

Statement by
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Mr. Chairman and Members of the Subcommittee, thank you for inviting the National Institute on Drug Abuse (NIDA) to participate in this important hearing. I am Dr. Nora D. Volkow. I have been serving as the Director of NIDA for close to nine months and I am very pleased to have this opportunity to testify about the remarkable advances we are making in the treatment arena.

The reason we are here today is because we all want to harness our energies and resources to alleviate the tremendous burden that drug abuse places on our Nation. Drug abuse and addiction are major public health problems that impact us all. To put it in dollar figures, substance abuse, including smoking, illegal drugs, and alcohol, costs our Nation more than \$484 billion per year. Illicit drug use alone accounts for about \$161 billion. But the impact drug abuse and addiction have on individual lives, families, and communities is even more devastating and in comparison makes the dollar impact seem less significant. Drug abuse is inextricably linked with the spread of infectious diseases such as HIV/AIDS, STD's, tuberculosis, and hepatitis C, and is also associated with domestic violence, child abuse, and other violent behavior.

Fortunately, our investments in biomedical research to improve the health of ALL Americans are paying off. Scientific advances supported by NIDA are coming at an extraordinary rate and are significantly influencing the way this Nation approaches drug abuse and addiction. Foremost, research is continuing to provide new insight into the chronic relapsing nature of addiction. Understanding addiction as a chronic relapsing disease that involves the brain, behavior, the environment in which an individual is raised, along with genetic factors, is critical since it frames how we must ultimately develop strategies to treat this disease.

Research shows us that drug abuse and addiction are complex. It usually begins in childhood or adolescence, when the adolescent brain is undergoing dramatic changes in both structure and function. This is the time when individuals begin risk-taking behaviors, and without early interventions the abuse can worsen, progressing to addiction. This is one of the reasons we refer

to addiction as a developmental disorder and why NIDA is initiating a number of activities to get pediatricians and other primary care physicians more knowledgeable about drug abuse screening and treatments.

New imaging technologies reveal the neurochemical and functional changes that occur in the brains of drug-addicted individuals. These same techniques also demonstrate that individual differences in the numbers of certain brain receptors can predict whether a person will find a drug to be pleasant or aversive. We also now have extensive knowledge on how most drugs of abuse affect the brain--the receptors they bind to, the circuits they activate, and the ways in which the brain can change following chronic exposure to a drug or multiple drugs. For example, almost every drug of abuse, including nicotine, marijuana, cocaine, heroin, and methamphetamine, elevates the level of a brain chemical or neurotransmitter, known as dopamine.

Dopamine is elevated by natural rewards as well as by stress, and is part of a reward circuit. Addiction results from the repeated perturbation of reward circuits. There comes a point, where an individual's brain becomes so altered that normal rewards are no longer sufficient, judgment and decision-making circuits become impaired, and the individual's overriding motivation becomes seeking and taking drugs. NIDA is committed to understanding the brain mechanisms and circuitry that underlie the actual transition from the drug abuse state to the addicted state. Researchers are working to determine if the change is gradual or precipitous, and they are studying, for example, the role that the prefrontal cortex of the brain plays in driving behaviors, as well as the individual differences in vulnerability to drugs, to determine more definitively how taking a drug repeatedly over time changes the brain in such a way that leads to the compulsive, self destructive patterns of drug use that characterize addiction.

Research shows that addiction is similar to other chronic diseases such as type II diabetes, hypertension, cardiovascular disease, and many forms of cancer with respect to its onset, course, and response to treatment. Like these other chronic diseases, drug addiction can be effectively treated and managed over its course, but this requires treatments to be readily available and adhered to. Addiction treatment has also been shown to be an effective way to prevent the spread of diseases, such as HIV/AIDS and hepatitis. Drug injectors who do not enter treatment, for example, are up to six times more likely to become infected with HIV than injectors who enter and remain in treatment. Participation in treatment also presents opportunities for screening, counseling, and referral for additional services, which can all help to reduce the spread of diseases to the general population.

There is hope. Recovery is possible and is happening. It is happening in hospitals, recovery centers, therapeutic communities, clinics, faith-based programs, and self-help groups in every corner of the Nation. Effective treatment occurs in a variety of settings, in many different forms and for different lengths of time. We have found treatments that are delivered by qualified professionals using empirically validated medications and behavioral therapies and applied for adequate durations, followed by monitoring and after-care, have successful outcomes. In fact, recovery from addiction is an established reality, achieved through a variety of treatment modalities when they are matched for the needs of individual patients. Numerous studies have

shown that addiction treatments are comparable in effectiveness to treatments for other chronic illnesses.

However, as with other chronic illnesses, long-term treatment adherence and lifestyle change can be difficult to maintain. One very important analysis of these issues was published in the Journal of the American Medical Association (JAMA, October 4, 2000). The authors clearly show that addiction treatment outcomes are very similar to treatments for other chronic, relapsing illnesses such as asthma, hypertension, and diabetes. In almost every case where patients were prescribed medications for chronic illnesses, less than 50% continue to take those medications as prescribed; less than 30% of patients comply with prescribed behavioral changes such as weight loss, dietary restrictions or exercise regimens. The factors that led to rehospitalization for chronic diseases were the same factors implicated in relapse to drug use. In this analysis, treatment compliance, drop-out rates, and relapse rates were similar for all four diseases. Thus, though we've come a great distance in our understanding of treating chronic illnesses, we still have many challenges to confront.

The ideal outcome of addiction treatment is the complete elimination of drug use. Not only does abstinence improve the health of the individual, but it reduces the adverse consequences that drugs can have on the health and safety of families and communities. Therefore, a primary goal of addiction treatment is to stop all drug use. Addiction, however, is a complex chronic disorder that often co-occurs with problems in the domains of physical health, mental health, criminal justice, employment, and family and social functioning. All of these areas must be addressed, not just the drug use. Similarly, measuring the outcomes of drug treatment should not be limited to drug use levels alone, improvements in these other domains can contribute to recovery.

Our expectations for treatment are high. Not only do we expect treatment to eliminate drug dependence; but we expect it to return the patient to productive functioning in the family, workplace, and community. Because of the heterogeneity in patients, such as age, gender, types and severities of substance abuse problems, and mental and medical health problems, eliminating drug dependence is difficult and moreover it is imperative that treatment providers have an array of science-based treatments to offer patients, in addition to access to services and resources to address the complex problems that patients bring to treatment. As with other chronic disorders, we should also expect that those who are addicted may require multiple episodes of treatment continuing over the course of the disorder. We need to study further how to improve abstinence rates and quality of care.

NIDA grantees continue to bring new treatments to the forefront, both behavioral and pharmacological. A little over a year ago, for example, NIDA's medications development program saw the realization of its ten-year research investment when it was able to bring a new medication for opiate addiction, called buprenorphine, to physicians treating patients for addiction.

Thanks to NIDA's research investment, pharmaceutical company participation, agencies working together, and an Act of Congress, qualified physicians can now treat their patients in their own offices. Other pharmacological approaches influenced by NIDA research are nicotine patches

and gum, bupropion, and LAAM. Also, numerous controlled trials provide evidence that behavioral treatment approaches can be effective in reducing drug use while also improving associated behavioral, familial, and psychosocial outcomes. These pharmacological and behavioral interventions are components of an overall treatment process that proceeds through stages in which the patient engages in the therapeutic process, learns skills needed for recovery, addresses problems related to drug use, and learns to sustain recovery. Many of these treatments that have been shown to be efficacious in pristine research settings are now being tested in real-life settings across the country through NIDA's National Drug Abuse Treatment Clinical Trials Network (CTN). The CTN provides a national infrastructure to bring science-based behavioral and pharmacological treatments for addiction into diverse patient and treatment settings across the country.

Treatment of drug addiction requires a continuum of care, based on the evolving needs of the individual over time. This can include detoxification as an initial acute first step to treatment, the treatment itself, and participation in self-help groups, for example, once treatment is completed. Most effective drug treatments include an after-care component. For example, studies in states such as Delaware and California have shown that comprehensive treatment of drug-addicted offenders, when coupled with treatment after release from prison, can reduce drug use by 50-70% when compared to those who are untreated. Treated offenders are also 50-60% less likely to end up back in prison.

These findings hold true for at least four years after release. Moreover, offenders who did not receive after-care in the transition back into the community, despite receiving in-prison treatment, had significantly poorer outcomes. Particularly for those who have the most serious problems, the most favorable outcomes are obtained following treatments that provide comprehensive services, often in a residential setting. To be effective, treatment should attend to problems of the individual that would otherwise jeopardize his or her recovery and participation as a productive member of society. This means that a continuum of care is crucial for success, including offering treatment and services to offenders with substance use disorders as they transition and after they return to life in the community.

It is not easy, nor simple to measure treatment outcomes; but it is also not impossible. We are committed to the President's management agenda. Program effectiveness must be measured and accountability for outcomes must be established. Typically measurement is done at the individual, not at the program level. To be able to understand the many factors that determine long-term outcomes in treating the chronic addictive disorder, researchers look at factors such as levels of drug use, criminal behavior, family functioning, educational achievement, employment, and medical problems. This kind of information is typically gathered before treatment begins, during the course of treatment, and at intervals over time following treatment. It is critical to assess the problems that patients bring with them as they enter treatment in order to compare the effectiveness of any given program with that of another.

A variety of instruments have been developed that can be used to assess patient needs and develop treatment plans. One well-known instrument is the Addiction Severity Index (ASI). The ASI, which has been developed and refined through NIH and Veterans Administration support

over the past 20 years, is the most widely used and validated addiction assessment instrument in the world today. It provides the trained counselor with the tools he or she needs to conduct a structured 45-60 minute interview that has been shown over the years to provide valuable information that not only captures critical baseline data, but sets the stage for improved treatment outcomes. A computerized version is now being piloted in the United States as a way to collect information about clients entering federal treatment programs. Other measurement tools have been developed through federal research and are in the public domain.

These are some of the ways that treatment effectiveness is currently measured. Like other areas of health care, standardized measures of drug abuse treatment effectiveness have not yet been developed. To help in this development, NIDA offers a robust health services research portfolio that is teasing out the active and necessary components of an effective treatment program. Those that have successfully led the addicted through recovery.

There is also some research being supported by NIDA and the Substance Abuse and Mental Health Services Administration (SAMHSA) looking at performance measures. Researchers are looking at data to determine which performance measures could be used to more systematically determine the effectiveness of treatment services and to promote quality and accountability in the delivery and management of drug abuse services by organized systems of care.

NIDA's goal is to improve the Nation's quality of addiction treatment using science as the vehicle. NIDA will continue to encourage research that supports the development of innovative treatments, including online treatments, and determine ways to measure their effectiveness. Improving drug abuse treatment will ultimately depend not just upon the development of effective interventions, but also upon research to understand and to improve the overall treatment process. Thank you. I will be happy to respond to any questions you may have.