# 6.3 Amphetamines/Methamphetamine

Amphetamines were first synthesized in the late 19th century, and their medicinal use began in the early 20th century for various purposes, including the treatment of asthma, obesity, and narcolepsy. However, their potential for abuse and addiction became apparent over time.

Today, amphetamines are primarily prescribed for the treatment of attention deficit hyperactivity disorder (ADHD) and narcolepsy. Common prescription formulations include medications like Adderall, Vyvanse, and Dexedrine. These medications work by increasing the levels of dopamine and norepinephrine in the brain, which can improve focus, concentration, and impulse control in individuals with ADHD.

Outside of medical use, amphetamines are also frequently abused for their stimulant effects. When taken recreationally, they can produce feelings of euphoria, increased energy, and enhanced sociability. However, the misuse of amphetamines can lead to tolerance, dependence, and addiction, as well as a range of negative physical and psychological effects.

Due to their potential for abuse and dependence, amphetamines are classified as Schedule II controlled substances in the United States, meaning they have a recognized medical use but also a high potential for abuse that can lead to severe psychological or physical dependence.

An example of a type of amphetamine is the drug methamphetamine, commonly known as “**meth**.” It is chemically similar to amphetamine, but its effects on the brain are more potent and longer lasting. Methamphetamine can be produced illicitly in clandestine laboratories using a variety of chemicals and is typically available in the form of a white, odorless, crystalline powder that can be ingested orally, snorted, smoked, or injected. When consumed, methamphetamine increases the release and blocks the reuptake of dopamine, norepinephrine, and serotonin in the brain, leading to a rapid onset of intense euphoria, increased energy, and heightened alertness.

Chronic methamphetamine abuse can result in severe health problems, including cardiovascular issues, respiratory problems, dental decay (often referred to as "meth mouth"), skin sores, and cognitive impairment. Methamphetamine use is also associated with an increased risk of mental health disorders such as anxiety, paranoia, hallucinations, and psychosis.

In addition to its significant health risks, methamphetamine production and distribution are often associated with criminal activity, including violence, property damage, and environmental contamination due to the toxic chemicals used in the manufacturing process.

Efforts to address the methamphetamine epidemic include regulation of precursor chemicals, law enforcement efforts to disrupt production and distribution networks, and initiatives to provide education and support for individuals struggling with addiction. Treatment for methamphetamine addiction typically involves a combination of behavioral therapies, counseling, and support groups to help individuals overcome dependence and achieve recovery.

## High Dose Use of Amphetamines/Methamphetamine

Amphetamines/methamphetamine can be taken orally, intravenously, or by smoking. The intensity and duration of effects vary according to the mode of administration. The “**speed freak**” uses chronic, high doses of amphetamines intravenously and is often infected with HIV or other diseases related to needle sharing1. Another approach to administering amphetamines is smoking ice, which can cause effects as potent, but perhaps more prolonged and erratic, than intravenous doses.

The initial effect (after 5-30 minutes) of these potent stimulants is called the **rush** and includes a racing heartbeat and elevated blood pressure, metabolism, and pulse. During this phase, the user has powerful impressions of pleasure and enthusiasm.

The next stage is thehigh (4-16 hours after drug use) when the person feels aggressively smarter, energetic, talkative, and powerful and may initiate and complete highly ambitious tasks. The amphetamine addict tries to maintain the high for as long as possible with continual drug use leading to extended mental and physical hyperactivity; this is referred to as a run or binge and can persist for 3-15 days.

Persistent use of these drugs, to maintain the high for long periods of time is called **tweaking**. The tweaker often has neither slept nor eaten much for 3-15 days and can be extremely irritable and paranoid and have an elevated body temperature, a condition known as hyperpyrexia. This is a potentially dangerous stage for medical personnel or law enforcement officers because if the tweaker becomes agitated, he or she can respond violently to the efforts of others to help. To relieve some of the side effects of the extensive use of methamphetamine, tweakers often use depressants such as alcohol, barbiturates, benzodiazepines, or opioid narcotics. The consequences of such a drug combination are to intensify negative feelings and worsen the dangers of the drug. Tweakers are frequently involved in domestic violence and frequently injure their children and partners2.

**Withdrawal** follows for 30 to 90 days, including feelings of depression and lethargy. During this phase, craving can be intense, and the user may even become suicidal. Because a dose of methamphetamine often relieves these symptoms. Many addicts in treatment return to abusing this stimulant3.

After the first day or so of a run, unpleasant symptoms become prominent as the dosage is increased. Symptoms commonly reported at this stage are teeth grinding, disorganized patterns of thought and behavior, stereotypy, irritability, self-consciousness, suspiciousness, and fear. Hallucinations and delusions that are similar to a paranoid psychosis and indistinguishable from schizophrenia can occur4. The person is likely to show aggressive and antisocial behavior for no apparent reason, although recent brain imaging studies have revealed that addictions to amphetamines can cause long-term damage to the brain’s inhibitory control center5. Severe chest pains, abdominal discomfort that mimics appendicitis, and fainting from overdosage are sometimes reported. “Cocaine bugs” or “meth mites” represent one bizarre effect of high doses of potent stimulants such as amphetamines: The user experiences strange feelings, like insects crawling under the skin.

Toward the end of the run, the adverse symptoms dominate. When the drug is discontinued because the supply is exhausted or the symptoms become too unpleasant, an extreme crash can occur followed by prolonged sleep, sometime lasting several days. On awakening, the person is lethargic, hungry, and often severely depressed. The amphetamine user may overcome these unpleasant effects by smoking ice or injecting speed, thereby initiating a new cycle4.

Continued use of massive doses or amphetamine often leads to considerable weight loss, sores in the skin, poor oral hygiene, deterioration of the teeth5,6, non-healing ulcers, liver disease, hypertensive disorders, cerebral hemorrhage (stroke), heart attack, kidney damage, and seizures7,8. For some of these effects, it is impossible to tell whether they are caused by the drug, poor eating habits, or other factors associated with the lifestyle of people who inject these types of stimulants.

Speed freaks are generally unpopular with the rest of the drug-taking community, especially “acidheads” (addicts who use lysergic acid diethylamide [LSD]), because of the aggressive, unpredictable behavior associated with use of potent stimulants. In general, drug abusers who take high doses of these agents, such as amphetamines, methamphetamine, or cocaine, are more likely to be involved in violent crimes than those who abuse other drugs9. Heavy users are generally unable to hold steady jobs because of their drug habits and often have a parasitic relationship with the rest of the illicit drug-using community.

Although claims have been made that amphetamines do not cause physical dependence, it is almost certain that depression (sometimes suicidal), lethargy, muscle pains, abnormal sleep patterns, and, in severe cases, suicide attempts occur after high chronic doses as part of withdrawal10,11. During withdrawal from amphetamine use, the dependent user often turns to other drugs for relief10. Rebound from the amphetamines is opposite to that experienced with withdrawal from CNS depressants (see Chapter 6).

Although the effects of amphetamines on the unborn fetus are not understood, some animal studies suggest there is a possibility of long-term problems in the offspring. However, these findings remain to be verified in humans12. There is evidence that repeated high-dose use of amphetamines, such as methamphetamine, by adolescents or adults causes long-term and perhaps permanent damage to both dopamine and serotonin systems of the brain13,14. This brain damage may result in persistent episodes of psychosis15 as well as long-lasting memory, motor impairment, and cognitive deficits16,17.

Abuse of amphetamines often seriously damages personal relationships with friends, associates, and even family members. Particularly disturbing is the increasing methamphetamine used by young mothers. Mom’s on meth claim use of this stimulant makes them invincible, and like they can run around the world – and then do it again. They claim to lose weight, but they also can lose their instinct to mother their children as they become obsessed with the drug17. Consequently, children are being exposed to dangerous levels of this drug in many forms.

Watch: FRONTLINE—THE METH EPIDEMIC

* **FRONTLINE—THE METH EPIDEMIC** (53:40 min), Public Broadcasting Service (PBS) Season 2006, Episode 6, 2005; 2011.
  + How does access to specific ingredients affect the two spikes in use?
  + How does meth effect individuals and society?
  + Link: [https://www.pbs.org/vi deo/frontline-the-meth-epidemic/](https://www.pbs.org/video/frontline-the-meth-epidemic/)
* [**Story: Of Meth and Motherhood**](https://content.byui.edu/integ/gen/9c41e324-86c6-4b5b-811e-c3334251b9bc/0/Week%2006/Of%20Meth%20and%20Motherhood%20%282006%29.pdf), (Idaho Falls Post Register, Striker, N., 2006)
  + How did Rachelle start her journey of meth use as well as cope with addiction?
  + How did it affect others around her?
  + How does this story help you understand addiction/dependence better?

## Methamphetamine Ingredients

Methamphetamine is completely artificial and created with very toxic chemicals. These chemicals can initially offer a high, but they can also cause serious harm or even death not only for those who take the drugs, but for those who make them as well. Methamphetamine ingredients can be combined in a wide variety of formulas, but the basics are the same – and most of them are highly flammable and extremely lethal if ingested in any way. The resulting product is just as bad, if not worse.

Methamphetamine ingredients are highly toxic. Most people would never choose to put a single one of these in their body, but users of meth do this on a regular basis. Just one of the following ingredients could cause severe physical and mental harm, or even death.

* Hydrochloric acid—A chemical used to make plastic or refined metal.
* Lithium—This chemical is used in lithium batteries and is highly corrosive.
* Acetone—Usually found in nail polish remover or paint thinner.
* Toluene—Used in brake fluid and is powerful enough to dissolve rubber.
* Pseudoephedrine—The active ingredient in Sudafed or other cold medications.
* Red phosphorous—This is commonly found on match tips and in road flares.
* Sodium hydroxide—Also known as lye, this is used to dissolve roadkill.
* Sulfuric acid—This is an active ingredient in drain cleaners and is highly corrosive.
* Anhydrous ammonia—This chemical is used in fertilizer and strong cleansers.

Other ingredients include starting fluid, lantern fluid or lighter fluid, antifreeze, iodine crystals and more. Since each batch of meth is different, additional ingredients might be used.

## Methamphetamine Cooking

The equipment for making meth typically uses common items found in everyone’s home. This might include glass bottles, cheesecloth, aluminum foil, oven-safe or heat-safe dishes, rubber tubing, and other common items. Everything can be picked up at a hardware store or discount store. In addition, most of the chemicals used in meth are perfectly legal and can even be acquired in large quantities. That explains the growing popularity of making meth in the everyday kitchen.

The process of making meth is very dangerous. It starts with grinding down the cold medication pills and adding a binder to them to separate the pseudoephedrine from the medication. Then the medication is mixed with acid and red phosphorus, bubbled for a while, and then the red phosphorus is filtered out. Next, caustic soda is added to give the meth a “base,” a process that has to be carefully cooled to avoid explosion.

After that, Freon or other chemicals are added to separate the liquid from the solids. Hydrogen chloride then turns the meth into a salt, which lowers the acidity. It is then dried on a cloth. The final product is filled with yet more additives to make it even more addictive, then it is packaged for sale and use.

Cooking methamphetamine is a highly dangerous endeavor. Most of the chemicals involved are exposed to high heat, and that heat can lead to explosions. It can also lead to serious toxic fumes – for instance, red phosphorous heated to a high degree can crate deadly phosphine gas, which will kill someone if they inhale it. Some chemicals are also highly reactive with each other – an example is ammonia and alkali metals, which can form a spectacular explosion if even a tiny bit of each is combined18.

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## Images:

Figure 1: Coca Plant via Wikimedia Commons <https://commons.wikimedia.org/wiki/File:Coca\_Plant.jpg>

Figure 2: Severe chest pains via Pexels <https://www.pexels.com/photo/man-wearing-polo-shirt-holding-left-chest-128597/>

Figure 3: Crystal Methamphetamine via Wikimedia Commons <https://commons.wikimedia.org/wiki/File:Crystal\_Meth.jpg>

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