These highlights are based on presentations and discussions at the National Conference on Marijuana Use: Prevention, Treatment, and Research.

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OPENING PLENARY SESSION

Welcome

Conference Host: *Alan I. Leshner, Ph.D.*
Director
National Institute on Drug Abuse

Good Morning. I am Alan Leshner, Director of the National Institute on Drug Abuse (NIDA), and it is my great pleasure to welcome all of you to this landmark event—the first National Conference on Marijuana Use: Prevention, Treatment, and Research.

We are here today on behalf of more than 3 million children and adolescents who have tried marijuana and by doing so have been placed at risk for a wide range of life problems. But we are also here on behalf of the other 20 million of our youth who have never tried marijuana. We want to make certain that they continue to receive the clear and unequivocal message that they need not and should not use this drug. We need to help them strengthen their conviction to engage in a healthy, productive, and drug-free lifestyle.

We are collaborating in sponsoring this meeting with our colleagues from the Center for Substance Abuse Prevention (CSAP) and the Center for Substance Abuse Treatment (CSAT). Our purpose in organizing this conference is to provide scientifically based information on marijuana; to dispel commonly held myths surrounding marijuana use; to increase public awareness of the rising trends in marijuana use; and to educate the public about the consequences of marijuana use, especially for young people.

We are also hopeful that the information disseminated by this conference will be useful in educating the drug abuse prevention and treatment communities about research results that can assist them in their prevention and treatment efforts.

Before going further, I would like to introduce Mr. Ronald G. Shafer, who has been speaking out about a very tragic personal experience.

America's Nightmare—Youth and Drugs: A Personal Experience

Ronald G. Shafer
Staff Reporter
The Wall Street Journal

America's new nightmare is our children as victims of drugs.

My teenage son, Ryan, started using drugs at about age 12. He played Little League baseball, had a sunny smile and big brown eyes, and was a free-spirited person who could make you laugh. He collected baseball cards. Now, Ryan's laughter is gone. Because of drugs, he is dead. And every day, my heart breaks a little more.

My family and I are reliving our nightmare in the hope that it might save another young person who thinks he or she can control their drug use. We may help a family from experiencing the pain we will always feel.

As a parent I am amazed that our children can hide even extreme drug and alcohol abuse from us until it is almost too late. We did not find out about Ryan's drug use until he was 14. And the extent of his use was far beyond our worst fears. I recently learned from Ryan's notes about his

drug use in 1986: "I used cocaine a lot. It started out as a weekend use, but soon I had or tried to have it daily. I used PCP (a hallucinogen) two or three times a week. I used hallucinogens all the time, such as acid, mushrooms, peyote, ecstasy, and mescaline. I used LSD about 300 times." It was marijuana that started Ryan on his downfall and was always the drug he went back to.

Most people never intend to get addicted to drugs. I am sure that Ryan never meant to get hooked. Ryan Glenn Shafer came into our lives on May 27, 1971, when my wife Barbara and I adopted him. He was 2 months old, and a major expansion to our family.

Ryan became a boy with wide and intense interests, who was fun-loving, had a sense of humor, and charmed his friends and adults. Ryan had been troubled by low self-esteem and by difficulty in school, despite being named "Joe Cool" at his school. (We now know that both are early warning signs of a child at risk of drug use.) We now know that Ryan had begun experimenting with drugs as early as the sixth grade. While Ryan went through his stages of drug abuse, we were going through the typical stages of parents of drug-abusing adolescents.

The first stage is ignorance. In 1983 we never suspected that drug use was possible with our preteen. He was way too young. We began to notice personality changes, hostility, and rebellion. These seemed to be normal changes we had seen in our friends' teenagers.

The next stage is denial. Ryan's actions worsened, but we did not accept what we know now were warning signs: use of eye drops to cover up red eyes from smoking marijuana, incense burning in his room to mask the odor, calls from friends whom we had not met, trouble at school, money missing from around the house.

In 1985 Ryan, in the ninth grade, could no longer hide his drug troubles. He began cutting classes—a common tipoff to drug use. He had missed nearly two dozen classes and was failing everything by the time the school called us. School officials at that time did not know much more about drugs than we did.

The school did guide us to a local physician who had treated hundreds of adolescents. Ryan denied drug use as most drug abusers do. "You don't trust me," he self-righteously protested.

Tests showed "low positive" for marijuana use. His tests would have been "high positive," but Ryan was sneaking into our bedroom and watering his urine. He later informed us of this and that he had been cutting classes to smoke marijuana daily.

The next stage was minimization. Thank God, it was "only" pot. Marijuana can be a damaging drug for young people. Heavy use can cause short-term memory loss and long-term health problems. Pot and alcohol can also be gateways to more serious drugs. By now, Ryan was long past his experimental stage of drug use and was into planned use.

As Ryan advanced into his third stage of drug abuse, chemical dependence, his problems took control of our family. Drugs changed him into a person we did not recognize. He was lying, shouting, scheming, and manipulating. My wife and I experienced anger over his actions, uncertainty over his insistence that he was innocent, and frustration over our inability to resolve the situation. It was time for professional help.

In January 1986, we moved into the stage of acceptance and placed Ryan in the Arlington (VA) Hospital's 6-week, residential, adolescent treatment program. When Ryan hit bottom he was ready to accept treatment. Despite this, he still hid the full extent of his use from us. He told us later that he saw snakes coming out of the TV set the night before entering treatment, while

[appearing] to be calm. He was on an LSD "acid trip." The intake tests revealed the extent of his drug use. He was called a "garbage head," a person who heavily abuses both drugs and alcohol.

Ryan's drug of choice was LSD, which causes vivid hallucinations. Fellow residents called him "blotter boy" because he had used LSD impregnated on blotter paper and sold like sheets of stamps for as little as $3 to $5 a hit.

We discovered the limits of drug testing. LSD is detectable only in special tests, while cocaine remains in the system for about 2 to 3 days. Marijuana stays in the system about 30 days and thus is the most likely to be detected.

While Ryan received treatment, Barb and I attended parent-counseling sessions. We learned that, like us, most parents had no idea of their children's heavy drug or alcohol use until the youths could no longer hide their dual lives. Some of the parents were strict, some were lenient, all were caring. Most were middle-class with insurance. There is no magic bullet of parenting against drugs.

Ryan dove into the program with gusto. He won over counselors and parents with his charm. We finally got our real son back. He told us about how he had slipped out of his bedroom window at night to buy drugs. Ryan was home for his 15th birthday in March 1986. He attended 15 weeks of after-care 5 days a week. He went to the 90 meetings of Alcoholics Anonymous or Narcotics Anonymous as required. He was on the road to recovery and our troubles were behind us.

Ryan was a 10th-grader by his 16th birthday, and was doing great. His drug tests were clean and his grades were great. He raised his reading level, damaged by pot use, to 12th-grade level; got his driver's license, and worked part-time. It was a joy having our son back.

Suddenly, the old signs reappeared. His grades dropped, he spent money excessively, and his behavior deteriorated. A test showed signs of marijuana, probably laced with PCP. Ryan had to go into another rehab program. We were crushed.

In spring 1987, he entered a new 10-week outpatient program at Arlington Hospital. As he progressed, his tests showed no drugs, but his personality did not return. He remained abusive and temper prone.

We believe he truly wanted to stop using drugs. In a note he wrote, thanking us for putting him in treatment, he said: "For the first time in a long time I am very happy with my life. I really do not want to lose what I have just because I want to smoke pot."

Then the situation took a dark turn. Ryan became involved with a person he claimed to be his Alcoholics Anonymous "sponsor." He was supposed to be a recovering addict with more sober time who could help Ryan. We discovered the man to be connected with Ryan's earlier drug use. We forbade Ryan from seeing the man, but he did so anyway. Things began to deteriorate quickly.

Ryan talked about committing suicide for the first time. He was ejected from the rehab program the next day after testing positive for marijuana. Springwood Psychiatric Hospital had one bed open. We took him in that night.

This time Ryan resisted. We got him to Springwood, where doctors told us he was in a deep depression. Therapy indicated low self-esteem. He was diagnosed a manic-depressive, suffering the wide mood swings of a bipolar disorder. It is not known whether drugs caused his problems,

or whether he used drugs to self-medicate. Tests at Springwood showed no recent drug use and there were no withdrawal symptoms, but with LSD there are not any.

Once again, he responded to treatment. His mood swings were stabilized with lithium and other medicines. After 6 weeks, in early September, he came home. He was accepted at Fairfax County's special education school.

Ryan seemed free from drugs and more like his old self. He closely followed the news and discussed the Supreme Court nomination of Robert Bork. He would correct his father, the journalist, with, "I think I know a little bit more about Supreme Court nominations than you do."

His medicine made him tired, and he often went to bed early. One night in late September, I looked in his room and said, "I love you, Ryan." He picked his head up, smiled, and said softly, "Thanks, Dad."

Within the week, he was dead. The fatal accident occurred at about 8:30 p.m. on October 1, 1987. It hit us with a jolt of electricity: Ryan was dead. I would never hold my little boy again. It is true that if your child dies, a part of you dies with him.

Ryan drove his car off a street in Vienna, VA. He inexplicably fled the minor accident and ran a half-mile down the road, where he was bumped by a car. This motorist tried to help Ryan, but he resisted and continued inexplicably fleeing. Ryan ran onto another highway where he was hit head-on and killed instantly by a van. This vehicle did not even stop.

Tests showed no evidence of drugs. But Ryan, we learned, was speeding from the home of a drug dealer. Ryan had obtained LSD, a hallucinogen that can cause panic and that often does not show up in tests, from someone earlier in the day. One way or another, drugs took my only son.

In the suburbs of America, both drug use and the violence related to it are often hidden. Ryan was coming from the home of a drug dealer. Several young people came forward to police after Ryan's death. These accounts along with our pleas resulted in the drug dealer's arrest. He was charged with distributing marijuana and other drugs to minors. He also was charged with the statutory rape of a 13-year-old girl and with soliciting sex from a 14-year-old boy.

Our main concern after Ryan's death was the psychological impact on our daughter, Katie, now nearly 16. Katie has never used drugs and has dealt with the loss of her brother by counseling others against drug use.

The key to saving lives is early intervention, during the first to third years that young people typically hide their drug use. If you feel in your heart something is not right, it is better to get your child in for an evaluation.

The only real solution is prevention. We must keep kids from ever trying drugs in the first place. Drug education—as early as elementary school—is vital, and it should include parents and teachers.

Countless deaths of youth like Ryan are related to drugs and are not recorded in the Nation's rising drug toll.

I will never fully know why Ryan got involved in drugs. In my view, there is still a dangerous myth that good kids from good families do not do drugs. Children are vulnerable no matter who

they are or where they live. My son had his problems, but he was a sensitive, caring, and unforgettable young man. Now we visit Ryan's grave and we weep, and we ask, Why?

For Ryan, it is too late. It may not be too late for your children.

Conference Introduction
Alan I. Leshner, Ph.D.

It is precisely this kind of story that we are here to try and prevent. This conference represents a clear statement of concern about marijuana, both by the administration and by the scientific community. I believe the presence, participation, and leadership provided by Secretary Shalala and Dr. Lee Brown, this country's drug czar, demonstrate the administration's commitment to combating the marijuana problem. Our related activities and actions announced at this meeting underscore this point.

Let me reiterate why we are here: Marijuana is currently the most widely used illicit drug in the United States. And marijuana use—especially among our Nation's youth—is growing. Results from the 1994 High School Survey, conducted annually for the past two decades through a NIDA-sponsored grant, found that for the third year in a row, the percentage of 8th-graders who reported having used marijuana increased significantly, and the percentage among 10th- and 12th-graders increased over a 2-year period.

Coupled with these increases in marijuana use has been a dramatic decrease in the perception of harmfulness and a decrease in social disapproval of using this drug among those surveyed at all grade levels. There is, therefore, a tremendous need to provide factual information about marijuana, its use, and its effects. And that is what we are here about!

Assembled among us are representatives of virtually all sectors: concerned families and other members of the lay public, representatives of the professional prevention and treatment communities, a large contingent of scientific experts on marijuana, and our colleagues from other Government agencies who share our concern and our commitment to addressing this major national problem. Among us, we need a renewed focus on conveying the facts about the deleterious health and social consequences of marijuana use by young people. Armed with the facts, each of us will be in a better position to help spread the clear and consistent message that marijuana use is not only illegal, but it is also unhealthy and potentially very dangerous.

A good many of today's parents are relatively sophisticated in terms of their prior exposure to illicit substances. Because many parents of this generation of teenagers experimented with marijuana in their youth, they often find it difficult to talk about marijuana use with their children and to set strict ground rules against drug use.

But marijuana use today starts at a younger age—the average age of first use is about 13.5 years—and more potent forms of the drug are available to these young children. Parents need to learn the facts, and to recognize that marijuana use is a serious threat to the health and well-being of their children.

Just because parents used drugs when they were 25 and survived, apparently unharmed, is no reason why they should not talk to their children about the harm in using marijuana. Talking to our children about
drug abuse may not always be easy, but it is, nonetheless, one of our most critical responsibilities as parents. Marijuana use is harmful, and it is our job as parents to do all that we can to protect our children from harm.

Our agenda is very full—we will be addressing *all* aspects of marijuana, its use and effects. And there will be many opportunities for discussion and exchange of information and perspectives. I hope you all enjoy and benefit from this meeting.

KEYNOTE ADDRESS
The Department's Marijuana Prevention Initiative

Donna E. Shalala
Secretary of Health and Human Services

Thank you, Dr. Leshner. I want to thank the staff at NIDA for organizing the first major national marijuana conference in history. I would like to begin by acknowledging the presence of the President's drug policy coordinator, Dr. Lee Brown. Dr. Brown is a leader with a law enforcement background who understands the health aspects of the drug issue. Thank you for joining us, Lee.

I would also like to recognize Dick Bonnette, president and CEO of the Partnership for a Drug-Free America, for his extraordinary leadership in the Partnership's development of effective anti-drug advertising campaigns.

Our Marijuana Prevention Initiative is just one part of a vigorous Department-wide commitment to prevention, treatment, and research concerning all forms of drugs— whether it is marijuana, cocaine, heroin, crack, inhalants, or any other illicit drug. And we have the same commitment regarding alcohol abuse.

Today's activities are a huge step in the right direction. First, we are releasing at this conference two new pamphlets—
"Marijuana: Facts Parents Need to Know," and "Marijuana: Facts for Teens." These new pamphlets will empower parents and teenagers with information and generate discussion around the kitchen table that will make a real difference in young people's lives.

We are also joining the Partnership for a Drug-Free America in releasing two new public service announcements encouraging parents to talk about marijuana with their children. After my speech, I will preview the PSAs for you—and you can go home tonight and do your own "Siskel and Ebert" critique. We believe this is the first time that the Federal Government has helped to fund one of the Partnership's PSAs—and we are very proud of our collaboration.

And we are here to announce new research findings that advance our scientific understanding of the effects of marijuana. We will hear from Dr. Peter Fried, who will discuss his latest preliminary results on prenatal exposure to marijuana use. Dr. Fried's research shows, through studies of children ages 9 to 12, the dangerous long-term effect marijuana use during pregnancy can have on children.

Dr. Billy Martin will present an animal model of marijuana addiction that may lay to rest any myths about marijuana not being addictive. His findings show that compulsive marijuana use may lead to an addiction similar to that produced by other illicit drugs.

And we will also hear from Dr. Judith Brook, who will share the findings of her research on factors that predispose young people to marijuana use. She will report that aggression, a distant relationship to one's parents, rebelliousness, and poor school performance make children more likely to use marijuana as young adults.

These illuminating findings advance our understanding of the dangers of marijuana by several paces. It is time for a national conversation about marijuana. And how fitting to begin that conversation in a scientific venue.

Research has helped us discover the following:

- One in three high school seniors reports using marijuana today.
- Marijuana is increasingly available, potent, and cheap.
- Marijuana use has risen among teenagers since 1991.

Behind these data are our daughters and sons, our nieces and nephews, our children and grandchildren.

We ought to be horrified by what some of our young people think and say about marijuana.

"Marijuana is the drug to do. It is cheap. It is easy to get. It is everywhere," says a 15-year-old Santa Monica high school freshman.

A high school senior in a small Delaware town says: "Pot's the best. It makes me feel good."

My friends "just do not think it is dangerous," says another student from Los Angeles.

Marijuana's resurgent popularity is not limited to any single group of young people. It encompasses wealthy, middle-class, and low-income families. It takes in suburban, urban, and rural youth. It includes high achievers and average students. It involves every ethnicity and every kind of household. As one student reminded me, "A lot of people think it's just low-life and troubled kids who drink and do weed. But it's not. Everybody's doing it . . . . It's the '90s."

Actually, everybody is not doing it. We need to keep reminding young people that most of their peers choose not to use marijuana and other drugs. But more young people will be at risk of becoming users if we do not gather up our wisdom and our candor and our commitment and stop this trend in its tracks.

The recent study put out by the Center on Addiction and Substance Abuse had some very interesting findings. The study showed that 95 percent of Americans viewed the use of heroin, LSD, and cocaine as a serious national issue. But fewer—although still a strong majority at 69 percent—viewed the use of marijuana as a serious national concern. That is a significant gap—and we have to roll up our sleeves and get busy educating all Americans about the dangers of marijuana use.

The marijuana issue is about the costs to society of drug-related auto wrecks, accidents, property damage, truancy and school failure, on-the-job mishaps, and lost productivity. It is about newer, more potent, and more dangerous forms of marijuana. It is about cigar-style blunts, cocaine-laced woolies, and crack-packed coolies—nonexistent during the 1960s and 1970s—and it is about Jamaican crude and greater THC content. It is about dreams that are cut short; lives that sometimes wind their way from marijuana to cocaine or to school failure or to teenage pregnancy or to crime and violence; lives that have to be delicately put back together in drug treatment programs.

Let me tell you about 21-year-old Dexter and 19-year-old Tawanna, both working to recover from marijuana addiction at New York's Phoenix House. Dexter, who started smoking marijuana at 14

and eventually sold crack and heroin on the streets, has been in treatment for 30 months. Tawanna, who tried marijuana at 12 and had her first child at 14, has been in treatment for 22 months now. We are here at this conference because we share a commitment to Dexter, to Tawanna, and to all Americans—whatever their age—who are at risk of using drugs.

We have come here as leaders from community-based organizations and the Government; from foundations and the nonprofit world; from the research community and the social sciences community; and most of all, we come here as caring adults—as parents and grandparents and aunts and uncles—united by a common concern to help build promising, drug-free futures for all young people.

President Clinton shares that commitment. The administration's drug strategy is built on sound, sensible policies and innovative ideas. The President's drug strategy is about *preventing* drug use, reaching young people *before* they take that first drag on a marijuana cigarette or any other drug. It is about making treatment more accessible. It is about assuring swift and sure punishment for those who import and sell illicit drugs. It is about working closely with the international community to develop effective eradication strategies and alternatives to growing drug crops. It is also part of the larger Clinton plan to invest in our citizens and communities by promoting summer jobs for youth, by improving access to quality health care, by creating jobs and raising incomes, and by promoting economic opportunities with Empowerment Zones and Enterprise Communities.

But I might say, since January, putting our ideas to work has been tough with a Congress that does not share all of our priorities. There are some in Washington who want to sound a retreat in the ongoing battle against substance abuse. It is unfortunate that just last week a House Subcommittee on Appropriations slashed $391 million in substance abuse demonstration and training grants at the Substance Abuse and Mental Health Services Administration. These cuts will affect research in prevention and treatment, and they will eliminate treatment for more than 26,000 people and prevention activities all across the country.

It is very important that we have these funds restored. But it is equally important that we remember that Government programs and Government funding cannot resolve the drug issue by themselves. We must have an action agenda anchored in partnership. We must merge the broad commitments of the Clinton drug strategy with State and local efforts to fashion antidrug messages rooted in science and research. We need an action agenda on marijuana that reaches young people where they live, where they work, where they study, and where they socialize.

This action agenda must weave through homes, schools, neighborhoods, and into the television sets and radios and CD players of our youth. At the core of our agenda must be a clear and consistent message— marijuana is illegal, dangerous, unhealthy, and wrong. We all must drive home that message—and to do it, we must sweep aside some powerful myths about marijuana.

I want to address some of those myths right now.

Myth number one: Marijuana is not harmful.

Fact: Marijuana can wrack the body physically, mentally, and emotionally, and can be addictive. Research continues to show that marijuana

- Impairs short-term memory,
- Distorts perception,

- Impairs judgment and complex motor skills,
- Alters the heart rate,
- Can lead to anxiety and panic attacks, and
- Can cause paranoia and lethargy.

And new research by Roger Roffman at the University of Washington and Robert Stephens at Virginia Polytechnic Institute shows the chokehold that marijuana can have on long-term users who try to quit.

Myth number two: Marijuana is not a serious crime.

Fact: It will get you a stiff sentence. Conviction for possessing 100 marijuana plants could get you 5 to 40 years in prison, without parole, under Federal mandatory minimum sentencing laws.

Fact: It could cost you a good job. More and more employers are withdrawing job offers to otherwise qualified individuals because they fail drug tests.

Myth number three: Popular culture has nothing to do with marijuana's increasing popularity.

Fact: Everywhere our young people turn, they are bombarded by messages that marijuana is okay, that marijuana is cool.

Fact: They can buy T-shirts with pictures of hollow cigar blunts right here in Washington, DC, and other cities.

Fact: They can go to a concert called the "Great Atlanta Pot Festival."

Fact: There are song lyrics that openly glamorize marijuana smoking and the rolling of marijuana cigarettes.

But we know the media can be an ally as well in protecting our young people from images that glamorize drugs. Increasingly, antidrug efforts of groups such as the Partnership for a Drug-Free America are winning the support of screenwriters, producers, recording artists, and celebrities in preventing the glorification of drug use in movies, television, and music. And we have to build on that momentum.

Myth number four: Parents cannot talk to their children about marijuana, especially parents who themselves may have tried marijuana.

Fact: Young people will listen—especially to the people in the world who love them—but they want straight talk, open dialog, and no myths.

When parents ask me, "How can I talk to my child about marijuana use when I smoked pot a couple times myself?" I always remind them of one simple fact: while most parents have consumed alcohol, we have made increasing progress in educating youth about drinking and driving. Why should we feel different about parents' ability to discuss marijuana? Parents often get through to their children more clearly when they talk about lessons learned from experience.

And make no mistake, our young people need to know that their parents do not endorse drug use, that using drugs will cause great pain to the people who love them the most in the world. The publications and the PSAs that I mentioned earlier are excellent vehicles to help hesitant parents and teenagers start up conversations about marijuana.

These materials, the conference, and your ongoing work are key components of a new network to carry the new message about the dangers and consequences of marijuana use.

Our partners in this new network to educate America about marijuana must include parents, other family members, and older siblings having an open and honest dialog with young people; teachers talking about the harmful effects and consequences of marijuana as part of their presentations about the dangers of cocaine, crack, and heroin; religious organizations, civic groups, voluntary and social organizations sponsoring education and awareness activities in local communities, and identifying and assisting families dealing with the fallout from marijuana use; and law enforcement and judicial authorities working proactively to prevent teen arrests.

And finally, we need to expand our partnership with leaders of the industries that make up our country's popular culture. The bottom line is this: our message must be consistent. Young people must hear the same antidrug message from popular culture that they hear from parents, from community leaders, and from teachers.

Make no mistake, vast public disapproval of marijuana use must be the cornerstone of our prevention effort. As a mountain climber, I know that the higher the mountain, the more effort and teamwork you need to reach the top. But the rewards are greater, too, when you get there.

Today, we are equipped with a multitude of new tools—solid research and science and effective prevention and treatment practices—to start a fast, steady climb up the mountain of ignorance about marijuana.

Let us look past the jagged rocks, the steep angles, the overhangs, the shifting winds, and reach for the peak. Our reward is a secure future for our youth, and for our country.

Thank you.

Now, let's look at two new video public service announcements that we have made with the Partnership for a Drug-Free America.

KEYNOTE ADDRESS
Marijuana Use and the National Drug Control Strategy

Lee P. Brown, Ph.D.
Director
Office of National Drug Control Policy

Let me begin by thanking Dr. Alan Leshner, Director of the National Institute on Drug Abuse, and Donna Shalala, Secretary of Health and Human Services, for inviting me to participate in this most important conference.

I want to commend Dr. Leshner and Secretary Shalala for their leadership in making this conference a reality. As the first national conference to focus on providing scientifically based information on marijuana, this effort is significant because we will have the opportunity to shatter some long-lingering myths about marijuana while at the same time providing a wakeup call to the Nation.

This wakeup call is all important. We who have access to the most accurate and advanced information should be driving the discussion about finding solutions to the drug problem, not those with the least knowledge who often seem to have the most to say.

For instance, outside of this hotel today are protesters and demonstrators who advocate the legalization of drugs in this society. At a time when every indicator points to an upsurge in drug use among our youngsters, how responsible is it for any adult to advance the message that using drugs is okay?

Even the Speaker of the House—Newt Gingrich—has gotten into the act. Last week he said that the choice about the Nation's drug problem is to "Either legalize it or get rid of it." Mr. Gingrich's state-ment is the ultimate in extremism and defeatism. Drug abuse is an American crisis, not a partisan political opportunity. It does not help kids or serve them well when our leaders play partisan politics with an issue that goes to the heart of everything we hold dear.

If we care about our children, we must treat drug use as the threat that it is. President Clinton and I are committed to fighting this threat with all the resources available to us. You will not hear us playing politics with the lives of American youngsters. And you will never hear us talking about legalization. Anyone who advocates that we legalize drugs has abdicated responsibility. Today, I urge the Speaker of the House and his colleagues to work together with us to implement the President's antidrug strategy instead of pretending they have a simplistic silver bullet that they know will not work.

Substance abuse is a serious matter. It claims the lives of many Americans each year. It touches all of us in one way or another. If a family member is an abuser, the whole family suffers. When families suffer, so, too, does the community. And when communities are in need, the whole Nation must stop and take notice. Substance abuse costs this Nation millions of dollars in lost revenues each year. The costs associated with incarceration, criminal case processing, victimization, accidents, and lost property due to substance abuse and related crime total more than $67 million annually.

So, it is clear that when we come together to discuss substance abuse, whether we are talking cocaine, heroin, inhalants, or marijuana, we are talking about one of the most critical issues of our time. President Clinton and I are committed to making America a drug-free society. We are

committed to saving our young people from the dangers of drug use and drug trafficking. We will do whatever it takes to make this a reality across this land, but we cannot do this job alone.

Each of us must commit to helping our youngsters resist the lure of drugs. Each of us must demand that our schools be drug-free and violence-free so that they can once again become the havens for learning that schools were intended to be. Each of us must make it clear that the only worthwhile drug message is a "no use" message. We cannot give mixed messages and come down hard on some drugs and soft-pedal the dangers of others.

Marijuana is a dangerous and harmful drug. We know this is true, so let's say it every chance that we get. Our young people watch us and listen to us. When we tell them that we will not tolerate any drug use, we have to make it clear that marijuana is included in this prohibition.

I have read that some baby boomer parents are ambivalent about the "no use" message when it comes to marijuana, because they do not want to appear hypocritical. Let me warn you that hypocrisy is not the issue. Keeping our youngsters safe and free from harm is. This means that we cannot equivocate on this all-important message. It has to be clear and precise—all drugs are harmful; all drugs are dangerous.

Marijuana is the most widely used illicit drug in America today, and this has been the case for some years. Nearly 70 million Americans have used marijuana in their lifetime. Marijuana is a potent, intoxicating drug with long-term, cumulative effects. Unlike alcohol or most other substances of abuse, it remains in the body for many hours, sometimes for a period of days. Heavy users can test positive for the drug even after weeks of abstinence.

We also need to realize that much of the marijuana that is being consumed today is far more potent than it ever was in the 1960s and 1970s, when popular culture considered it a relatively benign substance. The result is higher levels of intoxication by users, over longer periods of time, with far greater consequences.

A key indicator is the number of persons seeking hospital emergency room treatment for marijuana effects. And this number has increased dramatically in recent years. In fact, in a trend that started in 1990, marijuana-related emergencies jumped by 86 percent in the 3 years for which we now have data (through 1993).

A closer look at these figures is even more revealing. In the 12-to-17 age group, what could be described as our newest users, there were twice as many marijuana-related emergency room cases in 1993 as in 1990, when this upsurge began. Half of all marijuana emergency room cases happen to individuals under age 26.

In fact, in that same 12-to-17 age group, the youngest and newest users, marijuana now accounts for more than twice the number of hospital emergency room cases as cocaine and heroin combined. In 1993, there were 4,293 marijuana mentions in the 12-to-17 age group, 1,583 cocaine mentions, and 282 heroin-related cases. Also significant is the trend of change beginning in 1990: while marijuana use has doubled, cocaine cases among our young have gone down. Maybe the message has been heard about the dangers of cocaine.

Now it is time that this same message be heard loud and clear about marijuana. And the message is that marijuana is not benign, it is not harmless, it should not be legalized. It is a very dangerous drug that can well cause you to fight for your health and your very life in a hospital emergency room.

Another issue is the strong link between marijuana use and violence. The Parent Resource Institute for Drug Education, known as PRIDE, has studied the correlation between violent behavior and drug use and found that 66 percent of high school students who carried guns to school also used marijuana. Another important message to our youngsters is that if you use marijuana, you could end up in a violent fight, in a traffic accident, and, as we said earlier, in the hospital emergency room.

Contrary to popular opinion, marijuana does have addictive properties. The consequences of heavy use include both physical and psychological dependence. Youngsters are being misled and misinformed about the dangers of marijuana. I held a press conference on Monday where we highlighted what I call the seductive marketing of American youngsters. You would be shocked at the kinds of products that are being marketed to children that glamorize drug use and getting high.

These products, which include T-shirts, bottles, gum, cigar blunts, and posters, are an initiation to a culture that implicitly sends a message that being cool is everything and that playing it safe is for losers. We have to stop Corporate America from marketing "coolness." We have to stop those who would profit at our children's expense. Kids who do not want to use drugs must not be made the targets of unscrupulous marketers.

The good news is that many of our young people already know that using marijuana is the wrong choice. Some have even spoken out saying that something has to be done about the drug use of their friends. A recent poll of student leaders revealed that many youngsters are happy that some limits are being set.

One student said, "I talked to a kid about 2 weeks ago, and he could not hold a sentence together because of drug use. I mean that was like living proof. It's like he's still on the trip he did not come back from."

Some of these same students applauded the Supreme Court's recent ruling on drug testing for high school athletes. In fact, *USA Today* reported that many of the students surveyed felt that the ruling should apply to all students, not just athletes. One female student said, "I wish something would happen in my town. Half of our soccer team smoke marijuana and drink every weekend. They need to be tested."

It is important that we recognize that not all of our youngsters are enamored with drug use. In fact, the Monitoring the Future Study reports that 61 percent of high school seniors say they have never used marijuana. What we need to do is target those youngsters who have not gotten the message. They need our help. And they need it now.

This is why President Clinton's 1995 National Drug Control Strategy is so important. It forms the basis for the Nation's fight against drugs, and it lays out in clear and certain terms what we see as the problem and how we intend to address it. The overarching goal of the strategy is to reduce illicit drug use and its consequences. The President is requesting $14.6 billion in FY 1996 to implement our National Drug Control Strategy—a strategy that is both tough and smart.

The 1995 National Drug Control Strategy emphasizes programs that are aimed at preventing drug use before it starts. Its key components are prevention, education, treatment, and law enforcement. We believe in this approach because we know that it works. The strategy is balanced and comprehensive. What we need now is the U.S. Congress to give us the funding to support the National Drug Control Strategy. We need Congress to work with us, not against us.

The Califano-Luntz poll that was released on Monday underscores that the direction the Clinton administration has staked out is the right one. The study points out that 91 percent of the population blames illegal drug and alcohol abuse for the rate of violent crime in this country. This poll is significant because for the first time we have a national study that substantiates what we have known for some time.

President Clinton has stressed that we must "Put People First." The National Drug Control Strategy does just that. His veto of the House of Representatives rescission bill demonstrates his concern about people and their most critical needs. The bill would have reduced or eliminated antiviolence and drug prevention programs serving nearly 39 million students.

In addition, the President's leadership has been a wakeup call to those countries that have supplied the drugs that poison our country. His determination has been the force behind the recent arrest of the leading drug traffickers in the Cali cartel based in Colombia. The arrests in Miami of U.S. attorneys who assisted drug traffickers in evading our laws also has sent a chill through those marketing death. This success on the international front is important because a key element of our international policy calls for source country eradication efforts. Marijuana eradication is also critical to our domestic strategy.

We also are committed to domestic law enforcement efforts. Marijuana seizures are up substantially, and the Drug Enforcement Administration's eradication/suppression program has shown some impressive results. In 4 years, assets seized totaled almost $200 million and arrests for marijuana production and trafficking increased to almost 40,000.

Seizure, eradication, and law enforcement activity represent a significant effort to disrupt the flow of marijuana to our neighborhoods and communities. We know we have to make it more difficult for drug trafficking organizations to acquire, transport, and sell their product. These efforts, ultimately, impact the price of marijuana on the street and reduce its availability to those wishing to purchase it.

But let me emphasize that law enforcement and eradication are just two pieces of the puzzle. We also need to fund treatment for those addicted to drugs and to keep hardcore drug users off the street. We also desperately need to fund prevention programs that target potential drug users before they even begin.

Only through a concerted effort combining law enforcement, treatment, and prevention can we ever hope to really make an impact on the rate of current drug use in America. We need programs that are community-based if we are to have a fighting chance to defeat drugs, because we cannot win the fight against drugs and crime with Federal initiatives alone. This is a long-term problem that will yield only to long-term commitment. I urge all of you to come together in your communities to change the social environment for all who live there.

And finally, I need you, as the experts in the field, to help me in our crusade against dangerous drugs. The country needs you to spread the word to parents and children about the work that you are doing. Your presence here today means you understand the importance of outreach. Let everyone—parents, children, the media, everyone you know—understand what your research and your community efforts have found about the dangers of marijuana.

Use your knowledge and position to urge parents in your communities to talk to their children about marijuana and about all drug use. Tell your friends to stay informed and clear about what is acceptable behavior and what is not.

Let your own children know that because they matter so much, you care so much about their well-being and safety. Ask them to carry this message, to become leaders in school in the antidrug effort.

In short, we all have to let children know that we care. And because we care, we need them to know that drugs are wrong and they are dangerous. This is a message about the future of our country. If we fail at this, we fail our children and our communities, and the whole society will suffer.

But I am very hopeful about our future generation. There are enough youngsters in America who want to do the right thing. We have to guide them and provide a safe passage. It is a moral duty, my friends, that I am talking about.

Join me in this crusade to make our country drug-free so that our children can grow and develop healthy in body and spirit.

Changing Trends, Patterns, and Nature of Marijuana Use

Lloyd D. Johnston, Ph.D.
Program Director
University of Michigan

In the Monitoring the Future Study, close to half a million American young people have been surveyed over the last 20 years. The study has included between 400 and 500 schools each year and about 1,500 American college students and young adults who previously participated as high school seniors. The data presented in the survey covered approximately 16,000 high school seniors per year since 1975; approximately 18,000 8th-grade students per year since 1991; and approximately 16,000 10th-grade students per year since 1991. The participants were representative of students in both public and private schools. Results of the study show that specific attitudes, beliefs, and other factors influenced individual drug users and that marijuana again threatens to be the lead drug in a resurgence of the epidemic that began about 25 to 30 years ago.

The trend data covered young adults 19 to 28 years old because other studies show that it is in the teens and the twenties that most drug and marijuana use occurs. At the peak of marijuana use in 1978 and 1979, 50 percent of American high school seniors were semi-actively using marijuana. (In the past year, 1994, they had used marijuana at least one time.) College students and young adults showed almost the same behavior pattern, except that college students showed a turnaround in marijuana use a little earlier than high school students. For lifetime prevalence, the number was higher. The 10th-graders showed a sharp increase in annual marijuana use in the past 2 years, the 8th-graders in the past 3 years. This increase can be partly explained by a generational replacement process. In other periods, all age groups have moved in parallel; now we are seeing a difference as a function of age.

The study included three different measures of use—lifetime, annual, and 30-day. In 1975, 6 percent of high school seniors said they were daily users of pot. That number nearly doubled in the next 3 to 4 years when it reached almost 11 percent. One in every nine youngsters in 1975 actively smoked pot on a daily basis, averaging about two and one-half joints per day. There was a lot of marijuana use at that time, and it became the focus of our country's concern about drugs.

As other prevalence rates declined over the 12- or 13-year period that followed, so did daily marijuana use. This was a sign that we can have great success. Only 1.9 percent were smoking

pot daily in 1992. In the last 2 years, that rate has nearly doubled. That is 3.6 percent who are daily pot users, or about one youngster in every classroom in every high school in America.

The other, less widely known data from the early 1980s has to do with whether a young person ever smoked daily for at least a month. These numbers are even more shocking because one in every five youngsters was a daily pot smoker, and this was higher in the peak years of the late 1970s. This number also declined dramatically, but at the low point, 8 percent of our children had been daily pot smokers at some time by the time they finished high school. Today, the daily pot smokers—three to four per classroom—have had some experience with daily pot use that lasted at least a month.

The increase in marijuana use has permeated our culture. All four census regions report increases in marijuana use. All parts of the country and communities of all sizes, from our large cities to our small towns and rural areas, show the increase. Diverse social class groupings have also shown the same trends over time. Children from the most modest homes, from the wealthiest homes, and from the most educated backgrounds are all susceptible to marijuana use in roughly the same degree.

The three major ethnic groups, Caucasians, African Americans, and Hispanics, all show the same cross-time pattern. Although African Americans seem to have more protective factors against drug abuse in their lives, there has been a sharp increase in their use of marijuana. That may be connected to the fact that a lot of rap groups have become strongly promarijuana.

The recent increase in marijuana use is very broad. Some of the reasons for this shift are young people's attitudes about how dangerous marijuana is. Self-protection as a motivation seems to work in this realm. But young people have to see the danger as it applies to them and to their behavior. A significant change in the perception of the risk of heavy marijuana use began in 1978. During the years when there were a lot of daily marijuana users, practically every kid knew a user and could observe and learn firsthand about the effects of this drug. Because we were successful in combating the use of this drug, there is now less opportunity for informal learning to occur; there are fewer young marijuana users from whom to learn vicariously.

Over the past 3 years, all three grade levels (8th, 10th, and 12th) showed a significant and substantial decline in perceived dangers of marijuana use. Another major factor is peer norms and what young people think is cool. Peer norms have been eroding for the past 3 to 4 years. As young people view a drug as more dangerous, they are less accepting of its use; they think of it as foolish behavior. We have seen that in the larger culture with cigarettes, and we have seen some of that in the subculture of adolescence with marijuana.

The availability of marijuana does not show much evidence of having changed. For young people, it seems marijuana is universally available and has been for 20 years. There has also been a sharp increase in cigarette smoking among our children. Cigarette smoking is dramatically correlated with marijuana use, and the increase in the smoking rates may have contributed to the increase in the marijuana use rates.

We asked people who have never used marijuana, the abstainers, "Why don't you use?" The people who quit using marijuana and have not used in the past year were asked why they quit using. There were almost 6,000 abstainers and 1,500 quitters. The two top reasons they mentioned were concerns about physical and psychological damage. Those who quit are most likely to say, "Well, I just do not feel like getting high." Other reasons could be the fear of addiction, it is against their beliefs, or their parents would disapprove. Nearly three-quarters of young people who say they have used marijuana at least 40 times mention one or more problems

they expect because of marijuana use. We must reinforce the need for parents to communicate with their children about marijuana and its ultimate effects.

National Marijuana Media Campaign
Richard D. Bonnette
President
Partnership for a Drug-Free America

At its core, the drug problem is about our kids making decisions to use marijuana or other drugs. These decisions are driven by their attitudes toward these behaviors. The Partnership for a Drug-Free America's mission is to build attitudes that will help young people make the right decisions. It is working with partners in the American advertising and media industry to "unsell" kids about taking drugs and to tell children and their parents about the perils, penalties, and pain of using drugs. The Partnership develops advertising messages to convince young people that drugs, including marijuana, are dangerous and dumb.

The Partnership for a Drug-Free America uses research studies, including the Monitoring the Future Study, the Substance Abuse and Mental Health Services Administration National Household Survey on Drug Abuse, and the Partnership Attitude Tracking Study, to identify trends in illegal drug use and to explore the attitudes and feelings of their target audiences. Focus group studies are used to give full meaning to the statistics. Consultations with drug experts and child development professionals will add to the Partnership's knowledge. The Partnership's ongoing collaboration with the National Institute on Drug Abuse also increases the value of all its projects.

Creating the media messages is only half of the Partnership's challenge. Getting the messages out and getting the media to run them is the other half. Since the launch of advertising in 1987, television and radio networks, local stations, magazines, newspapers, the Yellow Pages, and the outdoor advertising industry have donated more than $2 billion of their time and space to the Partnership's antidrug campaign. The support provided to media partners is evidence that the advertising works. The Johns Hopkins study of students in Baltimore's middle and high schools shows that 83 percent of the youngsters in the study recall seeing the Partnerships antidrug messages. Three-quarters of these youngsters said the ads caused them to decrease or stop drug use, or convinced them to never start.

Another reason for such media support is the creative quality of the Partnership's antidrug messages. More than 200 advertising agencies from all over the country have contributed their talent, time, and resources to create a marvelous body of work. They deserve to be proud of the public service messages created and disseminated.

Marijuana: What It Is and What It Does
Billy R. Martin, Ph.D.
Professor
Medical College of Virginia

I have been researching the effects of marijuana's principal psychoactive ingredient, delta-9-tetrahydrocannabinol (THC) for 22 years. My presentation today will be in three parts: about marijuana and what it is, marijuana and brain mechanisms, and an exciting new marijuana dependence model.

Marijuana contains more than 400 compounds, more than 60 cannabinoids, and many other ingredients. Its potency is due to the concentration of THC, which varies widely among different batches or samples and different forms of marijuana. Comparisons of THC concentrations in

confiscated samples of loose marijuana, kilo bricks, buds, sinsemilla (the buds of unpollinated marijuana plants), hashish, and hash oil over the last 20 years show that after a rise in potency about 10 years ago, average THC levels have remained relatively constant.

Marijuana intoxication or a subjective high may include an altered state of consciousness, mild euphoria, relaxation, perceptual alterations, time distortion, intensification of ordinary sensory experiences, and/or increased sociability. Unpleasant psychological reactions can be anxiety, depression, panic, delusions, and/or hallucinations. Cognitive functions such as impaired short-term memory, disruption of mental activity, and motor functions like altered reaction time and disruption of coordination can result from marijuana intoxication. Analgesia, sedation, excitation, hypothermia, and immobility or catalepsy are some of the effects of THC revealed in animal studies of marijuana intoxication.

Recent major research breakthroughs, such as identifying marijuana receptors in the brain, have allowed scientists to learn more about how marijuana affects the brain and how it alters brain functions. These receptors are specific for cannabinoids, they belong to a family of brain receptors, they are in very high density in the brain, and their levels change during tolerance development. They are abundant in relevant areas of the brain that are associated with altered levels of cognition and the interruption of normal motor function and coordination. Much of the recent research uses highly potent analogs of THC that produce the same pharmacological effects as THC.

The recent discovery of anandamide, an endogenous (internally produced) cannabinoid ligand (molecule) that binds with marijuana receptors just as THC does, has opened the door to more scientific inquiry about marijuana use. Anandamide is naturally present in the brain, produces THC-like effects, and is synthesized and metabolized in the brain. The following unanswered questions remain: What is the normal physiological role of endogenous cannabinoids? What are the consequences of high-potency marijuana? What is the result of chronic marijuana use?

Our research findings indicate that marijuana *can* produce dependence. We employ standard, proven methods that have been used to demonstrate dependence on other drugs of abuse. Many drugs that induce a profound tolerance produce an accompany-ing development of dependence. Marijuana induces such a profound tolerance and would be an exception if it did not produce dependence.

Animal models for testing for drug dependence include abrupt withdrawal and precipitated withdrawal. In the former, an animal is continuously exposed to a drug, then drug administration is stopped abruptly and withdrawal symptoms are observed. In the latter, an animal is continuously exposed to a drug, then treated with an antagonist or blocker and withdrawal symptoms are observed. An antagonist immediately blocks the drug action when administered. In the past, there was not an antagonist available for marijuana, so precipitated withdrawal studies could not be done.

Last year, a French drug company developed a specific antagonist that precipitates withdrawal from THC. My colleagues and I have been able to use this THC antagonist to develop an exciting new marijuana dependence model. Preliminary studies using high doses of THC followed by the antagonist have demonstrated withdrawal symptoms in both rats and mice that are consistent with animal studies of other addictive drugs. A very dramatic response to the dose was exhibited in these and repeated studies with *low* doses of THC. Marijuana dependence is related to dose or quantity used and frequency of exposure.

The availability of a functional experimental model for marijuana dependence allows for the systematic study of chronic exposure to marijuana and for the development of treatment approaches for people who become compulsive marijuana users.

Effects of Marijuana on the Brain, Endocrine System, and Immune System

Moderator: *Donald P. Tashkin, M.D.*
Professor of Medicine
University of California at Los Angeles

Speaker: *Allyn C. Howlett, Ph.D.*
Professor
St. Louis University

There is a unique system in the brain by which marijuana produces its behavioral effects. Our laboratory has shown that THC and compounds like it bind to brain receptors. The location of these receptors is consistent with the type of behaviors associated with marijuana use. Areas of the brain where there are high concentrations of marijuana receptors include the hippocampus, relevant to altered levels of cognition, and the cortex and the cerebellum, relevant to interruption of normal motor function and coordination.

There are an extremely high number of receptors in the brain, much more than most neurotransmitters. Cannabinoid receptor one has been found in many parts of the brain. Cannabinoid receptor two has been found in the spleen. Cannabinoids are lipid-soluble and may interact with cell membranes to change some of the enzymes and receptors on those membranes. Proteins that are within the lipid layer of the cell transmit signals from the outside to the inside so the cell can continue in its function. The cannabinoid receptors are part of a large family of receptors for hormones and neurotransmitters. The compounds that interact with these receptors are likely to nestle within the interior of the larger protein structure within the cell membrane. Then the receptors can interact with other proteins in the cell to produce a response.

Scientists have been able to tag cannabinoid receptor one and show where it is in the brain. Some of the changes in the neuronal cells can be compared in a pharmacological way to behaviors, including analgesia, changes in cognition and memory, locomotor function, endocrine changes, and other actions. Regions of the brain that have a high density of cannabinoid receptors include the cortex, the hippocampus, the basal ganglia, and the cerebellum.

The cortex is related to motor behavior and premotor behavior; basic cognitive functioning; awareness; and visual, sensory, and visual-auditory sensory processing. A great deal of information processing can take place because significant input enters into this cognitive area. In humans, cannabinoid compounds can lead to euphoria, tranquility, difficulty in thinking, rapid flow of thoughts, dreamy states, and visual and auditory perceptual changes. The cortex is an area of the brain that integrates such information.

The hippocampus can interact with the neuroendocrine system. It is very important in memory formation and higher level processing of information from the cortex. The cerebellum processes information largely related to motor function. One of the major sources of cannabinoid receptors in the brain found in the basal ganglial structures is in the central region of the brain. In higher animals they function in taking information from the cortex, processing it, interacting with other regions of the basal ganglial structure, and then sending that information back to the cortex.

The cannabinoid receptors are in the parts of the cell that can change the way the neuron behaves and perhaps regulate the way in which the neuron can release other neurotransmitters or interact with other neurotransmitter systems.

Speaker: *Laura L. Murphy, Ph.D.*
Assistant Professor
Southern Illinois University

My major research interest is reproductive neuroendocrinology. The focus of my talk is a review of research studies about the acute and chronic effects of marijuana on the endocrine system with an emphasis on the reproductive system.

The endocrine system includes those organs and glands that produce hormones. Hormones are the chemical substances produced by organs and glands that are secreted into the bloodstream to affect the activity and function of specific target tissues. Endocrine organs and glands include the ovaries, testes, pancreas, adrenal glands, thyroid gland, and the pituitary gland.

The pituitary gland secretes eight different hormones that have important roles in the control of metabolic and reproductive functions throughout the body. Follicle stimulating hormone (FSH), luteinizing hormone (LH), and prolactin are hormones that have an important role in reproductive functioning. These hormones have a direct impact on the secretion of the male hormone (testosterone) and the female hormone (estrogen). The adrenocorticotropin hormone (ACTH) is released in response to stress. The thyroid stimulating hormone (TSH) and the growth hormone (GH) are important in the maintenance of metabolism.

Several studies, animal and human, conclude that chronic and acute use of marijuana alters the secretion of hormones from the endocrine system, which may have an effect on the reproductive system and the individual's ability to respond to different metabolic changes and stress. The chart, Effects of Cannabinoids on Pituitary Hormone Secretion (see chart), cites the researchers, identifies the animal model, and indicates the stimulation or depression of the secretion of a specific hormone.

The effects of chronic marijuana on the pregnant animal have been documented in some studies. The pregnant female could be vulnerable to changes in hormone levels that may have an effect on offspring development.

Speaker: *Guy A. Cabral, Ph.D.*
Professor
Medical College of Virginia

An accumulating body of research data indicates that marijuana and some of its components influence the immune system and affect the body's ability to resist microbes, including viruses, bacteria, fungi, and protozoa, and decreases the body's antitumor activities. These effects are compounded because marijuana use has occurred concurrently with the increased spread of sexually transmitted diseases like type B viral hepatitis, genital herpes, and AIDS. Because these diseases also target the immune system, marijuana users who are already vulnerable to infection may be especially compromised in their body's ability to fight infection.

Research suggests that THC, the major psychoactive component of marijuana, is also the component that targets the immune system. THC alters the activities of a variety of cells and cell functioning because it tends to accumulate in the fatty tissues of the body. THC affects body

Effects of Cannabinoids on Pituitary Hormone Secretion

Decreased LH	Mouse	Dalterio *et al.*, 1984
	Rat	Marks, 1972; Nir *et al.*, 1973; Tyrey, 1978; Steger *et al.*, 1981, 1983; Puder *et al.*, 1985; Wender *et al.*, 1987; Murphy *et al.*, 1990, 1994
	Monkey	Besch *et al.*, 1977; Smith *et al.*, 1979
	Human	Schaefer *et al.*, 1975; Kolodny *et al.*, 1976; Cone *et al.*, 1986; Mendelson *et al.*, 1986
Decreased FSH	Rat	Fernandez-Ruiz *et al.*, 1992
	Monkey	Smith *et al.*, 1979
	Human	Kolodny *et al.*, 1974; Cohen, 1976
Decreased Prolactin	Mouse	Dalterio *et al.*, 1981
	Rat	Johnson *et al.*, 1980; Hughes *et al.*, 1981; Hughes and Tyrey, 1982; Steger *et al.*, 1983; Rettori *et al.*, 1988, Murphy, 1994
	Human	Dornbush *et al.*, 1978; Kolodny *et al.*, 1979; Mendelson *et al.*, 1985; Dax *et al.*, 1989
Decreased GH	Mouse	Dalterio *et al.*, 1981
	Rat	Harclerode and Pennebacker, 1984; Rettori *et al.*, 1988
Increased ACTH	Rat	Kokka and Garcia, 1974; Puder *et al.*, 1982; Rodriguez de Fonseca *et al.*, 1991
	Human	Cone *et al.*, 1986

functions over an extended period of time because it persists in the body and opens the body's susceptibility to infection.

One type of immune system cell that has been shown by researchers to be particularly sensitive to THC exposure is the macrophage or scavenger cell, which clears the body of viruses, bacteria, and particles that are inhaled or ingested. Two other types of immune cells also influenced by THC are the T-lymphocytes and B-lymphocytes. The T-lymphocyte cells are important in resisting virus infections because they regulate communication between immune cells and impart information to the body's immunological memory so that upon reinfection with a pathogen, the body can use the appropriate immune response. The B-lymphocyte cells secrete antibodies into the bloodstream that react with and help eliminate viruses and bacteria. THC affects all three of these cell types by changing their ability to synthesize, modify, and secrete molecules that communicate with immune system cells or that target bacteria, viruses, and tumor cells.

The recent discovery of marijuana receptors on the above immune cells indicates a molecular and genetic basis for immunosuppression by THC. The inter-action of THC with brain receptors triggers intracellular signals that account for the high experienced by marijuana users. The presence of related cannabinoid receptors on immune cells indicates that binding of THC to the immune cell receptors results in a cascade of cellular events that leads to inhibition of the body's immune response.

The immune system plays a crucial role in protection against infection and cancer. It is a system with built-in backup mechanisms so that if one component is subverted, others come into play to limit or control infection or tumor development. Marijuana has the potential to alter the backup safeguards of the immune system because it affects diverse types of cells in the body. This dynamic could, in turn, compromise the immune system's ability to screen out cancer cells and eliminate infection.

Consequences of Marijuana Use

Moderator: *Samuel A. Deadwyler, Ph.D.*
Professor
Bowman Gray School of Medicine

Speaker: *Donald P. Tashkin, M.D.*
Professor of Medicine
University of California at Los Angeles

Research data show that regular smoking of marijuana may lead to similar complications as tobacco smoking, especially chronic bronchitis (cough and phlegm). Other consequences of habitual marijuana smoking include increased frequency of chest illnesses, a greater risk of lung infection, a tendency to obstruction of the lower airways, and a possibly increased risk of cancer in both the upper airway and the lungs.

Animal studies illustrate some of the consequences of marijuana smoking, including severe inflammation of the smaller airways, dose-related acute pneumonia, and subsequent chronic pneumonia. Although no evidence of emphysema was shown in one study, a more recent study revealed possible precursors to emphysema. Clinical studies with chronic marijuana smokers have shown a higher frequency of symptoms of chronic bronchitis and acute chest illnesses in marijuana-only smokers than in nonsmokers. In one study, the additive effects of combined marijuana and tobacco smoking on both respiratory symptoms and airflow obstruction were shown.

Some of my own research compared smoking profiles and smoke delivery to the lungs of marijuana users versus tobacco smokers. These studies indicated that marijuana smokers had a threefold greater delivery of tar to the lungs, 40 percent greater retention of inhaled tar in the lungs, and a fourfold greater deposition of tar in the lungs.

The effects of habitual smoking on lung immunity include a depressant effect of marijuana on the release of some inflammatory products from alveolar macrophages, which are key cells in the lung's defense against infection. Marijuana also had a depressant effect on the ability of the alveolar macrophages to kill harmful microorganisms.

That marijuana may play an important role in respiratory tract cancer is suggested by the following findings. The tar phase of marijuana smoke contains 50 percent more of some carcinogenic agents

than tobacco smoke. One marijuana cigarette deposits four times as much tar in the lungs as one tobacco cigarette, which amplifies the exposure of the lungs to carcinogens. Bronchial biopsies from habitual marijuana smokers reveal cellular changes that may be precursors of lung cancer. Combined smoking of marijuana and tobacco has an additive effect on these cellular abnormalities, suggesting an additive effect on the development of respiratory cancer.

Speaker: *Reese T. Jones, M.D.*
University of California at San Francisco

In folk medicine during the 19th century, marijuana was thought to be useful as an analgesic, muscle relaxant, anticonvulsant, and appetite stimulant. Tinctures, extracts, and elixirs made from marijuana were used for asthma, bronchitis, migraine headaches, depression, gonorrhea, uterine hemorrhage, and dysmenorrhea.

Early in this century, marijuana medical use declined. It was thought to be not very effective because its potency varied and therapeutic responses were erratic. Many better alternative treatment drugs were becoming available. With the Marijuana Tax Act of 1937, marijuana medical use faded fairly completely. Although doctors could still prescribe marijuana after that time, it probably required too much paperwork for them to do so.

In 1970, the Controlled Substances Act was revised. The act classified marijuana and cannabinoids as a Schedule I drug and, consequently, marijuana was no longer available. This made it very complicated and difficult, but not impossible, to do research with it. In the 1970s and early 1980s, basic and clinical research demand for treatment supplies of marijuana was moderate.

In 1976, marijuana was available to treat certain conditions. From 1976 through 1988, only 6 compassionate Investigational New Drug applications were approved, and in 1989, 34 new applications were approved by the FDA. Then, with a large backlog of applications, the program was put on hold in 1991 and finally suspended in 1992.

Some suggested medical applications of marijuana are as an antiemetic, anticonvulsant, appetite stimulant, analgesic, muscle relaxant, or a treatment for glaucoma, asthma, or migraine headaches. Although marijuana may work as an antiemetic or as a way to reduce ocular pressure in glaucoma, problems caused by THC on the immune system or the pulmonary system or other systems may outweigh any positive effects. For many of the other medical applications listed above, there are very few or weak scientific data about efficacy, or there are many other effective drugs, such as analgesics, that are already available.

To allow widespread use of marijuana for medical treatment, it must be evaluated like any other investigational new drug, and the same efficacy and safety standards must apply. Therefore, it seems unlikely that cannabis will return to treatment formularies. New cannabinoid derivatives acting on cannabinoid receptors offer the best promise for more specific cannabinoid medicines.

Speaker: *Peter Fried, Ph.D.*
Professor
Carleton University

For the past 15 years, our study team has been evaluating the children of mothers who used marijuana and/or cigarettes during pregnancy. I am presenting the preliminary findings of this research, focusing on 9- to 12-year-olds. It suggests that prenatal marijuana exposure is associated with impaired decisionmaking and future planning in children of that age.

Executive function is the intellectual ability that involves decisionmaking and future planning. Executive functioning involves the ability to anticipate or be flexible and the ability to suppress behaviors that are incompatible with a current goal. It also involves focused attention and the ability to not be distracted when necessary. It is relatively independent of I.Q. or global general intelligence.

Women who participated in the study were recruited with notices in medical offices and received prenatal care for participating. Since 1978, there has been a 98-percent retention rate of participants, aside from women who have moved away. There are 120 mother-child dyads in the study with 30 children of mothers who have used marijuana during pregnancy. The protocol, once the women volunteered, included an interview at the end of each trimester (during 1979, 1980, and 1981). Children were evaluated a few hours after birth and at 4 days, 1 week, 9 days, 30 days, and 6 months old, and every year thereafter. There are controls on about 300 to 400 background variables.

Other than mild effects that may be indicative of withdrawal in newborns, no effects were found in children from 4 days to about 4 years of age. At 4 years old, children of women who had smoked one joint per day or more showed some impairment of verbal, perceptual, and memory skills. At 5 years old, there were some significant deficits in the children's sustained attention.

The main result of this preliminary work is that regular marijuana exposure in utero is associated with executive function factors in 9- to 12-year-old children. Executive function is the type of cognitive intelligence associated with the functioning of the prefrontal lobe area of the brain. There is a lot of evidence from recent studies to suggest that marijuana has a tremendous impact on the prefrontal lobe and functioning associated with that part of the brain in chronic marijuana users. In addition, the prefrontal area in animals is one of the areas of the brain where there is a high concentration of cannabinoid receptors.

The major preliminary finding of this study about regular use of marijuana during pregnancy is that marijuana can have an impact that may prevent a child from achieving his or her full potential.

Questions and Answers About Marijuana: Patterns of Use, What It Is, Effects, and Consequences

Moderator: *Alan I. Leshner, Ph.D.*

Speakers: *Lloyd D. Johnston, Ph.D.*
Allyn C. Howlett, Ph.D.
Laura L. Murphy, Ph.D.
Guy A. Cabral, Ph.D.
Donald P. Tashkin, M.D.
Reese T. Jones, M.D.
Billy R. Martin, Ph.D.

The following is a sampling of questions and answers that were relevant to the themes from the first morning.

Dr. Tashkin, what are the differences between marijuana-only and tobacco-only smokers in regard to impact upon lung macrophages?

There are some similarities and there are some differences on how the two substances impact on the macrophages. From very preliminary data that I hesitate to mention, it appears that marijuana has more of a suppressive effect on macrophage function and tobacco a stimulant effect. Because

the difference between marijuana and tobacco is related to the cannabinoids in marijuana, my guess is the reason for the immunosuppressant effect of marijuana has to do with its cannabinoid content.

Dr. Cabral, what is the implication of immune suppression for AIDS/HIV?

The data as they stand are implicative; the direct impact in terms of HIV has not yet been determined.

Dr. Johnston, do you have data indicating the differences according to gender?

Basically, the data are similar for both sexes. In general, the sexes have moved in parallel in regard to marijuana use. At the heavier using end, however, the data show that females use less.

Dr. Johnston, I was concerned about eroding peer norms. What is the impact of the DARE program used in the elementary schools? Are there changes in those programs that can turn them around?

As a society, we are not effective enough. Eroding norms among the youngest students are impacted by what is happening in the media and entertainment industry. As for the school programs, it is important to improve DARE. It is not that easy to change human behavior. Let's find out which things are working. We need to do a lot more, creatively, in the schools.

Dr. Tashkin, in your studies on damage to the lungs, has paraquat been added to the equation?

It is impossible to determine whether the marijuana was affected by paraquat. These samples were taken in the 1980s when paraquat was not being used in this country.

What Do Teens Think About Marijuana? What Do Parents Think?

Speaker: *Ginna Marston*
Executive Vice President/ Director
Research and Strategic Development
Partnership for a Drug-Free America

The major problem is that, since 1992, marijuana use among teenagers has risen sharply. Because so many people today in movies, media, and music promote marijuana use, teenagers today believe that it is normal to try it and that even casual use is normal. The challenge in solving this problem, for adults and parents, is how to talk to teens and get through to them about not using marijuana. For that to happen, parents and adults need to do two things. The first is to better understand the teenagers' world in general, and the second is to better understand how marijuana fits into their world.

A major part of the teenagers' mentality is that they believe that everyone their age is using marijuana. This misconception leads teenagers to believe that nothing is wrong with those people, so why should they not try it? One survey showed that teenagers believe that 80 to 90 percent of people their age are using marijuana. When teenagers do see people who are messed up because of marijuana, they simply say, "Oh, I won't get like that." Many believe that they can control it, and they deny the fact that they can become "burned out." The fact of the matter is that marijuana is dangerous because most of the people who are addicted to the harder drugs, such as crack and

heroin, started with marijuana. However, many teenagers do not believe that because of what they see around them.

Teenagers live in a world nowadays that advocates marijuana. Because of music, movies, and fashion, it has become fashionable to be a proponent of marijuana. Musicians such as Tom Petty include lyrics that make marijuana smoking seem normal; some, such as Cypress Hill, promote drug legalization. Marijuana is being promoted by all types of music, from rap to heavy metal. It is more prominent in rap music, however. And, since rap is becoming more popular among teens, more teens are hearing the message that marijuana use is okay. The movie "Dazed and Confused" was, and still is, extremely popular among teenagers. It was full of teenagers who smoked marijuana and were viewed as "cool." Marijuana and hemp products are also featured in fashion. Everything from shirts to hats to jewelry displays the cannabis leaf. Since so many teens are fashion-conscious, they are getting that same message.

Many parents are not in touch with their children's world. They do not realize the young age at which children begin to experiment with marijuana and that the drug is smoked in the very places parents feel are "safe havens"—at home, at friends' houses, and outside of school. Parents need to educate themselves in order to talk to their children about marijuana. When parents have a clearer illustration of the teenagers' society, this will make it easier for parents to talk to their children, and in turn, help correct the problem of marijuana use.

Screening for Marijuana Use in Adolescents

Moderator: *Elizabeth Rahdert, Ph.D.*
Research Psychologist
National Institute on Drug Abuse

Speaker: *Richard Dembo, Ph.D.*
Professor
University of Southern Florida

Screening tools are used to determine the presence or absence of one or more specific problems among persons surveyed, interviewed, or tested. Four types of marijuana screening tools are currently available. They include hair, urine, and saliva toxicology screens as well as self-report questionnaires. Of these, hair analysis provides the longest history of marijuana use. On the other hand, urine and saliva screens are limited to providing evidence of more recent drug use because of the shorter period of time within which the marijuana can be detected.

In contrast to the biological measures, paper-and-pencil self-report questionnaires can be used to address the issue of marijuana use over any length of time, from daily use during the past week to lifetime use. Limitations to this screening approach include the accuracy and reliability of an individual's response.

Data on the use of marijuana obtained through drug screens can be utilized to address the needs of an individual teenager or a specific group of adolescents at risk. At the single case level, indications of marijuana use can be combined with indepth diagnostic information to plan a preventive or therapeutic intervention. At the aggregate level, results of marijuana screening can be used to estimate the need for continued support for ongoing programs or for the establishment of newly developed services in a community or statewide. Further, individual and aggregate data can be used by most agencies that serve youth. These settings include mental health and primary health care clinics, drug addiction programs, social service agencies, public schools, and juvenile court diversion and reintegration programs.

A screening tool with demonstrated validity and utility with adolescent populations is the Problem Oriented Screening Instrument for Teenagers (POSIT). The POSIT is a self-report, 139-item questionnaire, appropriate for use with boys and girls, ages 12 to 19. The POSIT is designed to screen for potential problems in 10 functional areas, including drug and alcohol use, physical and mental health, peer and family relationships, educational and vocational status, social skills, leisure time, and delinquent activities. As a cost-efficient means of gathering evidence on the use of marijuana and other drugs, the POSIT has been used as the first step in an adolescent assessment-referral system to gather information on individual marijuana use, as well as data on teenage subgroups experiencing multiple social and personal problems related to their drug use.

Science of Marijuana Testing

Speakers: *Donna Bush, Ph.D.*
Chief, Drug Testing Section
Substance Abuse and Mental
Health Services Administration

Ed Cone, Ph.D.
Chief, Chemistry and Drug Metabolism Section
National Institute on
Drug Abuse

Correct diagnosis of marijuana use is a key first step in dealing with an individual's drug problems. Traditionally, the most objective criterion available for identifying marijuana use is urine testing. Urinalysis is the most widely used technique and provides an objective measure for determining whether recent drug use has occurred over the past 2 to 4 days. Recently, interest has grown in improving urinalysis techniques and adopting other biological fluids and tissues, such as saliva, sweat, and hair, that may reveal additional information about an individual's drug use patterns.

Saliva testing, in comparison to urinalysis, offers different information regarding recency of marijuana use. The detection times for tetrahydrocannabinol, the active ingredient in marijuana, in saliva is similar to that for blood (4 to 12 hours).
Consequently, saliva testing offers the possibility of revealing current drug use that affects an individual's performance in complex psychomotor tasks such as driving and operating heavy equipment.

Sweat testing has recently become feasible through the development of a new sweat patch device designed to collect nonvolatile drugs of abuse from human skin. The device is applied like a bandage to the skin. Substances with the volatility of water or greater leave the device through a membrane barrier. Nonvolatile substances are concentrated on an absorption pad inside the patch. Subjects can wear the patch for up to several weeks. The patch is then removed and stored, and the contents analyzed. Preliminary studies with the sweat patch indicate that it may be useful for the detection of drug use over a period of 1 to 2 weeks. Currently, its usefulness is being evaluated.

Hair testing appears to offer the possibility of monitoring drug use over an extended period of time that is dependent upon the length of an individual's hair. Since hair grows at an average rate of 1.0 cm to 1.5 cm per month, analysis of segments of hair for drug content could possibly reveal historical drug use dating back months to years. However, caution is necessary in interpretation of positive hair test results for marijuana use since environmental contamination of hair can occur.

The technology and scientific knowledge base of each of these new biological measures is improving rapidly. Each technique offers different information regarding the extent, frequency, and impact of marijuana use in selected populations.

Community Prevention Strategies

Moderator: *Beverly Watts Davis*
Executive Director
San Antonio Fighting Back

Speaker: *Carol Reeves*
National President
National Family Partnership

The National Family Partnership (NFP) has been in existence for 15 years and is based on family and community volunteerism. NFP is a nationwide organization, with each chapter focusing on its own community. Membership includes mothers and fathers with various careers. Government officials or affiliates are not part of the partnership.

NFP looks to Government agencies, such as the Center for Substance Abuse Prevention, for information. NFP involves parents who have an understanding of what is going on with their children and in their homes. The organization helps parents and young adults, as well as teachers and others involved with the school system, to understand the system by distributing drug prevention education materials and information. The information is reinforced during school so more students can be positively affected and educated. Participants in NFP are helping others and they are educating themselves.

Speaker: *Jane Callahan*
Executive Director
Valleya Fighting Back Partnership

Valleya Fighting Back Partnership (VFBP) started as a red ribbon community in the Just Say No campaign. The organization initially coalesced as a strong group of people in a variety of fields who had an interest in the Robert Wood Johnson
Fighting Back Program. The Robert Wood Johnson Program is a 7-year program, beginning with 2 years of planning and ending with 5 years of implementation.

VFBP's focus is prevention, public awareness, intervention, treatment, education, and relapse prevention. VFBP brings all the elements of the community together as a part of the solution. These elements include political figures, families, youth groups, faith communities, and others. VFBP funds direct services, but does not provide services. Members of the organization believe that family, peer groups, schools, and communities determine risk or resilience to drug use for children. VFBP provides intervention and treatment programs, counselors, and peer counselors. It is the belief of the organization that school district officials, teachers, and school staff should partner with parents to reduce risk to drug abuse.

VFBP uses various environmental strategies to reduce the risk of drug abuse, such as forming an Alcohol Policy Coalition, which focuses on problems in the community surrounding alcohol; providing a series of programs to assist merchants in becoming more responsible with the sale of alcohol and drug apparatus; working with community organizations in establishing and conducting parenting classes; assisting young people to become peer counselors; creating partnerships with youth and adults; and establishing media projects for young adults to develop drug-free messages

targeting their peers to discourage drug use and abuse. The projects include newspaper ads, dramatic presentations, and commercials. After conducting these projects, schools that surveyed students have found positive differences in behavior.

Speaker: *Leroy Not Afraid*
Division Seekers Coordinator
InCare Network

The InCare Network works primarily with Native American youth. It believes that getting to the grassroots level is important for youth, but that bringing the issues to a professional level for adults is also important. "Drugs will destroy your life" is a theme featured by the network.

The Network uses a holistic approach in dealing with substance abuse, which includes physical, psychological, emotional, and spiritual elements. It believes that to be effective, the information must be presented at the level of the target community. Current information needs to be more culturally sensitive to Native Americans; information developers must realize the differences within the Native American community.

Speaker: *James Mills*
Executive Director
Philadelphia Anti-Drug/ Anti-Violence Network

The Philadelphia Anti-Drug/Anti-Violence Network is composed of 40 people, has a $1.6 million budget, and works with gangs and children from underclass communities. The organization is a crisis response agency and uses crises as leverage to create positive situations from negative ones. The organization uses crisis as a catalyst to develop smaller community organizations that address more specific problems such as open drug sales and lack of youth programs.

The Network trains new groups to assist in responding to crises and helps to develop alternative activities for youth. Network members share the belief that responsible adults have to develop positive relationships with children.

The organization also believes in including everyone who wants to work with the group, especially youth, and that, to be effective, it must have a common message, understand the perceptions and realities of children, use people with whom the target group can identify, work together beyond the hours of 9 to 5, and employ radical methods to eradicate radical problems. Philadelphia's Congresspersons are involved with the Network.

Perinatal and Developmental Effects of Marijuana
Speaker: *Peter Fried, Ph.D.*

This workshop was a continuation of a plenary panel session. The session became a question/answer session.

This presentation focused on Dr. Fried's research on prenatal effects of marijuana smoking. The study is based on 150 subjects classified as predominantly white (one cross-racial child), middle-class, educated, and living in Ottawa, Canada. Of the 150 subjects, 120 were non-drug-using and 30 were marijuana users. The 1 cross-racial child was in the 30 subjects who were marijuana users. The research is based on a 13-year study conducted from the perinatal period through age 12.

Questions and answers followed:

Are the effects of marijuana similar to fetal alcohol syndrome (FAS)?

No. No major malformations have been cited. There have been no mental re-tardation or growth differentials associated with marijuana use. Both of these are associated with FAS.

Does marijuana use by a parent prenatally affect the onset of puberty?

It may delay it. We are waiting for re-funding to conduct this research.

Are you planning to look at latent tendency to smoke as an outcome of marijuana use by parents?

I would like to. Of the 150 children studied, approximately 5 to 10 children may be smoking. It is very small.

Did you try to interview fathers about marijuana use?

Yes, but the fathers, for the most part, did not want to participate in interviews.

Was there testing for parents prior to the child's birth?

Mothers were administered culture-free intelligence tests; however, these tests do not tap into executive function.

Did marijuana use affect birth weight/head size?

No, not in humans. However, it did in animals. This is an interesting finding. The average gestation period was 1 week less for mothers who used marijuana. This was not a new finding. It has been known for centuries that use of marijuana brings on labor at an earlier stage (approximately 1 week). This information is based on research conducted on rats. It proved to be true for mothers participating in the study.

Did you study the subjects' diet?

Yes. Food intake was controlled. It is important to note that mothers took very good care of their babies in utero. This may be for several reasons. Canada has an extensive network of services, both health and human, for mothers and children. Also, many adults in the study who used marijuana were vegetarians and ate much better than the control group.

Have you looked at siblings who were exposed or not exposed?

There would have to be a 5,000- to 6,000-person study to have significant results.

What was the age range of women in the study?

Their ages ranged from 18 to early thirties. The median age was mid- to late-twenties (about 27).

Could executive function have a genetic component?

Maybe, although there is a strong argument against it. It is difficult to imagine.

Is there any effect on physical development?

Not yet. We would like to look at this factor in the next round if it is funded.

Who is doing research on executive function?

I am. Ed Riley is looking at alcohol as it relates to executive function; someone in San Diego is looking at the effects of cocaine on executive function; and Sand and Joe Jacobson are looking at the effects of cocaine on executive function.

What do you want to focus on during the next phase of the study if you are funded?

Executive function and the effects, if any, that marijuana use by the mother has on the onset of puberty.

Adolescent Females: Marijuana, Sexuality, and Risks

Moderator: *Lucille Perez, M.D.*
Associate Director
Medical and Clinical Affairs
Center for Substance Abuse Prevention

Speakers: *Janet Mitchell, M.D.*
Chief of Perinatology
Harlem Hospital Center

Barbara Garcia
Associate Administrator
Office on AIDS
Substance Abuse and Mental Health Services Administration

Adolescent females growing up in urban America face many more problems today than in generations past. The threats that HIV and AIDS, pregnancy, gang violence, date rape, and drugs impose on America's young women are haunting, but real. America's adolescent girls must empower themselves to overcome these obstacles in order to live happy and healthy lives, but they should not have to combat these problems alone.

Harlem Hospital runs New York's largest prenatal clinic, the Special Prenatal Program, which has served more than 1,500 women since its September 1985 opening. At Harlem Hospital Center, the Departments of Psychiatry and Obstetrics designed the program in an attempt to give comprehensive prenatal care to chemically dependent women. The program staff includes obstetricians, midwives, a nurse clinician, a registered nurse, a nursing assistant, a social worker, a drug counselor, a health educator/nutritionist, and a community liaison officer. The staff of the methadone maintenance program, which is located adjacent to the Special Prenatal Program, is readily available to the patients enrolled in the program.

Young women in the lower class are most at risk for all of these issues (drugs, sexually transmitted diseases, pregnancy, HIV), and therefore they need programs that are created especially for them. Women must be taught problemsolving skills and ways to negotiate issues with their partners.

Better decisionmaking skills would cut down the Nation's high rates of teen pregnancies and drug abuse.

Society is contributing to the problems young women are facing rather than finding ways to improve the conditions for all women. Some of the points raised included the following:

- Women with personal life goals and high self-esteem are more likely to terminate pregnancies than women who have few life goals and low self-esteem.

- Institutions are not supporting one another. Churches and some families are not supporting sex education or condom distribution in schools. Without total community support, our children will not benefit from our efforts.

- Continual exposure to stereotypes about sex and drugs through pop culture has changed children's values and norms.

Antecedents to Marijuana Use and Familial Transmission

Moderator: *Judith S. Brook, Ed.D.*
Professor
Mt. Sinai School of Medicine

Speaker: *Judith S. Brook, Ed.D.*

These are brief descriptions of three longitudinal studies. The topics are the adolescent antecedents of marijuana use, childhood factors that predict marijuana use, and the transmission of marijuana use across three generations.

One longitudinal study included a sample of 700 African American and 600 Puerto Rican youths living in East Harlem. We studied the effects of the interrelationship of personality, family, peer, and ecological factors on marijuana use. Findings indicated that, overall, the risk factors for later marijuana use in African Americans are very similar to those in Puerto Ricans. Those young people who were more likely to use marijuana tended to be somewhat unconventional and rebellious. They also may have experienced difficulty in emotional control, low self-esteem, and depression. Lack of bonding between a parent and child and drug use by other family members led to more marijuana use. Having friends who used alcohol and marijuana was related to later marijuana use, as was an adverse school or neighborhood environment. Factors that could offset the risks for marijuana use included a warm relationship with one's mother and greater time spent with a father.

A childhood study begun in 1975 with 1- to 10-year-olds, now continuing in its 20th year, shows a retention rate of 80 percent. The overall results of the study suggest that parental personality traits and parents' use of illegal drugs lead to difficulty in the parent-child relationship, which leads to a drug-prone personality in the child. These childhood risk factors result in adolescent drug-prone personality traits. Such risk factors during adolescence lead to marijuana use in young adulthood. A few of the many childhood factors measured include aggression toward siblings, anger, recklessness, noncompliance, temper, and predelinquency. The family factors that have been found to predict marijuana use 20 years later include lack of bonding with parents, low affection, parent-child conflict, and little parental time spent with a child.

An ongoing multigenerational study currently includes 150 children of more than 1,000 parents who participated in the above study. Preliminary findings reveal that psychological risk factors *can*

be transmitted across generations. The results indicated that adverse grandmother child-rearing practices were related to parental drug-prone personality traits and difficulty with toddlers. Difficulty in the parent-toddler bonding relationship was associated with the toddler's anger. In addition, aggressive children who have a distant relationship with their parents are more likely to use marijuana as young adults; adolescents who exhibit rebelliousness, poor school achievement, difficult family relationships, and have friends who use drugs are at risk for marijuana use. Identifying and decreasing these risks and strengthening the protective factors are essential for effective prevention programs.

Speaker: *Valerie Johnson, Ph.D.*
Associate Professor
Rutgers Center of Alcohol Studies

The focus of this presentation is to provide information from our longitudinal study about family-related antecedents of marijuana use. Factors include parental history of alcoholism and/or depression; comorbidity within the family; and the interaction of history, hostility, and living arrangements. Alcoholism was seen more in fathers and depression more in mothers. There were about equal proportions of families with a parent who was either alcoholic or depressed; a small proportion of families showed the comorbid disorders of alcoholism and depression. There was very little illicit drug abuse among the parents reported by the subjects.

This study began in 1979, and there have been four test phases since then. The first phase began with interviews with 12-, 15-, and 18-year-olds. Last year, we interviewed about 1,200 25-, 28-, and 31-year-olds.

Eighty-nine percent of the subjects have returned for all four phases.

Marijuana abuse and dependence among subjects were calculated using problem categories from the Diagnostic and Statistical Manual of Mental Disorders. Some of these categories were neglecting duties, hazardous behavior, legal problems, interpersonal problems, tolerance, withdrawal, efforts to cut down, reduced activities, and recurrent problems. As in other studies, 15- to 18-year-old children of alcoholic parents reported a greater level of family hostility. Children who live with alcoholic parents exhibited the highest marijuana frequency score; those of nonalcoholic parents displayed the lowest marijuana frequency score over time.

Nine percent of the subjects had parents who were comorbid with depression. Subjects who were age 15 reported that their alcoholic and comorbid parents were deemed most hostile. By the time the subjects were 25 to 31 years old, marijuana quantity and frequency were highest among the children of depressed or comorbid parents who had prior high hostility. Among children of alcoholic parents, marijuana quantity and frequency were high regardless of prior hostility. Alcohol quantity and frequency were not differentiated by parental group.

Parental attachment, tolerance to behaviors, alcohol use, and hostility are the family factors most strongly related to offspring's later use of marijuana. The factors found not to differentiate marijuana use are disciplinary practices, number of family activities, and parental permissiveness.

Speaker: *J. David Hawkins, Ph.D.*
Director/Professor
Social Development Research Group
University of Washington

This presentation focuses on the predictors of the initiation of marijuana use. Research has consistently shown that first-time alcohol or marijuana use at an early age is related to later substance misuse. This study examined when children were at greatest risk for their first use of alcohol and marijuana, the predictors of that first use, and how that changes over the course of development from age 12 to 18.

The Seattle Social Development Project is a longitudinal study of etiology (causes or origins of disease) and prevention program effects. The study began with 808 multi-ethnic, urban fifth-graders in 18 elementary schools in 1985, with a subsample of data from first grade. About 94 percent, or 757, of these students participated in the 1993 followup. Youths from high-crime neighborhoods were overrepresented in the sample.

Findings indicate that the paths of first-time alcohol and marijuana use were quite different. The risk of first-time alcohol use appeared relatively constant in youth through the ages of 16 to 17 years old, but steadily increased for first-time marijuana use in youth through the ages of 17 to 18. First-time alcohol use was better predicted by parental norms and peer use; first-time marijuana use was better predicted by family management practices, beliefs about harm from and acceptability of marijuana, and acquaintance and sibling use of marijuana. There were no significant differences in initiation of marijuana use between the genders in the sample. In this sample, Asian Americans had the lowest rates of marijuana initiation across the study period, and Native Americans had the highest rates of marijuana initiation.

The implications of these findings for prevention of marijuana use include early prevention and continued prevention efforts through the developmental period up through age 18, since the risk of first use continues through that age. It is also important to work to turn around attitudes favorable to marijuana use. Helping young people avoid or resist peer influences in their social environment is also promising for prevention of marijuana initiation. Finally, helping parents to develop clear expectations for their children's behavior, monitor their children, and provide positive reinforcement and consistent sanctions across the developmental period through age 18 all hold promise for preventing marijuana initiation.

Speaker: *Ralph E. Tarter, Ph.D.*
Director
Center for Education and Drug Abuse Research
University of Pittsburgh

This presentation focuses on how the components of liability for marijuana use interact, how person and environment interact, how liabilities or risks for marijuana use are classified and clarified, and how outcomes are predicted with use of a standard multifactorial model of liability.

In our society, marijuana and other psychoactive substances having abuse and addictive potential, including tobacco, alcohol, and prescribed medications, are omnipresent and part of our environment. Why then do some individuals succumb to a negative outcome while most others do not? This question entails an understanding of personal and environmental interactions. Individuals having even low levels of liability who are exposed to drugs having increasingly stronger potency results in a combined effect of increased prevalence for substance abuse in

society. Marijuana abuse needs to be understood in terms of its availability, the person's liability, and the potency of the product.

There are many factors that contribute to liability for marijuana abuse. Therefore, intervention at the school-based, community-based, and family-based levels, as well as individual forms of intervention, must be considered for prevention and treatment. Some salient factors that help determine the magnitude of liability for marijuana use are behavior, family, peers, environment, biochemistry, physiology, and psychopathology.

The Center for Education and Drug Abuse Research is conducting a longitudinal study of children, beginning with 10- to 12-year-olds, from substance-abuse families and non-substance-abuse families, and tracking them through age 30. Preliminary findings on boys ages 10 to 12 through age 16 show that sons of fathers who are substance users have twice the chance of using marijuana, compared to sons of non-substance-abusing fathers. These findings may be a result of transmission by the father of genetic factors or of culture, values, and behaviors, or an interaction among these variables. These data are from about 60 families at followup.

A second liability factor for marijuana use is effectiveness of father and/or mother discipline practices and family dysfunction. Another factor is peer influence, such as peer delinquency, conventional versus unconventional activities of peers, and peer acceptance of marijuana use. Difficult temperament alone or difficult temperament in combination with a substance-abusing family member is another liability component.

Youth who use marijuana tend to have more problems as illustrated on the drug use screening inventory. Problems that affect marijuana use or are impacted by marijuana use include other substance use, behavior patterns, health status, psychiatric disorder, social competency, family system, school performance, work adjustment, peer relationships, and other problems.

The Natural History of Marijuana Use:
From Initiation to Dependence

Moderator: *Denise Kandel, Ph.D.*
Professor
Columbia University and
New York State Psychiatric Institute

Speaker: *Robert J. Pandina, Ph.D.*
Professor and Director
Center of Alcohol Studies
Rutgers University

The Rutgers Health and Human Development study follows people, 12 to 31 years old, born in the 1960s. Individuals in the oldest group were born in the early 1960s and were exposed to the largest amount of drug use; individuals in the youngest group were born in the latter part of the 1960s and were exposed to lower levels of drug use.

As other studies have also demonstrated, individuals increase their marijuana use across time and keep entering the pool of marijuana users at increasing rates across time. Historically, individuals who entered the study who were born later in the 1960s, show somewhat lower rates of exposure to marijuana than those individuals who were born earlier and lived through the 1960s. There is a core of individuals who, irrespective of when they were exposed or how much they were exposed to, represent a very stable pool of fairly heavy users. Those rates remain relatively constant across time.

The percentage of individuals using marijuana more than 10 times decreases among individuals born over the decade of the 1960s. However, the percentage of daily and weekly "regular" users remains stable. Subjects born in 1967 to 1969 show the highest percentage never exposed (29 percent); the subjects born in 1961 to 1963 show 3 percent never exposed. No marijuana problem was experienced by 57 percent of the subjects; 11 percent experienced a chronic marijuana problem.

Categories used to measure alcohol or marijuana abuse and dependence included neglect of duties, hazardous behavior, legal problems, interpersonal problems, tolerance, withdrawal, efforts to cut down, reduced activities, and recurrent problems. Of subjects who display no substance problem, 71 percent reported marijuana use at some point in time.

Four percent of subjects who display a chronic alcohol problem did not try marijuana at any time, while 96 percent reported marijuana use at some time. Of subjects who reported an alcohol problem, 77 percent reported marijuana use at some point in time. Reasons for continued marijuana use for the purpose of increasing positive affect included to celebrate, to be more creative, to have fun, and to socialize. Reasons for continued use for the purpose of decreasing negative affect included to feel less tense, to escape from problems, and to relax.

Reasons for individuals to stop marijuana use included a concern that something bad might happen to their health or to their relationships. Other reasons were lifestyle changes such as getting married, having children, or obtaining full-time employment.

A key factor that may mark the transition from exposure to dependence is that some individuals use marijuana even though they experience negative personal consequences.

Speaker: *Ann Pollinger Haas, Ph.D.*
Professor
Lehman College
City University of New York

In our study about the lives of heavy marijuana users, unstructured, indepth interviews were used over a 6-year study period divided into two phases. In the first phase, 17 representative youngsters, 11 males and 6 females, were chosen from a larger group of about 300 marijuana-abusing youth. A case study approach was used to collect and report data. In virtually every family, the marijuana-abusing youngster did not receive as much sustained nurture, support, or affection as non-marijuana-using siblings. Typically, the marijuana-abusing child was viewed as the troublemaker in the family.

Across virtually all families in the study, marijuana use seemed to express the defiance these young people felt toward their parents, teachers, and other authority figures. Heavy marijuana use was part of a self-destructive pattern that included reckless driving, frequent accidents, failure to protect against unwanted pregnancies, and other risk-taking events. Marijuana was used to modify or suppress disturbing emotions, particularly intense anger. Chronic use allowed these youngsters to withdraw from conflicts about achievement and competition. It was used to encourage grandiose expectations, feelings of invulnerability, and a sense that a magical transformation of their life was possible.

Over the study, several of the youth underwent marked changes in their lives and, relatedly, in their drug behaviors. For some, a shift in environment, such as a move away from home, was accompanied by a significant decrease in the use of marijuana. As their need for marijuana became

less, their involvement with drug-abusing peers lessened, and they were able to make more stable friendships. A few became more entrenched in a drifting, aimless existence that included heavy use of cocaine and other drugs. For the majority, heavy marijuana use continued to be a part of their daily lives. For this group, marijuana played a continuing role in helping them to avoid the choices and challenges of growing up.

The second phase of the study focused on 15 adults, 8 men and 7 women, who had used marijuana regularly and heavily over many years. Participants averaged 30 to 31 years old and appeared to be functioning fairly well. Marijuana was the only drug they were using regularly. Each was interviewed with a structured questionnaire an average of 10 times over 2 years.

There were some consistent themes revealed through the interviews. Many of the participants were operating below their ability in their occupations, and heavy marijuana use seemed to foster a resigned acceptance of unacceptable jobs. Many had long-standing problems in their relationships, and marijuana played a role in creating an illusion of intimacy. Many spoke fervently of marijuana's effects on deepening their insights and understanding of themselves. However, marijuana consistently seemed to play a major role in
helping them to avoid looking at and accepting themselves for who they really were. Almost all showed a reluctance to examine their early life experiences or to recognize the effects such experiences had on their current life. They seemed to minimize their own contribution to their failure and disappointments. Many relied instead on astrology or ideas such as reincarnation to explain life's outcomes.

The findings of this study suggest that for many adolescents who use marijuana heavily, both the marijuana behavior and the psychological patterns associated with it are brought forward into adulthood. Rather than causing their difficulties, heavy use of marijuana was an integral part of these subjects' attempt to escape from or cope with problems. To the extent that the drug satisfies specific psychological and psychosocial needs, users depend on marijuana for as long as those needs are present.

PLENARY SESSION
Preventing Marijuana Use

Alan I. Leshner, Ph.D., Presiding

Vivian Smith, M.S.W.
Deputy Director
Center for Substance Abuse Prevention

The mission of the Center for Substance Abuse Prevention (CSAP) is to deliver effective substance abuse prevention messages to American families and communities. It does this through its public service announcement videos. It also uses evaluation and assessment methods to convert lessons learned today into time- and cost-saving guidelines for the future.

A closer and more productive collaboration among the prevention, treatment, and research sectors will enable us to take decisive steps to curb new challenges to our young people and our communities. The latest data have alerted the Nation to the dangerous upward trends in marijuana use among young people. Studies show that the drug is more harmful than any of us realized. Current successful prevention programs emphasize that what has already been learned can help turn the tide against increased marijuana use.

Historically, public health efforts have been reactive rather than proactive when situations have reached epidemic levels. Today, technological advances in biomedical and psychosocial research can capture, report, and interpret more data with a degree of accuracy that was unheard of 10 years ago. We know not only that specific types of treatment work for specific types of clients, but we know what constitutes effective treatment. Treatment has been shown to be the catalyst for introducing more persons to the recovery process and at earlier points in the progression of addiction, when the prognosis for full recovery is greater.

CSAP's role is to provide national leadership in the Federal effort to prevent alcohol, tobacco, and other drug problems and the many other serious problems to which they contribute, such as the following:

- Crime and violence,
- Rising health care costs,
- School failure,
- HIV and AIDS,
- Teen pregnancy, and
- Low work productivity.

CSAP seeks to motivate communities to act on their own behalf by helping them to identify their particular strengths and vulnerabilities regarding alcohol and other drug abuses. Communities are empowered to recognize that they have the authority to take action, once they have come to the realization that they are connected to people and resources that provide innovative ideas and strategies. Through CSAP's grant programs, allocations are passed on to these communities.

Community Partnership Models

CSAP refers to its successful grant projects as "Promising Practices: Prevention in Action at the Local Level." These are examples of effective prevention programs that have helped CSAP gain important new insights into what works and build its knowledge base to plan more effective models for the future.

The first example is the Demonstration Project for High-Risk Youth Populations, the CORE SMART curriculum that targets high-risk youths. This demonstration project was developed to enhance resistance and decisionmaking skills. The Boys and Girls Clubs of America targeted high-risk youths in five housing developments. As a result of this program, decreases were seen in the following areas:

- Alcoholism, tobacco, drug abuse, and other drug use;
- Criminal activity and vandalism; and
- Truancy, academic failures, and behavioral problems.

The Boys and Girls Clubs have gone on to establish similar programs in 200 housing projects. CSAP has funded 252 commu-nities to develop comprehensive long-term demonstration projects tailored to local needs in conjunction with community partnerships. Currently, there is active participation by 67 partners; nearly 10 times CSAP's minimum requirement of 7.

The second example is in Dade County, FL, where the Miami Coalition for a Safe and Drug-Free Community provided the law enforcement community with new information on a new system for closing down crack houses. The immediate result of this program was the closure of 475 crack houses. Since 1990, 1,300 crack houses have been demolished. From 1989 to 1994, the average reduction in crime was 24 percent.

The third example is from Tacoma, WA, and its SAFE STREETS Program. With $100,000 in seed money, this community was able to purchase over $2.5 million worth of advertising campaigns and materials. The project changed the community's attitudes about substance abuse by using message materials such as posters, T-shirts, and hats. As a result, crime decreased. Armed robberies decreased by 33 percent, and assaults with deadly weapons fell by 24 percent. These programs illustrate community mobilization at its most promising.

Overview of CSAP's Activities

CSAP's communication grantees have produced winning, cutting-edge materials for diverse audiences. These materials break new ground in health communications and represent innovative strategies from CSAP communications grantees.

CSAP's national resources are representative of the following:

- National leadership in workplace prevention programs and support for worksite prevention programs,
- The Women's Center,
- National Center for Advancement Prevention,
- National Training Center, and
- Prevline—providing instantaneous transfer of vital information.

How Do We Know That Prevention Works?

The following examples are proof that prevention works:

- Review of prevalence data reports—In 1979, 24.3 million Americans used illicit drugs. By 1993, users had declined to 11.7 million, a decline of 50 percent.

- Use of cocaine by high school seniors—In 1985, 17 percent of high school students used cocaine. In 1994, usage was down to 6 percent.

- Decline in alcohol-related traffic fatalities—In 1982, 57 percent of all traffic fatalities were alcohol related. In 1993, alcohol-related traffic fatalities had declined to 44 percent.

Underage drinking is still the leading cause of death among young people, and half a million people die from substance-abuse-related problems. CSAP is capturing a profile of what prevention programs work for specific audiences and will use this information to develop future prevention projects.

Prevention works only if the dosage level is high enough, and it must be sustained. It is not a one-time inoculation. It must persist for the same audiences even as it is being introduced to new audiences.

Preventing substance abuse will also reduce many costs associated with health problems including the following:

- Spinal cord and head injuries,

- Care for alcohol-exposed and other drug-exposed babies, and

- Chemotherapy and radiation to treat cancers.

Targeting women of childbearing age makes prevention begin working in the lives of children even before birth, benefiting them and their families for the rest of their lives.

CSAP began conducting youth and adult focus group testing across the country when the alarming statistics about the increase in marijuana use by young people were announced. The following issues were identified as a result of the focus group testing.

- Marijuana is not seen as life threatening or addictive by young people or their parents. There is an erroneous assumption that because people are not visibly dying from using marijuana, it is not dangerous.

- Young people need and want science-based facts from credible sources about the dangers of marijuana.

- Parents need help in resolving their conflict about their children's use of marijuana.

How Do We Make Prevention Work?

The following are some of the prevention practices that can work:

- Raise awareness,
- Promote good parenting skills,
- Build self-esteem,
- Build social skills,

- Build academic/vocational skills,
- Develop mobilized communities, and
- Strengthen norms that promote positive lifestyles.

Speaker: *Mary Ann Pentz, Ph.D.*
Associate Professor
University of Southern California

The study sites in our Midwestern Prevention Project were Kansas City, KS and MO, initiated in 1984, and Indianapolis, IN, initiated in 1987. The participants were sixth- and seventh-graders who participated from age 12 or 13 to age 22.

There are five components to the community-based program. The school program component consists of 18 sessions conducted over the first 2 years. The other components include child/parent homework programs, direct parent contact, community-based activities with community leaders and educators, health policy change, and mass media programming.

In comparison to the Life Skills Training program, which lasts 3 years, this project consists of 2 years of direct contact with a school program; 2 to 3 years of involvement with parents; and in subsequent years, general community involvement. The retention rate of the program is approximately 90 percent, and the cost of the program is approximately $24 to $37 per family per year.

In the Kansas City study, statistics show that over a 10-year period, there was a 38-percent net reduction in monthly marijuana use, a 43-percent net reduction in weekly marijuana use, and a 27-percent net reduction in heavy (greater than two times per week) marijuana use. In Indianapolis, the study included private and public schools. Their statistics showed an 11-percent net reduction in monthly use of marijuana, an 18-percent net reduction in weekly marijuana use, and a 33-percent net reduction in heavy marijuana use.

Future prevention programming should be strategic and include primary prevention, special topic activities, standardized student assistance programs, and facilitating prevention-treatment referrals.

Speaker: *Gilbert J. Botvin, Ph.D.*
Professor and Director
Institute for Prevention Research
Cornell University Medical College

My work has targeted junior high school students and older populations. The primary prevention program strategies consist of instituting ongoing intervention cycles, multiyear programs that last at least 3 years, and properly implemented quality control. The implementation of school-based prevention programs has had an impact on drug use behavior with a universal prevention strategy.

Our Life Skills Training program focuses on preventing the types of behaviors that can lead to drug and alcohol abuse by educating young adults in a number of different areas. These areas include social resistance skills, interpersonal skills such as effective communication and conversational skills, and self-management skills that relate to making effective decisions.

Research findings published in the 1995 issue of the *Journal of the American Medical Association* showed that there was a 33-percent decrease in marijuana use in the full sample and 44 percent in the high-fidelity sample. Marijuana and tobacco use decreased by 50 percent in the full sample and 50 percent in the high-fidelity sample. Marijuana, tobacco, and alcohol use decreased by 50 percent in the full sample and by 66 percent in the high-fidelity sample.

From our research, we have developed prevention principles that can be used to enhance the development of more effective prevention programs. These include targeting middle or junior high school students, using a comprehensive school-based approach, and teaching drug resistance skills. Teaching methods for skills training, standardized interventions, and periodic evaluation of interventions are also key to an effective prevention program.

Drug abuse prevention conducted with junior high school and high school students can produce a durable and meaningful reduction of drug, marijuana, tobacco, and alcohol use when these approaches teach a combination of drug resistance skills, general life skills, and properly implemented quality control that includes 2 years of booster sessions.

Speaker: *Thomas J. Dishion, Ph.D.*
Research Scientist/Clinical Psychologist
Oregon Social Learning Center

This discussion focuses on two areas: a study of the escalation of problem behavior and drug use among high-risk youth and a report on the results of the initial analyses of effectiveness of two intervention strategies that have been tried and evaluated.

In 11- to 16-year-olds, the following assessment was found to be compelling. Onset of drug use before the age of 15 was a unique risk factor; the pattern of use was alcohol, tobacco, and then marijuana use. Behavior problems required intervention for both drug use and antisocial behavior. Cognitive behavior modification, parent focus, and teen focus intervention are key factors.

For both the parent and teen focus interventions, the following method of assessment was identified: identify the problem, support prosocial behavior, set limits, and conduct relationship skills training (negotiation and communication skills).

The analyses of two intervention strategies showed that peer conditions had a negative effect on behavior; higher tobacco use was present in peer group conditions; and, after a 1-year followup, tobacco use was highest in those conditions that had peer group involvement.

Our findings reveal that it is most effective to avoid aggregating high-risk youth groups into special schools or treatment. It is better to deliver direct intervention to high-risk youth within conventional contexts, such as schools, and keep these youth integrated with non-high-risk students. Interventions aimed at parenting practices show promise for reducing risk for early substance use and accompanying antisocial behavior.

Treatment Strategies for Marijuana Use: Adults and Adolescents

Richard A. Millstein, Presiding
Deputy Director
National Institute on Drug Abuse

David Mactas
Director
Center for Substance Abuse Treatment

We as treatment professionals need to do a better job in terms of providing leadership for the treatment of people who present with marijuana use. Very often, those who enter treatment with marijuana use also abuse other drugs. I am very interested in those who do not enter treatment and to what extent we are creating an environment for their continued engagement. Clearly, if you work in the field and are invested in the engagement of people who experience dysfunction as a result of substance abuse, it is less important what drug they use as long as they present for treatment. The eminent issue, it seems to me, is to discover what we can do to help that client write a prescription for clinical progress and move along a continuum toward, if not abstinence, then measurable improvement.

There is something to be said for engagement of a client or a patient and attention to behavior that is independent of the drug abuse. There is a dilemma in terms of presentation of clients. We see 100,000 people a year who present for treatment with a primary, or at least a self-perceived primary, marijuana abuse problem. The challenge is how to handle this. We need to create and maintain an environment for presentation and engagement.

The important thing for me is engagement. We need to get people to the point of coming forward. Then we need to not make value judgments as to the nature of a specific drug that brings somebody to us. We need to be thankful that somebody is brought to us in the treatment setting.

The literature suggests that marijuana is the most widely used illicit substance. It is a problem. When I can only cite two sentences that constitute CSAT's protocol for the treatment of marijuana, then we must recognize that there is work yet to be done. We need to create an environment in which patients are motivated and are invested in their own recovery, recognize the incentives and disincentives of behavior, and accept the consequences of behavior.

As treatment professionals we need to create an environment in which healing can take place, where there is consistency, leadership, and research. There needs to be not only research that lives in monographs, but research that lives in organizations and programs. Then we must follow this research and give life to that which has been learned, and translate this revelation into humane, cost-effective, and clinically sound treatment.

So, your responsibilities are not only to come to conferences and listen. We need to hear from you more often. You need to be engaged in research. You need to be engaged in learning. You need to be engaged in planning, the allocation of funds, and the execution of learning, whether it is research or demonstration. Help us set the agenda, help us learn. This transcends issues of marijuana, cocaine, inhalants, or any other drug of abuse.

Family-Based Treatment for Adolescent Substance Abuse: Efficacy Evidence, Key Clinical Features, and Therapy Development

Howard A. Liddle, Ph.D.
Professor and Director
Center for Research on Adolescent Drug Abuse
Temple University

These reviews of studies about family-based treatment for adolescent substance abuse cover 28 studies: 11 about adults and 17 about adolescents. Of these, 14 were controlled trials. The subjects were adolescents who were heavy drug abusers, the therapists were well trained, therapies were well defined and representative of common models, and many of these studies existed within programs of research.

Representative findings about the efficacy of family-based models of intervention show they can retain and engage adolescent substance abusers and their parents in drug abuse treatment. For example, Jose Szapocznik and colleagues have developed and conducted studies about specialized engagement models. In their first study on engagement, 93 percent of the subjects were successfully engaged in treatment, with more than 75 percent completing several months of weekly outpatient treatment. This is compared to usual engagement rates of 42 percent and completion rates of 25 percent. Models of engagement such as these require a tremendous amount of work for clinicians and require the contextual support of the treatment setting. Unfortunately, most clinicians are not trained in these specialized methods.

Each of the clinical trials demonstrates reductions of drug use, and these decreases persist at followup. Not one study found that family-based treatment was ineffective. In one study from the late 1980s, drug use was reduced on average from daily marijuana and alcohol use to weekly use and no use of any other hard drugs. Rates of abstinence at termination range in the reviewed studies from about 73 percent with a sample of middle-class European-American youth, to 44 percent with hard drug users.

The characteristics of some of the "new breed" of family-based interventions include a strong emphasis on context and a redefinition of intervention. This includes the commitment of treatment providers to understand the theoretical and conceptual basis of their work. Additionally, intervention design is related to treatment development and treatment setting; there is an incorporation of different traditions and methods; and interventions are well defined yet flexible. These interventions may target different domains of functioning, focus on the prosocial, and guide practice with evaluation.

There are some good studies that show drug abuse treatment does work for teens; not only long-term, but 12- to 16-session models of treatment have worked. Outpatient as well as residential treatment works with adolescents, and 12-step programs can be an adjunct to psychosocial treatment. If adolescents and parents will not come to treatment, home-based treatment services are an alternative. We are understanding the components of treatment and what aspects of treatment are most effective. Family-based treatments do many things and include meeting with the entire family and with children and parents separately.

Extended versus Brief Treatment for Adult Marijuana Users

Robert S. Stephens, Ph.D.
Associate Professor
Virginia Polytechnic Institute

Marijuana is the most commonly used illicit drug in the United States, with over 5.5 million adults consuming this drug weekly. Until recently, there has been very little research on marijuana abuse/dependence and treatment. At the time our studies began, there was a popular assumption that marijuana dependence was unlikely to occur except in the context of polydrug dependence. The mild symptomatic profile of physiological dependence on marijuana may have been another factor that led to few researchers examining this phenomenon.

Evidence of damage to the lungs and reports of impairment in functions such as memory, concentration, and motivation pointed to the need for marijuana-specific treatment. In our studies, only about 20 to 25 percent of heavy marijuana users seeking counseling to help them cease use were abusing other drugs. Few of our subjects had ever sought prior treatment for heavy marijuana use. This may have been because, similar to alcohol abusers, marijuana users may not have wanted to be treated with other drug abusers and there were no marijuana-specific treatments. Roger Roffman and I therefore planned to offer various kinds of marijuana-specific treatment and see who showed up.

As we planned our interventions, the relapse prevention model (Marlatt and Gordon) was of primary interest to us. The ideas that drug use comes to serve various coping functions and that a drug abuser may not have coping skills to deal with high-risk situations were used to formulate these treatment interventions. One part of the treatment plan was to teach people skills to deal with situations where they usually smoked marijuana.

In both of our studies, research subjects were recruited through media announce-ments and news stories that promoted a research/treatment program for adults who were concerned about their marijuana use and who wanted help in stopping. People who had used marijuana fewer than 50 times in the last 90 days, who were abusing alcohol or other drugs, who showed signs of psychosis, or who were in other treatment were excluded.

In the first study, therapist teams led 10 2-hour sessions over 3 months with two types of treatment. One type was group therapy that helped clients identify and develop coping skills. It was based upon the relapse prevention model. The other type of treatment was a nonbehavioral group discussion in which therapists facilitated discussion of topics related to cessation.

In the second study, a longer timeframe of 14 sessions over 4 months was used for teaching coping skills and for group support. An attempt was made to create ongoing support groups that would continue after the therapist-led sessions had ended. Of 602 people screened for participation in just over 2 years, 291 were randomized to three treatment conditions: a 14-week group counseling treatment that focused on relapse prevention, a three-session individualized treatment, and a 4-month delayed treatment control condition.

Findings from both studies indicated that the active treatments produced outcomes superior to no treatment in terms of reduced marijuana use and associated problems. Although significant and substantial improvements were demonstrated for up to a year after treatment, relapse rates were comparable to individuals treated for other types of addiction. Only about 20 percent of the sample was abstinent from marijuana use 12 months after treatment. The results also suggest largely equivalent efficacy of the extended group and brief (three sessions) individual approaches to treatment.

Relationship Between Marijuana Use and The Use of Other Drugs, and Other Antisocial Problem Behaviors

Moderator: *Robert J. Pandina, Ph.D.*

Speaker: *Thomas J. Crowley, M.D.*
Professor
University of Colorado School of Medicine

This presentation focuses on the findings based on new data from my study of the last 5 years on delinquency in substance-involved adolescents. This research is part of a research demonstration grant about a group of adolescents with serious conduct disorder.

The study group was composed of 171 boys and 68 girls, 13 to 19 years old, who had been referred for substance and delinquency problems by criminal justice and social service agencies. All have abuse or dependence shown by a standard DSM III-R interview; all have had conduct disorder at some time in their lives; about 85 percent currently have conduct disorder. The criteria for diagnosing conduct disorder include stealing without confrontation, truancy, breaking and entering, and running away. Overall, the patterns are quite similar for girls and boys who have severe conduct disorder.

A majority of the sample have marijuana dependence; many also have major depression or attention deficit hyperactivity disorder. About 80 percent of the boys and about 60 percent of the girls have dependence on marijuana. The large majority of the youth with conduct disorder also are dependent on marijuana. There is a wide variety of comorbid disorders in this population.

The dependence symptom profile is about the same for marijuana, alcohol, and cocaine. The proportion of boys complaining about any particular symptom is about the same regardless of the drug being examined. In general, the data for the boys and girls are almost identical.

In terms of onset, conduct disorder usually precedes marijuana dependence. However, there is a striking overlap between the onset of the third conduct disorder symptom and the initiation of marijuana use. In other words, about the time the conduct disorder really starts up, marijuana use begins. Regular or monthly use of marijuana occurs very soon after the first use of marijuana.

The rapid progression from first use to monthly use of marijuana indicates that marijuana is readily available to these kids and that it is highly reinforcing to them. This progression is similar to that of cigarettes. The progression from first use to regular use of alcohol is a little longer, and the progression from first use to regular use for other drugs is much longer than for marijuana.

Marijuana use in this population persists despite intensive treatment. On average, the boys are in residential treatment programs based on a modified therapeutic community model for approximately 7 months. At 1- and 2-year followup, there are a number of dramatic positive changes in the youth in terms of their conduct disorder. However, at 2-year followup after admission to the study's treatment program, the prevalence of marijuana use is higher than it was at admission.

Speaker: *Denise Kandel, Ph.D.*

This presentation focuses on the relationships between the use of marijuana and the use of other drugs as they occur concurrently and developmentally. These themes are illustrated with data from my 19-year longitudinal cohort study from New York State (NYS) and the National Household

Survey on Drug Abuse. I conducted special secondary analyses of the 1993 wave of the latter study to present the most up-to-date national data.

The greater the involvement with marijuana, the more likely it is a young person will use multiple illegal drugs now and during his or her lifetime. Similarly, the proportion of youths who smoke daily increases sharply with the frequency of marijuana use; 40 percent of daily marijuana users smoke one or more packs of cigarettes per day. By contrast, frequent drinking of alcoholic beverages does *not* increase in direct proportion to the frequency of marijuana use.

Very clear-cut developmental stages in the use of drugs have been identified based on our NYS cohort study and many other studies. The first stage is the use of alcohol or cigarettes; the next stage is marijuana use; and the third stage is the use of other illicit drugs and/or medically prescribed psychotropic drugs. Young people are unlikely to try marijuana without first having experimented with an alcoholic beverage or cigarettes. Very few try other illicit drugs without first trying marijuana. For example, among men who have experimented with cocaine, only 3 percent did so without earlier experimentation with marijuana. Among women, smoking cigarettes plays a more important role in the pathway to drugs than for men.

Although there are clear developmental stages in drug use, this does not mean that use of a certain drug at a particular stage will invariably lead to the next stage of drug use or abuse. Marijuana use does not inevitably lead to cocaine or other drug use. Many young people stop at a particular stage of drug use and do not progress further.

Risk factors that can predict movement from one stage to the next include the age of onset of drug use and the degree of involvement with a specific drug. The earlier a youth begins to use legal drugs, the higher probability the youth will progress to experimentation with illegal drugs. More generally, earlier initiation of use of any drug is associated with greater involvement in the use of all other drugs. Intensity of use with a drug at one stage is related to progression to use of a drug at a higher stage.

Speaker: *Terence P. Thornberry, Ph.D.*
Professor
State University of New York at Albany

The Rochester Youth Development Study, an ongoing panel study, began in 1988 with a sample of 1,000 seventh- and eighth-graders from the public schools. The entire population of students is represented; youth at high risk for serious drug use and delinquency were oversampled. Students and their primary caretakers were interviewed at 6-month intervals during the first phase of the study. The last interviews occurred during the 11th and 12th grades. There was an 88-percent retention rate of the original panel at the ninth interviews. The sample is 75 percent male and 25 percent female, 69 percent African American, 17 percent Hispanic (mostly Puerto Rican), and 14 percent Caucasian. Data were collected also from agencies such as schools, police, social services, and others.

Frequency of marijuana use is compared to a variety of other behaviors, and the sample is divided into three groups: nonusers (61 percent), nonchronic users (29 percent) and chronic users (9 percent). The chronic marijuana users accounted for 83 percent of all of the instances of self-reported marijuana use. The data show a high overlap between marijuana use and alcohol use, virtually no overlap between nonusers and hard drug use, and about a 35-percent overlap of chronic marijuana use and hard drug use. Although not many young people sell drugs, about 71 percent of the chronic marijuana users report selling drugs at some time during the middle to high school years.

The serious delinquency of nondrug users is relatively low (21 percent) while that of chronic users is quite high (78 percent). Police records show 75 percent of chronic users have been arrested by the end of high school, compared to 25 percent of nonusers. Gang membership is also much higher among chronic marijuana users (35 percent) than among nonusers (4 percent), as is gun ownership for protection among chronic users (34 percent) than among nonusers (4 percent).

The relationship between the use of marijuana and sexual activity is indicated by the chronic users involved in pregnancy (65 percent) compared to nonusers (17 percent) and the regular use of condoms by chronic users (15 percent) compared to nonusers (41 percent).

Precocious transitions to adult roles and statuses were indicated by a number of situations. Chronic users left home to live on their own (37 percent) more often than nonusers (11 percent) and were much more likely to drop out of school (65 percent) than nonusers (16 percent) without returning to school during the timeframe of the study.

Chronic marijuana users have higher rates of problem behaviors than nonusers in all of the problem areas examined, and the patterns described here are similar for boys and girls. In general, marijuana use, especially chronic marijuana use, is clearly linked in a co-occurring way to many forms of antisocial problem behavior.

Questions and Answers About Marijuana: Prevention and Treatment
Moderator: *Richard A. Millstein*

Speakers: *Mary Ann Pentz, Ph.D.*
Thomas Dishion, Ph.D.
Thomas J. Crowley, M.D.
Denise Kandel, Ph.D.
Terence P. Thornberry, Ph.D.
Howard A. Liddle, Ph.D.

How can we really get to the people who are most at risk for escalation to harder drugs under the paradigm of no permissible use? This is really a question about harm reduction. How do we prevent escalation of marijuana use to heroin and cocaine use?

Do not focus exclusively on marijuana. Look at what has been learned from alcohol treatment. Heavy drinkers are reluctant to participate in treatment programs with an abstinence focus. Review the work of Bill Miller on the Motivation Interview/Drinkers Checkup, which found that 2-day intervention is just as effective in reducing alcohol use as 28-day inpatient efforts. It is also effective in gauging people who are highly at risk. Other presentations this morning showed the effectiveness of these methods with marijuana users.

What is the role of peer intervention and primary prevention and the role of the student-assisted programs?

The study by Dr. Dishion showed a special program where children were selected from different middle schools and brought into a community center as high risk. The children then became part of a prevention program. That process was less effective than working only with parents and leaving the students alone. Data suggest that bringing the youth together in this community center exacerbated their problem.

Dr. Thornberry, at the end of your presentation, you talked about no difference in patterns in boys and girls; no difference in racial and ethnic. But there was a difference between African Americans and Hispanics. What was that difference?

The only striking difference was [in] the concurrence of marijuana use and what we call the precocious transitions to adult roles and status that include dropping out of school, being a parent, being unemployed, and early emancipation from the family. The relationship between marijuana use and those four outcome variables were strongly significant for the African American respondents and the Hispanic respondents, but were rather weak and nonsignificant for the Caucasian respondents. Therefore, in that one area, there was a racial/ethnic difference.

Can a prevention program be based on a philosophy that is not judgmental?

Dr. Pentz: Yes. In the context of school programs, peers are asked to generate both positive and negative consequences of drug abuse with a teacher or another peer facilitator by not making judgments. You always end up with a class who, on its own, generates more negative consequences to drug use than positive consequences. The whole exercise is conducted in the context of being nonjudgmental, meaning only the peers in their Socratic discussions develop their own conclusions about this issue. The same thing happens with the parents in the parent program. There has always been the issue of abstinence versus moderate use particularly regarding drinking. We do not give guidelines for that group. Parents have to make their own decisions with the schools.

Dr. Dishion: I would agree. We work with higher risk families to set their own goals about what their intervention program goals should be. It very rarely works to come in with a standard intervention because people resist that. There have been therapy and intervention process studies that show that if you come in teaching or being judgmental, people do not show up.

Mr. Millstein: There seems to be a relationship between attitudes about disapproval of drugs and about perceived harmfulness of drugs and actual drug use, so it is appropriate that some of the strategies that we have heard people discuss are geared toward changing societal norms. One of the purposes of this conference is to get the information out that marijuana has consequences, negative consequences. It is not a benign substance. Education and prevention programs can get that message across so that young people do truly understand the effects of marijuana.

Dr. Liddle: The matter of judgment can be discussed a different way. There is some literature in the early stages of adolescent treatment that talks about beliefs and attitudes that we have about youth. Mental health professionals, teachers, and the lay public were found to be very good psychopathologizers of adolescents. They did not have a good sense of what normative adolescent development was about. Some studies in the psychotherapy field and adolescent treatment field found a very strong relationship between the attitudes that I have working with youth and their capacity to stay in treatment. Therefore, it is a very important matter for all prevention people to clarify the judgment or foundational assertions that we bring.

I work in a family-based treatment program for adolescents. This practice sees a relatively middle-class, Caucasian, primarily suburban high school and middle school population. Almost without exception, the children who are coming to this practice have had interactions with doctors or the psychiatric community, and the substance use is not being identified because no one is using urine or other screens to diagnose underlying causes. The practices are psychopathologizing the adolescent. The community and families seem content to have behavioral problems rather than drug-dependent children. This issue was not discussed this

morning, and I would like to hear the presenters' opinions or experiences with this issue.

We tend to dissect adolescents. Some people will say that a youth is an alcoholic, but my studies show that an alcoholic is at least dependent on two other substances. Another person will say that the youth is drug-dependent and perhaps ignore the alcoholism and, most certainly, the tobacco dependence. All of those people will probably ignore the fact that the youth has conduct disorders in addition or, in criminal terms, delinquency or something of that sort. In our population, these youth come from profoundly disturbed families. Abuse and neglect are extremely common in this population, sometimes even violent and revolting abuse and neglect. We tend to dissect these youth in terms of the particular expertise or knowledge that we have. The Government tends to dissect them according to the institute and its particular interests. It is crucially important that we pay attention to the broad range of multiple problems that are represented by these youth that we have known since at least 1977 and try to stop dissecting them.

Insurance benefits drive a lot of the dissection process. What collects is what gets diagnosed. Until we deal with some of the infrastructures of funding for mental health services, we are going to get that kind of behavior.

Dr. Kandel, your study indicated that 7 percent of the marijuana smokers also had used crack cocaine in your study. The recent NIDA publications on marijuana also indicate that marijuana use puts children and teens in contact with people who are users and sellers of other drugs. Did your study also find the link between marijuana users and movement into the other drug markets for illicit or hard drugs? Would this fulfill the Dutch model theory where soft and hard drug markets are separated in an attempt to keep marijuana users from moving onto harder drugs?

Buying and selling of drugs may be an intervening process and one explanation for some youth's progression from marijuana use to other drugs. This is by no means the only explanation. There may be different explanations for different subgroups of youth.

Dr. Crowley, do you really define regular use of marijuana as at least once per month? Do you see a difference between marijuana use and abuse?

Abuse and use are very different. I also see dependence as being different from either of these terms. My definitions are based on information from diagnostic and statistical manuals. In response to the issue of regular use, this timeframe was the standard for my study and could just as easily have been 1 week or less.

Dr. Dishion, your study indicated that students who are heavy drug abusers and are removed from their regular classes into separate classes by themselves do not have a positive treatment outcome from this removal. What research data are available on whether nonusing students benefit from their removal? Are the nonusers better off in the long term after the removal of these students?

I am not aware of any data in this area of drug prevention. It is important to note that only one or two students are being removed in these classes, they are not heavy drug abusers, and these small numbers do not adversely affect the group. Some of the literature from education and cooperative learning may offer some insights related to how integration of children with different learning abilities and social profiles into classes did not adversely affect the students already doing well, but definitely improved for those students with previous problems.

Marijuana smoke is about four times as carcinogenic as tobacco smoke. Do youth learn how to smoke using a lighter tobacco such as cigarettes and then move on to marijuana?

That may be a small part of the rationale. Adolescents who first smoke become recognized by their peers as having a special function in the group, that is as the smokers, or drinkers when alcohol is involved.

Could the mass advertisement of tobacco and the recognition of Joe Camel over Mickey Mouse be a contributing factor to youth smoking?

This certainly is worth further research.

Do you agree with the use of phenothiazines for the treatment of marijuana dependency? Should the National Institutes of Health consider developing guidelines to prevent young people from being dosed with prolixine, thorazine, and phenylthiazines for treatment of marijuana?

There is no evidence that neuroleptic medications are useful in the treatment of primary marijuana use in people with no other psychiatric disorders. In persons with psychiatric disorders, we do know that there may be an increase in primary substance disorder.

What are NIDA's plans to disseminate the valuable research on prevention and treatment from this conference to the grassroots community, besides monographs and conference proceedings?

Tapes are available during the conference and will also be available for some months after the conference is over. The *NIDA Notes* publication will have a special insert on the conference. A NIDA Capsule may be developed along with other materials and forums.

Is there a possibility that the political and social climate will allow for drug/health skills education to be a primary part of education along with reading, writing, and arithmetic?

Several movements are being considered that may fulfill this need. The Institute of Medicine is considering a comprehensive school health plan for K to 12 with the Centers for Disease Control and Prevention. This program would integrate health education into all grades and make it age- and development-appropriate. Managed care would be another option, if there were such a program for youth and adolescents. With no current program, the responsibility may be given to the schools, who could work to integrate regular exercise, nutrition, and other health-related programs into the current curriculum.

Parents and Family: Dealing with Marijuana Use Among Youth

Moderator: *Sue Rusche*
Executive Director
National Families in Action

Speaker: *Zachery S. Thompson*
Project Director
West Dallas Community Centers

The West Dallas Community Center has a program called Positive Direction. Positive Direction works with youth in the Dallas area and either helps straighten them out or helps keep them on the right track. The program has gained insight into the terminology and trends of marijuana use among youth. Young people today still use the same terms as 20 years ago like "grass," "weed," and "pot." However, there are many more new terms these days such as "cest" and "skunk weed." The term "blunt" refers to a hollowed-out cigar filled with marijuana. There are also new, more dangerous trends in marijuana use as well. "Wack" is a term used for marijuana dipped in embalming fluid. "Primo" is a term used for marijuana laced with cocaine. Parents and the community need to open their eyes and realize how dangerous these new trends are. The only way we can stop these trends is to convince kids to not even start.

Speaker: *Anna Gonzales*
Rosenberg, TX

Mexican-American families in Texas do not have appropriate access to drug abuse and prevention information. Much of the information in print form is not in Spanish. Those materials that are translated often lose their full meaning. This has led to a lack of education about drug abuse among Mexican-American youth and families. In order to effectively treat young people who use marijuana, adult family and friends must first become educated.

Speaker: *Carol Reeves*
National President
National Family Partnership

The National Family Partnership worked with National Families in Action to solve the problem of marijuana in the late 1970s. Young people these days are receiving mixed messages from the media and their parents and teachers. The only way to get through to youth is to understand their world. That means knowing what goes on in everyday life and what they think is "cool" and what is not. Parents also need to know exactly where the wrong messages are coming from and steer their children away from them.

Innovative Treatment Approaches for Juveniles In the Juvenile Justice System With a History of Marijuana Abuse

Moderator:
RADM Joyce Johnson, D.O.
Center for Substance Abuse Treatment

Speakers: *Scott Reiner*
Substance Abuse Program Supervisor
Virginia Department of Youth and Family Services

Benjamin W. Smith
Consultant
Virginia Department of Youth and Family Services

Ruth A. Phillips
Department of Juvenile Justice
Baltimore, MD

The State of Virginia Department of Youth Services has a program targeting male juvenile offenders. The following are four criteria for admission to the program:

- Commitment to the Virginia Department of Youth and Services,
- Moderate to severe substance abuse,
- Significant history of criminal activity, and
- Minimum 6-month sentence.

The program has expanded its service delivery through Center for Substance Abuse Treatment-funded enhancements. Those services include the following:

- Clinical direct services and management of personnel,
- Programming resources,
- Training, and
- Comprehensive program evaluation.

The philosophical approach is the Balance Approach, which is a triangle of public safety, competency development, and offender accountability.
Major issues addressed by the program include the following:

- Designing and implementing treatment within the "culture,"
- Coordinating parole with other followup corrections services,
- Meaningfully involving families,
- Focusing on criminal offending and its relationships to substance use, and
- Addressing the full spectrum of youth service needs.

Adult Chronic Marijuana Dependence: Assessment and Treatment

Speakers: *Roger A. Roffman, D.S.W.*
Professor
School of Social Work
University of Washington

Robert S. Stephens, Ph.D.
Associate Professor
Virginia Polytechnic Institute

These programs were marketed to a highly targeted population: adults in the Seattle area who were interested in reducing or abstaining from marijuana usage and wanted support. Two studies were funded, the first of which drew more than 500 interested individuals and the second more than 700. People who used the drug 50 or more times in the 90 days prior to the beginning of the study qualified for the program. In the most recent study, subjects were randomly assigned to one of two treatments in addition to a delayed treatment control group.

Group Counseling Approach

This approach provided participants the opportunity to join a group of 10 to 12 other adults trying to end their dependence on marijuana. Fourteen groups were conducted for the study. The group met once a week for 14 weeks (sessions) and was led by two cotherapists. Individuals were able to join the group without proving that they had stopped "smoking pot" prior to requesting assistance. Therefore, individuals entered the groups at varying levels of dependence. The intervention was designed to help people quit using marijuana by the fourth week (session). Individuals were not asked to leave the group if they were unable to completely stop using marijuana. Instead, those still using the drug were encouraged, by the therapists and group members, to continue trying to stop.

Individualized Assessment and Intervention

This three-session intervention was the second approach to which participants were randomly assigned. Session 1 was an assessment session that provided an overview to the client, an indepth discussion about the client's use of marijuana and reasons for favoring or opposing quitting, and answers to questions the client had about quitting or modifying use. Session 2 was a feedback session conducted 1 week after the assessment session, employing motivational interviewing strategies to assist the individual in resolving ambivalence about changing. During the feedback session, clients who decided to quit smoking marijuana were advised how to prepare for stopping and how to deal with relapse risks. A 30-day plan was developed as an opportunity to try out the behavior change (reducing or stopping usage). A review session was conducted with the client after 30 days had passed. At this session, clients were debriefed about their experiences, and the therapist assisted the client in considering future goals and identifying available supportive resources.

Following the end of these counseling approaches, both types of intervention were found to be equally successful. The researchers concluded that a brief, three-session intervention that focuses on assisting clients to resolve their mixed feelings about change, identifies short-term goals that can be worked on over a 30-day period, provides advice about initiating change, and reviews progress after 30 days have passed may be an effective counseling approach for many chronic marijuana smokers. Future studies will be needed to identify the best match of brief and extended counseling approaches for clients with varying needs.

Marijuana Use: Prevention in the Schools

Speaker: *Gilbert J. Botvin, Ph.D.*
Professor and Director
Cornell University Medical College

The Life Skills Training program is a drug abuse prevention program being researched in New York City junior high schools. Life Skills Training focuses on preventing the types of behaviors that can lead to drug and alcohol abuse by educating young adults in a number of different areas. Some of the areas of education include stress management, improving social skills, assertiveness training, refusal skills, initiating social interaction, and other communication skills.

Much effort has been made to ensure that the program is developmentally appropriate for junior high school children. The program was created to be culturally appropriate, thereby increasing its chances of success. Teachers, peer leaders, and health professionals are trained on how to implement the program in a way that will fit the children's cultural and economical backgrounds.

An interaction of many factors leads young adults to substance use and abuse. This program was designed to combat the underlying problems that create drug and alcohol problems in the first place. When dealing with adolescents, one must remember that few young people think about long-term effects or impacts that drugs may have on their lives. Children deal with the here and now. You cannot tell a child to beware of cigarette smoking because it may lead to lung cancer and expect it to keep him or her from smoking cigarettes. If you want to have an impact on children, tell them how tobacco, alcohol, or other drugs will affect their lives today, not in 20 or 30 years. Tell them it will make them less competitive at sports, or make them less attractive, or cause bad breath.

The problem with most prevention programs is that people either oversimplify or overcomplicate the strategies for change, or they do not follow through with the plan for change. Prevention programs must be comprehensive, sophisticated, and interactive in order to work. All evidence shows that drug abuse is a complex problem that requires prevention approaches that adequately address that complexity.

Public Perceptions of Marijuana: Knowledge, Attitudes, and Norms

Moderator: *Linda Bass, M.P.H.*
Public Affairs Specialist
Center for Substance Abuse Prevention

The 1994 National Household Survey on Drug Abuse revealed that the use of marijuana by 12- to 17-year-olds is increasing at a dramatic rate—nearly doubling since 1992. At the same time, teenagers' perceptions of the harmfulness of marijuana are decreasing. Clearly, there is a correlation between perceptions and use.

To further complicate the matter, marijuana is glamorized via entertainment media in music videos and youth popular music, and in movies featuring use and involvement without serious consequences. Vocal supporters stress its legalization, and many parents who smoked marijuana in the 1960s and 1970s feel they can not or do not know how to talk to their children about marijuana today. Some parents believe their children are better off using marijuana than alcohol. Others think it is just a passing fad that will go away, while many youth view marijuana as a drug that is "not so bad," considering other drugs.

In essence, there is no universal agreement on how risky marijuana is, and the widespread views held by youth and adults about marijuana are rife with myths and misconceptions.

CSAP recognizes that to effectively address issues of perceptions and use of marijuana at a community level and, ultimately, to have an impact on preventing new use and reducing ongoing use, many steps must be undertaken—to gain understanding about the community's prevailing attitudes and practices toward marijuana, to develop credible and effective approaches to educate and inform the public about the problem, and to galvanize support for changing community norms regarding the use of marijuana.

Speaker: *Edna Kane-Williams, M.A.*
Senior Communications Specialist
University Research Corporation

CSAP commissioned a media campaign targeted at African-American youth. The purpose was to determine and develop appropriate substance abuse prevention messages and strategies for this audience. Market research, creative development, and implementation involving the community resulted in an innovative public education campaign in 14 cities, called "By Our Own Hands." Current efforts are underway on a marijuana prevention campaign. As part of the research, focus groups have been conducted with youth and youth caregivers and have revealed the following:

- There is no universal agreement between adults and youth concerning marijuana use.
- Youth saw no risk in using marijuana.
- Youth viewed marijuana as a drug that is "not so bad."
- Marijuana is more accepted than cocaine among youth.
- Exposure to marijuana was high in all groups.
- Youth knew where to obtain or purchase marijuana, and its price range.
- Youth witnessed drug transactions.
- Youth witnessed drug use at home.
- Youth had no appreciation for scare tactics because they knew people who have not suffered negative effects from marijuana use.
- Youth did not see marijuana as a problem.
- There was no consensus on the legalization of marijuana; however, it was acceptable.
- Respondents did not have the information to make good decisions.
- Younger respondents did not like the smell of marijuana, which was a deterrent.
- Youth preferred peer methods to deliver messages against the use of marijuana.

Speaker: *Ivan J. Juzang, M.B.A.*
President
MEE Productions, Inc.

Motivational Educational Entertainment (MEE) Productions conducted focus groups about marijuana use among youth. Youth participants were recruited from predominantly low-income, single-parent families, and many lived in public housing communities. Youth who were still attending high school as well as those who had dropped out were invited to participate.

For today's low-income urban youth, the issue is survival, and marijuana use has now become a defining criterion for "belonging" among urban teens. It is the passport to being part of the "in crowd." Using and selling marijuana are perceived as many things: a road to knowledge and insider status, a means of economic power, and a form of escape from the stark reality of inner-city life. Many decisions being made by teens regarding marijuana use are heavily influenced by peer pressure. Moreover, urban teens show little awareness of the long-term health risks associated with marijuana use.

MEE's research has found that five key contemporary issues contribute most to escalating marijuana use among urban youth, especially among African Americans:

- Peer pressure and acceptance,
- Change in attitudes,
- Economics (supply and demand),
- Media consumption and TV/media images, and
- Lack of information to make decisions.

It will take a new media strategy to reduce marijuana use among youth. As a society, we must make a commitment to support innovative ways of communicating with urban youth by using credible and, above all, effective messages. MEE's research has shown that young people are constantly bombarded with messages from music, films, and television. Problems arise when messages do not provide useful information.

Speaker: *Lewis Donohew, Ph.D.*
Media Research Associate

Research conducted at the University of Kentucky found a change in attitude and a change in health concern, which caused an increase in marijuana use. Novelty and sensation seekers are willing to take risks and to try new things. These people are the ones most likely to use and abuse drugs.

Two studies were conducted. The first study focused on the impact of sensation-seeking on public service announcement effectiveness. The study gathered data by using an intent-to-call hotline. The study used various types of programs and embedded messages in them. The programs were aimed at high sensation-seekers and found that the low sensation-seekers would be included. The study was considered successful because of proven behavior change, particularly in alcohol use. There was also a change in drug use, particularly marijuana.

The second study focused on African-American youth ages 14 and 15. The study, a school-based program, found that African-American youth need novelty, also. Focus groups consisting of

college students were also used. Humor and lighter tones are important to the success of literature for high school and college students, and thrill-seekers set the norms for other students. For African Americans, however, thrills are not found in bungee cord jumping or other expensive activities. African Americans find novelty in getting a job, going out on interviews, meeting people outside of their circles, and having people talk to them in their language.

Communicating About Marijuana Use Prevention: Creating New Networks and Changing Norms

Moderator: *Patricia A. Wright, Ed.D.*
Project Director
University Research Corporation

Speaker: *Patricia A. Wright, Ed.D.*

The goal of the Center for Substance Abuse Prevention Communications Team is that of providing communication training and technical assistance to city, State, and Government agencies. CSAP has reviewed national data as well as focus group findings. All show that there is marked change in perceptions, attitudes, and norms regarding the use of marijuana and a disturbing lack of knowledge regarding the effects of marijuana use. Moreover, CSAP and many of its constituents share a great concern about the intentional, and perhaps unintentional, promotion of marijuana use through the media. New strategies are needed to communicate the dangers of using marijuana. These new strategies must begin at the community level with new allies and new approaches.

Speaker: *James E. Copple, M.Div.*
National Director
Community Anti-Drug Coalition of America

The Community Anti-Drug Coalition of America works with 3,500 coalition members around the country. Coalition members recognize that they need to move toward advocacy and education processes to make the future what they want it to be.

Coalitions need to bring people to the table to advance their positions. Conversations are needed with major national, State, and local associations. The expertise of all parties is needed to mobilize locally and make inroads toward a national agenda to make change.

Speaker: *Beverly Watts Davis*
Executive Director
San Antonio Fighting Back

The United Way of San Antonio is working to mobilize people around a cause and attempting to reach them through what concerns them (jobs, health care, child care). It gives people a reason to attend a meeting and look at their immediate problems. Until that immediate problem is solved, chances are they won't be able to listen to you about other issues. Young people fail to see the negative effects of using marijuana because, for example, they see athletes getting away with using it. So, you have to appeal to them through what they know. True solutions are in the power of people to do things for themselves with local solutions. Citizens derive a sense of accountability from these programs because we have noticed as programs go away, people stay. The local community needs community empowerment.

Speaker: *Hector Erickson-Mendoza*
Publisher
Hispanic Link News Service

Media people are busy. However, if you are persistent about writing, calling, and visiting them, they will eventually listen. Mainstream media can and do stereotype various racial and ethnic groups in their portrayal of drug use in America. For instance, Hispanics are portrayed in television, print, and movies as ignorant and greasy. There is a steady diet of crime stories about African Americans. Members of the National Association of Hispanic Journalists communicate among themselves in an effort to educate other media journalists about the realities of Hispanic life. Using e-mail and other on-line services to connect with other organizations has also been a successful strategy. If you would like to share your thoughts and interests, the local newspapers and televisions are available and relatively inexpensive alternatives.

Speaker: *Makani Themba*
Associate Director
The Marin Institute

Marijuana use breeds complex problems that produce medicinal, social, and political effects. With the increase in marijuana use and its popularization, there are many levels on which to focus. The question then becomes, "Where do we begin?" One place is to develop a comprehensive model to formulate a national policy on marijuana use.

As urban areas increasingly become sites for marijuana sale and distribution, they are increasingly under siege by violence, neglect, deterioration of public space, and other environmental impacts. Marijuana has become a lucrative trade for farmers and urban entrepreneurs—both seeking financial security in the midst of economic difficulty. The *New York Times* reports that marijuana is America's number one cash crop. Hydroponics, pager companies, security companies, and others are also thriving from increased use. Marketing (through T-shirts, paraphernalia, and concerts supporting legalization and use) is pervasive and draws heavily on urban youth culture—not only as strategies for targeting urban youth, but also as a way to identify marijuana use with popularity of urban youth culture. The appeal of urban culture spans race, geography, and class.

Behavioral Effects: Motivation, Cognition, Intellectual Performance

Moderator: *Ralph E. Tarter, Ph.D.*

Speaker: *Don R. Cherek, Ph.D.*
Professor
University of Texas-Houston

The acute effects of marijuana smoking on motivation and the "amotivational syndrome" were examined under controlled laboratory conditions in one of our studies. Subjects with a history of marijuana smoking who smoked one to four joints per month were recruited. They were males, between the ages of 18 and 22 years with 10 to 12 years of education. The subjects were required to abstain from marijuana smoking outside the laboratory for the duration of the study; this was monitored through urine samples.

Subjects smoked marijuana in a prescribed, standardized manner in a ventilated smoking booth. The study examined the effects on these nonchronic marijuana smokers of smoking varying amounts of marijuana and then participating in a behavioral task immediately after peak

intoxication. The behavioral procedure was developed specifically for this experiment and included an option of working to earn money or not working to earn a lower rate of pay. The "work option" consisted of a simple button-pressing task that required more effort to earn each successive 10 cents. Results indicated that among these subjects, marijuana produced a decline in the amount of time spent in the working component, decreased the number of responses made, and caused subjects to exit the work component earlier. The more potent the marijuana, the greater the effect.

A second study was conducted to determine the acute effects of marijuana smoking on human aggressive responding. The main feature of the paradigm is that subjects are provoked by others and given the opportunity to retaliate. The amount of retaliation at a given amount of provocation is then observed and recorded. Male subjects who had a history of polydrug use as well as marijuana use were recruited for the study. They also met the diagnostic criteria for antisocial personality disorder. These behaviors cause clinically significant impairment in social, academic, or occupational functioning. Antisocial personality disorder occurs in about 3 percent of the male population and about 1 percent of females.

Surprisingly, findings showed that acute marijuana smoking produced increases in aggressive responding. This was specific to aggressive responding; responding on two other response options was not changed or decreased. Other studies with college students, conducted by Stuart Taylor and his colleagues, have shown that marijuana produced no changes or reduced aggressive responding in laboratory conditions.

Results of these studies suggest that the effects of marijuana on motivation and aggression may not be predictable and may vary considerably amongst different individuals. More research is needed to replicate these findings and identify individual factors that may alter the effects of the drug. These differences, if established, may have implications for treatment, prevention, and policy.

Speaker: *Samuel A. Deadwyler, Ph.D.*
Professor
Bowman Gray School of Medicine

In humans, the most pronounced effects of marijuana are on recent memory. Memories that have been with the individual for a long time are not affected. Consequently, marijuana intoxication does not selectively render a person incapable of functioning on the basis of knowledge regarding his personal life. The types of memory processes most affected are those in which the information is new and the subject must recall the material with no cues or prompts. Recognition memory is also affected severely by marijuana use, and in animal studies this technique is the most commonly employed to demonstrate it. The graph below shows the effect of marijuana on a forgetting curve in a short-term memory task in which the animal must retain information and demonstrate such knowledge across intervening "delay" intervals of 1 to 30 seconds in duration. Since the graph represents data from the same animals, the separation of the two curves reflects more rapid forgetting under the influence of marijuana. The fact that memory is not impaired at the very short delay intervals is evidence that the effect of marijuana is selective and at this dose level does not impair other attributes.

The basis for marijuana's effect on memory lies in the region of the brain called the hippocampus, which contains receptors for the drug and also the endogenous marijuana substance called "anandamide." It is this area, when damaged, that renders patients literally incapable of remembering new information for more than a few minutes and is undoubtedly critically involved

in the well-known memory deficits in Alzheimer's disease. When these hippocampal marijuana receptors are stimulated, they have the effect of rendering the hippocampus inactive.

Long-term exposure to marijuana has dual consequences for the memory. First, repeated exposure to marijuana in animals makes them more and more tolerant of this memory disruptive effect. However, this also means that continued use of the drug requires higher and higher doses before the euphoric or high state is achieved. Hence, even though memory is not impaired at the same dose as before, it will be impaired just as much because the individual will take more drugs to obtain the original euphoric state. What this means is that chronic use will eventually produce permanent effects on memory since the hippocampus will adjust its memory storage mechanisms to handle the lower capacity or volume of information flow produced by the drug. Thus, even when the drug is not present, the hippocampus will be altered and reduced in capacity to perform at optimum level. This may be the basis for the well-known memory deficits that are present in chronic marijuana users.

Speaker: *Jack M. Fletcher, Ph.D.*
Professor
University of Texas, Houston Medical School

Extensive studies of the acute effects of marijuana consumption have been complete since the early 1970s. Effects on cognition are related to the amount and mode of consumption, and context in which it occurs. Acute effects are well known and include alterations of mood, time sense, short-term memory and learning skills, and attention and motor-based skills.

Carryover effects on cognition that occur 24 to 72 hours after marijuana use reflect the amount of time required for marijuana to metabolize through the body and are not well understood or well documented.

The best evidence for carryover effects involves motor and memory performance. Chronic effects due to long-term, regular usage for at least 5 to 10 years are difficult to isolate from acute or carryover effects, from effects of polydrug use, and from the cultural context in which they occur. Many of the early North American studies were anecdotal and uncontrolled. The more controlled neuropsychological studies (or those with some type of comparison group and an attempt to measure cognitive skills) generally show no cognitive effects and usually involve polydrug use. An exception is a recent (1993) study at the University of Iowa that had a sample of chronic, heavy users in North America. This study revealed effects of chronic marijuana use on short-term memory, motor skills, and abstraction.

Cross-cultural studies have occurred in Jamaica, Greece, Costa Rica, Egypt, and India. Those in the latter two countries were not as well controlled as the first three, outcome measures were not as sensitive, and documentation of drug use patterns was probably not as reliable. The Jamaican studies have not shown differences in cognitive or neuropsychological functions between long-term users and nonusers. The Greek studies largely address acute effects, which parallel those observed in North American studies.

The Costa Rican studies involved samples that were more westernized and literate than the other cross-cultural studies. The study samples were literate, urban, working class and included some white-collar workers. Marijuana use was well ingrained, but not culturally supported, and extremely illegal. The 1973 and 1975 studies revealed no effects on intellectual or cognitive functions.

Although there were no effects on intellectual functions and no decline in other cognitive functions in the 1985 and 1986 Costa Rican followup studies, data did reveal problems with short-term memory and other skills that may reflect carryover and/or chronic effects. There was clear evidence from anthropological studies of social and occupational decline, reflecting an accommodation to marijuana usage patterns. More recent studies have provided more consistent evidence for cognitive correlates of chronic marijuana use in Costa Rica.

Effects on cognition were subtle, but would be magnified in a North American culture. Although chronic effects may be subtle, the acute and carryover effects of marijuana use on learning, memory, and performance are significant and should be of great concern for children, adolescents, and adults.

Marijuana Use and Performance

Moderator: *Don R. Cherek, Ph.D.*
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Speaker: *Stephen J. Heishman, Ph.D.*
Research Psychologist
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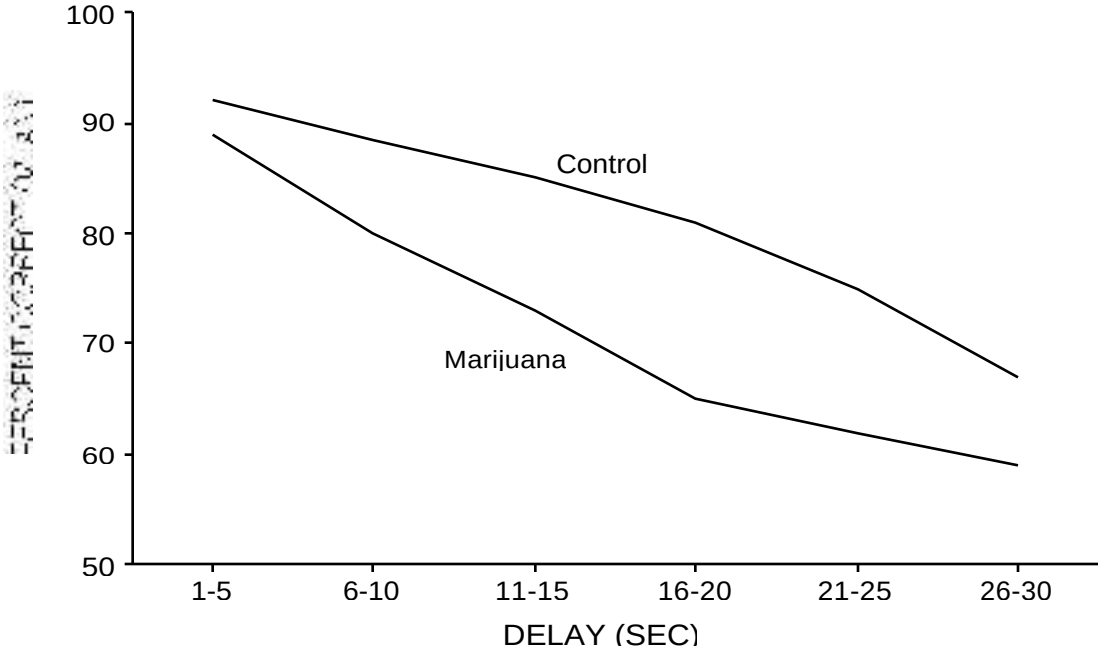
Epidemiological survey data from American and Canadian research in the late 1970s through the early 1980s all indicated that about 17 to 25 percent of 16- to 21-year-olds surveyed drive while high from marijuana; 10 percent indicated this occurred one to five times in the past month. Two other studies from the same time period indicate about 1 to 4 percent of drivers stopped at roadside



checkpoints had used marijuana recently. Combined, these studies imply about one-fifth to one-third of marijuana users are at risk for traffic accidents.

A number of studies have examined the incidence of THC in the blood of accident victims. Overall, these studies indicate that about 6 to 12 percent of nonfatally injured drivers had THC alone [i.e., no other drugs found] in their blood. A 1988 study of more than 1,000 patients in shock trauma because of traffic accidents revealed about 32 percent of the drivers had THC alone in their blood. A number of studies summarized together indicate that 4 to 16 percent of fatally injured drivers were found to have THC alone in their blood. In almost all of these studies, at least 50 percent of the individuals who were found to have THC in their blood also had alcohol in their blood. The causal role of marijuana is confounded by alcohol.

In laboratory performance testing, it is possible to study the components of driving under controlled conditions to examine the effects of higher doses than those used by the average person. Hundreds of laboratory performance studies indicate marijuana did not impair vision, did impair fine and gross motor control, divided attention and impaired vigilance, and did impair reaction time when there was a choice of reactions.

Recent data from studies at the National Institute on Drug Abuse Addiction Research Center are about the effects of smoked marijuana on field sobriety tests. Twenty moderate marijuana users were the volunteer subjects. At three separate experimental sessions, separated by at least 72 hours, they smoked two marijuana cigarettes that contained 0, 1.8, or 3.6 percent THC, and then they took field sobriety tests. The four tests were the Romberg Balance, Walk and Turn, One Leg Stand, and Finger to Nose. In summary, marijuana did not have any significant effects on the Romberg Balance test; it did somewhat impair the Walk and Turn test; and it did significantly and greatly affect the One Leg Stand and the Finger to Nose test.

A brief review of some highway and urban driving data from recent studies conducted in the Netherlands was presented. Moderate marijuana users were given varying strength marijuana cigarettes to smoke and then were allowed to drive either on open highways or through an urban setting. In the highway studies, data showed that marijuana decreased the ability to maintain a straight lane position. The cars were not weaving across the road, but there was a significant lateral movement within the lane. In the urban driving study, for safety reasons, the researchers chose to use only the low-dose marijuana, and they found this low dose produced no impairment of specific or global driving abilities.

In conclusion, marijuana impairs component driving behaviors in the laboratory. To date, less impairment has been shown in actual driving tests. Higher doses of marijuana need to be tested in the field and alcohol and marijuana combinations need to be tested.

Speaker: *Wayne E.K. Lehman, Ph.D.*
Research Scientist
Texas Christian University

Three methods for assessing marijuana use in the workplace are self-report, chemical methods, and indirect methods. Self-report is somewhat problematic because a lot of employees may not be truthful and may not give accurate responses at work. The strength of such data in surveys is that information about recreational use, use at work or away from work, patterns of use and long-term patterns be accurate and available. Chemical methods include urine testing and some hair testing. These methods are accurate measures of drug use; however, they do not reveal where drug use has taken place. Indirect methods of drug testing use measures that correlate with drug use, such as attitudinal measures, performance tests, fitness for duty tests, or physiological tests.

The most consistent finding from the literature on employee marijuana use is its association with increased absenteeism. It is also associated with increased accidents, higher turnover, low job satisfaction, counterproductive behaviors, withdrawal and antagonistic behaviors, and higher use of Employee Assistance Programs and medical benefits. Marijuana use is associated with a syndrome or lifestyle referred to as general deviance. This may include avoidance of work, abuse of benefits, irresponsibility, and failure to abide by workplace rules.

Results from the Institute of Behavioral Research are based upon surveys of more than 4,600 municipal workers in 4 southwestern cities. The surveys have covered personal and job background, performance, coworker drug use, attitudes, and self-reports of personal drug and alcohol use. Findings indicated that marijuana users tend to be males, to be under the age of 30, and to have less than a college education. They were also more likely to have an arrest history, have low self-esteem, experience high depression, and be risk-takers. Friends of marijuana users are more likely to use drugs.

In terms of their jobs, marijuana users are less likely to bond with the organization and have more unscheduled absences, tardiness, accidents, and worker's compensation claims. Marijuana users in the sample are more likely to admit poor work and receiving warnings from a supervisor because of alcohol use. One-third of marijuana users drink frequently, one-half get drunk regularly, and 60 percent report problems with alcohol use. One-fourth drink at work, one-fourth use drugs at work, and 40 percent use drugs with coworkers. One-fourth of marijuana users admit cocaine use. Marijuana users tend to be highly tolerant of coworker drug use, less likely to support sanctions against drug use, and less likely to support drug testing.

Employees who report marijuana use are different from nonusers. They have lifestyles consistent with general deviance, low organizational bonding, and more negative job performance. They are more tolerant than others of drug use among coworkers and are not supportive of drug-free workplace programs. Marijuana use seems strongly associated with problematic alcohol use and, to a lesser degree, with other illegal drug use.

Speaker: *Donna M. Bush, Ph.D.*
Chief, Drug Testing Section
Substance Abuse and Mental Health Services Administration

It is important to remember that high school seniors are the workforce of tomorrow. Surveys of drug use behavior, such as marijuana use, by high school seniors and other groups of young people today may be an indicator of workplace issues tomorrow.

President Reagan's Executive Order Number 12564 in September 1986 emphasized that "The Federal Government, as the largest employer in the Nation, can and should show the way towards achieving drug-free workplaces through a program designed to offer drug users a helping hand . . . ." This program is intended to deter employees from using illegal drugs, but it is also an early intervention program, with treatment options to follow detection of an employee's drug use. The Department of Health and Human Services published the "Mandatory Guidelines for Federal Workplace Drug Testing Programs" in the *Federal Register* on April 11, 1988, with revisions published on June 9, 1994. Marijuana (and its metabolites) is one of the drugs included in this Drug-Free Workplace Program, which focuses on illicit drugs. A major change in this revision to the guidelines was the lowering of the marijuana initial test cutoff from 100 ng/mL to 50 ng/mL. Because of technology advancements over 6 years of program experience, it is now possible to

accurately and reliably detect specific metabolites of delta-9-tetrahydrocannabinol (THC) in urine at lower concentrations. These guidelines establish scientific and technical guidance for Federal agencies' workplace drug testing programs and establish a certification procedure for laboratories engaged in urine drug testing for Federal agencies.

The choice of specimen to analyze for drugs of abuse is determined by three considerations: (1) Are there accurate and reliable analytical methods for testing that specimen? (2) Can that accurate and reliable result be interpreted once it is obtained? (3) How applicable is the specimen to the particular purpose of testing (for example, current impairment, recent use)? There must be a balance struck among these three considerations. In looking for an appropriate biological specimen to detect recent drug use in a workplace population, urine was chosen as the most appropriate.

Urine is the biological fluid that best indicates recent drug use (drug use in recent days). If one were interested in detecting current behavioral impairment, the testing of blood, saliva, or actual behaviors would be more appropriate. If one were interested in detecting drug use in more distant history, hair or nails may be a more suitable specimen, but the science behind these tests is uncertain at this time.

The accuracy, precision, and multiple layers of quality control throughout any analytical testing process must be documented and available for scientific peer review. In federally regulated workplace urine drug testing, two tests, using different chemical principles, are utilized to determine the presence of drugs of abuse, such as marijuana. The initial chemical test required is an immunoassay, which detects the presence of a three-dimension chemical structure that may be the drug of interest, such as marijuana (and metabolites). If the screening test is positive, the exact chemical structure, a "fingerprint" of the drug, is obtained by performing a confirmation test using gas chromatography/mass spectrometry (GC/MS). GC/MS is the "gold standard" analytical method used to confirm the identity of the drug.

Continued evolution of these standards will be of use to individual States as they implement their own drug-testing programs within welfare reform, job training, and the criminal justice system interfaces with the workplace.

Other biological specimens may be candidates for testing. Saliva may be tested for drugs, and a saliva:plasma drug concentration ratio determined. At the Addiction Research Center, NIDA is examining this testing technology. Some
advantages of using saliva as a specimen are its availability, relative ease of collection, and tendency to be less objectionable to collect than urine. Disadvantages include the fact that saliva may be contaminated by residual drug following oral administration, and collection methods may influence concentration of the drug in saliva. A sweat collection device—a sweat patch—was recently cleared by the FDA for collection of sweat from individuals in the criminal justice and treatment communities for drug testing. The sweat collected on the patch would then be analyzed for the presence of illicit drugs (currently, FDA has not cleared using this patch for detection of THC). The advantage to using sweat as a specimen for drug testing is that the patch may be worn for 14 days, which will likely extend the window for detection of illicit drug use. At this time, the testing of saliva, sweat, hair, or any new specimen type or drug class involves many unanswered questions. Using hair as an example, these questions include, but are not limited to, the mechanism of drug entry into the hair, at what doses does one detect incorporation of drug into hair, over what dosing timeframe is drug detectable in hair, is the quantity of drug incorporated into hair related to color (melanin content) of the hair, and does the sex of the individual influence the quantity of drug deposited in hair?

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