



Substance Use and Health in America

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Introduction

A “substance” is defined as any psychoactive compound with the potential to cause health and social problems, including addiction. These substances may be legal (e.g., alcohol and tobacco); illegal (e.g., heroin and cocaine); or controlled for use by licensed prescribers for medical purposes such as hydrocodone or oxycodone (e.g., Oxycontin, Vicodin, and Lortab). These substances can be arrayed into seven classes based on their pharmacological and behavioral effects: Nicotine, Alcohol, Cannabinoids, Opioids, Depressants, Stimulants, and Hallucinogens, etc.

As a country, we have a serious substance misuse problem - use of alcohol, illegal drugs, and/or prescribed medications in ways that produce harms to ourselves and those around us. These harms are significant financially with total costs of more than \$420 billion annually and more than \$120 billion in healthcare (1,2). But these problems are not simply financial burdens - they deteriorate the quality of our health, educational, and social systems, and they are debilitating and killing us - particularly our young through alcohol-related car crashes, drug related violence, and medication overdoses [1].

Most Americans are already painfully aware of the size and cost of substance misuse problems. Many Americans believe that there are no viable solutions to what they think of as these unfortunate “lifestyle problems” - that they are as intractable as poverty and ignorance. However, a review of the available science offers a much more optimistic projection for our efforts to reduce these problems. As will be discussed, substance misuse can reasonably be considered a lifestyle problem, but there are effective prevention policies and practices that could significantly reduce the harms and costs of these problems. Genetic, brain imaging, and neurobiological science suggests that “addiction” is qualitatively different from substance use and is now best understood as an acquired chronic illness, similar in many respects to type 2 diabetes - illnesses that can be managed but not yet cured [2].

In this regard, science has already produced a range of effective interventions, treatment medications, behavioural therapies, and recovery support services that make full recovery from even serious addictions an expectable result of professional, continuing, evidenced-based care. Also, recent changes in healthcare insurance regulation and financing now open the door to integration of prevention and treatment of substance use disorders into mainstream medicine in ways that were previously not possible [3].

Thus, the first and perhaps most important message from this paper is NOT that that substance misuse and disorders cause immensely expensive and socially devastating harms and costs. Rather, the major message from this paper is that science now offers a public health-oriented approach to translate the available science into effective, practical, and sustainable policies and practices to prevent substance “use” before it starts; identify and intervene early with emerging cases of substance “misuse”; and effectively treat serious substance use disorders.

Substance misuse problems and substance use disorders

Although different in many respects, all substances discussed

here share three features that make them important to public health and safety. First, all are widely used and misused: 61 million people in the United States admitted to binge drinking in the past year and more than 44 million people used an illicit or non-prescribed drug in the past year [3]. Second, using any of these substances at high doses or in inappropriate situations can cause a health or social problem - immediately or over time. This is called substance misuse. One important and very prevalent type of substance misuse is binge drinking. Binge drinking for men is drinking 5 or more standard alcoholic drinks in one sitting (a few hours). For women, it is drinking 4 or more standard alcoholic drinks in one sitting [4]. The health and social problems from misuse of alcohol or any of the other above substances can be as simple as low severity and transient embarrassment. But misuse can also result in serious, enduring, and costly consequences, such as an arrest for driving under the influence (DUI), an automobile crash, intimate partner and sexual violence, child abuse and neglect, suicide attempts and fatalities, a stroke, or an overdose death.

The third feature shared by all of the above substances is that prolonged, repeated use of any of these substances at high doses and/or high frequencies (quantity/frequency thresholds vary across substances) can produce not only the kinds of problems described above, but a separate, independent, diagnosable illness that significantly impairs health and function and may require special treatment [5]. This illness is called a substance use disorder. Disorders can range from mild and temporary to severe and chronic. Severe and chronic substance use disorders are commonly called addictions.

Significance of substance misuse

It may be thought that a discussion of substance use and misuse is secondary to the real issue of addiction that has captured so many media headlines and has been linked to so many social problems. This is an important misconception: the great majority of substance-related health and social problems occur among those who are not addicted. Individuals with severe substance use disorders (addictions) do have high rates of substance misuse-related health and social problems and costs [6].

One particularly clear implication from these findings is that reducing the harms and costs of substance related problems in the United States cannot occur simply by treating addictions. The greatest public health benefit will come from reducing substance misuse in the general population. Of course, reducing population rates of substance

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misuse will also reduce rates of addiction [7].

Overdose incidents and deaths

Poisoning, or overdose, deaths are typically caused by binge drinking at high intensity and/or by consuming combinations of substances such as alcohol, sedatives, tranquilizers, and opioid pain relievers to the point where there is inhibition of critical brain areas that control breathing, heart rate, and body temperature [8,9].

Alcohol Overdose: The CDC reported more than 2,200 alcohol poisoning deaths in 2014 - an average of six deaths every day. Importantly, approximately 70% of those alcohol-overdose deaths occurred among those who did not meet diagnostic criteria for alcohol dependence; nor were they using other drugs at the time of the death [10].

Opioid overdose (heroin and prescribed opioids)

Opioid analgesic pain relievers are now the most prescribed class of medications in the United States with more than 289 million prescriptions written each year [11,12]. The increase in prescriptions of these powerful analgesics has been accompanied by a 300% increase since 2000 in both rates of overdose incidents (478,000) and overdose deaths (18,893 involving prescription opioids and 10,500 involving heroin) in 2014 [13,14].

To address this problem, researchers, medical societies, and the CDC have suggested "...

- (1) Screening patients for use...of alcohol and/or street drugs;
- (2) Taking extra precautions when prescribing medicines with known dangerous interactions with alcohol and/or street drugs; and
- (3) Teaching the patient the risks of mixing medicines with alcohol and/or street drugs" [15]. Again, screening for substance use and substance use disorders before and during the course of opioid prescribing, combined with patient education, are recommended [15].

Again, despite these and other indications of extreme threats to healthcare quality, safety, effectiveness, and cost containment, as of this writing, few general healthcare organizations screen for, or offer services for, the early identification and treatment of substance use disorders. Moreover, few medical, nursing, dental, or pharmacy schools teach their students about substance use disorders.

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