FACT SHEET

Drug Abuse and Addiction

NATIONAL INSTITUTES OF HEALTH

Yesterday

- Addiction was considered a moral failing, a lack of will over one's actions.
- The mid 70s were the "heyday" of many drugs of abuse, including nicotine, marijuana, and amphetamines. Had these trends continued rather than shift downward over the last decade, we would today see exponentially higher healthcare and education costs, unemployment, and crime.
- We were only beginning to understand how drugs of abuse worked in the brain, as the technologies that would reveal how and which brain areas were affected *in humans* were just coming into use.
- The wide-ranging health effects of drug abuse (e.g., heart and lung diseases, hepatitis and HIV/AIDS) were also just being discovered.
- Methadone was the only medication available for treating drug addiction. Behavioral treatments existed but were not yet in use.

Today

Combined biological, epidemiological, and social science discoveries of the last 3 decades have given us a detailed understanding of the risks, mechanisms, and consequences of drug abuse and addiction.

- Because drug use typically begins in adolescence, we have targeted prevention and public outreach towards youth, their families, teachers, and other community stakeholders. These efforts have prompted notable shifts in attitudes and behaviors regarding drug abuse. Today, the rate of cigarette smoking in youth is at its lowest point since the Monitoring the Future survey (http://monitoringthefuture.org/) began tracking drug use and attitudes of teens in 1975. Marijuana use has shown a consistent decline since the mid-1990s, although that trend has flattened in recent years (see figure below).

Recent scientific advances have revolutionized our understanding of addiction as a chronic, relapsing disease and not a moral failure.

- Scientists have identified the specific sites of action in the brain where every major drug of abuse has its initial effects, including opiates, methamphetamine, cocaine, tobacco, and marijuana.
- Brain imaging technology has demonstrated that addiction is a brain disease by delineating profound disruptions in the specific brain circuits affected by addiction. These changes go beyond the brain's reward system to include regions involved in memory, learning, impulse control, stress reactivity, and more. Repeated drug exposure "resets" these circuits toward compulsive behavior so that a person's control over the desire to seek and use drugs is compromised, despite devastating consequences.

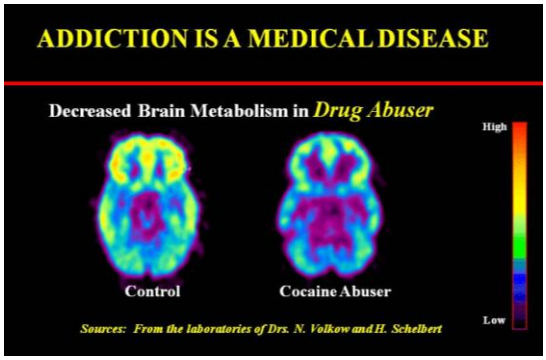


Image courtesy of NIDA

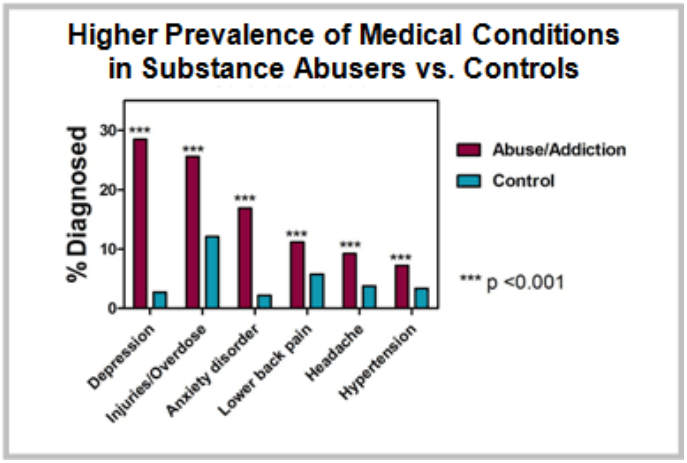
- In-depth NIH-supported studies of chronic drug exposure (particularly in animal models) uncovered the critical role played by brain plasticity. By causing abnormal regulation of key brain receptors (e.g., glutamate, dopamine), addictive drugs modify the strength of connections between neurons. This finding casts a new light on the phenomenon of drug addiction as a process of maladaptive learning that over time can become an automatic, compulsive behavior.
- Addiction is recognized as a treatable disease, requiring continuing care and multifaceted approaches—similar to other chronic conditions like diabetes, or cardiovascular disease. And like other diseases,

treatment for drug abuse and addiction not only saves lives, but is cost effective, with a 7:1 return on cost. Treatment includes use of medications, now available for nicotine, alcohol, and opioid addiction, along with behavioral treatments, a mainstay for these and other addictions for which medications have not yet been approved.

Tomorrow

The scientific knowledge we have accumulated will be used to transform the way we treat addiction and how we prevent drug abuse in the first place, or its escalation to addiction.

- Genes account for about 50 percent of a person's risk of becoming addicted, and environmental factors influence the effect of these genes—an area of research called epigenetics. Progress in genetics/ epigenetics research will lead to more refined prevention and treatment interventions targeted to individual risk or to modifiable environmental influences.
- Emerging medication targets and treatment approaches will capitalize on our expanded knowledge of underlying neurobiology and brain circuitry involved in addiction. For example, research has revealed new candidate systems (e.g., cannabinoid) that may be promising targets for the development of medications to treat addiction and other disease (e.g., pain). Medications will also be developed to affect systems common to multiple addictions, such as stress-induced relapse, or cognitive remediation. Of critical importance to the development of future addiction therapies is the notion of brain plasticity as a two-edged sword: the same malleability that can bring about deleterious brain changes also holds promise for effective and enduring treatments.
- Immunotherapy (e.g., "vaccines"), will be available to sustain abstinence, even prevent addiction. Studies are underway to develop or improve vaccines that use antibodies to bind the drug while it is still in the bloodstream, preventing it from entering the brain. A vaccine for nicotine addiction is already in advanced efficacy trials, having garnered significant improvement in smoking cessation rates and continuous long-term smoking abstinence.
- Pharmacogenomics—or understanding how variations in an individual's genome affect his or her response to a medication—will advance sufficiently to allow physicians to individualize patient treatment for maximum efficacy and minimal adverse effects.
- The Mental Health Parity and Addiction Equity Act of 2008, along with increased accessibility to insurance coverage provided by the Affordable Care Act, will expand access to substance abuse treatment and improve delivery of integrated healthcare for addiction and its health consequences. This will require well-trained substance abuse treatment providers and seamless integration with the mainstream healthcare system.
- Primary care physicians and other healthcare professionals will routinely screen their patients for substance abuse and help prevent its escalation to addiction. By Identifying substance abusers—already overrepresented in the patient population—physicians can provide better and more comprehensive patient care that will improve outcomes for many medical conditions where substance abuse is already present (figure below). Early and appropriate substance use intervention will also alleviate the significant societal costs of drug abuse and addiction, currently estimated at about $600 billion a year.



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National Institute on Drug Abuse (NIDA) website: www.drugabuse.gov