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Evidence-Based Interventions for Preventing Substance Use Disorders in Adolescents

Kenneth W. Griffin, PhD, MPH[a] and
Professor of Public Health, Division of Prevention and Health Behavior, Weill Cornell Medical College, Cornell University, New York, NY

Gilbert J. Botvin, Ph.D[b]
Professor of Public Health and Psychiatry; Chief, Division of Prevention and Health Behavior, Weill Cornell Medical College, Cornell University, New York, NY

Synopsis

Substantial progress has been made in developing prevention programs for adolescent drug abuse. The most effective interventions target salient risk and protective factors at the individual, family, and/or community levels and are guided by relevant psychosocial theories regarding the etiology of substance use and abuse. This article reviews the epidemiology, etiologic risk and protective factors, and evidence-based approaches that have been found to be most effective in preventing adolescent substance use and abuse. Exemplary school and family-based prevention programs for universal (everyone in population), selected (members of at-risk groups), and indicated (at-risk individuals) target populations are reviewed, along with model community-based prevention approaches. Challenges remain in widely disseminating evidence-based prevention programs into schools, families, and communities.

Keywords

prevention; substance abuse; adolescence; school; community; family

Substance use and abuse continue to be important public health problems that contribute greatly to morbidity and mortality rates throughout the United States, Canada, and globally. For several decades, substantial research efforts have been undertaken to understand the epidemiology and etiology of substance use and abuse. The knowledge gained from this work has been important in identifying and developing effective prevention and treatment approaches. From person to person, there is great variability in patterns of substance use and

[a]Corresponding Author address: Kenneth W. Griffin, PhD, MPH, Division of Prevention & Health Behavior, Department of Public Health, Weill Cornell Medical College, Cornell University, 402 East 67th Street, New York, NY 10065, 646-962-8056, 646-962-0284 (fax), kgriffin@med.cornell.edu
[b]Coauthor address: Gilbert J. Botvin, Ph.D, Division of Prevention & Health Behavior, Department of Public Health, Weill Cornell Medical College, Cornell University, 402 East 67th Street, New York, NY 10065, 646-962-8056, 646-962-0284 (fax), gjbotvin@med.cornell.edu
Kenneth W. Griffin, Ph.D., M.P.H. is a Professor of Public Health at Weill Cornell Medical College. Gilbert J. Botvin, Ph.D., is a Professor of Public Health and Psychiatry at Weill Cornell Medical College and Director of Cornell's Institute for Prevention Research. Dr. Botvin is also President of National Health Promotion Associates (NHPA), which markets the Life Skills Training program. Dr. Griffin is a consultant to NHPA.

abuse. Some individuals face life-long struggles with addiction, while others go through life without experimenting with any substances. However, from a population perspective, the epidemiologic patterns are consistent and predictable. According to national datasets, the prevalence of alcohol, tobacco, and other drug use increases rapidly from early to late adolescence, peaks during the transition to young adulthood, and declines though the remainder of adulthood. Furthermore, there is accumulating evidence showing that the initiation of substance use early in life contributes to higher levels of use and abuse later in life. Early onset is also associated with a host of later negative health, social, and behavioral outcomes including physical and mental health problems, violent and aggressive behavior, and adjustment problems in the workplace and family (1).

The well established pattern of onset and progression of substance use and abuse during adolescence has led to the development of a variety of prevention initiatives for children and adolescents. The majority of adults with substance abuse problems begin to use substances during their adolescent years and therefore relatively few prevention efforts have focused on adults. Youth-focused prevention initiatives include educational and skills training programs for young people in school settings; programs that teach parents effective ways to monitor and communicate with their children and establish and enforce family rules regarding substance use; and community-based programs that combine these components with additional mass media or public policy components (e.g., restricting access though enforcement of minimum purchasing age requirements). Preventing early-stage substance use or delaying the onset of use is a goal of many of these prevention initiatives. They typically focus on alcohol, tobacco, and marijuana use because these are the most widely used substances in our society. Because of their widespread use, these substances pose the greatest risk to public health. Middle or junior high school age students are most often targeted in prevention efforts because early adolescence is the time of life when substance use experimentation often begins to occur. A large body of research has examined the efficacy and effectiveness of prevention programs for adolescent substance abuse. Findings show that the most effective programs target salient risk and protective factors at the individual, family, and/or community levels, and are guided by relevant psychosocial theories regarding the etiology of substance use and abuse (2,3).

Epidemiology and Progression of Use

National survey data demonstrate that the prevalence rates of alcohol, tobacco, and other forms of substance use among adolescents peaked during the period of the late 1970s and early 1980s. Prevalence rates generally declined during the late 1980s, only to begin to increase again during the 1990s. In recent years, prevalence rates for many substances have gradually declined among adolescents, although they remain a source of concern. Among high school seniors, the 2008 Monitoring the Future (MTF) study (4) found that the 30-day prevalence rate for cigarette smoking was 22% and the lifetime rate was 47%. The annual and lifetime prevalence rates for alcohol use among high school seniors were 67% and 73%, respectively. About 37% of high school seniors reported having used one or more illicit drugs over the past year and 48% report having done so during their lifetime. The annual and lifetime prevalence rates among high school seniors were 32% and 42%, respectively, for marijuana use; 5% and 9%, respectively, for hallucinogen use; and 8% and 12%, respectively, for amphetamine use.

While MTF trend data have shown gradual decreases in prevalence rates of smoking, alcohol use, and many forms of illicit drug use among adolescents, there have been increases in some forms of substance use and abuse as well. MTF findings reveal that non-medical prescription drug abuse is a growing problem among adolescents. Prevalence rates for the nonmedical use of several prescription opiates have increased in recent years. Data on rates

of abuse for Vicodin, OxyContin, and Percocet began to be collected in 2002 in the MTF study. Among high school seniors, annual prevalence rates for Vicodin abuse have gone from 4.1% in 2002 to 5.7% in 2008; rates of OxyContin abuse have gone from 1.6% in 2002 to 3.7% in 2008; and rates of Percocet abuse among high school seniors have gone from 1.9% in 2002 to 2.9% in 2008. The abuse of over-the-counter medications (including cough syrup to get high) is another growing problem among adolescents (4). It is important that prevention efforts remain flexible enough to address the sometimes variable and changing nature of adolescent substance use and abuse as trends change over time.

In contemporary American society, it has become commonplace among young people to engage in some level of experimentation with substances. Substance use occurs almost exclusively in a social context during early adolescence and typically involves substances that are readily available. These include alcohol, tobacco, and inhalants. Some individuals become regular users and/or progress to marijuana, hallucinogens, and other illicit drugs in a fairly predictable pattern (5). However, many individuals discontinue use after a brief period of experimentation, or fail to progress to the use of other substances. Unfortunately, some adolescents will develop patterns of substance abuse characterized by both psychological and physiological dependence. Progressing to more serious levels of substance abuse and disorder can be best understood in terms of probabilities. At each step further along the developmental progression from experimentation with alcohol and tobacco to the regular use of illicit drugs, an individual's risk of developing an alcohol or substance use disorder increases. Additionally, the initial social motivations for alcohol, tobacco, and other drug use eventually yield to motives primarily driven by pharmacological and psychological factors (6). Knowledge of the usual patterns and the progression of substance use has important implications for the focus and timing of preventive interventions. Prevention programs that effectively target risk factors for alcohol and tobacco use may not only prevent the use of these substances, but may also decrease or eliminate the risk of using other substances further along the progression.

Risk and Protective Factors

In many respects, substance use and abuse can be considered developmental phenomena. First, there are the predictable epidemiologic patterns of adolescent substance use onset and progression. Second, research demonstrates that substance use is frequently linked to important developmental goals and transitions. The degree of involvement in substance use for any teenager is often a function of the negative pro-drug social influences that they are exposed to combined with their individual developmental vulnerabilities to these influences.

Social Influence Factors

One of the most consistent findings in research on the etiology of adolescent substance use is that social influences are central, powerful factors that promote experimentation or initiation of use. Along with exposure to positive attitudes and expectations regarding substance use, the modeling of substance use behavior by important others (e.g., parents, older siblings, and peers) is a critical negative social influence (7). Other powerful negative influences involve the positive portrayal of substance use and abuse by celebrities in movies, television, and music videos (8). Advertisements that communicate positive messages about alcohol and tobacco use promote pro-substance use attitudes, expectancies, and perceived positive consequences of use that can translate into an increase of cigarette smoking and alcohol use behavior among young people (9).

Developmental Factors

A developmental perspective on the etiology of substance use is instructive in our understanding of how best to prevent early experimentation with alcohol, tobacco, and other drugs. The second decade of life involves physical, biological, social, and psychological changes that are profound and numerous. Adolescence is a key period for experimentation with a wide range of behaviors and lifestyle patterns. An adolescent's drive to experiment with new behaviors occurs for a number of reasons that are typically linked to psychosocial development. Trying out new and different behaviors is part of a natural process of separating from parents, gaining acceptance and popularity with peers, developing a sense of identity, autonomy, independence, and maturity, seeking fun and adventure, and/or rebelling against authority. Unfortunately, from an adolescent's point of view, engaging in alcohol, tobacco, and other drug use may be seen as a functional way of achieving independence, maturity, or popularity, along with other developmental goals. The most effective prevention approaches incorporate an understanding that substance use behaviors can fulfill a variety of developmental needs. Therefore, teaching children to "just say no" to substance use is necessary but not sufficient for behavior change.

Multiple Levels of Influence

Risk and protective factors contribute to the initiation, maintenance, and escalation of alcohol, tobacco, and illicit drug use, and these factors can be identified and addressed at the level of the individual, family, school and community.

Individual Factors—Individual level factors encompass cognitive, attitudinal, social, personality, pharmacological, biological, and developmental factors (10). Cognitive risk factors for substance use include a deficiency of knowledge regarding the risks of use and abuse, along with the misperception that substance use is "normal" and that the majority of people engage in use. As described in the self-medication hypothesis, affect regulation plays a central role in the etiology of substance use (11). Psychological characteristics associated with substance use include poor self-esteem, low assertiveness and poor behavioral self-control. Pharmacologic risk factors become increasingly important as an individual's substance use increases in frequency and quantity. Drugs of abuse such as cocaine, amphetamine, morphine, as well as nicotine and alcohol, have different pharmacological mechanisms of action. However, research shows that each of these substances affects the brain in a similar way. Drug use typically increases the activity of excitatory synapses on midbrain dopamine neurons (12). Furthermore, there are likely to be important individual differences in terms of neurochemical reactivity to drugs, placing some individuals at higher risk.

Family Factors—One central risk factor within families is the role that social learning processes play in terms of the modeling of behaviors and attitudes regarding substance use. A second important risk factor is the role that genetic heritability plays in the development of substance use disorders. Parenting practices need to be considered as well. Parenting can affect substance use both directly and indirectly by influencing established precursors of substance use such as aggressive behavior and other conduct problems. In particular, harsh disciplinary practices, poor parental monitoring, low levels of family bonding, and high levels of family conflict contribute to both internalizing and externalizing behaviors including substance use and abuse. Of course, family and parenting factors can also play a key beneficial or protective role in preventing adolescent substance use. Examples of protective parenting practices include firm and consistent limit-setting, careful monitoring, nurturing and open communication patterns with children (13).

School and Community Factors—Findings show that environmental factors and degree of bonding to conventional institutions are associated with adolescent substance use (14). Students who are not engaged in school, fail to develop or maintain relationships with their teachers, and those who fail academically are more likely to engage in substance use. Similarly, when young people feel disengaged from their communities or feel unsafe in their neighborhoods, not only is this associated with greater substance use, but it also creates greater levels of community disorganization (15). Youth who maintain active involvement in community institutions such as school and church are less likely to engage in substance use. Schools and communities can play a protective role by taking active steps to engage young people in order to avoid drug use and other problem behaviors.

Prevention Terminology

Contemporary terminology for classifying interventions, initially proposed by the Institute of Medicine in 1994 (16), incorporates a continuum of care that includes prevention, treatment, and maintenance. In this framework, prevention refers only to interventions occurring prior to the onset of a disorder. Prevention is further categorized into three types: universal, selective and indicated interventions. Universal prevention programs focus on the general population, with the aim of deterring or delaying the onset of a condition. Selective prevention programs target selected high risk groups or subsets of the general population believed to be at high risk due to membership in a particular group (e.g., pregnant women or children of drug users). Indicated prevention programs are created for those already showing early danger signs, such as the initial stages of engaging in a high risk behavior or other related behaviors. Recruitment and participation in a selective intervention is based on membership in a high risk subgroup. Recruitment and participation in an indicated intervention is based on an individual's warning signs or behaviors.

Evidence-Based Prevention Programs

In the following sections, contemporary evidence-based approaches to drug abuse prevention for children and adolescents at the school, family, and community levels are described. Several model preventive intervention programs are reviewed, including universal, selected, and indicated programs for schools and families, along with a comprehensive community-based prevention programs. Descriptions of the model programs, including information on their primary goals, target audiences, implementation methods, program components, provider training, and evidence of effectiveness, were adapted in part from the SAMHSA Model Program *Fact Sheets* (17) and the SAMHSA National Registry of Evidence-Based Programs and Policies (NREPP) web site (18). Our review of the effectiveness of these model programs is focused on intervention effects on substance use behaviors as described on the NREPP web site. We also state each intervention's readiness for dissemination score. The NREPP web site rates each intervention on its' readiness for dissemination based on the availability of implementation materials, training and support resources, and quality assurance procedures. Scores range from 0 to 4, where 4 is the highest rating given, representing highest readiness for dissemination.

School Based Prevention

Schools are the focus of most attempts to develop and test evidence-based approaches to adolescent drug abuse prevention. School-based efforts are efficient in that they offer access to large numbers of students. Additionally, substance use is seen as inconsistent with the goals of educating our youth. However, many initial attempts at prevention were ineffective because they focused primarily on lecturing students about the dangers and long-term health consequences of substance use. Some programs used fear-arousal techniques designed to

dramatize the dangers of drug use and scare individuals into not using drugs. These initial attempts were not theory-based and failed to incorporate information about the developmental factors and social influences and other etiologic factors that contribute to adolescent substance use. These approaches were based on a simple cognitive conceptual model: that people make decisions about substance use and abuse based on their knowledge of the adverse consequences involved. Over time, more effective contemporary approaches to school-based prevention were developed and tested. Programs became available that were derived from psychosocial theories on the etiology of adolescent drug use and focused primary attention on the risk and protective factors that promote the initiation and early stages of substance use (2,3). Contemporary approaches to school-based prevention of substance use can be categorized into three types: a) social resistance skills training; b) normative education; and c) competence enhancement skills training. Within a single preventive intervention, one or more of these approaches or components may be combined.

Social Resistance Skills

These interventions are designed with the goal of increasing adolescent's awareness of the various social influences that support substance use and teaching them specific skills for effectively resisting both peer and media pressures to smoke, drink, or use drugs (19). Resistance skills training programs teach adolescents ways to recognize situations where they are likely to experience peer pressure to smoke, drink, or use drugs. Students are taught ways to avoid or otherwise effectively deal with these high-risk situations. Participants are taught that they can effectively respond to direct pressure to engage in substance use by knowing what to say (i.e., the specific content of a refusal message) and how to deliver what they say in the most effective way possible. Resistance skills programs also typically include content to increase students' awareness of the techniques used by advertisers to promote the sale of tobacco products or alcoholic beverages. Students are taught techniques for formulating counter-arguments to the appealing but misleading messages used by advertisers.

Normative Education

Normative education approaches include content and activities to correct inaccurate perceptions regarding the high prevalence of substance use. Many adolescents overestimate the prevalence of smoking, drinking, and the use of certain drugs, which can make substance use seem to be normative behavior. Educating youth about actual rates of use, which are almost always lower than the perceived rates of use, can reduce perceptions regarding the social acceptability of drug use. One way to present this information would be to collect and provide findings from classroom, school, or local community survey data that show actual prevalence rates of substance use in the immediate social environment. Otherwise, this can be taught using national survey data which typically show prevalence rates that are considerably lower than what teens believe. Additionally, normative education attempts to undermine popular but inaccurate beliefs that substance use is considered acceptable and not particularly dangerous. This can be done by highlighting evidence from national studies that shows strong anti-drug social norms and generally high perceived risks of drug use in the population. Normative education materials are often included in social resistance programs.

Competence-Enhancement

Competence-enhancement programs recognize that social learning processes are important in the development of drug use in adolescents. Further, they recognize that youth with poor personal and social skills are more susceptible to influences that promote drug use. These youth may also be more motivated to use drugs as an alternative to more adaptive coping strategies (19). Typically, competence enhancement approaches teach some combination of the following life skills: a) general problem-solving and decision-making skills; b) general

cognitive skills for resisting interpersonal or media influences; c) skills for increasing self-control and self-esteem; d) adaptive coping strategies for relieving stress and anxiety through the use of cognitive coping skills or behavioral relaxation techniques; e) general social skills and general assertive skills. Competence enhancement programs are designed to teach the kind of generic skills that can be applied broadly in many areas of a young person's life, in contrast to the more task-focused drug resistance skills training approaches. The most effective competence-enhancement programs teach personal and social skills and emphasize the application of general skills to situations related to substance use as well as how they are used in other important situations. These same skills can be used for dealing effectively with the many challenges one confronts in everyday life.

Model School-Based Programs

In the following section, the authors review three model school-based substance abuse prevention programs for adolescents (Table 1). The three programs represent different tiers of prevention: *Life Skills Training* is a *universal* program designed for all students in a particular setting; *Project Towards No Drug Abuse* is a *selective* program designed for students attending alternative or continuation high schools; and Brief Alcohol Screening and Intervention for College Students is an *indicated* program designed for college students who are heavy drinkers.

Life Skills Training

The Life Skills Training (LST) program seeks to influence major social and psychological factors that promote substance use. Separate curricula have been developed for elementary school students (grades three to six), middle or junior high students (grades six to eight, or grades seven to nine), and high school students (grades nine or ten). The Life Skills Training Middle School (LST-MS) program has been studied most extensively and is the focus of the following review. The LST-MS program is designed for 11 to 14 year old students and is delivered in fifteen class periods (typically 40 to 45 minutes long) in the first year of middle or junior high school. Booster interventions are taught in ten class periods in the second year and five in the third year of middle or junior high school. Optional violence prevention units are available for each year of the program. LST-MS can be taught one or more times a week until the program is complete. The program content is delivered using cognitive-behavioral skills training techniques including instruction, demonstration, behavioral rehearsal (practice), feedback, social reinforcement, and extended practice in the form of behavioral homework assignments. The LST program received a score of 4.0 (out of 4.0) on readiness for dissemination by NREPP.

Program Components—The LST program consists of three major components that address critical domains found to promote substance use. Each component focuses on a different set of skills: 1) Drug Resistance Skills enable young people to recognize and challenge common misconceptions about substance use, as well as deal with peer and media pressure to engage in substance use; 2) Personal Self-Management Skills help students to examine their self-image and its effects on behavior, set goals and keep track of personal progress, identify everyday decisions and how they may be influenced by others, analyze problem situations, and consider the consequences of alternative solutions before making decisions; and 3) General Social Skills give students the necessary skills to overcome shyness, communicate effectively and avoid misunderstandings, use both verbal and nonverbal assertiveness skills to make or refuse requests, and recognize that they have choices other than aggression or passivity when faced with tough situations.

Program Providers and Training Requirements—The LST program is implemented either by a trained classroom teacher, counselor, or health professional. Program materials consist of a Teacher's Manual, Student Guide, and relaxation audiotape or CD. Provider training is recommended for all program providers in the form of a face-to-face training workshop, CD-ROM, or online training. The standard face-to-face training workshops consist of a day and an half training session conducted by certified LST trainers who teach the background, theory, and rationale for the program, familiarize participants with the program, teach participants the skills needed to implement LST, provide an opportunity to practice teaching selected portions of the program, and provide opportunities to discuss practical implementation issues.

Evidence of Effectiveness—In support of the quality of research on LST, the NREPP web site lists seven peer-reviewed outcome papers from four demographically diverse cohorts of students, along with ten replication studies. All the outcomes studies were randomized controlled trials comparing LST to control group participants. One long-term study followed a cohort of predominantly White suburban students from seventh grade to the end of high school. Students who received LST were compared to controls six years after the intervention, and findings revealed a significant decrease in cigarette smoking, alcohol use (drunkenness), and concurrent tobacco, alcohol, and marijuana use in the LST group. The strongest intervention effects were observed among students exposed to at least 60% of the intervention; these students had significantly lower rates than controls for use of tobacco, alcohol, marijuana, and multiple drugs. A separate randomized controlled trial of a predominantly urban minority sample found less smoking, alcohol use, inhalant use, and multiple drug use at the posttest and one-year follow-up among students who received LST relative to controls as well as a 50% reduction in binge drinking at both the one- and two-year follow-up assessments. A subsample of adolescents considered to be at high risk for substance use initiation were found to engage in less smoking, drinking, inhalant use, and multiple drug use compared with similarly matched controls. A third randomized controlled trial of a rural predominantly White sample found a significantly slower rate of increase in substance use initiation from at the posttest, one-year follow-up, and five and a half years past baseline compared to controls. The LST group was found to engage in less methamphetamine use in the 11th and 12th grade follow-up assessments, relative to controls. When growth over time was examined in a high risk subsample, the LST group had slower increases in the rates of marijuana use and multiple drug use compared to controls. In addition, LST was found to produce effects on violence and delinquency, normative beliefs about substance use, and substance use refusal skills.

Project Towards No Drug Abuse

Project Towards No Drug Abuse (TND) is a high school-based program designed to help high risk students (14 to 19 years old) resist substance use and abuse. TND consists of twelve 40 to 50 minute lessons that focus on motivational activities, social skills training, and decision-making components. The program content is delivered through group discussions, games, role-playing exercise, videos, and student worksheets. Project TND was initially developed for high-risk students attending alternative or continuation high schools. It has been adapted and tested among students attending traditional high schools as well. Project TND's lessons are presented over a four to six week period. Project TND received a score of 3.1 (out of 4.0) on readiness for dissemination by NREPP.

Program Components—Project TND was developed to fill a gap in substance abuse prevention programming for senior high school youth. Project TND addresses three primary risk factors for tobacco, alcohol, and other drug use, violence-related behaviors, and other problem behaviors among youth. These include motivation factors such as attitudes, beliefs,

and expectations regarding substance use; social, self-control, and coping skills; and decision-making skills with an emphasis on how to make decisions that lead to health-promoting behaviors. Project TND is based on an underlying theoretical framework proposing that young people at risk for substance abuse will not use substances if they 1) are aware of misconceptions, myths, and misleading information about drug use that leads to use; 2) have adequate coping, self-control, and other skills that help them lower their risk for use; 3) know about how substance use may have negative consequences both in their own lives as in the lives of others; 4) are aware of cessation strategies for quitting smoking and other forms of substance use; and 5) have good decision-making skills and are able to make a commitment to not use substances. Program materials for Project TND include an implementation manual for providers covering instructions for each of the 12 lessons, a video on how substance abuse can impede life goals, a student workbook, an optional kit containing evaluation materials, the book The Social Psychology of Drug Abuse, and Project TND outcome articles.

Program Providers and Training Requirements—A one- to two-day training workshop conducted by a certified trainer is recommended for teachers prior to implementing Project TND. The training workshops are designed to build the skills that teachers need to deliver the lessons with fidelity, and inform them of the theoretical basis, program content, instructional techniques, and objectives of the program.

Evidence of Effectiveness—In support of the quality of research on Project TND, the NREPP web site lists five peer-reviewed outcome papers with study populations consisting of primarily Hispanic/Latino and White youth, along with four replication studies. Across three randomized trials, students in Project TND schools exhibited a 25% reduction in rates of hard drug use relative to students in control schools at the one-year follow-up; in addition, those who used alcohol prior to the intervention exhibited a reduction in alcohol use prevalence of between 7% and 12% relative to controls. In a study testing a revised 12-session TND curriculum, students in Project TND schools (relative to students in control schools) exhibited a reduction in cigarette use of 27% at the one-year follow-up and 50% at the two-year follow-up, a reduction in marijuana use of 22% at the one-year follow-up, and at the two-year follow-up students in TND schools were about one fifth as likely to use hard drugs. In this study, males who were nonusers at pretest were about one-tenth as likely to use marijuana relative to similar students in control schools. At the four- and five-year follow-up assessments, students in Project TND schools were less likely to report using hard drugs, compared to students in control schools. In addition, Project TND was found to produce effects on risk of victimization and frequency of weapons-carrying.

Brief Alcohol Screening and Intervention for College Students

The Brief Alcohol Screening and Intervention for College Students (BASICS) program is an indicated prevention program for college students who drink alcohol heavily and have had or are at risk for alcohol-related problems including poor class attendance, missed assignments, accidents, sexual assault, or violent behavior. It is not designed for students who are alcohol dependent. The goal of BASICS is to motivate students to reduce their alcohol use in order to decrease the negative consequences of drinking. BASICS is delivered in two one-hour interviews. Students complete a brief online assessment survey between the first session and second session. BASICS received a score of 3.9 (out of 4.0) on readiness for dissemination by NREPP.

Program Components—BASICS is based on principles of motivational interviewing, a directive, client-centered counseling style that is focused on eliciting behavior change by helping clients to explore and resolve ambivalence. BASICS is delivered in an empathetic,

nonconfrontational, and nonjudgmental manner and is aimed at providing personal feedback to the student that reveals discrepancies between a student's risky drinking behavior and his or her life goals and values. The first of two interviews gathers information about the student's drinking patterns and history, beliefs about alcohol, and provides instructions for self-monitoring drinking between the two interview sessions. Between interviews, students complete an online assessment survey which is used to develop a customized feedback profile that is reviewed in the second interview. The assessment survey compares an individual's alcohol use with alcohol use norms, and assesses negative consequences and risk factors for heavy drinking along with perceived risks and benefits of drinking. The assessment results are discussed in the second interview which takes place approximately one or two weeks later. The counselor provides personalized feedback and works with the student to review options in terms of how the student can make changes to decrease or abstain from alcohol use.

Program Providers and Training Requirements—Providers are counselors and other college personnel proficient in motivation interviewing techniques. Provider training can be completed in one to two days, and is conducted by the program developers either onsite or offsite. Training reviews the relevant information about alcohol use among college students along with principles of motivational interviewing. A training workbook provides the information and charts needed for conducting the interviews.

Evidence of Effectiveness—In support of the quality of research on the BASICS program, the NREPP web site lists four peer-reviewed outcome papers (representing three cohorts of students) with study populations consisting of primarily White youth, along with four replication studies. The first study evaluated the impact of BASICS on students engaging in high-risk drinking over a four year follow-up period. Findings indicated that students receiving BASICS had significantly greater reductions in drinking frequency and quantity compared to control group students, with the greatest intervention impact observed in the first year after the intervention. A second study evaluated the short-term effects of BASICS on college students engaging in binge drinking. Controlling for gender, BASICS reduced the number of times alcohol was consumed and the frequency of binge drinking episodes from baseline to a six week follow-up assessment. At the six-month follow-up, students receiving BASICS had greater reductions in drinking quantity and peak quantity compared to students in the control group. At the two-year follow-up assessment, students in the intervention group reported drinking an average of 3.6 drinks per drinking occasion, compared to 4.0 drinks per occasion for controls, a small effect size that was statistically significant. A third study evaluated the effectiveness of the BASICS program among fraternity members. In this study, students in the control group received a required one-hour didactic presentation on alcohol use. Findings indicated that students receiving BASICS had significantly greater reductions in average drinks per week and typical peak blood alcohol content levels at the one-year follow-up. In addition, BASICS was found to produce effects on negative consequences of alcohol use.

Family-Based Prevention

There are a variety of effective family-based prevention approaches for adolescent substance abuse. Some focus exclusively on providing parents with the skills needed to keep their children away from drugs. These programs, provided to parents without children present, teach specific parenting skills such as ways to nurture, bond, and communicate with children; how to help children develop prosocial skills and social resistance skills; training on rule-setting and techniques for monitoring activities; and ways to help children reduce aggressive or antisocial behaviors. A second type of family-based prevention focuses on teaching family skills with parents and children together. These programs aim to improve

family functioning, communication skills, and provide training to help families discuss and develop family policies on substance abuse, along with teaching parents how to effectively enforce these rules (13). Interventions that focus on both parenting skills and family bonding appear to be the most effective in reducing or preventing substance use. However, an important limitation of family-based prevention lies in the difficulty of getting parents to participate, particularly the parents of teens most at risk for drug abuse.

Model Family Based Prevention Programs

In the following section, the authors review three model family-based substance abuse prevention programs for adolescents (Table 2). Again, programs are selected at each prevention tier: *Family Matters* is a universal program designed for all families that include young adolescents; *Creating Lasting Family Connections* is a selective program designed for youth and families in high-risk environments; and *Brief Strategic Family Therapy* is an indicated program designed for families in which children and adolescents exhibit early substance use, rebelliousness, and/or delinquency.

Family Matters

Family Matters is a universal prevention program designed to prevent tobacco and alcohol use in children 12 to 14 years old. The program is implemented at home by parents, who receive four instructional booklets that are successively mailed to the home along with follow-up telephone calls from trained health educators after each mailing. During the telephone calls, health educators answer questions and encourage parents to complete each booklet and the included parent-child activities. The first booklet is mailed 24 days after an introductory letter is sent to parents; health educators telephone the parent 13 days after each booklet is mailed; and the next booklet in the series of four is mailed after each phone call is completed. One complete program cycle is scheduled to take 79 days. Family Matters received a score of 3.3 (out of 4.0) on readiness for dissemination by NREPP.

Program Components—The Family Matters booklets contain readings and activities designed to get families to identity and address family characteristics, behaviors, and attitudes that can influence adolescent substance use. These include levels of adult supervision and support; family rule-setting and communication; family time spent together; parental monitoring; family/adult substance use; the availability of substances; and social attitudes about substance use in the media and among peers. The four Family Matters booklets are: 1) *Why Families Matter*, which describes the program and encourages participation; 2) *Helping Families Matter to Teens*, which discusses how family factors such as communication patterns and parenting styles influence adolescent alcohol and tobacco use; 3) *Alcohol and Tobacco Rules are Family Matters*, which addresses issues such as the availability of tobacco and alcohol in the home and developing family rules about child substance use; and 4) *Non-Family Influences That Matter*, which deals with non-family influences on adolescent substance use, such as friends who use and the media. Some of the Family Matters materials and activities are for adult family members only, while other are for adult and adolescent family members together.

Program Providers and Training Requirements—The health educators who conduct follow-up telephone calls after each mailing can be paid staff or volunteers. It is recommended that they participate in a two-day training prior to making telephone calls. They do not interact with the adolescent as part of program delivery.

Evidence of Effectiveness—In support of the quality of research on Family Matters, the NREPP web site lists two peer-reviewed outcome papers with study populations consisting

of primarily White youth (no replication studies were listed). In a randomized controlled trial comparing families participating in Family Matters to those not participating, findings indicated that the intervention reduced the prevalence of smoking and drinking among both users and nonusers, after adjusting for demographic variables and pretest rates of use. Further, these effects were maintained at 3-and 12-month follow-up assessments, although the effect sizes were small. The intervention reduced smoking onset among adolescents; at the 12-month follow-up, 16.4% fewer participating adolescents had initiated smoking compared with a control group of adolescents who did not receive the program.

Creating Lasting Family Connections

Creating Lasting Family Connections (CLFC) is a selective intervention that is designed to prevent substance abuse and violence among adolescents and families in high-risk environments. CLFC is designed to enhance family bonding and communication skills among parents and youth, while promoting healthy beliefs and attitudes that are inconsistent with drug use and violence. CLFC has been implemented in schools, churches, community centers and other settings. Facilitators provide weekly parent and youth training sessions for a 20-week period, or the sessions can be offered in 5-week increments throughout the year. Facilitators are trained to be knowledgeable about local community service providers and make referrals when appropriate and necessary. CLFC received a score of 3.7 (out of 4.0) on readiness for dissemination by NREPP.

Program Components—A coordinator planning to implement CLFC trains a small staff of volunteers to recruit and retain participating families from high-risk environments, and then identifies, recruits, and selects the relevant community collaborators for the program. The program facilitator administers six interactive modules, three to parents and three to youth. Each module contains five to six sessions lasting up to 2.5 hours each. The sessions focus on substance use issues, personal and family responsibilities, and communication and refusal skills. In addition to the parent and youth training sessions, the CLFC program aims to foster greater use of community services in resolving family problems and addressing youth problem behavior.

Program Providers and Training Requirements—It is recommended that two or more facilitators run each of the parent and youth sessions in order to facilitate a team approach that enhances learning. If CLFC is provided over a 20-week period, these four facilitators can work with up to 30 families (one day per week, four hours a day). Preparation for implementing the program can take up to three months, including five to ten days of facilitator training that focuses on methods to fully engage participants, followed by the recruitment of families, and the planning and organization regarding community mobilization activities.

Evidence of Effectiveness—In support of the quality of research on CLFC, the NREPP web site lists two peer-reviewed outcome papers reporting results of one cohort of youth and parents (no replication studies were listed). Findings indicated that when resiliency factors targeted by the program improved, the program produced effects on substance use frequency at the three- and 12-month assessments. Compared to youth in the comparison group, those receiving the CLFC intervention reported less frequent alcohol use in the previous three month period. As family pathology decreased, CLFC reduced the frequency of alcohol and other drug use at the 12 month assessment. In addition, CLFC was found to produce effects on other outcomes, including use of community services and parent knowledge and beliefs about alcohol and other drug use.

Brief Strategic Family Therapy

Brief Strategic Family Therapy (BSFT) is an indicated family-based prevention program that aims to decrease individual and family risk factors through skills building and by improving and strengthening family relationships. BSFT targets children and adolescents (6 to 17 years of age) who engage in rebellious, truant, or delinquent behaviors, as well as those who are engaging in substance use and/or associating with peers exhibiting these behaviors. The program is also beneficial for families experiencing problematic relationships, parental discord, or behavior management issues. BSFT is designed for a variety of settings, and has been implemented in community-based health and social services agencies and clinics. The program is designed to be delivered over an 8 to 12 week period, and the sessions are 60 to 90 minutes each. The BSFT counselor meets with family members at their home or in the program office. BSFT received a score of 3.3 (out of 4.0) on readiness for dissemination by NREPP.

Program Components—The BFST counselor implements the intervention in four distinct steps. The first step is to develop a therapeutic alliance by accepting and demonstrating respect for each individual family member and the family as a whole. The second step is to assess family strengths and supportive relationships as well as problematic relationships within the family that affect youth behavior or parenting abilities. The third step is to develop an approach to change that takes advantage of family strengths and that addresses problematic relationships. The fourth and final step is to implement change strategies that may include reframing to change the meaning of interactions, shifting interpersonal boundaries as needed, building conflict resolution skills, and providing parental coaching. The overall goal of these change strategies is to increase and reinforce competent family interactions and behaviors.

Program Providers and Training Requirements—One full-time BFST counselor can provide the program to 15 to 20 families for in-office sessions and 10 to 12 families for in-home sessions. To successfully implement BSFT in-office, an agency should be open at times that are convenient for participating families and provides transportation and childcare services if needed. In BSFT, the counselor is trained to be problem-focused and practical, with a goal of moving the family from problematic to competent interactions. An ideal BFST counselor has master's level training in social work or marriage and family therapy, however, individuals with bachelor's level training with experience working with families can implement the intervention. Certification is required for agencies implementing the BFST program. Advanced training consists of four three-day workshops (12 days total) over a period of several months.

Evidence of Effectiveness—In support of the quality of research on BSFT, the NREPP web site lists seven peer-reviewed outcome papers and one replication study. Three of the outcome studies reported on adolescent drug use outcomes. Adolescents who participated in BSFT showed significantly greater reductions in marijuana use compared to adolescents in the comparison group in one study, and less overall substance use in another study. In a third study, adolescent girls who participated in BSFT showed significantly greater reductions in substance use at posttest and at the one year follow-up than adolescent girls in the comparison group. In addition, BSFT was found to produce effects on other outcomes, including engagement in therapy, conduct problems and aggression, and family functioning.

Community-Based Prevention

Evidence-based drug abuse prevention programs delivered to entire communities typically have multiple components. These often include a school-based component, family or

parenting components, along with mass media campaigns, public policy initiatives, and other types of community organization and activities. These interventions require a significant amount of resources and coordination, given the broad scope of the activities involved. The program components are often managed by a coalition of stakeholders including parents, educators, and community leaders. Research has shown that community-based programs that deliver a coordinated, comprehensive message about prevention can be effective in preventing adolescent substance use.

Model Community Based Prevention Program

Community Trials Intervention to Reduce High-Risk Drinking

Community Trials Intervention to Reduce High-Risk Drinking (RHRD) is a universal intervention that aims to alter community-wide alcohol use patterns such as drinking and driving, underage drinking, binge drinking, and related problems. This multi-component program uses several environmental intervention strategies to increase community awareness, prevent access to alcohol for underage drinkers, and enforce laws regarding alcohol use and sales. RHRD received a score of 2.8 (out of 4.0) on readiness for dissemination by NREPP.

Program Components—The RHRD program uses five prevention components. The first is reducing alcohol access, which is accomplished by helping communities use zoning and municipal regulations to control the density of bars, liquor stores, etc. The second component is responsible beverage service, which involves training alcohol beverage servers and assisting retailers develop policies and procedures to reduce drunkenness and driving after drinking. The third component aims to reduce drinking and driving through increased law enforcement and sobriety checkpoints. The fourth component reduces underage alcohol access by training alcohol retailers to avoid selling to minors and those who provide alcohol to minors, and through increased enforcement of laws regarding alcohol sales to minors. The fifth component provides communities with the tools to form the coalitions needed to implement and support the interventions that will address all RHRD prevention components. To properly implement RHRD, project staff must assess community priorities and decide which interventions to use and how to adapt them. Typically, this involves working closely with local community organizations, opinion leaders, law enforcement, zoning and planning commissions, policy makers, and the public to collect this information.

Program Providers and Training Requirements—Recommended project staff for RHRD include a director who is responsible for developing the initiative, seeking funding, building coalitions, and hiring project staff, an assistant director who manages office operations and staff and implements the program, along with one or more data managers, administrative assistants and volunteers. Training and consultation target the specific needs and problems of the individual community. Training manuals for RBS are available along with brochures that offer strategies and tactics for reducing alcohol use within the community. The RHRB project web site is located at http://www.pire.org/communitytrials/index.htm.

Evidence of Effectiveness—In support of the quality of research on RHRD, the NREPP web site lists two peer-reviewed outcome papers and one replication study. One of the outcome studies reported on alcohol use outcomes. In the study, alcohol consumption was assessed via telephone surveys to randomly selected individuals from households in the intervention and comparison communities. Findings indicated that individuals living in the intervention community sites had significant reductions in drinking quantities, rates of driving when having had too much to drink, and rates of driving over the legal limit, when

compared to individuals living in comparison sites. In addition, RHRD was found to produce effects on other outcomes, including alcohol-related traffic accidents and alcohol-related assaults.

Summary

Prevalence rates of alcohol, tobacco, and other drug use increase rapidly during the years from early to late adolescence, and typically peak during young adulthood. Prevention programs for adolescents have been developed and implemented in school, family, and community settings. The most effective programs are guided by relevant psychosocial theory regarding the etiology of substance abuse and target key risk and protective factors that have been shown to be associated with substance abuse behavior. Among adolescents, substance use involvement is typically a function of the negative pro-drug social influences in their social environment combined with individual psychosocial vulnerabilities to these influences.

School-based prevention programs that have been tested and proven effective focus on building drug resistance skills, general self-regulation and social skills, and/or changing normative expectations regarding inaccurate beliefs about the high prevalence of substance use. The most effective programs are highly interactive in nature, skills-focused, and implemented over multiple years. Literature reviews and meta-analytic studies have shown that programs with these characteristics can reduce smoking, alcohol, and other forms of substance use in young people, compared to youth who do not participate in such programs. Several rigorous outcome studies of school-based prevention programs have demonstrated clear evidence of short and long-term effects on substance use behavior. Family-based prevention programs typically emphasize parenting skills training and/or improving family functioning, communication, and family rules regarding substance abuse. Those family interventions that combine parenting skills and family bonding components appear to be the most effective. Community-based drug abuse prevention programs include some combination of school, family, mass media, public policy, and community organization components. Community programs present that present a coordinated, comprehensive message across multiple delivery components are most effective in terms of changing behavior.

While there are a growing number of evidence-based prevention programs for adolescent substance use and abuse, it is important that prevention efforts remain flexible and responsive to changing trends in use. For example, the abuse of prescription and over-the-counter medications among adolescents is a growing problem that requires a coordinated and comprehensive response. This is especially true because these medications are often readily accessible to teenagers, either from medicine cabinets at home, from friends or relatives, or for purchase at the local pharmacy or through the internet. Multiple stakeholders can address the issue of ready access. Parents can limit access by safeguarding medications in a secure location, keeping an inventory of medications in the home, and disposing of unused or old medications. Physicians can limit access by documenting and monitoring prescription histories and refill requests for all patients and ensuring that prescription pads are secured. Pharmacists can limit access by identifying and addressing the issue of forged prescriptions. Of course, in addition to reducing access, each of these stakeholders can play a key role in raising awareness of the dangers of abusing medications.

As we move forward, it is important to address several factors that reduce the public health impact of effective prevention programming. It is still the case that most schools use non-evidence based prevention programs, family-based prevention programs often do not reach the families in greatest need, and starting up community prevention programs requires

substantial resources. It is clear that more research is needed to facilitate the wide dissemination of effective prevention programs into our schools, families, and communities.

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Table 1
Sample school-based drug abuse prevention programs

	Universal (for everyone in population)	Selected (for members of at-risk groups)	Indicated (for at-risk individuals)
Program	***Life Skills Training***	***Project Towards No Drug Abuse***	***Brief Alcohol Screening and Intervention for College Students***
Web Site	http://www.lifeskillstraining.com	http://tnd.usc.edu	http://depts.washington.edu/abrc/basics.htm
Target Population	Middle or junior high school students, additional programs available for elementary and high school students	Students attending alternative or continuation high schools; has also been tested in students attending traditional high schools	College students engaging in heavy alcohol use and/or at risk for negative consequences of alcohol use
Providers	Classroom teachers, peer leaders, or health professionals	Classroom teachers, health education staff	College counselor or personnel proficient in motivational interviewing techniques
Provider Training	One and a half day workshops train LST providers to implement the program with fidelity; activities and teaching strategies used in the program are used in the training sessions	One to two day workshops provide TND teachers with an understanding of the theoretical basis, content, instructional techniques, and objectives of the program	One to two day training workshop, depending on staff experience; practitioner training video is available
Goals	Prevent alcohol, tobacco, marijuana, other drug use, and violence by targeting multiple risk and protective factors and providing skills training in drug resistance skills, personal self-management, and social competence skills in order to build resilience and help youth navigate developmental tasks	Prevent tobacco, alcohol, other drug use, violence-related behaviors, and other problem behaviors by addressing motivation factors (i.e., students' attitudes, beliefs, expectations, and desires regarding drug use); skills (social, self-control, and coping skills); and decision-making (i.e., how to make decisions that lead to health-promoting behaviors)	Motivate students to reduce alcohol use in order to decrease the negative consequences of drinking; reveal discrepancies between the student's risky drinking behavior and his or her goals and values
Materials	Teachers manual and student guide for each year, relaxation audiotape, optional multimedia materials for smoking & biofeedback	Teacher manual, student workbooks, optional videotape, and a TND board game	Program manual, program workbook with sample tools, a training video, and personalized assessment and feedback sheets and handouts
Sessions	30 class sessions over three years	12 class sessions	Two one-hour sessions
Teaching Methods	Facilitated discussion, structured small group activities, and role-playing scenarios are used to stimulate participation and promote the acquisition of skills	Program sessions are highly participatory and interactive. The sessions provide opportunities for interactions among students and between students and the teacher	Based on principles of motivational interviewing, program is delivered in an empathetic, nonjudgmental one-on-one session by trained counselor or staff
Findings	Three large-scale randomized effectiveness trials have shown reductions in tobacco, alcohol, marijuana, other illicit drug use, and violence/delinquency for a diverse range of adolescents, with duration of effects lasting up to	Several randomized trials have been conducted showing reductions in tobacco, alcohol, and marijuana for up to two	Students receiving BASICS had significantly greater reductions in drinking frequency and quantity compared to control group students, with the greatest intervention impact observed in the first year after the intervention

	Universal (for everyone in population)	Selected (for members of at-risk groups)	Indicated (for at-risk individuals)
	six years, among LST participants compared to controls	years; one study demonstrated effects on "hard drug" use four and five years after the intervention among TND participants compared to controls	

Table 2
Sample family-based drug abuse prevention programs

	Universal (for everyone in population)	Selected (for members of at-risk groups)	Indicated (for at-risk individuals)
Program	***Family Matters***	***Creating Lasting Family Connections***	***Brief Strategic Family Therapy***
Web Site	http://familymatters.sph.unc.edu/index.htm	http://copes.org/index.php	http://www.brief-strategic-family-therapy.com
Target Population	Children 12 to 14 years old and their parents	Adolescents aged 9 to 17 and their families from high-risk environments	Children and adolescents (6 to 17) who engage in substance use and/or delinquent behaviors; families with behavior management issues
Providers	Implemented at home by parents; four follow-up telephone technical assistance calls by health educators	Implemented by two or more trained facilitators	Counselor should have master's level training in social work or marriage/family therapy; individuals with bachelor's level training with experience working with families can implement the intervention
Provider Training	Health educators who conduct follow-up telephone calls receive two days of training prior to making telephone calls	Five to ten days of facilitator training focus on teaching the skills needed to implement the program and fully engage participants. A community mobilization component focuses on recruitment and retention planning	Training, supervision, and certification is required for agencies implementing the program; Advanced training consists of four three-day workshops (12 days total) over several months
Goals	Address issues related to family/adult substance use; the availability of substances; and social attitudes about substance use in the media and among peers. Help families improve parental monitoring, family support, rule-setting, and communication	Enhance family bonding and communication skills among parents and youth and other skills for personal growth. Facilitate the use of appropriate community resources and services in resolving family problems and addressing youth problem behavior	Provides families with the tools to overcome individual and family risk factors through focused interventions to improve maladaptive family interaction and skills building strategies to strengthen families
Materials	Four instructional booklets are mailed to parents, one every two weeks	Facilitator manual, participant notebooks, program posters	Videotape equipment is needed during supervision phase of provider training
Sessions	Booklets contain readings/activities to get participants to identity and address family characteristics, behaviors, and attitudes that influence adolescent substance use	Weekly 2.5-hour parent and youth training sessions for a 20-week period, or sessions can be offered in five week increments throughout the year	Counselor and family typically meet for 12 to 17 weekly sessions that are 60 to 90 minutes each
Teaching Methods	Self-administered at home by parents; some activities are for adult family members only; others are for adults and adolescents together	It is recommended that two or more facilitators run each of the parent and youth sessions in order to facilitate a team approach that enhances learning	Family therapy
Findings	A randomized controlled trial compared participating	Compared to youth in the comparison group, CLFC children	A series of randomized trials showed that participation in

	Universal (for everyone in population)	**Selected (for members of at-risk groups)**	**Indicated (for at-risk individuals)**
	families to controls and found that the intervention reduced the prevalence of smoking and drinking among teens, after adjusting for demographic variables and pretest rates of use. These effects were maintained at 3 and 12-month follow-up assessments, although effect sizes were small	reported less frequency alcohol use in the previous three month period; As family pathology decreased, CLFC reduced the frequency of alcohol and other drug use at the 12 month assessment; CLFC parents used more community services when a personal or family problem arose	BSFT produced reductions in youth marijuana use and overall substance use, compared to control group participants; A study of adolescent girls showed significantly greater reductions in substance use at posttest and at the one year follow-up compared to similar girls in the control group