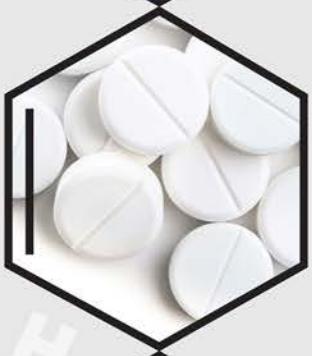

CONCEPTS *of* CHEMICAL DEPENDENCY

10th edition

HAROLD E. DOWEIKO

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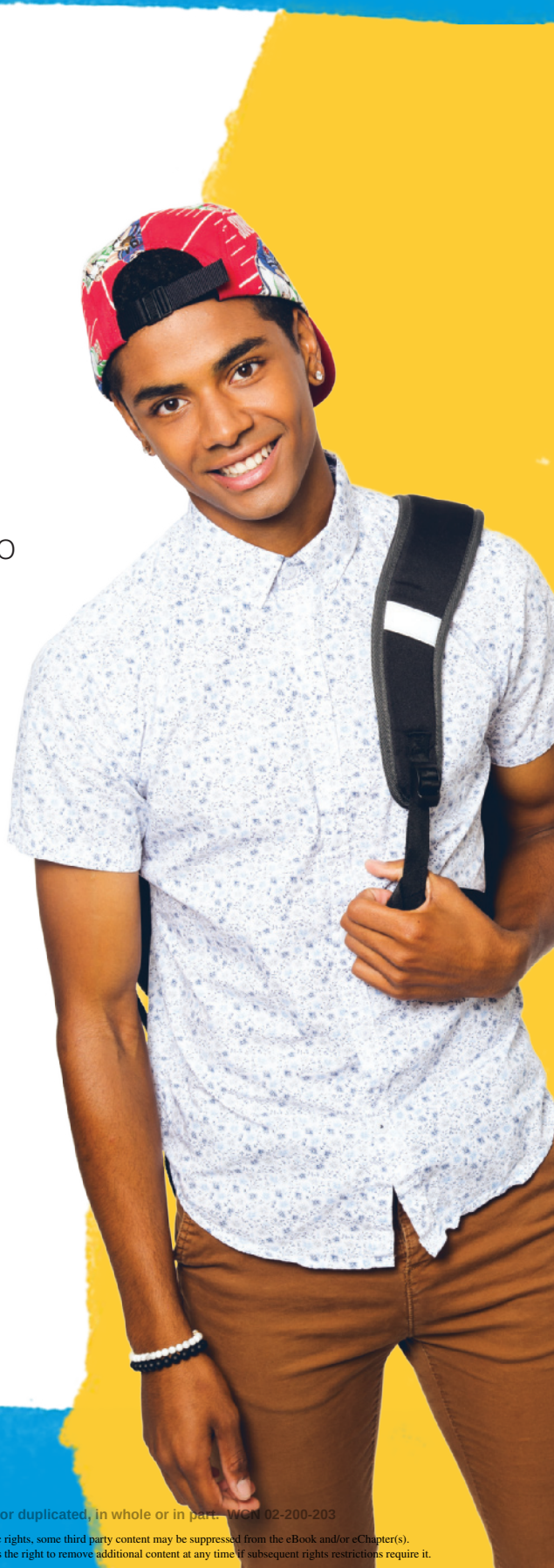

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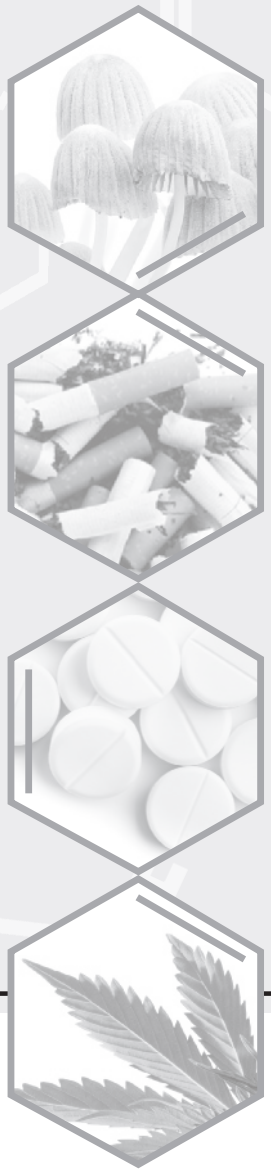

CONCEPTS *of* CHEMICAL DEPENDENCY

10th edition

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In loving memory of Harold Doweiko.

For Jan.

Brief Contents

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Preface

The world of the neurosciences is constantly changing. New discoveries about the process of neurotransmission, how neurotransmitter receptor sites are distributed throughout the brain, how certain chemicals force or block the action of various regions of the brain, how they damage neurons or aid in their recovery, how the brain interacts with the body to form the concept of a unified "self," all conspire to make a textbook such as this exceptionally difficult to keep current. Many long-cherished theories have been discarded, while new information leads to the formation of new theories, or suggests new directions for theoretical inquiry. An excellent example is Koob's (2009) assertion that scientists are only now starting to explore the role of glial cells in the brain. For example, the glial cells make up 90% of the brain's mass but were until recently overlooked by neuroscientists, who dismissed these cells as simply providing metabolic support for the neurons. It is now understood that while glial cells do indeed carry out this function, they also play a role in the process of neurogenesis and, as was recently discovered, are involved in a form of neurotransmission that both parallels and is independent of the neuron neural networks in the brain.

Over the years, there have been a number of changes made to this text, and this process has continued with the current edition. New research is cited, and the process of publishing journal articles online before the publication of the printed version has resulted in the citation of numerous journal articles that were "published on-line prior to print." Further, since research suggests that substance use patterns might differ between young adults who go on to attend college and those who do not, a new chapter that focuses just on substance use issues in the college student population has been added to the text. Information about the synthetic THC-like compounds that became popular drugs of misuse in the first months of this decade have also been reviewed. Several of the chapters have been rewritten in an attempt to avoid duplication of material. Out of curiosity I tried to count every change made to the manuscript from the addition or deletion of a reference to the addition of new material and deletion of material not thought relevant, movement of a section to another part of a chapter so that it would be more appropriate there, etc., and gave up at 600.

Over the years, several instructors have contacted the author to inquire about the chapter sequence decisions. It is difficult to write a text that will be used across a range of diverse fields of study in the order that will meet the demands of each class (psychology, sociology, nursing, and substance misuse counseling, to name a few of the college classes that have used earlier editions of this text). I do believe that it is important to review the drugs of misuse and their effects first so that the student might understand why the misuse of these compounds is so appealing.

The author of this text was, for example, speaking at a seminar about the total amount of amphetamine that an addict might inject in a "speed run."[1] when a nurse blurted out that the hypothetical person could not *possibly* be injecting that much methamphetamine because it was dangerous and potentially fatal. "Welcome to the world of amphetamine misuse" was the author's response. Substance misuse is a different reality than the one taught in nursing schools, psychology programs, sociology programs, or even medical school. On more than one occasion the author of this text has been approached by a trauma surgeon to explain why a person would knowingly expose themselves to doses of anabolic steroids, and how this would affect their behavior. On many occasions, students or seminar participants have expressed surprise at some of the contaminants or adulterants found in illicit drugs. Trying to explain that for the person addicted to

[1]Discussed in the chapter on amphetamine misuse and addiction.

these compounds the contaminants are an unwelcome inconvenience but a necessary evil that must be suffered to use the desired drug(s). For these reasons the author of this text has adopted the philosophy that to understand and treat substance use disorders, you need to first understand the chemicals being misused and their effects.

Acknowledgments

It is not possible to thank all of those people who have provided so much support during the preparation of this edition. I would like to thank Dr. David Metzler for his willingness to part company with many copies of various journals over the years. This allowed me access to many of the references cited in this text, and his kindness is appreciated. In addition, I would like to thank in addition, I would like to thank Dr. Amelia Evans for her invaluable contributions to this edition.

DISCLAIMER

The clinical examples used in this text are based on a wide variety of sources, including (but not limited to): characters as portrayed in various movies, books, or television programs, news stories from the media, and clinical examples provided in various references cited at the end of this text or as portrayed by presenters at various workshops that the author has attended. *All examples provided are hypothetical in nature. Any resemblance to any person, living or dead, is entirely due to chance and should not be inferred by the reader.* Further, the practice of substance misuse counseling or psychotherapy is very complex and the practitioner should be familiar with a wide range of resources in conducting their practice. *Neither the author nor the publisher shall be liable or responsible for any harm, loss, or damage allegedly arising from any information or suggestion made in or omitted from this text.*

CHAPTER 1

Why Worry About Substance Misuse or Substance Use Disorders?

LEARNING OBJECTIVES

After studying this chapter, students should be able to:

1.1 Understand why substance misuse and SUDs are legitimate problems for society
1.2 Identify the scope of the problem of alcohol and drug misuse and SUDs
1.3 Understand the costs related to alcohol and drug misuse and SUDs
1.4 Describe those who encounter and treat individuals with SUDs
1.5 Comprehend the lack of education prevalent in those who encounter individuals with SUDs

> Doctors are men who prescribe medications of which they know little, to treat diseases of which they know less, in human beings of whom they know nothing.
>
> —*Voltaire quotes (2015)*

Introduction

It is indeed unfortunate that the above quotation from Voltaire could easily be applied to the study of the substance use disorders (SUDs). Some researchers speak with great authority about persons with a SUDs, demonstrate increased or decreased activity in the brain as measured by one parameter or another when under the influence of chemicals, or show that certain genes are activated or deactivated in critical phases of development significantly more often in those persons with a SUDs than in the general population, as if these things *caused* the chemical use problem. Such things might reflect contributing factors but might equally be the end result of the SUDs itself. However, the most important point is the SUDs involves not nameless statistics in journal or newspaper articles, but *people*. Whether directly or indirectly, SUDs affect each of us (Hari, 2015).

People with SUDs are often ostracized by people in "polite" society who either focus on the substance as if it were the problem or look down on those who have become addicted as if they were a lower life form (Maté, 2010). Researchers now believe that collectively SUDs (SUDs) affect 1 in every 11 Americans over the age of 11 years and cause more than 60,000 deaths a

year[1] in this country alone (Frakt & Bagley, 2015). SUDs[2] might take any number of forms, including the subset of SUDs known as alcohol use disorders (AUDs) and nicotine use disorders (NUDs). Individuals who misuse prescription drugs fall under the rubric of having an SUD, but often are able to successfully hide their prescription drug use from others because their drugs were *prescribed* by a health care professional. A subgroup of individuals who misuse substances indulge in infrequent use of illegal drugs such as the hallucinogens, cocaine, illicit narcotics, and marijuana.[3] Finally, there are those individuals who misuse compounds not normally intended for human use such as inhalants or anabolic steroids.[4,5]

The face of SUDs evolves over time: One compound or another gains widespread acceptance and then is replaced by the next popular drug. The increasing use of social media allows potential customers to arrange to meet their suppliers at mutually agreed upon locations to carry out their illegal transactions. Alcohol and nicotine (and in some states marijuana) hold a unique position in this process: Their use is legal for persons over a certain age, and the level of alcohol or tobacco use has remained relatively constant in spite of widespread knowledge of the physical, social, and financial toll that the use of these compounds causes. Additionally, marijuana continues to gain acceptance in many states, not only for medicinal use, but for personal recreational use as well. There have been initiatives to ban the use of these compounds over the years, with arguable success, an excellent example being the Prohibition era in the United States. Although alcohol and tobacco are legal, they do share one characteristic with the other drugs that are misused: They exact a terrible cost on the individual and society. In this chapter, we will begin to examine the impact of SUDs on society and the individuals who make up that society.

SUDs as Unsuspected Influences on Society

It is difficult to identify every way in which SUDs influence society. It has been estimated that the direct and indirect costs of SUDs consume *over 15%* of the average state's budget[6] (National Center on Addiction and Substance Abuse at Columbia University [CASA], 2009a). Each year in the United States individuals who misuse illicit drugs spend $100 billion to purchase those drugs (Kilmer et al., 2014b), while another $467 billion is spent annually on substance misuse and addiction (CASA, 2015). This is misleading, however, since politicians slide part of the expense from one budgetary column to the next (CASA, 2009a), and only 2% of the money spent goes toward prevention and treatment (CASA, 2015). The cost of incarcerating those who are convicted of drug-related offenses is not considered part of the cost of the "war on drugs" but a part of the Department of Corrections budget. The cost of providing health care for the families of those convicted of drug-related offenses becomes part of the Department of Human Services budget, and so on (Cafferty, 2009).

In the 21st century, the rising cost of health care in the United States has become hotly debated. Politicians speak at length about the rising cost of health care, but ignore the impact of SUDs, as evidenced by the following facts:

- Approximately 20–25% of patients seen by primary care physicians have a SUDs (Jones, Knutson & Haines, 2004; McLellan et al., 2017).

[1]This number excludes those persons who lose their lives to tobacco- or alcohol-related illness.

[2]Because the term *alcoholic* has been found to actually deter many in need of treatment for their alcohol use problem from seeking rehabilitation (Keyes et al., 2010), the term "alcohol use disorder" will be used to indicate persons who misuse or are addicted to alcohol, while the more inclusive term "SUDs" is used to address the entire spectrum of drug use disorders.

[3]The legal status of marijuana is highly variable at this time because some states are allowing its use for medical disorders while other states have legalized possession in small quantities for personal use.

[4]While many of the steroid compounds being misused were indeed intended for human use, they are used at dosage levels far in excess of what is medically acceptable, and thus could be said not to be intended for human use. Further, many of the steroid compounds being misused were not intended for use by humans, but were designed for use with animals and diverted to the illicit market or manufactured in illicit laboratories.

[5]Membership in these subgroups is not fixed or mutually exclusive. A person might belong to more than one subgroup simultaneously or move from one subgroup to another over time.

[6]Alcohol-related disease results in approximately 20,700 deaths each year in this country, a figure that does not include persons who die in alcohol-related accidents or who are killed in an alcohol-related homicide (Johnson, 2010).

- Substance misuse and SUDs can cause or exacerbate more than 70 health conditions (CASA, 2015).
- Excessive alcohol use was a factor in 50% of all deaths from acute traumatic injuries (Baron, Garbely, & Boyd, 2009).
- Approximately one million hospital emergency room visits are the result of illicit drug use (Centers for Disease Control and Prevention, 2010b).
- Approximately 40% of *all* hospital admissions can be tied either directly or indirectly to alcohol use/misuse (Baron et al., 2009; Greenfield, 2007; Greenfield & Hennessy, 2008).
- Hospitalized persons with a SUDs are more likely to require rehospitalization within 30 days of discharge than nonusers (Walley et al., 2012).
- Approximately 25% of those individuals on Medicaid have a SUDs. As this group ages, the cost of their medical care increases at a higher rate than for age-matched individuals without an SUD ("Substance abuse adds millions," 2008).
- There were 47,055 drug overdose deaths in 2014, of which 28,047 involved a narcotic either alone or in combination with other chemicals (Rudd, Aleshire, Zibbell, & Gladden, 2015).

SUDs are frequently intertwined with psychiatric problems, further contributing to the rising cost of health care as evidenced by the facts that:

- The SUDs are a factor in 50–75% of all psychiatric hospital admissions (Miller, 2004).
- Of hospital stays that are non-pregnancy/delivery related, 17% involve individuals with psychiatric disorders co-occurring with SUDs (Heslin, Elixhauser, & Steiner, 2015).
- One-third of those persons who commit suicide have an alcohol use disorder (Karch, Dahlberg, & Patel, 2010).
- Between 40 and 60% of those individuals who committed suicide were intoxicated at the time of their deaths,[7] and 10% had evidence of other drugs in their bodies at the time of their death (Karch, Cosby, & Simon, 2006; Scott & Marcotte, 2010).
- Traumatic brain injury (TBI) accounts for almost one-third of trauma-related deaths in the United States each year, and between 29 and 52% of those who survive the TBI have alcohol in their bodies at the time of admission to a hospital (Miller & Adams, 2006).
- Neurological damage that is apparently induced by long-term heroin abuse appears to continue for at least three years after the individual discontinues the abuse of the substance[8] (Zou et al., 2015).

SUDs and interpersonal violence: There is a well-documented relationship between SUDs and violent behavior that has remained relatively constant over the years. Yet ongoing research is needed to fully understand the impact of SUDs and violence (United Nations, 2016). Half of all perpetrators of a violent crime have been found to have been drinking before the commission of that crime (Coghlan, 2008; Parrott & Giancola, 2006). Researchers have found that adults misusing substances are 2.7 times as likely to have been physically abused as a child and 4.2 times as likely to have neglected a child than were peers who do not misuse substances (Ireland, 2001). Alcohol is involved in 40–86% of all homicides committed in the United States (Parrott & Giancola, 2006)[9] and 40% of homicide cases in Europe (Coghlan, 2008). Illicit drug use increases a woman's chance of being murdered by her significant other by as much as 28-fold, even if she was not misusing chemicals herself at the time of her death (Parrott & Giancola, 2006). Forty percent of homicide victims across 17 states were found to have alcohol in their systems (Naimi et al., 2016).

The Scope of the Problem of the SUDs

At least half of the world's population has used at least one psychoactive substance at least once, with alcohol being the most commonly used psychoactive chemical (Leamon, Wright, & Myrick, 2008). However, when alcohol use is not included in the assessment of the scope of SUDs, close to 250 million people, or just above 3% of the entire population of the world between 15 and 64, used an *illicit* substance in 2014 (United Nations, 2016). The majority of those who use a psychoactive substance do so on a short-term experimental

[7]The discrepancy between these two figures is explained by the fact that many of those who commit suicide consume alcohol as a way to steel their courage before taking their lives, while others commit suicide impulsively while intoxicated.

[8]It is not known whether this is a direct result of the heroin use, exposure to any of the "fillers" or contaminants in the heroin, or polydrug use, but the results strongly suggest heroin as the primary cause for the neurological damage.

[9]These different estimates reflect the different methodologies used in different research studies.

basis and rarely present the problems to society seen in cases of substance *addiction*. The team of Grant and colleagues (2015) utilized *DSM-5* criteria and concluded that approximately 10% of the population will meet the criteria for physical addiction at some point in their lives and that 4% do so any given point in time. The majority of those individuals who are actively addicted to chemicals fail to receive any form of treatment, according to the authors.

A thriving black market,[10] which is further aided by the availability of drugs via internet sources including the dark net, has evolved around the world to meet the demand for illicit drugs[11] created by those misusing substances or by those who are addicted to one or more chemicals. In spite of strict legal sanctions, this distribution system is quite resilient. The worldwide illicit drug trade has been previously estimated to be a $800 billion/year industry, making it larger than the annual gross domestic product of 90% of the world's countries ("Vital signs," 2007; United Nations, 2012).

In a sense, drug use might be said to be an "American way of life." Close to 30 million people in the United States over age 12 smoked cigarettes daily, 15.1 million had an alcohol use disorder, and 7.7% had an illicit drug use disorder in 2016 (Substance Abuse and Mental Health Services Administration [SAMHSA], 2017). Keep in mind that it is possible for an individual to be in two or all three of the categories listed above. Still, with less than 5% of the world's total population, the United States consumed $100 billion a year of the cocaine, marijuana, methamphetamine, and heroin produced on this planet from 2000 to 2010 (Kilmer et al., 2014a). Each day in the United States, approximately 8,000 people will try an illicit drug for the first time (Lemonick & Park, 2007; SAMHSA, 2009), with over 4% of individuals age 13 and older initiating illicit drug use in 2015 (SAMHSA, 2016). Many of these individuals will probably only experiment with illicit drugs out of curiosity for under 12 months[12] and then discontinue or curtail further use of that compound (Center for Substance Abuse Research, 2008).

The most commonly used drug worldwide is marijuana (United Nations, 2016), with 44% of those age 12 and older in the United States acknowledging marijuana use at some point in their lifetime, with 24 million acknowledging use in the past month (SAMHSA, 2016, 2017). The second figure still means that close to 5 million people over the age of 12 misused an illicit compound other than marijuana in the month preceding the survey (SAMHSA, 2017). An interesting research study methodology utilized by Banta-Greene and colleagues (2009) tested waste water from both rural and urban areas and found measurable amounts of cocaine and methamphetamine metabolites, underscoring the widespread misuse of these compounds in this country. In the next section, we will more closely examine the scope of the problem of SUDs in this country.

Alcohol Use, Misuse, and Alcohol Use Disorder

As the estimated 176 million people in the United States who ingest alcohol at least once each year can attest, alcohol is a popular recreational chemical (SAMHSA, 2016). For most of these people, alcohol will not become a problem in any sphere of their lives. However, between 8 and 16 million persons in the United States do become physically dependent on alcohol, while another 5.6 million are believed to misuse it on a regular basis (Bankole & Ait-Daoud, 2005). This may underestimate the total number of persons with an alcohol use disorder, since many high-functioning persons with an alcohol use disorder are able to successfully hide the fact from friends, family, and coworkers, possibly for decades (Benton, 2009).

For the average person, alcohol might represent a pleasant diversion from the stress of daily living; however, a minority of those who drink consume a disproportionate amount of the alcohol produced. Ten percent of individuals who drink alcohol consume 60% of the alcohol consumed in the United States, while the top 30% of individuals who drink consume 90% of the alcohol consumed in this country (Kilbourne, 2002). If their drinking has resulted in their suffering social, physical, emotional, or vocational consequences,[13] then they may have an AUD. The majority of those in the United States who do develop an AUD are predominantly male by a ratio of approximately 2 or 3 to 1 (Kranzler & Ciraulo, 2005a; SAMHSA, 2016). These figures underscore the danger of alcohol use and misuse in spite of its legal status as a socially acceptable recreational compound for adults.

Estimates of the Problem of Opiate Misuse and Opioid Use Disorder[14]

When many people in the United States hear the term "narcotics" they usually think of heroin, a drug that does indeed account for 71% of the opiate use disorders around the world

[10]See Glossary.

[11]Or illegal alcohol to minors or in areas where alcohol use is prohibited.

[12]However, it is important to keep in mind that even those who are merely curious about the effects of an illicit drug(s) run the risk of becoming addicted.

[13]The topic of determining whether a person has an AUD will be discussed later in this book.

[14]For purposes of this text, the terms *opioid*, *opiate*, and *narcotic* will be used interchangeably, although, as will be discussed in Chapter 11, there are technical differences between these terms.

(United Nations, 2012). Globally, it has been estimated that 17.4 million people use opiates such as heroin and opium (United Nations, 2016). In the United States, current estimates suggest that approximately 5 million people have used heroin at some point in their lives and that there are over 600,000 with a heroin use disorder (SAMHSA, 2016, 2017).

Unfortunately, heroin is only one of a wide range of opioids that might be obtained and misused.[15] In the United States, there are a growing number of people who are addicted to prescription narcotic analgesics, either prescribed for the user or obtained from illicit sources. An estimated 1.8 million people in this country have a use disorder related to prescription opioids, with 3.3 million misusing prescription opioids (SAMHSA, 2017). The problem of medication diversion is an ongoing one in the United States, with the result that many individuals addicted to opiates support their opioid misuse almost exclusively on prescribed medications obtained either from a physician or from illicit sources. Thus, the estimates above *underestimate* the total number of people addicted to an opiate in this country by an unknown margin.

Estimates of the Problem of Stimulant Misuse and Stimulant Use Disorder[16]

Globally, the problem of central nervous system (CNS) stimulant misuse[17] includes the 35.7 million people around the world misusing a CNS stimulant at least once each year (United Nations, 2016). About 1.7 million people in the United States use methamphetamine compounds at least once each year (SAMHSA, 2016). Much of the methamphetamine enters from other countries, although there are still local "labs" making small amounts of methamphetamine for local consumption (United Nations, 2016). The media in this country often focuses on local CNS stimulant use disorders; however, in reality, only 15% of those who misuse CNS stimulants live in North America (United Nations, 2012). As it is true for narcotic analgesics, an unknown percentage of prescribed CNS stimulants is diverted to the illicit market, providing a pool of unrecognized individuals who rely on these stimulants.

Estimates of the Problem of Cocaine Misuse and Cocaine Use Disorder

The number of individuals who use or are addicted to cocaine in the United States has actually gone down in recent years (United Nations, 2016). Globally, approximately 18.3 million people use or are addicted to cocaine (United Nations, 2016). In this country, it has been estimated that there are close to 2 million people who use cocaine monthly, and close to 40 million people who have used it at some point in their lives (SAMHSA, 2016, 2017). The true scope of cocaine misuse/addiction in the United States is confused by the fact that, in spite of its reputation, researchers during the last wave of cocaine use concluded that only 3–20% of those who used cocaine would go on to become addicted to it[18] (Musto, 1991).

Estimates of the Problem of Marijuana Use, Misuse, and Cannabis Use Disorder

Globally, it is estimated that at least 182.5 million people have used marijuana in the past 12 months (United Nations, 2016). An estimated 24 million people are thought to be current users of marijuana in the United States (SAMHSA, 2017). Approximately 44% of the entire population of this country is thought to have used marijuana at least once, and, 8.9% have used marijuana in the past month (SAMHSA, 2016, 2017).[19]

Estimates of the Problem of Hallucinogen Misuse[20]

Many researchers question whether it is possible to become *addicted* to hallucinogens. But it is thought that perhaps 15% of the population of the United States has used a hallucinogen at least once in their lives (SAMHSA, 2016). It is estimated that 1.4 million persons in this country have used a hallucinogenic compound in the past month (SAMHSA, 2017).

Estimates of the Problem of Tobacco Use and Tobacco Use Disorder

Tobacco is a special product: It can be legally purchased by adults, yet it is acknowledged to be destructive and addictive.

[15]The topic of opioid misuse is discussed in Chapter 11.

[16]This topic is discussed in more detail in Chapter 8.

[17]Which includes the misuse of methylphenidate and the various amphetamines.

[18]The danger, as will be discussed again in Chapter 9, is that it is impossible to predict at this time *which* individual will go on to become addicted to cocaine, and thus the use of this compound is discouraged, if only for this reason. Other dangers associated with cocaine use/addiction will be discussed in Chapter 9.

[19]Although most people do not think of marijuana as a potentially addictive substance, as will be discussed in Chapter 10, some individuals do indeed become addicted to it.

[20]This is a difficult subject to discuss in depth since some researchers classify MDMA as a hallucinogen, others classify it as an amphetamine, and still others call it a hallucinogenic amphetamine compound. In this text it will be classified as a hallucinogen. See Chapter 12 for more details on this issue.

Unfortunately, tobacco products are easily available to adolescents, and in some cases to children. More than one billion people in the world smoke tobacco, yet tobacco kills more than 7 million people each year (World Health Organization, 2017). Researchers estimate that approximately 23.5% of the entire population of the United States are current tobacco users, of which number 66.8% smoke only cigarettes (SAMHSA, 2017). An estimated 171 million individuals in this country over age 11 have used tobacco at least once, which accounts for almost 64% of the population (SAMHSA, 2016).

The Cost of Chemical Misuse and SUDs

Globally, drug use disorders are the sixth leading cause of disease in adults (Leamon et al., 2008). Fatal drug overdoses have increased by 137% over a 14-year period in the United States (Rudd et al., 2016). Illicit drug use is thought to cost the global economy $880 billion a year, with alcohol use disorders costing the world economy another $880 billion a year ("Vital signs," 2007). In the United States, alcohol and drug use disorders are thought to drain at least $375 billion/year from the economy (Falco, 2005). The annual toll from the various diseases associated with illicit drug use in the United States, combined with the number of drug-related infant deaths, suicides, homicides, and motor vehicle accidents, is estimated to be approximately 12,000–17,000 people a year (Donovan, 2005; Miller & Brady, 2004; Mokdad, Marks, Stroup, & Gerberding, 2004).

All the estimates cited in the last paragraph are in addition to the 20 million Americans who have died since 1964 from tobacco-related causes (U.S. Department of Health and Human Services, 2012). Further, approximately 100,000 people die each year in the United States due to chronic or acute alcohol use (Centers for Disease Control and Prevention, 2013). Alcohol use disorders contribute to or exacerbate 70 different disorders (CASA, 2015; Room, Babor, & Rehm, 2005). A person might die from one of the disease states exacerbated by their drinking, but the cause of death recorded on the death certificate will be the disease state itself and not the individual's alcohol misuse. If one were to include these "indirect" alcohol-related deaths it becomes clear that alcohol either directly or indirectly causes as many deaths each year in the United States as do tobacco products (Room et al., 2005).

The Cost of Alcohol Use/Misuse/AUD

In the United States, alcohol dependence ranks as the third most common cause of preventable death (Johnson, 2010). The annual economic impact of overuse of alcohol in this country is thought to be at least $250 billion a year, which is approximately $2.05 per drink consumed (Sacks, Gonzales, Boucher, Tomedi, & Brewer, 2015). Between 2006 and 2010 in the United States, of those for which information related to alcohol could be obtained, one out of every 10 deaths was related to excessive drinking (Stahre, Roeber, Kanny, Brewer, & Zhang, 2014).

It has been estimated that the complications brought on by alcohol use account for 15–25% of the total annual expenditure for health care each year in the United States (Anton, 2005; Swift, 2005). Although only 5–10% of the population in this country has an AUD, they consume a disproportionate amount of the yearly health care expenditures, as evidenced by the fact that between 15 and 30% of those individuals in nursing homes are thought to be there either as a direct or indirect result of their AUD (Schuckit, 2006a). Alcohol misuse is thought to be a factor in approximately 40% of all motor vehicle accidents (Craig, 2004; Savage, Kirsh, & Passik, 2008), and 40% of those who die as a result of these accidents were not the ones driving (Hingson & Rehm, 2014).

The Cost of Tobacco Use Disorders

Although it is legally produced, purchased, and used by adults without restriction, tobacco use extracts a terrible toll around the globe. Globally, 7 million people a year die as a result of tobacco products, with more than 6 million deaths related directly to the individual's tobacco use (World Health Organization, 2017). The annual economic losses from in just the United States alone for medical care related to smoking approach $170 billion/year (Xu, Bishop, Kennedy, Simpson, & Pechacek, 2015). One in every five deaths in this country can be directly traced to smoking-related illness (Sadock, Sadock, & Ruiz, 2015). This figure does not include those persons who die as a result to exposure to "secondhand" or "environmental" tobacco smoke each year in this country.

The Cost of SUDs

It has been estimated that when one totals the cost of premature death and illness, lost wages, financial losses to victims of substance-related crime who were hurt by others, combined with the cost of law enforcement activities directly aimed at the problem of SUDs, illicit and legal SUDs cost at least $900 for every person 18 years or older in the United States each year (Heyman, 2009). When the cost of disability, accidental injuries, health care, and absenteeism from work are added together, the total economic impact of the SUDs on the U.S. economy each year is estimated

to be $468 billion (CASA, 2012; Gonzalez, Vassileva, & Scott, 2009). The reasons for this huge economic burden can be seen in the facts that individuals who are hospitalized because of alcohol misuse had average hospital care expenses that were 120% higher than for persons who did not misuse alcohol, and that individuals who misuse opioids who are hospitalized require health care expenditures that are 482% higher than for those who do not misuse opioids (Santora & Hutton, 2008). Society's response to this crisis has arguably been haphazard, piecemeal, and frequently inadequate.

Who Treats Persons with an SUD?

Having established that SUDs are a legitimate problem, we are left with the question: Who treats those people with such disorders? The various state governments spend only two cents of every dollar on programs devoted to the prevention and treatment of persons with a SUDs (CASA, 2015; Grinfeld, 2001). Health care professionals in general are woefully ill-prepared to work with those who misuse substances. Although between 15 and 30% of patients seen by the typical primary care physician have an SUD, most physicians are still under-trained (or not trained) to recognize substance misuse (O'Brien, 2015; O'Connor, Nyquist, & McLellan, 2011). Less than one-fifth of physicians surveyed reported that they thought they were trained to treat patients with the most common form of SUDs, the AUDs, while less than 17% thought their training was sufficient to enable them to work with patients with other forms of SUDs (CASA, 2009a; Clay, Allen, & Parran, 2008). Only one medical school in the country requires a course on SUDs (O'Brien, 2015).

Further, most physicians emerge from graduate training with a negative attitude toward individuals with an SUD (Renner, 2004a). Possibly as a result of this deficit in their training and their preconceptions about persons with SUDs, fewer than one-third of physicians carefully screen for SUDs among their patients (Greenfield & Hennessy, 2008). Less than 50% of patients who go to see a physician about alcohol-related problems are even *asked* about their alcohol or drug use by their physician (Pagano, Graham, Frost-Pineda & Gold, 2005). This failure to inquire about patients' substance use habits might be a major reason why SUDs are both under-diagnosed and undertreated (Clay et al., 2008; Greenfield & Hennessy, 2008). This conclusion is supported by the observation that less than 1% of internal medicine and family practice physicians, and only 5.1% of psychiatric consultations, come to an accurate diagnosis of an SUD when it is present (Banta & Montgomery, 2007). Thankfully, there is a call to improve SUD training for medical students across all fields of medicine (Das & Roberts, 2016; Ram & Chisolm, 2016).

Physicians are taught that addictions are chronic, treatable disorders, yet "more often than not [will] view the addicted patient as challenging at best and not worthy of customary compassion" (R. Brown, 2006, p. 5). Physician postgraduate educational programs have attempted to address this problem; however, the average length of such training in addictions is only about 8 hours (Renner, 2004a). Nor is this professional blindness limited to physicians. Nursing professionals frequently have more contact with patients than do physicians, yet "the majority of nursing schools . . . required only 1 to 5 clock hours of instruction on alcohol and drug abuse content during their entire undergraduate curricula" (Stevenson & Sommers, 2005, p. 15). Thus, those health professionals who will have the most contact with the patient—the nursing staff—are as ill-prepared to work with patients with SUDs as is the average physician.

Marriage and family therapists are another group of health care professionals who, as a whole, are ill prepared to recognize, much less deal with, SUDs. Such problems are rarely identified, meaning that vital clues to the nature of the disorder within the family are missed, and therapy might be rendered ineffective. *If* these disorders are identified, they are usually addressed by a referral to a therapist of another discipline than marriage or family therapy. This interrupts the continuity of care, and therapy is often carried out in a haphazard manner with little communication between researchers and clinicians (Batman & Miles, 2015) or between treatment professionals working with the same individual. Further, if there is a co-occurring disorder situation (SUDs with co-occurring mental illness) there is a definite need for family therapy, but this is rarely initiated (Minkoff, 2008).

Despite the obvious relationship between the SUDs and various forms of psychopathology, "most clinical psychologists are not well prepared to deal with issues involving substance use or abuse" (Sobell & Sobell, 2007, p. 2). Seventy-four percent of psychologists surveyed admitted that they had no formal training in the identification or treatment of addictions, and rated their graduate school training in this area as being inadequate (Aanavi, Taube, Ja, & Duran, 2000). Only professional substance abuse counselors are required to have a high level of professional training in the recognition and treatment of SUDs, with national standards for individuals working in this field having only recently been established. Since such counselors make up only a minority of those in the health care industry, the most common response to the question of who treats those individuals who are addicted to alcohol or drugs is all too often "nobody."

Designer Drugs for Pleasure: A (Frightening) Brave New World

There has been virtually no research into drugs whose purpose is to treat a disease but which induce a sense of pleasure or euphoria enjoyed by the patient (Morris, 2014). Pharmaceutical companies are now hard at work to correct this oversight, drawing upon the latest research into the manner in which the reward cascade works. It is impossible to predict when, but soon a new class of pharmaceuticals whose sole purpose is to induce a sense of pleasure in the user will appear on the market. The addiction potential of such chemicals is readily apparent, and raises a philosophical question: Does society have the right to block public access to such recreational chemicals? Would this not introduce a new class of illicit chemicals into society, setting the groundwork for the growth of illicit distribution networks such as those seen for alcohol during the Prohibition era or the wave of methamphetamine use seen in the last decade of the 20th century and the first part of the 21st century? How should society respond to the hypothetical introduction of this new class of chemicals?

Chapter Summary

The problems of excessive alcohol use and illicit drug use have plagued society for generations. Solutions to the problem of the SUDs that have been shown to be inadequate include: banishment, execution, castration, incarceration, religious intervention, and various form of treatment. The United States, with a minority of the world's population, is the largest consumer of illicit drugs, yet society's response to the problem of SUDs has been poor at best, if not virtually entirely ineffective.

CHAPTER 2

The Nature of the Beast

(Being an Examination of the Problem of SUDs)

LEARNING OBJECTIVES

After reading this chapter you should be able to:

2.1 Understand why individuals may use alcohol and/or drugs
2.2 Describe the cycle of drug misuse and the continuum on which individuals may fall
2.3 Understand the terminology used in the field and in this text
2.4 Consider the questions that remain unknown regarding SUDs

Introduction

Substance use disorders (SUDs) in the United States present the researcher in the field with a plethora of contradictions: laws made on the basis of prejudice, emotional reasoning, and preconception (Lachenmeier & Rehm, 2015); misinformation that sometimes reflects political agendas;[1] and a comparative lack of sound scientific research. One example of this might be seen in the extensive pool of data on the effects of pharmaceuticals, including therapeutic threshold, therapeutic and elimination half-lives, and side effects of compounds based on multi-participant research studies, and a lack of similar data on the drugs of misuse beyond what can be extrapolated from animal studies and anecdotal case reports.

The desire to become intoxicated is not unique to humans: Biologists have documented episodes in which at least some mammals appear to intentionally seek out fermented fruits or mushrooms that contain compounds that can bring about a state of intoxication. Many such episodes have been captured on film or electronic media and are available for viewing as public entertainment on the internet. Domestic cat owners have supplied their pets with catnip, often doing so on a regular basis, much to the delight of their four-legged family members. It would appear that we share the desire to chemically alter our perception of the world with our mammal cousins.

The American Society of Addiction Medicine (ASAM) has suggested a model of substance use disorders that attempts to integrate the biological, psychological, and sociological theories of addiction into one unified model.[2] This model attempts to address the various forces that

[1]See discussion in Chapter 38 of how marijuana came to be criminalized, for example.

[2]Discussed in Chapter 26.