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# Substance Abuse Therapeutics

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## Abstract

This chapter provides a broad overview of therapies for substance abuse. These therapies are understood in the context of the history of drug use in the United States and factors that influenced the expansion and regulation of substance use. This is followed by a discussion of how the complexity of these factors was associated with difficulties in understanding substance misuse and created challenges to the creation of effective treatment systems. The chapter reviews the moral and disease models of addiction before discussing the diagnosis of substance-related disorders. The chapter describes major treatment approaches and their efficacy.

**Keywords:** Substance abuse, Treatment

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## 1. Introduction

This chapter will provide a brief overview of the history of substance abuse therapeutics and survey of approaches to the treatment of substance use disorders. To fit the history of, and approaches to, substance abuse therapeutics into a chapter of this type, great simplification is required; at the same time, the entire enterprise bears much resemblance to the well-worn parable of the group of blind men attempting to describe an elephant. The elephant parable illustrates beautifully that reasonable people may disagree vigorously about the essence of something by virtue of how they encounter it. This array of views has been likened to metaphors [1], but the significance of each metaphor has profound implications. So, while the parable of the men and the elephant *does* highlight the potential validity of differing perspectives on substance use, the parable *does not* do enough to consider the implications and consequences of substance abuse. Community and professional responses to substance use have reflected the untold conflict and enormous consequences that have still not yielded widely agreed upon responses to the

destructive effects of substance use. The vast social issues include, but are certainly not limited to moral, legal, ethical, economic, political, sociological, and psychological considerations. So, it is virtually impossible to be exhaustive in one's review of these issues, and this chapter will focus only on the highlights of treatment of substance use conditions.

Modern data indicate that substance use and misuse continue to be widespread [2]. For 2014, nearly 140 million people over the age of 12 used alcohol, more than 60 million reported some binge drinking, and more than 16 million people reported heavy binge drinking in the United States. Estimates for the use of illicit drugs overall appear to be overshadowed by data pertaining specifically to marijuana use. More than 22 million people reported use of marijuana, nearly 67 million reported use of tobacco, and more than 4 million persons reported misuse of prescription medication. Perhaps of greater concern than the reported patterns of use overall is the reported 17 million people whose self-reported use is consistent with a diagnosis of an alcohol use disorder and more than 21 million people whose self-reported use is consistent with a diagnosis of a substance use disorder. Clearly, misuse of psychoactive substances remains a significant problem.

## 2. Early roots of treatment in the United States

The treatment of substance-related problems in the United States came from the intersection of various forces in the middle of the nineteenth century. Patterns of alcohol and other substance use, social reform movements, regulatory efforts, and the dynamics of professional guilds all combined to shape the beginning of attempts to intervene with these problems. Both the Europeans on the North American continent and the Africans who were brought as slaves were users of alcohol, but the Native Americans were mostly *not* users of alcohol. Cultural factors were significant and patterns of usage and resulting problems, including the catastrophic effect of alcohol on Native American tribes [3]. As colonization progressed, public drunkenness may have been the most significant problem that was explicitly identified [4]. Benjamin Rush (1746–1913) was an influential writer on a number of subjects, having been a member of the Continental Congress, a signer of the Declaration of Independence, and notable hospital reformer of the eighteenth century. Rush's work was rich with descriptions of alcohol use as a progressive *medical* condition that required abstinence as a method of invention. Until the influence of his writings, alcohol had previously been seen as a moral problem or a manifestation of mental illness [4].

### 2.1. Temperance

The American temperance movement emerged as alcohol-related problems became more salient. As one might discern from the name of the organizations ("Temperance"), the initial goals were to promote moderate use. However, the goals of the temperance movement changed to a perspective that emphasized abstinence [5]. While modern abusers of substances must battle for recovery in the context of a variety of possible interventions, substance abusers in the nineteenth century had far fewer alternatives. There is evidence that these

persons turned to a variety of social change movements and were met with various attitudes. For example, the political attitudes of temperance movement participants could sometimes be confused with other political stances (e.g., slavery). Thus, factors that were associated with the rise and fall of various social movements were also critical to attempts to establish programs to assist substance users (primarily alcoholics at that time).

## **2.2. Institutional treatment**

Because of the difficulties associated with substance misuse, attempts have been made to provide shelter for persons who needed some form of assistance. These efforts to provide residential care have been referenced in writings as long as 5000 years ago [6]. By the early 1800s in the United States, the physical effects of alcohol were becoming clearer, and there was a significant increase in the number of institutions that emphasized the treatment of alcohol and other addictions [7].

Just as the public response to substance abuse was a product of complex forces, complex forces were also significant to treating institutions. Economic forces, primitive clinical methods, conflict within the field, and problems associated with individual behavior all contributed to a decline in the institutional treatment movement. It was clear by the mid-1800s that the search was on for more effective approaches to treating addictions. Not surprisingly, miracle cures were suggested in the context of entrepreneurialism. Innumerable chemical preparations and marketing techniques were seen [8]. The first “inebriate asylum” was called for by Dr. Samuel B. Woodward, whose efforts led to the establishment of the first real institutional treatment in the form of the New York State Inebriate Asylum, established in 1864. The first facility for women was the Martha Washington Home in Chicago that was established in 1867. Further progression in institutional care as part of the moral treatment that Dr. Woodward espoused was slow to grow.

## **2.3. The increase in legal controls**

The sentiment of many Americans seemed to have been critical of the non-medical use of any drug, including alcohol and tobacco. From colonial times through the Civil War, these attitudes were associated with abstentionist outcries against alcohol and tobacco and calls for regulation. The regulation of substance use has been increasingly relevant to treatment since the proliferation of public regulations in the early 1900s. However, the energy expended to stem the availability and use of psychoactive substances has met with controversy. The specific consequences of both direct and indirect action included the intention to eliminate use, pressure to make the price of substances rise, and efforts to reduce social costs of use [9]. History has been clear that race, ethnicity, and social class have been highly tied to efforts to control substance use and that legal controls frequently represented bigotry and oppression that served the aims of dominant groups.

The path to regulation began with registration and taxation mandates. The first significant step in this regard was the Pure Food and Drug Act of 1906. At time in which there had been decades of proliferation of substances and their combination in Patent Medications, the Pure Food and

Drug Act established the requirement that medications with opiates and other drugs must provide a list of ingredients. This made opium and cocaine were early casualties of regulation attempts [10].

The Harrison Narcotic Act was passed in 1914 by the United States government. The original intention of the bill was to place a special tax on opium and coca, but the effect was to eliminate legal opiates. Alcohol and tobacco were also soon to be subject to growing legal pressure. Tobacco was not traditionally used in the form of modern cigarettes, but tobacco habits were fostered by the development of modern cigarettes, leading to large increases in tobacco use between 1900 and 1910.

The battle over alcohol was even to be more visible and controversial. Andrew Volstead of Minnesota saw his name attached to the Eighteenth Amendment to the United States Constitution. The result of the “Volstead Act” (H.R. 6810) was that from 1920 until 1933, and the manufacture, sale, and consumption of alcohol were prohibited in the United States. The failure of prohibition leads to the Twentieth Amendment that repealed federal prohibition in 1933. The states gradually repealed their own legislation ending with Mississippi in 1966.

As one alternative to the futility of broad prohibition, legally mandated treatment for substance abusers is now widely practiced [11], and legally mandated treatment is seen as a sensible approach for persons whose criminal offense is substance related. The intention is to direct the convicted individual to a system in which treatment is a more central focus than would be expected in a traditional correctional context. Critics of the approach question the propriety and efficacy of this strategy.

#### **2.4. Spiritual traditions and intervention**

Another common perspective on treatment of substance-related problems emerged from spiritual traditions. Spiritual traditions provided the foundation for a variety of approaches to substance-related problems. Some of this influence has been direct and some indirect. For example, a movement as broad as the American temperance movement was substantially derived from the evangelical movement. The Benjamin Rush speculated that religion by itself could “carry the day” with substance abusers [12]. The early view that religious experiences were an important path to recovery was bolstered by the perspectives of some early mental health professionals. Some professionals in health care were skeptical of religious approaches and others opined that religious approaches were only good for certain patients. Even within psychology, there were advocates for spiritually based intervention. The prominent work of George Cutton’s *The Psychology of Alcoholism* (1907) and the broad work of the pragmatist William James (non-practicing M.D. and Harvard psychologist) went far to legitimize the spiritual view. James was well known because of the variety of his contributions related to psychology. James operationalized the center of religious conversion as anti-Christian by referring to it as “the hot place in a person’s consciousness ... The habitual center of one’s personal energy ([13], p. 196).” Despite knowing that reports of religious conversion experiences would be met with skepticism in a professional community of materialists, James felt that the results or specific components of spiritual interventions should be considered independent of the underlying assumptions of a particular spiritual perspective. The contin-



ued significance of the spiritual contribution to substance abuse therapeutics is reflected in a number of contemporary realities. The United States Congress passed a measure in 1996 that allowed states to contract with faith-based programs in substance abuse treatment. This led to an increase in emphasis on such programs and associated research into the effectiveness of such approaches [14, 15]. Typically, such programs include Bible study, church services, spiritually based therapy, in addition to a strict regimen of activities. There are continued efforts to clarify the precise nature of treatment that is based on Christian principles [16].

### **3. Models of misuse and methods of treatment**

#### **3.1. The diversification of substances**

Many types of substances have been used throughout history for a host of purposes. Early North American settlers used a variety of preparations for a variety of medicinal and recreational purposes. Until the late 1800s, it was easy for opponents of substance use to locate their targets. Many substances began as legitimate medications and became used outside the clinic. Despite the widespread use of a variety of substances, it was not until the Controlled Substance Act of 1970 that anti-substance law began to keep up with the great variety of substances that are used. The proliferation and diversification of substance use, the variety of substance pharmacologic action, the impact of route of administration, and the host of socio-cultural factors have all been significant in the development of effective treatment methods [17].

Tobacco was first introduced to Europeans by Native Americans. Sailors adopted tobacco, both smoking the leaf and chewing it and brought tobacco home to Europe. By the time of the Civil War, alcohol and tobacco were established and clearly the most common American substances associated with problematic use.

Marijuana use has a long and complex history. Varied types of cannabis existed long before its appearance in the United States. Cannabis sativa was available in the early days of the new world, first appearing in South America in the 1500s [16]. Varieties of cannabis were both a medicinal/recreational substance and a critical crop for the American colonies in the 1700s. Hemp was grown for its fiber, and it was a major export for farmers as well as a source of rope and sail material. In the 1800s, hemp plantations thrived in Staten Island, New York, as well as in Mississippi, Georgia, California, South Carolina, and Nebraska [17].

At the same time that Hemp was so commercially and strategically significant, cannabis sativa was becoming better known. Cannabis was known to have been used for thousands of years in China, and “marijuana” became a widely accepted medication in the nineteenth century. Limited non-medical use of cannabis began to appear and the allegedly scandalous behavior of cannabis users was a featured item in the popular press in the early decades of the 1900s [17]. Publicity associated with anti-cannabis sentiments demonized the substance and patterns of its use and manifest subtle themes of bigotry against Mexican people.

Opium was a new entry to the American scene in the 1800s. Railroad laborers from China brought their opium smoking habit with them as they were hired by railroad magnates as less

expensive labor than Americans. The connection between opium and the displacement of American workers was not to be forgotten and became a part of legislation that emerged later. However, the use of opium was not regulated by the mid-1800s, so opium and its extractions were readily available. For medical purposes, morphine had been derived from opium in the early 1800s and became an ingredient in some patent medicines (discussed below) in the United States. A vibrant patent medicine industry developed in the United States, with widespread marketing and distribution of a many products that contained large quantities of opium. These “medicines” claimed to cure just about anything, but they were really a vehicle for opium at an inexpensive price [17]. Perhaps, the most commercially dramatic development among the opioids was heroin. The Bayer Company first marketed heroin in 1898 as an (allegedly) addiction-free pain medication as well as a curative for abuse of other opioids.

Cocaine has a long history that first appeared in accounts of the chewing of coca leaves by the native populations of South America [17]. By 1844, cocaine had been isolated in pure form, though little use of it was made until later in the century. In the late 1870s, cocaine was used for the treatment of alcoholism and morphine addiction. In the 1880s, Sigmund Freud became aware of the use of cocaine to sustain Bavarian soldiers and started to experiment himself. He published his exuberance quickly, but he came to see cocaine as more problematic than he originally reported. Other distinguished medical professionals saw cocaine’s beneficial potential. William Stewart Halstead found the mood enhancing and anesthetic properties of cocaine in the mid-1880s.

Amphetamines were first created in the laboratory in 1887, but it took 40 years for clinical applications to be realized. Military physicians used these stimulants for various purposes in the combat theater as well as in clinics. Illicit use increased in the military in the 1950s [17], and the use was also seen in truck drivers and students for a variety of medical conditions.

By the 1870s, Native Americans had begun ritual use of peyote, as had the Aztecs before them. For the Comanches, Cheyennes, Arapahoes, and other tribes, peyote rituals were a completely religious practice, requiring total abstinence from alcohol. Among these tribes, alcohol was considered to be a substance of considerable abuse. White land speculators sought to have peyote outlawed as a way to join with Christian missionaries and secure the Indian land. Much like other pursuits of criminalization of substances, there was a powerful motive that was different than the overt motivation [17].

As existing medications took more complex and pure forms, there was an increase in the promotion of “patent medicines.” These preparations were promoted with great vigor, so had creative names and claims of effectiveness that were more associated with marketing than clinical effect. These preparations that were not actually patented were produced in England and began to appear in the colonies in the 1700s. The production of patent medications grew independently in the United States in the nineteenth century and was available through a wide range of vendors. Alcohol, cocaine, and morphine were common ingredients [18, 19]. These products included Laudanum (an alcohol preparation that originally included all of the opium alkaloids), Vin Mariani (a wine with coca leaves), and Coca-Cola (with cocaine as an ingredient).

In 1943, Dr. Albert Hofmann discovered what came to be a popular and widely used hallucinogen, lysergic acid diethylamide (LSD). Working with the fungus ergot to isolate components for pharmaceuticals, he accidentally ingested a small amount of the substance and had what has been described as the “first acid trip.” Despite his careful account of the experience in a professional publication [20], his serendipitous discovery has been widely repeated and distorted. Hofmann went on to do further research in several areas and was persistent throughout his career in his criticisms of public claims of the great dangers of LSD.

### **3.2. Expanding treatment in the early twentieth century**

Before the Second World War, there were relatively few treatment alternatives for a person in trouble with substance use. Concerned persons and some healthcare professionals complained about the limited treatment options, but most addiction treatment centered on the management of withdrawal symptoms (now known as detoxification). The result of the lack of treatment was increased the expansion of where addicts would seek mood-altering substances. The lack of treatment and expanding drug seeking combined with advancing criminalization led to the evolution of a new category of criminal. In addition, the United States Public Health Service became involved in the problem of addiction in the 1920s. State facilities for psychiatric patients and prisons were being overcrowded because of the arrests following the Harrison Narcotic Act [17]. In 1929, the Porter Act was passed, allocating funds to develop to rehabilitation facilities. The first results of this legislation were the new facilities in Lexington, Kentucky (1935) and Forth Worth Texas (1938). Treatment consisted primarily of withdrawal, convalescence, and rehabilitation. Outcome studies yielded disappointing results.

Three groups were critical to the development of what has become known as the “modern alcoholism movement.” The Research Council on Problems of Alcohol, the Yale Center of Alcohol Studies, and the National Committee for Education on Alcoholism combined to promote a host of initiatives aimed at promoting treatment [21]. Following the Second World War, there was increasing understanding about substance abuse disorders and the need to organize public health efforts. The “disease model” (discussed below) was instrumental in promoting significant discussions about substance-related problems. Most treatment still occurred in general hospitals, state psychiatric hospitals, and private sanitariums. It is also significant that freestanding treatment programs began to appear. Many of the early freestanding programs became well known because of the unique ways in which they were developed. What came to be important to all of the treatment efforts that began to emerge was the nature of each facility’s connection to alcoholics anonymous.

### **3.3. Alcoholics and narcotics anonymous**

Alcoholics anonymous was established in 1935, and the eponymously named book of the central tenets of AA was published in 1939. AA is based on 12 “steps” that are central to the process of recovery and are considered to be indispensable to success. These steps are part of a program that is codified in the “Big Book” and is very specific about being effective for 75% of the participants [21]. With an avowed spiritual foundation (e.g., Step 2: “Came to believe



that a Power greater than ourselves could restore us to sanity” and Step 5: “Admitted to God, to ourselves, and to another human being the exact nature of our wrongs”), AA developed a strong following and claimed considerable success. When AA was established, the treatment industry and the understanding of addiction could reasonably describe as being in its infancy. Despite claims made in the Big Book, the efficacy of AA is very difficult to submit to rigorous empirical evaluation due to the structure and procedures of the organization [22].

As noted above, the range of substances used and the associated problems expanded in the early twentieth century. Efforts to assist users of substances other than alcohol gradually expanded. By the mid-1940s, AA’s co-founder Bill Wilson discussed the possibility of a group for a drug addicts that was separate from AA.

The first realization of Wilson’s idea was called NARCO; it first appeared in 1947 and met weekly at the United States Public Health Service’s treatment center in the Lexington, Kentucky federal prison. By the end of the 1940s, a NARCO member started a short-lived group called “Narcotics Anonymous” in the New York Prison System. By 1953, Narcotics Anonymous was clearly established in California [17]. Early members, many of whom were from AA, worked out the 12 Traditions for the new organization. Within a year, the first NA publication was printed, called the “Little Brown Book.” There was controversy in AA and NA regarding Bill Wilson’s experimentation with LSD. While he experimented under the supervision of a psychiatrist and a psychologist, the use of another drug (in addition to alcohol) was seen as antithetical to the letter and spirit of “Anonymous” teachings.

AA continues to foster a spiritual foundation and works to alter the thinking of alcoholics through “spiritual awakening.” Studies of the effectiveness of AA have not produced clear results. AA is supported primarily by voluntary donations, and meetings are held in a vast array of facilities, including prisons, treatment facilities, hospitals, and churches. AA groups are available in most towns in the United States. Despite the relative paucity of efficacy studies, AA has been recognized by professional groups [21]. In addition, despite initial scorn by much of the medical profession, the American Medical Society recommended use of such self-help groups in 1979.

### **3.4. The moral and disease models**

#### *3.4.1. The moral model*

Modern medical views of substance misuse claim to view the problem as a medical, rather than moral, problem. This appears to refrain from giving serious consideration to morality or values as the foundation for the problem. However, there is considerable evidence, in public opinion and its reflection in political discourse and the law, that substance misuse continues to be viewed as a moral problem. Consistent with current views, there is extensive history of morality as a dominant component of the views of substance abuse by many [23]. The moral view was, in part, a part of an absence of other useful perspectives. However, there is also substantial evidence for social control exerted from class and culture-related factors [24, 25]. Social groups who were so oriented would promote public campaigns in which misinformation and inflammatory information were promoted related to the types of substances used, the

nature of substance use, and other conduct associated with substance use. Substance use and certainly misuse was proclaimed to be a manifestation of misplaced values and lack of moral standing. Today, criminal penalty remains a dominant approach to substance-related problems, despite considerable evidence that argues against the practical value of such an approach. Some elements of faith-related perspectives, while offering assistance to some users, continue to communicate judgment of these problems.

### 3.4.2. *The disease model*

One of the most significant developments in the intellectual representation of substance use disorders was the “Disease Model” of addiction. The first major proponent of this approach was Morton Jellinek [26]. Jellinek had witnessed the massive failure of the Volstead Act to stem the use of alcohol and began to write from the Yale Summer School of Alcohol Studies. The Disease model posits that certain individuals are vulnerable to substance use disorders as a result of (inferred) neurochemical dysfunction. This “disease” is characterized by, in part, an inability to control/inhibit behavior, loss of control, a failure to recognize the syndrome in one’s self, and predictable decline. The disease model also suggests that the substance abuse vulnerability can/does occur independent of other problems and is chronic. Thus, the enlightened practitioner refrains from judgment of the abuser, and problems with substance use should be permitted to mitigate criminal punishment when crimes are committed [27]. The disease model is not always described in the same way, and it may be seen as having evolved since its first description. For example, despite the focus on factors internal to the substance abuser in the disease model, [28] characterized the disease model as being “multidimensional” and including psychological and sociocultural factors.

The later diversification of the disease model has done little to mute its detractors. Major objections to the disease model appear to be linked to the basic assumptions of any disease-related approach. For example, Wallace [29] called for a move beyond the disease model in the context of Native North Americans, suggesting that the disease model is particularly toxic in its neglect of context and culture in evaluating and intervening with substance-related problems. Feminist theorists have highlighted the construction of gender in the context of research and treatment approaches in general [30]. A behaviorist approach has also made cogent arguments against the disease model [31].

Recognizing the actual physical destruction that is a possible result of substance use, some behaviorists argue that a disease model is not needed at all for there to be adequate rationale for effective treatment. Consistent with general behavioral principles, the behavioral approach finds it more useful and even humane to view the problematic use of substances is a by-product of the interaction between unique features of virtual and reinforcement contingencies within their environment. That is, what is rewarding about the context in which a person has learned to use the substance? The behaviorist perspective also gives careful consideration to the nature of motivation, since the nature of motivation, or drive states, is critical to the reward value of environmental features.

### 3.5. Diagnosis of the substance-related disorders

The history of psychology and psychiatry includes a legacy of efforts to develop the most elegant and powerful nosology of disorders of psychological adaptation. There is evidence of attempts to categorize disorders as far back as the ancients, but increased focus emerged around 1900 and has accelerated since. The first comprehensive modern work was the Diagnostic and Statistical Manual (DSM) in 1952 [32]. Given that psychoanalysis still enjoyed hegemony in the clinical world of the late 1940s, the original DSM was relatively brief and grounded in clinical lore and psychoanalytic theory. The DSM subsequently evolved from a primarily psychoanalytic work to an atheoretical compendium that is designed to reflect the highest levels of clinical and empirical science. By the time of DSM-II (1968 [33]), the role of theory was substantially reduced and increasing specificity in diagnostic criteria was realized.

The introduction of the Diagnostic and Statistical Manual of Mental Disorders (Fifth edition: DSM-V [34]) brought revisions to previous diagnostic criteria in the DSM tradition. Most recently, the DSM-IV [35] used two main categories of substance misuse conditions, substance abuse and substance dependence. The DSM-IV criteria were considered to be inadequately descriptive of what was seen clinically, and the new criteria are claimed to be a substantial improvement. These two categories from DSM-IV were combined into one disorder in DSM-V that is diagnosed in conjunction with a rating from mild to severe. This also eliminates the “substance dependence” category, which was widely seen as easily confused with “addiction.” While using the same underlying criteria, each substance is indicated as a distinct use disorder, including alcohol, cannabis, hallucinogens, inhalants, opioids, sedatives, hypnotics or anxiolytics, stimulants, and tobacco. Caffeine-related syndromes are not included.

It is important to review the DSM-V criteria for substance use disorder. It is important to bear in mind that each of these eleven criteria may be manifest in different ways and will be influenced heavily by the pharmacology of the specific substance. For each of the substances, the following are the eleven possible symptoms:

1. Taking the substance in larger amounts and for longer than intended
2. Wanting to cut down or quit but not being able to do it
3. Spending a lot of time obtaining the substance
4. Craving or a strong desire to use the substance
5. Repeatedly unable to carry out major obligations at work, school, or home due to substance use
6. Continued use despite persistent or recurring social or interpersonal problems caused or made worse by substance use
7. Stopping or reducing important social, occupational, or recreational activities due to substance use
8. Recurrent use of substance in physically hazardous situations

9. Consistent use of opioids despite acknowledgment of persistent or recurrent physical or psychological difficulties from using substance
10. \*Tolerance as defined by either a need for markedly increased amounts to achieve intoxication or desired effect or markedly diminished effect with continued use of the same amount (does not apply for diminished effect when used appropriately under medical supervision).
11. \*Withdrawal manifesting as either characteristic syndrome or the substance is used to avoid withdrawal (does not apply when used appropriately under medical supervision).

The DSM-V section with substance-related disorders includes gambling, which was not in the same section as substances in prior versions of DSM. The task force members for the substance and other addictive disorders section gathered findings that suggest that gambling disorder is similar in a number of respects to substance-related disorders. It is also thought that this development will make the accessing of treatment more likely. Other disorders that may be considered relevant (e.g., Internet, social media) have not yet been seen as having the empirical support needed for inclusion in this section.

## 4. Treatment approaches

There have been a staggering number of treatment approaches substance-related problems over the centuries [17]. It is virtually impossible to organize and categorize all treatment approaches, and the intersection of treatment method and type of professional further complicates the picture. The difficulties of professional domains and perspectives are further exacerbated by the relative lack of evidence for the effectiveness for different interventions [36]. In fact, there is some evidence to suggest that the specific treatment approach or technique is not as important to outcome as are factors associated with intervention relationships such as empathy [37]. Garner [38] issued a clear call for greater methodological rigor in studies of treatment efficacy to ensure development of treatment approaches that are grounded in empirical support. Recent suggestions have begun to clarify how this research might be conducted. DuPont et al. [39] suggested that addiction should be considered separate from other forms of health care because of the complexity and need for better kinds of research. In addition, they highlighted the high level of investment required in successful treatment, the variety of substances associated with disorders, and the varieties of organizational structures present in the treatment community. They also highlighted the severity, complexity, and chronicity of these disorders as important guideposts for the development of outcome measures. In light of the complexity of the treatment factors just noted, the final section of this chapter will highlight a few of the major treatment perspectives.

### 4.1. Detoxification

The critical role of detoxification in substance abuse treatment has continued since its central place in nineteenth century treatment. Because of a relative lack of knowledge about the exact

impact of substance use, addictive processes, and treatment, there was obvious emphasis detoxification as an essential step in recovery. In addition, there was considerable emphasis on physical dependence as a central element of addiction. So, work with a patient began with simply clearing the body of the toxic substances, often with inpatient medical supervision and sometimes medications such as benzodiazepines. Today, detoxification is not technically considered to be actual treatment for a substance use disorder, though it is widely seen as a fundamental first step for treatment. However, contemporary perspectives on treatment manifest great variability in the rate of movement from detoxification to longer forms of intervention. The relative merits of gradual versus sudden withdrawal quickly became a matter of intense dispute in the medical community [1,42–44]. Modern research has identified factors that make detoxification a more effective part of a treatment system in which approximately one-fifth of annual admissions include detoxification [40]. The availability of intervention beyond detoxification is greatly influenced by healthcare economics. Despite efforts associated with the Affordable Care Act, many persons with substance use disorders are uninsured or underinsured. It is clear that finances are associated with the quality of intervention as well as limitations on the quantity and nature of service modalities. The Wellstone and Domenici move in 2008 to bring parity to mental health care did attempt to reduce barriers to treatment utilization, reduce financial burdens, and decrease stigma, though the success of those efforts is a matter of debate [41].

#### 4.2. Harm reduction

“Harm reduction” is a relatively recent approach that functions in contrast to abstinence-only models. There have been several major contributors who have influenced this approach, though their assumptions and strategies are similar (in particular [1, 42–44]). With a pragmatic perspective that is theoretically inclusive, the harm reduction approach considers psychoactive substance use to be a part of the human experience and works to minimize damage resulting from use. The harm reduction approach, like many other approaches, considers substance use (and misuse) to be a complex result of many forces and maintains the view that there are constructive and destructive ways to use many substances. Without minimizing the real destruction from use, this perspective emphasizes the participation of substance users in reducing harm as well as the great significance of poverty, class, racism, social isolation, past trauma, sex-based discrimination and other social inequalities as vulnerability factors. With this broad emphasis, intervention is associated with the unique realities of the person who is struggling with substances and predetermined treatments are not embraced. Proponents of harm reduction thus characterize it as a public health alternative to moral, criminal, or disease models. From this point of view, it is appropriate to adopt a “whatever it takes” perspective on intervention with persons who abuse substances.

Peele, in particular, supports harm reduction and speaks in contrast to the AA tradition, promoting natural solutions in the context of careful goal-setting and the making of personal meaning in recovery. His writing includes specific arguments about the perils of the disease model. Peele argues that addicts are not different from other people in respects other than the addiction. In addition, Peele disputes a number of long-standing assumptions of the AA



tradition. He does not agree that recovery depends on forces outside the individual or that substance abusers are unable to control themselves in any situation. Since Jellinek's seminal contributions to the disease model, "addiction" has been perceived as a predictable, progressive, and fatal disease. Peele argues that this is not the standard progression through which an addict must inexorably pass, and recovery does not consist of a lifelong conscription to abstinence and twelve-step methods. In fact, Peele argues that the pessimism and determinism that are intrinsic to the disease model actually contribute to the likelihood of relapse and continued harm.

Some harm reduction techniques include methadone maintenance, which serves as a safer alternative to heroin use because of the longer half-life of methadone and the safer route of administration. Other approaches may include over the counter medications or even care in maintaining hydration with club drugs [45]. Needle exchange programs have been a highly visible and controversial approach to harm reduction that targets the high levels of risk associated with sharing intravenous drug administration supplies [46].

The harm reduction approach has been bolstered by the addition of mindfulness techniques [47]. Grounded in Buddhist tradition, mindfulness is considered to be the cultivation of awareness in the present moment. Mindfulness practices have been integrated into many of the therapeutic approaches since it began to appear in Western teachings in the 1950s. Mindfulness began to appear into the scientific literature associated with substance abuse treatment relatively recently [48].

### 4.3. Relapse prevention

"Relapse" refers to a return of problem behavior following an interval during which an individual has been relatively problem free. The study of relapse has been motivated by the prevalence of relapse, by attempts to bolster treatment effectiveness as well as to understand the persistence of substance-related problems. The practice of relapse prevention is an eclectic blend of a variety of approaches that have mixed empirical support. Many of these approaches are rooted in clinician beliefs and experience as well as guidance from recovering users. For example, "booster sessions" may follow the termination of regular treatment contact. Relapse prevention strategies are likely to be a part of a final phase of treatment and attempts to solidify relapse prevention may be a routine protocol during a termination phase. Recovering users are called upon to identify high risk situations and develop a range of robust coping mechanisms. Similar to this evaluation of the environment, persons in the treatment are encouraged to identify warning signs within him or herself as well as overall factors of vulnerability that may increase the risk of relapse. Attempts to generalize training experiences that are cultivated in treatment include exercises to bring lessons from treatment to real-life situations.

### 4.4. Interpersonal therapies

Since the inception of psychoanalysis in the late 1800s, the *relationship* between a would-be healer and a suffering person has been considered to be critical to the success of interven-

tions. As the understanding of the fundamental conditions of therapeutic relationships advanced in the twentieth century, so did empirical support for the essential quality of certain therapeutic conditions. Interpersonal therapies were not initially designed for substance abusing persons, and the psychopharmacology of substances was recognized early in the history of psychotherapy as a complicating factor in treatment. Freud's exaltation of and subsequent struggle with cocaine is a well-known example of this uncomfortable reality. Early psychoanalytic theories of substance misuse were provocative and controversial [49–52]. In general, however, themes emerged that suggested that substance use problems developed in association with the person's inability to meet their inner needs in more adaptive ways [53].

Interpersonal approaches to substance use disorders are optimized when recognizing and incorporating psychopharmacological and substance use realities. In addition to the realities of substance misuse, patients are encouraged to confront issues that emerge in the absence of the substances. For example, a recovering user may be encouraged to grieve the "lost friend" of the substance. Shame is frequently identified and challenged as a factor in the inevitable frustration of needs. Defense mechanisms, originally couched in psychoanalytic language as negative factors, became seen as essential elements of psychic life and forces which need to be improved and not eliminated. For persons who use substances in problematic ways, defense mechanisms are identified as adaptive or maladaptive and modified accordingly. In general, the enhancement of self-expression and the relative satisfaction associated with human connections are bolstered in this approach.

#### **4.5. Cognitive behavior therapy**

Cognitive behavior therapy (CBT) may reasonably consider one of the dominant perspectives in mental health and substance abuse therapeutics today [54]. CBT is a blend of behavior therapy (BT) and cognitive therapy (CT). BT was originally introduced as an attempt to apply laboratory-based behaviorism to human change processes. BT was, in part, a reaction to psychoanalysis that was seen as pessimistic, deterministic, and nearly impossible to investigate empirically. An example of a behavioral approach to substance abuse therapeutics is contingency management (CM[55, 56]). CM uses the principles of operant conditioning and provides established reinforcers for drug abstinence or other objective measures of drug abstinence. The rewards may be a coupon for goods and services, a verbal reward, or small monetary tokens. This approach includes escalating rewards with rules for resetting the reward when there has been a relapse. Another example of a behavioral approach illustrates the role of contingencies on task participation (in contrast to abstinence as in the previous example). Spohr et al. [57] reported the results of behavioral approach in which rewards were established related to participation in probation and treatment of tasks.

Cognitive therapy has a broad history, in as much as there is evidence of some of the central tenets of the approach in the writings of the ancients [54]. While there are an increasing number of variants, cognitive therapy addresses thinking patterns that contribute to problems in adaptation.

Another approach that some consider to be within the cognitive behavioral tradition is dialectical behavior therapy (DBT [58]). DBT is an empirically supported therapy approach

that was designed originally to assist persons who are struggling with symptoms of borderline personality disorder. Since its original development, it has been adapted for the treatment of substance use disorders [59]. DBT prioritizes risky behaviors (self-injury) and then works directly with substance use issues. Next, the approach attends to effects of substance use, such as legal jeopardy and vocational difficulties. Finally, DBT builds skills for broad psychological adaptation and relapse prevention.

#### **4.6. Contributions from contemporary pharmacology and neuroscience**

With the rise of neuroscience and a deeper understanding of cognitive processes, contemporary neuroscience has begun to offer evidence holds some promise of informing clinical efforts. It has been suggested [60] that mechanisms associated with motivation and control elements of addictive processes are better illuminated by advances in the neurocognitive laboratory than prior models. In particular, attentional bias, reward processing, and cognitive control are important areas of research that are soon to make direct contributions to treatment. These findings are consistent with early findings related in impulse control that indicate that impulse control problems is a likely culprit in at least the exacerbation if not a cause of substance abuse problems [61]. EEG study has suggested that patterns of substance misuse may be associated with detectable deflections in brain activity as assessed via quantitative electroencephalography (qEEG) methods [62]. The decade of the 2000s reflected increased interest in the role of executive function in a number of human problems in adaptation including substance abuse patterns. An essential element of executive function is the capacity to postpone, prevent, and/or arrest a behavioral response to permit time for the development of more constructive paths of behavior [63].

Some facets of substance misuse phenomena are being treated with repetitive transcranial magnetic stimulation (rTMS [64]). This non-invasive method uses an electromagnetic field that changes rapidly and induces electrical currents in the brain. rTMS has been found to have promising effects on some aspects of addiction-related cognitions. While there is continued investigation into the exact mechanism of effect of rTMS, craving has been seen as an area of patient difficulty that responds to rTMS [65].

The role of dopamine represents another avenue of research/treatment progress. While the direct treatment implications are not clear, it is important to note that the emerging work in physiology indicates that substance abuse and disinhibition are different [66]. Prominent striatal dopamine has an important influence on externalizing proneness (disinhibition) and on reward-based decision-making. Using eyeblink rate as estimator of dopamine level associated with disinhibition, investigators have found that dopamine is more strongly associated how much an individual “wants” (motivation) to learn about making decisions associated with tangible rewards. This orientation to learning about decision-making is then accompanied by working with an individual’s broader substance use patterns that are associated with learning of action-reward contingencies [67].

For a number of reasons consistent with the approaches just noted, psychotropic medications have been used with some success to reduce vulnerabilities associated with substance misuse syndromes. Medication-assisted treatment (MAT) uses medications that can reduce

cravings (agonists or partial agonists), interfere with the pleasurable sensations that come from use (antagonists), or create negative feelings with a substance is taken. Methadone, buprenorphine (opioid partial agonist-antagonist), and naltrexone (antagonist) have been used for opioid addiction. Antabuse has been used for alcohol since tire manufacturers noticed that workers could not drink alcohol after the vapors of the precursor of antabuse was inhaled during the vulcanization of rubber [17]. In the wake of problems associated with methadone maintenance, buprenorphine has become an effective alternative in reducing withdrawal symptoms and cravings associated with opioid dependence. For nicotine, there are three FDA-approved approaches to nicotine replacement. The FDA first approved nicotine gum (approved in 1984 and available over the counter in 1996) and the transdermal nicotine patch (approved in 1992 and over the counter in 1996) for smoking cessation. Finally, nicotine sprays (1996) and inhalers (1998) were approved for dispensing by prescription. Other psychotropic medications have been used in an off-label fashion to reduce depression and anxiety associated with recovery.

#### 4.7. Motivational interviewing

Motivational interviewing (MI) is defined by its originators as a directive, client-centered counseling style for eliciting behavior change by helping clients to explore and resolve ambivalence [68]. The developers of MI affirm that MI is primarily a style of relating to service recipients rather than a specific set of techniques [69]. The originators of MI explicitly described borrowing many ideas from the interpersonal therapy tradition, and MI has become a “Gold Standard” for intervention. MI concepts include a focus on the capacities of the client, maintaining positive communication, an emphasis on resolving change-related ambivalence, and appreciating the variability in change readiness. In addition, empathy is emphasized and therapeutic resistance is a force with which one collaborates, and client inconsistencies are challenged. Further, MI emphasizes engagement with clients in empathic and collaborative communication, attention to established behavior change goals, and the initiation of change planning when the client is ready. There is a growing body of empirical work that supports the efficacy of MI for substance abuse disorders [70, 71].

Despite the fact that MI is touted primarily as a style of relating to patients, literature that followed its introduction highlighted specific techniques. These techniques were not forwarded as specifically essential to the approach but rather were considered to be naturally emerging and optimal examples of how the perspective might appear in practice.

#### 4.8. Efficacy of treatment approaches

As has been discussed, various treatment approaches have developed for the treatment of substance-related disorders. In the interest of brevity, **Table 1** is presented with references pertaining to the nature of the treatment approaches and their efficacy. There are some important observations that are worth noting beyond the specifics of the table. Evidence continues to accumulate for the effectiveness of a variety of treatment approaches as well as the distinct cost advantage that treatment has over incarceration [72]. There is a continued call

for “translational research” that takes findings from the laboratory and cultivates enhanced clinical practice [73]. New methods of assessing efficacy have been proposed that are more ecologically valid than traditional outcome studies, particularly emphasizing longer periods of follow-up [74].

	References	Notes
Evidence-based approach	[77]	Argues for more specific targets in treatment and reviews difficulties in empirical support for empirically supported treatments
	[78]	Examines issues associated with the development and use of evidence-based treatment research
Detoxification	[40]	An evaluation of the factors that are associated with successful detox completion
	[79]	Examined the impact of medically assisted detoxification on subsequent outcomes
Harm reduction	[80]	Reviews approaches to and perspectives on the harm reduction approach
	[81]	Evaluation of syringe dispensing machines and public impact – example of harm reduction strategy
Relapse prevention	[82]	Reviews three main approaches to pharmacological intervention for relapse prevention
	[83]	Review of the effectiveness of relapse prevention with substance abuse disorders
Interpersonal therapies	[84]	Description of practical elements of family therapy approaches to substance abuse treatment
	[85]	Review of six articles that considered creative writing as a facilitator of the interpersonal therapy process
	[86]	Considers a broad array of approaches to improving the life of a substance abuser, including expressive therapy, art therapy, spiritual intervention, etc.
	[87]	Brief discussion of elements of interpersonal intervention with substance abusers
	[37]	A discussion of relationship factors in treatment of substance use disorders
Cognitive behavioral and behavioral therapy	[88]	Examined the impact of adding a trauma component to group-based cognitive behavioral therapy
	[57]	Outcome study of electronic reminders of goals for group of drug-involved offenders.
	[89]	Review of the effectiveness of mindfulness interventions with substance use disorders
	[55]	Evaluation of a contingency management program to reduce substance use



	References	Notes
Medication assisted and physiologic therapy	[90]	Report of a review of studies of transcranial magnetic stimulation on addiction
	[62]	A review outcome studies of the effectiveness of EEG Biofeedback for treatment of substance use disorder
	[65]	Evaluated the use of transcranial magnetic stimulation on smoking cue-induced craving
	[91]	Evaluated the use of selective serotonin reuptake inhibitors for substance use disorders.
Motivational interviewing (MI)	[92]	Discusses the combination of MI with cognitive behavioral technique
	[93]	Considered the connection between therapist attitude toward MI and impact on client interpersonal functioning
Drug court	[94]	Evaluated drug courts as a promoter of “turning points” for offenders in areas of self-esteem, relationship, educational development, employment
	[95]	Examination of the value of compulsory treatment of addiction in Australia and the United States
Alcoholics anonymous	[96]	Considers the value of the “therapeutic alliance” that develops in AA as a significant curative factor
	[97]	Examines the effectiveness of AA in a research method that reduces previous method problems. Support for the effectiveness of AA is reported.

**Table 1.** Representative literature of efficacy and application of treatment approaches.

5. Conclusion

The history of use of mood-altering substances is complex and controversial. For centuries, the conflict between the benefits of varied substances and the massive societal costs of the misuse of substances has been confused by political and economic motivations for action related to substance users. A contemporary response to the complexity and cost of substance-related disorders is the development of the drug court. The first drug court was created in Florida in 1989 [75] as there was growing awareness of the widespread presence of substance abusing offenders in the criminal justice system. As testimony to the appeal of the drug court concept, one may note that National institute of Justice reported that there were more than 3400 drug courts in the United States by the middle of 2014. Drug court programs consider an individual’s unique patterns of use and associated consequences with a graduated series of rewards for the attainment of target behaviors. Early evidence suggests that drug courts are associated with lower recidivism [76]. Drug court may reflect the type of approach that fits the

complex and destructive influence of substance misuse. Drug court is a program that offers many services to legally mandated individuals, and it represents an intersection between several models of addiction, most notably the moral and medical models. Following a legal adjudication, a treatment and follow-up plan is created that involves the judgment and leverage intrinsic to the criminal justice system. Thus, the moral dimension of drug court serves as the “teeth” for the accountability built into the program. At the same time, the nature of the substance use problem is assessed and diagnosed by treatment facilities that work in concert with the court. Treatment is based on the prevailing diagnostic system (DSM, ICD) that reflects the specific diagnostic criteria and decision rules that characterize the medical model. With this combination of perspectives, the drug court concept may represent the interdisciplinary future of substance abuse therapeutics.

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