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# COLLEGE ON PROBLEMS OF DRUG DEPENDENCE

## STATEMENT ON NATIONAL DRUG POLICY

(Adopted March, 1997)

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### INTRODUCTION

The COLLEGE ON PROBLEMS OF DRUG DEPENDENCE (CPDD) is a professional organization of scientists whose research is directed toward a better understanding of drug abuse and addiction. We take it for granted that it is in the public interest to prevent or minimize the adverse consequences caused by drugs of abuse to individuals and society. As an organization of scientists, we are in a position to provide information on which sound drug policy can be based. We want to help policy-makers and the public to understand what is known about drug abuse and what is not known, so that those responsible for national drug policy can shape their efforts according to the best available scientific data.

### SUMMARY

#### *The drugs of abuse*

1. Eight families of psychoactive drugs account for the major drug abuse and addiction problems. In order of prevalence of use these are: alcohol, nicotine, marijuana, sedatives (e.g., benzodiazepines like Valium, barbiturates), inhalants (volatile solvents and nitrous oxide), psychostimulants (cocaine and amphetamines), heroin and other opiates, and hallucinogens (e.g., LSD, PCP). Some would add caffeine to the list; but it appears to be relatively harmless in most people unless used very heavily, perhaps especially by children.
2. Drugs of abuse can impair brain function, sometimes irreversibly. They cause their effects by altering brain chemistry, and with prolonged heavy use most of them are capable of producing an addicted state in which the user's ability to stop using drugs is greatly impaired.
3. The "drug problem" is not a single entity. The drugs differ from each other in important ways such as their effects on brain and behavior, their adverse effects on users and society, and their addiction

potential. Many societal drug problems result from drug use (adverse health effects, disturbed and violent behavior, accidents, physical dependence). Some result from policies that make drugs illegal and difficult to obtain (predatory and property crimes to get money for drugs, organized crime enterprises, corruption). Drug policies should recognize and respond to these important differences.

4. The drugs that are used and abused by the greatest number of people are nicotine (in tobacco) and alcohol, causing enormous harm to the users and to society.

5. The illicit drugs (primarily marijuana, cocaine and amphetamines, heroin, and hallucinogens) present special problems. Concerning the distinction between legal and illegal drugs, it should be noted that even tobacco and alcohol are illegal for minors. Because of their association with crime, crack cocaine, methamphetamine ("speed") and heroin are perceived by the public as the most threatening drugs of abuse. At present levels of use, the health costs they impose on users and on society are dwarfed, however, by those attributable to tobacco (nicotine) and alcohol. The health costs of the illicit drugs might well approach or exceed those of tobacco and alcohol if their legal status were changed and their use increased sharply.

#### *Consumption depends on availability*

6. The more available a drug of abuse, the more people use it, the more is consumed by the user, and the higher is the number of users who encounter problems caused by heavy use. Therefore, legal controls (including but not necessarily limited to prohibitions) that restrict availability are effective means of reducing consumption, reducing drug-induced problems, and discouraging initial use by children and adolescents.

#### *Legal controls: striking the right balance*

7. Legal controls themselves may have harmful consequences. These have to be balanced against the dangers of each drug to users and society. Some drugs of abuse may currently be under stricter legal controls than necessary, while others may require stricter regulation. Inhalants are widely abused, primarily by children, and are extremely toxic; here we need to find better methods of restricting use.

8. Extensive studies over many years have suggested that the social benefits (e.g., deterrence) of criminal sanctions against marijuana users for possession of small amounts -- especially sentences of imprisonment as in some states -- are outweighed by the costs of this approach to the individuals involved and to society.

#### *Drug abuse is a public health problem*

9. Drug abuse and addiction are basically public health problems, which are best dealt with by the classical public health approaches -- prevention, early intervention, and treatment -- provided the procedures are based on solid findings of scientific research. Public health measures, in the broadest sense, must include vigorous law enforcement to reduce trafficking in illicit drugs. Legal controls to reduce drug supply (including tobacco and alcohol to children) coupled with education, anti-drug advertisements, early intervention, and treatment to reduce demand are complementary public health measures.

10. Drug addiction itself can be considered a form of brain malfunction. In addition, some persons who suffer from depression, anxiety disorders, and other mental illnesses also abuse drugs, making both problems more difficult to treat and necessitating special treatment approaches.

11. Treatment -- even compulsory treatment -- is effective for many drug abusers. Some effective treatments are based on the principle of substitution pharmacotherapy, as with methadone or nicotine. Treatment is especially valuable as an alternative or adjunct to incarceration. Special drug courts and other programs for diversion of nonviolent addicts into treatment offer promise but require rigorous outcome evaluations.

*Research provides a basis for rational policy making*

12. Any changes in national drug policy should be based on scientific evidence, and -- difficult though it is -- research should attempt to evaluate the effects of any policy changes. Drug abuse research is essential for better understanding of the biology, psychology, and sociology of drug abuse, and for finding the most effective means of preventing and treating it.

## STATEMENT

### *The drugs of abuse*

Eight families of psychoactive drugs account for the major drug abuse and addiction problems. In order of prevalence of use these are: alcohol, nicotine, marijuana, sedatives (e.g., benzodiazepines like Valium, barbiturates), inhalants (volatile solvents and nitrous oxide), psychostimulants (cocaine and amphetamines), heroin and other opiates, and hallucinogens (e.g., LSD, PCP). Some would add caffeine to the list, although it appears to be relatively harmless for most people unless used very heavily; and as children consume substantial amounts in soft drinks, more research is needed to determine what harm may result.

Pharmacology, the science of drugs, makes no distinction between licit and illicit drugs. All the drugs of abuse are subject to some degree of legal control, from outright prohibition to restrictions based on age of the consumer or places and times of allowable consumption. Even caffeine, the least harmful of the psychoactive drugs, is regulated; FDA sets a maximum amount allowable in soft drinks. On the other hand, even tightly controlled and highly addictive drugs like cocaine and morphine have legitimate medical uses. Likewise, THC, the psychoactive substance in the prohibited marijuana, is authorized by the Food and Drug Administration as an oral medication by prescription for treatment of the nausea and vomiting associated with cancer chemotherapy, and for appetite enhancement in AIDS. Because legal controls differ so much among the drugs, "legalization" is a meaningless term unless one specifies exactly which legal controls are to be relaxed -- for which drug, for what purpose, and under what circumstances.

Many years of research with both animals and people have taught us that drugs of abuse have profound immediate and long-term effects on the chemical balance in the brain, resulting in altered behavior. Important immediate effects are mood changes, often including euphoria (the "high"), and reinforcement (strengthening) of drug-taking behavior. Addictive drugs, when taken repeatedly,

interfere with rational decision-making and motivation concerning whether to continue using the drug. After chronic drug use, the drug itself may pharmacologically drive the user to continue using.

Frequent regular use of these psychoactive drugs in sufficient amounts may lead to a state in which the user comes to prefer the drugged condition, and in which brain chemistry is so disturbed that the user's voluntary control of behavior is impaired. These hallmarks of addiction mean that it is difficult for addicts to stop using the drug or to maintain abstinence if they do stop. In some cases, drug use has become more important than many other activities that formerly provided satisfaction. Thus, without strong outside intervention or control, drug use is likely to continue. When the drug itself is seriously harmful to physical or mental health -- whether immediately or over many years -- and addicts continue using, the effects on the users themselves, their families, and society as a whole (e.g., through health costs) are profound. In addition to the consequences of drug use, many addicts suffer from other mental illnesses such as depression and anxiety disorders; sometimes these may be caused by drug use, sometimes drug use may have begun as an attempt to treat their own psychiatric disturbances. Coexistence of other mental illnesses ("comorbidity") may compromise judgment about using both legal and illicit drugs, and can exacerbate the behavioral consequences associated with either condition, including an increased risk of violence.

Drugs of abuse have both similarities and differences. The differences in addiction liability, physical and behavioral toxicity, and potential societal harm suggest that legal controls should be tailored to the harmfulness of each drug. For example, one reason (but by no means the only one) for tight controls is an increased likelihood of violent behavior, as seen with alcohol, cocaine, amphetamines, and some hallucinogens (e.g., PCP) at sufficient dosage. In contrast, the predominant behavioral effects of heroin, marijuana, and the sedatives are calming rather than excitatory. Many of these drugs can disturb judgment and motor coordination -- effects that endanger the user and others through disturbed interpersonal relationships as well as accidents in the operation of motor vehicles, aircraft, trains, and heavy equipment.

### *Consumption depends on availability*

This principle has been established most clearly for alcohol through monitoring the effects of different legal controls, including prohibition and various regulatory schemes, in several countries over many decades. One often hears that prohibition of alcohol "didn't work". But the facts show otherwise. In the United States, Canada, and Europe, during years of restricted availability (local and statewide prohibitions culminating in the Volstead Act in U.S., wartime rationing or shortages elsewhere), alcohol consumption fell substantially. Even the heavily addicted drinkers consumed less, as indicated by a profound drop in the rate of alcoholic liver cirrhosis. In one prospective controlled study, in Finland, the frequency of drinking and the total consumption increased greatly in rural counties where wine and beer were made available locally, compared to others where it was unavailable without considerable travel. A Canadian study showed how permitting alcohol sale by self-service from the shelf rather than by filling out an order form increased alcohol consumption. Few such studies have been carried out with other drugs, but the common-sense logic that relates availability to consumption is undeniable. Thus, the more an addictive drug is available, the more people will use it, the users will consume more of it, and the more serious will be its adverse effects.

Comparing nicotine (tobacco) with crack cocaine illustrates the point. Nicotine is freely available

(except, supposedly, to children, but one-third of high school seniors smoke). At the peak of consumption around 1966, we had about 80 million smokers (41% of the population). This number has declined steadily, but even today, despite the change in public attitudes, there are 35 million "hard-core" nicotine addicts, who seem unable to quit. This is an example of what can happen when a rewarding addictive drug is freely available. In contrast, crack cocaine is prohibited. The number who use it at all (current month usage) is less than two million, and the number who use it weekly or daily is less than one million. Yet it is noteworthy that both drugs are taken by the same easy route - smoking. No one would claim that nicotine is more rewarding than cocaine. On the contrary, animal self-administration experiments suggest that cocaine is greatly preferred and more addictive than nicotine. Yet easy availability and lax legal controls have permitted far more people (nowadays often adolescents) to become addicted to nicotine than to cocaine.

Laboratory research shows that there is a kind of competition between alternative reinforcers. Thus, an animal with access to an alternative reinforcer uses less of a reinforcing (addictive) drug. At the same time, increased availability of the drug itself weakens the effectiveness of the alternative reinforcer. For humans, alternative reinforcers would be life's numerous rewarding and satisfying activities. Clearly, conditions of life in impoverished communities do not offer much in the way of alternative positive reinforcers, so it is not surprising that some drugs of abuse are used disproportionately in the inner city neighborhoods. Thus, improvements in socio-economic circumstances (jobs, housing, education, etc.) may be appropriate elements in a balanced prescription for reducing addiction. On the other hand, simplistic attempts to blame drug abuse entirely on socio-economic deprivation or ethnicity are not supported by the facts, for alcohol, nicotine, marijuana, and cocaine abuse occurs even in the affluent, well-educated middle-class suburbs. Indeed, most alcohol and cocaine addicts are well-off and white.

Strong research evidence on the contributions of availability and environment to drug abuse comes also from our Vietnam experience. With heroin readily available and cheap, fully 15% of our forces there became heroin addicts. After returning home, having first undergone detoxification and some treatment, most of them did not use heroin again. This finding is encouraging in indicating that heroin addiction is not necessarily irreversible; thus, substantial rehabilitative efforts may possibly help even those addicts who are trapped in our inner cities to escape their addiction.

*Legal controls: striking the right balance.*

Inasmuch as availability and prevalence of use are directly related for any drug, reducing availability should be beneficial. However, to accomplish this effectively requires striking a balance between the adverse effects of a drug and the adverse effects of the legal controls on that drug.

The comparison of tobacco with crack cocaine in the previous section epitomizes the difficulty of striking the right balance. For example, in considering policy changes to promote public health, one might reasonably consider stricter legal control of nicotine rather than more relaxed legal control of cocaine. Relaxed legal control of cocaine would reduce the harm related to zealous enforcement of the laws, but would increase the drug's availability, use, and adverse medical and social consequences. Stricter regulatory schemes for tobacco would decrease its availability, use, and adverse medical consequences, but might give rise to problems and costs related to enforcement of the stricter laws. The key to finding the optimal regulatory schemes for cocaine, tobacco, and other

drugs of abuse lies, we believe, in cost-benefit analyses based on collecting the necessary data to support informed policy choices.

Consider alcohol, which is readily available (again, supposedly not to children). Could stricter legal control short of outright prohibition reduce consumption without creating a significant black market? Measures shown by research to be effective include restricted hours and places of sale and consumption, as well as increased price (including higher taxation). Research has shown that curtailment of alcohol consumption by these means affects all drinkers, including the heaviest drinkers. However, medical research suggests that a low level of alcohol intake may actually be beneficial to health; regulatory measures need ideally to reduce heavy consumption without causing large reductions in light social drinking by adults.

One regulatory measure for reducing availability is to increase price, as by taxation. Research has demonstrated that demand for drugs responds flexibly to price, as with other commodities. Income from taxation on tobacco products has been targeted for major educational and advertising efforts (California) and also for research (Washington). Drug abuse prevention education in schools, on billboards, and in the media should not be seen as an alternative to other means of reducing consumption but rather as a complement to them. Both restrictions on advertising legal drugs, and increased advertising about the dangers of drugs tend to reduce consumption by affecting social norms concerning drug use.

As many drugs of abuse also have legitimate medical uses, physicians must be able to prescribe these drugs to respond to their patients' medical needs. Physicians cannot be exempt from regulation, especially as some physicians have abused drugs themselves or sold them to addicts for profit. But excessive zeal by regulatory agencies can have unintended consequences. For example, in New York, an attempt to reduce what was perceived as overprescribing of benzodiazepines (chiefly Valium) by requiring triplicate prescriptions and increased paperwork had the unfortunate outcome of leading many physicians to prescribe more dangerous sedatives. Furthermore, excessive supervision has often intimidated physicians, so that their patients are too often undermedicated with needed opiates for relief of pain.

It is sensible to examine our present national policies for each drug separately in order to judge if the degree of legal control is already optimal. As noted above, a drug like nicotine (tobacco) that has proved more harmful than was recognized in the past might now require tighter regulation, while a drug that has proved less harmful than thought previously might be suitable for less stringent legal control.

Over the years, blue-ribbon panels and government commissions have periodically considered the status of marijuana. Their conclusions, supported by scientific data, are consistent in recognizing that this is one of the less harmful drugs of abuse. Unlike alcohol or cocaine, marijuana is rarely, if ever, lethal; nor does it lead typically to violent behavior but usually has a calming effect. However, marijuana, hashish, and THC (the active substance in the hemp plant) are by no means harmless. They certainly distort judgment, time sense, and coordination, and they impair short-term memory and cognition. Their disruptive effects on tasks requiring these qualities (such as operating a car, train, aircraft, or other complex equipment) are severe. Moreover, significant impairment may last as long as 24 hours even though it may not be recognized by the user. Heavy long-term use can cause

serious damage to the lungs (possibly including lung cancer). Some research findings indicate that marijuana, as well as alcohol, cocaine, and heroin can damage the immune system. Marijuana is addictive in that some users become compulsive users. And it is especially attractive to adolescents, in whom frequent heavy use can interfere with motivation, education, and the normal processes of socialization.

Like nicotine and alcohol, marijuana functions as a "gateway drug," meaning that some users, having already obtained a "high" through drug use -- in this case illicit drug use -- move on with greater ease to smoking crack cocaine or heroin, and may ultimately become intravenous drug users.

Despite these significant adverse effects, questions have been raised by various investigative commissions about whether the social costs associated with the prohibition of marijuana are warranted by its actual harm to individuals and society, and especially whether imprisonment for mere possession unaccompanied by other crimes -- the law in some states -- is appropriate. It can be argued that placing marijuana in the same category as heroin and cocaine also sends a counterproductive message because it erases distinctions among drugs with very different degrees of hazard.

Various states have softened the penalties on marijuana possession, sometimes redefining possession of small quantities for personal use as a civil rather than a criminal offense. A key question is the extent to which a significant increase in consumption occurs if legal controls are relaxed. Unfortunately, without adequate research protocols in place to evaluate the individual and public health consequences of these changes, nothing useful can be learned.

Concerning marijuana, therefore, we recommend careful study of the justification and cost to taxpayers of imprisonment (as in some states) of marijuana users who committed no serious crime against persons or property and were not major traffickers. We also recommend that changes in legal controls on any drugs be preceded by carefully crafted research protocols to establish pre-change baselines in order to learn whether the consequences, on balance (especially in a cost-benefit analysis), are beneficial or harmful.

Concerning the "war on drugs" in general, it is likely -- as witness opium policy in the years following 1949 in China and current policy on alcohol in Saudi Arabia -- that Draconian measures could greatly reduce the extent of drug abuse. However, such measures, though perhaps appropriate to the "war" metaphor, would be incompatible with our democratic traditions and constitutionally guaranteed liberties.

The relationship of crime to drug abuse requires special comment. The public perception that increased violent crime is a simple and direct consequence of the cocaine epidemic does not stand up to scrutiny; the murder rate has gone down steadily over recent years as cocaine abuse has remained fairly stable. More research is needed to understand all the reasons why the use of illicit drugs is associated with criminal activity. To some unknown extent, crime is a consequence of the prohibition itself, in that both turf wars and property crimes to support a habit are driven by the high price of black-market goods. Often, however, individuals engage in criminal activity before drug abuse and addiction become factors. The trade in illicit drugs is certainly associated with violence, but easy availability of handguns, increased depictions of violence in films, TV, and popular music, and many

other factors contribute. Teasing out mere association from causation in such a complex issue is a nearly impossible task for research. Research tells us that treatment can be effective in diverting some addicts from crime. But no research has yet told us convincingly to what extent addicts would cease criminal activity if the prohibitions were relaxed and the drugs were available at very low cost, nor whether this would be more than made up for by an increase in the number of new addicts and of health and work problems arising from increased drug use.

The statement that pregnant women are damaging their unborn children by using crack cocaine has been made repeatedly and sensationalized in the media. As a result, extraordinary measures have been taken, such as removing a child from its mother after birth or even prosecuting the mother for providing an illicit drug to the fetus. Animal research does indeed show serious effects on fetal and postnatal growth and development due not only to cocaine but also to alcohol, nicotine, THC (from marijuana), and other drugs of abuse. But direct extrapolation to humans is risky. Women who abuse drugs can give birth to premature and developmentally handicapped infants, many of whom show impaired learning abilities in later childhood. The evidence is clear that high alcohol intake during pregnancy can cause serious fetal abnormalities (fetal alcohol syndrome). Heavy smoking during pregnancy is also implicated in immediate and long-term disturbances of physical and mental development of the newborn. Whether other kinds of fetal damage are due specifically to other drugs is obviously an important question. Improved research studies are needed in order to evaluate the impact of all the confounding factors such as lack of prenatal care, nutritional deficiencies, and combined use of multiple drugs. Regardless of which drug or circumstance is most harmful in a given case, it is important to find more effective ways to discourage pregnant women from drug use. Overly punitive policies may have the unintended effect of deterring users from seeking needed prenatal care.

*Drug abuse is a public health problem.*

To physicians and medical scientists the drug problem is primarily a public health problem. To much of the public, however, the term "drug abuse" merely evokes images of crime -- turf wars, drive-by shootings, burglary, robbery, and theft -- in part because "drug" means "illicit drug" to so many. The discrepancy between these two perceptions of the drug abuse problem needs to be addressed through better dissemination of the facts. The concept of public health is not limited to infectious diseases and other medical concerns but also properly embraces other social problems that increase morbidity and mortality such as driving under the influence of alcohol or marijuana, handgun violence, and the maltreatment of children. Thus, law enforcement appropriately complements the traditional medically oriented approaches to many public health problems, including drug abuse.

The most prevalent drugs of abuse are the ones that are legal for nonmedical use, namely, nicotine (tobacco) and alcohol; they are extremely damaging to the health of heavy users, and they are enormously harmful and costly to society. Thirty-five million hard-core nicotine addicts continue to risk their lives despite widespread knowledge about lung cancer, emphysema, heart disease, and stroke. Smoking contributes to the deaths of about 450,000 Americans every year; these deaths are due to long-term toxicity. Of our population aged 12 and older, nearly half (100 million) drink alcohol in moderation, but more than 13 million are drinking out of control, risking severe damage to their livers and brains, and tragedy for their families and friends. Alcohol kills 20,000 Americans every year in highway accidents, and contributes to an additional 90,000 homicides, suicides,

unintentional overdoses, and deaths due to chronic use (e.g., cirrhosis). Related pharmacologically to alcohol and the sedatives are the inhalants (volatile solvents), which are extremely toxic (especially to the liver) and are used primarily by children.

There are about two million regular (weekly) users of any form of cocaine or methamphetamine. Crack cocaine is a form of cocaine that can be smoked. Comparing the safety of smoked, snorted, and injected cocaine is a complex issue. In some respects, smoking is a safer route for administering any drug because the total dose can be regulated by the user, puff by puff; but, as noted below, smoking may be more addictive because of more rapid onset and more intense euphoria. Overdose deaths and serious immediate toxicity are usually due to injected drug because the whole amount (often of unknown strength in the illicit market) is injected at once. Cocaine and methamphetamine kill more than 4,000 annually, chiefly by constriction of blood vessels in the heart or brain, causing a heart attack or stroke, and by disturbance of the heart beat leading to sudden heart stoppage. In addition, injection -- as with any drug -- carries the dangers of transmitting hepatitis and HIV unless scrupulous care is taken to use sterile paraphernalia. More than half of all new AIDS cases are linked to drug abuse by direct exposure to dirty needles, sex with an HIV-infected intravenous drug user, or being born of an HIV-positive drug-abusing mother.

The figures cited here for mortality underestimate substantially the number of lives lost as a result of using illicit drugs. For example, they do not fully include homicides caused by cocaine-associated aggression, murders related to turf wars, accidental deaths caused by impaired judgment related to marijuana or cocaine, deaths from AIDS due to unsafe sex under the influence of a drug or to intravenous drug use, or deaths that result from long-term insults to the body engendered by years of illicit drug use. Moreover, most deaths from illicit drugs occur at a much earlier age than those from tobacco or alcohol, so in terms of years of life lost, illicit drugs are even more important than the figures suggest. Nevertheless, even after making the appropriate adjustments, the figure for mortality due to illicit drugs will be much smaller than that due to tobacco or alcohol, simply because there are fewer users. In addition to deaths and physical illness, the illicit drugs and alcohol cause enormous suffering due to family disruption, physical and sexual abuse, and other psychosocial problems.

Smoking crack cocaine can cause serious damage to the lungs. From a public health perspective, smoking is a dangerous route of administration just because it is still socially acceptable and therefore more seductive for people who have not yet crossed the line to intravenous drug use. Moreover, smoking is a very effective way to deliver drugs rapidly to the brain, thus enhancing the psychoactive effects and the potential for addiction. Finally, the merchandising of crack in small quantities, making it available to children and low-income populations, is a particularly dangerous aspect. Current sentencing guidelines deem trafficking in small amounts of crack cocaine equivalent to 100 times as much powdered cocaine intended for snorting or injection. However, whatever social justification there may be for this difference, there is no scientific basis for it in the pharmacology or toxicology of these two forms of cocaine.

There are considerably fewer than one million heroin addicts. Most use heroin by the intravenous route, but smoking and snorting are becoming increasingly popular. Heroin, like cocaine and methamphetamine, kills more than 4,000 users annually, usually by injection overdose. For heroin, as for cocaine, the injection route carries the serious danger of infections like hepatitis B and HIV. Research suggests that needle exchanges are probably effective in curtailing the spread of infection in

intravenous drug users, and possibly also in attracting them to treatment. Furthermore, the data suggest that providing sterile paraphernalia does not recruit new drug users, but long-term data on this point are lacking. However, more research is needed to clarify the value of needle exchanges, especially to establish whether, on a cost-benefit basis, they are truly effective. Drug abuse treatment remains the most effective way of diminishing the spread of HIV among heroin users, as demonstrated by the fact that addicts maintained on methadone are much less likely to become HIV positive or to share needles.

There is no single universally effective treatment for heroin addiction; many studies have demonstrated that different approaches can be effective for different people. Rigorous research over more than 30 years has shown methadone maintenance (with adequate dosages and with ancillary counseling and other support services) to be effective in reducing or abolishing heroin use by clients in treatment.

Government surveys show that marijuana has been tried at least once by about one-third of Americans, approximately 20 million have used it within the previous month, and a much smaller number use on a weekly or daily basis. Among high school seniors in 1995, nearly one in twenty had used marijuana in the previous 30 days, and this figure was more than double that reported in 1991. There are no known deaths from marijuana due to overdose (in contrast to cocaine or heroin), but there are deaths due to behavioral toxicity, such as the adverse impact on driving skill and judgment. Only routine testing for marijuana (in addition to alcohol) in highway accidents will tell us how important a problem this is.

Research is critically important for establishing which kinds of drug abuse treatment are most effective and most cost-effective. Treatment research is difficult, but nevertheless has already produced convincing results that point the way to policy changes. For example, several studies by the Rand Corporation and by the National Institute on Drug Abuse and others have shown that treatment of addicts can indeed be effective, and furthermore, that a dollar spent on treatment saves seven or eight dollars in health-care costs and the costs of drug-associated crime and incarceration. For example, while heroin addicts are participating in a methadone treatment program, they commit far fewer crimes than when they are using heroin.

Not included in the above is the extent to which law enforcement reduces the availability of illicit drugs and thus reduces the ultimate cost burden on society for treatment and incarceration. Furthermore, experts find that many drug abusers resist treatment until compelled by the criminal justice system, but then may be treated successfully. Thus, more research is needed to evaluate the cost-effectiveness of law enforcement in reducing the availability of illicit drugs and in forcing rehabilitation through treatment as an alternative to incarceration. If addicts were no longer incarcerated for possession of drugs for personal use or small-scale distribution (no other crime having been committed), and if there were more diversion to treatment, the prison population could be reduced considerably at a saving of some \$25,000 annually per inmate. Such changes would require repeal of "mandatory minimum" sentencing laws, which deprive judges of discretion. The key to arriving at an optimal policy is the cost-benefit analysis -- is the increased deterrence of harsh sentences worth the high cost as compared with discretionary misdemeanor penalties coupled with mandatory treatment?

Finding and implementing cost-effective ways to reduce the demand for all drugs of abuse deserve a high priority in our national effort. At present, our national expenditures (federal and state) for law enforcement and interdiction with respect to illicit drugs (supply reduction) take about 75% of the total \$30 billion devoted to the "war on drugs", with only 25% applied to prevention and treatment (demand reduction) and to research. What limited data are available suggest that greater expenditures for demand reduction might be more cost-effective in ameliorating the ravages of drug abuse and addiction on our society. Research has shown that prevention efforts can be effective -- that we can limit access to new medications with abuse potential, that school and community prevention and education programs reduce drug use by children and adolescents. Research has also demonstrated that treatment works in ameliorating the adverse consequences of drug abuse. Both prevention and treatment need careful, ongoing, rigorous evaluation.

*Research provides a basis for rational policy making.*

Research findings are continuing to shed light on relevant questions such as the following:

- (1) What chemical changes in brain are caused by each psychoactive drug, and what common nerve pathways in brain are responsible for the rewarding and dependence producing properties of these drugs and for the behavioral changes they cause?
- (2) What predispositions -- whether due to heredity, fetal damage, or environment -- make some people more vulnerable than others to becoming drug abusers and addicts?
- (3) What are the long-term developmental consequences of fetal exposure to each of the drugs of abuse?
- (4) Based on scientific understanding of drug abuse, what new treatments might be developed to prevent and ameliorate drug abuse? Which prevention and treatment methods are effective and cost-effective, and which are not? Given the complexity of drug abuse, what combinations of treatments will be most effective?
- (5) What sorts of post-treatment interventions are needed to prevent relapse after recovery from the addicted state?
- (6) What are the ongoing trends in drug abuse as determined from large-scale surveys? What are the consequences of changes in drug control policies? How can we react quickly to emerging new drug abuse problems?
- (7) What is the effectiveness of drug abuse prevention initiatives aimed at reducing demand for drugs among our nation's youth? How can prevention measures be improved, how can ineffective ones be weeded out?

Research on drugs of abuse obviously requires that such drugs be available, under legal controls, to legitimate researchers; unreasonable obstacles put forward by the controlling agencies that restrict or unduly delay such availability are counterproductive. Research is our only sure route to new knowledge, and new knowledge can help greatly in improving national drug policies. Rigorously controlled human research is extremely difficult to carry out. To cut the corners and not get decisive

answers is ethically unacceptable because subjects are put at risk to no purpose. To do it right is expensive; but the benefits of unambiguous outcomes are great and the total costs are then much less. Drug abuse research needs adequate, stable funding through the National Institute on Drug Abuse (NIDA) and the National Institute on Alcohol Abuse and Alcoholism (NIAAA) as well as other branches of federal, state, and local government (as through earmarked taxes on legal drugs), and the private sector.

Concerning the "war on drugs," the metaphor is perhaps helpful in calling attention to the serious dangers of drugs. But we should recognize that drug abuse is an endemic public health problem. It has a very long history in human societies, and nothing we can do will totally eradicate it. Our goal should be to contain it and to minimize the aggregate damage. We strongly recommend that legislators and other policy makers pay more attention to the hard data produced by scientific research, so that policies can be guided more by facts and less by emotion and political expediency.

## **SUGGESTED ADDITIONAL READINGS**

(Listing is chronologic within each category.)

### **U.S. Government Publications**

"Marihuana: Signal of Misunderstanding" First Report of the National Commission on Marihuana and Drug Abuse. (Washington DC, 1972)

"Marihuana and Health" (Second Annual Report to Congress from the Secretary of Health, Education, and Welfare; Washington DC, 1972)

"Drug Use in America: Problem in Perspective", Second Report of the National Commission on Marihuana and Drug Abuse. (Washington DC, 1973)

"The Health Consequences of Smoking: Nicotine Addiction," A Report of the Surgeon General (US Department of Health and Human Services, Washington DC, 1988)

"Drug Abuse and Drug Abuse Research" (Third Triennial Report to Congress from the Secretary of Health and Human Services, Washington DC, 1991)

"Special Report to the U.S. Congress on Alcohol and Health" (National Institute on Alcohol Abuse and Alcoholism, Government Printing Office, Washington DC, published annually)

"National Household Survey on Drug Abuse" (US Department of Health and Human Services, Washington DC, published annually)

"The Monitoring the Future Study" (National Institute on Drug Abuse, US Department of Health and Human Services, Washington DC, published annually)

"Drug Abuse Warning Network (DAWN)" (Office of Applied Studies, Substance Abuse and Mental Health Services Administration, US Department of Health and Human Services, Washington DC, multiple reports, published annually)

### **National Academy Press**

"Marijuana and Health," Institute of Medicine (National Academy Press, Washington DC, 1982)

"Treating Drug Problems" vols. 1 and 2, DR Gerstein, HJ Harwood, eds., Institute of Medicine (National Academy Press, Washington DC, 1990)

"Preventing Drug Abuse: What Do We Know?" DR Gerstein, LW Green, eds., National Research Council (National Academy Press, Washington DC, 1993)

"Under the Influence? Drugs and the American Work Force", J Normand, RO Lempert, CP O'Brien, eds., National Research Council and Institute of Medicine (National Academy Press, Washington DC, 1994)

"Growing Up Tobacco Free", BS Lynch, RJ Bonnie, eds., Institute of Medicine (National Academy Press, Washington DC, 1994)

"Preventing HIV Transmission -- The Role of Sterile Needles and Bleach," J Normand, D Vishov, LE Moses, eds., Institute of Medicine (National Academy Press, Washington DC 1995)

"Pathways of Addiction: Opportunities in Drug Abuse Research," Institute of Medicine (National Academy Press, Washington DC, 1996)

### **Other Publications**

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