretest equivalence in experimental and comparison groups, failure to examine attrition effects, failure to examine the extent of faithful implementation of the program model, and failure to examine changes in theoretically important mediating variables (19,37,97,113,241,274).

In a recent study designed to overcome methodological and other criticisms, Botvin and his colleagues implemented their approach among almost 5,000 junior high school students in 56 schools across New York State (37,38). Fidelity to program criteria was assessed, and only students who received at least 60 percent of the prevention program were included in the 3-year evaluation (37). A major focus of the evaluation was a comparison between an intervention providing formal provider training (more costly) and an implementation with videotaped provider training and no feedback (less costly); a no treatment group was also included (37).

⁷⁷According to Botvin the primary distinguishing feature of the life skills training approaches is that they typically attempt to develop two or more of the following skills: 1) general problem-solving and decision-making skills (e.g., brainstorming, systematic decision-making techniques); 2) general cognitive skills for resisting interpersonal or media influences (e.g., identifying persuasive advertising appeals, formulating counterarguments); 3) skills for increasing self-control and self-esteem (e.g., self-instruction self-reinforcement, goal setting, principles of self-change); 4) adaptive coping strategies for relieving stress and anxiety through the use of cognitive coping skills or behavioral relaxation techniques; 5) general interpersonal skills (e.g., initiating social interactions, complimenting, conversational skills); 6) general assertive skills (e.g., making requests, saying no, expressing feelings and opinions) (36). The theoretical bases of the life skills training approach include social learning theory (18) and problem behavior theory (139,142,224).

Over a 3-year period (1 year of full program implementation and booster sessions in 2 succeeding school years), statistically significant effects for smoking and marijuana use were found for both training conditions, compared with the comparison condition (37). Effects were measured in terms of comparison and experimental group differences in average drug use scores on a post-test (37). No differences between experimental and control groups were found in overall drinking frequency or drinking amounts in any group, although there was a reduction in the frequency of getting drunk in the group with videotape-trained teachers (37). When a more conservative school-level analysis of the data was performed, significant effects for reductions in cigarette smoking (only) were retained.

This study's measures for testing the development of theoretically predicted skills were limited to self-reports by students of their confidence in their ability to use specific personal and social skills, and their knowledge of communication and general social skills (37). Only communication and interpersonal skills showed improvement (37). According to Botvin and his colleagues, this evaluation provided further evidence that life skills training is effective in at least delaying the use of substances other than tobacco and demonstrated for the first time the feasibility and effectiveness of the life skills training approach in typical classroom situations (37). However, the broad test of the life skills training approach reported in 1990 by Botvin and his colleagues was somewhat limited by having a sample that was 91 percent white and mostly suburban and rural. Previous research by Botvin and his colleagues with urban black (39) and Hispanic (41) students provided only tentative support for the effectiveness of life skills training with nonwhite adolescents (37).

Project STAR—Project STAR (Students Taught Awareness and Resistance)—part of the Midwest Prevention Project—is widely known as a broad-based, comprehensive community-based drug prevention intervention (220,221). The target group includes the entire adolescent population in 50 schools of the 15 communities comprising the Kansas City (Kansas and Missouri) metropolitan area. Begun in 1984, Project STAR sequentially attempted to involve the media, community organizations, and families in drug prevention in the Kansas City area, but the cornerstone of the program is a school-based education curriculum with an emphasis on resistance skills.



Photo credit: Education Week

Project STAR is an example of a contemporary school-based drug abuse prevention program that attempts to teach young adolescents the kinds of skills that will help them resist pressures to use drugs. These Kansas City students are participating in part of the Project STAR curriculum.

The Project STAR drug use prevention model builds upon earlier efforts to reduce adolescent pregnancy and cigarette smoking and to prevent heart disease. Its agenda covers tobacco, alcohol, and marijuana and the program focuses on sixth and seventh graders. In the first 2 years of the project, 22,500 sixth and seventh grade students participated in the school-based educational component. Other components (i.e., parent education, community organization, and health policy changes at the community level) have been added to the project sequentially—approximately one each year. Boosters are provided on a yearly basis through the 12th grade. Annual assessments are made of adolescent drug use in schools assigned to immediate intervention or delayed intervention control conditions.

Evaluation of broad-based community programs and mass media campaigns is exceedingly difficult and subject to numerous methodological problems (77), and reported results for Project STAR have varied somewhat. In a report on a 1-year followup, Pentz and her colleagues reported modestly, but statistically significantly, reduced *rates of increase* in cigarette, alcohol, and marijuana use by experimental v. control students in the week and month prior to the followup survey (220). In another analysis of 1-year followup data that used a smaller sample and different statistical methods, Dwyer, MacKinnon, Pentz, and their colleagues reported reduced rates of increase for cigarette smoking,

mixed evidence for effects on marijuana use (depending on whether schools or students were used as the unit of analysis), and no evidence of an effect on alcohol use (77).

Another study compared the effects on high- v. low-risk adolescents⁷⁸ of 3 years of Project STAR (144). By 3 years into the project, experimental schools had been exposed to a parent organization program, parent-child communication skills training, initial training of community leaders in the organization of a drug abuse prevention task force, and mass media coverage, as well as the 1-year, 10-session, resistance skills curriculum for students. The comparison groups were exposed only to the initial training of community leaders in the organization of a drug abuse prevention task force and the media elements of Project STAR (144). Overall, this analysis found generally lower *rates of increase* for tobacco and marijuana use, but not for alcohol use, in program schools than in control schools. The only difference between high and low risk groups of students was a greater reduction in the rate of increase in cigarette smoking in those students exposed to the program during a 6th rather than 7th grade school transition.

Other studies by Pentz and her colleagues suggest reasons for variations in results across schools other than method of statistical analysis (77). Pentz, Trebow, Hansen and colleagues found, for example, that the greater the amount of the school-based portion of the program actually delivered to students in Project STAR schools, the less was the increase in drug use after a year (223). In one of six comparisons, there was an actual decrease in drug use among project students with more extensive exposure to the curriculum (223).

The Project STAR effort in Kansas City was evaluated with a quasi-experimental design. A replication in Indianapolis, Indiana (Project I-STAR), is being evaluated with a true experimental design.

Comprehensive Health Education—As prevention programs, comprehensive health education efforts are premised on the belief that children and adolescents can benefit from instruction in all phases of healthy living. Thus, sequential curricula have

been developed for prekindergarten through the 12th grade, focusing on developmentally appropriate subjects. The prevention of psychoactive substance use can be either a separate segment within the instructional sequence or integrated throughout the health curricula (247).

In a 1985 evaluation of four comprehensive health education curricula for grades 4 through 7, based on a survey of 1,000 classroom programs in 20 States, the School Health Curriculum Project was identified as the most effective health education program (66). The School Health Curriculum Project is highly structured and emphasizes ‘hands-on’ activities but requires significant teacher in-service training and student classroom time. The program appears to have been successful in deterring sixth and seventh graders from smoking, but its impact on other substance use has not been assessed (59,65).

Parent Education Programs—Parent education programs attempt to influence adolescent behavior by altering the interactions that occur within a family. Parents attend seminars or courses designed to help them encourage and support appropriate behavior in their adolescent family member. Typically, a program will provide factual information and training in discipline, communication, and other parenting skills. Sometimes, parent education programs are held in conjunction with programs for adolescents.

Parent education programs specifically geared toward substance use concerns have not been widely tested. Schaps and his colleagues found that only 4 percent of 127 drug education programs included in their review used a family involvement strategy (241). Nearly a decade later, Moskowitz found very few family-oriented educational programs targeted toward adolescent alcohol or drug problems in his review of the literature (195). Of those adolescent substance use/parent involvement programs that do exist, only two have been evaluated. The first, a 20-hour Parent Effectiveness Training program, which emphasized communications and problemsolving skills for parents, was examined in a 4-year, quasi-experimental study that showed short-term improvements in parenting skills but also revealed an increase in alcohol use among the children of participants (251).

⁷⁸High risk students were defined as those students: 1) who had previously used a so-called ‘gateway drug’ (tobacco, alcohol, or marijuana); 2) whose parent(s) used tobacco, alcohol, or marijuana; 3) with higher numbers of friends perceived as having used tobacco, alcohol, or marijuana (cutoff not given); and 4) of higher age (measured as grade level). Gender was also used as an indicator of relative risk.

The second study looked at a program that combined drug education for students and 12 hours of parent training on drugs, adolescent development, decisionmaking, and communication(118). Preliminary results showed some improvement in parenting, but recruitment and attrition problems limit inferences about the validity of the findings.

Other studies of parent education programs which were not targeted toward substance use issues have tended to support the conclusion that these programs can improve parents' attitudes and skills, but that they have limited impact on an adolescent's behavior—including substance use (72).

Alternatives Programs—The provision of alternatives to alcohol and other drug use have had a long history in prevention efforts (1 13). According to Botvin, the original model for alternatives programs took the form of establishing youth centers in the community to provide a particular activity or set of activities:

The underlying assumption of this approach was that adolescents could be provided with real-life experiences that would be as appealing as substance use and, therefore, involvement in these activities would actually take the place of involvement with substance abuse (36).

Examples of this approach, which provided a predetermined single set of activities for all participants, include Outward Bound (36). A second type of alternatives approach involves attempting to match specific alternatives with an individual's unfulfilled needs (36). For example, interpersonal needs, such as gaining peer acceptance, might be satisfied through participation in sensitivity training or encounter groups (36,274). Another way to categorize alternatives approaches is as 1) efforts to *provide positive activities* more appealing than drug use; and 2) efforts aimed at developing competence to *overcome individual deficits* in basic life skills, low self-worth, and limited experiences that place them at risk (1 13,274).

The provision of alternatives to psychoactive substance use is intuitively appealing and has been one of the approaches used in the contemporary "War on Drugs" (see below). As noted above, at

least some the predominant risk factors for substance abuse (e.g., dysfunctional families, association with drug-using peers, school transitions) appear to be those that could be amenable to the alternatives approach. Unfortunately, however, there is little systematic research that can be used to evaluate whether alternatives work in preventing drug use and abuse by adolescents (36,1 13,241,242,274). For example, in a 1986 quantitative review of studies covering the period 1972 through 1984, Tobler found only 11 alternatives programs that had adequate evaluation data, and not all of the evaluations measured drug use by adolescents (274). In a subsequent meta-analysis of the same studies, Tobler limited her review to studies using drug use outcomes (274a) .79 In both meta-analyses, Tobler found that alternatives programs had the second greatest effects on drug use (274a) and related outcomes (274), after resistance skills and life skills training programs that involved peer interaction (274,274a) .80 Tobler concluded that alternatives programs were especially effective with "high-risk" adolescents such as drug abusers, juvenile delinquents, or students having school problems (274).

Further examination of the components of successful alternatives programs seems to be in order. For example, Swisher and Hu noted that some types of *activities* have been associated with substance abuse (e.g., entertainment, vocational, and social activities), while others (e.g., religious activities) have not (269a). Consequently, it is conceivable that some alternatives programs could be counterproductive if the wrong type of activities were selected (36). Feldman notes that it maybe important to mix both troubled and nontroubled adolescents in alternative activities (88a) and both Feldman and Tobler note the importance of well-trained group leaders (88a, 274a).

Selected Supply Side Substance Use Prevention Efforts

Health protection is an aspect of prevention that acts through the passage of laws and regulations limiting access to substances believed harmful to health. Many of the psychoactive substances dis-

⁷⁹In a subsequent review, Botvin found only two studies of alternatives (peer tutoring and working in a school store), neither of which measured drug use (36).

⁸⁰In Tobler's articles, resistance skills and life skills training programs are called 'peer programs' because peer interaction (not peer leadership) is the key component (274,274a).

cussed in this chapter are illegal for use by people of all ages. As noted earlier, however, the psychoactive substances used the most by U.S. adolescents—alcohol and tobacco—are legally available for use by older people. Some public health measures have been taken to limit access to and use of these substances by adolescents. Others are under consideration. Supply side substance use prevention efforts discussed here are laws related to access by minors (e.g., minimum drinking and smoking ages) and some actions under consideration that would affect not only adolescents but all individuals (e.g., additional limits on advertising, increased excise taxes on cigarettes and alcohol). Relatively little research has been done on the effects of health protection efforts specifically on adolescents.

Minimum Ages for Drinking and Smoking—Between 1970 and 1975, 29 States lowered their drinking age to conform with a Federal shift in the voting age from 21 to 18 in 1970 (123). By 1984, however, 28 States had increased their legal drinking age. In 1984, the U.S. Congress passed the Uniform Minimum Drinking Age Act (Public Law 98-363). Under this law, increasing percentages of Federal highway funds would be withheld from States that did not make the drinking age 21. Currently, all 50 States and the District of Columbia have a drinking age of 21, although there are some exceptions to the general rule (e.g., for employment, with parental guidance, under medical supervision, and possession for purposes other than consumption) (123,290).

Age limits on possession of tobacco products are more lenient than those on alcohol (317). Changes are occurring, but the minimum age in most States is 18 rather than 21 (315).

Limits on Advertising—Recognizing that anti-drug education messages compete with advertising that makes alcohol use appealing to adolescents (180), there has been congressional interest in limiting the advertising of alcohol and cigarettes (169). Cigarettes and hard liquor are not advertised on television or radio but can be advertised in magazines⁸¹ and on billboards. Wine and beer can be advertised in any medium.

Further passage of restrictive advertising laws is problematic because of concerns about possible

infringements on advertisers' constitutional rights. On the one hand, there is precedent for such action. The Public Health Cigarette Smoking Act of 1970 (Public Law 91-222), for example, banned prosmoking cigarette advertising on radio and television beginning in 1971. On the other hand, Goodstadt and Miller concluded that studies of the impact of alcohol advertising have demonstrated little to no effect on alcohol consumption (113). These studies have not been specific to adolescents.

Excise Taxes—Economists suggest that adolescents' use of alcohol and tobacco may be more sensitive to increases in price than adult's use of alcohol and tobacco (123). One way to increase the price of alcohol and tobacco is to increase excise taxes. As of spring 1990, Federal excise taxes had not been raised in real terms since 1951 (123). Beer, a preferred alcoholic beverage of adolescents, is taxed at one-third the rate of liquor.

In a simulation for ADAMHA's National Institute on Alcoholism and Alcohol Abuse (NIAAA), Grossman found that the raising of excise taxes on beer to the same level as taxes on liquor would reduce motor vehicle fatalities among 18- to 20-year-olds by 21 percent (123). Grossman found that an increased excise tax would have a greater effect on reducing fatalities than could be expected from increases in the minimum drinking age because the minimum drinking age can be evaded, at least in part. Grossman notes, however, that these simulations have not been tested empirically.

Simulations of the effects of excise taxes on cigarette smoking have focused on reductions in premature mortality as an outcome. Cigarette smoking generally does not result in fatalities until later in life (although there are short-term health effects of smoking for adolescents). Grossman's analysis of an increase in excise taxes on cigarettes found that over 800,000 premature deaths in the cohort of Americans 12 and over in 1984 would be averted. Coincidentally, an earlier analysis by Warner suggested that raising the excise tax would discourage approximately 800,000 adolescents from starting to smoke (331).

⁸¹A check by OTA staff of several teen magazines suggested that such magazines do not tend to advertise cigarettes or alcohol.

Conclusions About the Effectiveness of Prevention of Psychoactive Substance Use

From the foregoing review of the research findings from selected contemporary efforts to prevent or delay the onset of psychoactive substance use by adolescents, and from the reviews summarized in table 12-10, it is clear that most demand side prevention programs targeted at individuals have yet to make a compelling case for their effectiveness. Some models show some positive effects in delaying increases in drug use, but the effects are generally small. Whether these models are of much practical significance in reducing drug use among adolescents is debatable. However, some programs may turn out to be effective in other important respects, such as enhancing adolescents' general life skills (e.g., social competence, decisionmaking),

Recognizing the limited evidence for the effectiveness of traditional school-based drug prevention efforts, as well as the wide variety of risk and protective factors apparently involved in drug use and abuse (see figure 12-6), some observers have urged that drug abuse prevention efforts not be limited to small-scale, time-limited, educational interventions, although these interventions have their place (36,1 13,172,273). Neither, say many observers, should prevention be limited to coercive supply side strategies such as minimum drinking ages, limits on advertising, or excise taxes (113, 172).

Goodstadt and Mitchell, for example, recommend that the Nation take a *health promotion approach* to preventing alcohol and other drug use and abuse by adolescents. The health promotion perspective permits greater acknowledgement of the fact that psychoactive substance use problems may result from: a) what the user/drinker does, b) the properties of the drug, and c) the impact of social and physical environments (1 13). According to Goodstadt and Mitchell, "this appreciation for the diverse etiology of problems should increase the range, appropriateness, and effectiveness of prevention measures' because "problems with complex etiologies usually require diverse or complex solutions' (1 13). Further, "addressing the three elements would reduce scapegoating of any single factor":



Photo credit: Office of Technology Assessment

Current recommendations on preventing alcohol and other drug abuse among adolescents suggest that prevention efforts not be limited to efforts targeted at individual potential users-although these maybe useful-but that they also focus on adolescents' environments.

It would no longer be appropriate to "blame the victim" by attributing the abuse exclusively to the abuser's personal deficiency; nor would it be sufficient to condemn drugs as the cause of problems, or strive for prohibition as the sole solution for abuse; nor would individuals and communities be tolerant of environmental conditions or social practices that contribute to drug abuse (1 13).

The fact that these recommendations (and other similar thoughts) were published by OSAP suggest that a more comprehensive approach to psychoactive substance abuse prevention is possible (76,1 13, 313). Unfortunately, however, implementing systemic approaches may prove to be quite difficult (172).

Substance Abuse Treatment Services for Adolescents⁸²

For some adolescents, the use of or experimentation with alcohol or other psychoactive substances may progress to a point where the adolescents develop physical, emotional, or social problems. When substance use becomes fictionally incapacitating, health-threatening, or presents a danger to self or others, professional services may be necessary to treat the condition. The broad goals of substance abuse treatment can be defined as the

⁸²This section is based on the paper by James Emshoff and Ronni Margolin-Mankoff entitled 'Treatment of Adolescent Substance Abuse: A National Review and Critique,' which was prepared under contract to Carnegie Corporation of New York and the Carnegie Council on Adolescent Development for OTA's adolescent health report (85).

Table 12-10—Summary of Reviews of Evaluation Literature on Demand Side Substance Use Prevention Programs for Adolescents

study ^a	Evaluations reviewed	Method of the study	Key findings and recommendations
Schaps, DiBartolo, Palley, et al., 1978, 1981	75 (127 programs)	Crosstabular and correlational analyses of primary drug abuse prevention programs, using 70 dimensions; included all psychoactive drugs. Studies had to assess a planned intervention and use drug-specific measures of effectiveness in terms of use, intention to use, or attitude toward use. Included unpublished manuscripts. Ninety percent of programs served target populations of college age or younger; 56 percent served high school age adolescents. Comparison groups were not required.	Most evaluations were poorly done; most studies ignored racial and ethnic characteristics; only 5 percent of programs were peer-led. Information-only programs were not effective; combination programs hold promise, but data are unreliable. More research is needed, particularly with regard to minorities; greater use of peers and parents should be explored; a repository for evaluation reports should be created; evaluation must be more rigorous and better documented.
Tobler, 1986	143 (98 studies)	Meta-analysis; reviewed substance abuse evaluations of variety of program types; controlled for effect size; included unpublished studies. Limited to young adolescents. Five modalities were examined: knowledge, attitudes, use, skills, and behavior; drugs, alcohol, tobacco, were included. Control group was not required for some studies.	Peer programs showed definite superiority in outcome across substance; alternative programs successful for "high-risk" adolescents; "for knowledge-only and affective-only programs solid evidence exists for discontinuing their use."
Bangert-Drowns, 1988	33	Meta-analysis; controlled for effect size; only school-based drug education programs were included. Covered elementary through college level; limited to publicly available studies; anti smoking studies were excluded; only U.S./Canada studies were reviewed. Control group was required,	Most studies were of poor quality. Substance abuse education may alter knowledge and attitudes but is unsuccessful in changing drug-using behaviors of students; peer-led and group discussion models were more effective in changing attitudes; students who volunteered for programs reported lower drug use than compulsory participants. More rigorous research is needed but not on effect of education on knowledge; substance use education has not been effectively used in schools to date.
Moskowitz, 1989	NA	Literature review/focus on alcohol issues. Four types of interventions were examined, including primary prevention. Not oriented toward adolescents-general alcohol abuse review.	There is little evidence that primary prevention programs are effective; additional research is needed on affective education and social influence models; behavior is unlikely to be influenced by education or media efforts; parent attitude changes are not reflected in adolescent behavior; social norms must change; some prevention programs may actually increase problems; recommends <i>large-scale</i> social experiments combining control and prevention strategies.
Goodstadt and Mitchell, 1990	NA	Narrative literature review of evidence on noncoercive (drug education, mass media, and alternatives ^b) and coercive (legal deterrence) strategies, and conceptual analysis of health promotion (concept of lifestyle, community-based health promotion, community responsibility and empowerment) strategies.	Could not conclude with confidence that <i>drug</i> education (including school-based education and non-school-based parenting skills education) is either effective or ineffective. Criteria for effective school-based drug education appear to include: targeting subpopulations with a uniform level of use, or incorporating elements and processes that recognize the needs of varying subgroups; attending to the major personal and social determinants of human behavior; implementing programs with adequate intensity of time and effort, staff training, and adequate administrative and community support; integrating school-based programs into the larger community. Studies of mass <i>media</i> antidrug campaigns do not encourage optimism about effectiveness. Laws and regulations play a significant role in controlling average level of alcohol use and abuse in a population, but evidence for the effectiveness of legislation (legal deterrence) in controlling individuals' drug use is neither encouraging nor consistent. Recommends a <i>health promotion perspective</i> , which would develop policies to address the implications of the diverse causes of drug use problems (i.e., behavior, properties of the drugs, and the impact of the social and physical environment).

KEY: NA = not available.

^aFull citations are listed at the end of this chapter.^bThis review's evaluation of the alternatives approach summarized Tobler's findings (274).

Continued on next page

Table 12-10-Summary of Reviews of Evaluation Literature on Demand Side Substance Use Prevention Programs for Adolescents-Continued

study ^a	Evaluations reviewed	Method of the study	Key findings and recommendations
Botvin, 1990	35 interventions	Narrative review of theoretical and evaluation literature on 4 approaches: informational, affective, alternative, psychosocial.	Except for the more recently implemented psychosocial approaches (resistance skills alone or in combination with life skills training), primary prevention approaches targeting adolescents have not been successful in reducing actual substance use because they have not focused on documented risk factors. Some methodological and dissemination/implementation problems with the psychosocial approaches remain, but these psychosocial approaches should be further disseminated because they can reduce susceptibility or vulnerability to environmental factors and reduce potential intrapsychic motivations to use drugs. They can be used as substitutes for widely-utilized school-based prevention programs that rely on intervention strategies that have either been found to be ineffective or have no scientifically defensible basis. Several additional levels of intervention need to be adopted: at the broadest societal level, eliminate or reduce environmental influences promoting or facilitating smoking, drinking, and drug use; at the interpersonal level, go beyond strategies that rely solely on school-based interventions; and, at the intrapsychic level, reduce potential motivations to engage in substance use.

SOURCE: Office of Technology Assessment, 1991.

elimination of chemical dependency and related undesirable behaviors and the restoration of the individual under treatment to a healthy and functionally appropriate status (201).

But despite a general consensus about the broad goals of substance abuse treatment, substance abuse treatment for adolescents is often fraught with controversy. It is not always clear when—or if—an adolescent requires treatment for substance use. In addition, there remains disagreement about the respective virtues of abstinence and responsible use of psychoactive substances as treatment outcomes. Nor is there agreement within the treatment community or its critics regarding the efficacy or effectiveness of various kinds of treatment, desirable length of treatment, or criteria for matching individual clients to particular treatment settings. In a comprehensive 1990 study on drug treatment, a committee of the Institute of Medicine concluded that the state of knowledge on drug treatment effectiveness was worst with respect to treatment for adolescents, and this committee recommended that drug treatment of adolescents be studied intensively (201). Exploring the variety of substance abuse treatment services could illustrate the needs for additional research, highlight some of these points of contention, and provide a conceptual framework for future policy

deliberations on substance abuse treatment services for adolescents.

The importance of such exploration becomes clear when one considers the number of adolescents whose lives are affected by treatment and how many others might benefit if additional services were available. However, assessing the number of U.S. adolescents in substance abuse treatment is difficult because of limitations in data sources. Several data sources were used to gather the information presented below—the National Drug and Alcohol Treatment Unit Survey (NDATUS) (308,309); the Chemical Abuse Treatment outcome Research (CATOR) network, which provides outcome data for private treatment centers (126); and the Treatment Outcome Prospective Study (TOPS) at the Research Triangle Institute (134). Information was not always available regarding specific issues, in particular interactions between race and age.

The NDATUS census of private and public drug abuse treatment provides a cross-sectional snapshot of treatment on October 30, 1987, and not a count of clients served in an entire year. Among other problems with NDATUS is its low response rate: a total of 22.5 percent of the surveyed treatment units did not respond to the NIDA-sponsored survey. Thus, OTA multiplied totals by 1.29 to reflect an

estimate of the numbers served by nonresponding programs. This extrapolation seems to be a closer representation of the total population served than the number calculated by including only the 77.5 percent.

A second correction factor can be estimated in order to convert the point prevalence data to yearly totals served. Dividing the number of drug abuse clients served in 12 months by the number in treatment on October 31, 1987, one finds that 3.21 people were served in the 12-month period ending on that date. The ratio of annual total served to the total served in the point prevalence data for alcoholism treatment is 4.23. Applying these ratios to subtotals based on age and setting yields the only available estimate for total clients served by drug and alcohol treatment programs in a 12-month period.

Using these adjusted figures, an interesting picture emerges. Approximately 76,000 children and adolescents under age 18 were in drug and alcohol treatment programs on the day the most recent NDATUS was taken in 1987 (308,309). An estimated 49,000 of these minors were in drug abuse treatment (15 percent of the total population of all ages in drug abuse treatment), and the other 27,000 were being treated for alcoholism (6 percent of the alcohol treatment population of all ages). Over the course of a year, it is estimated that nearly 272,000 adolescents are treated for substance use—157,000 for drugs and 115,000 for alcohol. Adolescent males made up 55 percent of the adolescent drug treatment population and 67 percent of the adolescent alcohol treatment populations.

Substance abuse treatment services for adolescents, provided to adolescents after assessment and referral, fall broadly into five sometimes overlapping categories (see table 12-11):

- . self-help groups,
- . outpatient treatment (including day treatment),
- residential treatment,
- . inpatient treatment or hospitalization, and
- . other.

Treatment is usually, but not always (e.g., self-help), preceded by assessment and diagnosis.

In addition to there being overlap within these five categories of substance abuse treatment services,

there may be some overlap between prevention strategies and treatment. Thus, for example, prevention and treatment strategies may both use similar techniques such as assertiveness, coping, and life skills training; efforts to build self-esteem and refusal skills; and group therapy.

Nonetheless, prevention and treatment efforts are targeted toward different populations and also may be distinguished by the focus of prevention on deterrence of use and the focus of treatment on recovery from abuse and its consequences. In contrast to prevention programs, substance abuse treatment programs are aimed at adolescents for whom psychoactive substance use has progressed past the stage of experimentation. Substance abuse treatment programs are usually geared toward older adolescents and include a variety of interventions designed to restore an individual to physical and mental health (267).

Adolescents seldom receive substance abuse treatment in age-specific settings. As likely as not, they can be found mixed into programs designed for adults or programs intended for children. There are few drug treatment programs specifically for adolescents, and the adolescent-specific drug treatment programs that do exist tend to serve a disproportionate share of the adolescents in treatment. Currently, only 18 percent of all drug treatment programs are adolescent-specific but nearly half of the adolescents in drug treatment are served by these programs (308,309). Adolescents in treatment for alcohol use problems are less likely to receive treatment in special adolescent programs; about 15 percent of adolescents being treated for alcohol use problems are treated in special adolescent programs. Almost one-fourth of adolescent alcohol treatment clients were in programs in which less than 10 percent of the client population were adolescents (21 1).

Self-Help Groups for Substance Abusers

Self-help groups for substance abusers often serve as alternatives or adjuncts to professional treatment, and many include programs not only for substance abusers but for family members as well. Self-help groups are widely used as a treatment of choice by many professionals and nonprofessionals and are frequently incorporated into professional substance abuse treatment programs (267). In this context,

Table 12-1 I-Overview of Substance Abuse Treatment Services for Adolescents

Service	Setting	Target population	Strategies
Assessment/referral	Community agencies: schools, medical settings, youth services agencies, juvenile justice, mental health settings	Substance users, to determine level of use/abuse and refer for treatment	Interviews, standardized tests
Treatment: Self-help groups	Community settings	Substance abusers, substance dependent (especially highly motivated, successful treatment completers)	Education, group support
Outpatient treatment	Mental health facilities, drug/alcohol treatment centers	Substance abusers, substance dependent (especially highly motivated, early abusers, with no prior treatment history)	Counseling, social skills development, psychotherapy group therapy, family therapy self-help
Residential treatment	Group homes, drug/alcohol treatment centers	Substance abusers, substance dependent (especially less motivated, prior treatment failures, limited support system)	Milieu therapy, education, group therapy, daily supervision, counseling, family therapy, self-help
Inpatient treatment	Hospitals (general, psychiatric, or specialized)	Substance dependent (especially less motivated, prior treatment failures, poor support system, medical risk, dually diagnosed)	Medical services, milieu therapy, psychotherapy, counseling, group therapy, family therapy, education, daily supervisions, self-help
Other	Schools, juvenile justice system	Students; adolescents arrested for delinquency offenses	Student assistance programs, diversion

SOURCE: Office of Technology Assessment, 1991.

self-help groups may serve as group therapy and/or aftercare.⁸³

The oldest, largest, and best-known self-help group is Alcoholics Anonymous (AA), which was formed to help recovering alcoholics maintain their sobriety. As of 1986, AA included approximately 1.5 million participants (1). About 3 percent, or 47,000, were under the age of 20. In recent years, participation in AA by adolescents has been increasing, at least in part because of the inclusion of AA groups in formal treatment programs. Adolescents in their mid-to-late teens are likely to attend two or three meetings per week, slightly fewer than adults. Adolescent alcoholics are far more likely than adult alcoholics to also consider themselves addicted to other drugs (80 percent of AA members in their late teens, as compared with 30 percent age 40 or over).

Narcotics Anonymous—modeled after AA as a self-help group for narcotics abusers—indicates that its ‘fellowship’ of participants is generally younger than that of AA, with most between the ages of 16 and 40 and approximately 10 percent under the age of 20. Informal estimates indicate that about 18,000 adolescents participate in Narcotics Anonymous meetings annually (199).

Although there are numerous formal and informal self-help groups in the substance abuse field, most use the 12-step model popularized by AA or some variation on it. This model regards substance dependence as a chronic illness from which recovery is an ongoing, lifetime process maintained solely by total abstinence. The program involves acceptance of the illness and one’s powerlessness in relation to it; acknowledgement of the damage done by substance abuse; and commitments to make amends, continue the recovery effort, and help others. A strong spiritual, but nonsectarian, component is essential in the 12-step program. Whereas 12-step programs for adults have traditionally been voluntary, adolescents are often *required* to attend 12-step groups.

Peer support is a primary aspect of the self-help group approach. Most AA and Narcotics Anonymous groups include a “sponsor” system. Each recovering addict is paired with a more experienced partner (who, in the case of an adolescent, can be either a peer or an adult) available for crisis intervention and emotional support. The meeting format usually involves first-person accounts of drug and alcohol problems and recovery from them.

⁸³Aftercare refers to a variety of services designed to render assistance to an individual recovering from substance abuse following discharge from a hospital or formal treatment program, including such things as peer support and counseling, crisis services, job referral, or drop-in centers.

These inspirational testimonials help participants feel less alone in their recovery struggles.

AA and Narcotics Anonymous have traditionally been resistant to rigorous research studies, primarily as a means of protecting the confidentiality and anonymity of their membership. AA's own survey of its membership indicated that 67 percent of its members report having been sober for more than 1 year (1). Specific information regarding adolescent members is not available. Problems noted with the AA model include high attrition rates, apparently due to resistance to the spiritual component of AA (47). Although clinical descriptions of the use of the 12-step model with adolescents are available (e.g., 28), it is notable that outcome research is not available, despite the almost universal inclusion of these groups in formal adolescent treatment programs.

Outpatient Substance Abuse Treatment Programs for Adolescents

Outpatient substance abuse treatment programs are oriented around counseling rather than medical intervention. If a person needs medically managed detoxification, that is handled in another setting prior to the person's entry in the outpatient drug-free program. Outpatient substance abuse treatment programs seldom use medications on their clients.⁸⁴ Some outpatient substance abuse treatment programs are integrated into comprehensive youth service centers, family-planning services, or nutrition counseling (27).

The most intensive outpatient treatment programs are *day treatment programs*, in which the participant arrives early in the day and returns home only in the evening. Parental involvement is considered "mandatory" when available, in order to provide family support for continued participation by the adolescent. Day treatment programs function much like inpatient programs, with structured activities, onsite education, and a variety of therapeutic programs for adolescents and their families (131).

Outpatient substance abuse treatment programs often serve as early aftercare services for inpatients

(16). Although some of these programs are available to low-income adolescents, they are frequently associated with private for-profit organizations, and can be quite costly—as much as \$2,000 to \$5,000 for outpatient day care (337). Community mental health centers also offer outpatient treatment as an alternative for low-income clients.⁸⁵ One estimate suggested that about 30 percent of such programs are associated with community mental health centers (134).

Residential Substance Abuse Treatment Programs for Adolescents

Residential substance abuse treatment programs for adolescents offer 24-hour supervision by trained adults and recovering peers, providing immediate confrontation of substance-abusing or other self-defeating behavior. Residential programs may have locked units, employ nursing and counseling staff very much like those in psychiatric hospitals, and include structured daily routines, including a variety of educational and therapeutic groups. They frequently operate on the 28-day model, with a high level of structure in the initial stages and diminished structure as the client earns privileges through program participation and responsibility.

Residential treatment programs remove participating adolescents from peer or family environments that may have encouraged or failed to prevent their substance abuse. Some observers argue that such removal not only limits the adolescent's access to drugs but also offers a positive environment in which the adolescent can deal with his or her substance abuse (207). Other observers, however, dispute this view, suggesting that adolescents in residential treatment are exposed adversely to more peers with problems (95). Unfortunately, research on the relative effectiveness of residential programs in comparison with other treatment options is not available to settle this issue.

Ideally, the *halfway house model of* residential treatment offers adolescent participants supervision coupled with participation in public school and extracurricular activities. Located in neighborhoods where residents can attend regular public schools,

⁸⁴Less than 8 percent of adolescent clients in outpatient substance abuse programs are on maintenance medication, and less than 1 percent are in detoxification programs (308,309).

⁸⁵ *Community mental health centers* are public or private nonprofit mental health clinics intended to serve the local residents of a community—generally on an outpatient basis. They are funded through a combination of fees, third party reimbursements, State and local government contracts, and Federal alcohol, drug abuse, and mental health block grants.

halfway houses are often staffed by a live-in couple who serve as “teaching parents.” They usually include regularly scheduled group meetings focused on interpersonal relations and individual goals. Some are developed specifically as substance-abuse treatment settings, and others are simply homes for adolescents with any of a variety of problems—e. g., delinquency, emotional disturbance, homelessness.

In the *therapeutic community model*, residents maintain the administrative and therapeutic functioning of the facility. Less emphasis is placed on specific forms of therapy and more on global changes in conduct, feelings, values, and attitudes (71). In therapeutic community settings, household responsibilities and privileges are often assigned based on seniority and success in the program, thereby providing motivation for individuals to continue their participation. Although this model has been used extensively with adult substance abusers, it is less commonly available for adolescents. Therapeutic communities can be highly confrontational and may be difficult environments for adolescents.

In *wilderness-challenge programs*, a group of adolescent clients and counselors live together in a “primitive” camp environment (274). Personal challenges include mastering unfamiliar environmental conditions and learning survival skills. Wilderness camps often operate on the therapeutic community model. Although information regarding the effectiveness of these models for *treatment* of adolescent substance abuse is quite limited, Tobler, in her meta-analysis of 143 adolescent drug *prevention* programs found alternative programs to be highly successful among disadvantaged and high risk adolescents (105,267,274).

A more recent type of residential program is the “boot camp” or “shock incarceration” concept for young offenders (adolescent delinquents). According to the Institute of Medicine, boot camps vary in nature: “Some are entirely militaristic environments with few if any therapeutic staff or procedures; others incorporate many drug treatment elements that the more successful prison treatment efforts display but lack still other requirements—particularly continuity of care when the individual returns to the community” (201). There have been

no rigorous evaluations of the effectiveness of boot camps for drug-using offenders.

Inpatient Substance Abuse Treatment Programs for Adolescents

Hospital inpatient programs offering treatment for substance abuse include programs in independent facilities specializing in addiction, psychiatric hospitals, and general hospitals (85,201). Only a few States fund inpatient substance abuse programs (especially for alcohol abuse) specifically for adolescents (85). More than one-half of all adolescents treated for alcoholism are treated in settings serving primarily adults (308,309).

Adolescents in inpatient treatment settings often do not have the option of leaving. In 32 States, adolescents can be admitted for substance abuse treatment through “voluntary” commitment by their parents, with varying degrees of legal safeguards against inappropriate hospitalization.⁸⁶ Most inpatient facilities include locked-door units.

Hospitals generally include medically managed services, such as detoxification, as a part of treatment (13 1,203). In addition to medical services, hospitals generally offer therapy groups, individual therapy, and on-site educational facilities. These services are typically provided by an interdisciplinary staff. Family information and therapy programs are often available.

According to NDATUS, rehabilitation and recovery accounted for the largest percentage of inpatient adolescent care for alcoholism (89 percent) in 1989 (308,309). Five percent were in medical detoxification, 2 percent received social detoxification, and 4 percent were in custodial care. An adolescent receiving inpatient treatment for *alcoholism* had a 70-percent chance of being placed in a hospital, while an adolescent requiring inpatient *drug abuse* treatment was much more likely to be placed in a residential treatment facility (308,309). The standard length of stay for inpatient facilities has been 28 days for adults and slightly longer for adolescents. Adolescents are often assumed to need an even longer separation from their previous environment (193,267).

⁸⁶For a further discussion of this topic, see ch.17, “Consent and Confidentiality in Adolescent Health Care Decisionmaking,” in vol. III.

Issues Related to Substance Abuse Treatment for Adolescents

Methodological Issues in Evaluation

Interpretation of research in the field of substance abuse treatment for adolescents has been hampered by a number of factors. Several investigators have reviewed relevant research literature between 1975 and 1988, resulting in the following conclusions:

- Evaluations too often fail to distinguish among age groups within adolescence or specify substances for which treatment is sought.
- Reliable measures of abuse, dependence or treatment success are not often used.
- Outcome research is limited, with poorly defined variables.
- Followup is rare and too brief.
- Research is often poorly designed, with insufficient attention to controls and comparison groups and factors associated with effectiveness.
- Definitions of terms need to be standardized (57,336).

Many programs report success rates only for those who complete treatment. Yet the attrition rate of clients (often as high as 50 percent, and sometimes as much as 90 percent) in a particular treatment program is in itself considered to be a valid practical criterion of program success (126). Methods and statistical procedures for dealing with clients lost to followup also vary, creating opportunities for significant bias.

Thus, despite the conclusion of some evaluators that adolescents who participate in treatment fare better than those who do not, these groups have not been systematically compared in long-term studies (134). Further research, utilizing clearer measures, stronger research designs, and a broader variety of adolescent patients, is badly needed. There is a significant gap in knowledge of treatment effectiveness in relation to adolescents, seriously hampering the development of appropriate public policy (201).

Some of the characteristics of clients and programs which have been examined with varying degrees of scientific rigor are presented below to illustrate the paucity of substantive data available in

this area as well as to suggest directions for further research development.

Client Characteristics Related to the Effectiveness of Substance Abuse Treatment

Age--Laundergan, reporting on clients under age 25 in a private inpatient setting, found that younger clients were less likely to consider themselves "chemically dependent" and more likely to use drugs and alcohol at followup (164). This finding may be important when coupled with another finding that acceptance of chemical dependency is a significant predictor of adolescent treatment success (126).

In considering only residential clients, research has been contradictory regarding the effect of age on completion of a treatment program. One study found that adolescents overage 15 were more likely to complete treatment (94). One recent study found, however, that "relatively younger" clients were more likely to remain in treatment (103).

Ethnic Factors--Using race as an independent variable, some studies indicate higher rates of completion of treatment and reduction of drug use for white adolescents compared with nonwhites (238,248). Whites have also been found to be more likely than nonwhites to reduce posttreatment drug usage (103). Similarly, Jewish adolescents are more likely than others to complete a day-treatment program (94).

Pretreatment Behavior—Adolescents who initiate substance abuse early tend to experience more family discord and other problems, including resistance to authority,⁸⁷ and are less likely to complete treatment (94,126,238). Adolescents who have a history of educational failure or use multiple drugs are more likely to drop out of treatment (126).

Mental Health Problems—Although adolescents who are depressed are more likely to drop out of treatment, those with relatively severe psychopathology who do complete treatment seem to be more successful at reducing subsequent drug use (102,126). This interesting finding may reflect positive response to adjunctive treatment such as individual or group therapy.

Substance Abuse History-Specific substances used may be predictive of later treatment success.

⁸⁷A cause-and-effect relationship has not been determined.

One fairly consistent finding is that the two substances most commonly used by adolescents, alcohol and marijuana, are the most resistant to treatment (103,135,292). Findings are less definitive regarding other substances (57).

Program Characteristics Related to the Effectiveness of Substance Abuse Treatment

Setting-Comparisons of inpatient v. outpatient treatment offer no conclusive evidence that either setting is clearly more effective in reducing substance use. In the two largest national studies—the Drug Abuse Reporting Program (DARP) and the previously mentioned Treatment Outcome Prospective Study (TOPS)—comparisons of inpatient v. outpatient treatment resulted in contradictory results. Residential clients fared better in TOPS (135), while outpatients fared slightly better in the DARP study (248). These studies were both conducted with adult patients. A study using random assignment compared inpatient and outpatient services for juveniles characterized as delinquent and substance abusing and found improvement in both groups but no differences between groups (6). These researchers suggest that maturation, and not treatment, was responsible for change.

Time in Treatment—According to some studies, time in outpatient treatment for adolescents is negatively correlated with certain outcome measures, such as posttreatment productivity and frequent marijuana use (135,238). Hubbard looked at clients ages 17 and under and found that residential treatment was more successful for longer stays, but adolescents in outpatient treatment were more successful if their course of treatment was shorter (135). These findings were not true of 18- and 19-year-old adolescent clients. However, another study suggests that time in treatment positively correlates with posttreatment reductions in drug use (103).

Types of Services—Despite the emphasis in most programs on the addiction model, the services most clearly associated with positive treatment outcome are those often considered “adjunctive” to substance abuse treatment, such as educational, recreational, and family therapy services and social skills and assertiveness training. For example, a number of researchers suggest that recreational programs such as challenge-adventure courses are especially important because they teach adolescents alternative discretionary time activities as well as enhance self-esteem (102, 103, 126). Friedman and Glickman

found that provision of educational services, mandated in residential programs, are an effective intervention in outpatient treatment as well (102).

Family involvement is also consistently found to be a positive influence upon program cooperation and treatment effectiveness—even more effective than individual therapy (22,53,94,102,260). One research team reports success in changing family relationships by intervening with only one family member (270). These findings may be particularly helpful, given that mothers were much more likely to be involved in their adolescents’ treatment than fathers (126).

Program Climate—While counselors appear to be poor judges of their own success according to one study, their ratings of how explicitly they addressed clients’ personal problems and feelings correlated with reduction in drug use (103). Other important correlates identified in this study were a practical orientation towards preparation for release from the program, measures of organization and order within the program, and adolescent client ratings of program flexibility.

Voluntary Participation—Mandated treatment is usually followed to completion, possibly because of legal sanctions, but voluntary treatment is more likely to be considered successful (71,23). An adolescent’s perception of choice in treatment decisions is an effective predictor of treatment success.

The Economics of Substance Abuse Treatment

Substance abuse treatment for adolescents is generally expensive, though the range is substantial. Wright estimates the cost of a continuum of substance abuse care ranging from a primary prevention alcohol education program through medically intensive rehabilitation (337). According to Sunshine and Wright, a 1-month stay in a private hospital costs at least \$4,000 to \$5,000, may average around \$10,000, and can be as high as \$20,000 (267).

Publicly funded services are uniformly less expensive, with public hospitals costing between \$1,000 and \$6,000 per month (267). Day treatment is considerably less expensive than hospitalization—around \$3,000 per month for a private for-profit program. Community mental health centers often provide outpatient services which cost clients only a few dollars, while the State reimburses the centers approximately \$30 per hour of client services. There

is no conclusive relationship between the cost and effectiveness of services (267).

Costs for most substance use treatment services can represent a considerable burden to adolescents, their families, and to those health insurance plans that cover such treatment. Medicaid coverage for substance abuse treatment services is limited, and⁸⁸ less than 20 percent of all treatment units serving primarily adolescents accept Medicaid coverage (308,309). Uninsured adolescents may seek treatment through community mental health centers or private nonprofit agencies, which often operate on a sliding-scale basis. Unfortunately, these agencies often report long waiting lists and limited staffing.

State expenditures for alcohol and drug treatment for persons of all ages exceeded \$1.6 billion in 1988 (55). This represents a 61 percent increase over 1985. States provided funds to 6,926 treatment units in 1988. While almost one-half of adolescent alcohol clients received treatment in settings receiving some public support, adolescent drug abuse clients are served primarily in settings receiving no public support (308,309).

Utilization of Substance Abuse Treatment by Adolescents

According to data from NDATUS, the largest number of treatment programs are offered by private, nonprofit facilities (65 percent of the total). Utilization rates for these programs average 80 percent. Private, for-profit programs accounted for 14.4 percent of all programs surveyed by NDATUS in 1987 and served 11.9 percent of the total population in treatment (with an average 61-percent utilization rate). On the other hand, State and local governments own 17.3 percent of all treatment facilities, yet they serve 24.6 percent of the population in treatment, maintaining a utilization rate of almost 90 percent (308,309). These figures include adult facilities and adult utilization. Adolescent-specific figures are not available.

While not conclusive, these numbers at least suggest that available treatment may be underutilized in the private sector, creating a potential for overtreatment—especially in private, for-profit settings. At the same time, some observers have suggested that adolescents who cannot afford private treatment may continue to be unserved, underserved, or inappropriately served (109,218).

Assessment and Referral of Adolescents With Substance Abuse Problems

The identification and referral of an adolescent with a substance abuse problem, although not technically substance abuse treatment per se, are usually the first steps in the treatment process. In most cases, the initial identification of an adolescent with a substance abuse problem is made by family and friends (126, 134). In fact, however, other institutions or agencies—including schools, child welfare agencies, juvenile courts, mental health providers, medical settings, and community organizations—may be better informed and able to identify adolescents in need. The role of these other institutions and agencies in referring adolescents to assessment or treatment is crucial. And referral is not always a simple matter (see box 12-C). For this reason, emphasis has been placed in recent years on improving communications between treatment providers and these institutions.

The preliminary identification of an adolescent with a substance abuse problem is normally followed by more detailed assessment of the suspected substance use problem and the adolescents need for particular services. Assessments can range from observation and interviews through the use of standardized tests to complete physical and psychological workups. A few assessment scales appropriate for adolescents have been developed, but the extent of their use is not known.⁸⁹ Schools and nonspecialized community agencies generally do not engage in elaborate assessment work themselves. They either rely on interviews and common testing procedures or refer an adolescent to a mental

⁸⁸See ch.16, "Financial Access to Health Services," in Vol. III for discussion of public (e.g., Medicaid) and private third-party payment for substance abuse treatment services.

⁸⁹One scale, the Adolescent Alcohol Involvement Scale, measures an adolescent's alcohol use only (179). Another scale, the adolescent-SpWifC Addiction Severity Index, provides information regarding the severity of an adolescent substance use problem as well as sociological and behavioral information related to family, employment, medical, and personality factors (87). Another scale is a two-part instrument developed by Winters and Henley to assess the extent and severity of chemical abuse (the Personal Experience With Chemicals Scale) and risk and maintenance factors (the Personal Experience Scale) (336). Some standard tests include indicators of substance abuse. One of the most frequently used diagnostic tests, the Minnesota Multiphasic Personality Inventory (MMPI), for example, includes a scale for substance abuse (the MacAndrews scale), which has been found to be a valid index for adolescents (229).

Box 12-C-Problems With Access to Substance Abuse Treatment Services in a Large Metropolitan Area

One large metropolitan area has at least eight different inpatient and residential substance abuse treatment facilities that serve adolescents. Seven of these facilities require health insurance payment. The eighth facility **does** offer an occasional “scholarship,” but the criteria under which financial aid is available are unclear.

For low-income adolescents in need of substance abuse treatment who do not have health insurance, the only other substance abuse treatment services available in the area are outpatient services provided through community mental health centers. The nearest publicly funded inpatient substance abuse treatment facility is approximately 50 miles away, treats only females, and reports a long waiting list. Two nonprofit halfway houses are available, but these are most frequently used as aftercare or transitional facilities for adolescents who have already been hospitalized. They also report waiting lists. One of the private hospitals that claims a speciality in adolescent substance abuse treatment has a referral list for low-income youth, but fewer than one-quarter of the facilities on the list actually serve adolescents.

SOURCE: J. Emshoff and R. Margolin-Mankoff, “Treatment of Adolescent Substance Abuse: A National Review and Critique,” paper prepared under contract to Carnegie Corporation of New York and the Carnegie Council on Adolescent Development, for the Office of Technology Assessment U.S. Congress, Washington, DC, 1990.

health or substance abuse professional for assessment. Data provided by these interviews, however, have certain implicit difficulties in that some investigators have questioned the validity of such self-reporting. Researchers caution that assessment tests should be part of a battery of evaluation techniques that include intellectual and personality functioning, family relationships, and other areas (336). Comprehensive psychological assessment is especially important when dual diagnosis (diagnosis of psychiatric disorder in addition to substance abuse) is known or suspected, so that need for appropriate psychotherapeutic treatment is documented (186). NIDA recently developed a comprehensive assessment and

referral manual for adolescents available for use and further testing (307a).

Once an assessment is done, the adolescent may be referred to a treatment program or service provider. This is the point at which decisions are made which affect patterns of utilization. Some of the more common formal sources of assessment and referral are examined below, followed by consideration of the need for standards for placement to guide treatment decisions (2).

Schools--Schools have a significant stake in the early identification and treatment of adolescent substance abusers. In 1984, 21 percent of school administrators surveyed nationally indicated that substance abuse problems ranked second only to discipline as a major problem (196). In addition, schools are where most adolescents spend a large part of their waking hours and, as discussed above, schools have been a primary site for drug prevention education.⁹⁰ Thus, these institutions provide convenient opportunities to observe behavioral changes which may be associated with substance use problems. Academic performance may suffer when an adolescent is using alcohol or drugs, and behavior also may begin to affect others if classroom disruption ensues. As a consequence, teachers and peers may be the first to recognize an emerging problem.

It is hardly surprising, then, that attempts have been made to develop school-based programs for identifying adolescent substance users and referring them to treatment. An example of a school-based program is substance abuse counseling—generally known as a Student Assistance Program. Student Assistance Programs are modeled on employee assistance programs (188,192). They provide on-site, immediate intervention—identifying students with problems, helping them to acknowledge their difficulties, and making referrals to other services in the community. In some cases, they use peer or guidance counselors already involved with other school programs. Student Assistance Programs often use prevention techniques and may reach out to students who are neither high risk nor active users. In many communities, Student Assistance Programs are among the only substance abuse intervention services available to low-income adolescents.

⁹⁰For discussions of school environments and their impact on health and of adolescents’ use of discretionary time, see ch. 4, “Schools and Discretionary Time,” in this volume.

Despite efforts like Student Assistance programs, school systems are often reluctant to become involved in substance abuse issues which may be seen as health problems and not strictly educational concerns. In addition, policies requiring suspension for substance use may interfere with a school's ability to provide services onsite. Thus, one researcher argues that school personnel must make more effective use of community treatment resources, rather than attempting to provide long-range counseling themselves (341). Some States require schools to document efforts at coordination and to specify agency responsibilities before funding school-based substance abuse intervention programs. Confidentiality, coordination of services for multiproblem students, lack of parental involvement, and the advisability of increasing treatment services may be problems when schools become involved in identification and referral (275,341). The scarce literature on Student Assistance Programs (1 13) has not addressed these issues, but there have been reports of positive reception to Student Assistance Programs by students (188).

Juvenile Justice Agencies--The incidence of substance abuse problems among adolescents served by the juvenile justice system is disproportionately high (127).⁹¹ Thus, the juvenile court can be an important link in connecting adolescents with substance abuse problems to needed treatment. Generally, services provided in court settings focus on assessment and referral for substance abuse treatment. However, in some instances the court may retain jurisdiction over a juvenile and actually approve a treatment plan in coordination with substance abuse or mental health agencies. This can occur under a diversion plan before adjudication is completed or afterwards, with treatment imposed as a condition of probation (sometimes with provision for expunging a record upon successful completion of treatment).

In diversion, the juvenile justice system (i.e., the court or a lower officer of the court) may redirect an adolescent to a substance abuse treatment program as an alternative to the adjudication process—reducing the caseload of the court system while providing rehabilitative services to adolescents (10).

By retaining jurisdiction pending completion of a substance abuse program, a juvenile court may provide the added leverage of potential sanctions for noncompliance, thereby increasing cooperation with treatment (148). Although some authors have questioned the appropriateness of court-ordered treatment for substance abuse problems (258), others have shown that even mandated treatment can be effective when some measure of decisionmaking is available to the adolescent within the treatment program (104).

Treatment Alternatives to Street Crime is a Federal program that was developed for use in the adult corrections system in the 1960s but now funds programs for juvenile offenders as well (148). One comprehensive evaluation and referral program funded by Treatment Alternatives to Street Crime screens all juveniles involved in complaints for substance abuse (148). If initial screening reveals a substance use history, a more comprehensive assessment is done. Subsequent referral for treatment is then incorporated into conditions of probation.

The High-Intensity Treatment and Supervision program reported by Swarm provides mandatory counseling not only for substance abusing delinquents but also for their parents (269). This program seeks to “empower” parents whose children are out of control by teaching parenting skills. Swarm suggests that this program serves younger siblings in these families as much as the delinquents themselves (269).

Primary Health Care Services--Some observers have suggested that primary care physicians should evaluate adolescents for a variety of “risky behaviors,” including substance abuse, at routine examinations (51,93). Although most physicians are willing to provide counseling and referral for adolescents with substance abuse problems, they are often quite poor in identifying drug users among other medical patients (255).⁹²

NIDA's DAWN system, discussed earlier, documented 13,975 adolescents in 1988 who were admitted to selected emergency rooms nationwide for conditions involving the use of drugs. Most of these encounters (61.8 percent) were related to

⁹¹The drug abuse and other health problems of adolescents in the juvenile justice system, as well as problems with the health services available to such adolescents, are discussed in ch. 13, “Delinquency: Prevention and Services,” in this volume.

⁹²For a fuller discussion of primary health care for adolescents, including studies of physicians' ability to detect substance abuse problems in adolescents, see ch. 15, “Major Issues Pertaining to the Delivery of Primary and Comprehensive Health Services to Adolescents,” in Vol. III.

suicide attempts (302). While the use of a drug in a suicide attempt does not necessarily demonstrate the existence of a continuing substance abuse problem, the DAWN data do indicate that medical personnel come into contact with adolescents at crucial moments and that these opportunities for substance abuse treatment interventions are not being fully utilized. One review of an emergency department of a university hospital that was especially designated as an alternative to incarceration for public drunkenness suggests that intensive and longer term intervention at the emergency-room level may be effective in reducing episodes of intoxication (264). In this program, intoxicated adolescents were evaluated and observed closely for an extended period, interviewed extensively, and scheduled for followup appointments. At 13 months, only 13 percent of these high-risk patients had come back to the emergency department because they were intoxicated. The lack of a control group makes definitive conclusions about the effectiveness of this intervention difficult. However, since emergency room personnel rarely provide such interventions, specialized training in the provision of extensive counseling and followup seems warranted, and further systematic study of such interventions would be worthwhile.

Mental Health System—Considerable differences exist between professionals in the substance abuse and mental health areas, mostly centering upon appropriate identification of treatment needs and services. These differences have sometimes worked to the disadvantage of the adolescent seeking services. So, too, has the tendency in some areas to maintain separate substance abuse and mental health programs, even though certain clients may have dual diagnoses and therefore be denied needed treatment for one condition while enrolled in a program for the other.

Given the documented incidence of mental health problems in substance abusing adolescents, involvement by mental health providers is appropriate and necessary (102,126). However, these professionals need a basic knowledge of the substance abuse process and treatment to be most effective. In fact, a common complaint by substance abusers is that those in the mental health professions fail to recognize the severity of their problems (52). There is a divergence in perspective between traditional mental health professionals and those specializing in substance abuse treatment based on their respective

philosophical frameworks. Mental health treatment frequently emphasizes development of self-control and searches for ‘underlying issues,’ while substance abuse treatment stresses loss of control over a substance and identifies the immediate symptom (the substance abuse) as the primary problem for treatment. In addition, traditional therapists may have difficulty with the spiritual focus of 12-step programs (52). While some mental health therapists are increasing acceptance and involvement with practitioners of the addiction model of substance abuse, others continue to develop psychologically oriented treatments especially focusing upon cognitive-behavioral and family approaches (52).

Standards for Placement of Adolescents With Substance Abuse Problems

The need for criteria to guide placement decisions for adolescents with substance abuse problems has arisen from the “dilemma of recommending the most appropriate treatment option from a proliferating array of choices” (131) and recent concerns about the potential overuse of both inpatient and outpatient treatment. In response, the substance abuse treatment community has developed its own placement standards, because the broad guidelines of the Joint Commission on Accreditation of Healthcare Organizations and the Commission on Accreditation of Rehabilitation Facilities do not offer sufficient assistance in admission decisions (64). The “Cleveland Criteria” were developed in 1986 by the Chemical Abuse Treatment Outcome Research (CATOR) network in collaboration with several treatment centers and advisers. These criteria offer standards for placement and treatment in six levels of substance abuse services and cover six levels of care, including separate guidelines for adolescent clients. Other work is being done by the National Association of Addiction Treatment Personnel (203). The Provisional Committee on Substance Abuse of the American Academy on Pediatrics has also developed guidelines for the selection of substance abuse treatment programs (2).

The emergent criteria stress placement in the least restrictive environment and seek to take adolescent maturation levels, cognitive functioning, and developmental factors into account in placement decisions. The National Association of Addiction Treatment Personnel’s draft document suggests that placements should be based on clinical functioning rather than issues of sponsorship or payment.

Preliminary standards suggested by both the National Association of Addiction Treatment Personnel and the Cleveland group require a DSM-III-R diagnosis of a substance use or dependence disorder for a client to be considered for treatment (4). Placement decisions are also affected by medical, psychiatric, and “environmental” complications.

Interestingly, these criteria fail to address the issues raised by many experts in the field of substance abuse assessment. No mention is made of standardized instruments (beyond the criteria themselves) or of incorporation of assessment procedures into treatment planning. Furthermore, adherence to these criteria is, at this point, entirely voluntary and is not monitored at all.

Staffing of Substance Abuse Services

The credentialing of substance abuse treatment professionals is an enduring problem. Some level of standardization was recommended a decade ago, in a 1980 General Accounting Office report that called for a national system for accreditation of substance abuse counselors (279). That report noted that “counselor competency is vital to proper treatment (279). Despite such recommendations, however, no nationally standardized system of accreditation has yet been developed.

The substance abuse treatment community has responded to this void by developing certification criteria of its own in several different fields. For example, the American Society of Addiction Medicine (ASAM) offers a certification examination to board-certified physicians with at least one year’s full-time involvement in the field of alcoholism and other drug dependencies (3a).⁹³ The National Association of Alcoholism and Drug Abuse Counselors has developed certification criteria for National Certified Addiction Counselors (204).⁹⁴ All States now provide (and most require) some form of certification for substance abuse treatment professionals—usually identified as “certified alcohol counselor,” “certified drug counselor,” or a com-

bined “certified addictions counselor” —and, as of 1989, 36 States extended reciprocity for certification. But, as discussed elsewhere in this Report, the number of health care providers trained specially to provide health care to adolescents is very small.⁹⁵

Staffing patterns also affect the quality of care in adolescent substance abuse treatment programs and substance abuse treatment programs in general (201). Funding limitations may restrict staffing, especially in public settings. Administrative personnel report that in many cases, due to funding limitations, one staff member may provide several different services. Within drug treatment outpatient programs in which at least 75 percent of the clients are adolescents, there are approximately 20 clients per counselor. Each client has an average of only 1.7 scheduled appointments per week, including individual and group meetings (308,309).

In residential settings, psychiatrists or addiction specialists may provide individual therapy and paraprofessional staff provide milieu therapy and supervision of client activities. Inpatient programs are usually managed by physicians with training in psychiatry or addictions. Nonetheless, physicians may have limited contact with their clients, often meeting with them only for brief sessions and making decisions based on record reviews. Most hospitals use a team approach in which a variety of professionals share responsibility for patient care.

A complicating issue in evaluating staff requirements is the norm of hiring former substance abusers as counselors, especially in residential programs. In one study, about 40 percent of counselors in residential programs and nearly half in outpatient programs were described as recovering personnel (134). An assessment involving adolescent treatment found no differences in selected client outcomes between programs using staff who were former substance abusers and staff professionals with no personal substance abuse history.

⁹³ASAM is not itself a member of the American Board of Medical Specialties, and thus the ASAM certification process is not a board certification (3a).

⁹⁴In order to be certified as a National Certified Addiction Counselor, applicants must possess current State certification or licensure as an alcoholism and/or drug abuse (AODA) counselor, have 3 years’ full-time or 6,000 hours of supervised experience as an AODA counselor, 270 contact hours of education and training in AODA or related counseling subjects, and pass a written examination administered by the National Association of Alcoholism and Drug Abuse Counselors Certification Commission (204). The National Association of Alcoholism and Drug Abuse Counselors Certification Commission defines addiction as “the condition or state wherein an individual is physiologically and/or psychologically dependent upon alcohol and/or other drugs” (204).

⁹⁵See ch. 15, “Major Issues in the Delivery of Primary and Comprehensive Health Services to Adolescents,” in Vol. III.

The recent Institute of Medicine report on drug treatment did not deal in depth with the issue of staffing—and did not deal with staffing for facilities and programs treating adolescents at all—but, with respect to publicly funded treatment programs, it concluded in general that “the competence, quality, and continuity of care givers may well be a critical element in explaining . . . differential effectiveness” (201). Overall, the Institute of Medicine report recommended considerable upgrading of public facilities. With respect to private facilities, the Institute of Medicine suggested “the development of soundly derived standards for admission, care, and program performance” (201).

Conclusions About Substance Abuse Treatment Services for Adolescents

Clearly, there is no one system for the treatment of psychoactive substance use problems among U.S. adolescents. Costs of services vary tremendously by type of provider and setting. Adolescents from affluent homes or those with insurance coverage are likely to be seen in private settings that tend to offer more intensive services.⁹⁶ Low-income adolescents are typically restricted to what local public services may be available. Public services may vary tremendously from State to State, depending on the funds available for inpatient and outpatient services, policies regarding the mandating of substance abuse coverage in private health insurance plans, and the use of Medicaid funds to support substance abuse treatment.

The lack of standards and uniform definitions plague the field. Whether one considers quality of care standards, professional qualification standards, or key conceptual terms like “abuse,” “need,” or “success,” confusion is more common than concurrence. Program accountability is affected when “success” is defined in terms of completion of treatment rather than in terms of short-term or longer term behavioral outcomes.

“Client-treatment matching” is described in the literature as an important reason for advancing research. However, it is questionable that more than one basic treatment exists with which individual client needs can be matched, because most treatment is based on the addiction model. Treatment for substance abuse seems quite uniform, with rather

rigidly scheduled activities and little individualization. Furthermore, services are not currently differentiated as a function of the presenting problem, or the characteristics of the adolescent, the family, and the larger environment. Even when comprehensive assessments are undertaken, it is unclear how these data are used in program development.

Insufficient attention has been paid to whether adolescents should be considered a special treatment population in need of adolescent-specific treatment services, rather than continue incorporating adolescents into substance abuse treatment programs primarily intended for adults.

Similarly, insufficient attention has been paid to the special needs of minorities in both the delivery of services and the design of research efforts. Too often, data are not collected or analyzed on an ethnic-sensitive basis, so that little is known about what types of substance abuse treatment work best for which adolescent subpopulations.

Little attention has been paid to the differences among adolescents at different ages and stages of development. Adolescent programs, where they exist, tend to treat adolescents without much distinction between early, middle, or late adolescence. And adolescents with combined substance abuse and other problems such as mental retardation, mental illness, and delinquency may find themselves excluded from single-focus treatment programs because of their multiple diagnoses. Further exploration of the developmental stages of adolescence, the maturational process, and the unique needs of adolescents with dual-diagnoses is necessary so that treatment programs can be structured in ways that are responsive to the therapeutic needs of adolescents.

The need for increased funding for adolescent-specific substance abuse treatment services is accompanied by a comparable need in treatment and services system research. In too many treatment areas, research has yet to determine what works effectively and what does not. Research models which are specific to the characteristics of adolescents, different cultures, and substances need to be developed and rigorously tested with a variety of settings, providers, and clients if this deficit is to be addressed. Support by Federal agencies—particularly NIDA—for future research on adolescent

⁹⁶Limitations on health insurance coverage for substance abuse treatment are discussed in ch. 16, “Financial Access to Health Services,” in Vol. III.

substance abuse treatment, however, should require a strong commitment to methodological integrity and scientific evaluation.

Major Federal Policies and Programs Related to the Use and Abuse of Psychoactive Substances by Adolescents

Overview

The Federal role in the prevention and treatment of psychoactive substance abuse changed throughout the 1980s. Prior to 1980, the Federal Government had taken some direct role in funding prevention and treatment activities. In 1981, with the introduction of the Alcohol, Drug Abuse, and Mental Health (ADM) Block Grant Program of the Public Health Service Act, the bulk of Federal funds for prevention and treatment were given directly to the States in the form of block grants, and States were given primary responsibility for establishing program requirements and monitoring program activities (Public Law 97-35).⁹⁷ At the same time, the National Institute on Drug Abuse (NIDA) and the National Institute on Alcoholism and Alcohol Abuse (NIAAA) in DHHS continued to take the lead role in intramural and extramural *research* on alcohol and illicit drug abuse.

In 1986, in response to increased public and governmental concern about the spread of illicit drugs and drug-related crime, Congress and the executive branch joined together in strengthening the Federal role related to drug abuse, by passing the Anti-Drug Abuse Act of 1986 (Public Law 99-570). This law had provisions affecting the actions of numerous executive branch agencies, including the White House, the U.S. Department of Justice, the Federal Communications Commission, the U.S.

Department of Defense, the U.S. Department of Education, the U.S. Department of Health and Human Services, the National Park Service in the U.S. Department of the Interior, and others. In 1988, Congress passed, and the President signed, another Anti-Drug Abuse Act (Public Law 100-690), further strengthening the Federal role in antidrug activities, and creating an executive branch office to coordinate national drug control policy. This executive branch office became known as the Office of National Drug Control Policy (ONDCP).

In both Anti-Drug Abuse Acts, substantial funds were authorized to be newly allocated to or reallocated within executive branch agencies for purposes of: strengthening Federal efforts to encourage foreign cooperation in eradicating illicit drug crops and in halting international drug traffic; improving enforcement of Federal drug laws and enhancing interdiction of illicit drug shipments; providing strong Federal leadership in establishing effective drug abuse prevention and education programs; expanding Federal support for drug abuse treatment and rehabilitation efforts; and for “other purposes” as delineated in the acts (Public Law 99-570, Public Law 100-690). ONDCP estimated the budget authority of the drug control agencies to have been \$9.378 billion in fiscal year 1990 (327,327a). Forty-eight executive branch agencies, in 18 cabinet departments or independent agencies, were counted by ONDCP as being “national drug control program agencies” in February 1991 (327).⁹⁸

With respect to adolescents, several features of the Anti-Drug Abuse Acts of 1986 and 1988 and subsequent executive branch activities are worth noting. As discussed above, alcohol and tobacco are the substances most likely to be used and abused by adolescents.⁹⁹ In contrast, both the 1986 and 1988

⁹⁷For further discussion of the Alcohol, Drug Abuse, and Mental Health Block Grant Program, see ch. 11, “Mental Health Problems: Prevention and Services,” in this volume.

⁹⁸According to ONDCP, 12 cabinet departments have agencies that are national drug control program agencies: U.S. Department of Justice, U.S. Department of the Treasury, U.S. Department of Transportation, the U.S. Department of Agriculture, the U.S. Department of the Interior, the U.S. Department of Health and Human Services, the U.S. Department of Education, the U.S. Department of State, the U.S. Department of Defense, the U.S. Department of Housing and Urban Development, the U.S. Department of Labor, and the U.S. Department of Veterans Affairs (327). Six independent agencies are national drug control program agencies: ONDCP, the U.S. Judiciary, ACTION, the Agency for International Development, the U.S. Information Agency, and the Central Intelligence Agency (327). In addition, according to ONDCP, the following budget accounts are part of the national drug control program budget: the Special Forfeiture Fund (ONDCP), the Asset Forfeiture Fund (U.S. Department of Justice), Support for Prisoners (U.S. Department of Justice), and Emergencies in the Diplomatic and Consular Service (U.S. Department of State) (327). As dictated by the law mandating the creation of ONDCP, national drug control program agencies were to be designated “jointly by the Director [ONDCP] and the head of the department or agency; or . . . by the president” (Public Law 100-690, Title I, Subtitle A, Sec. 1010). As explained further in the drug control budget submitted by ONDCP, not all activities of all the national drug control program agencies are earmarked for drug control activities.

⁹⁹As discussed below, however, prevention activities funded by the Office for Substance Abuse prevention (OSAP) in DHHS do include efforts to prevent or delay the use of alcohol and tobacco by adolescents and younger children, either because these are regarded as “gateway drugs” (see above) or because the use of these substances is illegal for most adolescents.

Anti-Drug Abuse Acts *emphasized* activities related to controlled substances (illicit drugs). Each act has some mention of activities related to alcohol abuse (e.g., drunk driving prevention programs under Title IX, Subtitle A, of Public Law 100-690), but such activities are not a leading focus of the laws. As perhaps the leading example of this focus on illicit drugs, the activities of ONCDP were legislated to include only those drugs included in section 102(6) of the Controlled Substances Act (21 U.S.C. 802(6)) (Public Law 100-690, Title I, Subtitle A, Sec. 1010); thus NIAAA is not considered a national drug control program agency. Neither act authorizes activities pertaining to tobacco use or dependence.¹⁰⁰

Second, since the passage of the Anti-Drug Abuse Act of 1986, there has been continuing tension concerning the roles of the Federal Government relative to drug supply reduction and demand reduction. Supply reduction activities under the acts are more relevant to illicit drugs than to alcohol or tobacco, the substances most likely to be used by adolescents, so one would expect such activities to have a smaller immediate impact on adolescents in general than effective demand reduction activities. On the other hand, as noted above, one could argue that supply reduction activities are of primary importance in protecting adolescents from increasing quantities of—and growing illegal markets for—illicit drugs, and from the violence and other crime that is associated with the illicit drug market. In any event, approximately 70 percent or more of the budgets of the National Drug Control Agencies have been allocated to supply reduction activities, and this seems unlikely to change. Although, as described below, Federal investment in substance abuse prevention and treatment activities has grown throughout the 1980s, as a general matter, ONCDP continues to believe that the Federal Government should have a more limited role in activities related to reducing the *demand* for illicit drugs (defined in

public Law 100-690 as drug abuse education, prevention, treatment, research, and rehabilitation) than in activities related to reducing the *supply* of illicit drugs (defined in Public Law 100-690 as international drug control, foreign and domestic drug enforcement intelligence, interdiction, and domestic drug law enforcement, including law enforcement directed at drug users). ONCDP argues that “many supply reduction activities are intrinsically [Federal] Government operations. . . whereas most demand reduction efforts can and should be shared by our schools, churches, and communities” (327). Perhaps for this reason, the ONCDP national drug control strategy for fiscal year 1992 suggested some Federal pulling back from selected drug use prevention activities.

As noted above, it would be difficult to assess the impact of current illicit drug supply reduction activities on adolescents, and no such attempt is made here.^{101 102} This section provides a brief overview of the current leading executive branch activities in demand reduction activities (substance abuse research, prevention, and treatment) specific to adolescents. The two agencies with the largest role in reducing the demand for drugs among adolescents are the DHHS and the U.S. Department of Education. Other Federal agencies with smaller roles include ACTION, the U.S. Department of Housing and Urban Development, and the U.S. Department of Labor.¹⁰³

Specific Federal Agencies and Their Roles in Substance Abuse Prevention and Treatment for Adolescents

U.S. Department of Health and Human Services

DHHS has by far the largest role in adolescent-related demand reduction. The DHHS agency with the largest role is the Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA), but other agencies such as the Centers for Disease

¹⁰⁰Each of the acts did have a particular focus on the susceptibility of *children and adolescents to the use of drugs*.

¹⁰¹ONCDP itself admits difficulty in evaluating the effectiveness of its supply reduction activities. According to ONCDP, data on drug availability, including domestic marijuana production are “not yet available” (327).

¹⁰²In March 1987, OTA published an analysis of Federal efforts in drug interdiction (stopping or reducing the amount of drugs coming across U.S. borders) (285a). The U.S. General Accounting Office has also analyzed Federal policies related to supply reduction/drug interdiction and has numerous publications on the issue (281).

¹⁰³The U.S. Department of Transportation’s efforts related to the reduction of driving under the influence of psychoactive substances are described in ch. 5, “Accidental Injuries: Prevention and Services,” in this volume. The U.S. Department of Justice’s activities related to substance use and sales by adolescent delinquents are described in ch. 13, “Delinquency: Prevention and Services,” in this volume. Within DHHS, the National Cancer Institute provides most support for smoking prevention as part of its cancer prevention activities. These activities are discussed in ch. 6, “Chronic Physical Illnesses: Prevention and Services,” in this volume, and in ch. 19, “The Role of Federal Agencies in Adolescent Health,” in Vol. III.

Control (CDC), the Indian Health Service, the Office of Human Development Services, Health Resources and Services Administration, and the Office of Disease Prevention and Health Promotion, also play some role.

Alcohol, Drug Abuse, and Mental Health Administration Agencies—Four of ADAMHA's five agencies deal with substance use and abuse:

- the Office for Substance Abuse Prevention (OSAP),
- the Office for Treatment Improvement (OTI),
- the National Institute on Alcoholism and Alcohol Abuse (NIAAA), and
- the National Institute on Drug Abuse (NIDA).

OSAP and OTI are two relatively new ADAMHA agencies which fund program demonstration projects and other nonresearch activities. NIAAA and NIDA are research agencies.¹⁰⁴

Office of Substance Abuse Prevention—OSAP was created by the Anti-Drug Abuse Act of 1986 (Public Law 99-570) as “the cornerstone of the Federal demand reduction strategy” and is “the major prevention unit of ADAMHA” (310). OSAP's programs are important to a consideration of substance use by adolescents, because, as dictated by the legislation that authorized the agency, a prime target group for OSAP programs is “high-risk youth.”

Most of OSAP's prevention activities can be categorized as primary or secondary prevention, but some treatment demonstration projects are funded. Under its High-Risk Youth Demonstration Grants program, OSAP has funded the developing, testing, and evaluation of promising approaches for working with high-risk youth. OSAP's fiscal year 1990 budget was \$193.4 million overall, approximately 30 percent of which was estimated to be spent on high-risk youth demonstration projects (\$39.0 million) and community youth activities (\$19.8 million) (327).

In its summary of national drug control program agency budget proposals for fiscal year 1992, ONDCP recommended increasing the budget for high-risk youth demonstration projects by about 8 percent over its fiscal year 1991 level (from \$50.7 million to \$54.8 million) and completely discontinuing the community youth activities program (327a, 327b).¹⁰⁵

Office for Treatment Improvement—OTI was created in fiscal year 1990, and its long-term goal is to develop national prototypes for effective drug treatment policy. OTI's major responsibility, however, is to administer the ADM block grant, the drug and alcohol portion of which was \$895.6 million in fiscal year 1990 (155a). Block grant funds are provided to States, and there is little requirement for State reporting. Thus, it is unclear what portion of ADM block grant funds are used for adolescents. A major OTI initiative directly relevant to adolescents has been a competitive grant program to assist States and communities in enhancing existing drug abuse treatment programs for critical population groups, including adolescents (defined as individuals up to age 22), racial and ethnic minorities, and residents of public housing projects. This grant project is not directed toward the development of new treatment approaches so much as the application of apparently promising modes of service delivery (for example, the use of aftercare services). For fiscal year 1991, \$38.1 million was appropriated for the program on critical population groups, and a grants announcement was to be published in summer 1991 (327 b).

National Institute on Alcoholism and Alcohol Abuse—NIAAA is not considered one of the national drug control program agencies (327,327a), but it funds and conducts research on the prevention and treatment of alcohol-related problems. NIAAA has three priority areas specific to adolescents: 1) defining sociocultural factors that promote adolescents' drinking, 2) developing and testing preventive interventions, and 3) assessing the impact of changes in the drinking age on alcohol consumption (270a,289a,289b). In fiscal year 1989, NIAAA spent

¹⁰⁴NIAAA and NIDA do conduct research on the effectiveness of particular substance abuse prevention and treatment programs, but more of their focus is on research on the epidemiology, risk factors, and effects of drugs and alcohol. When projects involving intervention are funded by NIAAA and NIDA, they are required to have a more rigorous research design than that required for OSAP and OTI projects (304a). Depending on the results of the OSAP and OTI project evaluation, some projects can be expected to be subjected eventually to the rigors of controlled trials (31 la).

¹⁰⁵The community youth activities program is a combined block grant (\$4.9 million in fiscal year 1991), State demonstration-t (\$14.2 million in fiscal year 1991), and Projects of National Significance (\$1.1 million in fiscal year 1991) program to provide funds for after-school, vacation, and weekend activities for dropouts and in-school youth (Public Law 100-690). As this Report was being prepared for publication it was not clear whether Congress would grant to ONDCP's request to discontinue funding for the community youth activities program.

over \$6 million (under 5 percent) of its overall budget on activities aimed at adolescents. In fiscal year 1991, NIAAA funded an Adolescent Alcohol Research Center.

National Institute on Drug Abuse—NIDA supports research on use and abuse of illicit drugs (e.g., marijuana, cocaine, PCP), although it also supports some research on tobacco use and on the combined use of alcohol and other drugs. In the late 1980s and early 1990s, NIDA received considerable increases in its overall budget; NIDA's overall budget for fiscal year 1990 was \$379 million; its estimated budget authority in fiscal year 1991 was \$428.3 million (327).

Many of NIDA's current projects are related to the prevention or treatment of substance use by adolescents, but NIDA could not estimate for OTA what proportion of its overall budget would be spent on projects involving adolescents ages 10 to 18 (304a). OTA's review of material submitted by NIDA in 1989 suggested that most of NIDA's adolescent-related projects focus on prevention, and that very few current projects were investigating new treatment approaches for adolescent substance users (304a). In 1991, ONDCP said that the administration was placing a high priority on research on drug abuse treatment for adolescents, which it characterized as "perhaps the least researched aspect of the field" (327), and NIDA has initiated a large-scale study of the effectiveness of drug treatment for adolescents, with long-term followup of clients (327). NIDA has also begun to devote more grant funds to the investigation of risk factors for drug abuse among inner-city minority adolescents.

Other DHHS Agencies—Within CDC, the Center for Chronic Disease Prevention and Health Promotion's Office on Smoking and Health is the lead Federal agency on tobacco and health (320a). CDC's new Division of Adolescent and School Health has the prevention of HIV and AIDS as its major emphasis, but it has also focused on other health-compromising behaviors by adolescents, including psychoactive substance use. The major activity in this respect is the development of a Youth Risk Behavior Surveillance System (YRBSS), which

will periodically question adolescents about their engagement in a range of health-compromising behaviors, including substance use.

American Indian and Alaska Native adolescents are more likely than many other adolescents to use alcohol and illicit drugs (286). In addition, they are very likely to live in communities in which alcohol abuse is almost epidemic (284). Yet a focus on Indian adolescent substance use was long in coming in the *Indian Health Service*, the major health service agency for Indians (286). The 1986 Anti-Drug Abuse Act provided funds to be used for substance abuse prevention and outpatient and residential treatment of Indian adolescents, and in 1988, the Indian Health Service reported a commitment to providing services to all Indian adolescents diagnosed with a substance abuse problem (286,327a).¹⁰⁶ According to ONDCP, eight Adolescent Regional Treatment Centers were to be established by the end of fiscal year 1991, an increase of one over fiscal year 1990 (327a).

The *Office of Human Development Services' Administration for Children, Youth, and Families* funds two grant programs related to adolescent drug use (327a,327b). One is the Drug Abuse Prevention Program for Runaway and Homeless Youth, which awards grants to public and private nonprofit agencies, organizations, and institutions to carry out research, demonstration, counseling and services to runaway youth and their families, and for other activities (327b). The other is the Youth Gang Drug Prevention program, which provides grants to projects designed to prevent the participation of adolescents in gangs that engage in illicit drug-related activities, and for other purposes (327b). Each of these programs had \$14.8 million to carry out existing grants in each of fiscal years 1990 and 1991, and level funding was requested for fiscal year 1992 (327b).

Except for its role in administering the maternal and child health services block grant,¹⁰⁷ the Bureau of Maternal and Child Health in the *Health Resources and Services Administration* has no direct role in substance abuse prevention and treatment for adolescents. The Bureau does participate in a

¹⁰⁶The Bureau of Indian Affairs @~) in the U.S. Department of the Interior also has a role in adolescent substance use prevention and treatment through drug education in BIA-supported schools and detention and diversion of Indian adolescents who become involved with Indian juvenile justice programs because of alcohol and other drug use (286,327a,327b).

¹⁰⁷See ch.19 "The Role of Federal Agencies in Adolescent Health," in Vol. III for additional information on the maternal and child health services block grant.

number of formal and ad hoc interagency coordinating activities, however (319a).

The Office of Disease Prevention and Health Promotion (ODPHP) in the Office of the Assistant Secretary of Health has a general focus on “high-risk youth and reducing high-risk behavior” and has supported a number of efforts to help improve adolescent health (320a). These include initiating the interagency Ad Hoc School Health Committee, funding a marketing study of adolescent high risk behaviors, and developing publications related to school health programs (320a). ODPHP also oversees the development of the health objectives for the nation (e.g., Year 2000 National Health Objectives). Objectives related to reducing adolescents’ use of tobacco, alcohol, and other drugs are included in the objectives (320b).

U.S. Department of Education

The U.S. Department of Education was required to get involved in drug abuse prevention with the passage of the Anti-Drug Abuse Act in 1986 (Public Law 99-570). By 1989, the Department had developed a three-pronged approach to the drug problem, involving 1) the provision of leadership, 2) the dissemination of information, and 3) the provision of technical and financial assistance to States (57a).

The most prominent U.S. Department of Education activity related to adolescent substance use has been the promotion of drug-free schools and communities, pursuant to the mandate of the Drug-Free Schools and Communities Act (Public Law 99-570). This legislation, which was enacted as part of the 1986 Anti-Drug Abuse Act and reenacted in 1988 with the Augustus F. Hawkins-Robert T. Stafford Elementary and Secondary School Improvement Amendments of 1988 (Public Law 100-297), supports State and local programs of drug abuse prevention and education. It was subsequently amended at the end of the first session of the 101st Congress to require schools to adopt firm drug policies as a condition of eligibility for Federal funds (Drug-Free Schools and Communities Act Amendments of 1989 [Public Law 101-226]). Other adolescent-related grant programs in the U.S. Department of Education include demonstration grants to insti-

tutes of higher education, an emergency grants program to local educational agencies that demonstrate a significant need for additional assistance in combating drug and alcohol use, a school personnel training program, a counselor training grant program, a Federal activities grants program, and regional centers for drug-free schools and communities (327b).

In fiscal year 1990, approximately \$435.9 million in formula grants (based on the number of elementary and secondary school students (in the State) was distributed to States under the Drug-Free Schools and Communities Act local grants program; in fiscal year 1991, the amount was \$497.7 million (327b). No increase was requested for fiscal year 1992 (327b). Neither were increases requested for any of the other Department of Education programs except for the emergency grants program (from \$24.3 million to \$49.5 million) (327b).¹⁰⁸

Other Federal Agencies

ACTION, the Federal agency that coordinates volunteer activities, has taken an increasing role in the drug war (327a). The ACTION program most directly related to efforts to reduce adolescent drug use is the Drug Alliance grant program (54 FR 173, 1989). In fiscal year 1991, this program was to provide grants of up to \$40,000 (with a requirement for a 50-percent non-Federal match) for projects that use nonstipended volunteers to provide positive peer activities for youth serve as mentors for high-risk youth, and other services (327b). In the program announcement, ACTION cited increasing acceptance of the notion of “‘immunization’-that voluntary service may in fact reduce the risk of drug involvement among participating youth by reinforcing good work habits, helping enhance self-esteem, establishing a sense of belonging within the community, and providing positive role models’ (54 FR 173, 1989). Applicants, who must be private non-profit incorporated organizations or public agencies, must adhere to “‘a strict policy of the nonuse of illicit drugs’ ‘ and not endorse a philosophy or any activities that would advocate “‘the tolerance of the initial or responsible use of any illicit drug, or the illicit use of any legal drug’ (54 FR 173, 1989).

¹⁰⁸The emergency grants program provides assistance to local educational agencies that demonstrate a **significant** need for additional assistance in combating drug and alcohol use. Districts compete for funding to support a comprehensive range of services, including educational programs, counseling programs, enhancement of school security, afterschool programs, programs for parents and other community outreach efforts, and alternative programs for students with a history of drug abuse or others who are difficult to reach in the regular school setting (327b). ONDCP estimated that 50 awards would be made under this program, ranging from \$100,000 to \$1 million (327b).

Budget authority for the Drug Alliance grants was \$1.3 million in fiscal year 1990, and \$2.2 million in fiscal year 1991 (327a). The administration requested a reduction in funding to \$1.5 million for fiscal year 1992.

In fiscal year 1991, the *U.S. Department of Housing and Urban Development* was to provide \$7.5 million in financial assistance for the creation and implementation of Youth Sports programs in public and Indian housing (327b). Individual grants were to be for a maximum of \$125,000 and would require a 50 percent match by the applicant (327b). No funds were requested by the Administration for this program for fiscal year 1992 (327a,327b).

Adolescent drug use is addressed to some extent by *U.S. Department of Labor-funded* programs such as:

- Job Corps-drug tests for applicants, drug education, and treatment for enrollees;
- Youth Opportunity Unlimited (YOU) program—drug eradication control is one part of the provision of coordinated, comprehensive services for all youth in six funded communities.

ONDCP estimates that \$9.5 million was spent on drug control activities in the Job Corps in fiscal year 1991, and \$6.0 million for the YOU program in fiscal year 1991. A substantial increase (to \$25 million) was requested for YOU for fiscal year 1992 (327b).

Issues in Federal Programs and Policies Related to the Use and Abuse of Psychoactive Substances

Clearly, numerous resources are being applied to the drug problem among adolescents. It is unclear, however, whether the infusion of resources is being targeted appropriately. Much of the Federal money on prevention being given to States is provided with little requirement for evaluation (280). In turn, because few evaluation data are available, States often have little idea of how best to use available funding (281). Audiovisual materials, for example, are often not evaluated before being sent out for use by local school districts, and it is unclear whether the materials are being used (265a). OSAP is attempting to evaluate materials, but it does not have rigorous research requirements.

Available curricula for substance abuse education may be inappropriate. So-called “model curricula”

developed by the U.S. Department of Education have been criticized as being inappropriate to the needs of urban schools in multicultural settings (180). On the other hand, States that believe they have an effective approach to prevention have pointed out that the amount available from the Federal Government is insufficient. The cost of putting one substance abuse counselor in every middle school in the country, for example, was estimated at \$400 million in 1989, more than the entire Drug-Free Schools and Communities Act authorization in fiscal year 1988 (265a). Almost \$500 *million* was appropriated for Drug-Free Schools and Communities Act programs in fiscal year 1991, but it was to be used for drug abuse education as well as early intervention (327b). About \$3.4 million was authorized for counselor training grants, and \$20 million for school personnel training grants, in fiscal year 1991, but no funds were allocated to actually placing counseling services in schools (327b).

Some charge that funding has not been targeted to high-risk areas (180). The U.S. Conference of Mayors has criticized the channeling of Federal money through block grants to States. The mayors argue that it is their neighborhoods, police officers, and children who are most under siege (246). The Nation’s governors, on the other hand, support the use of State block grants, arguing that direct money to cities “would present an uncoordinated method that could only serve to displace drug trafficking rather than dismantle entire operations” (246).

It is further unclear whether national drug control efforts are targeted toward the substances that are most often used, and perhaps abused, by adolescents. The national drug control strategy has been criticized for its relative lack of attention to problems of alcohol abuse among adolescents (180). Tobacco is the substance used most often by adolescents, but justification for studying tobacco-related risk factors or attempting to reduce its use among adolescents must often be justified by the notion that tobacco is a “gateway drug.”

Although very little adolescent-specific information is known about the effects of drugs such as marijuana and cocaine, NIDA and NIAAA are devoting only minimal funding to encourage research on the consequences of psychoactive substance use by adolescents. Support for research on treatment for adolescents who abuse substances is

beginning to increase. It appears that after several years of increases in funding, support for some types of drug prevention activities may be leveling off or declining (327a,327b).

Conclusions and Policy Implications

Adolescents' use, and possibly problem use, of psychoactive substances has been of great public concern. This chapter suggests that adolescents' use of substances that are legally available to adults—i.e., alcohol and nicotine—is more prevalent than their use of illicit drugs. One-third of high school seniors report having had five or more alcoholic drinks in a row during a 2-week period. Almost 19 percent of high school seniors report smoking at least some portion of a cigarette daily. Using daily use of illicit drugs as an indicator of problem use, between 0.3 and 3 percent of adolescents nationwide would appear to have a serious drug problem.¹⁰⁹ Some local surveys and studies of homeless and incarcerated adolescents, however, have found evidence of more extensive illicit drug use. Further, daily use is not the only indicator of problem use; CDC has found that 5 percent of students in grades 9 through 12 in Washington, DC, reported using needles to inject illicit drugs at least once, possibly putting themselves at risk of overdoses, addiction, and HIV and other infections.

Extensive financial and human resources are being applied to *preventing* psychoactive substance use among adolescents, but it is unclear whether the infusion of resources is being designed or targeted appropriately. For example, more information is needed about how many adolescents use substances in ways that cause problems and interfere with optimal development. Fortunately, additional Federal resources are being put into understanding the extent of, and risk and protective factors for, substance use among adolescents now believed to be at particularly high risk (e.g., inner-city, low-income adolescents). However, recent evidence that suggests that excessive substance use (as opposed to occasional use or nonproblem use of drugs) may be the result, rather than the cause, of other psychological problems suggests that considerable attention should be given to assessing mental health status as

a risk factor, and attempting to prevent excessive drug use through early treatment of poor psychological adjustment.

Is Prevention Effective?

Assessments of the effectiveness of psychoactive substance use prevention efforts have been limited by methodological shortcomings in most of the evaluations. This situation is unlikely to change soon because Federal agencies that support preventive interventions (e.g., OSAP, U.S. Department of Education, Indian Health Service) often do not require scientifically rigorous evaluations.

The substance use prevention programs that have been evaluated relatively rigorously show relatively little change in adolescents' use of substances, even using self-report measures. The generally unremarkable results of primary prevention programs do not necessarily imply, however, that such programs should be discontinued. Both the rigorously evaluated and not so rigorously evaluated programs may achieve other goals for adolescents, for example:

- 1) improvements in their social competence, including their ability to make decisions, refuse unwanted peer pressure, and otherwise have rational discussions with their peers and others;
- 2) improvements in their self-understanding; and
- 3) improvements in their knowledge about a range of psychoactive substances and possible physiological and developmental effects.

The extent to which substance use prevention programs achieve some or all of these goals is largely unknown, because outcomes other than reductions in use have not usually been measured. The danger is that programs taking more broad-based approaches may be discontinued eventually if they do not show marked reductions in use.

What About Treatment?

Some adolescents are problem users of alcohol and/or other psychoactive substances and require some form of treatment. However, numerous questions remain about treatment for substance-using adolescents. For example, although instruments are

¹⁰⁹A total of 0.3 percent of high school seniors reported using cocaine (all forms) 20 or more times in the month preceding the 1989 High School Seniors/Monitoring the Future Survey; 2.9 percent of high school seniors reporting using marijuana or hashish 20 or more times in the month preceding the 1989 survey. No other survey found higher "daily" use of marijuana, but other surveys found that daily use of cocaine was higher (e.g., the National PRIDE survey found that an average of 0.6 percent of senior high school students reported daily use of cocaine).

under development, there is currently no valid way to assess which adolescents need treatment specifically related to their substance use. There is very little research on new treatments for adolescents or regular data collection on the effectiveness of what is being provided.

Evidence suggesting that some placements are inappropriate includes data derived from NDATUS that private treatment centers appear to be underutilized, while public facilities are almost always at capacity. In addition, twice as many adolescents (49,000 on the day the most recent NDATUS was taken) were estimated to be in treatment for the use of drugs other than alcohol, despite the fact that alcohol is much more widely used among adolescents. Adolescent clients being treated for use of drugs other than alcohol are served primarily in private for-profit and not-for-profit settings. These data suggest that financial considerations may be driving placement decisions, but additional investigation on this point is needed. This issue is difficult to investigate rigorously precisely because of the lack of definitions of problem use among adolescents.

Less restrictive treatments, which might be sought out by adolescents themselves, are often unavailable. All but five States and the District of Columbia have statutes specifically authorizing at least some adolescents¹¹⁰ to receive drug- and/or alcohol-related health services without parental permission¹¹¹, but gaining access to such services may be a problem. Only 17 percent of employees in medium and large firms who were covered by private insurance had coverage for outpatient substance abuse treatment that was the same as that for treatment of other illnesses.¹¹² Medicaid payment for substance abuse treatment is not required by Federal law. Few school-linked health centers are in existence; in any event, these tend not to deliver many services or make many referrals for substance use problems.¹¹³ There is considerable enthusiasm for the early intervention programs known as Student Assistance Programs (based on the workplace-

based Employee Assistance Program model), but there is as yet no evidence as to their availability or effectiveness. In 1987, 272,000 adolescents ages 10 to 18 were estimated to have had any treatment for substance use problems.

Some barriers to treatment are due in part to the fact that there is very little evidence on the effectiveness of contemporary approaches to substance abuse treatment for adolescents, and considerable concern about a number of features of the contemporary treatment system. Of greatest concern is that the centerpiece of the treatment approach for adolescents is the same as that for adults: the addiction model, which requires thinking of oneself as a lifetime addict who will never be able to control the use of any psychoactive substances. This approach may or may not be appropriate for adolescents, who are still developing a sense of themselves. Evidence concerning risk factors for problem use of substances, and the prevalence of psychiatric comorbidities in adolescent patients, suggests that greater emphasis on adolescents' mental health needs than on the addiction model may be beneficial.

There is concern as well about the training and credentials of substance abuse treatment personnel. Treatment in substance abuse treatment facilities tends to be delivered by recovering drug abusers, who may not be the most effective models for adolescents. However, the ability of mental health professionals and primary care physicians to both recognize and treat substance abuse problems has not been demonstrated, and the little research that has investigated the issue suggests the 'recovering' personnel are as effective as health care professionals.

Certain features of substance abuse treatment modalities have been found to increase success rates, although definitive conclusions are limited because of a scarcity of methodological rigor.¹¹⁴ Apparently successful features include parental involvement and adolescents' perceptions of choice in treatment decisions, including the decision to seek treatment. Also, despite the emphasis in most programs on the

¹¹⁰Some States have placed age restrictions for allowing minors who are age 12 and over, or age 16 and over, to consent to such services.

¹¹¹See ch. 17, 'Cement and Confidentiality in Adolescent Health Care Decisionmaking,' in Vol. III.

¹¹²See ch. 16, 'F@&l Access to Health Services,' in Vol III.

¹¹³See ch. 15, 'Major Issues in the Delivery of Primary and Comprehensive Services to Adolescents,' in Vol. III.

¹¹⁴For example, program success may be defined as mere completion of a scheduled treatment program. When other outcomes are used, clients who leave before their scheduled treatment is complete are often not counted as part of the evaluation. Outcome measures are often not comparable across studies and no-treatment comparison groups are rarely used.

addiction model, the services most clearly associated with positive treatment outcomes are those often considered “adjunctive” to substance abuse treatment: educational and recreational services and social skills and assertiveness training. There is no definitive research on whether outpatient or inpatient treatment is more effective.

The overall lack of effectiveness data and the preliminary evidence concerning the relative effectiveness of voluntary treatment are especially troubling in light of the fact that in 32 States adolescents can be admitted under ‘voluntary’ commitment status by their parents, with no legal recourse to contest this status.

Research

Much additional research is needed on psychoactive substance use and abuse among adolescents. Given current data, it is impossible to determine the number of adolescents using such substances or the number for whom substance use is a problem. Conclusions about the effectiveness of prevention efforts can be only preliminary at this point, and it is therefore impossible to say whether resources are being wasted. An in-depth look at the effectiveness of drug abuse prevention interventions currently being funded seems warranted. The bulk of prevention efforts have focused on prevention of any and all substance use by adolescents, and disturbed adolescents who may be in greatest need of intervention may be getting neglected. The number of adolescents in need of treatment, the numbers in treatment, and whether such treatment is appropriate and effective are not known. There has been until recently very little Federal support for research on treatment effectiveness.

As noted here and in other chapters in this report, there are considerable barriers to access to health services for those adolescents who feel themselves to be in need of them. Specific policy options related to alcohol, tobacco, and illicit drug abuse by adolescents are listed in Volume I.

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