A Collection of

NIDA NOTES

NATIONAL INSTITUTE ON DRUG ABUSE

Articles That Address

Drug Abuse Prevention

U.S. Department of Health and Human Services
National Institutes of Health
National Institute on Drug Abuse

NN0015

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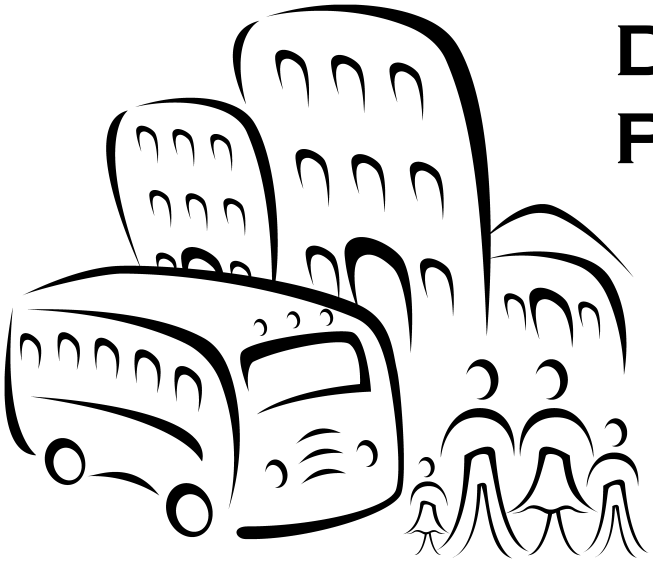

Drug Abuse Prevention

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Introduction

The National Institute on Drug Abuse (NIDA) supports most of the world's research on drug abuse and addiction. NIDA-funded research enables scientists to apply the most advanced techniques available to the study of every aspect of drug abuse, including:

- genetic and social determinants of vulnerability and response to drugs;
- short- and long-term effects of drugs on the brain, including addiction;
- other health and social impacts of drug abuse, including infectious diseases and economic costs;
- development and testing of medications and behavioral treatments for abuse and addiction; and
- development and evaluation of effective messages to deter young people, in particular, from abusing drugs.

Included in this document are selections of topic-specific articles reprinted from NIDA's research newsletter, *NIDA NOTES*. Six times per year, *NIDA NOTES* reports on important highlights from NIDA-sponsored research, in a format that specialists and lay readers alike can read and put to use. Selections like the current one are intended to remind regular *NIDA NOTES* readers and inform other readers of important research discoveries during the periods they cover.

We hope the information contained here answers your needs and interests. To subscribe to *NIDA NOTES* and for further information on NIDA's drug abuse and addiction research, please visit our Web site at www.drugabuse.gov.

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NIDA NATIONAL INSTITUTE ON DRUG ABUSE

Research Findings

Volume 20, Number 5 (April 2006)

MTF Survey Finds Overall Decline in Teen Substance Abuse

Substance abuse among teenagers in the United States declined 19 percent over the past 4 years, with 15.8 percent reporting past-month abuse in 2005, compared with 19.4 percent in 2001, according to the latest Monitoring the Future Survey. The nationwide survey of 8th-, 10th-, and 12th-graders found that the overall decline was tempered by increases or unchanged rates of abuse of some prescription drugs, inhalants, and other substances.

The 4-year decline has been driven largely by decreasing rates of marijuana abuse. For example, since 2001, past-month abuse of marijuana fell by 28 percent among 8th-graders and by 23 percent among 10th-graders. Although most year-to-year changes in the annual survey are not statistically significant, teen abuse of five substances—GHB, LSD, MDMA/Ecstasy, methamphetamine, and steroids—showed significant declines from 2004 to 2005.

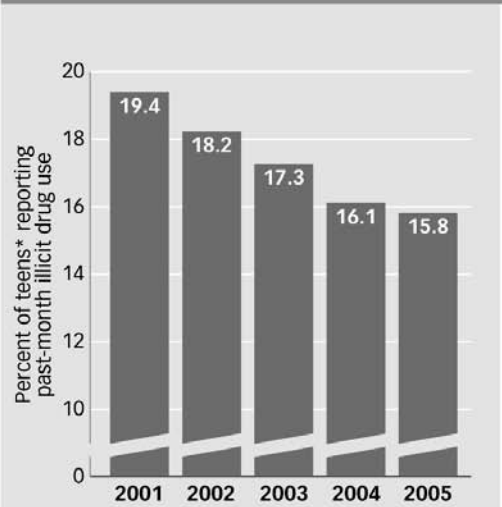
The survey findings are encouraging because teenagers are most vulnerable to the effects of drugs and youths who abstain in their teen years are less likely to abuse drugs later in life, NIDA Director Nora D. Volkow, M.D., says. She notes, however, that teens' abuse of prescription medications and inhalants has continued unabated in the past few years. NIDA is particularly concerned about the nonprescribed use of opioid painkillers, such as OxyContin and Vicodin. In 2005, 9.5 percent of 12th-graders reported abusing Vicodin in the past year, and 5.5 percent reported OxyContin abuse, which has increased more than one-third since 2002. "Using these drugs without a prescription is dangerous. It's imperative that teens get this message," Dr. Volkow stresses.

Abuse of inhalants, which are found in common household substances such as nail polish remover, glue, and cleaning fluids and are very toxic, also has been rising in recent years. Abuse among eighth-grade students has increased significantly since 2002, Dr. Volkow says.

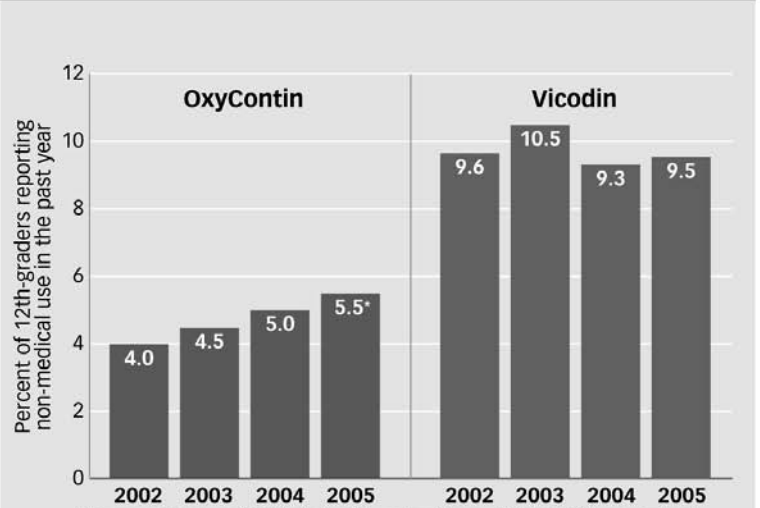
Smoking Decline May Be Tapering Off

Dr. Lloyd Johnston of the University of Michigan, the principal investigator of the study, notes a worrisome signal that the decline in smoking may be tapering off: The smoking rate among eighth-graders held steady in the

ILLICIT DRUG USE DROPS AMONG TEENS, BUT NONPRESCRIPTION USE OF PAINKILLERS REMAINS A CONCERN While overall substance abuse among teenagers in the United States declined 19 percent over the past 4 years, abuse of prescription opioid painkillers such as OxyContin and Vicodin has continued unabated.



* 8th, 10th, and 12th grades combined.
SOURCE: University of Michigan, 2005 Monitoring the Future Survey.



* Increase in the abuse of OxyContin by 12th-graders between 2002 and 2005 was significant.
SOURCE: University of Michigan, 2005 Monitoring the Future Survey.

latest survey, following a long-term decline over the past several years. Eighth-graders are considered an important bellwether of drug-related trends among teenagers. Moreover, smoking declines in the upper grades also slowed in 2005. Survey data do not indicate long-term declines in the abuse of marijuana and other illicit drugs among 8th-graders, and declines among 10th- and 12th-grade students were very modest, Dr. Johnston notes.

On the positive side, cigarette smoking is at its lowest rate in the 30-year history of the survey. Also, the proportion of eighth-graders reporting that they have ever tried to smoke cigarettes declined in the latest survey, which could reflect shifts in behaviors and intentions that occurred several years earlier.

The survey covered about 50,000 students in more than 400 public and private schools. The University of Michigan conducted the survey under a grant from NIDA, the National Institutes of Health, and the Department of Health and Human Services. Further details on the survey are available at *www.drugabuse.gov/DrugPages/MTF.html* and at monitoringthefuture.org. NN

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Research Findings

Volume 20, Number 5 (April 2006)

NIDA Launches HIV/AIDS Public Awareness Campaign

The link between drug abuse and HIV infection is the focus of a new public awareness campaign launched by NIDA on November 29, 2005. NIDA Director Nora D. Volkow, M.D., announced the campaign and screened "Text Message," a new public service announcement (PSA) aimed at teenagers, during a press conference at the National Press Club in Washington, D.C. "Drug abuse prevention is HIV prevention," says Dr. Volkow. "In recent years, the number of young people in the United States diagnosed with AIDS rose substantially. Because drug use encourages risky behaviors that can promote HIV transmission, NIDA views drug abuse prevention and treatment as essential HIV prevention."

The PSA shows young women text messaging on cell phones about a friend who contracted HIV after using drugs and having sex at a party. The dialogue says, "She got high, got stupid, and now she has HIV." The announcement is being aired on television stations across the country.

The PSA was produced in collaboration with students from the Duke Ellington School of the Arts, a Washington, D.C., public high school. Students were involved in developing the concept for the PSA and also performed the lead roles. The intent is to dispel the myth that only intravenous drug abuse can lead to HIV infection and to promote awareness of the consequences of the risky sexual behavior that can follow any type of drug abuse.

"Before working on the PSA, I was more concerned about pregnancy as a result of unprotected sex than HIV infection, which seemed only to affect older people," said Ellington student Rebecca Hollingsworth. Research has shown that this view is widespread: A large proportion of youths are not concerned about becoming infected with HIV, despite the fact that young people between the ages of 13 and 24 represent a growing percentage of new infections.

NIDA has formed a coalition with organizations including the American Academy of Child and Adolescent Psychiatry; the AIDS Alliance for Children, Youth and Families; and the United Negro College Fund Special Programs Corporation to get this important message about the link between drug abuse and HIV infection to teenagers and young adults. In addition to the PSA, which will be aired on television stations across the United States, posters advertising NIDA's message— "Drug Abuse and HIV: Learn the Link"—will be displayed on public transportation and buses in Washington, D.C., Chicago, and Dallas.

An image from NIDA's "Text Message" public service announcement

NIDA's public awareness campaign also includes a recently launched Web site, *www.hiv.drugabuse.gov*, where visitors can browse publications such as the new HIV/AIDS Research Report, download the PSA, and read about the latest scientific findings on the relationship between drug abuse and HIV infection. NN

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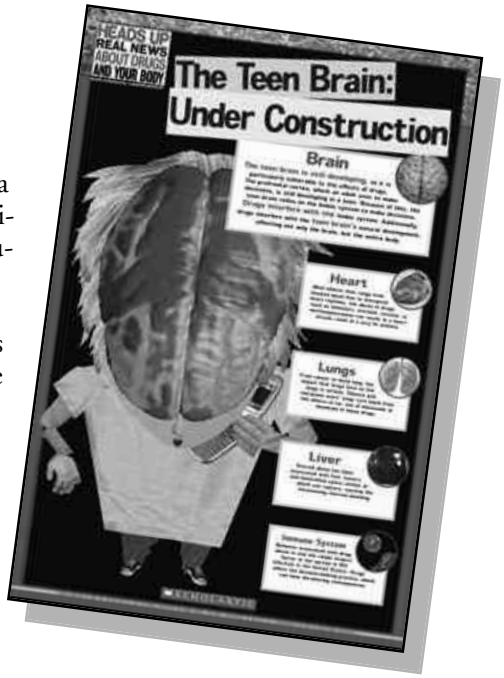
Research Findings

Volume 20, Number 4 (March 2006)

NIDA and Scholastic Offer Teens and Teachers New *Heads Up*



NIDA and Scholastic, Inc., have joined forces to produce a third installment of the series *Heads Up: Real News About Drugs and Your Body*. The new science-based articles and vivid, informative graphics will be distributed to nearly 2 million middle and high school students via the pages of Scholastic's publications *Junior Scholastic, Science World,* and *Up Front*. This year's materials, which include a teacher's guide, once again strike the theme of the unique dangers drugs pose to teens.

"Research indicates that adolescence, a time when many changes are occurring in the brain, may be a period of significantly increased vulnerability to drugs' effects," says NIDA Director Dr. Nora D. Volkow. By presenting NIDA's research in an accessible format, *Heads Up* speaks directly to its youthful audience about issues including HIV and drug abuse, the link between food cravings and drug cravings, the health dangers of inhalants, and the misuse of prescription drugs.

Adolescents, AIDS, and Abuse: A Deadly Connection

Between 1998 and 2000, one of every six persons with a newly diagnosed HIV infection was between the ages of 13 and 25. Along with injecting drugs, which 1 in 50 U.S. high school students report having done at least once, drug-influenced bad judgments can lead to infection, and drugs can reduce the body's ability to fight off infection. "Teens, Drug Abuse, and AIDS: The Deadly Connection" provides young people with the statistics and scientific information they need to understand the potential health consequences of their decisions concerning drugs and sexual relationships.

Linking Addictions to Food and Drugs

"Two Teen Health Dangers: Obesity & Drug Addiction" tells readers how NIDA scientists discovered that cravings for food and cravings for drugs have a common biological basis in the brain. Both drug abusers and obese people tend to have lower than average numbers of the brain proteins called dopamine receptors, a deficit that could limit the amount of pleasure they gain from ordinary activities and achievements. Overeating and drug abuse may be attempts to compensate; both stimulate the dopamine system to higher activity levels.

The article leads readers through the specific experiments researchers conducted to find these connections and teaches how to design a scientific experiment and calculate their own body mass index. It points out that people can enhance the brain's dopamine activity without overeating or taking drugs by exercising and spending time with friends and family.

Bucking the Trend: Increase in Inhalant and Prescription Drug Abuse

The 2005 University of Michigan Monitoring the Future (MTF) Survey found that the number of U.S. 8th-, 10th-, and 12th-grade students who reported abusing drugs in the past month dropped 19 percent from 2001 to 2005. However, past-year inhalant abuse among eighth-graders increased, and abuse of the prescription drugs oxycodone (OxyContin) and hydrocodone (Vicodin) remained high. "Abuse of Inhalants and Prescription Drugs: Real Dangers for Teens" paints a vivid, realistic picture of these substances' ill effects. Even in an otherwise healthy person, a single session of abusing highly concentrated amounts of certain inhalants can lower oxygen levels enough to cause asphyxiation or disrupt heart rhythms and cause death from cardiac arrest.

Prescription medication abuse can cause both short-term and long-term health problems, from potentially fatal overdose to addiction and long-term brain changes. In addition to exposing the dangers of these substances, the *Heads Up* article explains how the MTF Survey data were collected and why these data are important in understanding and fighting drug abuse.

All *Heads Up* materials can be found at either *www.drugabuse.gov/scholastic.html*, or at Scholastic's Web site, *www.scholastic.com/headsup*. NN

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Volume 20, Number 4 (March 2006)

Teen Access to Cigarettes Declining, But Still High

Fewer underage teens bought cigarettes in 2002 than in 1997, but most still found the products easy to obtain, according to the Monitoring the Future (MTF) Survey of 8th-, 10th-, and 12th-graders. Half the teens who said they were current smokers reported personally buying cigarettes from a retail store, down about 5 percent from 1997; only one-third said they were asked to provide proof of age during their last purchase. They most often bought cigarettes at gas stations or convenience stores, which have the highest rates of pro-tobacco advertising and self-service access to tobacco products. Dr. Lloyd Johnston and colleagues at the University of Michigan say the findings suggest that some policies to limit access to cigarettes by minors—for example, requiring clerk-assisted purchases—may be having an impact, but also point to considerable retailer noncompliance with underage sales regulations.

American Journal of Preventive Medicine 27(4):267-276, 2004. NN

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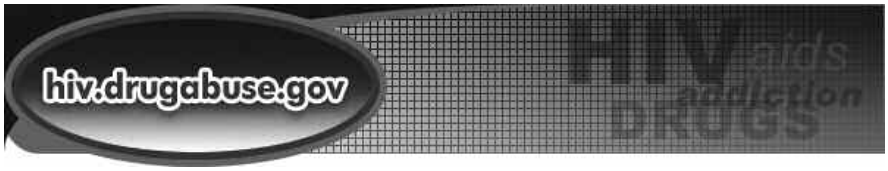
Research Findings

Volume 20, Number 3 (October 2005)

HIV/AIDS Research and Education Are Crucial to Drug Abuse Prevention

Behavior associated with drug abuse is the single largest factor in the spread of HIV infection in the United States, where about one-third of HIV/AIDS cases are related to injection drug abuse.



NIDA's Web site, *http://hiv.drugabuse.gov*, provides research-based information about HIV/AIDS and its relationship to drug abuse. A compendium of NIDA publications and public service announcements, the Web site is a valuable resource for care providers as well as parents and teens looking for information. Visitors to the site will find a list of drugs that are commonly abused, a phone number and Web site for treatment referrals, up-to-date research findings, and announcements in English and Spanish about special events.

Using or sharing drug paraphernalia such as unsterile needles, cotton swabs, rinse water, and cookers to inject heroin, cocaine, or other drugs places drug abusers at risk for contracting or transmitting HIV. Drug abuse without the use of needles and syringes can also foster the spread of HIV. Research sponsored by NIDA and the National Institute on Alcohol Abuse and Alcoholism has shown that drug and alcohol use can interfere with judgment about sexual behavior and thereby affect the likelihood of engaging in unplanned and unprotected sex. This increases the risk for contracting HIV from infected sex partners.

In the past 15 years, NIDA has sponsored a comprehensive research program in response to the dynamic nature of the co-occurring epidemics of drug abuse and HIV/AIDS. This research has yielded science-based principles that should prove useful to community planners, policymakers, service providers, and medical practitioners as they develop and implement programs to prevent the spread of HIV and other infections among injecting and noninjecting drug users and their sexual partners. To foster widespread use of these principles, NIDA has produced a number of publications, such as *Principles of HIV/AIDS Prevention in Drug-Using Populations* and *The NIDA Community-Based Outreach Model: A Manual To Reduce the Risk of HIV and Other Blood-Borne Infections in Drug Users.*

The Web site also offers the "Jack & Jill" public service announcements, which are geared toward teens and provide information about substance abuse and risky sexual behavior. "Jack & Jill" was the first installment in NIDA's "Keep Your Body Healthy" campaign, and deals with the connection between drug abuse and contracting HIV/AIDS. It has been estimated that at least half of all new HIV infections in the United States are among people under age 25, and most of these young people are infected sexually.

NIDA's Web sites, including *http://hiv.drugabuse.gov*, help bring the Institute's research and policies to a wide audience; by disseminating material online, parents, teens, and providers have an accessible resource for the latest in drug abuse research. NN

AIDS Cases By Exposure Category and Sex Through 2002

Exposure category	Males		Females		Overall total	
	No.	%	No.	%	No.	%
Male-to-Male Sexual Contact	384,784	55	—	—	384,784	55
Injection Drug Abuse	151,367	22	58,552	39	209,919	30
Heterosexual Contact	36,692	5	63,379	42	100,071	14

Source: CDC. HIV/AIDS Surveillance Report: Cases of HIV infection and AIDS in the United States, Vol. 14, 2002. Atlanta, Georgia: U.S. Department of Health and Human Services.

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Research Findings

Volume 19, Number 3 (September 2004)

Exploring the Why's of Adolescent Drug Abuse

By NIDA Director Nora D. Volkow, M.D.

Adolescence and early adulthood are periods of growth, exploration, and—for some teens and young adults—the development of drug abuse and addiction. Each day roughly 3,000 teens smoke their first cigarette. Among 30,000 teenagers polled by the National Survey on Drug Use and Health in 2002, 4.2 percent of 12- to 13-year-olds reported using an illicit drug in the past month, along with 11.2 percent of 14- to 15-year-olds, 19.8 percent of 16- to 17-year-olds, and 22.5 percent of 18- to 20-year-olds. Data gathered in 2002 by the Substance Abuse and Mental Health Services Administration show that 64 percent of patients entering treatment for drug abuse started abusing drugs at age 20 or younger.

Teen smoking illustrates the risks of early exposure to addictive drugs. A third of high school students who try smoking eventually become daily smokers. Young smokers appear to be more vulnerable to nicotine addiction than are older smokers; teen users report symptoms of dependence after smoking fewer cigarettes than adults, and they have more difficulty quitting and experience more severe withdrawal than adults who smoke similar amounts.

NIDA research is shedding light on the processes that underlie the exceptional susceptibility to addiction experienced by boys and girls who begin using drugs in adolescence. Recent animal studies provide evidence that drugs affect the developing brain differently than they do the matured brain. In one study, rats exposed to nicotine in adolescence self-administered more nicotine—as adolescents and as adults—than rats first exposed to nicotine in adulthood. In another study, rats exposed to nicotine in adolescence and given cocaine when they reached adulthood exhibited more sensitivity to cocaine's stimulant effects than did rats that were first exposed to both drugs as adults (see "Early Nicotine Initiation Increases Severity of Addiction, Vulnerability to Some Effects of Cocaine," *NIDA NOTES,* Vol. 19, No. 2).

To strengthen prevention and treatment of drug abuse and addiction during the crucial adolescent period, NIDA has initiated a three-pronged research effort. One component of the effort will explore how developmental changes that occur in the adolescent brain may increase vulnerability to drugs, and how drugs in turn may subvert normal neurobiological maturation. We will increase support of animal studies to ascertain the successive steps in adolescent brain development and whether they differ with abstention from drugs, initiation of drug abuse, escalation to uncontrollable abuse, and relapse (RFA 04-011: "Animal Models of Adolescent Drug Abuse: Integrative Studies of Brain and Behavioral Development").

A second component of our initiative aims to increase our ability to dissuade teens from abusing drugs by focusing on the cognitive processes—learning, motivation, judgment, and decision making—that influence choices to abuse or avoid drugs (RFA 04-009: "Behavioral and Cognitive Processes Related to Adolescent Drug Abuse"). This research will elucidate how teens perceive risk and make decisions on matters that involve risk. It will address such questions as why some young people engage in drug abuse when they have received information regarding its destructive potential. Do they assess the risks inaccurately, or do they understand the risks but weigh them more lightly than do abstaining adolescents?

The third focus of NIDA's new initiative is the period of emerging adulthood, which spans the years from 18 to 25. This is a time of continued brain development, but most of all of new personal and social choices and challenges: the emergence of personal beliefs and values, exploration of career roles, and transitions involving increasing independence and shifts in relationships with parents and peers. Overall rates of drug use peak and begin to subside during these years. Most youths who abuse drugs in their teens or early twenties desist as they mature into full adults, but some do not and some initiate new abuse of additional drugs: About 25 percent of smoking, 33 percent of marijuana use, and roughly 70 percent of cocaine abuse begins after age 17. Personal, social, and demographic factors such as education, employment, and home

environment all appear to influence the patterns of abuse in this period.

NIDA's sharpened focus on emerging adults will support development and testing of interventions to prevent initiation or escalation of drug abuse during this life transition (RFA 04-013: "Prevention Research for the Transition to Adulthood"). The research will draw on a broad array of academic disciplines to generate and evaluate strategies of intervening on factors ranging from interpersonal relationships— the negative influence of one intimate partner on the drug use of the other, for example—to broader social contexts, such as workplaces and college campuses.

The choices adolescents make have a profound impact. NIDA's intensified concentration on the interaction of drugs and adolescent development will sharpen our understanding of those crucial choices, and will help us provide adolescents with the information they need to choose wisely. NN

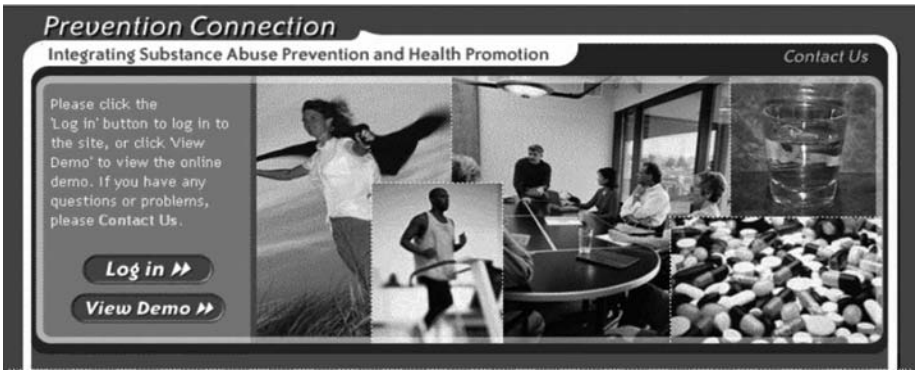
NIDA NATIONAL INSTITUTE ON DRUG ABUSE

Research Findings

Volume 19, Number 3 (September 2004)

Web-Based Program Trains Practitioners To Add Prevention Messages to Wellness Programs

In the last 20 years, drug abuse prevention strategies have increased dramatically in number and in scientific sophistication. Prevention training programs have not kept pace, especially in the area of equipping health professionals to deliver prevention education to adults.



To make up this lag, ISA Associates of Alexandria, Virginia, offers *Prevention Connection: Substance Abuse Prevention Training for Health Promotion Practitioners.* The Web-based training program was developed and tested under a NIDA-supported Small Business Innovation Research (SBIR) grant. It uses an interactive, multimedia approach to train wellness professionals to integrate substance abuse prevention materials and messages into health promotion programs across a range of topics—from stress management to healthy eating, active lifestyle, and parenting skills.

"Research shows that by integrating substance abuse messages into health promotion programs in the workplace and community, we can reach a much larger audience and reduce substance abuse," says Dr. Royer Cook, principal investigator for the project. "Unfortunately, many health practitioners do not know enough about substance abuse or how to incorporate relevant information into their programs. With *Prevention Connection,* any English-speaking health practitioner with an Internet connection can learn in just hours how to integrate substance abuse prevention messages and materials into a wellness program."

Prevention Connection emphasizes that health promotion and health education practitioners can weave substance abuse prevention information seamlessly into other health promotion programs without losing the program's impact on the targeted health behavior. In addition to hands-on exercises that allow practitioners to build their own program outlines, *Prevention Connection* helps wellness professionals understand the importance of integrating substance abuse prevention with health promotion and shows how substance abuse prevention makes good business sense.

Screen captures from the Prevention Connection Web site.

Practitioners will appreciate *Prevention Connection's* indepth look at the leading substance abuse prevention models and theories, descriptions of innovative workplace prevention programs, and facts about drugs and their effects. ISA tested the program with members of the Worksite Health Promotion and Health Educator Groups of the American College of Sports Medicine, who found it engaging and effective.

In the past two decades, ISA has completed eight NIDA-funded SBIR projects. Two more prevention projects are in development: One targets prescription drug abuse, and the other is a DVD-based program for young adults in the workplace.

For More Information

The current annual licensing fee for an individual *Prevention Connection* user is $495; group rates are available. To order *Prevention Connection* or to get more information about this and other employee-focused health promotion programs offered by ISA Associates and the Center for Workforce Health (www.centerforworkforce-health.com), please contact Dr. Tracy McPherson (tmcpherson@isagroup.com) or Dr. Royer Cook (rcook@isagroup.com) at 703-739-0880. NN

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

Research Findings

Volume 19, Number 2 (July 2004)

New Index Measures Self-Control, Predicts Drug Abuse Vulnerability in Adolescent Boys

By Marion Torchia, *NIDA NOTES* Contributing Writer

Researchers at the University of Pittsburgh's Center for Education and Drug Abuse Research have identified a set of characteristics that appears to predict a boy's vulnerability to substance use disorder (SUD) in young adulthood. Once validated for use with the general population, this new construct, "neurobehavioral disinhibition," may help clinicians tailor drug abuse prevention programs for children most in need of support.

Under the direction of Dr. Ralph E. Tarter, the researchers have conducted comprehensive longitudinal studies to understand how neurobehavioral disinhibition may relate to the genetic, biological, psychological, and environmental factors that are thought to predispose individual boys to SUD. They have developed an index that links the set of personality characteristics to a quantitative scoring system. The index appears to identify as early as age 10 children who are especially vulnerable to drug problems in adolescence.

Researchers hope that early identification and treatment of neurobehavioral disinhibition can help at-risk children develop self-control and avoid drug initiation and abuse.

Neurobehavioral disinhibition comprises a cluster of emotional tendencies, behavioral symptoms, and problems in cognitive function that indicate that a child has not adequately developed psychological self-regulation, a capacity that depends on normal neurological development (see below, "Neurobehavioral Disinhibition: A Closer Look").

According to Dr. Tarter, the construct's key strength is its biological basis: Its elements closely relate to what is known about the brain's development. "Neurobehavioral disinhibition points to deficiencies in those higher level brain functions—self-control and deliberate, goal-directed action—that we know are managed in the prefrontalcortex."

According to Dr. Kevin Conway, director of the Program on Antisocial Behaviors and Related Vulnerability in NIDA's Epidemiology Research Branch, Dr. Tarter's research shows that the construct actually works. He notes that Dr. Tarter and his colleagues followed the same group of children for more than a decade and that "the children's early scores for neurobehavioral disinhibition predicted with amazing accuracy whether or not they would develop SUD and how severe their problems would be." He adds that
"Dr. Tarter's study takes earlier research on vulnerability to drug abuse a step forward and points to particular components of a person's biological makeup that may be at the root of the problem."

Construct Developed, Tested

To develop their construct and its numerical scoring system, Dr. Tarter's group tracked from childhood to young adulthood 47 boys at high average risk and 65 boys at low average risk of SUD based on their status as biological offspring of fathers with or without SUD as defined by the American Psychiatric Association's diagnostic criteria (DSM-III-R). The investigators limited this particular study to boys because the girls in their longitudinal research program were enrolled later and had not been followed long enough to make valid predictions and match the outcomes to them.

The neurobehavioral disinhibition construct was developed by assessing the children in the study using a series of existing tools that measure dysregulated emotions, behavioral undercontrol, and executive (higher order) cognitive capacity. To measure emotion, for example, the researchers used the "difficult" temperament index from the Revised Dimensions of Temperament Survey. They measured behavior "undercontrol" using two diagnostic tools, the Schedule for Affective Disorders and Schizophrenia for School-Age Children, as rated by the children's mothers, and the Disruptive Behavior Disorders Rating Scale, as measured by their teachers. A battery of neurological tests measured cognitive processes that depend on the prefrontal cortex.

The next step, verifying the construct by a statistical technique called factor analysis, confirmed that the separate components of neurobehavioral disinhibition—personality style, behavior, and brain function—tend to occur together. This suggests that neurobehavioral disinhibition is driven by a single process involving prefrontal cortex functioning. Says Dr. Tarter, "We are looking at the integrity of the brain by measuring its activities."

Index Predicts SUD Vulnerability

To test the hypothesis that the neurobehavioral disinhibition score is correlated with expected risk of future SUD, Dr. Tarter's team compared the scores of the high-risk boys in the study with those of the low-risk boys. The boys at higher risk had significantly higher scores at ages 10 to 12 on several, though not all, of the component indicators of neurobehavioral disinhibition. When the boys were tested again at age 16, the higher risk boys had scores consistent with neurobehavioral disinhibition on every component indicator of the trait.

Moreover, the boys' disinhibition scores at ages 10 to 12 predicted with nearly 70-percent accuracy whether they would actually develop SUD by age 19. Even more strikingly, their disinhibition scores at age 16, combined with their frequency of drug use in the previous 30 days, predicted with 85-percent accuracy their likelihood of developing SUD by age 19. In fact, the boys' disinhibition scores at age 16 were better predictors of SUD at 19 than the frequency of their drug use at age 16. In addition, their disinhibition scores were strongly predictive of the general severity of their problems as measured by the "overall problem density score" on the revised Drug Use Screening Inventory. This score includes health, behavior, school, family, and social adjustment problems.

The scores have both positive and negative predictive value, according to Dr. Tarter's research report. However, some of the data indicate that a high disinhibition score predicts that a boy will have SUD with a greater degree of probability than a low score predicts that he will avoid the disorder. The boys' high scores at age 16 predicted future SUD with 97-percent accuracy; on the other hand, low scores at this age predicted with only 61-percent accuracy that SUD would not develop.

Neurobehavioral Disinhibition: A Closer Look

The construct developed by Dr. Tarter and his colleagues includes many symptoms that characterize attention-deficit/hyperactivity disorder, conduct disorder, and oppositional defiant disorder. But it reaches beyond those diagnostic categories to describe emotional states and neurological capacities as well as their behavioral manifestations.

Compared to his peers, a "disinhibited" child can be described as "difficult." His (or her) moods are volatile, and he often exhibits restlessness and an inability to persevere in a task. Poor self-management often reveals itself in risky, even reckless behavior. Neurological tests reveal a lack of certain capacities that originate in the part of the brain that manages higher level thinking. Three dimensions of his problem are especially important:

- **"Difficult" temperament.** A disinhibited child is irritable and easily thrown off balance and has a harder time than other children returning to a comfortable emotional state after a stressful or arousing experience. His emotions seem to be more intense than those of his peers. These characteristics commonly provoke negative responses from adults and other children. If so, a vicious cycle can develop, and the child's reactions can become more extreme as time goes on.
- **Undercontrolled behavior.** The disinhibited child's behavior is chronically out of touch with the demands of the situation. He or she has a hard time meeting a school's learning requirements and does not relate easily to either adults or peers. He may engage in "externalizing behavior" or "acting out," typically through disruptiveness, unprovoked aggression, defiance of authority, or delinquency. His behavior is also marked by impulsivity and an inability to persist in pursuing his goals.
- **Deficiencies in complex brain functions.** The prefrontal cortex in the human brain manages an individual's purposeful activities. It is possible to measure a child's ability to pay attention, to remain aware of what is going on in the environment, and to complete a task or a coordinated sequence of actions. For example, researchers can see whether a child can turn away from a signal and deliberately look in the opposite direction when asked to do so. A disinhibited child will have trouble with this simple task, which requires deliberate control over eye movement, a capacity that resides in the prefrontal cortex.

Value of Findings Cited

"From NIDA's perspective, this research is a long-term investment," notes Dr. Conway. "Because it is a longitudinal study, Dr. Tarter and his colleagues have been able to gather a broad range of information about the boys, so that the effect of the multiple factors known to be related to SUD can be traced over time."

The next phase of the study will be especially interesting, because the first group of boys will have entered young adulthood, when SUD most often emerges. The researchers will continue to track the young men even as new participants join the study.

The findings should not be assumed to apply to all children, Dr. Tarter cautions. Before the trait can be considered universally valid and ready for use in working with children, much larger studies will be needed involving the general population, including both genders and diverse ethnic and socioeconomic groups.

"It is important that our new knowledge be used to bring about constructive change," Dr. Tarter adds. "An index of neurobehavioral disinhibition has potential value because it offers an opportunity to monitor children's development and detect those children with significant deviations, who may be at heightened risk of SUD. If teachers, counselors, and parents can identify a child's problems early, they can structure environmental conditions to promote a healthy outcome and avoid the path to SUD."

Source

- Tarter, R.E., et al. Neurobehavioral disinhibition in childhood predicts early age at onset of substance use disorder. *American Journal of Psychiatry* 160(6): 1078–1085, 2003. NN

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

Research Findings

Volume 18, Number 6 (February 2004)

School-Based Program Promotes Positive Behavior, Reduces Risk Factors for Drug Use, Other Problems

By Susan Farrer, *NIDA NOTES* Contributing Writer

Addressing a young student's classroom antics may do more than allow his teacher to get through a lesson. Comprehensive, school-based programs can reduce young children's antisocial behavior while boosting their social competency, academic performance, and commitment to school, recent NIDA-funded research suggests. Such programs hold promise for reducing risk factors for drug use, violence, school dropout, and other problem behaviors during adolescence, the researchers say.

Dr. Richard Catalano and colleagues at the University of Washington in Seattle evaluated initial 18-month results of the Raising Healthy Children (RHC) program, designed to reduce antisocial behaviors and academic failure while promoting prosocial behaviors by working closely with students and their teachers and parents. First implemented with NIDA funding in 1994, RHC offers children in grades 1 through 12 age-appropriate services at school and at home. This unique long-term intervention addresses key factors that affect a child's social development at each age and either protect against or increase the risk of drug use and other problems. The original RHC program participants, who were 1st- and 2nd-graders in 1994, are now in 11th and 12th grades and still participating in the program.

"Elementary school interventions are relatively rare but are potentially very powerful if we can determine exactly what the target risk and protective factors are and how to get to them early," notes Dr. Aria Crump of NIDA's Prevention Research Branch. "If we can intervene early—by addressing precursors to antisocial behaviors—then we're getting a head start on preventing problems."

RHC is founded on the social development model, which hypothesizes that elementary school children learn behavior patterns from teachers and peers at school as well as their families, with peer influence increasing as children age. The model also suggests that consistent patterns of socialization with prosocial individuals create social bonds that positively influence behavior. RHC strategies seek to engender consistent, positive socialization and prosocial development within children's classrooms, peer groups, and families.

Dr. Catalano, who with Dr. David Hawkins helped craft the social development model, notes that it emerged from a growing understanding of the developmental etiology of substance use and other problem behaviors. The model suggested that prevention interventions delivered to preadolescents might be effective.

"Longitudinal research has shown that risk and protective factors are present before adolescence and that we might set kids on a different developmental path if we can change these factors early in life," Dr. Catalano explains. "Building on this knowledge, our research focuses on incorporating a developmental approach into intervention efforts and addressing risk factors as they become salient."

The RHC program includes:

- Teacher workshops and booster sessions that support classroom instruction—proactive classroom management, cooperative learning methods, and techniques to improve children's interpersonal and problem-solving skills, for example—to reduce academic failure and early aggressive behaviors and enhance the protective factor of commitment to school.
- Parent training and involvement strategies implemented by school-home coordinators through parenting workshops and in-home family services to reduce family management problems, family conflict, and academic failure and enhance family bonding and clear standards for behavior.
- Summer camps and in-home services for students identified by teachers or parents as being at risk for academic failure or in need of enhanced social competence.

The RHC study included 938 1st- and 2nd-graders enrolled in 10 suburban public schools in the Seattle area in 1994. After the schools were paired by socioeconomic status and attendance patterns, one school in each pair was randomly assigned to the RHC group and the other to a control group.

Data were collected from classroom teachers and parents just before the study was launched and at the 6-month, 1-year, and 18-month marks. Additional data were gathered from students through simple surveys they completed 6 and 18 months after the study began. Teachers and parents rated children's antisocial behavior, social competency, academic performance, and commitment to school. Students rated their own antisocial behavior and social competency.

For purposes of this study, examples of antisocial behavior include intentionally breaking things, taking others' things, lying extensively, and initiating fights. Social competency includes, among other behaviors, understanding others' feelings, cooperating with peers, sharing things, and accepting responsibility for one's actions.

The Raising Healthy Children (RHC) program incorporates strategies for teachers, parents, and students in grades 1-12. RHC seeks to develop students' prosocial behaviors, lessen antisocial behaviors, reduce academic failure, and prevent adolescent problem behaviors, such as drug use and violence.

Students appear to have benefited from the RHC program after only 18 months of participation. The teachers' reports revealed that the intervention students were significantly more committed to school and had higher academic performance than students in the control group. According to the teachers, RHC students also displayed significantly more social competency than did control students, with social competency levels increasing for participants as they decreased for those in the control group. The teachers' reports also indicated that program students exhibited less antisocial behavior than their control group peers. Further, the rate of new displays of antisocial behavior declined in RHC students, whereas the rate in control students increased.

Parent-reported data confirmed that program students had significantly higher levels of academic performance and commitment to school than did the control group. However, neither the parent-reported nor student-reported data showed significant differences between the two groups in social competency and antisocial behavior after researchers controlled for gender, low income, and baseline conditions.

The investigators say the lack of parent-teacher agreement on items assessing children's behavioral outcomes is not surprising because this result is consistent with previous research. "Generally, if you look at studies involving teacher and parent reports, parents are less able to discriminate differences in behavior," Dr. Catalano says.

The differences in teachers' and parents' reports on prosocial behavior may relate to several factors. First, parents may not have as many opportunities as teachers do to see their children interact in structured environments. Second, parents may have less exposure to children's social behaviors, and their comparisons may be limited to a small group of their children's friends.

The researchers suggest that data collection issues may account for child-reported data not showing significant differences between program participants and nonparticipants in social competency and antisocial behavior. For example, the children's young age precluded asking them a sufficient number of questions to measure all of the relevant dimensions. In addition, data were not collected from the children before the intervention began, so data provided by parents were used as baseline measures.

"The significant findings are that the intended targets for intervention have been changed," Dr. Catalano observes. "On the risk side, it appears that we've reduced antisocial behavior and academic failure. On the protective side, we appear to have increased kids' social competency and commitment to school."

The researchers observe that the study provides only preliminary results of the longitudinal RHC intervention, and a NIDA-funded study of long-term RHC outcomes in middle school and high school students is now underway. With its encouraging initial findings, this research appears to support other evidence of the effectiveness of social development interventions in young children. Dr. Catalano notes that the RHC program replicates and

extends the Seattle Social Development Research Project (SSDP), but focuses on institutionalizing intervention practices school-wide. Evaluation of the SSDP showed short-term success in increasing academic performance and reducing violent behavior. It also showed long-term success in increasing academic performance and decreasing substance use, drug-selling, and other problem behaviors.

"Because we've tried to find ways to enhance implementation of the practices and update the practices, we really have a second generation of these studies," Dr. Catalano explains. "That makes it a stronger contribution than a single study. The message is that developmental prevention can work and can be replicated."

Sources

- Catalano, R.F., et al. Raising healthy children through enhancing social development in elementary school: Results after 1.5 years. *Journal of School Psychology* 41:143–164, 2003.
- Hawkins, J.D.; Catalano, R.F.; Kosterman, R.; Abbott, R.; and Hill, K.G. Preventing adolescent health-risk behaviors by strengthening protection during childhood. *Archives of Pediatrics and Adolescent Medicine* 153(3):226–234, 1999. NN

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

Research Findings

Volume 18, Number 5 (December 2003)

School Prevention Program Effective With Youths at High Risk for Substance Use

By Robert Mathias, *NIDA NOTES* Staff Writer

Science-based drug abuse prevention programs designed for all students in the same middle school grade have significantly reduced early use of alcohol, tobacco, and other substances. The benefits of these programs persist through later grades, resulting in reductions in substance use through high school. Originally developed and tested among white students in suburban schools, such universal prevention programs subsequently have been shown to deter racially diverse, multiethnic students in urban schools from initiating substance abuse. Now, a NIDA-supported study has shown that the prevention effects of one such program extend not only to students who are initially at low or moderate risk of early drug abuse, but also to those at higher-than-average risk of initiating substance abuse.

The study found that Life Skills Training (LST), a thoroughly tested, school-based, universal prevention program, significantly reduced initiation of drug use among urban, minority middle school students who were doing poorly academically and had substance-abusing friends. Previous research has linked these academic and social factors to increased risk of subsequent substance abuse. Yet 1 year after the LST program, these high-risk youths reported lower rates of cigarette, alcohol, and inhalant use than a comparable group of nonparticipating students. Moreover, LST participants who reported using these substances used them in lower amounts than nonparticipants.

"This study shows that a school-based universal prevention program, like LST, can have substantial prevention effects for diverse youths, regardless of their level of risk for substance abuse," says Dr. Gilbert J. Botvin, who developed the LST program and directs the Institute of Prevention Research at Weill Medical College of Cornell University in New York City. This finding counters the prevailing notion that while universal programs are effective with broad groups of youths, more targeted and tailored interventions are needed for high-risk youths, Dr. Botvin says.

In the study, Drs. Botvin and Kenneth W. Griffin, also of Cornell, tested the LST program's effectiveness in a controlled trial with minority, mostly African-American and Hispanic, inner-city students in 29 New York City schools. Schools were randomly assigned to receive either the LST program or the standard New York City substance abuse education curriculum. Regular classroom teachers delivered LST to participating 7th-graders in 15 sessions, each approximately 45 minutes long, that inculcated anti-drug norms and taught drug refusal, personal management, and general social skills.

After determining that the LST program substantially reduced early drug use among participants in the broad

Just in from the 2003 Monitoring the Future study:

- Use of any illicit drug declined significantly for 8th- and 10th-graders, for the second year in a row.
- MDMA (Ecstasy) use is down significantly among 8th-, 10th-, and 12th-graders.
- Marijuana use declined significantly among 8th-graders.
- Amphetamine and tranquilizer use are down among 10th- and 12th-graders.
- Steroid use declined among 10th-graders.
- Heroin and crack use remained mostly stable, with some decline among 10th-graders.
- Lifetime cigarette use dropped in all three grades, and past-month use was down among 12th-graders.
- Alcohol use was unchanged in 2003, after declining in 2002.
- Increases in past-year inhalant use by 8th-graders signal a potential problem.
- Use of Vicodin, the illicit drug most used after marijuana, and Oxycontin are high enough to raise concern.

MTF is an annual survey conducted by the University of Michigan under a NIDA grant. Since its launch in 1975, the study has surveyed high school seniors; 8th- and 10th-graders were added in 1991. The 2003 sample includes 48,467 public and private school students from 392 schools.

student population, the researchers focused on a subgroup of 426 students identified as being at higher-than-average risk of initiating substance abuse. These students had Cs or lower grades and friends who used both alcohol and tobacco. The study also identified and tracked a control group of 331 students with a similar high-risk profile.

Baseline assessments found no significant differences in substance abuse rates between the two groups prior to the intervention. Assessments conducted 1 year later found lower rates of smoking, drinking, and inhalant and polydrug (multiple substance) abuse among participants than were seen in students in the control group. For example, 22.1 percent of control students reported smoking in the past month, compared with 15 percent of students who participated in the LST program—almost a one-third reduction in the rate of smoking. Similarly, compared with controls, program participants had a 20.8 percent lower rate of drinking, a 21.1 percent lower rate of marijuana abuse, a 90.5 percent lower rate of inhalant use, and a 30.5 percent lower rate of polydrug abuse.

Students who participated in the LST program also had lower scores than did control students in composite measures of the frequency and quantity of smoking, drinking, and inhalant and polydrug abuse in the past month. Significant program impact on marijuana abuse was not found in composite measures or in rate of use 1 year after the program ended.

Additional research is needed to determine whether the initial prevention effects LST achieved in this study will lead to later reductions in more severe levels of drug abuse among high-risk youths, Dr. Botvin says. However, his past research has shown that LST's initial reductions in experimental substance abuse in general populations of students resulted in later reductions in pack-a-day cigarette smoking and polydrug use. A more recent study by Dr. Botvin extended this finding of LST's long-lasting prevention effects to the incidence of binge drinking (three or more drinks per episode) in later years among inner-city minority youths. "The proportion of binge drinkers was more than 50 percent lower in the intervention group than in the control group at both the 1-year (8th grade) and 2-year followup assessments," he notes.

"We are not saying that a universal prevention program eliminates the need for more targeted prevention and treatment programs down the line that meet the specific needs of high-risk kids who already have more severe drug and alcohol abuse problems," Dr. Botvin cautions. "Rather, we are saying that this body of research culminating in our study of high-risk students shows the utility of a universal prevention approach for reducing initial substance use across the board from lower to higher risk white and minority youths in suburban and inner-city schools. By doing that, you'll likely also reduce more severe levels of later drug involvement."

Prevention Program Reduces Substance Abuse Rates Among High-Risk Students

Substance	LST Participants	Control Group
Cigarettes	15%	22.1%
Alcohol	16.4	20.7
Marijuana	11.2	14.2
Inhalants	0.2	2.1
Polydrug*	12.6	19.7

** Past-month use of multiple substances.*

One year after participating in the Life Skills Training program, urban minority students at high risk for substance use reported lower rates of past-month substance use than peers who did not participate in the program.

Sources

- Botvin, G.J., et al. Preventing binge drinking during early adolescence: One- and two-year follow-up of a school-based preventive intervention. *Psychology of Addictive Behaviors* 15(4):360–365, 2001.
- Griffin, K.W.; Botvin, G.J.; et al. Effectiveness of a universal drug abuse prevention approach for youth at high risk for substance use initiation. *Preventive Medicine* 36(1):1–7, 2003. NN

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

Research Findings

Volume 18, Number 4 (November 2003)

NIDA-Funded Research Drives Revision of Guide to Prevention Programming

NIDA has released the second edition of its highly regarded *Preventing Drug Use Among Children and Adolescents: A Research-Based Guide for Parents, Educators, and Community Leaders* in the fall of 2003. Like the first edition, published in 1997, this booklet offers parents, educators, and community leaders, as well as prevention practitioners, the latest findings from NIDA-funded prevention research. Accompanying this edition is an *In Brief* companion piece for quick reference. The goal of both publications is clearly defined: to help communities apply the findings from research-based prevention studies in addressing drug use among children and adolescents.

In the last 5 years, NIDA's prevention research program has more than doubled in size and scope to address all stages of youth development, a mix of audiences and settings, and the delivery of effective services at the community level. Research funded by NIDA and other Federal research organizations—such as the National Institute of Mental Health and the Centers for Disease Control and Prevention—shows that early intervention can prevent many adolescent risk behaviors.

NIDA-funded research has identified interventions that can minimize or prevent risks for drug abuse and other problem behaviors that can occur at every step along a child's development path. Working with families, schools, and communities, scientists have found effective ways to help people gain skills and learn strategies that can stop problem behaviors before they occur and strengthen factors that protect youths from vulnerability to drug use.

Sixteen fundamental prevention principles, derived from research on effective prevention programs, frame the guide's discussion. Using a question-and-answer format, the booklet addresses

- key factors that place youths at risk for drug use, as well as those that confer protection;
- how to plan prevention programs tailored to community needs; and
- core elements of effective programs, which should be retained when adapting programs to match a community's characteristics.

Community Action Box

PARENTS can use information on risk and protection to help them develop positive preventive actions (e.g., talking about family rules) before problems occur.

EDUCATORS can strengthen learning and bonding to school by intervening early to address aggressive behaviors and poor concentration—risks associated with later onset of drug use and related problems.

COMMUNITY LEADERS can assess community risk and protective factors associated with drug problems to appropriately target prevention services.

Example of a Community Action Box, offering straightforward tips on how parents, educators, and community leaders—the guide's primary readers—can apply the information found in each chapter.

Each chapter ends with a "Community Action Box" that provides clear advice to parents, educators, and community leaders on how to apply that chapter's information.

The revision also describes more than 20 prevention programs, tested and proven in controlled trials by researchers throughout the Nation. Programs are described by the setting where they are implemented—*the family, school, or community*—and by the audience they target—all youths (*universal programs*), those at greater risk (*selective programs*), and those already involved with drugs or other problem behaviors (*indicated programs*). Some of the programs described are tiered, targeting more than one audience. Selected resources and references point to additional information to guide program planning and implementation.

To view additional NIDA publications and videos on drug abuse prevention, visit www.drugabuse.gov/PubCat/PubsIndex.html and select "Preventing Drug Abuse." NN

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

Research Findings

Volume 18, Number 3 (October 2003)

NIDA National Prevention Research Initiative Begins Broad Range of Studies

By Robert Mathias, *NIDA NOTES* Staff Writer

NIDA's National Prevention Research Initiative (NPRI) has embarked on the next generation of prevention research. NIDA launched the comprehensive initiative last year with three requests for research that could accelerate the development of new approaches to preventing drug abuse and the adoption of research-based programs by communities in the United States. Now, a broad range of newly funded studies has put NPRI on a fast track to achieving its goals. The studies range from basic behavioral research to large-scale trials of proven prevention programs.

One recently funded study under the National Prevention Research Initiative seeks to identify more effective prevention strategies for high-sensation-seeking youths, whose strong need for stimulation places them at heightened risk for substance abuse. The study is examining how this population's motivation to seek reward affects how they respond to drug abuse prevention messages.

"We already have many interventions and prevention strategies that we know work," says Dr. Elizabeth Robertson of NIDA's Division of Epidemiology, Services and Prevention Research. "Instead of continuing to focus research on developing similar programs, NPRI is breaking new ground in all areas of prevention research. Basic studies are looking at fundamental features that could be incorporated into new prevention approaches. Comprehensive research centers are tapping knowledge from multiple scientific disciplines and applying them to innovative prevention approaches. And large-scale field trials are studying the implementation of research-tested programs at multiple sites with diverse populations."

Recently funded studies within each of three NPRI complementary components include the following efforts.

Basic Prevention Research

Studies in this arena seek to increase understanding of fundamental aspects of human behavior. Research findings will point to possible new prevention approaches or ways to improve existing programs. For example, more effective approaches are needed for youths with a strong need for stimulation that drives them to pursue new and thrilling experiences. These high-sensation-seeking (HSS) youths are known to be at increased risk for substance abuse. One of the first basic NPRI grants is a communications study assessing how basic differences in HSS youths' motivation to seek reward or avoid harm affect their responses to drug abuse prevention messages. Findings from this small lab study could aid the design of more precisely targeted media messages to deter drug use among youths with this personality trait.

Transdisciplinary Prevention Research Centers (TPRCs)

TPRCs will focus the collaborative efforts of neuroscientists, behavioral and cognitive scientists, and drug abuse prevention researchers on a specific research area that has the potential for producing new approaches to drug abuse prevention. Working as a team, TPRC scientists will synthesize and translate basic science discoveries in these areas into new prevention approaches. They will also study the underlying biological, psychological, and social processes that account for the outcomes of successful research-based programs and develop and test new prevention hypotheses based on their findings.

Late last year, NIDA awarded $6.5 million to the University of Southern California's Keck School of Medicine in Los Angeles to establish the first TPRC. This Center is conducting basic research on memory, cognition, and peer group dynamics. For example, one study is assessing how a prevention program that has shown it can

reduce drug use affects memory associations and unconscious thought processes that trigger drug use. Better understanding of the underlying behavioral states and thought processes that influence the program's efficacy could be applied to developing new prevention approaches or refining existing programs. NIDA is continuing to solicit applications to establish additional TPRCs.

A University of Oregon field trial is using USDA's Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) as a vehicle for delivering a family drug abuse prevention program to rural, suburban, and urban communities.

Large-Scale Community Prevention Field Trials

Field trials bring together researchers, State and local agencies, and prevention practitioners to identify the processes and mechanisms that contribute to the successful implementation and sustainability of science-based interventions in a range of settings. Late last year, NIDA awarded more than $4.5 million in grants for four field trials. Each trial is implementing a research-proven prevention intervention in a variety of communities. For example, a University of Oregon study is integrating a family drug abuse prevention program that focuses on improving parenting practices into the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) in rural, suburban, and urban communities. WIC is a nationwide U.S. Department of Agriculture program that provides nutritional and other assistance to low-income women who are pregnant or have young children. The study is examining how the characteristics of program participants and the settings in which the program is delivered affect program implementation and effectiveness.

Other field trials will

- Test whether school staffers in several different urban settings can effectively deliver a delinquency and substance abuse prevention program targeting 5th- and 6th-graders who exhibit early signs of aggressive behavior.
- Study how using onsite and remote training and technical assistance approaches affects the costs, accuracy, and effectiveness of implementing a school-based program in middle schools.
- Examine systemic barriers to successfully implementing a parent-focused program in government-sponsored health programs on a countrywide scale in 435 municipalities in Norway. This international collaboration should answer questions about how cultural adaptation affects the program and whether government-sponsored health programs and municipalities can train large numbers of social workers, psychologists, and health workers to deliver the program accurately and effectively. NN

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

Research Findings

Volume 18, Number 3 (October 2003)

Multiculturalism at Least as Effective as Cultural Specificity in Test of Prevention Program

By Jill Schlabig Williams, *NIDA NOTES* Contributing Writer

A multicultural version of a substance use prevention program tested in middle schools in Phoenix, Arizona, proved at least as effective as culturally targeted versions, according to recent research by Drs. Michael L. Hecht, Michelle Miller-Day, and Flavio Marsiglia and colleagues at Pennsylvania State University and Arizona State University. The NIDA-funded researchers compared a multicultural version of a drug prevention program—which included cultural values from all of the groups participating in the program—to two culture-specific programs. The latter programs are based on the hypothesis that messages matched to the student's culture are more effective than messages that are not culture-specific.

"This is good news for the future of drug prevention in schools serving culturally diverse students," says Dr. Hecht. "It is very difficult logistically to deliver culture-specific programs in culturally diverse schools. Multicultural programs are much easier to deliver, and now we find that they're also as effective as culture-specific programs."

Research has shown that students respond better to drug prevention programs when they see their culture and images of themselves represented in the prevention message. Moreover, minority youth respond favorably to programs that feature a teacher or characters from their own ethnic group.

"We know that kids need to see something of their own lives and cultures reflected in the programs," Dr. Hecht explains. "But we wanted to test the effectiveness of multicultural prevention programs and compare their effectiveness to selectively targeted or matched interventions."

The prevention program, dubbed "keepin' it R.E.A.L.", is a school-based intervention targeting substance use among urban middle schoolers. Its goals are to reduce use of alcohol, cigarettes, and marijuana; promote antidrug norms and attitudes; and develop effective drug resistance decisionmaking and communication skills. Through NIDA funding, "keepin' it R.E.A.L." was developed, tested, and evaluated in 35 middle schools in Phoenix. Designed to reflect aspects of the adolescents' cultures and learning styles in content and format, it includes 10 classroom lessons that promote antidrug norms and teach substance use resistance skills, life skills, risk assessment, and decisionmaking skills. The intervention was reinforced by a public service announcement radio and billboard campaign and by booster activities.

Three versions of the curriculum were created and delivered: one based on Mexican-American culture, one based on African-American and European-American culture, and a multicultural version using five lessons from each of the other two versions. The large proportion of Mexican or Mexican-American students (approximately 74 percent) in the study population contributed to the choice of Mexican-American culture for one curriculum version.

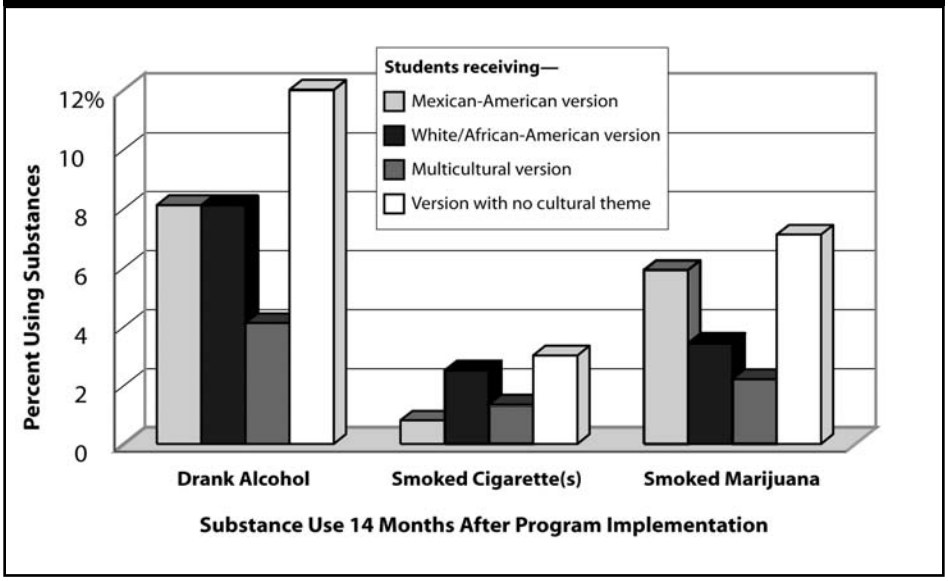
"In developing this program, we studied the process by which kids resisted drugs and used a narrative approach to teach these skills to other kids. The whole program is from youth through youth for youth," observes Dr. Hecht. Stories of drug resistance were collected from adolescents in each ethnic group and used to write scripts for videos that were then performed and videotaped by local high school students. These 10 videotapes (5 for the Mexican-American version, 5 for the African-American/European-American version) form the core of the program. They teach resistance skills through enactments of successful drug resistance in recognizable locales, by youths similar to the students in age and ethnicity.

The lessons' content is built on previous research on what is effective in drug prevention. In addition, researchers

infused the curriculum with cultural norms and values that are predominant within certain groups—for example, the value of family to Mexican Americans, respect to African Americans, and individualism to European Americans. Affirming these values can help students use familiar behaviors and attitudes to resist drugs. The curriculum emphasizes family and cultural norms that discourage behaviors like drug use, equipping students with the skills to tap their social support systems to effectively resist drug offers.

"We don't generalize about the cultures. We give them stories. We show them scenarios that come from their mouths. It's always a specific situation, with no moralizing," says Dr. Hecht.

Multicultural Intervention Had Greatest Impact on Substance Use Initiation



The multicultural version of the intervention program "keepin' it R.E.A.L." had the greatest positive impact on initial substance use over the course of the study, compared to controls and to the culture-specific versions. Students who participated in the multicultural version of the program had the smallest increase in alcohol or marijuana use and the second smallest increase in cigarette use from the initial preintervention survey to the final postintervention survey, 14 months after implementation of the curriculum.

In the fall of 1998, 25 Phoenix middle schools were randomly assigned to one of the three versions of the curriculum, and 10 schools were assigned to the control condition. Schools in the control condition received other drug prevention programs already planned for those schools, including a statewide antitobacco campaign. The research team administered a preintervention survey to all participants and then implemented the curriculum in 7th-grade classes in the 25 treatment schools. Followup surveys were conducted 2 months, 8 months, and 14 months after curriculum implementation. Surveys included questions on demographics; recent alcohol, cigarette, and marijuana use; use of resistance strategies learned in the program; antidrug norms; and intentions to accept substances. The final sample included 6,035 students, of whom 55 percent were Mexican American, 17 percent were non-Hispanic white, 9 percent were African American, and 19 percent were of other Latino or multiethnic Latino origin.

The results showed that the interventions were significantly more effective than the control condition, with statistically significant effects on the use of gateway drugs (alcohol, tobacco, and marijuana) and on norms, attitudes, and use of resistance strategies. Students participating in any of the three test versions reported better behavioral and psychosocial outcomes related to substance use than did the control students. Although use of alcohol, cigarettes, and marijuana increased over time for both sets of students, the rate of increase was significantly less for students who participated in the intervention. Those students also reported adopting more resistance strategies.

When researchers compared the three versions of the curriculum against the control group, they found that the Mexican-American and multicultural versions of the curriculum had far more significant effects over the course of the study. Students who participated in the multicultural curriculum had, on average, the smallest increases in use of alcohol and marijuana from pretest to final posttest, and the second-smallest increase in use of cigarettes. The Mexican-American and multicultural versions of the program had positive effects on several of the psychosocial outcomes studied, including intent to refuse substance offers and antidrug attitudes for themselves and their friends.

To determine if matching program content to a student's ethnicity enhanced program outcomes, the researchers used the students' ethnic self-labeling to categorize them as matched to the curriculum they received, mismatched, or mixed (i.e., various ethnicities receiving the multicultural program). Very few significant differences in program effectiveness emerged; therefore, the researchers found little support for the cultural matching hypothesis.

"We created an intervention that worked, and we found that the multicultural version worked as well as—or better than—the culture-specific versions," says Dr. Hecht. "We found that it is not necessary to ethnically segregate students into narrowly tailored programs to achieve effectiveness. Rather, it is critical to incorporate a representative level of relevant cultural elements."

The Center for Substance Abuse Prevention has recently added the "keepin' it R.E.A.L." curriculum to its National Registry for Effective Prevention Programs, recognizing it as an effective program and making it available to middle schools across the country for implementation. In the future, Dr. Hecht and his colleagues plan to study the effectiveness of offering intervention programs to students as early as 5th grade. They also plan to look at the process of acculturation, examining how Mexican-American youth make the transition to a new culture and language, how that process puts them at risk for increased drug use, and how to combat those risks.

"This is one of the first studies to compare multicultural and culturally specific substance abuse prevention approaches," says Dr. Aria Davis Crump of NIDA's Division of Epidemiology, Services and Prevention Research. "This research highlights the importance of continuing efforts to better understand how to effectively provide prevention services in a culturally diverse society."

Source

- Hecht, M.L., et al. Cultural grounding in substance use prevention: An evaluation of the Drug Resistance Strategies intervention. *Prevention Science,* in press.

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A Name to Remember: "keepin' it R.E.A.L."

Preliminary research identified four strategies adolescents use to successfully resist offers of substance abuse:

- Refuse by verbalizing simple "no" statements.
- Explain by elaborating reasons for refusing.
- Avoid situations known to involve alcohol, tobacco, or other drugs.
- Leave the environment once substance use enters the picture.

These strategies constitute the acronym "R.E.A.L.," which students later translated into "keepin' it R.E.A.L." Each of the four videos focused on one of these strategies, and an introductory video was added to kick off the program.

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

Research Findings

Volume 18, Number 2 (August 2003)

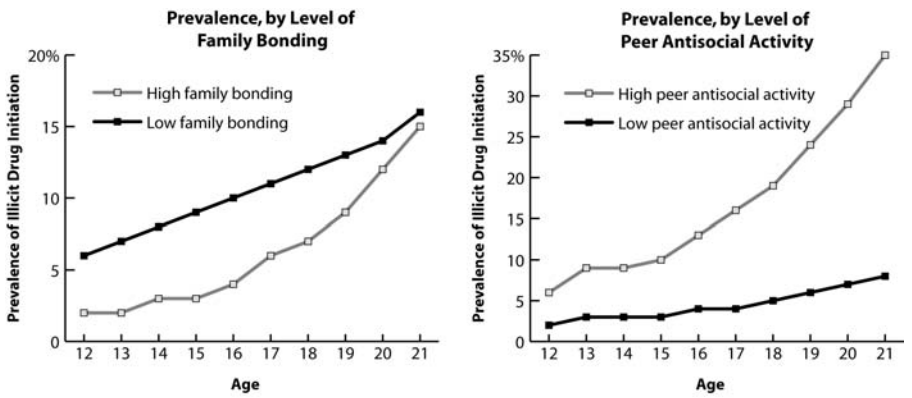
Relationships Matter: Impact of Parental, Peer Factors on Teen, Young Adult Substance Abuse

By Arnold Mann, *NIDA NOTES* Contributing Writer

The influence of family and peers on adolescent substance abuse has been well documented in the scientific literature. Generally, positive family influences, such as family bonding and consistent rules, appear to reduce the risk of tobacco, marijuana, and other drug abuse among teens, while negative family influences tend to increase risk. The same is true of positive and negative peer factors. Little research, however, has been conducted to see how parental and peer factors interact to influence adolescents' initiation to and young adults' use of drugs.

Two new NIDA-funded studies—one looking at initiation of substance use, the other at continued substance abuse—show that some aspects of family and peer influences remain potent from early initiation into young adulthood and across socioeconomic, ethnic, and gender lines. Both studies yielded surprises and implications for intervention. For example, the first study found that although family and peer factors had similar effects on males and females, family monitoring and rules had a stronger protective effect for males than females. The second study found that for either gender, peer influence was not mediated by the quality of the relationship, except for female peer influence on young adult marijuana use.

Family Bonding and Peer Antisocial Activity Impact Drug Initiation Among Adolescents



Source: Guo, J., et al., *Journal of the Academy of Child and Adolescent Psychiatry*, 2002.

Low levels of family bonding and high levels of peer antisocial activity were consistently associated with higher prevalence of illicit drug initiation among youths ages 12 to 21 compared with prevalence seen when high levels of family bonding and low levels of peer antisocial activity were present. By age 21, however, a high level of family bonding had far less impact than in earlier years on adolescent drug initiation.

Impact of Family on Teens' Initiation to Drugs

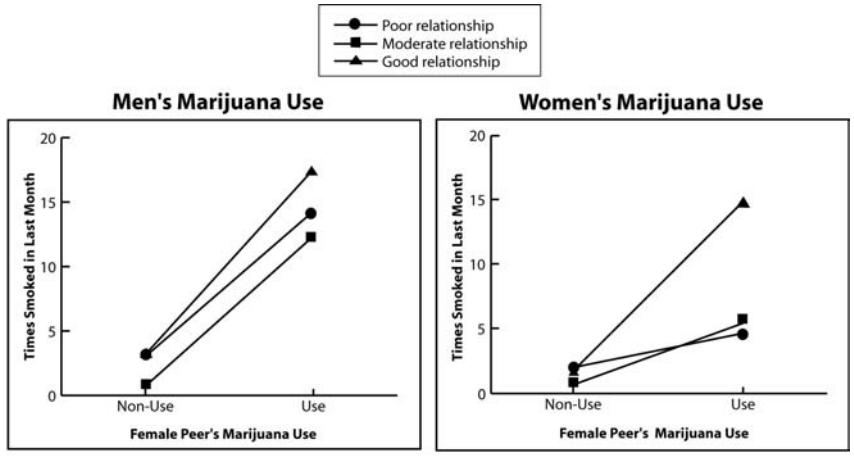
University of Washington researchers recruited 808 5th-graders from 18 Seattle elementary schools in high-crime areas and followed them from ages 12 to 21 to see how peer, family, and sociodemographic factors interacted to influence drug initiation.

As part of an ongoing NIDA study directed by Dr. J. David Hawkins, data from this group were gathered annually through age 16 and again at 18 and 21. The sample included a high proportion of low-income families, "but not all children came from homes in high-risk neighborhoods," says Dr. Karl Hill, one of the study's authors. Of concern were the extent of bonding to family, family involvement (time spent interacting with parents), family conflict resolution and parenting practices (monitoring, rules, and consistent discipline), peers' prosocial and antisocial activities, and measures of use for tobacco, marijuana, cocaine, amphetamines, tranquilizers, sedatives, and psychedelics.

Initiation of illicit drug use for the entire study group was 4.6 percent by age 12, 8.4 percent by age 13, 12.6 percent by age 18, and 40.5 percent by age 21. By age 21, 45.4 percent of male participants had initiated illicit drug use, as had 35.5 percent of females. Native Americans had the highest rate of initiation, at 55.9 percent, compared to 53.6 percent of European Americans, 33.3 percent of African Americans, and 14.6 percent of Asian Americans.

All of the measured family factors were influential, with the terms low level referring to families in the lowest 10 percent for a specific factor and high level referring to those in the highest 10 percent. Higher levels of family monitoring and rules were associated with a "significantly" lower risk of illicit drug initiation, according to Dr. Hill. For example, youths with low levels of family monitoring and rules at age 18 were twice as likely (14 percent versus 7 percent) to initiate illicit drugs as those with high family monitoring. The same was true for a higher level of moderate and consistent family discipline—youths with low consistent family discipline were over twice as likely (15 percent versus 6 percent) at age 18 to initiate illicit drugs as those with high consistent family discipline.

Quality of Female Peer Relationship Impacts Young Adult Marijuana Use



Source: Andrews, J.A., et al., Health Psychology, 2002.

Each participant brought one same-sex and one opposite-sex peer into this study; participants who were married brought their spouse as their opposite-sex peer. The quality of the relationship with a female peer was a factor in young adults' marijuana use; with young adults' use of other substances, however, the quality of the peer relationship was not a factor.

Family bonding was particularly influential before the age of 18—youths with low family bonding at age 15 were three times more likely (9 percent versus 3 percent) to initiate illicit drugs than those with high family bonding. Higher levels of family conflict were associated with a higher risk of initiation. For example, youths with high family conflict at age 18 were over twice as likely (15 percent versus 6 percent) to initiate illicit drugs as those with low family conflict. High levels of peer antisocial activity, especially after age 15, found youths at age 18 nearly four times as likely (19 percent versus 5 percent) to initiate illicit drugs as those with low antisocial peer influence (in the bottom 10 percent).

Family monitoring and rules seemed to reduce the risk of initiation primarily by affecting the child's choice of peer groups. "Some family factors operate through peers and some are independent of peer groups," Dr. Hill explains. "Kids with low bonding to parents are more likely to get involved with narcotics and stimulants, even if they don't hang out with bad peers. So you end up with this set of independent risks with high family conflict, low bonding, and bad peer involvement. All these things stack the deck toward initiation of serious drug use.

"In general, family and peer factors had similar effects on boys and girls," Dr. Hill observes. "Only family monitoring and rules had a stronger protective effect for males than for females." Family monitoring and bonding were more predictive for European Americans than for African Americans. Otherwise, says Dr. Hill, "family and peer factors affecting illicit drug initiation were similar across gender and ethnic groups."

The message is clear: Family factors matter. "The impact of only one factor—family bonding—begins to decline after age 18," Dr. Hill says. Peer factors also matter. Having antisocial peers, especially after age 15, increases the risk of drug initiation. "Both sets of influences contribute," he says, "even after controlling for sociodemographic background and prior alcohol, tobacco, and marijuana initiation."

In terms of intervention, "family and peer factors should be important targets for preventive efforts," Dr. Hill says. The effort should start early and continue into the twenties, emphasizing family bonding early and family monitoring, rules, and reduction of conflict throughout. "Programs that address these family and peer factors should work relatively well across gender and ethnic groups," he concludes.

Influence of Peers on Young Adults' Substance Abuse

Another NIDA-funded study took a slightly different path, looking at peer influence on young adults. As part of a long-range study led by Dr. Hyman Hops of the Oregon Research Institute in Eugene, Oregon, the researchers gathered data from 294 participants ages 19 to 25. Each participant brought one same-sex and one opposite-sex peer into the study; those who were married brought their marital partner as their opposite-sex peer. Data gathered annually for 3 years included the quality of these relationships, the extent of any substance abuse, and the problems associated with drug use.

At the beginning of the study, 30 percent of the 294 participants had smoked cigarettes, 29 percent had smoked marijuana in the previous month, 10 percent had used other illicit drugs, and 41 percent reported problems associated with drug use in the previous 12 months. Thirty-nine percent had not used any drugs in the period specified. Men who smoked marijuana did so, on average, more often than female marijuana smokers did—an average of 5.5 times per month versus women's average of 2.7 times a month. "Other differences between genders were not significant," says Dr. Judy Andrews, lead author of the Oregon team. "Correlations between various substances were moderate."

Use of drugs by male peers positively influenced subsequent use by both men and women. "I expected females, in general, to be more influenced by males than by females," Dr. Andrews says, "and we found that to be true only in cases where the user reported problems associated with drug use. For example, friends of both genders also influenced both males' and females' subsequent cigarette smoking."

Another surprise emerged in the effect of good versus bad peer relationships. In general, the quality of the relationship with the friend did not matter when it came to substance use. "We expected that peer influence would be mediated by the quality of that relationship," explains Dr. Andrews. "If you don't like somebody, why would you emulate him or her? But we found this effect only with marijuana use when the peer was female. Good female friends influenced the marijuana use of both males and females. But if the good friend was male, he did not influence the marijuana use of either his male or female friend."

Again, the overall message is clear: Young adults are influenced by their friends. "It's an important finding," observes Dr. Andrews. "Interventions with substance-abusing young adults should not only be with individuals, but with their peers as well."

"We are continuing to see family and peer effects into early adulthood," says Dr. Kathleen Etz of NIDA's Division of Epidemiology, Services and Prevention Research. "People assume that families become less important as kids move out of the house, and this does not appear to be the case.

"Many of our interventions target adolescents and very few target young adults. Given that in the Oregon Research Institute study marijuana use was initiated after high school, it's clear that we have to look more carefully at interventions for young adulthood."

Sources

- Andrews, J.A.; Tildesley, E.; Hops, H.; and Li, F. The influence of peers on young adult substance use. *Health Psychology* 21(4):349–357, 2002.
- Guo, J.; Hill, K.G.; et al. A developmental analysis of sociodemographic, family, and peer effects on adolescent illicit drug initiation. *Journal of the Academy of Child and Adolescent Psychiatry* 41(7):838–845, 2002.

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Research Findings

Volume 17, Number 6 (March 2003)

Few Middle Schools Use Proven Prevention Programs

By Patrick Zickler, *NIDA NOTES* Staff Writer

Since 1994, U.S. schools have been able to use Federal funds to provide education programs designed to prevent drug abuse. Under amendments to the Safe and Drug-Free Schools and Communities Act (SDFSCA) in 1998, however, the schools receiving Federal grants for drug abuse prevention were required to use an evidence-based curriculum. There are several such curricula, incorporating elements proven to be effective in reducing teen drug use: information about the effects of illicit drugs, alcohol, and nicotine as well as information about social influences, refusal skills, assertiveness, and decisionmaking.

Most Middle School Prevention Programs Don't Combine Effective Content and Delivery

Criterion	Percentage of Programs/Instructors Meeting the Criterion
Effective Use of Content Some or most sessions include knowledge about drugs and alcohol, refusal skills, and generic skills such as decisionmaking, communication, assertiveness, and social skills.	62%
Effective Delivery Some or most sessions involve interactive methods such as role-playing.	17
Content and Delivery Combine effective content with effective delivery.	14

Of 1,795 instructors surveyed, only 1 in 7 (14 percent) provided programs that combined effective content with effective delivery in some or most sessions as defined in the Safe and Drug-Free Schools and Communities Act's "Principles of Effectiveness."

In 1999, shortly after the SDFSCA amendments took effect, NIDA-supported researchers found only one in four middle schools that offer drug abuse prevention programs met standards set in the Principles of Effectiveness. Dr. Christopher Ringwalt of the Pacific Institute for Research and Evaluation in Chapel Hill, North Carolina, Dr. Susan Ennett of the University of North Carolina, and colleagues surveyed more than 1,900 U.S. middle schools to assess the use of evidence-based programs. They found, Dr. Ringwalt says, that relatively few schools appear to consider research results when selecting programs. "Only about a third of the Nation's public schools and one-eighth of private schools are using substance prevention curricula for which there is evidence of effectiveness," he says.

The 1,656 public and 249 private schools surveyed all include some or all middle school grades (5 through 8). Respondents identified, from a list of 51 prevention programs, which program their school used. Programs on the list included 10 research-based programs identified as effective in reviews published by NIDA, the Center for Substance Abuse Prevention (CSAP), the Centers for Disease Control and Prevention (CDC), the Safe and Drug Free Schools Program of the U.S. Department of Education (SDFSP), or Drug Strategies, Inc. (DSI). The researchers also asked instructors to respond to questions about how the program was taught in the classroom.

Project Alert—identified as effective by CSAP, DSI, and SDFSP—was used by 19 percent of public and 6 percent of private schools. Life Skills Training—identified as effective by NIDA, CSAP, CDC, DSI, and SDFSP—was used by 12 percent of public and 3 percent of private schools. The most prevalent curriculum—used by 53 percent of public and 54 percent of private schools—is DARE (Drug Abuse Resistance Education), which has been extensively evaluated and found to be ineffective, Dr. Ringwalt observes.

Responses to questions about how the programs are taught suggest that only one school in five uses them to maximum advantage, according to Dr. Ennett. "To be successful, prevention programs need more than effective content," Dr. Ennett explains. "They also must be delivered effectively, by instructors who involve students in role-playing and other interactive, participatory activities.

Unfortunately, we found that only about 21 percent of instructors used effective, interactive delivery."

In all, the researchers summarize, only one school in seven offers prevention programs that incorporate elements proven to be effective and delivers the content in the most effective way.

These findings paint a discouraging picture, observes Dr. Elizabeth Robertson of NIDA's Prevention Research Branch, but it may be improving. "Dr. Ennett and Dr. Ringwalt gathered their data only a year or so after the Department of Education issued the Principles of Effectiveness that could help schools select the most effective prevention programs. It's likely that more schools are now using materials that meet the guidelines for demonstrated effectiveness," Dr. Robertson says. "And instructors working with effective programs are likely to deliver the program content effectively. When both content and delivery are combined day-to-day in the classroom, we should begin to see, in studies such as the annual Monitoring the Future survey, major reductions in substance abuse among school-age youth."

Sources

- Ennett, S.T., et al. A comparison of current practice in school-based substance abuse prevention programs with meta-analysis findings. *Prevention Science,* in press.
- Ringwalt, C., et al. The prevalence of effective substance abuse prevention curricula in U.S. middle schools. *Prevention Science* 2(4):257–265, 2002. NN

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

Research Findings

Volume 17, Number 5 (January 2003)

Grouping High-Risk Youths for Prevention May Harm More Than Help

By Jill Schlabig Williams, *NIDA NOTES* Contributing Writer

Grouping high-risk youths in early adolescence may inadvertently reinforce problem behavior, according to a NIDA-funded study by researchers Dr. Thomas Dishion and his colleagues at the University of Oregon Child and Family Center. They found that 11- to 14-year-olds at high risk for drug abuse and increasingly serious delinquency who were grouped together for a 12-week program designed to reduce problem behavior actually increased their levels of self-reported smoking and teacher-reported delinquency over 3 years. These youths exhibited significantly worse behaviors than similarly at-risk youths who were given prevention materials to study by themselves individually or received no intervention at all.

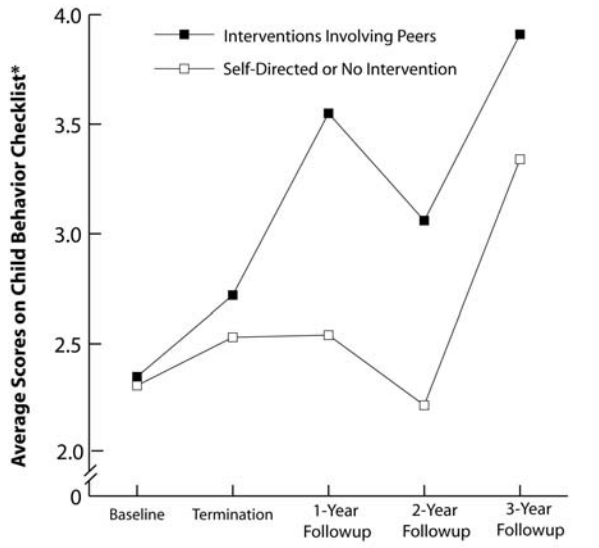
These findings raise important questions about the common practice of grouping high-risk, aggressive, or antisocial adolescents together in interventions. The results are consistent with a number of studies elucidating negative peer dynamics within high-risk youth groups.

"The failure of some very sophisticated interventions to improve behavior has been a mystery in the field for many years," says Dr. Elizabeth Robertson, chief of NIDA's Prevention Research Branch. "Now, this research from Dr. Dishion offers some clues to help us understand what's going on."

The youths originally took part in a 12-week cognitive-behavioral intervention called the Adolescent Transitions Program (ATP), designed by Dr. Dishion and his colleagues. ATP aimed to improve the behavior of young adolescents identified by their parents as having problems in at least four of the following risk areas: closeness to parents, emotional adjustment, academic engagement, involvement in positive activities, experience-seeking behaviors, substance use, having friends who use substances, or family substance use history. The study was designed to compare the effectiveness of intervention approaches focusing on parental influence and on peer influence.

A total of 158 at-risk youths (83 boys and 75 girls) aged 11 to 14, enrolled in grades 6 through 8, were randomly assigned to a parent-only group intervention, a peer-only group, a parent-and-peer group, or control conditions that involved no group meetings. The control group received reading materials and videotapes or else no intervention at all.

Problem Behavior Increases Following Peer Group Intervention



*Rates problem behavior with respect to 20 items including school functioning and participation in sports, hobbies, friendships, jobs, other activities.

Teacher reports of problem behavior among the 11- to 14-year-olds in the prevention study showed that adverse effects of the peer-group interventions extended to 3 years after the end of the study period. A score of 0 would indicate a student is seen as never engaging in problem behavior; the maximum in this study, a score of 12, indicates several problem behaviors reported.

All of the group interventions used discussion and role-play to build skills in managing emotions, setting limits, building relationships, and refusing drug offers. Parent-family management practices and communication skills were the focus of the parent-only intervention. Researchers followed study participants at 1, 2, and 3 years postintervention, looking at teacher reports of delinquency and the participants' self-reports of frequency of tobacco use—confirmed by assessment of expired carbon monoxide levels.

At the end of 12 weeks, researchers found that all three intervention groups improved parent-child interactions

and skills acquisition. However, at 1-year followup, participants in the peer-only and the parent-and-peer intervention groups had increased rates of self-reported smoking and teacher-reported problem behavior. After 3 years, adolescents grouped with peers for the 12-week program reported twice as much tobacco use as those who were not grouped with peers. In addition, teacher reports of delinquency were 75 percent higher for study participants grouped with peers than for all other groups. Additional analysis revealed that youth with initially low levels of problem behavior showed the greatest increase in problem behaviors.

"For the ATP program, we hypothesized the opposite of what we found," says Dr. Dishion. "We wanted to use the reinforcing power of peers to promote abstinence and improve behavior. Instead, at 1-year followup we found that kids grouped with peers were actually exhibiting more problem behaviors than those who had not been grouped with peers."

Dr. Dishion describes the method by which peers negatively influence one another as "deviancy training": for example, rule-breaking discussions about drug use receive positive responses from peers, further encouraging such behavior and more discussions. In a previous study of adolescents interacting one on one, Dr. Dishion had found that antisocial peers react positively to rule-breaking discussions, while nondeviant peers react positively to normative discussions. He hypothesizes that this process may also occur among youths grouped for treatment, thwarting the assumed benefits of the group setting.

These interactions are very subtle and can occur even in situations designed to promote positive behavior. In the ATP trial, for example, all sessions were videotaped. Later analysis of the tapes revealed that interactions before and after sessions and during breaks actually negated positive interactions that went on during the intervention.

"This research is most relevant for the youngest adolescents—from junior high to early high school. We're hypothesizing that negative peer influences are most dangerous at the outset of drug use," he says.

A great deal more research is needed to study the unintended effects of interventions. Not all interventions with peer groups exhibiting problem behavior have had adverse effects. "We're working to understand which situations are the most problematic. We don't want to make a blanket statement that aggregating kids will always have a negative effect," he says. "Additional data also exist," Dr. Dishion notes, "that indicate that peer interventions may result in beneficial effects, especially when the groups include prosocial youth."

Dr. Dishion says also that the more effective interventions for adolescents target parenting practices. "Adult involvement is needed to prevent escalating cycles of risk in young people. Without adult involvement, youngsters are left vulnerable to peer effects," he says.

NIDA's Dr. Robertson agrees that finding better ways to help at-risk children and adolescents is of utmost importance. "A small percentage of troubled kids grow into those adults with the majority of social and health problems, including substance abuse, criminality, and sexually transmitted diseases. It is worthwhile to find better ways to identify at-risk kids and intervene with them, their families, and their schools earlier in their lives—as early as preschool."

Sources

- Dishion, T.J.; McCord, J.; and Poulin, F. When interventions harm: Peer groups and problem behavior. *American Psychologist* 54(9):755–764, 1999.
- Poulin, F.; Dishion, T.J.; and Burraston, B. 3-year iatrogenic effects associated with aggregating high-risk adolescents in cognitive-behavioral preventive interventions. *Applied Development Science* 5(4):214–224, 2001. NN

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

Research Findings

Volume 17, Number 5 (January 2003)

Social Environment Appears Linked to Biological Changes in Dopamine System, May Influence Vulnerability to Cocaine Addiction

By Kimberly R. Martin, *NIDA NOTES* Contributing Writer

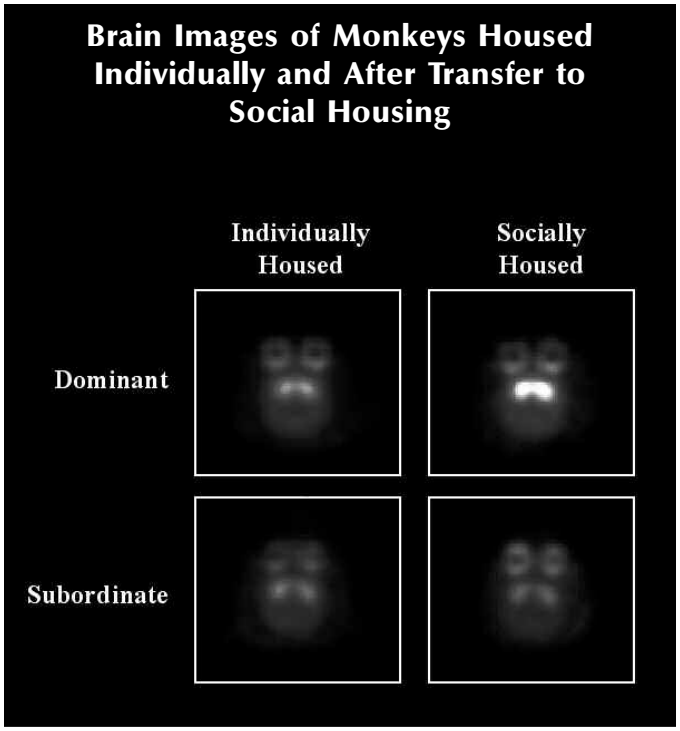
Cocaine is a highly addictive drug; however, little is known about the factors that make some individuals more vulnerable to it than others. Recently, NIDA-supported researchers at Wake Forest School of Medicine in Winston-Salem, North Carolina, have provided potential insight as to why some drug abusers have an increased susceptibility to cocaine addiction. They have found a link in monkeys between environmental conditions, the brain chemical dopamine, and the addictive qualities of cocaine. In the study, transferring the animals from individual to social housing produced biological changes in some animals that decreased their response to cocaine.

Previous studies have indicated that certain environmental conditions—such as living in an enriched environment with access to more resources or reduced stress—may reduce animals' self-administration of drugs, particularly cocaine. Animal studies also have suggested that environmental conditions may affect the activity of dopamine. Specifically, these studies have indicated that animals' housing conditions and social rank can affect dopamine's ability to bind to dopamine D_2 receptors and thereby initiate the cellular processes that produce feelings of pleasure and reward. Taken together, these findings inspired the Wake Forest researchers to look for a three-way link between environment, dopamine D_2 receptor function, and drug self-administration.

The researchers studied 20 macaque monkeys that were first housed individually and then assigned to social groups of 4 monkeys per housing group. Social hierarchies were allowed to develop in each group, and social rank was determined by observations of aggressive and submissive behavior. "Placement of the monkeys in social groups is modeling two extremes—socially derived stress for the most subordinate monkeys and environmental enrichment for the dominant monkeys," said Dr. Michael Nader, who led the study. "Although these variables have been studied in other animal models, in our model the stressors and environmental variables were not artificially produced in the lab. The model also allows us to study issues related to cocaine-induced changes in social behavior and the interactions of those changes with the reinforcing effects of cocaine."

Positron emission tomography (PET) was used to measure the amount and availability of dopamine D_2 receptors while the monkeys were individually housed and 3 months after their placement into social groups. After the second PET scan, monkeys were trained to self-administer cocaine by pressing a lever. They were allowed access to cocaine during daily sessions; the rate of cocaine self-administration was determined by the number of times the lever was pressed.

The second PET scan revealed that the monkeys that had become dominant now had 20 percent more dopamine receptor function compared to when they were housed alone. In the subordinate monkeys, dopamine receptor function was unchanged. Although dominant monkeys did not avoid cocaine completely, they had significantly lower intakes of cocaine than subordinate monkeys.



In these PET scans, lighter colors represent increases in markers of dopamine D_2 function. Greater levels of D_2 markers in socially housed, dominant monkeys—attributed to their living in an enriched environment—suggest that positive changes in one's environment can result in a biological protection from cocaine addiction.

"The increase in markers of dopamine D_2 receptor function among dominant monkeys may be the result of an increase in the number of dopamine D_2 receptors, a decrease in the amount of circulating dopamine competing for the receptors, or both as a consequence of becoming dominant," says Dr. Nader. "This suggests that, regardless of an individual's past, positive changes in the environment may result in a biological protection from the effects of cocaine. In other words, living in an enriched environment may enhance dopamine function and thus cause the pleasurable effects associated with cocaine use to be diminished."

The Wake Forest team's findings in monkeys have implications for understanding and possibly reducing drug abuse vulnerability in people. In people as in monkeys, drugs' effects on dopamine levels and function are a key to the motivation for abuse. There is evidence that individuals with low levels of dopamine D_2 receptors have higher risk for abusing drugs. In these individuals, reduced dopamine function may produce less bountiful feelings of pleasure and reward from natural activities, making drug-induced euphoria more compelling. The new results suggest that it may be possible to identify environmental improvements that enhance individuals' dopamine D_2 receptor function and thereby lower their risk for drug abuse.

"Dr. Nader's research shows that environmental experiences can increase dopamine D_2 receptor levels, which in turn are associated with a decreased vulnerability to cocaine self-administration," says Dr. Cora Lee Wetherington of NIDA's Division of Neuroscience and Behavioral Research. "This work, along with previous research regarding the role of dopamine D_2 receptors in drug abuse, points to the need for additional research to identify both environmental factors that promote low dopamine D_2 receptor levels and the associated vulnerability to cocaine's reinforcing effects as well as environmental factors that give rise to high levels of dopamine D_2 receptors that confer resistance to cocaine's reinforcing effects. Such research could point to risk and protective factors that could be translated into better prevention and treatment interventions."

Source

- Morgan, D., et al. Social dominance in monkeys: Dopamine D_2 receptors and cocaine self-administration. *Nature Neuroscience* 5(2):169–174, 2002. NN

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

Research Findings

Volume 17, Number 5 (January 2003)

Youths' Opportunities To Experiment Influence Later Use of Illegal Drugs

By Kimberly R. Martin, *NIDA NOTES* Contributing Writer

NIDA-supported researchers have reported new epidemiological evidence about the associations linking earlier alcohol or tobacco use with later use of marijuana, and the link from earlier marijuana use to later use of other illegal drugs such as cocaine and hallucinogens. This study builds on the many prior NIDA-supported studies of the "gateway" theory of youthful drug involvement: Once use of tobacco or alcohol begins, there is greater likelihood of marijuana use, and once marijuana use begins, there is greater likelihood of other illegal drug use.

"This research increases our understanding of the complex relationship between the different stages of drug use and raises concerns about factors that promote the transition from opportunities to initiate drug use to patterned use," says Dr. Kathleen Etz of NIDA's Division of Epidemiology, Services and Prevention Research. "We know that earlier drug use is associated with later, more advanced use; however, this research identifies a previously overlooked aspect of this transition, opportunities to use."

Using annual data from the 1991 through 1994 National Household Survey on Drug Abuse (NHSDA), the research team, led by Dr. James C. Anthony from Johns Hopkins University Bloomberg School of Public Health in Baltimore, analyzed the responses of 26,015 individuals aged 12 to 18 who answered questions regarding marijuana use and the responses of 44,624 individuals aged 12 to 25 who answered questions regarding cocaine use. The research focused on a concept called "drug exposure opportunities." This concept takes into account that some young people actively seek out opportunities to try marijuana or cocaine, whereas others are more passive recipients of drug exposure opportunities.

The researchers found that alcohol and tobacco users were more likely than nonusers to have an opportunity to try marijuana and were also more likely to try the drug when the opportunity arose. About 75 percent of alcohol or tobacco users reported an opportunity to try marijuana by age 18, and more than 85 percent of them made the transition to marijuana use. Only about 25 percent of nonsmokers and nondrinkers were given an opportunity to try marijuana by the same age. Of these, fewer than 25 percent began smoking marijuana within 6 years after they were first given the opportunity. Overall, alcohol or tobacco users were seven times more likely to start using marijuana than individuals who had used neither alcohol nor tobacco.

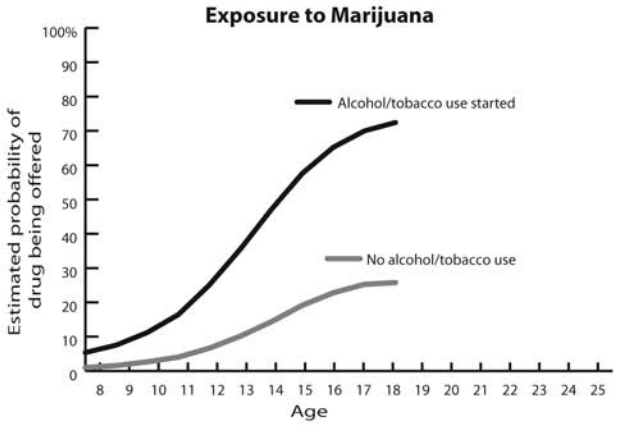
Prior marijuana use was closely associated with the opportunity to try cocaine and the likelihood of young people's starting to use cocaine once given the opportunity. Among the young people who were given the chance to try cocaine, those who were already using marijuana were 15 times more likely to use cocaine than those who did not use marijuana. About 50 percent of marijuana users used cocaine within 2 years of their first opportunity to do so. However, among young people who never used marijuana, fewer than 10 percent initiated cocaine use.

Prior marijuana use was closely associated with the opportunity to try cocaine and the likelihood of young people's starting to use cocaine once given the opportunity.

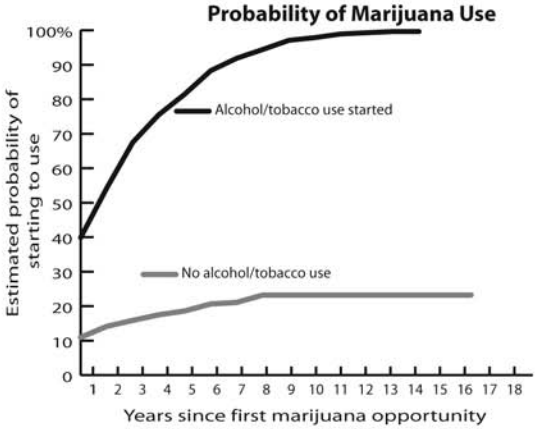
In a separate but related study, the researchers analyzed data from 41,271 young people who participated in the 1991 through 1994 NHSDA, investigating the relationship between the use of marijuana and use of hallucinogens. The results showed that marijuana users are more likely than nonusers to be offered an opportunity to use LSD, mescaline, mixed stimulant-hallucinogens, and PCP and more likely than nonusers to try these hallucinogenic drugs when they're offered. By age 21, nearly one-half of the teenagers who had smoked marijuana were presented with the opportunity to try hallucinogens, compared to only one-sixteenth of those who had not used marijuana. Once given the opportunity to use hallucinogens, marijuana smokers were about 12 times more likely to use hallucinogens than those who did not use marijuana.

"These studies are the first to support the idea of two separate mechanisms linking the use of alcohol, tobacco, marijuana, cocaine, and hallucinogens—one mechanism

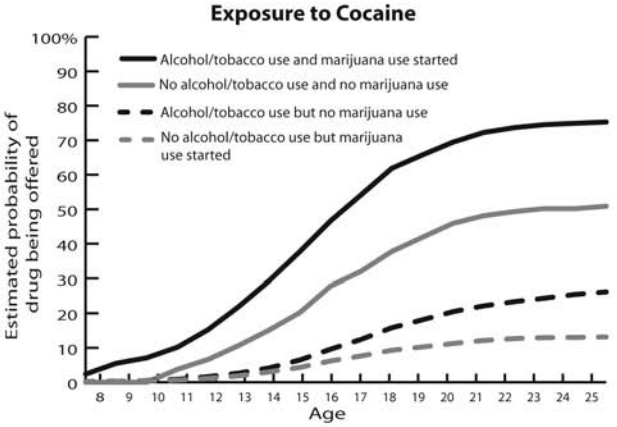
Drug Use Associated With More Opportunities To Use, Higher Rates of Acceptance



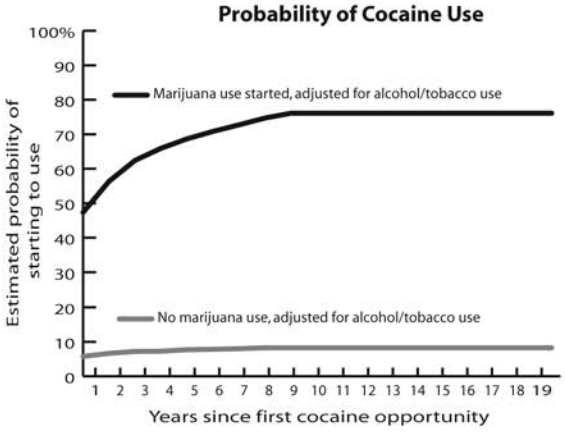
The likelihood that a nonsmoking, nondrinking 14-year old will be exposed to marijuana is only 14 percent, but the odds jump to 47 percent for a user of alcohol or tobacco.



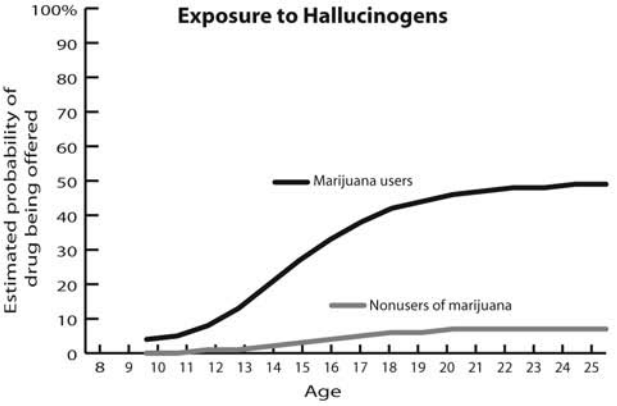
Among nonsmoking, nondrinking youth, 11 percent will be marijuana users 1 year after their first exposure to marijuana, compared to 40 percent of alcohol/tobacco users. Over time, the likelihood of marijuana use for the alcohol/tobacco users climbs to greater than 95 percent.



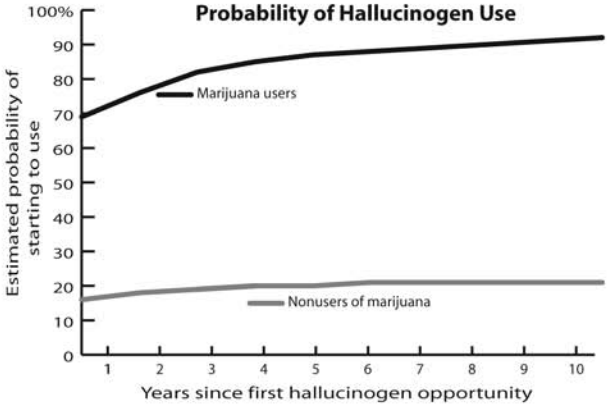
A 14-year-old user of tobacco or alcohol and marijuana is 10 times more likely to be exposed to cocaine than a nonsmoking nondrinker.



Having been exposed to cocaine, fewer than 1 in 10 nonusers of marijuana will use cocaine, compared to 50 to 75 percent for marijuana users.



Although fewer that 5 percent of nonusers of marijuana are exposed to hallucinogens, the likelihood jumps to nearly 50 percent for marijuana users over time.



Fewer than one in five nonusers of marijuana who are exposed to hallucinogens will use hallucinogens, but 70 to 90 percent of marijuana users will try hallucinogens.

Sources: Wagner and Anthony, *American Journal of Epidemiology,* 2001; Wilcox et al., *Drug and Alcohol Dependence,* 2002.

involving increased drug exposure opportunity, and a separate mechanism involving increased likelihood to use once the opportunity occurs," says Dr. Anthony. "Even if there is an underlying common vulnerability or predisposition that accounts for the observed sequencing of drug exposure opportunities and actual drug use, these observations may have implications for the design and evaluation of drug prevention activities. Drug users often are members of social circles where drug use and experimentation are more common and friends are likely to share drugs. In addition to trying to persuade young people not to use drugs, it may be worthwhile for us to persuade users not to share their drugs with friends."

Previous research has also shown that although males are more likely than females to have opportunities to use drugs, both are equally likely to make a transition into drug use once an opportunity to try a drug has occurred. Dr. Anthony and his colleague, Dr. Fernando Wagner, also from Johns Hopkins University Bloomberg School of Public Health, have made similar observations in ongoing research studies.

Dr. Anthony believes that his research carries a strong message for parents and pediatricians, who often neglect the opportunity to ask children and adolescents about whether they have had chances to try illegal drugs. As Dr. Anthony notes, "Kids will talk to us about their chances to try illegal drugs even when they are unwilling to talk about actual drug use. Once the chance to try marijuana or cocaine occurs, it is a red flag, and we need to be paying close attention to what happens next."

"Future research in this area will be a great asset to the development of effective drug prevention programs," says Dr. Etz. "It will assist us in understanding the process through which the use of one drug is related to use of another and help us to target prevention programs to individuals more likely to progress to advanced substance use."

Sources

- Wagner, F.A., and Anthony, J.C. Into the world of illegal drug use: Exposure opportunity and other mechanisms linking the use of alcohol, tobacco, marijuana, and cocaine. *American Journal of Epidemiology* 155(10):918–925, 2001.
- Wilcox, H.C.; Wagner, F.A.; and Anthony, J.C. Exposure opportunity as a mechanism linking youth marijuana use to hallucinogen use. *Drug and Alcohol Dependence* 66(2):127–135, 2002. NN

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

Research Findings

Volume 17, Number 2 (May 2002)

Shortened Family Prevention Programs Yield Long-Lasting Reductions in Adolescent Drug Abuse

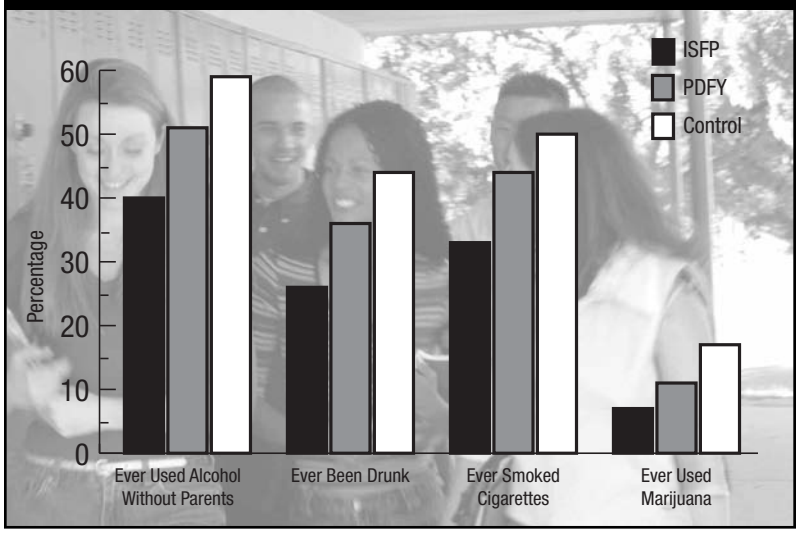
By Robert Mathias, *NIDA NOTES* Staff Writer

Two brief family-focused drug abuse prevention programs have produced long-term reductions in substance abuse among adolescents in rural Iowa public schools who were assigned to the programs in the sixth grade, a study funded by NIDA and the National Institute of Mental Health has shown. The programs may offer communities a practical approach to effective family-based drug abuse prevention.

The longer of the two programs reduced the proportion of students who used any marijuana, tobacco, or alcohol in grades 6 through 10 as well as students' current use of alcohol and tobacco. The shorter program decreased alcohol use among 10th-graders significantly, along with reducing lifetime substance use behaviors.

"The study demonstrates that brief family interventions can reduce drug use among young people during the high-risk years when they are making the transition from childhood to adolescence," says Dr. Richard Spoth of Iowa State University in Ames, who led the study. Reducing the number of children who begin substance use during these years may have important public health benefits because early initial use is associated with higher rates of substance dependence in later adolescence and young adulthood, he says.

Substance Use Behaviors Among 10th-Grade Students



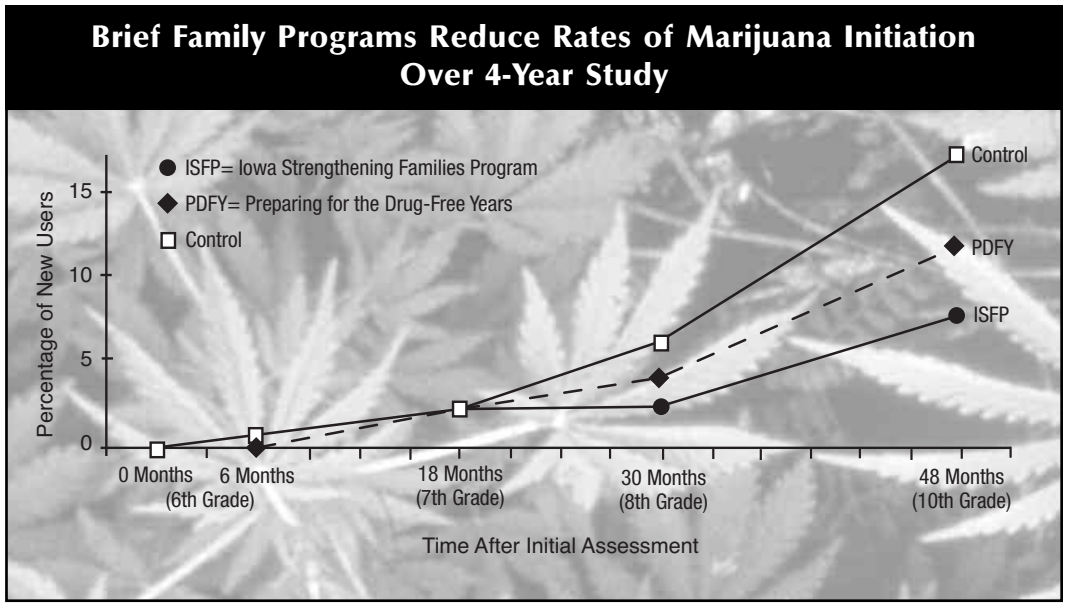
Lower percentages of ISFP and PDFY 10th-graders than control students had initiated a number of substance abuse behaviors involving use of alcohol, cigarettes, and marijuana 4 years after they had received the programs in the 6th grade.

A total of 667 families of sixth-graders from 33 public schools in Iowa were recruited for the study. The children's schools were randomly assigned to either a five-session program called Preparing for the Drug Free Years (PDFY), a seven-session Iowa Strengthening Families Program (ISFP), or a control group. The two programs were designed for families with young adolescents. The ISFP was adapted from a more extensive program that had previously been evaluated in a variety of settings and with several racial and ethnic groups.

"The purpose of modifying longer programs and trying to replicate their results in new settings is to make them more practical for communities to implement and for families to participate in them," notes Dr. Elizabeth Robertson of NIDA's Division of Epidemiology, Services and Prevention Research. "The fact that the adapted programs achieved very positive results indicates they can be whittled down and still maintain their effectiveness," she says.

Staff members from the Iowa Cooperative State Research, Education, and Extension Service of the U.S. Department of Agriculture worked with community facilitators to implement either PDFY or ISFP in a total of 22 schools with 459 families whose family, school, and community characteristics had previously been assessed. Eleven schools with 208 comparable families were assigned to a control group that was mailed leaflets on adolescent development and parent-child relationships. The programs were delivered in weekly evening sessions to participating families at the schools. Parents in PDFY attended four sessions and were joined by their children for a final joint session. In the relatively more intensive ISFP, parents and children attended both separate and joint sessions for 6 weeks and a final joint session. The weekly PDFY and ISFP sessions sought to improve how parents and children functioned individually and as a family in a variety of situations. Both

programs taught skills such as effective parenting, appropriate management of family conflicts, and how to resist peer pressure. The development of such skills has been linked to delayed onset or reduction of substance abuse.



Initiation of marijuana use occurred at a slower rate among students who participated in the ISFP and PDFY programs than among those in the control group.

Four years after 6th-grade students had received the programs, the researchers interviewed them and found that significantly lower percentages of ISFP than control 10th-graders had ever initiated any of five substance abuse behaviors. Specifically, lower percentages of ISFP students than controls had begun to use alcohol, cigarettes, or marijuana; had ever used alcohol without parental permission; or had become drunk. The proportion of new marijuana users in the control group was 2.4 times greater than it was among ISFP youths. Similarly, the proportion of controls who had been drunk or smoked cigarettes were 1.7 and 1.5 times greater than they were among ISFP youths. Participants in the PDFY program also showed lower rates of initiation of all five substance use behaviors than controls, but only the differences in lifetime drunkenness and marijuana use approached statistical significance. Nevertheless, the rates of new marijuana use and ever getting drunk were 1.5 and 1.2 times greater for controls than they were for PDFY youths. Actual rates of substance use behaviors among 10th-graders in all three groups are shown in the illustration on page 8.

Among those 10th-graders in the three groups who had begun to use alcohol, tobacco, or marijuana, the study found lower proportions of PDFY and ISFP students than controls had used alcohol and tobacco in the preceding month and marijuana during the preceding year. For example, frequency of past-month alcohol use among PDFY and ISFP students was about two-thirds that of controls. Among ISFP students, past-month cigarette use was approximately half that of control group students.

"Developmental timing is an important factor in the long-term effects of these interventions," Dr. Spoth says. "Intervening at this time, in the sixth grade when kids are experimenting with substances, probably contributes greatly to the positive effects," he says. The careful design of the interventions with their theory-based focus on parenting and family interactions also is important, he adds.

The critical element affected by both programs is the parent component, says NIDA's Dr. Robertson. "When you provide parents with information about what to expect of children at that age, what is typical and what is not, and how to deal with some of the problems, you are shaping how parents relate to their children. Changing the family context can have a long-lasting effect because you are positively influencing the day-to-day environment of the child over a long period of time," she says.

Whether the findings of this study would apply to more diverse populations in other settings remains an open question, Dr. Robertson says. However, the original programs from which the critical elements in these programs were derived have been successfully tested in a variety of settings, she notes. In addition, the ISFP has been adapted for and is now being tested with urban and rural African-Americans and Native American families.

Source

- Spoth, R.L.; Redmond, C.; and Shin, C. Randomized trial of brief family interventions for general populations: Adolescent substance use outcomes 4 years following baseline. *Journal of Consulting and Clinical Psychology* 69(4):627–642, 2001. NN

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

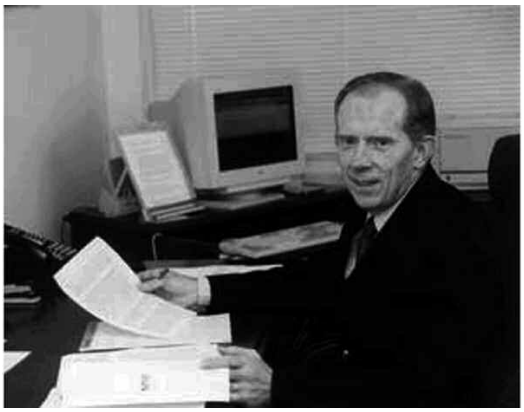
Research Findings

Volume 16, Number 6 (February 2002)

New Vistas in Drug Abuse Prevention

By NIDA Acting Director Glen R. Hanson, Ph.D., D.D.S.

"Prevention is the best treatment" is an oft-cited maxim, and one that certainly applies to drug abuse. Anyone who can be influenced to avoid abusing drugs is spared their harmful health and social effects, including increased risk for lethal infections, family disruption and job loss, confusion and despair, the difficult struggle of treatment, and—for many—the ravages of addiction and the ordeal of climbing back after relapse. From society's point of view, drug abuse prevention helps keep a tremendous burden—related to disease and premature death, lost capacity for productive work, and crime—from being even worse.



New ideas and information have emerged recently that hold great promise for enhancing the impact of current prevention efforts.

The bulk of current interventions to prevent drug abuse fall mainly into two groups. One set is designed to reduce risk factors associated with higher likelihood of drug abuse and increase protective factors associated with lower likelihood of drug abuse. When implemented in conformity with proven prevention principles (see "Risk and Protective Factors in Drug Abuse Prevention," *NIDA NOTES,* Vol. 16, No. 6), this strategy, the product of more than a decade of research and clinical experience, is effective and inclusive enough to apply to most populations. Moreover, researchers continue to learn more about how risk and protective factors relate, and practitioners are ever more adept at applying this knowledge. These efforts will continue to yield incrementally—perhaps even dramatically— higher impact interventions well into the future.

Nonetheless, there are limitations to the risk-and-protective-factors strategy. One feature that ultimately limits its impact, for example, is the nature of the factors themselves. They tend to be fundamental or deeply entrenched characteristics or experiences of a person, family, or community. Some are hidden, such as sexual victimization; others are prominent in society, such as adolescent depression or ready access to drugs of abuse. As a result, traditional risk factors generally can be modified only by relatively broad and long-term interventions. Certain factors may not be susceptible to modification, such as a genetic predisposition to risk-taking. In addition, for the most part, traditional risk factors pertain to an individual's vulnerability to drug abuse, rather than the actual choice to use drugs. As important as it is to lower vulnerability, on a given day, even someone with a relatively low vulnerability may opt to use drugs.

The second important group of preventive interventions complements and extends the risk-and-protective-factors strategy by focusing on the dynamic of situations, beliefs, motives, reasoning and reactions that enter into the choice to abuse or not to abuse drugs. Important applications of this strategy include normative education to refute the common belief that "everyone takes drugs," and equipping young people with the skills to refuse drug offers without feeling they are losing face. This strategy is full of untapped promise, and today likely offers the best prospects for rapid development of more effective prevention. A few of the many issues whose elucidation may yield improved interventions include why even very young children tend to expect positive experiences from drugs; how individuals' styles for processing language and visual images affect drug-taking decisions; the roles of curiosity and impulsivity in such decisions; and what logical processes people typically follow when deciding to use or not use drugs.

A recent dramatic finding in neurobiological research may greatly increase our understanding of adolescent decision-making and our ability to help adolescents choose wisely regarding drug abuse. Scientists have long suspected that

the adolescent brain is still developing physically, and researchers have now demonstrated that new neural tissue and connections continue to form throughout the transitional years between childhood and adulthood. Further investigation of this growth process undoubtedly will yield important insights relevant to some of the cognitive issues affecting the appeal of drugs and drug-taking decisions. The impact on drug abuse prevention could be tremendous, especially in light of the fact that adolescence often is a critical period for initiation of drug abuse. Most chronic drug abusers start experimenting with intoxication in adolescence or young adulthood. While populations are constantly changing—and while prescription drug abuse by older individuals today is a serious and mounting concern—it remains generally true that people who do not abuse drugs during the decisive years before age 25 are unlikely ever to develop a serious drug problem.

It remains generally true that people who do not abuse drugs during the decisive years before age 25 are unlikely ever to develop a serious drug problem.

A tighter focus on decisionmaking regarding drug abuse should enable us to progress in a vitally important area: preventing escalation from early, experimental drug use to regular use, abuse, and addiction. We know that fewer than 10 percent of people who experiment with drugs become dependent or addicted. We also know that some of the factors that influence whether a person will become dependent or addicted are independent of the factors that influence whether he or she will initiate drug abuse. For example, research has suggested that, perhaps because of their particular brain chemistry, some individuals dislike the agitation cocaine can produce more than they like the euphoria it brings—and so discontinue use after their initial experimentation. Interventions based upon such factors may curtail drug abuse before it reaches critical severity and thereby forestall most of its truly tragic health and social consequences.

NIDA's prevention agenda is to aggressively pursue research on risk and protective factors while also seeking to identify, develop, and integrate new science-based approaches into existing prevention programs. To accomplish these goals, NIDA recently launched the three-part Drug Abuse Prevention Research Initiative. (See page 43, "NIDA Conference Reviews Advances in Prevention Science, Announces New National Research Initiative.") Basic researchers will mine new neurobiological and other fundamental research discoveries for prevention applications. Basic, clinical, and applied researchers and practitioners will work together in Transdisciplinary Prevention Research Centers to synthesize knowledge from all the relevant scientific fields into powerful new prevention packages. Researchers and State and local practitioners will collaborate in Community Multisite Prevention Trials to rapidly assess proposed new prevention approaches and interventions in diverse communities and populations.

Exciting moments in science occur when the gradual accumulation of knowledge suddenly gives rise to new perspectives with the promise of new solutions to problems of living. In the area of drug abuse prevention, this is such a moment, and NIDA is moving swiftly to take full advantage of its potential. NN

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

Research Findings

Volume 16, Number 6 (February 2002)

NIDA Conference Reviews Advances in Prevention Science, Announces New National Research Initiative

By Barbara Cire, *NIDA NOTES* Associate Editor

A review of current, effective drug abuse prevention programs and the announcement of a new NIDA initiative were among the highlights of the Second National Conference on Drug Abuse Prevention Research held August 9 and 10 in Washington, D.C. Almost 900 participants from all 50 States, the District of Columbia, Puerto Rico, and 13 foreign countries attended the meeting, which was sponsored by NIDA and the Robert Wood Johnson Foundation.

"A particular focus of this conference is to examine how prevention programs can be implemented at the local level," said Dr. Elizabeth Robertson, chief of NIDA's Prevention Research Branch.

"Messages should be pretested for their effectiveness and appropriateness to the target audience."

—Dr. Joseph Cappella University of Pennsylvania, Philadelphia

"In 20 years of research, we have learned that there are modifiable risk and protective factors, particular points of vulnerability to drug use and abuse, and some basic prevention principles which we summarized in the first-ever science-based guide to prevention, *Preventing Drug Use Among Children and Adolescents*," said then-NIDA Director Dr. Alan I. Leshner in his remarks to participants. "Research has answered many questions, but others remain. We now target risk and protective factors in our prevention programs, but what are the factors that influence the actual decision to use drugs?

"Over the next 2 years, NIDA will establish the National Drug Abuse Prevention Research Initiative," said Dr. Leshner. "Our goal is to provide the resources to bring the full power of science to bear on the challenge of developing effective drug abuse prevention programs. The Initiative will have three components: Basic Prevention Science Research, Transdisciplinary Prevention Research Centers (TPRCs) and Community Multisite Prevention Trials."

The initiative is intended to stimulate research to translate new knowledge into new interventions, Dr. Leshner noted. The Basic Prevention Science Research component will examine ideas from the sociological, biological, behavioral, and cognitive literature, looking for new information with the potential to inform the development and pilot-testing of new prevention interventions. The TPRCs will support collaborative projects by basic, applied, and clinical researchers across the country. They will focus on identifying and addressing the major knowledge gaps that affect the work of State and local prevention service providers.

The Multisite Trials will test the effectiveness of drug abuse prevention programs in diverse populations and locations. "The trials will examine the features that influence the successful adoption, adaptation, sustainability, and outcomes of science-based interventions in large-scale field trials," Dr. Leshner said.

The conference also featured panel discussions on using risk and protective factors in prevention, identifying effective features in prevention interventions, assessing substance abuse in the community, and building multicomponent community programs. Small-group workshops and lunchtime discussion groups gave participants an opportunity to learn about particular programs in detail and share lessons learned in their own communities.

Risk and Protective Factors

Dr. David Hawkins of the Social Development Research Group at the University of Washington in Seattle summarized the risk and protective factors that can influence whether young people will use drugs. "Over the last 20 years, longitudinal studies have identified many factors that predict youth violence, substance abuse, and other problem behaviors," he said. "Such factors exist in every domain of life: individual, family, peers, school, and community. We must reduce the risk factors and promote the development of protective factors on all levels: individual, family, school, peer, and community." (See "Risk and Protective Factors in Drug Abuse Prevention," *NIDA NOTES*, Vol. 16, No. 6) There is a growing list of tested,

"We must reduce the risk factors and promote the development of protective factors on all levels: individual, family, peers, school, and community."

—Dr. David Hawkins, University of Washington, Seattle

effective prevention programs that have been shown to reduce risks, enhance protection, and prevent adolescent substance abuse, Dr. Hawkins noted.

Dr. Sheppard Kellam of the American Institutes for Research in Washington, D.C., discussed a school-based intervention called the "Good Behavior Game (GBG)." Previous research has shown that aggressive and disruptive behavior among first-graders is associated with later aggression, violence, drug abuse, and school dropout. The GBG was originally developed in the late 1960s to help teachers organize and manage classroom behavior and to teach young children how to behave as students. Accepting rules of classroom behavior, concentrating and being ready to work, participating appropriately in classroom teaching and with classmates, and learning were the focus of the GBG. In 1985–1986, Dr. Kellam and his colleagues implemented the GBG as a prevention intervention in 40 first-grade classrooms in 18 representative elementary schools in Baltimore.

First- and second-grade children were assigned to one of three teams in their classroom. During the game, teams were penalized if any team member did not follow the rules, for example, by speaking out of turn or getting out of their seats without permission. Teams with four or fewer penalties at the end of the game were rewarded with verbal praise from the teacher, special snacks, or extra time at recess; teams with more than four penalties were not rewarded. At first, the game was played three times a week for 10 minutes at a time. The length of time the game was played increased until it reached a weekly maximum of 3 hours.

"Previous research has shown that aggressive and disruptive behavior among first-graders is associated with later aggression, violence, drug abuse, and school dropout."

—Dr. Sheppard Kellam, American Institutes for Research, Washington, D.C.

Six years later, preliminary analysis of followup data revealed that aggressive behavior and smoking initiation were lower among children who received the classroom intervention compared to those who had not, particularly among boys who had been disruptive or aggressive in first grade. In a recent followup of the participants at age 19 to 22, preliminary analyses indicate that the prevalence of antisocial personality disorder among the most aggressive boys appears to be three to four times lower compared to aggressive boys who did not receive the intervention. These results underscore the importance of early socializing children into the role of student, particularly those at increased risk of learning and/or behavioral problems.

Implementation of Interventions

"We will examine how prevention programs can be implemented at the local level."

—Dr. Elizabeth Robertson, chief of NIDA's Prevention Research Branch

Dr. Linda Dusenbury of Tanglewood Research, Inc., in Greensboro, North Carolina, discussed the effective implementation of interventions. She noted that effective programs are research-based and typically include social resistance training to help students refuse offers to use drugs, as well as information that counters their erroneous perceptions that drug use is widespread among their peers. Effectiveness also depends on the "dosage"—how much of a program is delivered—and the quality—how well the program is delivered, she said. "Ineffective prevention strategies include scare tactics and moral messages," Dr. Dusenbury said. "An exclusive focus on information about different drugs and testimonials from recovering addicts doesn't work very well, either."

Dr. Dusenbury noted that when programs are implemented, there is always a tension between fidelity to the program as it was originally designed and the flexibility required to adapt it to local needs. "If some aspect of a particular program is not working in your community and you want to change it, it's best to talk to the people who developed the program to make sure your adaptation does not violate key principles of the program," Dr. Dusenbury said. "This step helps you and provides the developers with useful feedback."

Dr. Christopher Ringwalt of the Pacific Institute for Research and Evaluation in Chapel Hill, North Carolina, reported preliminary results of a study to identify the prevention curricula being used in middle schools and junior high schools across the country and to determine how many schools were using research-based curricula. Data were collected in 1999 from 1,905 public and private schools via a questionnaire filled out by school staff who taught substance abuse prevention classes.

The study found that only 25 percent of the schools surveyed used at least one research-based curriculum. Respondents were more likely to use didactic instruction methods such as lectures and classroom discussions than interactive methods such as small-group discussions and role-playing activities when presenting information.

The most frequently emphasized content area was knowledge of drugs and their effects; the least emphasized area was drug refusal skills. "These results demonstrate a considerable gap between current school prevention practices and our understanding of effective curricula and their components," said Dr. Ringwalt.

Mass Media Campaigns

An overview of the key elements that make mass media campaigns effective was presented by Dr. Joseph Cappella of the Annenberg School of Communication at the University of Pennsylvania in Philadelphia. He began by noting that success is contingent upon clearly defining a target audience, understanding their prevailing attitudes and beliefs, and crafting engaging and persuasive messages that are presented over the long term. These messages should be pretested for their effectiveness and appropriateness to the target audience.

Well-designed campaigns, Dr. Cappella noted, can affect behavior, as demonstrated by research on smoking and drug use among teens. For example, an antimarijuana public service announcement (PSA) campaign developed by NIDA-supported researchers at the University of Kentucky in Lexington decreased marijuana use by more than 25 percent among high-sensation-seeking adolescents—a group particularly at risk for drug abuse. (See "Television Public Service Announcements Decrease Marijuana Use in Targeted Teens," V16-4, October 2001.) The PSAs included messages especially designed to appeal to the sensation-seeking teens and ran for 4 months during TV programs popular with this group. NN

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

Research Findings

Volume 16, Number 5 (December 2001)

The Many Faces of MDMA Use Challenge Drug Abuse Prevention

By Robert Mathias, *NIDA NOTES* Staff Writer

Three NIDA-funded ethnographic studies presented at the MDMA/Ecstasy Conference illustrate the diversity and complexity of MDMA use in the United States. The studies showed both similarities and differences in patterns of MDMA use and associated sexual behaviors among homosexual men in Boston and New York City, predominantly white heterosexual users in central Ohio, and a racially diverse group of users in Hartford, Connecticut. The studies employed a variety of research techniques, such as on-site observation and interaction with ecstasy users in clubs, informal and structured interviews, and small focus groups, to ascertain who uses MDMA, their patterns of drug use and related behaviors, and the settings in which they use drugs.

Preliminary findings from these studies suggest that targeted drug abuse prevention approaches that address specific factors that are associated with MDMA use by different types of users and in different regions of the country are needed to reduce MDMA abuse. Further research to understand the factors that increase or reduce the risks for drug use in these groups is needed to shape prevention initiatives, the researchers indicated.

MDMA Use Among Men Who Have Sex With Men

A field study conducted by Dr. Patricia Case of Harvard Medical School in Boston found considerable individual, group, and regional variations in patterns of MDMA use among club-drug-using men who have sex with men (MSM) in Boston and New York. More than 50 percent of men interviewed in the study frequently used MDMA in combination with other drugs and 11 percent had injected mainly anabolic steroids within the last 3 months. MSM reported that MDMA use usually occurs with other drugs, including ketamine, cocaine, methamphetamine, and Viagra. Some users primarily engage in uncontrolled drug use, others also take MDMA frequently but according to a set schedule with other drugs to achieve special effects, and still others use MDMA occasionally in connection with special circumstances or holidays.

The MSM in this study were very sexually active and reported unprotected sex while using MDMA although not so often as with other drugs, such as methamphetamine. MDMA prevention messages have had little effect on MSM. This population expressed more concern about the risks of GHB (gamma-hydroxybutyrate), a central nervous system depressant, because of reported overdose deaths from that drug in both cities.

MDMA Use in Central Ohio

Dr. Robert Carlson and colleagues of Wright State University School of Medicine in Dayton, Ohio, conducted a pilot study of MDMA use among 28 individuals in 2 focus groups in Dayton and Columbus. Participants were evenly divided between men and women who were almost exclusively heterosexual. Like the MSM study, the Ohio study showed tremendous variations in patterns of MDMA use.

One-third of the study population said they had used other club drugs, such as ketamine and GHB, and high alcohol use was common. Dance clubs were popular settings for MDMA use among college students and other young adults, who tended to use MDMA to enhance sociability. MDMA users at raves were younger, less educated, and more likely to have a drug-using lifestyle than were the club-goers. Participants said they also used MDMA at parties, lakes, beaches, high schools, and in cars.

"MDMA is seen as a relatively benign drug," Dr. Carlson said. "Most people hear of very few negative consequences from friends, although they do express concern about adulterants in the pills they are getting." None of the participants reported any negative effects of MDMA use on memory, cognition, or work performance. Condom use during sex appeared to be the norm, but several women reported having sex with men they had not intended to be with after taking MDMA.

MDMA Use Among Urban Youth in Hartford, Connecticut

Dr. Jean Schensul, of the Institute for Community Research in Hartford, Connecticut, reported information from observations and interviews with urban youths in party and club settings combined with survey data obtained during a 15-month study of youths in Hartford. Study participants were 16 to 24 years old, 70 percent male, 40 percent Hispanic, 38 percent African American, and 22 percent Caucasian, Asian, and mixed race or ethnicity. MDMA use in this population is linked to their

social networks, club-going, and parties. MDMA is often used with other drugs, including marijuana, PCP, and alcohol.

"These youth have limited access to accurate sources of information and are uninformed about the risks of MDMA use and drug mixing," Dr. Schensul said. They are exposed to popular hip-hop magazines and rap music lyrics that promote the connection between ecstasy, the "good life," and better sex. The study shows that MDMA use has spread from the suburbs to the city and is increasing the already high levels of risk of unprotected sex and sexually transmitted diseases among these economically vulnerable young people. The findings suggest that culturally and developmentally appropriate prevention approaches that focus on reducing harmful behaviors are needed for this population, Dr. Schensul said. NN

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

Research Findings

Volume 16, Number 4 (October 2001)

Television Public Service Announcements Decrease Marijuana Use in Targeted Teens

By Kimberly R. Martin, *NIDA NOTES* Contributing Writer

NIDA-supported researchers have helped clarify the necessary elements in effective anti-drug public service announcements (PSAs) directed at high-sensation-seeking adolescents.

NIDA researchers have previously shown that high-sensation-seekers—individuals characterized by their need for new, emotionally intense experiences and the willingness to take risks to obtain these experiences—are at greater risk for using marijuana and other drugs and for using them at an earlier age than other individuals.

Using a prevention approach developed from previous NIDA-supported studies, the researchers produced five anti-marijuana PSAs. The dramatic and attention-getting PSAs were aired during programs that appealed to high-sensation-seekers such as action-oriented television shows. The media placement was supported by paid as well as donated advertising to ensure the most effective outreach to the target audience.

"To appeal to high-sensation-seekers, a PSA must be dramatic, intense, and highly original," says Dr. Philip Palmgreen, the research team leader at the University of Kentucky in Lexington. "An effective PSA needs to show the negative consequences that can occur as a direct result of drug use. For example, high-sensation-seekers need to see that they can end up in a wheelchair, lose their job, or lose their girlfriend or boyfriend as a result of drug use. We found that the threat of death is not a deterrent because high-sensation-seekers do not believe that death is a real possibility," he says.

The PSAs were aired from January through April 1997 in Fayette County, Kentucky, and from January through April 1998 in Fayette County and Knox County, Tennessee. One hundred students in 7th through 10th grade were selected each month by random phone calls and asked to participate in the study. The students were interviewed to determine whether they saw the PSAs and their attitudes toward and whether they used marijuana and other drugs. Questions also were asked to determine their degree of sensation-seeking. More than 70 percent of the targeted age groups watched at least three PSAs per week, the researchers say.

Drs. Philip Palmgreen (left) and Lewis Donohew review a public service announcement at the University of Kentucky.

Marijuana use declined substantially among teens during the campaigns in both counties and residual effects of the campaigns were evident for several months. According to Dr. Palmgreen, the second campaign in Fayette County had a "booster effect," resulting in further declines. Overall, marijuana use decreased by 38 percent in Fayette County. In Knox County, marijuana use declined among high-sensation-seeking teens by 26.7 percent.

"We have shown that, for PSAs to be effective, they must be designed for a specific audience and must air frequently during programs watched by that audience," says Dr. Palmgreen. "PSAs typically are shown during donated airtime. However, the trend toward paid placements of PSAs, as in various campaigns across the country, is a very positive approach."

Source

- Palmgreen, P.; Donohew, L.; Lorch, E.P.; Hoyle, R.; and Stephenson, M.T. Television campaigns and adolescent marijuana use: Tests of sensation seeking targeting. *American Journal of Public Health* 91(2):292-296, 2001. NN

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

Research Findings

Volume 15, Number 3 (August 2000)

NIDA Initiative Targets Increasing Teen Use of Anabolic Steroids

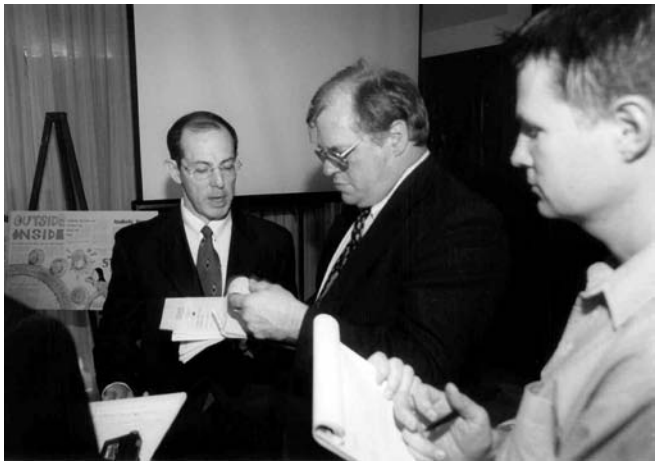
By Patrick Zickler, *NIDA NOTES* Staff Writer

To reverse the rising use of anabolic steroids by high school-age children, NIDA and seven national partners have launched an initiative designed to alert the public about the risks associated with anabolic steroid use.

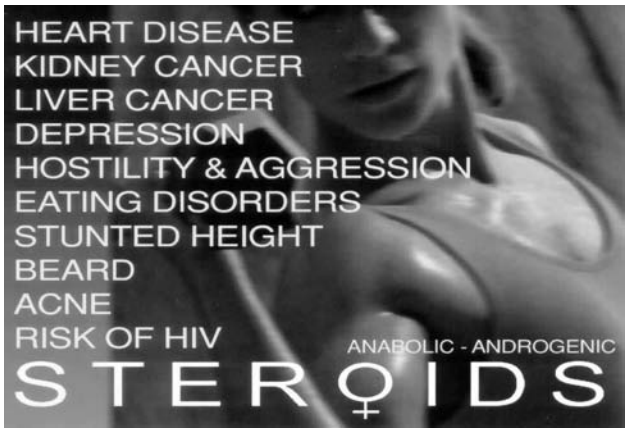
"The most recent data from our Monitoring the Future survey tell us that the trends in use of these drugs and in teenagers' attitudes about them are going in the wrong direction," said NIDA Director Dr. Alan I. Leshner at a Washington, D.C., press conference to announce the initiative. "More than a half million 8th- and 10th-grade students are now using these dangerous drugs, and increasing numbers of high school seniors say they don't believe the drugs are risky."

Anabolic steroids are synthetic compounds that mimic the action of the male sex hormone testosterone. The drugs have some medical uses, but they also are abused by some athletes and sports enthusiasts who want to increase muscle mass and improve performance. Some teens use them because of concern about body image.

In adolescents, anabolic steroid abuse can halt bone growth and has been associated with damage to the heart, kidneys, and liver. In males, steroid abuse can lead to impotence, shrunken testicles, and breast enlargement. In females, the drugs' effects include menstrual irregularities, growth of body hair and loss of scalp hair, a deepened voice, and reduction in breast size. Some of these biological effects are irreversible. Use of anabolic steroids also has been linked to increased and unpredictable levels of aggression in human and animal studies.



Dr. Linn Goldberg (left) of Oregon Health Sciences University, explains the Adolescent Training and Learning to Avoid Steroids (ATLAS) program to reporters at a science session following the NIDA press conference.

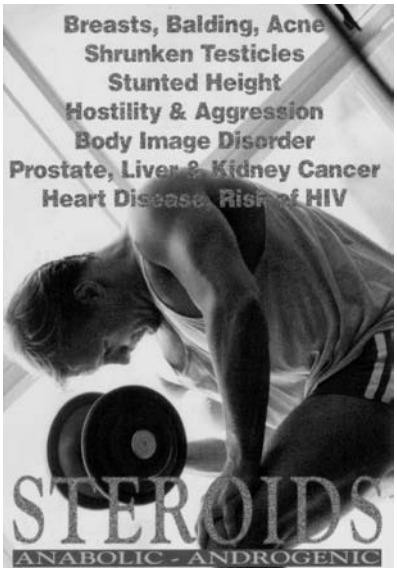


As part of NIDA's anabolic steroids initiative, the Institute has distributed more than 500,000 "art" cards-colorful postcards with messages about the harmful effects of steroid abuse-in gyms, restaurants, bookstores, and clubs.

NIDA's initiative includes a new Web site-*www.steroidabuse.org*-that provides science-based information about the risks and prevention of steroid abuse. NIDA has also released an updated Research Report on anabolic steroids as part of the nationwide multimedia initiative (see "About Anabolic Steroid Abuse," *NIDA NOTES*, Vol. 15, No. 3). NIDA and its partners will distribute 250,000 copies of a special Community Drug Alert Bulletin on anabolic steroid abuse and will place 500,000 "art cards"—colorful postcards with messages about the harmful effects of steroid abuse-in gyms, bookstores, restaurants, and clubs in Washington, D.C., Los Angeles, Miami, Baltimore, Seattle, and Indianapolis.

The Institute's partners in the initiative include the National Collegiate Athletic Association, the American Academy of Pediatrics, the American College of Sports Medicine, the National Association of School Nurses, the National Federation of High Schools, International Students in Action, and Dr. Drew Pinsky, a physician who hosts discussions about relationships and sexual behavior on MTV's "Loveline" and the Web site www.drDrew.com.

The press conference announcing the initiative was followed by a scientific session at which NIDA-supported scientists presented summaries of research on anabolic



"Art" cards like this and the one on page 1 help spread the word about the harmful effects of steroids.

steroids. Dr. Charles Yesalis of Pennsylvania State University discussed the history and social context of steroid use and abuse. Dr. Linn Goldberg and Dr. Diane Elliot of the Oregon Health Sciences University in Portland described the Adolescent Training and Learning to Avoid Steroids (ATLAS) program, a science-based prevention program that uses a team-centered approach to educate young male athletes about the risk and protective factors associated with steroid use. The researchers are currently developing a similar program—Athletes Targeting Healthy Exercise and Nutrition Alternatives (ATHENA)—to prevent eating disorders and abuse of steroids and other body-shaping drugs by young women on school-sponsored athletic, dance and drill, and rally teams. Dr. Harrison Pope of the McLean Hospital in Belmont, Massachusetts, discussed results of a study designed to examine the effects of steroids on mood and increased aggression—a phenomenon referred to as "roid rage." The research, which involved 56 men who regularly work out at gyms and health clubs, revealed increased aggressive behavior in some participants who received testosterone in dosages smaller than those typically used by athletes or body-builders. Dr. Marilyn McGinnis of Mount Sinai School of Medicine in New York City provided additional evidence that steroid use can result in aggressive behavior. She described recently completed laboratory studies in which rats with elevated levels of steroids exhibited unprovoked aggression toward passive, nonthreatening rats as well as intensely aggressive responses to provocation.

For More Information

The NIDA Research Report "Anabolic Steroid Abuse" (NCADI publication #PHD561) can be obtained from the National Clearinghouse for Alcohol and Drug Information, P.O. Box 2345, Rockville, MD 20847; phone 800-729-6686; fax 301-294-5516; e-mail info@health.org. The report and other information about anabolic steroids can be found at the special NIDA Web site: www.steroidabuse.org. NN

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

Research Findings

Volume 14, Number 6 (March 2000)

Putting Science-Based Drug Abuse Prevention Programs to Work in Communities

By Robert Mathias, *NIDA NOTES* Staff Writer

NIDA-supported studies are defining ways to get scientifically tested drug abuse prevention programs applied in communities across the Nation. This complex line of research is developing new partnerships and strategies that can enable both rural and urban communities to select and sustain effective prevention programs that promote young people's well-being and deter drug use and other harmful behaviors.

Scientists have shown that programs that help parents and children function better individually and as a family can reduce substance abuse among general populations of young people. However, the potential of such research-based family and school competency-building programs has not been fully realized because such programs are not being widely used in communities across the Nation.

"Many challenges must be overcome to implement empirically supported programs on a large scale," says Dr. Richard Spoth of Iowa State University in Ames. People seeking to adopt prevention programs often don't have good information about scientifically tested programs, he says. In addition, they often lack the personnel and time required to implement such programs faithfully.

Over the last 7 years, Dr. Spoth has led a series of interrelated studies called Project Family. The project, which is funded by NIDA, the National Institute of Mental Health, and other Federal agencies, has developed some promising ways to use existing community service delivery systems to facilitate putting youth- and family-focused prevention science into community practice. For example, Project Family researchers have developed partnerships with the Iowa Cooperative State Research, Education, and Extension Service of the U.S. Department of Agriculture.

The Strengthening Families Program addresses risk and protective factors for drug abuse and other problem behaviors. In the program, parents and children work together to improve their ability to communicate and to resolve problems at home and at school.

Extension Service agents work in nearly every county in the United States and are dedicated to serving families and youth. This network of professional practitioners has a long history of disseminating the latest scientific information for the benefit of residents of both rural and urban communities. Programming and information provided to local residents cover a wide spectrum of topics ranging from child development, family relations, and consumer economics to weed science and crop management.

The Extension Service network has helped Project Family researchers engage community residents to help with the project. For example, Extension Service agents have involved schools in research evaluating family and youth competency-building programs and have recruited and helped train local residents to deliver the programs. Extension Service agents also have assisted in such tasks as assessing family needs, identifying factors affecting family engagement in prevention programs, and carrying out strategies to disseminate effective family and youth programs.

One of the programs developed and disseminated through this research-Extension-community partnership is a brief family-focused prevention program called the Iowa Strengthening Families Program (ISFP). Adapted for general populations by Dr. Virginia Molgaard of Iowa State University from a prior, more intensive program, the seven-session ISFP was designed to improve parents'

family management practices and communications skills and children's personal skills, social skills, and ability to deal with peer pressure. The program was tested with 161 families of 6th graders enrolled in Iowa public schools.

"Using the Extension Service... is an exciting way to use an existing delivery system to get effective programming into the local communities."

Children who took part in the program when they were in sixth grade were significantly less likely to begin using drugs and alcohol or to progress to more serious substance use than their peers who did not participate in the program, according to followup studies conducted at regular intervals over the last 4 years. For example, 48 months after the initial assessment, the proportion of new marijuana users among youths who didn't participate in the ISFP was 2.4 times greater than it was among youths who did participate. Furthermore, the divergence in drug use between youths who received the program in the sixth grade and those who didn't has widened in the 4 years since the study's pre-intervention assessment, according to a recent evaluation.

Once Project Family research demonstrated the effectiveness of the Iowa Strengthening Families Program, the State Extension Service took the lead in disseminating the program through its statewide network, Dr. Spoth says. To date, the Extension Service has trained more than 600 group leaders to deliver the ISFP, and the program has been offered in 91 communities in Iowa.

"Using the Extension Service as the mechanism to replicate these programs in other communities is an exciting way to use an existing delivery system to get effective programming into the local communities," says Dr. Elizabeth Robertson of NIDA's Division of Epidemiology, Services, and Prevention Research. "Similar types of service delivery systems across the country could be tapped in the same way," she says. "We're working to identify such systems and tap them to disseminate effective drug abuse prevention programs."

In the last 2 years, Project Family has been working extensively in Iowa with another major service delivery system—the public schools—to implement its latest study, the Capable Families and Youth project. This NIDA-funded study will assess whether adding the Iowa Strengthening Families Program to a scientifically proven school-based prevention component has a greater impact on children's substance abuse and other health behaviors than the school-based program alone.

"Comprehensive prevention programs that include school, family, and community components require effective partnerships to implement and sustain them," Dr. Spoth says. "We're integrating the school system and its technical assistance infrastructure with the Extension Service as a way to implement these kinds of programs," he says. (See "The Next Step in Dissemination Proven Prevention Programs?" *NIDA NOTES*, Vol. 14, No 6.)

Sources

- Spoth, R. and Molgaard, V. Project Family: A partnership integrating research with the practice of promoting family and youth competencies. In: T.R. Chibucos and R.M. Lerner (eds.). *Serving Children and Families Through Community-University Partnerships: Success Stories*, Boston: Kluwer Academic Publishers, pp. 127-137, in press.
- Spoth, R.; Reyes, M.L.; Redmond, C.; and Shin, C. Assessing a public health approach to delay onset and progression of adolescent substance use: Latent transition and loglinear analyses of longitudinal family preventive intervention outcomes. *Journal of Consulting and Clinical Psychology*, in press. NN

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

Research Findings

Volume 14, Number 5 (December 1999)

Studying Comprehensive Drug Abuse Prevention Strategies

NIDA NATIONAL INSTITUTE ON DRUG ABUSE 25 Years 1974-1999 25 Years of Progress

In the early 1980s, NIDA began to encourage research on comprehensive drug abuse prevention programs that involve many components of a community. The theory behind this approach is that children are more likely to pay attention to antidrug messages that are repeated throughout the community than they are to heed messages from only one source, such as in school or at home.

One of the first of these comprehensive prevention programs was the Midwestern Prevention Project conducted by Dr. Mary Ann Pentz and her colleagues at the University of Southern California in Los Angeles. The research program was first implemented in Kansas City, Kansas, and Kansas City, Missouri, in 1984 and later replicated in Indianapolis, Indiana, starting in 1987.

The program involved schools, mass media, parents, community, and health policymakers. Sixth- and seventh-graders were taught in school how to resist social influences to use drugs. This learning was reinforced through public service announcements and news stories. Parents were encouraged to help their children on drug abuse prevention homework assignments and to talk with their children about drugs. Volunteers from the community provided leadership, developed community antidrug campaigns, and raised funds for related prevention activities. Finally, the community established policies that discouraged the use of drugs, cigarettes, and alcohol in schools, at work, and in public places.

Research findings indicated that students in the 107 participating schools in Kansas City and Indianapolis used significantly less marijuana, cigarettes, alcohol, and cocaine than did students whose schools did not participate. Substance abuse increased for both groups of students as they got older, but the increase was substantially less for students in participating schools.

Data from the Indianapolis study showed that the program could also reduce the use of marijuana, cigarettes, and alcohol by 6th- and 7th-graders who were already users of these substances. "Studies have shown that young people who use drugs and alcohol earlier than their peers are particularly likely to continue to abuse these substances later, so the fact that this program reduced substance use in this high-risk group was particularly promising," says Dr. William Bukoski of NIDA's Division of Epidemiology, Services, and Prevention Research.

"Our studies have shown that a substance abuse prevention strategy that involves many components of the community can slow the rate of increase of drug, alcohol, and cigarette use among early adolescents and also decrease the use of these substances by adolescents who are already using them," says Dr. Pentz. "This strategy works because it changes social norms and expectations. Changing social norms about drug use changes drug use behavior in turn." NN

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

Research Findings

Volume 14, Number 4 (November 1999)

Student Use of Marijuana Linked to Perceptions of Risk

Many American teenagers today do not believe that smoking marijuana is dangerous. That was one of the conclusions of a recent study, by Dr. Jerald G. Bachman and colleagues at the University of Michigan in Ann Arbor, that examined changing attitudes of high school students toward the use of marijuana. The study is based on an extensive review of data from NIDA-supported annual surveys of 8th-, 10th-, and 12th-graders. The surveys, which together make up the ongoing Monitoring the Future project, have collected data on drug use from high school seniors since 1975. Data from 8th- and 10th-graders have been collected since 1991.

The percentage of high school seniors who used marijuana at least once during the past year decreased from 50.8 percent in 1979 to 21.9 percent in 1992, before rising steadily to 37.5 percent in 1998. While use rose, the perception of harm from use declined from 76.5 percent in 1992 to 58.5 percent in 1998. Those who disapproved strongly of regular use dropped from 90.1 percent in 1992 to 81.2 percent in 1998.

Dr. Bachman's group's statistical analysis showed that the simultaneous rise in use and decline in perceived harmfulness during the mid-1990s was more than simple coincidence. To account for this waning concern about the dangers of marijuana, the researchers suggest that the decline in drug use in the 1980s may have led to a "lowering of the guard" of government, schools, mass media, and families. News coverage of drug issues fell substantially in the early 1990s, and fewer antidrug messages were aired during prime-time television programs, the researchers note.

Young people pay close attention to realistically and creatively presented information about the risks of drug use, the researchers suggest. "Presenting this kind of information on the risks and consequences of marijuana use only once does not do the job," says Dr. Bachman. "The message must be repeated regularly so we don't lose students from one year to the next." NN

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

Research Findings

Volume 14, Number 3 (September 1999)

Ethnic Identification and Cultural Ties May Help Prevent Drug Use

By Patrick Zickler, *NIDA NOTES* Staff Writer

Among Puerto Ricans, African Americans, and Asians, cultural influences and ethnic identification may significantly influence drug use. Studies conducted by NIDA researchers in New York City suggest that Puerto Rican and African-American adolescents who strongly identify with their communities and cultures are less vulnerable to risk factors for drug use and benefit more from protective factors than do adolescents without this identification. In San Francisco, NIDA-supported research demonstrated different patterns of drug use among different subgroups of the Asian community. These findings suggest that incorporating ethnic and cultural components into drug abuse prevention programs can make these programs more effective.

Adolescents who strongly identify with their communities and cultures are less vulnerable to risk factors for drug use.

In one study, Dr. Judith Brook at the Mount Sinai School of Medicine in New York City examined the extent to which ethnic and cultural factors influenced drug-related behavior in Puerto Rican adolescents. She and her colleagues interviewed 275 males and 280 females aged 16 to 24. The researchers asked the participants to describe the importance in their lives of cultural and ethnic factors such as observation of Hispanic holidays and customs, preference for speaking Spanish or English, feelings of attachment to their ethnic group, ethnic affiliation of their friends, and the value placed on the family. The participants also answered questions designed to assess their personal risk for drug use; these risk factors included the use of drugs by parents or siblings, peer use or tolerance of drug use, perception of the riskiness of drug use, and the availability of illegal drugs in their environment. The participants were categorized into stages of drug use: no reported drug use, used alcohol or tobacco only, used marijuana but no other illicit drug, or used illicit drugs other than or in addition to marijuana.

"Other studies have looked at ethnic identification in isolation, not as an interactive part of a young person's cultural and social context," Dr. Brook says. "We wanted to determine the extent to which ethnic and cultural factors might mitigate risk factors or enhance protective factors and lead to lower stages of drug use. We found that strong ethnic identification acts to offset some risks, resulting in less drug use.

"For example, strong identification with Puerto Rican cultural factors offsets drug risks such as a father's drug use, peer tolerance of drugs, and the availability of drugs. Identification with Puerto Rican friends offsets risks associated with family tolerance for drug use and drug availability," Dr. Brook notes.

Ethnic identification also serves to amplify the effect of protective factors, Dr. Brook says. For example, among participants whose siblings were not drug users, those with a strong Puerto Rican affiliation were significantly more likely to be in a lower stage of drug use than those whose affiliation was weaker.

In a related study that focused on late-adolescent African Americans in New York City, Dr. Brook and her colleagues found a similar interaction between ethnic and cultural identification and drug use. The study involved 627 participants—259 males and 368 females—ages 16–25 years.

The researchers found that components of ethnic identity—such as awareness of African-American history and tradition, identification with African-American friends, or participation in African-American cultural activities such as Kwanzaa interacted with other factors to reduce risk or to enhance protection.

"In isolation, few specific components of ethnic identity play a role as main effects on drug use. Instead, they act in combination with family, personality, or peer influences to blunt the negative impact of risk factors and magnify the positive value of protective factors," Dr. Brook says.

"Together, the research with Puerto Rican and African-American populations points out the importance of incorporating ethnic identity into drug programs," Dr. Brook concludes. "It can be a valuable part of drug prevention programs in communities and can also be applied to individual treatment programs."

Cultural Differences Lead to Different Patterns of Drug Use

In another NIDA-supported study, Dr. Tooru Nemoto and his colleagues at the University of California, San Francisco, have identified patterns of drug use among Asian drug users that are unique to ethnicity, gender, age group, and immigrant status.

"Large multiracial studies have not distinguished between Asian ethnic groups," Dr. Nemoto says. "The purpose of our study was to describe the patterns of drug use in Chinese, Filipino, and Vietnamese groups and to assess the relationship between cultural factors and drug use among the groups."

The San Francisco study was based on qualitative interviews with 35 Chinese, 31 Filipino, and 26 Vietnamese drug users who were not enrolled in treatment programs. All participants were 18 years or older, with an average age of 32.5, and had used illicit drugs more than three times per week during the preceding 6 months. Overall, immigrants and women represented 66 percent and 36 percent, respectively. However, all Vietnamese were immigrants.

Overall, participants born in the U.S. began using drugs at an earlier age—15 years—than did immigrant Asians—19 years—and were more likely than immigrants to use more than one drug. In general, women started drug use at about the same age as men-about 17.5 years-but ethnic groups showed a varied pattern. Chinese women began earlier—at 15.2 years—than Chinese men—at 18.5 years. Filipino women began using drugs later-at 15.5 years—than Filipino men—at 13.1 years. Vietnamese women in the study started drug use much later—at 27.8 years—than did Vietnamese men—at 19.9 years.

Dr. Nemoto and his colleagues identified differences in drug use among the ethnic groups. Filipino drug users were most likely to have begun drug use with marijuana, while Vietnamese drug users in the study most often started with crack or powder cocaine. Chinese and Vietnamese were twice as likely as Filipinos to be using crack as their current primary drug. Filipinos were four times more likely to be using heroin than were Chinese or Vietnamese. Filipino study participants were more likely than Chinese or Vietnamese to be injecting and less likely to be smoking drugs. There were also significant differences in the characteristics of drug user networks among the ethnic groups. For example, Filipinos were more than twice as likely as Chinese or Vietnamese participants to use drugs in groups that included members of other races or ethnic groups.

"These differences among ethnic groups have important implications for the way we design programs aimed at Asian drug users," Dr. Nemoto says. "Prevention programs should address the common factors among Asian drug users, such as stigma associated with injection drug use, but we should also be careful to incorporate factors that are unique to each target group."

Sources

- Brook, J.S., et al. Drug use among African Americans: Ethnic identity as a protective factor. *Psychological Reports* 83:1427-1446, 1998.
- Brook, J.S.; Whiteman, M.; Balka, E.B.; Win, P.T.; and Gursen, M.D. Drug use among Puerto Ricans: Ethnic identity as a protective factor. *Hispanic Journal of Behavioral Sciences* 20(2):241-254, 1998.
- Nemoto, T., et al. Drug use behaviors among Asian drug users in San Francisco. *Addictive Behavior* (in press). NN

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

Research Findings

Volume 12, Number 4 (July/August 1997)

Steroid Prevention Program Scores With High School Athletes

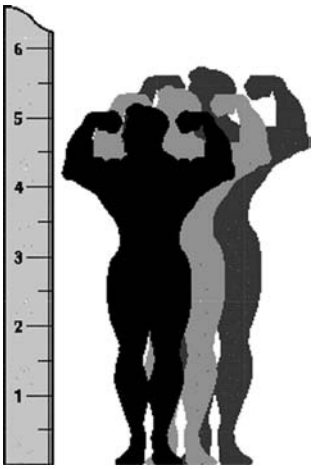
By Robert Mathias, *NIDA NOTES* Staff Writer

A NIDA-funded drug abuse prevention program is showing high school football players that they do not need to take anabolic steroids to build powerful muscles and improve athletic performance. By educating student athletes about the harmful effects of anabolic steroids and providing nutrition and weight-training alternatives to steroid use, the program has increased football players' healthy behaviors and reduced their intentions to use steroids.

Until now, anabolic steroids, drugs derived from the male hormone testosterone, have rarely been the focus of drug abuse prevention studies, says Dr. Ro Nemeth-Coslett of NIDA's Division of Epidemiology and Prevention Research.

This may be because steroids are not widely abused. Only about 2 percent of 8th-, 10th-, and 12th-grade students have ever used steroids, according to the NIDA-supported Monitoring the Future study for 1996. However, steroid abuse occurs more often among young people who are involved in physical training because anabolic steroids can increase muscle mass, strength, and stamina, Dr. Nemeth-Coslett points out.

Although adolescent boys, particularly those involved in athletics such as football or body building, make up the majority of high school steroid users, national surveys show that adolescent girls also are vulnerable to the lure of steroid use. However, that lure contains a hook—anabolic steroid use can have severe physical and emotional consequences for both males and females. Physical effects can include stunted growth, high blood pressure, and liver tumors. Psychological effects can include wide mood swings that range from episodes of uncontrolled anger and aggressiveness to clinical depression when steroid use is



Student athletes in the ATLAS program learn that stunted growth and many other harmful effects can result from steroid use.

Adolescent Girls Abuse Steroids, Too

What do anabolic steroids have in common with amphetamines, tobacco, diet pills, laxatives, and anorectics? They all are drugs used by adolescent girls seeking to stay thin, says Dr. Linn Goldberg of Oregon Health Sciences University. The use of these drugs, which often goes hand in hand with eating disorders, is particularly prominent among adolescent girls engaged in athletic activities ranging from track and field, soccer, basketball, and volleyball to school dance and drill teams, Dr. Goldberg says.

Dr. Goldberg and his colleague Dr. Dianne Elliot have been conducting preliminary research, funded by NIDA, to identify risk factors that influence adolescent girls use of harmful drugs. Among other things, the researchers have found that many adolescent girls use drugs to maintain thinness, Dr. Goldberg says. National surveys indicate that girls account for about one-third of the high school students who abuse steroids, Dr. Goldberg says. The primary reason that these girls use steroids is to lose fat and gain lean muscle, he says.

Dr. Elliot and Dr. Goldberg have already developed an effective steroid prevention program for male high school athletes described beginning on the previous page. Now, they are developing a similar drug abuse prevention program for adolescent girls. In their future research, the researchers hope to test the effectiveness of the intervention in reducing drug use and eating disorders among female athletes in Oregons public middle and high schools.

The prevention program gives student athletes the knowledge and skills to resist steroid use and achieve their athletic goals in more effective, healthier ways.

stopped. (See "Questions and Answers About Anabolic Steroids," *NIDA NOTES*, Vol. 12, No. 4)

"The Adolescents Training and Learning to Avoid Steroids (ATLAS) program uses a team-oriented educational approach that motivates and empowers student athletes to make the right choices about steroid use," says Dr. Linn Goldberg of Oregon Health Sciences University in Portland, who led the research team that developed and tested the program. The program consists of classroom, weight-training, and parent information components. Together, they give student athletes the knowledge and skills to resist steroid use and achieve their athletic goals in more effective, healthier ways, he says.

In ATLAS's classroom component, football coaches and student leaders conduct seven highly interactive sessions that explore the effects of steroids, the elements of sports nutrition, and strength-training alternatives to steroid use. These classes also hone the athletes' decision-making and drug-refusal skills. In a typical session, the football team is split into squads of six or seven students, with student squad leaders conducting the sessions and teaching most of the intervention, according to Dr. Goldberg. "It's kids talking to kids; that's an important ingredient in our program," he says. Coaches, who have a substantial influence on these student athletes, also play an important role on the steroid prevention team, Dr. Goldberg says. Coaches introduce topics and wrap up each session, he explains.

"The ATLAS program is voluntary, and students get no credit for it, so it better be entertaining," he says. As a result, ATLAS classroom sessions are designed to combine fun and games and learning. Coaches move from squad to squad and introduce a topic, such as the effects of anabolic steroids. Then squad leaders take over and initiate an action game that incorporates the topic. For example, players may toss a football to each other as they answer questions about problems that stem from steroid use. "Although they are playing a game, each one is paying attention and listening because someone is flipping the ball to them," says Dr. Goldberg. "No one is saying to them, 'Watch out, steroids cause liver disease, acne, and so forth,'" he notes. "But while they are laughing and having a good time, they are actually watching and learning at every step of the way."

"Football players are athletes; they like to compete," Dr. Goldberg notes. Therefore, several games pit squads against each other to try and earn the most points for correct answers about weight training, nutrition, and steroids. In addition to games, "students do mock public service announcements, they do 'rap,' they do songs, and they do newspaper articles in the classroom sessions," he says.

In ATLAS's weight-training component, research staff members conduct seven hands-on sessions that teach the students proper weight training techniques. These sessions are designed to help student athletes build the muscular strength and agility needed to achieve their athletic goals without using steroids.

In the parent information component, parents participate in an information and discussion session about the program with the ATLAS staff. The staff gives the parents a family sports nutrition guide and encourages them to support and reinforce the antisteroid and nutritional goals of the program at home. Students in the program say their parents are more opposed to steroid use after the intervention and often provide healthier meals at home, according to Dr. Goldberg.

Late last year, Dr. Goldberg reported results of an ongoing study of ATLAS's effectiveness in preventing steroid use among more than 1,500 football players from 31 high schools in the Portland area. Some 702 football players at randomly selected schools received the 7-week program during football season. Another 804 football players at matched schools served as a control group and received only a standard informational brochure on the dangers of steroid use.

Assessments conducted immediately after the intervention and 1 year later show that, compared with control students, student athletes who participated in the ATLAS program knew more about exercise, nutrition, and the harmful effects of anabolic steroids. ATLAS participants also had an increased sense of personal vulnerability to negative effects of steroids, more unfavorable attitudes toward their own and others' use of steroids, and reduced intent to use steroids. ATLAS students also showed greater improvement in their nutritional habits than did control students. For example, they were more likely to eat high-protein low-fat meals at school, home, and fast-food restaurants. In addition, ATLAS students were more likely than students who did not participate in the program to use established weight-lifting and strength-conditioning techniques.

"The program's positive effects flow from changing the student athletes' attitudes and perceptions about steroids and then changing their nutrition and exercise behaviors," Dr. Goldberg says. These changes in behavior are reinforced by conducting periodic tests of the athletes' body

composition, strength, and power. "If they are training properly, they are a heck of a lot stronger. So, it's real positive reinforcement to them," he says.

"Student athletes who participate in the ATLAS program achieve," Dr. Goldberg says. The year before they entered the program, the football teams that were randomly assigned to receive the intervention had much worse won-lost records in football than the teams in the control group had, he says. At the end of the first year, the two groups' records were about the same, but teams in the ATLAS program did slightly better. At the end of the second year, the won-lost records of the ATLAS teams were substantially better than those of the control teams, with some of the ATLAS teams making the playoffs at the end of the season. "I don't know whether these teams' improved performance is due to the ATLAS program," Dr. Goldberg says. "I do know some of those schools hadn't been to the playoffs in 25 years. The data showing improvements in program participants' body composition and muscle mass are consistent with these teams' success," he says.

Source

- Goldberg, L.; Elliot, D.; Clarke, G.N.; MacKinnon, D.P.; Moe, E.; Zoref, L.; Green, C.; Wolf, S.L.; Greffrath, E.; Miller, D.J.; and Lapin, A. Effects of a multidimensional anabolic steroid prevention intervention: The adolescents training and learning to avoid steroids (ATLAS) program. *JAMA* 276(19):1555-1562, 1996.

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Research Findings

Volume 12, Number 3 (May/June 1997)

Specialized High School Prevention Programs Target At-Risk Adolescents

By Robert Mathias, *NIDA Notes* Staff Writer

Adolescents on their way to dropping out of school and abusing drugs can be diverted toward healthier, more successful lives, according to NIDA-supported researchers. By using interventions designed specifically to address the personal and social factors that place some high school students at risk of drug abuse, schools can reduce these young people's drug use and other unhealthy behaviors, these researchers say.

One such drug abuse prevention program under way in the Seattle area has improved academic performance and reduced drug involvement among high school students whose poor academic records and behavioral problems indicate they are at high risk of dropping out of school and abusing drugs. Another drug abuse prevention program in California is showing promising early results in reducing and preventing serious drug use among students in continuation schools. Continuation schools are alternative public schools where students with behavioral and other problems can complete their high school education.

Reconnecting Youth

"Our ethnographic studies show that kids who are at high risk of dropping out of school and abusing drugs are more isolated and depressed and have more problems with anger," says Dr. Leona Eggert of the University of Washington in Seattle. "They are disconnected from school and family and are loosely connected with negative peers," she says. Additional assessments indicate that many of these youths also have suicidal behaviors or thoughts, Dr. Eggert says. Universal drug abuse prevention programs that are aimed at all youths in a school are usually inadequate to meet the special needs and problems of these youths, she states.

Dr. Eggert and her colleagues have developed a high school-based drug abuse prevention intervention that is designed for students in the 9th through 12th grades who are skipping classes, doing poorly academically, and in danger of dropping out of school and abusing drugs. The program, called Reconnecting Youth, works to reattach at-risk youths to their schools, their families, and positive peer groups. The program also teaches them social and personal skills they can use to better manage their emotions and deal with their problems without resorting to drug use.

Reconnecting Youth's core element is a one-semester daily Personal Growth Class that is incorporated into the youths' regular class schedule. The class is led by a teacher who fosters the development of a mutually supportive peer group that encourages positive behaviors. The group encourages acceptance, respect, understanding for others, and a willingness to help other classmates solve their problems constructively. The class also focuses on enhancing the youths' self-esteem; improving their decision-making and communications skills; and improving their ability to manage stress, anger, and depression. The ultimate goals of the program are decreased drug use and increased school performance and emotional well-being.

Studies conducted among multiethnic populations of at-risk boys and girls in Seattle area high schools show that, compared to at-risk youths who did not receive the intervention, youths in the Reconnecting Youth program have increased academic performance and decreased drug involvement. The program also improves at-risk youths' ties to their schools and teachers and increases their self-esteem and social support. The program is equally effective with boys and girls but appears to have more of an effect on reducing girls' attachment to friends who skip school and use drugs. Determining the ramifications of this apparent gender difference requires more detailed analysis, which Dr. Eggert plans to do in future studies.

The latest version of the Reconnecting Youth program includes additional classroom and school components that address the needs of the substantial portion of these youths who also are at risk for suicide. The program has been shown to decrease depression, anger and aggression, stress, and suicidal thoughts and behaviors among these youths.

Project Toward No Drug Abuse

Adolescents completing their education in continuation or alternative public high schools are another group at high risk for drug abuse. In California, youths are transferred from regular schools to continuation high schools because of negative behaviors such as drug use, truancy, and fighting with schoolmates, explains Dr. Steven Sussman of the University of Southern California. These students report much higher levels of drug and alcohol use than do students in traditional schools, he says. Research by

Dr. Sussman and others indicates that about 36 percent of continuation high school students report weekly marijuana use compared to 9 percent of high school students in traditional schools. About 25 percent of continuation high school students in California also say they smoke marijuana daily, Dr. Sussman says.

Preventing drug abuse among these youths presents many difficulties, he says. First, drug abuse prevention programs that have worked with general populations of younger adolescents in junior high and middle school are less likely to be effective with these older, at-risk high school students. Second, students in continuation high schools present a complex mix of behavioral and social problems and come into daily contact with many other students who use drugs and have a favorable attitude toward drug use. Finally, many of these youths already have used, or currently are using, a variety of drugs.

To meet the needs of this at-risk population, Dr. Sussman has been developing a specialized school-based curriculum for continuation high school youths that forms the core of a program called Project Toward No Drug Abuse. To develop the curriculum, he relied heavily on extensive testing and the feedback of continuation high school youths themselves. This research sought to ensure that the curriculum would be acceptable and relevant to these youths, tailored to counteract their specific reasons for drug use, and practical for continuation high schools to implement.

The resulting curriculum consists of motivational activities, social skills training, and decision-making components. These components are delivered in nine classroom sessions over the course of three weeks to all students in the continuation high school by health educators trained by project staff. The program uses a variety of interactive teaching strategies such as role playing and self-scoring questionnaires to motivate students in the class against drug use, provide them with the skills they need to change their negative behaviors, and guide them toward decisions to not use drugs.

"What we're doing in the nine lessons is trying to find motivators for change that are personally relevant for these high-risk youths," says Dr. Sussman. For example, in one session, the students are encouraged to resist succumbing to negative stereotypes of continuation high school students as "losers" who abuse drugs and have no goals in life. In fact, continuation high school students say they have goals like anyone else, such as getting a job or attending college, Dr. Sussman says. Therefore, another session demonstrates how drug abuse can destroy their health and limit their ability to achieve their goals. "Basically, we are getting them to be more internally and externally consistent so their behavior matches what they think of themselves and what they want," he says.

The curriculum for Project Toward No Drugs is currently being tested among a multiethnic group of more than 1,500 boys and girls in 21 continuation high schools in southern California. An initial analysis conducted 1 year after the conclusion of the class indicates that the program has had significant preventive effects on drug and alcohol use, Dr. Sussman reports. Because the program was developed with feedback from boys and girls from a number of ethnic groups, there were no significant differences in effect by gender or ethnicity, he says.

Sources

- Eggert, L.L. Psychosocial approaches in prevention science: Facing the challenge with high-risk youth. *Communicating Nursing Research* 29(4):73-85, 1996.
- Eggert, L.L.; Nicholas, L.J.; and Owen, L.M. *Reconnecting Youth: A peer group approach to building life skills*. Bloomington, IN: National Educational Service, 1995.
- Eggert, L.L.; Thompson, E.A.; Herting, J.R.; and Nicholas, L.J. Reducing suicide potential among high-risk youth: Tests of a school-based prevention program. *Suicide and Life-Threatening Behavior* 25(2):276-296, 1995.
- Eggert, L.L.; Thompson, E.A.; Herting, J.R.; Nicholas, L.J.; and Dicker, B.G. Preventing adolescent drug abuse and high school dropout through an intensive school-based social network development program. *American Journal of Health Promotion* 8(3):202-215, 1994.
- Sussman, S. Development of a school-based drug abuse prevention curriculum for high-risk youths. *Journal of Psychoactive Drugs* 28(2):169-182, 1996.
- Sussman, S.; Simon, T.R.; Dent, C.W.; Stacy, A.W.; Galaif, E.R.; Moss, M.A.; Craig, S.; and Johnson, C.A. Immediate impact of thirty-two drug abuse prevention activities among students at continuation high schools. *Substance Use and Misuse* 32(3):265-281, 1997.

For more information

- About Reconnecting Youth, contact Psychosocial and Community Health Department, Box 357263, University of Washington School of Nursing, Seattle, WA 98195-7263, (206) 543-9455.
- About Project Toward No Drug Abuse, contact Institute for Health Promotion and Disease Prevention Research, University of Southern California, 1540 Alcazar St., CHP 207, Los Angeles, CA 90033, (213) 342-2589. NN

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Research Findings

Volume 12, Number 3 (May/June 1997)

Multifaceted Prevention Programs Reach At-Risk Children Through Their Families

By June R. Wyman, *NIDA NOTES* Staff Writer

Two NIDA-funded studies are finding that working with the family is more effective in reducing risks of drug abuse than working with parents or children alone. Both projects target families at risk. The Strengthening Families Program works with parents and children in families where the parents abuse drugs, while Focus on Families works with parents who are in methadone treatment. Children from such families, research shows, are at risk for becoming drug abusers themselves.

Strengthening Families

The Strengthening Families Program is aimed at 6- to 10-year-old children of drug abusers and their parents.

"We work on improving parent-child relationships—their time together, their communication patterns," says Dr. Karol Kumpfer of the University of Utah in Salt Lake City, the project's principal investigator. "We try to change the family dynamics, to create a more democratic family where they actually have family meetings, talk together, and plan activities together. Then the child feels that he or she belongs to something, that 'we are a family, we believe certain things, we stand for certain things, and we work together as a unit.'"

Dr. Kumpfer devised her program after reviewing more than 500 family drug abuse prevention programs. From this survey, she designed a study to compare three promising approaches: a 14-session parent training program; the same program combined with a children's skills training program; and a three-way merger of the parent and child programs with a family skills training program.

Her study, done in Salt Lake City, involved families with parents who were in methadone treatment programs or who were substance-abusing outpatients at community mental health centers. The research showed that the three-part intervention was the most powerful in reducing problem behaviors. Compared with families that did not receive any intervention, families that went through the three-part program showed significant improvements in adults' parenting skills, children's social skills, and family relationships. Children achieved significant reductions in aggressiveness and other problem behaviors. Older children significantly reduced their use of tobacco, drugs, and alcohol, and parents reduced their depression and drug use substantially.

The three-part curriculum became the Strengthening Families Program and has since been adapted and tested with different ethnic populations across the country. Although these modified versions of the program differ in cultural content, all use the same basic framework: parent training, children's training, and family skills training. In each of 14 weekly sessions, groups of parents and children

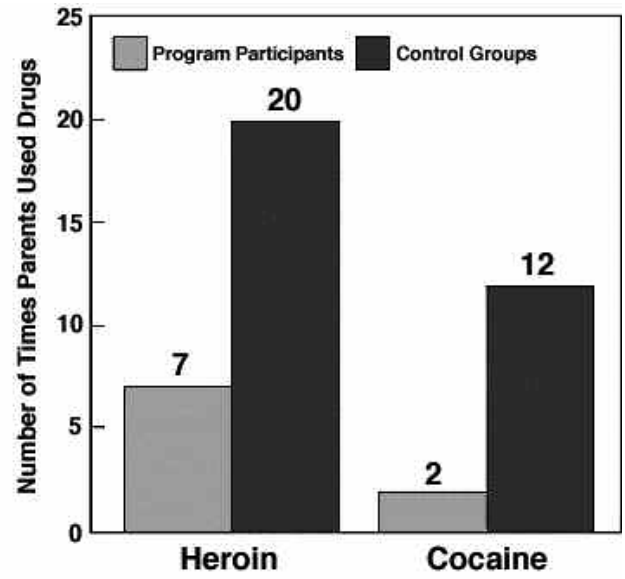
Defining Prevention Programs By Their Audiences

Any program works best when it is tailored to its audience—and the same is true of drug abuse prevention efforts. While some programs try to reach whole communities, others target specific at-risk subgroups. To describe the different approaches, researchers have adopted new definitions:

- Universal programs reach the general population, but in a defined setting. Example: all students in a school.
- Selective programs target groups within the general population that research has defined as at risk for drug abuse. Examples: children of drug abusers, poor school achievers.
- Indicated programs are designed for people who already have tried drugs or show other risk-related problem behaviors. Example: high school students at risk for dropping out because of multiple problems such as depression, poor grades, and substance abuse.

A project may use one, two, or all of these strategies. The family-focused programs on this page are selective prevention projects; the school-based programs described in "Specialized High School Prevention Programs Target At-Risk Adolescents" (page 60) are indicated programs.

Average Drug Use During Past 30 Days By Parents, 12 Months After Finishing Focus on Families Program



Parents in the Focus on Families parenting program, all recruited from methadone treatment clinics, reported using heroin and cocaine less often than did clinic parents who did not participate in Focus on Families.

are taught separately for the first hour. In the second hour, they come together to practice their new skills. Afterward, the whole group shares dinner and a movie or other entertainment.

In their sessions, children learn how to be direct, to talk about problems, and to ask for what they need. For example, "A lot of the kids say that they would like to tell their parents to stop using drugs, and they just don't know how —so we teach them those skills," says Donna Lee Picaso, a caseworker with the Denver Area Youth Services Agency who led children's classes in the Denver study. Children also learn how to resist peer pressure, handle anger, deal with criticism, and cope with problems without resorting to drugs.

Parents are trained in techniques such as establishing goals, giving incentives and reinforcements, and setting limits. "They're right up front with saying they have very limited skills, and they're anxious to learn new ones," says Donna Martinez, a social worker in the Denver study.

Sessions are held in facilities that are easy for participants to reach such as family support centers in urban housing projects, community centers, local churches, and schools. Group size has ranged from 5 to 14 families. Session leaders are recruited from local social service agencies and have counseling or social work experience.

Focus on Families

A different approach is taken in Focus on Families, a parenting program for methadone treatment patients developed by Dr. Richard Catalano and his colleagues at the University of Washington in Seattle. The goal of this program is to reduce parents' use of illegal drugs by teaching them how to cope with problems without resorting to drug abuse and how to manage their families better.

The program was tested in Seattle with families recruited from two Seattle-area methadone clinics. Although all parents were in methadone treatment to reduce their drug use, 54 percent reported that they had used heroin, marijuana, cocaine, and other illegal drugs in the month before entering the family program. Families were randomly assigned to the experimental group, which went through the Focus on Families program, or the control group, which did not.

After families attended an initial 5-hour retreat, parents completed 4 months of twice weekly 90-minute training sessions. Children attended 12 of the sessions to practice communication skills with their parents.

Case managers visited each family at home every week for 9 months to help apply new skills and solve family problems. These house calls were critical, says Kevin Haggerty of Dr. Catalano's research team. "Families need hands-on coaching to reinforce the skills they learn and to deal with the never-ending crises in the lives of addicted parents."

To assess the program's impact, parents were interviewed before the program, right after their 4-month training, and again at 6, 12, and 24 months after the end of training. Children age 6 and older in the treatment families, as well as control group families, were interviewed at the same intervals.

"A lot of the kids say that they would like to tell their parents to stop using drugs, and they just don't know how—so we teach them those skills."

At the 12-month interview, program parents reported dramatic reductions in their heroin and cocaine use and significantly better parenting skills compared with the control group, Dr. Catalano reports. At the 24-month followup, parenting and problem-solving skills remained significantly better, but "we lost the significant treatment effects on drug use," says Haggerty. "Family interventions need to be ongoing with parents who are drug addicts," he concludes.

The program had a mixed impact on the children, who ranged in age from 3 to 14 years. At the 24-month followup, program children reported a trend toward less delinquent behavior and marijuana use, and those 9 years and older reported lower rates of alcohol initiation. The program appears to have had a greater impact on younger children than older ones. This finding suggests that children of addicts may benefit more if they are exposed to improved parenting earlier and longer, the researchers conclude.

Next Steps

Despite promising results from these models, there is much to learn about preventing drug abuse in families, says Dr. Rebecca Ashery of NIDA's Prevention Research Branch. More research is needed on issues such as:

- how to adapt successful programs to different cultural and ethnic groups as was done with the Strengthening Families Program;
- how males and females respond differently to drug abuse prevention training;
- how to attract and retain families in prevention studies;
- intervening with the extended family; and
- intervening with the most dysfunctional families—for example, parents who take drugs, are physically or emotionally abusive, and suffer from major mental illnesses.

Another next step is to put more emphasis on very young children. "Through research we're finding out that it's not too soon to intervene early in school or even before school," says Dr. Ashery.

"In the long run, what it will take is a comprehensive approach. You can't do the family in isolation, the school in isolation, the community in isolation," she says. "You have to do it all in concert: school, family, and community together."

Sources

- Catalano, R.F.; Haggerty, K.P.; Fleming, C.B.; and Brewer, D.D. Focus on Families: Scientific findings from family prevention intervention research. *NIDA Research Monograph*, in press.
- Kumpfer, K.L.; Molgaard, V.; and Spoth, R. The "Strengthening Families Program" for the prevention of delinquency and drug use. In: Peters, R., and McMahon, R., eds. *Preventing Childhood Disorders, Substance Abuse, and Delinquency*. Thousand Oaks, CA: Sage Publications, pp. 241-267, 1996.

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- About Focus on Families, contact Kevin Haggerty, Social Development Research Group, University of Washington, 9725 Third Ave. N.E., Ste. 401, Seattle, WA 98115, (206) 543-3188. NN

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Research Findings

Volume 12, Number 3 (May/June 1997)

Research Meets the Challenge of Preventing Drug Use Among Young People

By NIDA Director Dr. Alan I. Leshner

National surveys of drug abuse have brought disturbing news in the last few years: Drug use has increased among our Nation's youth. While some news media speculate about a possible return to the high levels of adolescent drug use that the Nation witnessed in the 1970s, they are missing an equally important and more hopeful story. NIDA-supported prevention research has made great strides in developing both the knowledge and the tools that can stem the tide of drug abuse and curb its devastating effects on our Nation's young people.

A growing body of scientific information shows that many factors can protect young people from drug use while other factors put them at risk of abusing drugs. Strong parent-child attachment, appropriate parental supervision, commitment to school, academic success, and friends who have conventional values are some protective factors. Chaotic family environments, ineffective parenting, poor academic performance, and deviant peer influences all put youths at risk. We also know that the impact of specific risk and protective factors may diminish or increase as young people develop, and their circumstances change.

Prevention practitioners now can select from a broad array of effective family-, school-, and community-based prevention programs.

Because risk and protective factors for drug use are found in the home, the school, and the community, NIDA has supported research on prevention programs in each of these domains. As a result, prevention practitioners now can select from a broad array of effective family-, school-, and community-based prevention programs to meet the needs of different groups in their communities.

Successful drug abuse prevention programs fall into three categories—universal, selective, and indicated—that describe their intended audience. "Universal" programs are meant for everyone in a school, a community, or a similar group and can reduce the overall prevalence of drug use. Our research indicates that universal community programs need to be comprehensive with well-coordinated components for the individual, the family, the school,the media, and community organizations. One such universal community-based program, developed by NIDA-funded researchers at the University of Southern California in Los Angeles, has reduced drug use over a 5-year period among middle-school students in Kansas City, Missouri. In this comprehensive program, a classroom curriculum teaches students how to resist influences to use drugs. In addition, schools, parents, mass media, and community organizations work together to promote consistent antidrug messages, attitudes, and policies in the community.

Although universal drug abuse prevention programs can work with general populations, they may not meet the special needs of groups within those larger populations who are particularly at risk of drug abuse. NIDA-funded researchers have been identifying these at-risk groups and individuals and developing "selective" and "indicated" programs to meet their complex needs. A special section in this issue, "Children on the Brink: Youths at Risk of Drug Abuse," highlights some of the remarkable results of this research.

"Selective" drug abuse prevention programs target groups who are exposed to factors that place them at greater-than-average risk of future drug abuse. Such programs are tailored to reduce the identified risk factors and strengthen appropriate protective factors in these individuals' lives. Research shows that children of substance abusers make up one such at-risk group.

Armed with this knowledge, NIDA-supported researchers at the University of Utah in Salt Lake City have developed a selective prevention program for these children and their parents. The family-focused program works to improve interactions within families. As a result, the program has reduced family conflicts, youth problem behaviors such as aggression and delinquency, and substance abuse. (See page 62, "Multifaceted Prevention Programs Reach At-Risk Children Through Their Families.")

Early childhood programs could reduce risk factors and build resistance to drug use even before children enter school.

NIDA also has supported research to develop "indicated" drug abuse prevention programs for adolescents who already are exhibiting early signs of drug abuse and other problem behaviors such as school failure, antisocial behaviors, and psychological problems. Research shows that youths with these characteristics are at high risk of continued drug abuse. Successful indicated programs address these youths' specific problems, enhance protective factors, and reduce their substance use. A high school-based indicated program developed for such troubled youths by NIDA-supported researchers at the University of Washington in Seattle has reduced their problem behaviors, increased their academic performance, and reduced their drug involvement. (See page 60, "Specialized High School Prevention Programs Target At-Risk Adolescents.")

While NIDA research shows that drug abuse prevention can work, we need to expand the range of effective prevention approaches and strategies. In one such effort, NIDA's Division of Epidemiology and Prevention Research is emphasizing the development of family prevention programs that intervene in early childhood to improve family functioning and parenting skills. Such early childhood programs could reduce risk factors and build resistance to drug use even before children enter school. Current studies also are testing new school-based programs that begin as early as kindergarten and extend through the primary grades. Several of these programs are aimed at children with conduct disorders, a known risk factor for later drug abuse.

We also are seeking and supporting research on the special needs of older children and adolescents who have dropped out of school, run away from home, become homeless, or been placed in juvenile court detention programs. This comprehensive research program will help us develop targeted interventions to meet the specific needs of diverse groups of youths at risk of drug abuse. (See "Drug Abuse Among Runaway and Homeless Youths Calls for Focused Outreach Solutions," *NIDA NOTES*, Vol. 12, No. 3)

The increased drug use we have seen among America's youth in recent years is a warning signal that it is time for new and effective solutions to address the problem. NIDA's prevention research program is providing the knowledge, guidance, and tools to States, communities, families, and individuals as they work to ensure that young people remain firmly on the road to healthy and productive lives. NN

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