American College of Medical Toxicology
Physicians Specializing in the Care of Poisoned Patients

METHAMPHETAMINE

What is methamphetamine?
Methamphetamine is an amphetamine-type stimulant originally developed as an alternative to ephedrine (another stimulant) in 1919.

Are there other names for methamphetamine?
Other names for methamphetamine include biker's coffee, black beauties, chalk, crank, crystal meth, glass, ice, meth, poor man's cocaine, speed, and tweak.

How is methamphetamine used?
Methamphetamine can be administered rectally (also called a butt rocket or plugging), swallowed, inhaled or smoked (also called chasing the white dragon), nasally insufflated (also called snorting), intravenously injected (also called banging or mainlining), and vaginally.

What are the signs of intoxication?
Intoxicated methamphetamine users are energized, restless, talkative, have difficulty sleeping, and can be paranoid and hallucinate.

Where and how is methamphetamine made?
Methamphetamine is synthesized domestically as well as imported illegally from other countries. Clandestine labs are set up in basements, homes and even automobiles. There are many recipes for making methamphetamine and current popular methods have been called Shake and Bake, Nazi, or Red White and Blue. These recipes use simple cold medications containing pseudoephedrine, phenylpropanolamine, or ephedrine, and then add a variety of chemicals in a step-wise fashion, resulting in methamphetamine. Pseudoephedrine and other similar medicines are sold over the counter at pharmacies or grocery stores, and the rest of the supplies can be obtained at a grocery store or a home improvement warehouse.

Are there health risks and dangers associated with methamphetamine production?
Illicit drug manufacturers are called cooks, and are at risk for numerous injuries related to the production of methamphetamine. Not only are methamphetamine

cooks at risk, but also anyone in the vicinity of a methamphetamine lab has risk for chemical exposures, depending on proximity and ventilation.

> **Direct contact or inhalation**—Through direct contact or inhalation, some chemicals used during the production of methamphetamine can injure the eyes, skin, lungs, and/or brain (e.g. inhaling the fumes of ammonia can result in wheezing and burns to the upper airways). Certain chemicals handled improperly or erroneously mixed, can spontaneously combust or explode.
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> **Waste products**—With every pound of methamphetamine synthesized, up to 6 pounds of hazardous waste is produced. The disposal of this waste is unregulated; unsuspecting others are at risk if exposed. There have been reports of toxic exposures by children who live or play near a methamphetamine lab or disposal sites, as well as first responding law enforcement agents (police or firefighters), and hospital personnel.
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> **Traumatic injuries**—Some of these clandestine labs will have homemade security systems, which can inflict bodily harm to trespassers. Labs can have loaded firearms and drug paraphernalia that increase the risk of traumatic injury or death for those in the vicinity.

Thus, synthesis of methamphetamine increases the risk of toxic or traumatic exposures, resulting in serious chemical and mechanical injuries and/or death for both cooks and others whom reside in the area.

What are the adverse effects of methamphetamine use?
Methamphetamine can cause adverse effects to many organ systems including the brain and nerves, gastrointestinal tract, heart, lung, kidney, muscles, skin, bones, and urinary tract. The developing fetus may also be at risk from methamphetamine use.

> **Bones and teeth**—Methamphetamine is associated with tooth decay by causing dry mouth, teeth grinding, malnutrition and overall neglect in personal hygiene. There is also increased risk of traumatic injury to bones.
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> **Brain and nerves**—Methamphetamine is associated with spontaneous bleeding in the brain, seizures, strokes, temporary or permanent memory and attention problems, difficulty walking, sensitivity to light and complete vision loss. Abstinence following intoxication is associated with depression, apathetic attitude, irritability and poor concentration. Chronic abuse is associated with depression and suicidal ideation, psychosis with hallucinations, persecutory delusions and hostility.
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> **Gastrointestinal tract**—Methamphetamine users are at increased risk of viral hepatitis compared to nonusers if they use contaminated needles or engage in risky sexual behavior. Methamphetamine has been associated with

complications which cause severe abdominal pain, bloody diarrhea and vomiting. Methamphetamine can cause spontaneous bleeding in the pancreas.

Heart—Methamphetamine can cause chest pain, high blood pressure, fast or abnormal heart rate, coronary artery disease, heart attacks, heart muscle weakness, rupture of the aorta, and can predispose to infections of the heart.

Lung—Methamphetamine can cause fluid to accumulate in the lungs and cause problems with breathing.

Kidney—Methamphetamine can injure the kidneys, sometimes resulting in the need for dialysis.

Muscles—Methamphetamine is associated with muscle breakdown, which may produce pain and lead to kidney injury. It also leads to increased risk of traumatic injuries.

Pregnancy—Methamphetamine is associated with premature delivery, vaginal bleeding, smaller than normal fetus, and sudden death of the mother or developing fetus.

Skin—Methamphetamine causes repetitive picking behavior that can result in severe scratching of the face and extremities, and result in severe infections.

Urinary—Methamphetamine users are more likely to contract a sexually transmitted disease than nonusers if they engage in risky sexual behavior; they also have increased risk of transmission because of longer sexual encounters.

Are there permanent effects from methamphetamine use?
Repeated high doses of methamphetamine can cause permanent brain changes, which result in memory and attention problems or even psychosis with hallucinations, persecutory delusions and hostility.

Are there laws to counter the production of methamphetamine?
The federal government passed the Methamphetamine Control Act of 1996 as well as the Combat Methamphetamine Epidemic Act of 2005. These laws strengthen penalties and tighten controls on methamphetamine precursors, regulating the sale of pseudoephedrine, ephedrine and phenylpropanolamine.

References

1. Hart CL, Marvin CB, Silver R and Smith EE(2012)Is cognitive functioning impaired in methamphetamine users? A critical review.Neuropsychopharmacology37(3):586-608
2. Rusyniak DE(2011)Neurologic manifestations of chronic methamphetamine abuse.Neurol Clin29(3):641-55
3. Vearrier D, Greenberg MI, Miller SN, Okaneku JT and Haggerty DA(2012)Methamphetamine: History, pathophysiology, adverse health effects, current trends, and hazards associated with the clandestine manufacture of methamphetamine.Dis Mon58(2):38-89

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