

# **Substance Induced Psychosis**

## **ABSTRACT**

When patients present with signs of psychosis, it is critical that health clinicians are able to properly assess and determine root cause. A diagnosis of substance-induced psychosis is an opportunity to work with the patient to determine and resolve underlying mental illnesses and to discourage a reliance on drugs or alcohol. Because individuals with a history of psychosis have a higher than average suicide rate, early recognition and intervention is extremely important.

## **Introduction**

Issues related to substance-induced psychosis are important for clinicians to understand so that they can properly assess and determine root cause when patients manifest signs of mental illness. Factors related to substance-induced psychosis vary depending on the patient's age, type and frequency of drug used. Early intervention by a qualified and knowledgeable health clinician is critical to help patients obtain the needed treatment and to avoid patient risk of harm to self and harm to others. A high risk factor that clinicians should always keep at the forefront of medical management in cases of substance-induced psychosis is that individuals with a history of psychosis can have a higher than average suicide rate.

## **Substance-Induced Psychosis: Epidemiology**

Psychosis is a mental state where a person's mental capacity to recognize reality, communicate, and relate to others is impaired. This interferes with life demands. It manifests as disorientation, disorganized thought processes

and often can include varied forms of hallucinations. An estimated 13 to 23 percent of people experience psychotic symptoms at some point in their lifetime, and 1 to 4 percent of people will meet the criteria for a psychotic disorder.<sup>2</sup>

Substance-induced psychosis is commonly known as *toxic psychosis*, which is a condition that can be attributed to psychosis as a result of substance use. The psychosis results from the poisonous effects of drugs or chemicals. This includes those chemicals produced by the body itself. Some psychoactive substances could be implicated in causing or worsening an existing mental illness involving psychosis.

Clinicians can pinpoint substance-induced psychosis to specific chemicals affecting the brain as well as to the type of drug activity. Drug use, addiction, and withdrawal can all lead to psychosis. Additionally, a psychotic state can occur after a person uses a variety of legal or illegal substances, or a combination thereof. Such a state can often be temporary and reversible. A fluoroquinolone-induced psychosis is an exception and can be irreversible.<sup>2,7</sup>

Clinicians should keep in mind that substance-induced psychosis can include many substances. These include alcohol, illegal and street drugs, and medications. Substance-related causes of psychosis may also include using too much of a substance or having an adverse reaction to mixing substances. Symptoms of a substance-induced psychosis can include delirium tremors, paranoia, persecutory delusions, and hallucinations. The hallucinations can be visual, auditory, and tactile.

The epidemiology of psychosis is determined by studying and analyzing the patterns, causes, and effects of psychosis in a defined population. This

allows clinicians to identify risk factors for the disease and to create preventive health approaches for patients at risk. Understanding psychosis related to substance use requires knowledge of the types of substances used and factors that play a role, such as age or socioeconomic factors. Typically, illicit drug use is seen in younger individuals whereas medication-related psychosis may occur in the elderly.

When considering the epidemiology, types, and age-specific considerations of substance-induced psychosis, it is important to be aware of the common types of illicit drug use with the young and drug and/or medication-induced symptoms known to occur in the elderly. A relevant part of the patient work-up during acute psychosis is determination of a pre-existing mental health disorder that commonly becomes exacerbated by the use of substances.

### **Correlating Factors in Acute Psychosis**

Substance-induced psychosis may be complicated in the setting of correlating or contributing factors. For example, epidemiologic studies show that the prevalence of substance use disorder is higher in persons with schizophrenia, as compared to the general population. One study on substance use had evaluated 9,142 people with severe psychotic disorders, of which 5,586 subjects had schizophrenia and 2,037 had a schizoaffective disorder. In this group, the odds of drug use appeared higher in patients with psychosis compared to the control group consisting of 10,195 non-psychiatric individuals.<sup>8</sup> Nicotine, alcohol, marijuana, and other drug use had an odds ratios ranging from 3.5 to 4.6 for patients with psychosis when compared to the non-psychiatric control individuals.

The lifetime prevalence of substance use and addiction with patients who have schizophrenia is estimated in the range of 47 to 59 percent in the U.S.,

as compared to the general population (16 percent). High rates of these psychotic disorders and correlating substance use are observed in other countries, including Australia, England, Germany, Italy, and Switzerland. The use of two or more substances was present in many cases.

### **Type of Drug Used**

Another factor to consider with the epidemiology of substance-induced psychosis concerns the type of drug used. One example is methamphetamines. A methamphetamine is a powerful and highly addictive stimulant. It affects the central nervous system.<sup>4,5</sup> These amphetamine-type stimulants are the second most widely used type of illicit drug worldwide.<sup>6</sup> Concerning psychiatric disorders, individuals with methamphetamine use and addiction have shown high rates of comorbid psychiatric disorders. About one-third to forty percent of those with methamphetamine use disorder in samples studied had a prior diagnosis of attention deficit hyperactivity disorder (ADHD). Additionally, depressive symptoms may commonly occur with methamphetamine use.

A higher rate of comorbid psychiatric disorders has been found in small studies. For example, in a study of 189 patients with methamphetamine use, co-occurring psychiatric disorders were identified. Primary psychotic disorder was at 28.6 percent, including schizophrenia, schizoaffective disorder, or a manic episode. Primary mood disorder was at 32.3 percent, including bipolar disorder and major depression. Primary anxiety disorder was at 26.5 percent, including generalized anxiety disorder, social phobia, and posttraumatic stress disorder (PTSD). In another sample of 214 individuals, more than 70 percent of those who used methamphetamines at least weekly had depressive symptoms of a severity that met diagnostic criteria for major depression. These individuals were enrolled in a clinical trial of a

psychotherapeutic treatment for methamphetamine use, and the results showed that the greater methamphetamine use correlated with greater depressive symptom severity.

### **Gender, Age, Ethnicity, and Race**

Rates of substance use vary in different groups. Group variables were based on gender, age, ethnicity, and race. Those with a psychotic disorder had increased odds of substance use in each subgroup. There are reports of 80% of patients presenting with psychosis between the ages of 16 and 30. A study has been done of people between the ages of 17 and 35 who required treatment for first episode psychosis. This is from an early intervention service that estimated an incidence of about 50 per 100,000 persons per year. This could be higher than expected for an urban and semirural area. In a rural community in England the incidence rate showed psychosis was twice as frequent in men as women. In a Welsh study, a higher incidence of psychosis existed in urban dwellers as compared to those living in a rural community.<sup>9</sup>

There is a tendency for women to present with psychosis at a slightly older age than men. Women have been found to be more susceptible during menopause, postpartum, and when premenstrual. Another study suggested a higher prevalence of psychosis in minority ethnic and black populations in contrast to a white population.<sup>9</sup>

### **Low Socio-economic Status**

Low socio-economic status is common with chronic mental illness, such as schizophrenia. Specifically, low socio-economic status has been shown to have an influence on the development of schizophrenia.

## **Influencing Factors of Psychosis**

Psychotic disorders that include schizophrenia are complex behavior disorders. According to recent findings, these disorders are influenced by several factors, such as psychosocial, genetic, neurodevelopmental, and neurochemical factors. Risk factors can include psychoactive substance use as well as stressful early life experiences, urban upbringing, and immigration.<sup>10</sup>

Unfortunately, while there has been significant progress in pharmacotherapy, a psychotic disorder can often result in a long-term disability or a severe mental illness. This disability is ranked globally among the top ten leading causes of disability according to the World Health Organization (WHO).<sup>10,39</sup> The burden and human suffering associated with psychosis can be extensive.

Identification and treatment of psychotic disorders by mental health services result in societal costs and high service costs throughout the world. Efforts at facing related challenges can be especially hard because a person seeking help for a psychotic disorder may be reluctant, lack knowledge, fear being stigmatized, and face poor accessibility. These hindrances can lead to extended delays before a person receives needed treatment. It can also mean that the prevalence of these disorders in a community will be underreported.

Currently, the prevalence of psychosis is greater than the rate of treatment, which raises questions about how well clinicians and the general public understand when a psychotic disorder requires treatment.<sup>10</sup> For example, the median age at onset for the first psychotic episode of schizophrenia is

the early to mid-20s for men and the late 20s for women. A prodromal phase that lasts months to years can precede the first psychotic episode.<sup>11</sup>

Early diagnosis and treatment can influence outcomes over the long-term for schizophrenia patients therefore it is imperative that communities be educated on symptom identification and treatment. Knowledge of the prevalence of severe mental illness or psychosis can help patients, caregivers, and community agencies plan interventions and early detection. Preventive strategies may also be developed.

### **Diagnosis And Management Of Psychosis**

This section takes a closer look at the differential diagnosis of psychosis and disease management. It should be remembered that psychosis is a *severe* mental disorder with the potential to become unremitting or a chronic condition. With the disorder there is extreme impairment of the ability to think clearly, respond with appropriate emotion, communicate effectively, understand reality, and behave appropriately.

Psychosis occurs in a number of serious mental illnesses. It does not occur in schizophrenia only. It also occurs in depressions, bipolar disorder or manic depressive illness, and as postpartum psychosis (a rare psychiatric emergency beginning suddenly in the first two weeks after childbirth with symptoms of mania, racing thoughts, depression, confusion, paranoia, hallucinations, and delusions). Psychosis can occur with certain neurological conditions and with drug and alcohol use, which will be discussed in more depth later on. It can occur in drugs with or without known high risk potential of a substance use and addiction disorder.

Psychosis interferes with the ability to function and can be extremely debilitating. Disabling symptoms include hallucinations and delusions. As mentioned earlier, hallucinations can occur in varied forms, and include a perception of seeing, hearing, feeling, or smelling something with no appropriate stimulus in reality. Hearing voices when no one is talking or seeing insects where there are none are common examples. Not all hallucinations are associated with psychosis.

A delusion, on the other hand, is a firmly held belief that is irrational, false, fixed, and/or strange. This belief is not normally accepted with other members of a group or culture. Clinicians should consider the culture and ethnic issues when caring for a patient presenting with symptoms of psychosis to determine if a belief is really psychotic or simply strange. Paranoia is an example of a delusion where an individual believes there are plots against them that are not reality-based. Another example is a delusion of grandeur where a person has an exaggerated idea of their importance or identity. Someone can also have a somatic delusion where they believe falsely that they have a terminal illness.

While symptoms can vary according to the psychotic condition, the health clinician of first contact should address general issues. Often a third party escorts a patient to a health facility. This could be because the patient lacks insight to obtain needed help. It could also be because the condition is distressing for the patient and for those around the patient. By the time support is required, a first contact is often with a family member who has a concern about their loved one.



Sometimes patients will refuse treatment and being escorted to a health facility. In such cases, a home visit could help. If a patient is behaving aggressively, a joint visit of an experienced community psychiatric crisis team member and/or the police may be warranted. Health professionals and law enforcement of first contact can question the patient to discern the nature and severity of symptoms. The presence of an accompanying person, such as a friend or family member, can be valuable. Collateral information from friends and family will help formulate the psychiatric history for those intervening at first contact. The following guidelines on what to ask during a psychiatric assessment should be included during the initial intake.<sup>11-13</sup>

- Is there a history of substance abuse to include alcohol and drugs?
- What hallucinations are involved?
- What delusions are involved?
- What is the span of time for the symptoms?
- What are recurring theme?
- What is the disconnect with reality
- What a relevant recent life events?
- What is the family history of mental illness?
- What is the psychological vulnerability of the patient with symptoms such as withdrawn mood, irritability, uneasiness, and suspiciousness?

During determination of a psychiatric history, an assessment of the mental state of the patient can be made. Items to determine whether a mental disorder exists are listed here.

- How in touch with reality is the patient?
- Are there delusions?
- Is there a bewildered mood?
- Are thoughts disorganized?

- Is speech disorganized, vague, or abstract?
- Are emotions appropriate and normal?
- Are there inappropriate emotional outbursts?
- Is there confusion?
- Is there excitement?
- Is there depression?
- Are there thoughts of suicide?

Clinicians and first-responders to a mental health crisis situation should know that all forms of mental illness, not just depression, have a risk of suicide. Clinicians should keep this risk factor at the forefront of their management of cases involving substance-induced psychosis.<sup>1</sup> Additionally, clinicians should be aware that depression can lead to psychosis.

An evaluation tool for performing a self-harm assessment could be useful when intervening on behalf of patients in crisis. Also, a physical exam may be helpful. For an older patient, looking for signs of alcohol and drug use, neurological features, and other signs of disease are needed. An assessment of the patient's personal hygiene and evidence of self-neglect should be part of the initial evaluation.

When psychosis is diagnosed it usually requires a referral to a mental health service. The responding clinician during a crisis call can investigate and uncover information that can help determine the right referral. Most clinicians will get a specialist opinion to determine a diagnosis such as schizophrenia before deciding and managing a course of treatment.<sup>1</sup>

### **Acute Care And Mental Health Referrals**

Psychosis is a mental health condition that will usually require referral to mental health services but there are some initial investigations that may be undertaken. The management of schizophrenia in primary care is well-established but most health clinicians will want a specialist opinion at the outset. For example, an abnormal liver function test and macrocytosis on a full blood count suggests a diagnosis of alcohol use and addiction. Other serological tests are generally indicated to determine root cause of psychosis, for example syphilis or acquired immune deficiency syndrome (AIDS). When screening for AIDs, a best practice is to precede with counselling as patients often experience high anxiety when faced with screening for this disease.<sup>82,88</sup>

Urine screens are done to uncover drug use. When using cannabis, a positive test can be found for two weeks following even light recreational use. With heavy and chronic use of cannabis the user can produce a positive result for months since the last use.

A computed tomography (CAT) scan of the brain has been used to exclude a lesion or cerebral atrophy. This is also the case with focal neurologic signs with impairment of nerve, spinal cord, or brain functions that affect parts of the body leading to weakness in the legs or any paralysis or paresis. The patient's history can help to determine a diagnosis. It can help to distinguish between schizophrenia, bipolar disorder, and depression.

Managing and recognizing the first episode of psychosis correctly is very important. Delay in a diagnosis can adversely impact the ultimate treatment of the condition. If substance use is the cause, the health clinician should address this. Substance use can be part of a *dual diagnosis*. Once a diagnosis of psychosis is made, family intervention is an evidence-based

approach that can help to reduce a relapse rate for psychotic patients in both early and late stages.

The National Institute for Health and Care Excellence (NICE) has published on the treatment of all patients who have psychosis. They advocate unconditional regard and respectful treatment by clinicians caring for patients diagnosed with psychosis. This should be throughout the whole course of treatment, including when hospitalization is needed. Aims of treatment should include early response and a reduction in time from the identification of initial symptoms to starting therapy. The goal is to reduce the duration of untreated psychosis. Some additional goals for treatment include 1) Accelerate remission, 2) Prevent relapse, 3) Maximize the ability of the patient to return to a normal life, 4) Provide a prompt assessment, and 5) Use both biological and psychological measures.

Often admission to a psychiatric unit is needed in the initial aspects of patient care. If a condition is distressing, a patient may accept admission voluntarily. A family member may also request a safer environment for the patient. On the other hand, involuntary admission may be required in severe psychosis where the patient is unable to safely care for self, and is a threat to self or threat to others. Rapid tranquilization could be required if the behavior of the patient presents a threat to personal safety or the safety of those nearby. An initial clinician role can be to cover the early management of a first episode of psychosis. Arranging for secondary care or follow-up is also part of the initial treatment plan.

Use of newer atypical antipsychotics such as risperidone or olanzapine can be a first-line treatment for suspected schizophrenia. Haloperidol is still used for acute psychosis. For mania and hypomania, drugs used for treatment could be atypical antipsychotics and benzodiazepines to aid sleep or reduce

agitation, and mood stabilizers such as lithium and anticonvulsant drugs, such as carbamazepine. Psychosis in depression can usually be part of the spectrum of bipolar disorder that is typically treated by both second generation antipsychotic and mood stabilizer drugs.

### **Types Of Psychosis**

The prognosis and outlook in patients with psychosis are less bleak today than in the past. This is due to early intervention and improvements in drug treatment. It should be kept in mind that psychosis can lead to disastrous consequences. Suicide, as mentioned, can occur with any form of mental illness.

The incidence of suicide is not as high as once thought. A study of 2132 patients showed suicide occurred in 51 patients. Risk factors are male gender, age, the cumulative effect of symptoms early in the disease, and possible early manic symptoms.<sup>12</sup> Another study found that twenty percent of patients were in remission symptomatically and functionally within two years. It has also been shown that the importance of education to help patients and family members develop insight is a factor in achieving an improved prognosis.

Psychosis appears to deteriorate rapidly in early stages. This is before reaching a level of stability. An early intervention that is effective is likely to improve the prognosis long-term.<sup>14,15</sup> Remember, psychosis is defined as an abnormal condition of the mind and involves a loss of contact with reality. A person with psychosis can exhibit personality changes and thought disorder. In severe psychosis, individuals could exhibit bizarre or unusual behavior and have difficulty with social interactions and daily life activities.<sup>15,16</sup>

Psychosis can be a sign of a psychiatric disorder and is a diagnosis of exclusion. This means that a new episode of psychosis is not a symptom of a psychiatric disorder until other known and relevant causes are excluded. This means medical and biological laboratory tests should exclude a central nervous system disorder or injury. It should also exclude injury and disease of other organs, psychoactive substances, and toxins as causes of symptoms of psychosis before any psychiatric illness can be diagnosed.

Psychosis is a sign of illness not different than other medical disorders. Comparing it to other medical states, such as a febrile condition, helps to elucidate the fact that multiple causes of the condition need to be factored into a diagnosis, which are not always readily apparent. This section highlights types of psychosis clinicians should consider during phases of initial diagnosis and treatment that can also involve associated medical conditions.<sup>17-19</sup>

### **Substance-induced Psychosis Disorder**

Substance-induced psychosis disorder can include drug and alcohol use. It can also include withdrawal. This use or withdrawal can result in psychotic symptoms. This may disappear once the effects of the substances or withdrawal symptoms wear off. There are cases where psychosis can persist after the initial substance-induced symptoms appear. This can happen with a stimulant drug such as methamphetamine.

### **Schizophrenia Spectrum Disorders**

Schizophrenia is a psychiatric disorder where the individual has disordered behavior and thinking. This often includes hallucinations and delusions. Psychotic symptoms can persist for at least six months. This is along with significant social and occupational dysfunction. *Schizophreniform disorder*

has symptoms that are similar to schizophrenia, but persist for between one and six months. *Schizoaffective disorder* includes prominent mood symptoms occurring with the characteristic symptoms of schizophrenia. At times psychotic symptoms are experienced in the absence of mood symptoms.

### **Delusional Disorder**

Delusional disorder involves holding strong and false beliefs that are not based in reality. Hallucinations are typically not present. Apart from the impact of the delusions, psychosocial functioning may not be impaired. Behavior may not be strange. At times delusions are so false that they cause problems with day-to-day life.

### **Dementia and Delirium**

Dementia includes psychotic symptoms that may appear with memory disturbances in conditions that cause physiological deterioration of the brain. This can include a head injury, AIDS, post-encephalitis, Alzheimer's Disease, or a brain tumor. Delirium includes psychotic symptoms that may be part of an acute state of confusion. This can result from another severe medical disorder, such as meningitis, septicemia, or after an epileptic convulsion.

### **Bipolar Disorder and Major Depression**

Bipolar disorder has also been called manic depression. Psychosis generally appears as part of a more general severe mood disturbance. Psychotic symptoms tend to match a mood. As an example, when someone is depressed they could hear voices urging suicide. A major depressive disorder can include psychosis.

### **Postpartum Psychosis**

Postpartum psychosis is a psychosis that may develop during the period of six months after childbirth. This is typically part of a severe mood disorder.

### **Brief Psychotic Episodes**

Brief psychotic episodes include psychotic symptoms that appear suddenly in response to a recognizable and highly stressful life event. This can be when someone is a victim of a violent crime. Symptoms can be severe but are short-lived. The psychosis lasts between one day and one month. A person may or may not be aware of their bizarre behavior.

### **Psychosis Due to a Medical Condition**

Psychosis due to a general medical condition includes psychotic symptoms that can appear as a result of brain tumors, epilepsy, and other chronic medical conditions. The psychotic symptoms are sometimes the first sign of the underlying medical condition.

### **Psychosis Of The Young And Elderly**

Issues related to age-specific psychosis includes psychosis of the young and illicit drug use. It also includes psychosis of the elderly that is primarily drug and medication-induced psychosis. Considering psychoactive drugs and psychosis in both the young and elderly, various psychoactive substances (both legal and illegal) have been implicated in causing, precipitating, or exacerbating a psychotic state or disorders in users, with varying levels of evidence. This can happen upon intoxication, upon withdrawal, or for a more prolonged period of use.



A person with a substance-induced psychosis can tend to have a greater awareness of their psychosis. These individuals can tend to have a higher level of suicidal thinking as compared to individuals who have a primary psychotic illness. The drugs commonly associated with inducing psychotic symptoms include alcohol, cocaine, cannabis, amphetamines, cathinones, psychedelic drugs (such as LSD and psilocybin),  $\kappa$ -opioid receptor agonists (such as enadoline and salvinorin A) and NMDA receptor antagonists (such as phencyclidine and ketamine).

Considering alcohol as a substance that can lead to psychosis in both the young and elderly, a statistic of note is that about 3 percent of people who are suffering from alcoholism experience psychosis during acute intoxication or withdrawal. An alcohol-related psychosis can be evident through what is called a *kindling* mechanism. This mechanism of alcohol-related psychosis can be due to the long-term effects of alcohol. This can result in distortions of neuronal membranes, thiamin deficiency, and gene expressions. In some cases, it is possible to develop a chronic substance-induced psychotic disorder such as schizophrenia. As well as causing psychosocial impairment, the effect of alcohol-related psychosis can include an increased risk of suicide and depression.

Cannabis is another substance that can lead to psychosis, considering that this is more likely among the young than the elderly but possible in both age groups.<sup>20-22</sup> Some studies show that the more often a person uses cannabis, the more likely the person is to develop a psychotic illness. Frequent use can correlate with twice the risk of psychosis and schizophrenia. Some accept cannabis as a contributory cause of schizophrenia, however, this is controversial.

A pre-existing vulnerability to psychosis is a factor that influences the link between psychosis and cannabis use. There are two active compounds in cannabis. They are tetrahydrocannabinol (THC) and cannabidiol (CBD). Some studies show these two have opposite effects with respect to psychosis. THC could induce psychotic symptoms in healthy individuals. CBD could reduce the symptoms caused by cannabis. Evidence has shown that cannabis use may hasten the onset of psychosis *only* in individuals who may be *predisposed* to the disease. Evidence has also shown that high potency cannabis use can accelerate the onset of psychosis in a predisposed patient. However, it is also noted that while cannabis use has increased over the past couple of decades and is becoming increasingly legal to use, the rate of psychosis in the overall population has not increased. Concerning the age of an individual and their use of cannabis, a related study concluded that cannabis use in early adolescence should be discouraged. This is because cannabis can play a role in the development of psychosis in vulnerable individuals.<sup>23</sup>

Methamphetamines are other substances that can lead to psychosis. This is typically seen and more likely in the young who are experimenting. Some studies show that for heavy users, methamphetamine induces a psychosis in 26 to 46 percent of these users.<sup>24,25</sup> These heavy users can develop a long-lasting psychosis that can persist for longer than six months. If someone has a short-lived psychosis from methamphetamine that person can have a relapse of the methamphetamine psychosis years later after a stress event. The event can be severe insomnia or a period of heavy alcohol use despite not relapsing back to methamphetamine.

If someone has a long history of methamphetamine use and that person experienced psychosis in the past from methamphetamine use, the person

could rapidly relapse into a substance-induced psychosis. This could happen within a week of going back to using the drug.

Medication can also lead to psychosis, most typically in the elderly in contrast to the young. Administering or withdrawing a number of medications can provoke a psychotic symptom. The kind of drug that can induce psychosis can include amphetamine and other sympathomimetics, dopamine agonists, ketamine, corticosteroids (often with mood changes in addition), and some anticonvulsants such as vigabatrin. Stimulants may also cause this and include lisdexamfetamine.<sup>25,28</sup> Many other types of medications can contribute to psychosis, which include corticosteroids, chemotherapy agents, anti-Parkinson medication, anticonvulsants, analgesics, antihypertensive medications, cardiovascular medications, antidepressants, antihistamines, and muscle relaxants (not discussed in detail here).

Age-related factors should be considered such as age at the time of onset of psychosis.<sup>24-26</sup> There is the suggestion by researchers that early onset of psychosis is a determinant of outcome. But knowledge concerning this is limited. Clinicians should consider characteristics of patients developing psychosis after age 26. This is toward the end of the usual age range for an early intervention program. This can help clinicians identify potential needs for such a patient. One study looked at 256 early psychosis patients aged 18 to 35. They were followed up over 36 months. Patients with an onset when over the age of 26 (later onset) were compared to the sample. Late onset patients were 32 percent of the sample. They had a shorter duration of untreated psychosis, were less likely to be male, had better premorbid functioning, and more likely exposed to trauma. Late onset patients were found to have fewer negative symptoms overall and greater insight at

presentation. The late onset patient also recovered faster. They were less likely to return to a premorbid functional level.

Because late onset psychosis correlates with better premorbid functioning and higher rate of trauma exposure, this should be a treatment focus in such patients. Also, as late onset patients were likely to return to a premorbid functional level, it was suggested that current treatment strategies may not necessarily impact whether patients could maintain employment. There is a need to further explore this research focus and the more central role of trauma in patients with onset after age 26 with respect to the possibility of distinct precursors or environmental triggers to psychosis associated with the age of onset.

### **ICD-10 Classification: Types Of Substance-Induced Psychosis**

The World Health Organization publishes the International Statistical Classification of Diseases and Related Health Problems (ICD), and ICD-10 is the tenth revision of the list. This list contains codes for diseases, signs and symptoms, abnormal findings, complaints, social circumstances, and external causes of injury or diseases. It is a code set that includes over 14,400 codes and allows for tracking of new diagnoses. Subclassification allows for expanding to over 16,000 codes of diseases. Types of psychosis are identified in the ICD-10 classification of substance use disorders.<sup>27,80</sup> The following sections identify the classifications and descriptors of different types of substance-induced psychosis.

### **Specifiers for Alcohol and Drug Use**

#### *F10.5 Alcohol*

The F10.5 alcohol code identifies alcohol as a common cause of psychotic disorders or episodes. This can occur through acute intoxication, chronic

alcoholism, withdrawal, exacerbation of existing disorders, or acute idiosyncratic reactions. Some research shows that alcohol use causes an eight-fold increased risk of psychotic disorders in men and a three-fold increased risk of psychotic disorders in women.

The majority of cases psychosis caused by alcohol use are acute and resolve fairly quickly upon treatment and/or with abstinence. Some cases can be chronic and persistent. Alcoholic psychosis is sometimes misdiagnosed as another mental illness, such as schizophrenia.

### *F12.5 Cannabinoid*

F12.5 cannabinoid is the code that specifies cannabis as a trigger for full-blown psychosis. Studies have shown there can be an increase in risk for psychosis in cannabis users.

### *F13.5 Sedatives/Hypnotics*

The F13.5 sedatives/hypnotics code is for barbiturates and benzodiazepines. Medical professionals should keep in mind that there can be paradoxical effects of some sedative drugs. Serious complications can occur with the use of sedatives creating the opposite effect as to that intended. It had been estimated that the incidence of these adverse reactions were about 5%. This is even with short-term use of the drugs.

The paradoxical reactions can include depression, with or without suicidal tendencies, aggressiveness, phobias, violent behavior, and symptoms sometimes misdiagnosed as psychosis. Psychosis is more commonly related to benzodiazepine withdrawal syndrome.

The relevant code for cocaine use is *F14.5 Cocaine*. Also, *F15.5 other stimulants* is the code for stimulant psychosis and includes amphetamines, methamphetamines, and methylphenidates. *F16.5 hallucinogens* is the code for LSD and other hallucinogens. *F11.5* is the code for opioid-induced psychosis.

Tobacco- and caffeine-induced psychosis are covered under *F17.5* and *F15.5*, respectively. *F17.5* tobacco-induced psychosis traditionally had not been associated with the induction of a psychotic state; and, *F15.5* caffeine-induced psychosis is supported by evidence showing that severe use of caffeine, for a long period of time, can induce psychosis.

### **Coding for Substance Use Disorders**

A more detailed consideration of the topic of substance use disorders and ICD-10-CM coding and, in particular, steps for clinicians to follow to help select the appropriate ICD-10-CM diagnostic code related to substance use disorders is covered here.<sup>81</sup> It should be noted that the ICD-10-CM overall does not contain considerably more codes related to mental and behavioral disorders than found in ICD-9-CM. However, the section on substance use disorders is larger and does contain more detail in ICD-10-CM.

Since Oct. 1, 2015, ICD-10-CM diagnostic coding became mandatory in the United States. Health care professionals who assess or treat individuals with substance use disorders are expected to indicate through their choice of diagnostic codes the substance involved and the degree of the problem. Remember that substance use codes in ICD-10-CM follow the format F1x.xxx. The letter F indicates that the code is from Chapter 5: Mental, Behavioral and Neurodevelopmental Disorders of ICD-10-CM. The numeral 1

indicates a mental or behavioral disorder due to psychoactive substance use. The next digit, indicated by the first x, signifies the problematic substance. Digits after the decimal point add further specificity by indicating the nature and severity of the problem. As an example, consider F12.121. This is the code for cannabis use with intoxication delirium.

Not all ICD-10-CM specifiers are used with every substance. Perceptual disturbance is one example. Clinicians should refer to the complete ICD-10-CM code set as follows.

- To download the ICD-10-CM, visit the Centers for Disease Control and Prevention website.
- Go to the FY 2016 release of ICD-10-CM section.
- Select ICD-10-CM PDF format to access a PDF version of the document.
- See an index of compressed zip files.
- From the index that appears, select ICD10CM\_FY2016\_Full\_PDF.ZIP.
- From the zip folder that contains five files, open the final file labeled Tabular.

Guidelines for identifying the correct ICD-10-CM code related to substance use disorders are considered below.<sup>93</sup> To identify the substance involved, the clinician should choose from the following selections.

### *Mental and Behavioral Disorders due to...*

#### Code 1

- ...use of alcohol F10
- ...use of opioids F11
- ...use of cannabis F12
- ...use of sedatives, hypnotics, anxiolytics F13
- ...use of cocaine F14

- ...use of other stimulants, including caffeine F15
- ...use of hallucinogens F16
- ...use of nicotine F17
- ...use of inhalants F18
- ...use of other psychoactive substances and multiple drug use F19

The correct specifiers and appropriate code extension are required when coding for a substance-induced psychosis.

### *Specifiers for Substance Coding*

Code 1

Abuse .1

Uncomplicated .10

With intoxication .12

- ...uncomplicated .120

- ...delirium .121

- ...with perceptual disturbance .122

- ...unspecified .129

With [insert substance] - induced mood disorder .14

With [insert substance] - induced psychotic disorder .15

- ...with delusions .150

- ...with hallucinations .151

- ...unspecified .159

With other [insert substance] - induced disorder .18

- ...anxiety disorder .180

- ...sexual disorder .181

- ...sleep disorder .182

- ...other [same-substance] - induced disorder .188

With unspecified [insert substance] - induced disorder .19



Dependence .2 2  
Uncomplicated .20  
In remission .21  
With intoxication .22  
    ...uncomplicated.220  
    ...delirium .221  
    ...with perceptual disturbance .222  
    ...unspecified .229  
With withdrawal .23  
    ...uncomplicated .230  
    ...delirium .231  
    ...with perceptual disturbance .232  
    ...unspecified .239  
With [insert substance] – induced mood disorder .24  
With [insert substance] – induced psychotic disorder .25  
    ...with delusions .250  
    ...with hallucinations .251  
    ...unspecified .259  
With [insert substance] – induced persisting amnesic disorder .26  
With [insert substance] – induced persisting dementia .27  
With other [insert substance] – induced disorders .28  
    ...anxiety disorder .280  
    ...sexual dysfunction .281  
    ...sleep disorder .282  
    ...other [same-substance] - induced disorder .288  
With unspecified [insert substance] - induced disorder .29  
Use, unspecified .9  
With intoxication .92  
    ...uncomplicated .920

- ...delirium .921
- ...with perceptual disturbance .922
- ...unspecified .929
- With withdrawal .93
  - ...uncomplicated .930
  - ...delirium .931
  - ...with perceptual disturbance .932
  - ...unspecified .939
- With [insert substance] – induced mood disorder .94
- With [insert substance] – induced psychotic disorder .95
  - ...with delusions .950
  - ...with hallucinations .951
  - ...sleep disorder .959
- With [insert substance] – induced persisting amnesic disorder .96
- With [insert substance] – induced persisting dementia .97
- With other [inset substance] – induced disorders .98
  - ...anxiety disorder .980
  - ...sexual dysfunction .981
  - ...sleep disorder .982
  - ...other [same-substance] - induced disorder .988
- With unspecified [insert substance] – induced disorder .99

It should be emphasized that this information is free to the public and accessible from and by the Centers for Disease Control and Prevention. The information can be accessed online. These specifiers differ for nicotine use.

It is also important to bear in mind that substance related causes for psychosis can result from too much of a substance. An adverse reaction to

mixing substances or withdrawal may be involved. Additionally, an underlying mental health issue can also be a consideration.

### **Substance Use Type And Withdrawal**

There are multiple examples of how withdrawal of a substance can lead to psychosis. Alcohol withdrawal is one such example. Alcohol withdrawal syndrome is a set of symptoms that can occur following a reduction in alcohol use. This withdrawal comes after a period of excessive use of alcohol. Typical symptoms can include shakiness, anxiety, sweating, vomiting, a fast heart rate, and a mild fever. Symptoms that are more severe can include seizures, seeing or hearing things that others do not, and delirium tremens.

Symptoms of alcohol withdrawal can begin about six hours following the last drink. The symptoms get worse at 24 to 72 hours and improve in seven days.

Alcohol withdrawal may occur in an individual with an alcohol use and addiction disorder. This can happen after a planned or unplanned decrease in alcohol intake. An underlying mechanism is decreased responsiveness of GABA receptors in the brain. The Clinical Institute Withdrawal Assessment (CIWA) scale can be of value to show a typical withdrawal process.<sup>26-30</sup>

A typical treatment of alcohol withdrawal is with benzodiazepines. This can include diazepam or chlordiazepoxide. The amount given should be based on the individual's symptoms. Routinely, thiamine is recommended. Additionally, low blood sugar and electrolyte issues need to be treated. Early treatment improves the outcome. Reports have shown about half of people with alcoholism develop withdrawal symptoms. This happens with reducing

their use and 4 percent develop severe symptoms. For someone with severe symptoms, up to 15 percent die.<sup>30</sup>

Too much of a substance can lead to psychosis. For example, people who drink excessive amounts of alcohol can develop the symptoms of psychosis. This includes hallucinations and/or delusional thinking while intoxicated or in a state of withdrawal. A person can also develop a distinct condition called alcohol-induced psychotic disorder or alcohol-induced psychotic syndrome (AIPS). The development of this AIPS condition is a very serious occurrence that can lead to poor treatment outcomes. A person can potentially recover from alcohol-induced psychosis with use of antipsychotic medication.<sup>30-32</sup>

Concerning nonprescription intoxicants, the likelihood of psychotic symptoms appearing, and the clinical presentation, varies depending on the type of substance; and, too much of a substance can increase the risk of psychosis. For example, taking a large amount of cocaine all at once can cause psychosis. This can happen in minutes. Psychosis from cocaine can produce persecutory delusions. This type of delusion can also happen with use of amphetamines.

Hallucinogens are known to cause visual, auditory, and tactile hallucinations. This is not the same as a psychosis. The clinician should also keep in mind that an adverse reaction or taking too much of a hallucinogen can cause delusions and paranoia.<sup>34</sup>

Another issue that can occur with too much of a drug is stimulant psychosis.<sup>35,36</sup> Stimulant psychosis involves symptomology that occurs typically after an overdose of psychostimulants with less than 1 percent of individuals affected. It can also occur within the first several weeks after

starting amphetamine or methylphenidate therapy. The most common causative agents include substituted amphetamines and dopamine reuptake inhibitors. This includes cocaine and methylphenidate.

## **Dual Diagnosis**

As mentioned in earlier sections, substance related causes for psychosis can result from an underlying mental health issue. Mental health issues can be connected to substance use, addiction, and resulting psychosis.<sup>36,82</sup>

Sometimes dual diagnosis is seen, which is a term used to describe a mental health issue co-occurring with a substance use issue. It has been discussed how psychosis can result from a substance use issue. This section looks more closely at the coexistence of both a mental health and substance use disorder.

Some illegal drugs can cause a person with an addiction to experience one or more symptoms of a mental health disorder. Mental health and substance use disorders can share underlying causes. There are several reasons why mental health problems and substance use disorders sometimes occur together. This connection can be because certain illegal drugs can cause people with an addiction to experience one or more symptoms of a mental disorder. Also, individuals diagnosed with a mental health disorder have been found at higher risk to use alcohol or drugs, often as a form of self-medication.

Mental health disorders and substance use disorders have been reported to share underlying causes, such as changes in brain composition, genetic vulnerabilities, and early exposure to trauma or stress. More than one of four adults living with serious mental health conditions also has a substance

use disorder. Substance use disorders have been found to occur more frequently with certain mental health conditions, such as schizophrenia, depression, anxiety disorders, and personality disorders.

Symptoms of substance use disorders can include behavioral changes. These behavioral changes can be a drop in attendance and performance at school or work. It can also involve behaviors such as frequently getting into fighting, accidents, and illegal activities. Using substances in physically hazardous situations such as when driving or operating a machine, engaging in secretive or suspicious behaviors may also be observed. Additional symptoms include:

- Changes in appetite or sleep patterns.
- Unexplained change in personality or attitude.
- Sudden mood swings, irritability, or angry outbursts.
- Periods of unusual hyperactivity, agitation, or giddiness.
- Lack of motivation.
- Appearing fearful, anxious, or paranoid, with no reason.

Physical changes can include abnormally sized pupils, bloodshot eyes, sudden weight gain or weight loss, and deterioration in physical appearance. There can also be unusual smells of the body, breath, or clothing. In addition, there could be slurred speech, tremors, or impaired coordination.

Social changes can include financial problems, unexplained need for money, legal problems related to substance use, and using substances even though this causes problems in relationships. There can also be sudden changes in friends and hobbies.

When considering the toxic effects of substances, clinicians should be aware they can mimic mental illness in ways that can be difficult to distinguish from mental illness. Substance-induced disorders include delirium, persisting dementia, amnesic disorder, psychotic disorder, mood disorder, anxiety disorder, hallucinogenic persisting perceptual disorder, sexual dysfunction, and sleep disorder. These are all substance-induced.

Substance-induced disorders are distinct from independent co-occurring mental disorders. That is because all or most of the psychiatric symptoms are the direct result of substance use. It is not meant to say that substance-induced disorders preclude co-occurring mental disorders. It is simply being noted here that a specific symptom cluster at a specific point in time is more likely the result of substance use, addiction, intoxication, or withdrawal than of underlying mental illness.

A patient could have both independent and substance induced mental disorders. As an example, a patient could present with a well-established controlled and independent bipolar disorder plus an alcohol use disorder in remission. The same patient could experience amphetamine-induced hallucinations that are auditory and paranoia from amphetamine use relapse that happened over the last few weeks. Clinicians should always bear in mind that symptoms of substance use disorders vary greatly. They can include mild anxiety or depression. These are the most common symptoms across all substances. They can also include a full blown manic or other psychotic reaction that is less common.

Withdrawal symptoms related to a physiological depressant such as alcohol and benzodiazepine are also reported to involve a unique cluster of symptoms. Symptoms include hyperactivity, elevated blood pressure,

agitation, and anxiety such as the shakes. By contrast, someone who uses a stimulant may crash, and present withdrawn, tired, and depressed. Almost any substance if taken in large quantities over a long period of time can lead to a psychotic state.

Patients vary in how they respond to intoxication and withdrawal given the same exposure to the same substance. Also, different or mixed substance use could be occurring at the same time. Predicting the effect of a particular substance related syndrome has limitations. It is important that clinicians continue to evaluate psychiatric symptoms. They should also evaluate the correlation of symptoms to abstinence or ongoing substance use over time.

Most substance-induced symptoms can begin to improve within hours or days after a patient stops using the substance. An exception can be psychotic symptoms caused by long-term and heavy use of amphetamines and cognitive changes involving memory, concentration, and problem solving. This occurs from substances that directly affect the brain, which include alcohol, inhalants (gasoline), and amphetamines. An overview of the most common types of substances used and the resulting psychiatric symptoms as seen in chronic use, intoxication, and withdrawal are discussed in subsequent sections, beginning with alcohol use and addiction.

### **Alcohol Use And Addiction**

Euphoria, decreased impulse control, and increased social confidence (often called “getting high”) is associated for most people with moderate to heavy consumption of alcohol. The next day the person can feel mild fatigue, nausea, and a hangover. If a person has life struggles, losses, and stresses, which can often be the case with addiction to alcohol, the lower impulse



control and change in mood can lead to increased aggression and violence of the patient against self and others. Prolonged drinking increases the incidence of anxiety, dysphoria, and the potential for violence.

Symptoms of alcohol withdrawal can include tremors, anxiety, agitation, malaise, hyperreflexia with an exaggeration of reflexes, increased blood pressure, rapid heartbeat, sweating, insomnia, nausea or vomiting, and perceptual distortions. With acute withdrawal of a few days some people may experience continued mood instability, insomnia, fatigue, reduced sexual interest, and hostility for weeks. This is called protracted withdrawal.

It can be a challenge to differentiate protracted withdrawal from a major anxiety disorder or depression. More severe withdrawal can include severe instability in vital signs, hallucinations, agitation, delusions, and seizures. A good predictor of whether this type of withdrawal can happen again is if it happened before. Delirium induced by alcohol after high dose drinking is characterized by fluctuating mental status, confusion, and disorientation. These are reversible once both alcohol and its withdrawal symptoms are gone. By definition, alcohol dementias are associated with brain damage. They are not entirely reversible even with sobriety.<sup>37</sup> This general issue must be considered relative to when drinking alcohol is a problem especially in light of issues such as binge drinking.

A survey showed more than half of all Americans aged 12 and older reporting being current drinkers of alcohol. This means about 135 million people. This can be safe and controlled drinking. For some estimated at a quarter or about 60 million people this can mean binge drinking in the thirty days prior to the survey. Seventeen million people reported heavy drinking.<sup>38,40</sup> People can have a hard time telling when normal drinking

becomes a problem. How does a person know if they have had too much? This is the central issue. This is especially true as reports show that a small to moderate amount of alcohol could be good for affected persons.

In broad terms, drinking is a problem when it adversely impacts the personal or professional life of a person. Drinking is also a problem if a person does not have control over drinking. It can be a challenge for a health clinician to determine if a person has a drinking problem. This is where screening tools can help, which are discussed later on.

Experts have not yet identified why some people develop problems with alcohol. They do know that there are factors that can increase a person's risk. Some of the risks are heredity, age, and history of mental illness.

### **Heredity**

Alcohol use disorder can be hereditary. If it runs in the family, this can be a risk factor. Certain genes can make people more vulnerable to drinking problems. If a person has a parent, sibling, or child who uses alcohol, that person has a three to four times higher risk of developing a drinking problem.

### **Age**

Ages 18 to 25 are the most common for problem drinking. It is also more common among men than women. While problem drinking can impact men and women of all ages and backgrounds, certain ages are more common. Women can have an alcohol-related problem at a lower drinking level than a male. If a man and a woman of the same weight drink the same amount of alcohol the woman can have a higher level of alcohol in her blood, which puts the woman at greater risk of harm.

If a person begins drinking at an early age the person is four times more likely to develop alcoholism than someone who starts drinking at or after age 21. In young people use of alcohol and drugs can lead to suicide, homicide, and car crashes. Whereas, the risk factor for older people are different. At age 65 or older alcohol use is common. Alcohol use can be especially dangerous at an older age because it can interact with medication typically used in the older age group. It can also be responsible for fall related injuries.

### **Mental Illness**

If someone has a mental health problem, including depression, severe anxiety, or a personality disorder, this person has an increased risk of using alcohol and developing addiction. There are estimates that show thirty-seven percent of those with a drinking problem in addition have a mental health condition. This is important for health clinicians to know when treating mental illness as part of helping affected persons overcome an alcohol addiction.

### **Definition of Alcohol Use Disorder**

There are many terms used to describe different types of drinking problems. Some of these include alcohol intoxication, alcohol use disorder, binge drinking, and problem drinking.

Alcohol intoxication happens when drinking excess alcohol leads to inappropriate behavior and impaired judgment. Symptoms of intoxication can include loss of coordination, slurred speech, unsteady walking, difficulty paying attention, difficulty remembering, confusion, and coma. *Alcohol use*

*and addiction disorder* is a medical term that identifies symptoms of use. The disorder can be specified as mild or severe. A person who has this disorder can have two or more of the following issues. The more issues they have the more severe the disorder.

- They drink more than they planned to.
- They drink longer than they planned to.
- They wish to cut down on alcohol use but cannot.
- They spend much time getting alcohol, getting drunk, or recovering from being drunk.
- They crave or have a strong desire to drink.
- They drink when drinking causes a dangerous situation such as while driving.
- Shaking is a symptom.
- Because of their drinking they often do not do what is expected such as go to work or school, clean their home, or remember family events.
- They drink even if it worsens their relationship and interactions with others.
- They cut back on social or work activities.
- They sweat or have a racing heart.
- They have insomnia where they are not able to sleep.
- They have nausea or vomiting.
- They feel restless or feel anxiety.
- They have seizures.
- They see, feel, or hear things that are not really there, having hallucinations.
- They drink even when they know they have a physical or mental problem caused by drinking or made worse by drinking.
- They need to drink more and more to get the same effect as they used to with less.

- They get less effect from using the amount that used to get them drunk, called tolerance.
- They have withdrawal symptoms if they stop drinking alcohol for a long time.

Problem drinking is a term applied to those people who do not fit the criteria for alcohol use disorder. However, they are at risk for accidents and problems resulting from drinking too much. A problem drinker is someone who accounts for a large proportion of those who come to an emergency department or trauma center for injuries related to drinking. These can be moderate drinkers, heavy drinkers, or binge drinkers. The definition of these terms is related to the number of servings of alcohol a person drinks per occasion and also how the person drinks. A drink in the United States contains 0.6 fluid ounces or 14 grams of pure alcohol. It is equivalent to 5 ounces of wine, 12 ounces of regular beer, 8 to 9 ounces of malt liquor, and 1.5 ounces of 80 proof distilled spirits.<sup>46</sup>

It can be a challenge to determine servings of alcohol. For example, with a mixed drink, this can involve the equivalent of one to three standard drinks. It can depend on the recipe. The alcohol content for different types of beer, malt liquor, or wine can also vary.

Moderate drinkers are healthy people who drink in moderation. These people have a relatively low risk of developing an alcohol-related problem. For women this can be one drink a day. For men it can be no more than two drinks a day. For someone who is 65 or older it can be no more than one drink per day. People who stay within these drinking limits are low risk but can still have problems if they drink too quickly, have health problems, or are taking certain prescription medications. Even a moderate amount of

alcohol can impact balance, judgment, and the ability to drive. This is even in the absence of feeling intoxicated or buzzed or high.

Heavy drinkers are people who have a significantly increased risk of developing alcohol problems. Heavy drinking is defined for women as more than seven drinks per week or three drinks per occasion. For a man it is more than 14 drinks per week or four drinks per occasion.

Binge drinkers also have a significant risk of developing an alcohol problem. Binge drinking is defined as drinking at a single occasion and generally within about two hours. For women this includes four or more drinks. For men it includes five or more drinks. A binge drinker can go days without drinking. But a binge drinker does not and at times cannot limit drinking once they have a drink. Young adults and teenagers can often be at a particular risk of binge drinking, often due to peer pressure. With greater heavy drinking over time, there is a risk of developing alcohol use and addiction.

### **Screening and Diagnosis of Alcohol Use**

A health clinician can focus on three key things when trying to determine if a person has a problem with using alcohol. This includes whether the person has lost control of their drinking, developed a higher level of severity of use or sign of addiction, and where alcohol has contributed to problems such as loss of a job, problems in relationships, or legal troubles.

To distinguish problem and normal drinking individuals must share information about their drinking and the impact drinking has on them. Screening questionnaires are a tool used by clinicians when trying to evaluate a person's level of alcohol use. Clinicians sometimes use one of

several questionnaires that are designed to identify people who may have a drinking problem. Such questionnaires ask specific questions that have been studied and shown to help predict when a person has a problem with alcohol use. Some patients may feel more comfortable providing information about drinking when asked as part of a questionnaire, or knowing that such questions are asked of all patients.

An alcohol use disorder is something a screening questionnaire can detect. Such a questionnaire is better at detecting alcohol use disorder than questions about the quantity or frequency of drinking. This is important because an alcohol use disorder has less to do with the amount of alcohol a person drinks and more to do with the effects that drinking has on a person's life. A questionnaire of this type is not intended to establish a diagnosis of alcohol use disorder. Instead, it can identify people who should be further assessed by their clinician to determine if alcohol is a problem for them. It can also help to determine if a person needs treatment.

In specific groups some tools work better than others. Some of the screening tests are designed specifically for college students, women, and pregnant women. One of the tests applicable to most people is the Alcohol Use Disorder Identification Test (AUDIT). This test asks about the amount of alcohol consumed, as well as experience in using alcohol. A sample version of the AUDIT questionnaire is available at the National Institute of Health (NIH) website (<http://pubs.niaaa.nih.gov/publications/arh28-2/78-79.htm>).

### *Screening Tests*

Health clinicians use screening instruments readily available to identify patients with alcohol problems; and, these screening instruments are

currently available in the *Assessing Alcohol Problems: A Guide for Clinicians and Researchers* publication. This publication is available from the NIH on Alcohol Abuse and Alcoholism. It can be accessed online at <http://pubs.niaaa.nih.gov/publications/AssessingAlcohol/index.htm>. The full reference for this publication is *Assessing Alcohol Problems: A Guide for Clinicians and Researchers*, 2d ed. NIH Pub. No. 03–3745. Washington, DC: U.S. Dept. of Health and Human Services, Public Health Service.

Some of the screening tools used today to identify hazardous or risky drinking are raised here. AUDIT and CAGE are the two standard screening tool instruments. These are useful tools in a variety of settings. Clinicians can use them with a number of target populations. T-ACE is another tool that can be used for the target population of pregnant women. The *Assessing Alcohol Problems: A Guide for Clinicians and Researchers* provides a full description of AUDIT, CAGE, and T-ACE plus other instruments, which should be reviewed by clinicians evaluating patients for a drinking problem. Ready information in this guide about reliability, target audiences, clinical utility, research applications, and source references can be also found, in addition to administrative criteria.

#### CAGE Assessment Tool:

CAGE stands for *C - cut down, A - annoyed, G - guilty, and E - eye opener*. The CAGE tool can help clinicians identify alcohol problems over a lifetime. If two positive responses are obtained, the clinician should consider this a positive test, and further assessment is needed. Specifically, CAGE includes:

- C – Have you ever felt you should **cut down** on your drinking?
- A – Have people **annoyed** you by criticizing your drinking?
- G – Have you ever felt bad or **guilty** about your drinking?



- E – **Eye opener** – Have you ever had a drink first thing in the morning to steady your nerves or get rid of a hangover?

#### T-ACE Assessment Tool:

The T-ACE assessment tool is interpreted as:

- T - Tolerance: How many drinks does it take to make you feel high?
- A – Annoyed: Have people annoyed you by criticizing your drinking?
- C – Cut down: Have you ever felt you should cut down on your drinking?
- E - Eye opener: Have you ever had a drink first thing in the morning to steady your nerves or to get rid of a hangover?

The T-ACE helps to identify range of use and is based on the CAGE. This is including lifetime use and prenatal use. A score of 2 or more is considered positive. Affirmative answers to questions A, C, or E get 1 point each.

Reporting tolerance to more than two drinks (the T question) gets 2 points.

#### AUDIT Assessment Tool:

The Alcohol Use Disorders Identification Test (AUDIT) is used to help detect alcohol problems in the last year. For an AUDIT score 8 or higher, harmful or hazardous drinking is suspected. Questions 1 to 8 get 0, 1, 2, 3, or 4 points. Questions 9 or 10 get 0, 2, or 4 points.

### **Alcohol Use Disorders Identification Test**

The following screening measures are used to evaluate alcohol use.

1: *How often do you have a drink containing alcohol?*

- a. Never
- b. Less than monthly
- c. Monthly
- d. Two to three times per week

e. Four or more times a week

2: *How many drinks containing alcohol do you have on a typical day when you are drinking?*

a. 1 or 2

b. 3 or 4

c. 5 or 6

d. 7 to 9

e. 10 or more

3: *How often do you have six or more drinks on one occasion?*

a. Never

b. Less than monthly

c. Monthly

d. Two to three times per week

e. Four or more times a week

4: *How often during the last year have you found that you were not able to stop drinking once you had started?*

a. Never

b. Less than monthly

c. Monthly

d. Two to three times per week

e. Four or more times a week

5: *How often during the last year have you failed to do what was normally expected from you because of drinking?*

a. Never

b. Less than monthly

- c. Monthly
- d. Two to three times per week
- e. Four or more times a week

6: *How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?*

- a. Never
- b. Less than monthly
- c. Monthly
- d. Two to three times per week
- e. Four or more times a week

7: *How often during the last year have you had a feeling of guilty or remorse after drinking?*

- a. Never
- b. Less than monthly
- c. Monthly
- d. Two to three times per week
- e. Four or more times a week

8: *How often during the last year have you been unable to remember what happened to the night before because you had been drinking?*

- a. Never
- b. Less than monthly
- c. Monthly
- d. Two to three times per week
- e. Four or more times a week

9: *Have you or someone else been injured as a result of your drinking?*

- a. No
- b. Yes, but not in the last year

- c. Yes, during the last year

10: Has a relative or friend, or a doctor or other health worker, been concerned about your drinking or suggested you cut down?

- a. No
- b. Yes, but not in the last year
- c. Yes, during the last year

### **Complications of Alcohol Use Disorder**

There are several serious consequences of drinking alcohol excessively. One is that that excessive alcohol consumption is a leading preventable cause of death in the United States. Another is that drinking alcohol increases the risk of traffic accidents, suicide, drowning, and other serious injuries. The use of alcohol continues to be the leading cause of injuries treated in trauma centers and emergency departments.

Another serious consequence is that alcohol-related liver disease may lead to end-stage liver disease (cirrhosis) and death. In addition, alcohol increases the risk of certain cancers of the mouth, esophagus, throat, liver, and breast. Additional consequences of prolonged, heavy alcohol consumption include heart failure and several types of dementia, some of which are irreversible.

### **Treatment of Alcohol Use Disorder**

People who have a drinking problem have several treatment options available to them. This includes counseling and medications. Counseling can involve meeting with a therapist, counselor, or physician to talk. Brief interventions are successful for some people. This is especially true when

combined with medication. Other people can benefit from more prolonged counselling.

Medications can be used in treating alcohol use disorder and are often helpful in combination with counseling. A peer support group can also help reduce drinking. In addition to a formal treatment, some clinicians recommend participation in a social support group such as Alcoholics Anonymous.

Some people can successfully overcome drinking problems on their own. However, people with an alcohol use disorder should not attempt this. Such a person should not try to cut down or stop drinking without the help of a health clinician. If they suddenly reduce alcohol intake this can cause life threatening withdrawal symptoms. Safe recovery for this group depends on medical supervision. As noted previously, there are different terms to describe problems with the use of alcohol. Generally, drinking is problematic if it leads to negative consequences in a person's life. If there is a severe problem it can cause increasing tolerance to alcohol, physical addiction, and a loss of control over drinking. If left untreated, problem drinking can lead to bodily harm, illness, and even death. Effective treatments can help and are available in acute care and community care settings.<sup>41-44</sup>

### **Alcohol-Related Psychosis**

Alcohol-related psychosis is a secondary psychosis. It can be accompanied as prominent hallucination and delusions. This occurs in a variety of alcohol-related conditions. For someone who has an alcohol use disorder, psychosis can occur during periods of acute intoxication or withdrawal with or without delirium tremens.<sup>49,50</sup> Additional conditions are alcohol hallucinosis and alcoholic paranoia. These are two uncommon alcohol-induced psychotic

disorders. These are seen in chronic alcoholics only with years of severe and heavy drinking. Psychosis can also happen during alcohol intoxication. This is known as pathologic intoxication, and is an uncommon condition; its diagnosis is considered controversial.

With chronic alcoholic patients, a common condition is lack of thiamine. This deficiency is known to lead to Wernicke-Korsakoff syndrome. This is characterized by neurological findings during a physical exam. It also appears as a confused and apathetic state. The Korsakoff psychosis is also known as Korsakoff amnesic state or amnesic confabulatory state. This refers to a state where memory and learning are impacted out of proportion to other cognitive functions with an otherwise responsive and alert patient.

Discontinuation of alcohol spontaneously clears alcohol-related psychosis. The alcohol-related psychosis can resume during repeated alcohol exposure. It can be difficult to distinguish alcohol-related psychosis from schizophrenia or other primary psychotic disorders through clinical presentation; however, it remits with abstinence, which can be diagnostic in itself. This is in contrast to a chronic mental illness, such as schizophrenia, where psychosis persists.

Comorbid psychotic disorders such as schizophrenia spectrum and severe mood disorder with psychosis can exist. This can result in confusion with the psychosis being attributed to the wrong disease or condition. A characteristic that can help differentiate alcohol-induced psychosis from a chronic mental condition such as schizophrenia is that alcohol-induced psychosis generally presents as later onset. It also shows higher levels of depressive and anxiety symptoms plus fewer negative and disorganized symptoms, less functional impairment, and better insight and judgement.

When a small amount of alcohol produces intoxication this is an unusual condition known as alcohol idiosyncratic intoxication. This condition results in impaired consciousness, aggression, prolonged sleep, transient hallucinations, delusions, and illusions. These episodes occur rapidly, can last for a few minutes or hours, and are followed by amnesia. Alcohol idiosyncratic intoxication often occurs in elderly persons and those with impaired impulse control.

### **Case Study 1**

A white male 37 years old is stationed in Iraq. He arrived at a field hospital and complained that a superior officer placed poisonous ants in his helmet. On his face are signs of persistent scratching. When examining him, he has mildly slurred speech, a tremor, and a mint odor to his breath. His troop leader notes empty bottles of mouthwash in his Humvee and reports of the man falling asleep at his post. He discussed use of mouthwash instead of alcohol. Mouthwash is the only available form of alcohol in Iraq.

### **Case Study 2**

A woman forty-four years old is 2-days postsurgical hysterectomy. The woman is complaining of rabbits running across the room. She has tremors and is irritable and disoriented to time and place. She complains to nurses who stop and intrude too often.

The patient's lab data shows an elevated gamma-glutamyl transferase (GGT) and slightly elevated liver function test values. Her white blood cell count is normal. Her urinalysis is normal. Her blood alcohol level is 0.01. Her medications were held prior to surgery. The medications included acamprosate 666 mg three times a day and clonazepam 1 mg 4 times a day.

Her sister informed the nursing staff that the woman is usually on her fourth Manhattan cocktail by this hour of the day.

### *Discussion of Case Studies*

Remember that alcohol is a neurotoxin. It damages the brain in a complex manner. This is through prolonged exposure and repeated withdrawal. It results in significant morbidity and mortality. Alcohol-related psychosis can be an indication of chronic alcoholism. It is associated with neurological, medical, and psychosocial complications. Alcohol-related psychosis lacks in-depth research needed to understand demographics, pathophysiology, treatment, and characteristics. Additional information is needed about adequate knowledge of alcohol-related psychosis and what is effective up to date treatment.

## **Summary of Part 1**

In cases of substance-induced psychosis, it is critical that clinicians are able to properly assess and determine root cause. A diagnosis of substance induced psychosis provides a chance to work with the patient to resolve underlying mental illnesses and discourage a reliance on substance use. Because individuals with a history of psychosis have a higher than average suicide rate, early intervention by a qualified clinician is extremely important. Screening tools are useful to identify a substance use issue, in addition to a physical exam and other testing to diagnose signs personal self-neglect, a mental health crisis, and risk of harm to self and to others.

## **Introduction to Part 2**

Variable factors can lead to an initial episode or exacerbate an existing condition of psychosis. There are also different types of psychosis and age



can play a role in how psychosis develops. Illicit drug use in the young and medication-related psychosis in the elderly are examples of how a diagnosis of psychosis may emerge depending on age-related factors. Substance-related causes, such as too much of a substance or an adverse reaction to mixing substances, must also be considered when evaluating root cause of a psychotic episode. Clinicians need to bear in mind that substance-induced psychosis can include multiple factors and many types of substances. These include alcohol, illegal drugs, and medications. The sections in this course will discuss common substances such as caffeine and nicotine, illicit drugs and prescription medications, and briefly touch upon how alcohol interacts with other substances in ways that precipitate and may lead to serious psychosis.

### **Types And Causes Of Substance-Induced Psychosis**

A drug-induced psychosis, also known as substance-induced psychotic disorder, involves a break from reality as a result of using a drug or alcohol. As stated, when individuals use too much of a certain drug or mix drugs, a psychotic reaction can result because of an overly intoxicated state or individual vulnerability due to an underlying mental health condition. A substance-induced psychosis can be triggered as a result of abstaining from a drug or alcohol use, especially in individuals at risk of developing symptoms of withdrawal. It is widely believed that having a preexisting mental illness increases the risk of substance use, and therefore individuals with a history of mental illness and psychosis may experience an acute psychotic episode when intoxicated.

A substance use disorder has been defined as use of any prescription medication outside a physician's prescription, or excessive use of illicit and legal substances, such as caffeine, nicotine and alcohol. The varied

categories of substance use disorders, risks and prognoses are discussed in this section.<sup>7,34,49,52,65-67</sup>

## **Caffeine and Nicotine**

Generally, when consumed in large quantities, caffeine can cause mild to moderate anxiety. The amount of caffeine leading to anxiety varies. Caffeine can be associated with an increase in panic attacks if a person is predisposed to them.

Someone addicted to nicotine can be more likely to experience depression as compared to someone not addicted to nicotine. It is not clear how much this is due to cause or effect. In some cases, a person can use nicotine to regulate mood. It is not known if nicotine can lead to symptoms of depression. What researchers do know is that some people who quit smoking experience a craving and they present with depressive symptoms to some extent. These can be relieved by resuming nicotine use.

## **Sedative Medication**

The acute intoxication a person experiences with a sedative such as diazepam is similar to alcohol, which will be discussed in a later section. Withdrawal includes symptoms that are also similar to alcohol. It can lead to mood instability, anxiety, depression, sleep disturbance, tremors, nausea, and hyperactivity. It can also include hallucinations, illusions, and even grand mal seizures.

Withdrawal can be protracted with symptoms of anxiety, depression, perceptual distortion, muscle pain, twitching, tinnitus, dizziness, headache, depersonalization, and impaired concentration. It can include de-realization and a burning or prickling sensation in parts of the body that is known as

paresthesia. Most symptoms resolve in weeks while some symptoms can last a year or more after withdrawal. This includes anxiety, depression, paresthesia, and tinnitus. People who use sedatives long-term can experience difficulty with anxiety symptoms and respond poorly to anxiety treatments.

## **Cocaine and Amphetamine**

Heavy and long-term use of amphetamines can cause changes in the function of the brain. This can accompany extensive problems with concentration, memory, and, at times, psychotic symptoms. Even with several weeks of abstinence, a person who is addicted to stimulants may not be helped. Some report a chronic dysphoric state with symptoms of anxiety and the absence of pleasure called anhedonia. Use of cocaine and amphetamines provides a sense of euphoria sought by the person suffering from dysphoria and lack of enjoyment or pleasure in life.

Euphoria is associated with a mild to moderate intoxication from cocaine, methamphetamines, and other stimulants. Euphoria describes a sense of wellbeing, and the euphoric person perceives that he or she has greater powers of strength, thought, and accomplishment. It has been found that certain student test-taking skills can temporarily increase with low to moderate doses of amphetamines, primarily by those with attention deficit hyperactivity disorder (ADHD).

As a person begins to use more types and higher amounts of substances, eventually there is a decrease in the person's attention and an ability to function or concentrate. With street cocaine and methamphetamines, the chance of impulsive and dangerous behavior increases as dosing increases.

Also, there is an increase in impulsivity and the chance of violence and promiscuous sexual behavior.

Some who become chronic and heavy users of cocaine and amphetamine experience temporary paranoid delusional states. Unlike schizophrenic psychotic states, a person who experiences a paranoid state that is drug-induced likely has intact abstract reasoning and linear thinking. The delusions are more likely paranoid and less bizarre. With methamphetamine use, these psychotic states can last for weeks, months, and even years.

After intoxication, the stimulant drug user experiences a crash. The person becomes fatigued, depressed, and often craves more stimulant to relieve these withdrawal symptoms. This could be why those who use stimulants often go on week- or month-long binges. They can have a hard time stopping. At some point the ability of stimulants to produce a feeling of being high is lost. This is believed to be due to the washing out of neurotransmitters, resulting in a serious crash.

## **Hallucinogen Drugs**

Hallucinogen drugs can produce visual distortions and hallucinations. Some people who use hallucinogens experience a distortion of their sense of time. They also have feelings of depersonalization. Hallucinogens can also be associated with drug-induced panic and paranoia. They can contribute to delusional states in addition to the hallucinations. A hallucination induced by these drugs usually is more visual with enhanced shapes and colors. This is in comparison to hallucinations in the setting of schizophrenia, which are often reported as auditory and visual.

There is some debate whether a psychotic state can be induced by marijuana use. Some who use hallucinogens experience chronic reactions. This can involve prolonged psychotic reactions, depression, flashbacks, and exacerbations of preexisting mental disorders. These symptoms can occur after one or more psychedelic experiences. They can consist of flashes of light and an after-image prolongation in the periphery. These flashbacks are defined as *hallucinogen persisting perception disorder*, which are distressing or impairing to the patient.

Phencyclidine (PCP) is a hallucinogen drug that can cause dissociative and delusional symptoms. This can lead to violent behavior and amnesia of the intoxication. Individuals exhibiting an acute psychotic state with PCP use could be more likely to experience another episode of psychosis with repeated use.

## **Opioid**

An intense feeling of wellbeing and euphoria is characterized with opioid use. With withdrawal can come agitation, severe body aches, gastrointestinal (GI) symptoms, dysphoria, and craving to use more opioids. Symptoms can vary during withdrawal. Some individuals become acutely anxious and agitated, while others will experience depression and feel no enjoyment. With abstinence some individuals find that anxiety, depression, and sleep disturbances can persist for weeks with a protracted withdrawal syndrome. The ability to differentiate this from major depression or anxiety can be a challenge. Some clinicians may just treat the ongoing symptom cluster. For some people who become addicted to opioid use, being abstinent can lead to ongoing withdrawal symptoms. These symptoms are so powerful that relapse can occur. This occurs even with the best of motivations and

treatments. For such a person, opioid replacement therapy could help. This includes methadone and suboxone, which can be necessary and even life-saving. There can be atypical opioid withdrawal syndrome characterized by delirium. This can occur after abrupt cessation of methadone. Long-term use of opioids can be associated with moderate to severe depression.

### **MDMA (Ecstasy/Molly)**

Clinicians should be aware of issues related to the use of MDMA, which is also known as Ecstasy or Molly. Ecstasy can cause psychotic symptoms, panic, and antisocial activity. This is made worse because Ecstasy users tend to take MDMA in combination with other drugs such as alcohol, marijuana, cocaine, and Viagra. This is an especially dangerous practice.

It is dangerous to mix MDMA with alcohol and with other drugs as deaths have involved drug cocktails of MDMA mixed with other substances. Alcohol is involved in most MDMA related deaths.

Popular mixing of MDMA with an amphetamine has been done to prolong the MDMA state. Mixing or drug cocktails can also lead to anxiety and paranoia. Physical compromise can result as well, because too much amphetamine places a great strain on the heart and kidneys. There have been a few scientific studies into the effects of combining psychoactive drugs but it is widely accepted that when mixing MDMA with alcohol, a greater strain is exerted on the kidneys. Further, heavy drinking can lead to dehydration and a worse come-down from MDMA. Overheating is also more likely.

### **Methamphetamine Use And Addiction**

Methamphetamine is a psychostimulant that is most often smoked or snorted. It is less commonly injected or ingested orally. Health clinicians should be aware of issues related to methamphetamine use and addiction. This includes epidemiology, clinical manifestations and course of symptoms, assessment, and diagnosis.<sup>48,77</sup>

## **Pathogenesis**

Methamphetamine is a psychostimulant that causes an increase in the synapse of monoamine neurotransmitters. This includes dopamine, norepinephrine, and serotonin via molecular mechanisms that include redistribution of catecholamines from synaptic vesicles to the cytosol. Reversal of transport of neurotransmitter through plasma membrane transporters also occurs. Other mechanisms include blocking the activity of monoamine transporters, decreasing the expression of dopamine transporters at the cell surface, inhibiting monoamine oxidase activity, and increasing the activity and expression of tyrosine hydroxylase, the critical enzyme for synthesizing dopamine.

Use of methamphetamine exerts its effects via the dopamine system. The consequence of these processes is that dopamine becomes highly concentrated in the synaptic cleft and is available to post-synaptic uptake and subsequent signaling.

Neuroimaging studies have been done on methamphetamine addicted individuals. The studies show lower striatal and orbitofrontal dopamine D2 or D3 receptor availability. This is associated with higher impulsivity. Studies also show lower dopamine transporter and vesicular monoamine transporter type-2 in the striatum as well as in orbitofrontal and dorsolateral prefrontal cortex. This persists even after protracted sobriety.

Research in animals suggests human brain structures are highly sensitive to oxidative stress. This includes the hippocampus as it may be affected by chronic methamphetamine use. Other studies in animals show that methamphetamine increases the blood brain barrier permeability in the hippocampus. Several molecular mechanisms have been proposed to contribute to methamphetamine-induced neurotoxicity and these include oxidative stress as with free radicals in the intracellular space, and others include excitotoxic mechanisms, such as excessive glutamate and neuro inflammation. Dysfunctional recycling of proteins is another mechanism as is a mitochondrial dysfunction with, for example, abnormal carbohydrate metabolism.

Neurotrophic factor dysfunction, such as the altered growth or development of neurons and glia, is another mechanism that is changed in the blood brain barrier. This may enable the entry of pathogens into the brain parenchyma. This could decrease endogenous brain repair resources. Studies of the human brain of individuals with a history of multiple drug use, and not necessarily stimulants, were found to show extensive evidence of neurotoxicity. Systematic histological, immunohistochemical, and morphometric studies of the brains of individuals with multiple drug use show profound neuronal loss. They also show neurodegenerative alterations and changes in microvasculature, among other neuronal toxic effects.

### **Clinical Manifestations**

It is useful for clinicians to be familiar with the clinical manifestations of methamphetamine use and the symptoms and complications related to both acute intoxicated and withdrawal states when formulating a diagnosis of methamphetamine use and addiction. Concerning clinical manifestations, the



effects of methamphetamine use are almost immediate. This is in part due to the routes of administration.

Methamphetamine has been found most often to be smoked with 68 percent of users. It is snorted by 31 percent of users, less commonly injected with 7 percent of users, and orally ingested with 3 percent of users.

Methamphetamine rapidly enters organs that are well perfused, which includes the brain. It has a half-life of about 9 to 13 hours. Acute behavioral effects, morbidity and mortality reports are further explained here.<sup>47,79</sup>

### *Acute Behavioral Effects*

Methamphetamines accumulate in the brain in concentrations up to 10 times greater than in the plasma. The acute behavioral effects of methamphetamine can include sympathetic nervous system activation, euphoria, increased energy, increased alertness, increased sexuality, excessive talking, sweating, disrupted sleep patterns, decreased need for sleep, weight loss, dry mouth leading to tooth decay, tightened jaw muscles, grinding teeth, and itching. Chronic adverse mood and cognitive changes, including irritability, anxiety, aggression, panic, suspiciousness, and/or paranoia, hallucinations, executive dysfunction, disorganized thinking, and memory impairment may also result.

### *Risky Sexual Behavior*

Concerning risky sexual behaviors, users of methamphetamine typically have more sexual partners and are more likely to engage in risky sexual behaviors. This is in part because methamphetamine enhances libido. In national studies of risky youth behavior representative samples of high school students in grade nine to twelve showed that lifetime

methamphetamine use was associated with greater likelihoods of recent sexual intercourse, multiple recent sexual partners, and pregnancy.

### *Methamphetamine-induced Psychosis*

Concerning psychosis, an estimated 8 to 27 percent of individuals using methamphetamine experience methamphetamine-induced psychosis. Symptoms can include paranoia, persecutory delusions, auditory, visual, and tactile hallucinations. Methamphetamine associated psychosis is characterized by relatively long duration of psychosis. There can be recurrence without relapse to using the drug. A meta-analysis found that methamphetamine use and addiction was associated with medium effect-size deficits in memory, executive functions, information processing speed, language, and motor skills.

### *Early Abstinence Syndrome*

People can experience an early abstinence syndrome after cessation of methamphetamine use, which manifests as one or more symptoms that include excessive hunger, inability to feel enjoyment, irritability, poor concentration, and insomnia or hypersomnia. Psychomotor agitation or retardation are also possible. Most of these symptoms can resolve within two weeks. The exception is sleep disruption, which can last as long as four weeks.

### *Cardiovascular Disease*

Cardiovascular disease is a health consequence of methamphetamine drug use. A review of clinical and experimental evidence showed that individuals who use methamphetamine are at an increased risk of heart disease. The review further concluded that the risk of heart disease is not likely to be

limited to the duration of the individual's methamphetamine use but the risk is greater among those who are chronic methamphetamine users.

Pre-existing cardiac pathology can increase the risk of an acute cardiac event. Methamphetamine use is also likely to exacerbate the risk posed by cardiac pathology from other causes.

### *Early Mortality*

Health consequences associated with methamphetamine use has been associated with increased risk of early mortality. As an example, in a study of 1254 subjects with methamphetamine use who were admitted to a psychiatric center, the five-year rate of all-cause mortality was approximately 5 percent. This is an observed death rate 26 times greater than expected in women and 6 times greater than expected in men.

### **Methamphetamine Addiction: Assessment and Diagnosis**

In one nationally representative U.S., survey, about 5 percent of respondents who used non-prescribed stimulants were estimated to develop a methamphetamine use disorder over a two-year period. Soon after the onset of use, methamphetamine users were more likely to become addicted as compared to users of other stimulants. The transition from non-addicted use of methamphetamine to methamphetamine addiction is not known.

Methamphetamine addiction can often be characterized by repeated periods of intense use with intermittent sobriety and relapse. There are a few long-term studies. Analysis of methamphetamine use in individuals with chronic use over a 10-year period following initiation found that subjects used the drug an average of approximately 12 days per month. Limited studies are

available to evaluate patient characteristics associated with completing treatments or outcomes.

Analysis of outpatient or residential treatment episodes for methamphetamine use and addiction has been studied. Non-completion of treatment has been found to be associated with patient and clinical characteristics including less than a high school education. Other associations were younger age of treatment admission, concurrent disability, greater severity of methamphetamine use prior to treatment, and methamphetamine injection. Studies also indicate that methamphetamine users who used the drug by injection had particularly poor treatment outcomes. For example, methamphetamine users in outpatient treatment had been studied that focused on patients who injected the drug. Relative to those using other routes of administration, those who injected had poorer treatment engagement.

Patients with a history of injecting methamphetamine had greater drug use during treatment, lower rates of treatment completion, and greater methamphetamine use 12 months following treatment. Social pressure to use methamphetamine has been found to be a leading antecedent of relapse.

### *Assessment*

An initial exam of a patient should focus on current use of methamphetamines. This includes the amount, pattern, route of administration, and progression of recent use. The exam should look at the comorbidity of other psychiatric disorders plus the medical consequences of methamphetamine use. Patients should be assessed for the presence of depression, anxiety, and psychosis. In addition, a patient should be assessed

for use of other substances, personality disorders, and medical conditions, including cardiovascular and central nervous system disease.

Additionally, the socio-cultural context of methamphetamine use is an important part of patient evaluation. This is needed to identify factors that might predict relapse. It includes consideration of who the patient has regular contact with, peers or partners, to determine if these persons continue to use the drug.

### *Methamphetamine Use Disorder Diagnosis*

Methamphetamine use disorder is defined as a maladaptive pattern of use within a 12-month period associated with recurrent use in one or more items of physically hazardous situations, such as driving, recurrent legal problems related to use, failure to fulfill an obligation at work, school, or home, and continued use despite methamphetamine-related social or interpersonal problems. The maladaptive pattern of use identified in methamphetamine addicts (over a 12-month period) is associated with three or more of the following outcomes:

1. Tolerance
2. Withdrawal
3. Methamphetamine taken in larger quantity than was the intent
4. Persistent desire to control use
5. Persistent desire to cut down on use
6. Time is spent obtaining, using, or recovering from methamphetamine
7. Social, occupational, or recreational task sacrifices
8. Use despite physical and psychological problems

Diagnosis of a comorbid psychiatric disorder most commonly includes an anxiety disorder, a depressive or psychotic disorder, or ADHD. Diagnosing a comorbid psychiatric disorder can be a challenge when the individual is actively using methamphetamine. This is because methamphetamine use can induce psychiatric disorder symptoms. A drug-free period of at least a month is suggested before diagnosing a mental disorder that is concurrent with drug use.

Differential diagnosis is a consideration as symptoms can be related to methamphetamine use yet distinguished from other mental and substance-use disorders that can present similarly. With use of the drug can come psychotic symptoms and disorganized thinking that can be indistinguishable from an acute psychotic episode due to other causes. Some of the causes are schizophrenia, schizoaffective disorder, acute manic episode, and use of other stimulant drugs, including cocaine, phencyclidine (PCP), and synthetic cathinone (bath salts).

Anxiety disorder symptoms can be associated with the effects of drug use. The effect of methamphetamine intoxication or withdrawal can mimic an anxiety disorder. Also, methamphetamine withdrawal can be difficult to distinguish from a major depressive disorder if withdrawal symptoms persist as long as two weeks. Differentiating a methamphetamine-use disorder from other mental disorders can be a challenge. What can help with the diagnosis process is information from individuals close to the patient, a detailed history of prior episodes, and a urine toxicology test for methamphetamine and other drugs. A urine toxicology test can identify if there is use of methamphetamine. However, no current laboratory or neuroimaging tests are useful in diagnosing methamphetamine use and addiction.

Radiographic and laboratory tests cannot predict outcomes for a methamphetamine use disorder following treatment. Some important points to remember about use of methamphetamines are highlighted here.

- Amphetamine-type use disorders are on the rise worldwide.
- Methamphetamine has profound and multi-level effects on the dopamine system in the brain.
- Methamphetamine increases the synaptic availability of this neurotransmitter following intake.
- Clinical manifestations of methamphetamine use include intense euphoria, energy, increased libido, and excessive talkativeness with some patients experience psychotic symptoms.
- Methamphetamine use and addiction can be prolonged and often characterized by repeated episodes of intense use, sobriety, and relapse.
- Individuals who inject the drug experience a worse course compared to those with other routes of administration.

The assessment process should focus on the severity of methamphetamine use, comorbid conditions, and psychosocial factors that could contribute to future relapse of drug use.

### **Diagnosis Of A Substance-Induced Mental Disorder**

The diagnosis of a substance-induced mental disorder is typically provisional. It requires reevaluation, which should be done repeatedly. What appears to be an acute mental disorder can actually be a substance-induced psychotic disorder. Some people who have what appears to be a substance-induced psychosis can actually have a dual diagnosis. They have both a substance use disorder and a co-occurring mental disorder. These patients can be

acutely suicidal, and should be evaluated for risk of harm to self as well as harm to others.<sup>64,67,78,80</sup>

For some people who are addicted to a substance, drugs can become more important than jobs, family, friends, and even children. A change in personal priorities can also be diagnosed as a personality disorder. Clinicians should keep in mind that the diagnosis of personality disorder is challenging and takes time to formulate. It is possible that with abstinence the symptoms of a personality disorder will clear. It can happen even somewhat early in recovery. Clinicians should consider drug dosage, environmental surroundings, preexisting mood state, and personal expectations when developing an understanding of how a particular person experiences a substance-induced psychotic disorder.

Diagnosing and treating a person with a substance use disorder can also take time. A substance use disorder could require abstinence for weeks or months. During abstinence is when clinicians can make a definitive diagnosis for an independent and co-occurring mental disorder. In a substance use treatment program, the staff can concentrate on screening for a mental disorder. The staff should determine the severity of symptoms and keep in mind an understanding of an overall life situation and peer support network.

## **Case Studies**

In diagnosing a substance-induced mood disorder and psychosis there are criteria developed by the American Psychological Association. One consideration of the criteria is that a prominent and persistent disturbance in mood predominates. This is characterized by a depressed mood or markedly diminished interest or pleasure in activities. It can also be characterized by



an elevated, expansive, or irritable mood. Other criteria include evidence from the history, physical examination, or laboratory findings that the symptoms developed during or within a month after substance intoxication or withdrawal, or medication use, is related to the mood disturbance. On the other hand, there are other criteria suggesting the disturbances are not better explained by a mood disorder.

Other criteria focus on how the symptoms cause clinically significant distress or impairment. The following case studies help to elucidate how substance-induced psychosis and mental illness can often overlap.

### *Case Study 1*

John is a male who is divorced and 35 years old. He was brought into an emergency room intoxicated. His blood alcohol level was .152. The toxicology screening showed positive for cocaine. He was suicidal. He stated that this time he would "do it right".

His history showed three psychiatric hospitalizations. The history also showed two inpatient substance use treatments. For each psychiatric admission there was first substance use. He never followed through with mental health care. He attended Alcoholics Anonymous, but not recently.

### *Case Study 2*

Mary is a divorced female, 35 years old. She was brought into a detox unit with a blood alcohol level of .150. After four days in a detox unit, she was observed to be depressed and withdrawn. She had little energy, poor concentration, and fleeting suicidal thoughts. She stated that she was fine and not depressed. She noted that life was good last week after her relapse.

Mary had not used drugs other than alcohol. She began drinking at age 32. She had alcohol related problems since drinking.

A psychiatric hospitalization for depression was reported during the history taking. Mary had three hospitalizations at age 20, 24, and 30. She had a positive response to antidepressants. She was not currently receiving mental health services or treatment for substance use. A diagnosis of alcohol use and addiction existed with a relapse and substance induced mood disorder. She had a likely history of major depression but it was not active.

### *Discussion of Case Studies*

When making an initial diagnosis for the case studies and in determining a treatment decision, the health clinician should examine many factors. It should be considered, for example, that John (Case Study 1) had psychiatric admissions that were two to three days long. If the discharges were that John left against medical advice, the clinician should factor that in when formulating a diagnosis. In John's case, the decisions about diagnosis and treatment could have been different than if admissions had been two to three weeks long.<sup>48</sup> It is likely in John's case that this is a substance-induced suicidal state. Referral at discharge could be a substance use treatment agency rather than a mental health center.

It should be determined whether two of John's psychiatric admissions were two or three weeks long with clearly defined manic and psychotic symptoms continuing throughout the course of stay. This would be despite aggressive use of mental health care and medication. It is more likely that John has a bipolar disorder combined with an alcohol use and addiction disorder, and that he requires integrated treatment for both severe alcoholism and bipolar disorder.

In Mary's case, it should be considered that she became increasingly depressed and withdrawn over the past 3 months. She also had for a month experienced disordered sleep, poor concentration, and suicidal thoughts. A possible diagnosis here could be major depression with an acute alcohol relapse, rather than a substance-induced mood disorder secondary to an alcohol relapse.

### **Mixing Substances And Psychosis**

This section reviews some reported common alcohol and drug combinations that increase the risk of a substance-induced psychosis. Some could lead to a psychotic episode or consequence. Health clinicians should be aware of, and rule out, whether a person has taken a mix of drugs. Mixing drugs complicates the patient's diagnosis and treatment plan.<sup>47-50</sup>

Alcohol and energy drinks with caffeine are one combination that is reported to trick the body into thinking it is not tired. The person may be more intoxicated than they feel. This can lead to alcohol poisoning. Energy drinks can also increase dehydration. Those who consume this combination could be more likely to experience serious side effects and need medical attention. This can include use of drinks known as Red Bull or Monster and a pre-mixed drink such as Four Loko.

Alcohol and ADHD medication that combines dextroamphetamine and amphetamine (commonly known as Adderall) is another reported combination whereby the ADHD medication causes a person to *not* feel as drunk as they really are. This can lead a person to make dangerous decisions. The person could be unaware of their level of intoxication. Alcohol is a depressant whereas the ADHD drug (Adderall) is a stimulant. This

means that drinking alcohol while taking Adderall can cause cardiac arrhythmias. It can also cause a psychotic reaction or paranoia. This is in addition to other symptoms of dizziness, vomiting, muscle twitching, and headaches.

Alcohol and pain killers are another combination used and can include hydrocodone, alprazolam, oxycodone, and meperidine. This can be a dangerous combination. Mixing these substances can lead to respiratory depression and an intensified sedative effect.

Alcohol and marijuana are another reported combination that can cause very strong paranoia. It can also lead to heavy vomiting, decreased motor control, and decreased mental concentration. Marijuana suppresses the gag reflex. This means a person is not able to throw up alcohol when needing it to happen.

Alcohol and cocaine combination use tends to be tried because users think they will cancel each other out, which is not true. This combination produces a unique substance called cocaethylene. In a high amount, cocaethylene increases the risk of cardiovascular toxicity. This can lead to stress on the heart.

Alcohol and heroin are a combination where each substance is known to cause depression of the central nervous system. In combination the mix can be dangerous and even fatal.

Alcohol and Ecstasy has been a reported dangerous combination. As mentioned, it is well known that users should never mix Ecstasy with another drug and especially alcohol. Ecstasy related deaths are due for the

most part because of mixing of alcohol with the drug. The mixture reduces the feeling of ecstasy's high. It puts a great strain on the kidneys. Dehydration caused by drinking alcohol happens more rapidly when someone takes it in combination with Ecstasy.

Alcohol and LSD/acid are another reported mixture known to slow down its effects and is used for relaxation. Unfortunately, the combination usually makes the comedown of the drug worse with vomiting and nausea.

Alcohol and mushrooms are a combination also reported with the mushrooms or "shrooms", a psychedelic not meant to be taken with any other drug. The intention for the mixture is to take away the effect and high of the mushrooms as alcohol is a depressant. This outcome is not a guarantee. Side effects can be nausea and vomiting.

Amphetamines alone are risky to take. They place a strain on the heart and increase blood pressure. Mixing amphetamines with alcohol can make the side effect of amphetamines ever more serious. Consuming alcohol while taking amphetamines can make someone act aggressive. The combination can also harm the kidneys and intensify a hangover.

Alcohol and antibiotics are a combination that should be avoided. Some labels for prescription drugs indicate patients should not take alcohol. Taking alcohol while on antibiotics can cause dizziness, nausea, fatigue, vomiting, headache, flushing, rapid heart rate, shortness of breath, and convulsions. Liver damage can also result since antibiotics and alcohol are broken down through the liver. The effect of the antibiotic is diminished if taken with alcohol.

Alcohol and antidepressants are another reported mixture. This can cause an increased response to alcohol. One drink could feel like two. The combination can cause unexpected emotions. The combination could also inhibit the effect of the antidepressant.

Caffeine in combination with MDMA or Ecstasy can lead to hyperthermia and serotonergic loss. Clinicians should be aware that caffeine promotes acute and long-term toxicity associated with Ecstasy. It is a serious drug interaction. It can have long term health consequences for the recreational drug user.

These combinations or mixing of drug use can cause a psychotic reaction. The following section discusses in more detail the mixing of substances, which include illegal or street drugs in combination with alcohol and medications.

### **Illegal Street Drugs And Psychosis**

Illegal and street drugs can lead to psychosis. Some of these illegal and street drugs include MDMA (Ecstasy or Molly), Phencyclidine (PCP), and Ketamine. Others are synthetic research chemicals used recreationally, including JWH-018 and other synthetic cannabinoids or mixtures containing them. These include drug names such as Kronic, MNG, Mr. Nice Guy, and Relaxinol. Also causing psychosis in people are various "JWH-XXX" compounds in what is called Spice or Incense. Other substances that can lead to psychosis include Mephedrone and related amphetamine-like drugs sold as plant food or bath salts.

Certain plants can cause psychosis. Some of those plants are Hawaiian baby woodrose (containing ergine), Morning glory seeds (containing ergine), Jimson weed (Datura, angel's trumpet, thorn apple), Belladonna (deadly nightshade), and Salvia divinorum.

Volatile solvents and gases (inhalants) can also lead to psychosis. Some of them are butane, gasoline (petrol), and toluene as found in glue, paint, and paint thinner.

### **Dangers of Black Market Fentanyl and Addiction**

Illegal use of Fentanyl and its analogs appeared in the mid-1970's. It continues until today. There are reports of a dozen different analogs of fentanyl produced clandestinely and identified in drug traffic in the United States. In 2015, death from fentanyl overdose was declared in Canada to be a public health crisis. It continues to be a significant public health problem. Reports in 2016 showed deaths from fatal overdoses of fentanyl in British Columbia, Canada, average at two persons per day. The cause of death of the musician Prince in 2016 was linked by medical examiners to an accidental fentanyl overdose. Fentanyl was among the counterfeit drugs found from the home of Prince after his death.<sup>86-88</sup>

The effects of fentanyl analogs can be similar to the effects of heroin. Some people report less euphoria associated with fentanyl and a stronger sedative and analgesic effect. Analogs of fentanyl can be more potent than street heroin. Fentanyl can produce more respiratory depression and be more dangerous than heroin to a user. Fentanyl can be used orally, smoked, injected, or snorted. It can be sold as oxycodone or heroin with this leading to overdoses. A fentanyl overdose can at first be classified as a heroin overdose.<sup>86-88</sup>

On the black market, fentanyl can be sold in the form of a transdermal fentanyl patch such as Duragesic. This is diverted from a legitimate medical use. The gel from the patch can be injected or ingested. Also, on the streets the Actiq lollipop is available and provides another form of fentanyl. At a pharmacy the price can be 15 to 50 dollars. On the black market the price can be 5 to 25 dollars. Certain states have launched investigations into diversion from legitimate pharmaceutical markets. This includes Pennsylvania and Connecticut.

What can be very dangerous and result in death is non-medical use of fentanyl by an individual with no opiate tolerance. Even someone with an opiate tolerance can be at high risk for an overdose. Once fentanyl is in someone's system, it is difficult to stop its course. This is because of the nature of the absorption. Illegally created fentanyl powder has also been seen in the United States market. As pure fentanyl powder has an extremely high strength, it is hard to dilute the powder appropriately. This can result in a mixture that is far too strong and very dangerous.<sup>85,88</sup>

Some drug dealers mix fentanyl powder with heroin. This is to increase potency or compensate for a low quality heroin. There have been cases of illegally manufactured and non-pharmaceutical fentanyl mixed with cocaine that caused an outbreak of overdose deaths. These deaths were in Canada and the United States, reportedly noted to occur in Dayton, Ohio, Chicago, Detroit, and Philadelphia.

Mexico is the source of much of the illicitly manufactured fentanyl powder sold in the United States. However, there is also a domestic fentanyl lab in Azusa, California. This lab created counterfeit oxycodone 80 mg containing fentanyl instead of oxycodone. The lab also created bulk fentanyl and other



drugs. There is also an operation making counterfeit alprazolam and oxycodone in Cottonwood Heights, Utah. The accused operation had ordered fentanyl powder from China and owned a pill press. There are reports of several large quantities of illegally produced fentanyl being seized by United States law enforcement agencies. One account is of 2 pounds (945 grams) of 83 percent pure fentanyl powder seized by California border control agents from a vehicle that entered from Mexico.

The form of fentanyl called China White refers to a number of clandestinely produced analogs, which includes  $\alpha$ -methylfentanyl (AMF). The Department of Justice classified these as Schedule 1 drugs in the United States. AMF involves extra difficulty from a synthetic point of view but the resulting drug is relatively more resistant to metabolic degradation. This means that the drug has an increased duration.

The United States Centers for Disease Control and Prevention (CDC) issued a health advisory to emergency departments concerning acetylfentanyl. This is a synthetic opioid analog of fentanyl. It has not been licensed for medical use. This drug caused 13 overdose deaths among intravenous drug users. The CDC also conducted a study with the conclusion that 82 percent of fentanyl overdose drugs involved fentanyl that was illegally made. Only about 4 percent were suspected to be a prescription drug.<sup>85,88</sup>

Starting in 2015, Canada saw a widespread number of fentanyl overdoses. There is speculation that the drug is being imported from Asia by organized crime groups. The drug is suspected to be in powder form and pressed into pseudo oxycodone tablets. We also see reports of traces of the drug in recreational drug mixtures that include cocaine, MDMA, and heroin. Reports

are of multiple deaths. The demographic goes from homeless people to young professionals including multiple teens.

### *Fentanyl Side Effects*

Fentanyl can be a buccal film, buccal tablet, compounding powder, injectable solution, intravenous solution, nasal spray, oral lozenge, oral lozenge, sublingual spray, sublingual tablet, transdermal device, and transdermal film extended release. It has side effects that can include fever, respiratory depression, nausea, vomiting, hypoventilation, confusion, convulsions, mood changes, seizures, thinking abnormalities, and seeing, hearing, or feeling things that are not there. It should be noted that hallucinations, anxiety, depression, and confusion are among fentanyl's side effects.<sup>84-86</sup>

A more complete list of fentanyl side effects can include tarry stools, blurred vision, chest pain, cough, decreased urine, difficult or labored breathing, dizziness, dry mouth, fainting, fever or chills, increased thirst, irregular heartbeat, lightheadedness, loss of appetite, lower back or side pain, muscle pain or cramps, nervousness, painful urination, numbness or tingling in the hands, pale skins, rapid breathing, sunken eyes, sneezing, sore throat, tightness in the chest, wrinkled skin, and swelling of the hands, headache, abdominal or stomach pain, change in walking and balance, clumsiness or unsteadiness, decreased awareness or responsiveness, decreased frequency of urination, muscle twitching or jerking, pounding in the ears, rhythmic movement of the muscles, severe constipation, severe sleepiness, shakiness in the legs, slow or fast heartbeat, and trembling or shaking of the hands or feet. Most common side effects include feeling sad or empty, loss of interest or pleasure, discouragement. Irritability, tiredness, trouble concentration, trouble sleeping, back pain, diarrhea, back pain, pain in the joints, muscle stiffness, lack or loss of strength, difficult have a bowel movement, and

difficulty with moving. In the nervous system, fentanyl side effects can include dizziness, sleepiness, sedation, pyrexia, fatigue, lethargy, tremor, headache, chills, irritability, malaise, confusion, abnormal thinking, and anxiety.

The psychiatric side effects placing the user at greater risk of a mood disorder and psychosis include depression, a confused state, hallucination, insomnia, anxiety, agitation, restlessness, agitation, disorientation, abnormal dreams, depersonalization, depression, emotional lability, euphoria, and delirium.

### **Other Illegal Drugs and Classifications**

Fentanyl was mentioned earlier as China White. This refers to a number of clandestinely produced analogs including  $\alpha$ -methylfentanyl (AMF). As the Department of Justice classified these as Schedule 1 drugs in the United States, Schedule 1 classification and what this and other classifications mean should be considered. The Drug Enforcement Agency (DEA) in the United States classifies drugs, substances, and certain chemicals used to make drugs. There are five distinct categories or schedules that depend on the drug's acceptable medical use and the potential for drug use and addiction. The drug use rate is a factor that determines the schedule for the drug. As an example, a Schedule I drug has a higher potential for use and for creating severe psychological and/or physical addiction. A Schedule V drug represents the least potential for use. The drug use potential varies depending on the potential for addiction.<sup>90-92</sup>

The Controlled Substance Act (CSA) Scheduling or CSA Scheduling for a listing of drugs and their schedule is a helpful reference. The list appears in

alphabetical order and describes the basic or parent chemical. The list is meant as a general reference and is not a comprehensive listing of all controlled substances. If a substance does not appear on the list, it can be treated as a Schedule I substance for criminal prosecution. A controlled substance analog is a substance that is intended for human consumption plus is pharmacologically and structurally similar to or is represented as being similar to a Schedule I or Schedule II substance. It is not an approved medication in the United States.

Schedule I drugs, chemicals, or substances are drugs with no currently accepted medical use. These have a high potential for abuse. Examples are heroin, lysergic acid diethylamide (LSD), marijuana (cannabis), 3,4-methylenedioxymethamphetamine (ecstasy), methaqualone, and peyote. Schedule II drugs, chemicals, and substances are drugs with a high potential for abuse. When used, these drugs can potentially lead to severe psychological and physical addiction. These drugs are considered to be dangerous. Some examples are combination products with less than 15 milligrams of hydrocodone per dosage unit, cocaine, methamphetamine, methadone, hydromorphone, meperidine, oxycodone, and, as previously discussed, fentanyl.<sup>90-92</sup>

### **Prescription Medication And Psychosis**

Some prescription medications can lead to psychosis, and include muscle relaxants, antihistamines, analgesics, anticonvulsants, antidepressants, chemotherapy agents, corticosteroids, cardiovascular and antihypertensive medications, analgesics, anticonvulsants, and anti-Parkinson medications. Fluoroquinolone drugs have been linked to serious cases of toxic psychosis that have been reported to be irreversible and permanent. The related quinoline derivative mefloquine has also been associated with psychosis.<sup>52</sup>

Levofloxacin is an antibiotic of the fluoroquinolone drug class.<sup>51</sup> It was approved for medical use in the United States in the mid-1990s. Psychosis and other side effects of the drug can occur. Levofloxacin has been used to treat a number of bacterial infections including acute bacterial sinusitis, urinary tract infections, pneumonia, chronic prostatitis, and some types of gastroenteritis. It can also be used to treat tuberculosis, meningitis, or pelvic inflammatory disease and is available by mouth, intravenously, and in eye drop form.<sup>83</sup> Unfortunately, serious side effects from the drug other than psychosis include potentially permanent peripheral nerve damage, seizures, tendon inflammation, and tendon rupture. Less serious side effects include nausea, diarrhea, and trouble sleeping. Tendon damage appearing months after treatment is completed has been seen.

Common prescription medications and their possible psychotic effects include those prescribed for attention deficit hyperactivity disorder. These are methylphenidates and are known by a variety of brand names. Psychotic effects can include violent behavior, aggression, psychotic behavior, suicidal ideation, and visual hallucinations.<sup>52</sup> Other prescription drugs that could cause possible psychotic effects include antiepileptics, L-dopa, scopolamine, atropine, anticholinergic drugs, and corticosteroids. Corticosteroids used to treat inflammatory conditions sometimes require doses for an extended time, such as weeks to months. Steroid use may lead to psychiatric symptoms such as psychosis, delirium, and mixed mood states of mania and depression.

Selective serotonin reuptake inhibitors (SSRI) antidepressants are prescribed for depression, anxiety, post-traumatic stress disorder (PTSD), panic disorder, and obsessive compulsive disorder (OCD) are drugs that include fluoxetine, sertraline, paroxetine, citalopram and escitalopram.

Psychotic effects can include violent behavior, mania and manic-like symptoms, suicidal thoughts and behaviors, and akathisia, which is an overwhelming physical and mental restlessness that can lead to destructive behavior.<sup>58</sup>

An anti-malaria drug, mefloquine, can cause possible psychotic effects that include nightmares, depression, hallucinations, psychosis, paranoia, and aggression.<sup>54</sup>

Prescribed for severe acne are drug names such as isotretinoin. Possible psychotic effects include emotional instability, violent behavior, aggression, psychosis, depression, and suicidal ideation and attempts.<sup>55</sup>

Anxiety, insomnia, epilepsy, muscle spasms, and anesthesia are treated by benzodiazepines. These drug names include diazepam, alprazolam, lorazepam, and clonazepam. Possible psychotic effects include suicidal ideation, depression, antisocial behaviors, attacks of rage or violence, hostility and impulsivity, irritability and aggression, and increased excitement.<sup>56</sup>

Some over the counter drugs can also have psychosis as a side effect. These non-prescription drugs include dextromethorphan (DXM) at high doses, certain antihistamines at high doses, and cold medications containing phenylpropanolamine (PPA).

### **Recognizing The Symptoms Of Substance-Induced Psychosis**

The symptoms of substance-induced psychosis include hallucinations, persecutory delusions, paranoia, and delirium tremens. The hallucinations

can be visual, auditory, and tactile. Paranoia is a thought process influenced by fear and anxiety. This can be delusional and irrational.<sup>58</sup>

Paranoid thinking can include persecutory thoughts and beliefs of conspiracy. This involves a perceived threat by the affected individual. It can also involve general distrust of others. While others may see an event as a coincidence or accident, someone with paranoia will see the same event as intentional and threatening.

Persecutory delusions include a set of delusional conditions. This is where the affected person believes they are being persecuted. The person with persecutory delusions thinks harm is occurring or going to occur. The individual also thinks that the perceived persecutor wants to cause harm. This is one of the most common forms of delusion for someone who has paranoid schizophrenia. The person believes they are being tormented, ridiculed, tricked, or spied on. Persecutory delusions can also appear in episodes of bipolar disease, depressive episodes, and can be a symptom of substance use.

A hallucination is a perception in the absence of external and real stimulus. It has the quality of a real perception. They are typically vivid, substantial, and perceived to be located in external objective space and the real world. Hallucinations are distinguishable from a related phenomenon such as dreaming, which does not involve wakefulness. It is also related to an illusion, which involves a distorted or misinterpreted real perception. In addition, a hallucination is related to imagery that does not mimic real perception and is under voluntary control.<sup>76</sup>

A pseudo hallucination does not mimic real perception, but is not under

voluntary control. Hallucinations also differ from delusional perceptions where a correctly sensed and interpreted stimulus such as a real perception is given some additional and typically absurd significance.<sup>76</sup>

According to the National Alliance on Mental Illness (NAMI), psychosis refers to an episode in which an individual has a break from reality. This does not require delusions but can include it. It also does not require false beliefs when clear evidence shows the belief is false, such as someone who believes insects are crawling up a wall. It can include hallucinations but does not require them. About 3 in every 100 people will experience at least one episode of psychosis in a lifetime.<sup>67-69,72</sup>

A drug-induced psychosis is also known as a substance-induced psychotic disorder. It refers to any psychotic episode related to the use of an intoxicant. This can result from taking too much of a certain drug. It can also result from having an adverse reaction after mixing substances. Another possibility occurs during withdrawal from a drug. It also applies if an individual has an underlying mental health issue. Taking a certain kind of drug does not suddenly trigger a severe mental illness when none existed. Instead, mental illness is a predictor of substance use. Someone prone to psychosis can find a trigger if they are overly intoxicated.

A substance use disorder is defined as any use of an illicit intoxicant, any use of a prescription medication outside the direction of a physician, or excessive use of legal substances such as alcohol. A national survey on drug use and health as conducted by the Substance Abuse and Mental Health Services Administration's (SAMHSA's) showed the following statistics:<sup>94</sup>

*"Approximately 21.5 million people aged 12 or older in 2014 had a substance use disorder in the past year, including 17 million people*



*with an alcohol use disorder, 7.1 million with an illicit drug use disorder, and 2.6 million who had both an alcohol use and an illicit drug use disorder. The percentage of people aged 12 or older in 2014 who had an SUD (8.1 percent) was similar to the percentages in 2011 to 2013, but it was lower than those in 2002 through 2010. Percentages of adolescents aged 12 to 17 and young adults aged 18 to 25 who had an alcohol use disorder, marijuana use disorder, or pain reliever use disorder in 2014 were lower than the percentages in several or all years from 2002 to 2012."*

The statistics do not include people who occasionally use drugs and are not considered to have an issue with addiction.

Concerning drug use, psychosis can be caused by the use of certain prescription medications or hallucinogens. In a rare case, a sensitive person can experience psychosis as a side effect when properly taking a prescription drug. Medications can include possible psychotic side effects, such as antihistamines, antidepressants, antihypertensive medications, analgesics, anti-Parkinson medications, chemotherapy agents, corticosteroids, cardiovascular medications, and muscle relaxants. As soon as a psychotic symptom appears when taking prescription medication, the person taking the medication or a cognizant individual should immediately contact a physician. It could be necessary for the person to stop taking the medication. Psychosis can be more possible when inappropriately taking these medications outside of a prescribed routine.

With use of a nonprescription intoxicant, the likelihood of a psychotic symptom and manifestation varies from substance to substance. An example is with taking a large quantity of cocaine all at once. This can cause psychosis in minutes. Psychosis from an amphetamine or cocaine typically

produces persecutory delusions. A hallucinogen can cause a visual, auditory, or tactile hallucination or combination of these. This is not the same as psychosis. What can happen is an adverse reaction or taking too much of a hallucinogenic drug and thus causing paranoia and delusions.

A serious problem happens when an individual is no longer aware that a hallucination is not real. That is when there is a break with reality. This can happen with psychotropic mushrooms and LSD or acid. As mentioned, psychosis can also happen with cannabis use. This is especially true with too large a dose.

Alcohol use can cause psychosis. This is typically after days or weeks of intense use. If a person has a chronic alcohol use problem that has continued for several years, the person is also vulnerable to intense paranoia and hallucinations. This can occur due to the damaging effects of alcohol on the brain. This happens over time and can lead to Wernicke-Korsakoff syndrome. Wernicke-Korsakoff syndrome is a combined presence of Wernicke's encephalopathy and Korsakoff's syndrome.<sup>59</sup> These two disorders have a close relationship to each other. People with one are usually diagnosed with the other as a single syndrome. The disorder is caused by a deficiency in thiamine (vitamin B1). This deficiency can cause a number of disorders, including Korsakoff's psychosis, Wernicke's encephalopathy, and beriberi. These can manifest separately or together.

Wernicke-Korsakoff syndrome is usually secondary to alcohol use. It can cause vision change, impaired memory, and the loss of full control of body functions known as ataxia. The syndrome and Wernicke's encephalopathy are typically seen in those who are alcoholic. Only twenty percent of cases are identified before death. The failure to diagnose Wernicke's

encephalopathy and treat the disease can lead to death in about twenty percent of cases. About seventy-five percent are left with the permanent brain damage associated with the syndrome. For someone affected about twenty-five percent need long-term institutionalization to receive effective care.<sup>59</sup>

Substance use does not always lead to physical addiction. It does, however, increase the risk of developing a physical addiction. The more intense and longer the addiction, the greater the risk. Physical addiction occurs when there are withdrawal symptoms when the person stops taking the drug. Depending on the type of substance used and the length of time of use plus how much is taken at once, withdrawal can involve psychosis.

Alcohol is the most commonly known substance-induced psychosis from withdrawal. For someone who has a long-term alcohol addiction, this can lead to significant changes in the chemistry and even the structure of the brain. This can possibly produce a set of symptoms referred to as delirium tremens (discussed in detail below) when the individual who is addicted stops consumption. The symptoms of delirium tremens include irritability, agitation, excitement, confusion, disorientation, delirium, sudden mood changes, fatigue, stupor, restlessness, body tremors, changes in mental function, decreased attention span, seizures, and hallucinations. There can also be sensitivity to light, sound, and/or touch.<sup>60-62</sup>

Delirium tremens is a medical emergency. The psychotic symptoms can be severe and can require sedation. The seizures can be directly life threatening. About 1 to 5 percent of people who experience delirium tremens die from it.<sup>60-62</sup>

Psychosis can also appear during withdrawal for any individual who has suffered from a long-term addiction to substances that can significantly affect brain chemistry. Amphetamines, opiates, and inhalants are included. The symptoms can last for hours or days. It is likely the individual will need sedation or at least require close monitoring during this period. With methamphetamine use, psychosis can reappear spontaneously in individuals who have been clean of the drug even for many years.

### **Delirium Tremens**

Delirium tremens (DTs) involves a rapid onset of confusion. It is usually caused by withdrawal from alcohol. If it occurs, it is typically three days into the withdrawal period. It lasts for two to three days. People can also see or hear things others do not. Physical effects can include shivering, shaking, irregular heart rate, and sweating. It can also cause a very high body temperature or seizures that can result in death. Alcohol is one of the most dangerous of all drugs from which to withdraw.<sup>63</sup>

Delirium tremens occurs typically only in individuals with a high intake of alcohol for more than a month. A similar syndrome can occur with benzodiazepine and barbiturate withdrawal. Withdrawal from stimulants such as cocaine does not have major medical complications. If a person has delirium tremens it is important other associated problems are ruled out. This can include electrolyte abnormalities, alcoholic hepatitis, and pancreatitis.<sup>63</sup>

Prevention can be achieved by treating the symptoms of withdrawal. If delirium tremens occurs, aggressive treatment improves outcomes. What is often recommended is treatment in a quiet intensive care unit with sufficient light. Benzodiazepines are the medication of choice with lorazepam,

diazepam, chlordiazepoxide, and oxazepam all used commonly. These should be given until a person is sleeping lightly. The antipsychotic haloperidol can also be used. A recommendation is the vitamin thiamine.

Mortality without treatment is between 15% and 40%. Currently death occurs in about 1% to 4% of cases. About half of people with alcoholism develop withdrawal symptoms if they reduce their use of alcohol. Of this half, three to five percent develop delirium tremens or have seizures. Another name for delirium tremens is shaking frenzy and Saunders-Sutton syndrome. Nicknames include the shakes, barrel-fever, blue horrors, bats, drunken horrors, elephants, gallon distemper, quart mania, and pink spiders. Nightmares, agitation, global confusion, disorientation, fever, high blood pressure, heavy sweating, and autonomic hyperactivity with a fast heart rate and high blood pressure are some of the main symptoms. Visual and auditory hallucinations plus tactile hallucinations are additional symptoms. These symptoms can appear suddenly or within two to three days after the stopping of heavy drinking. It can be the worst on the fourth or fifth day. The symptoms are worse at night.<sup>63-65</sup>

Delirium tremens are considered in general to be the most severe manifestation of alcohol withdrawal. They occur three to ten days following the last drink. Visions of snakes, insects, or rats are other common symptoms of intense perceptual disturbances. These can be hallucinations or illusions related to the environment. They could be, for example, patterns on wallpaper. They could also be in the peripheral vision of the patient with a false perception as a resemblance of an insect. There can also be tactile hallucinations such as something crawling on the person. This is known as formication.<sup>63</sup>

Extremely intense feelings of impending doom can occur with delirium. Feelings of imminent death and severe anxiety are common symptoms of delirium tremens. Severe and uncontrollable tremors of the extremities are sometimes associated with delirium tremens. Secondary symptoms are anxiety, paranoia, and panic attacks. Onlookers can notice confusion as the person with delirium tremens has trouble forming simple sentences or making basic logical calculations. The clinician should be sure to distinguish delirium tremens from alcoholic hallucinosis. About twenty percent of hospitalized alcoholics experience alcoholic hallucinosis. It does not carry significant mortality.

Delirium tremens occurs in five to ten percent of alcoholics. It carries up to a fifteen percent mortality with treatment and up to thirty-five percent without treatment. Characteristics of delirium tremens includes the presence of altered sensory perceptions. This is a complete hallucination without a recognition of the real world. Delirium tremens manifests with extreme autonomic hyperactivity with high pulse, high blood pressure, and high rate of breathing. Between thirty-five and sixty percent of patients have a fever. Some patients have seizures.<sup>63</sup>

### **Treatment Options For Substance-Induced Psychosis**

Treatment options for substance-induced psychosis include detoxification, withdrawal support, and medication management for mental illness. Medications used during detox help minimize withdrawal symptoms from substance use. Combined with behavioral therapy, medication treatment is considered very effective treatment and supports acute and long-term stabilization, including during ongoing outpatient treatment. The needs of the patient with a drug-induced psychosis or other co-occurring disorders

and their family members require ongoing evaluation all throughout the mental health and detox treatment planning.<sup>65-67</sup>

## **Detoxification**

Detoxification can be a treatment option for substance-induced psychosis. The psychosis is treated by no longer taking the substance inducing the psychosis. The detox options can include drug and alcohol addiction treatment. A medically supervised detox can prevent – sometimes easily – the more severe symptoms of psychosis through the use of common medications or by tapering off a substance gradually instead of quitting all at once or cold turkey.

### *Alcohol Detox*

Alcohol detox and rehab programs can include several approaches that could help a person with an alcohol use disorder. Everyone has different needs when it comes to treating an alcohol use disorder (AUD). AUD is the name the medical community gives to the range of issues a person can have with drinking. The care needed depends on where on the scale of severity the person falls. Alcoholism is the most severe part of the scale where the person has become addicted. If alcohol is taken away, there are challenges dealing with the physical effects and a detox program is needed.

Alcohol detox is not considered a treatment. It is the first step to helping a patient improve and embrace treatment. Detox happens when a person stops drinking and the body gets rid of alcohol and withdrawal symptoms are encountered. If a person has been a heavy drinker for a long time, the detox can start within six hours of the last alcoholic drink.

The symptoms of withdrawal are mild for some. They are more serious for others. A patient could have anxiety and delirium tremens, as mentioned already, which is a life threatening condition where a patient feels confused and on edge and experiences depression, hallucinations, problems sleeping, shaking (especially of the hands), and unstable changes in heart rate and blood pressure. If a person needs alcohol for the body to feel normal, the person probably needs medical help. For that person, going through detox is not just a matter of willpower. Withdrawal can put a life at risk. Even when it is not life threatening, it is a challenge.

A detox program can help a person with the support to get through withdrawal. This can include medication to help ease symptoms and to treat medical and mental health conditions. Detox can last a week or longer and can appear worse within twenty-four to forty-eight hours. The patient is more likely to stick with the detox program if there is an interdisciplinary team process in place to support recovery.

In expecting what will happen during detox, some basic steps in the process must occur. An overall exam should be obtained so that the health care team can determine what kind of support is needed. This can include blood work, engaging the patient to talk about health and drinking habits, and having tests to check physical and mental health. Detox support should include medication for withdrawal symptoms and ongoing care for any physical, psychiatric and emotional issues that arise. The goal is to help keep the patient mentally and physically stable.<sup>65-67</sup>

## **Medical Management**

A drug-induced psychosis can be mild. It can be identified with mood disturbances, memory issues, and cognitive impairment. It can also be



severe and include hallucinations, delusions, and/or a complete break from reality. Psychosis can also be the result of withdrawal or intoxication. It can dissipate after purging the substance from the body in some cases. In other cases, it can lead to the onset of a psychotic disorder, such as schizophrenia or bipolar disorder. Clinicians should always keep in mind that alcohol and drug use can speed the onset of a psychotic disorder if a person already has such a predisposition.<sup>68,72</sup>

Medications such as antipsychotics can be prescribed for psychotic symptoms. The antipsychotics can include haloperidol, chlorpromazine, fluphenazine, and perphenazine. This can also include atypical antipsychotics. Examples of these are lurasidone, paliperidone, risperidone, ziprasidone, aripiprazole, and olanzapine. With drug-induced psychosis or when psychosis occurs with addiction treatment, the health team might have to not use medications that could have a negative interaction with the drug being used or medications that could become habit forming.

There are other medications used during detox. These can also help minimize withdrawal symptoms from some drugs. Treatment of co-occurring disorders can include behavioral therapy that is typically started after achieving medical stabilization. Behavioral therapy can be through hospitalization as part of a medical detox program, and can be ongoing treatment in a residential or outpatient basis. This can depend on the needs of the family and individual experiencing drug-induced psychosis or other co-occurring disorders.

Cognitive behavioral therapy is a widely accepted option of treatment. With this therapy the individual learns what could trigger a psychotic episode. It can also help them learn what can contribute to a relapse and teach

individuals new and effective mechanisms for coping and enhancing self-esteem. A family therapy program can also help. This kind of program has a focus on the entire family as a whole. It is not a focus on just the individual who is battling mental illness and/or substance use. This kind of therapy can help restore a family unit.

Relapse prevention programs and support groups can be important to sustaining sobriety long-term. This can help to prevent further emotional, physical, and social complications and can be a very helpful adjunct to medical treatment for those in a recovery program.

### **Comorbid Diagnoses Of Chronic And Acute Psychosis**

Psychosis can occur as a result of a psychiatric illness, such as schizophrenia, or be caused by a health condition, medications, or drug use. An acute psychotic state can be triggered in someone with a substance use disorder who also has a chronic mental illness with or without a history of psychotic episodes. This section considers treatment of an acute on chronic state of psychosis where the clinical care may be complicated by symptoms of drug use intoxication and withdrawal.<sup>23,64,65</sup>

As previously discussed, a psychotic disorder or psychosis is a severe mental disorder that can cause abnormal thinking and perceptions where a person with psychosis loses touch with reality. Symptoms can possibly include delusions, hallucinations, incoherent talking, and agitation. Individuals with the condition are usually not aware of their behavior. Treatment can include medication and talk therapy. To have a better understanding of a connection of substance use in the setting of chronic mental illness and psychosis, a closer look at schizophrenia and psychosis may be helpful.

Schizophrenia is defined as a chronic and disabling neuropsychiatric illness. It can be characterized as a syndrome rather than as a single disease entity. The behavior of someone with schizophrenia can be abnormal and often bizarre. This behavior is a product of disturbances in volition, perceptions, and cognition. It is believed this results from dysregulation of frontotemporal and limbic neuro circuitry, but this is not completely understood.<sup>70,71</sup>

The National Alliance on Mental Illness (NAMI) designates schizophrenia as a brain disorder. NAMI offers patients and families self-help and peer support with an emphasis that schizophrenia is not simply a result of dysfunctional parenting or psychosocial stressors. Studies do show that non-genetic and genetic factors each play a role in the origin of schizophrenia.

Acute psychosis refers to a symptom complex. It includes disturbance of thought processes and behavior according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5). The presence of psychotic symptoms can usually indicate an underlying organic or psychiatric condition. Acute psychosis can manifest itself typically with a disruption of thought processes, hallucinations, delusions, agitation, and rapid deterioration in behavior. Acute psychosis can be a feature of schizophrenia, however, the diagnosis of schizophrenia requires the fulfillment of a variety of other diagnostic criteria. For men the median age at onset for the first psychotic episode of schizophrenia is the early to mid-twenties. For women the median age at onset is the late twenties.<sup>70,71</sup>

Preceding the first psychotic episode in a diagnosis of schizophrenia is a prodromal phase that lasts from months to years with this relating to or denoting the period between the initial symptoms appearing and the full development of psychosis. Acute psychosis and the hallmark of the acute

phase can follow the prodromal period abruptly, explosively, or in a subtle and gradual way. A possible process without treatment and sometimes even with treatment is for symptoms to wax and wane. This can be punctuated with recurrent episodes of acute psychosis. Over time the pattern of symptoms can change. There can be a progressive deterioration of function and cognition in some instances. There can also be progressive improvement of psychotic symptoms and functions in other instances.

Full recovery for patients diagnosed with schizophrenia is not common. This is especially true if the illness has been present for many years. In such cases, comorbid substance use is not uncommon and often exacerbates and prolongs symptoms of a mood disorder and psychosis occurring in a chronic mental illness. Substance use also contributes to treatment resistance because the patient may be self-medicating rather than cooperating with medical treatment and/or self-medicating combined with medical treatment, which interferes with the efficacy of prescribed medication and a therapeutic plan of care.

When comorbid substance use and chronic mental illness are suspected, clinicians may observe worse symptoms of social avoidance, eccentricity or magical thinking, emotional flattening, idiosyncratic speech, and peculiarities of attitude and behavior, also characteristic of the prodromal phase of schizophrenia. These prodromal symptoms can suggest panic, social anxiety, obsessive compulsive disorder, major depressive disorder, and antisocial behavior as well as substance use that can lead to early misdiagnosis and unsuccessful efforts for treatment. To avoid misdiagnosis, collateral information and careful history intake of events and possible triggers leading up to an acute psychotic episode are important before starting treatment.

The three main psychotic symptoms in schizophrenia are identified as positive, negative, and cognitive. Positive psychotic symptoms are predominant as an illness feature during the acute phase. The chronic phase typically includes negative and cognitive symptoms. The positive symptoms are unlike other types of psychosis and are complex and bizarre, such as unreal or unearthly imaginary events. The negative symptoms reflect neuroimaging evidence of reduced metabolic activity in the dorsolateral prefrontal cortex. Positive symptoms could represent abnormal temporal lobe activity.<sup>70,71,75</sup>

The positive symptoms of schizophrenia, hallucinations or delusions and disorganized speech, and negative symptoms, lack of speech and impairment in attention, memory, and executive functions, are generally diagnosed by observation during a mental health evaluation. These observed symptoms are also correlated with any reported social or occupational dysfunction when diagnosing schizophrenia. The diagnosis of schizophrenia is made for symptoms occurring for at least six months in the absence of another diagnosis that better explains the presentation.<sup>75</sup>

### **Medication Options for Psychosis**

There are options for effective treatment of psychosis whether substance-induced or not. Comorbid substance use and psychiatric illnesses involving psychosis may include recommended treatments for drug and alcohol addiction.<sup>78-81</sup>

Keeping in mind that psychosis is a symptom and not a condition, the clinician will want to observe for evidence that the psychosis may be temporary, resolving in a few hours or days. If psychosis lasts longer, it could be caused by a physical condition other than drugs or alcohol, such as

a brain tumor. Medical pathology should always be part of the differential when ruling out cause of psychosis. It is important to remember that psychosis is a very serious symptom that often requires medical intervention. Since individuals with a history of psychosis have a higher rate of attempted suicide, a suicide screen should always be part of the initial patient assessment.<sup>73</sup>

If substance-induced psychosis is diagnosed the cure is to stop using a substance. This can be complicated, because addiction can make it challenging to stop using a substance. Withdrawal symptoms can be unavoidable, especially with long-term substance use. Symptoms may become unbearable to the point of causing an individual to self-medicate. A loss of impulse control can cause an individual to no longer abstain.

The way to handle substance-induced psychosis is with an effective treatment approach. As mentioned, this can include a medically supervised detox program, the use of medications to prevent the more severe symptoms of psychosis, and/or tapering off of a substance gradually instead of abruptly quitting. When detox is completed, psychosis may not be an ongoing issue.

Psychosis can reappear during withdrawal if there is a relapse, in which case there would be a need to return to a detox program. The approach will be effective if the patient follows detox steps within the rehabilitation program. This can include care in an outpatient program or an inpatient facility, such as stabilization on medication, and therapy and/or support group meetings. Therapy groups can teach the skills needed to lead a life without substance use. The chance of relapse is reduced when an individual continues to attend support group meetings and group therapy sessions.

If there is a pre-existing mental illness, effective treatment is needed to be sure the person does not feel the need to self-medicate. There are medications that can help with an underlying condition such as major depression or bipolar disorder. Starting medication for a patient involves a process of finding the right medication to safely and appropriately manage symptoms of a mood or psychotic disorder.

For some individuals with a mood disorder, cognitive behavioral therapy can help. The goal of the therapy is to train a person to have a more adaptive thought pattern. The person can learn new behavioral skills to strengthen impulse control. This therapy can help a person cope during times of personal stress and when there is a challenging situation. Combined with medication, such as antipsychotic or mood stabilizing drugs, patients can achieve stability, even those with a more severe mental illness having extreme mood lability and/or psychosis. It is important that clinicians and patients understand that it can take time to find the right medication or combination of treatment to successfully manage symptoms.

Stress can trigger psychotic events and the urge to self-medicate. For some individuals with a mental illness, group therapy can be a helpful prevention approach. This can be more effective than dealing with schizophrenia through individual therapy because of the support from group members who can provide empathy. This approach can help a person stay on track and adhere to medication treatment. Family therapy can also be a helpful milieu to improve treatment outcomes. Some reports show that only about twenty-five percent of people with a chronic condition fully adhere to drug treatment during a period of twelve months, hence it is important to include a supportive therapeutic approach combined with medical care.<sup>77,79,80</sup>

Often individuals with chronic mental illness, such as schizophrenia, can lead a normal life with medication however can still have minor psychotic symptoms, such as hallucinations. But the person can recognize that the hallucination is not real and avoid psychosis through stress management and ongoing medical follow up. Chronic mental illness associated with recurring psychosis often leads to impairment in occupational and social functioning. Interdisciplinary interventions and support from occupational and social service health professionals are often a needed part of a patient's overall treatment plan.

### **Summary**

Understanding root cause of psychosis includes clinical awareness of the types of psychosis and how age can play a role. Illicit drug use in the young and medication related psychosis in the elderly have been reviewed. Substance related causes of psychosis can include using too much of a substance or mixing substances. Medications that can lead to psychosis and include muscle relaxants, antihistamines, analgesics, anticonvulsants, antidepressants, chemotherapy agents, corticosteroids and other medications. Symptoms can include delirium tremors, paranoia, persecutory delusions, and hallucinations.

Acute psychosis refers to a symptom complex. It includes disturbance of thought processes and behavior according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. The presence of psychotic symptoms can usually indicate an underlying organic or psychiatric condition.

Comorbid substance use and mental illness is common, and using drugs or alcohol can prolong a mental health issue. Substance use contributes to



treatment resistance. In chronic mental illness, such as schizophrenia, social avoidance, eccentricity or magical thinking, emotional flattening, idiosyncratic speech, and peculiarities of attitude and behavior can alert clinicians to an underlying problem. It is important that clinicians are trained to recognize the difference between an existing mental illness and signs of alcohol or drug use and/or withdrawal to avoid misdiagnoses and to start early treatment using the appropriate medication and therapy.

Initially, a detox program can help a person experiencing withdrawal from alcohol or drugs. This can include medication to help ease symptoms and to develop ongoing care and referrals for medical and mental health conditions. Detox support should include medication for withdrawal symptoms and care for any physical, psychological and emotional issues that occur. The goal is to help keep the patient mentally and physically stable. Because people with a chronic condition often do not fully adhere to drug treatment it is important to include interdisciplinary health professionals when developing short- and long-term goals of treatment to enhance the patient's network of support and ensure their success during treatment.

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