

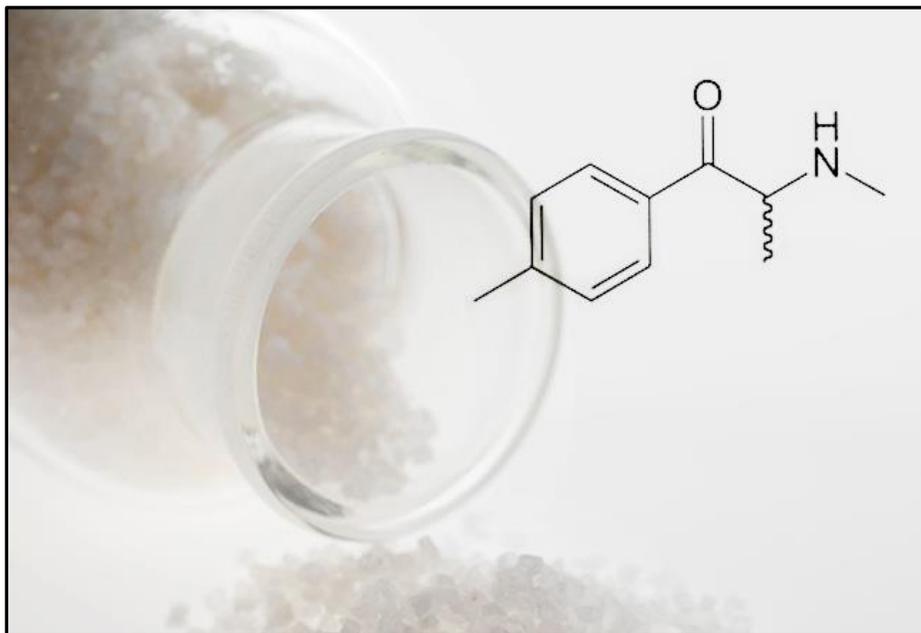
Drugs of Abuse: What You & Clinicians Need to Know

Larissa Mooney, MD | March 27, 2015

New Drugs of Abuse

According to the United Nations Office on Drugs and Crime (UNODC), drug use is shifting to new drugs and new markets. These new drugs of abuse include bath salts, synthetic marijuana (Spice), *Salvia divinorum*, methoxetamine, fentanyl, synthetic piperazines, dextromethorphan, Ecstasy (Molly), Kratom, anabolic steroids, cough syrups containing codeine, and even energy drinks.^[1,2] In the slides that follow, learn about these latest drugs of abuse, along with key guidance on recognition and management in clinical practice.

In association with the American Academy of Addiction Psychiatry



Bath Salts

"Bath salts" may appear as white or off-white powders or crystals, and they are misleadingly labeled to avoid detection.^[1] (They are not bath salts meant to be used while bathing.) Bath salts may be ingested, insufflated (snorted or inhaled), or smoked. They have various trade names, but their contents are believed to derive from synthetic cathinones that produce clinical effects akin to those of amphetamines or other stimulants. Sympathomimetic effects (eg, elevated pulse and blood pressure; diaphoresis; agitation; and, with long-term use, psychotic features) may predominate. Supportive care for the observed sympathomimetic effects and altered mental status should include benzodiazepines for sedation. If hallucinations are part of the presentation, a quiet environment devoid of auditory and visual sources of stimulation may help. Neuroleptics may also be indicated if agitation or psychotic symptoms are present.

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Spice (Synthetic Marijuana)

Synthetic cannabinoids are herbal mixtures that produce effects similar to those of marijuana. Marketed under the names Spice, K2, Chill Zone, Sensation, Chaos, Aztec Thunder, Red Merkury, and Zen, synthetic marijuana contains chemical compounds responsible for its psychoactive effects. Spice products often contain dried plant materials and are commonly smoked but may also be orally ingested. Liquid forms are increasingly popular when used in electronic cigarette devices. Synthetic cannabinoids do not resemble THC (tetrahydrocannabinol) in chemical structure but are often marketed as "safe" alternatives that are undetected in urine during drug screens. Clinical effects are variable, ranging from euphoria and relaxation to effects stronger than those associated with marijuana, including significant paranoia, hallucinations, and agitation resulting in self-harm. Severe medical consequences have also been reported in some users, including tachycardia, vomiting, seizures, and myocardial ischemia. Supportive care and a quiet environment devoid of stimulation, in addition to benzodiazepines as needed for sedation, may be helpful.

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Salvia divinorum

Salvia divinorum is a psychoactive plant whose active ingredient is salvinorin A.^[1] Users reportedly use this substance for its hallucinogenic properties by chewing or smoking the leaves, by brewing in a tea, or by using as a tincture (dissolving in alcohol and drinking). Users may experience short-lasting dissociative and visual experiences, often with a religious theme. Unlike other hallucinogens, *Salvia divinorum* is not historically associated with serotonin syndrome, but its kappa opioid receptor agonist effects may cause sedation, analgesia, GI hypomotility, aversion, and depression. If hallucinations are part of the presentation, a quiet environment devoid of auditory and visual sources of stimulation may help. Benzodiazepines may be used in cases of severe agitation.^[4]

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Energy Drinks

Energy drinks contain caffeine (1,3,7-trimethylxanthine) and may be consumed to excessive quantities, resulting in caffeine toxicity.^[5] Clinical effects corresponding to caffeine's adenosine receptor antagonism may include mild nausea or protracted vomiting (corresponding to the dose ingested), cardiac dysrhythmias, or seizures. Supportive care should include intravenous fluid resuscitation, antiemetics, and sympatholytics.

Energy drinks and supplements, including those marketed as diet or sports aids, fall into the “food” category of products regulated by the U.S. Food and Drug Administration (FDA). Food producers aren't required to provide the FDA with evidence of a product's safety before selling it. The FDA has said it has received reports of illness and death associated with Monster Energy drink. In addition to causing serious illness, drinks with high caffeine content can cause vomiting, abdominal pain, tremors, and abnormal heart rates. Children and teenagers are especially at risk.

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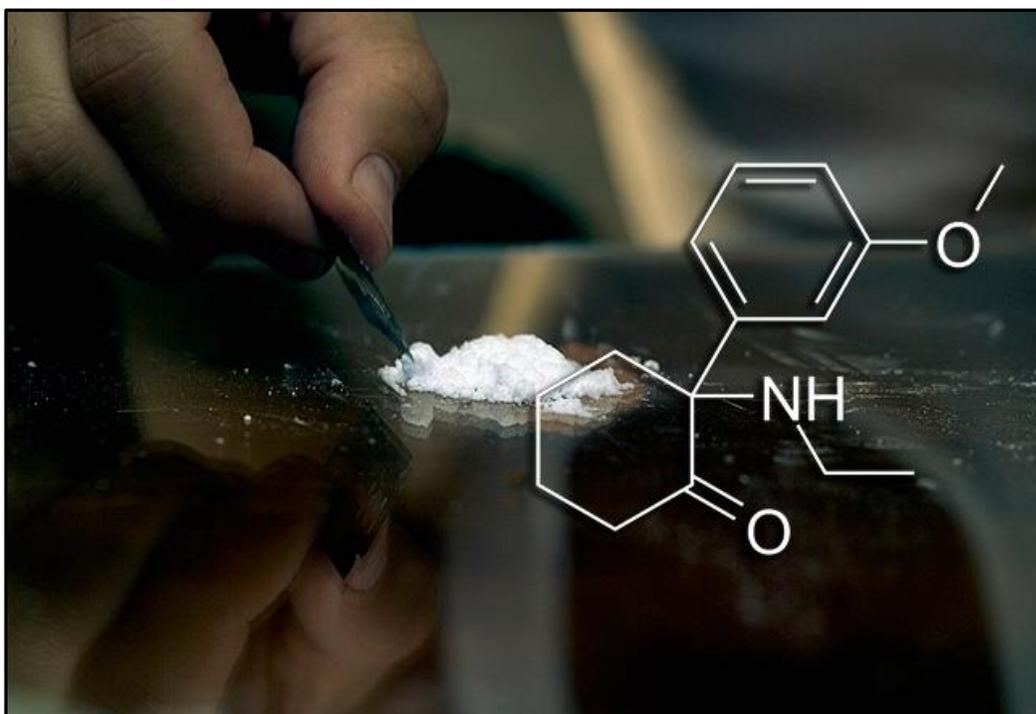


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Methoxetamine

Methoxetamine (MXE, AKA: Mexxy) a new drug and is an analog of ketamine; both drugs have structural similarity to PCP (phencyclidine).^[1] Clinical effects mirror those of ketamine and other dissociative anesthetics, including hallucinations and out-of-body experiences. The most common routes of administration include nasal insufflation and oral ingestion, but injection and sublingual use have also been reported. Physical exam findings may include midriasis, tremor, ataxia, slurred speech, agitation, tachycardia, and hypertension. Care is supportive.^[6]

Users of MXE experience distortions of sight and sound which lead to a sense of being separated from one's immediate surroundings including oneself. MXE is a laboratory created chemical compound not yet proven to be safe for humans and as such carries with it any number of unknown and unpredictable side effects. The drug is so far known to produce eye malfunctions, loss of balance, lack of coordination, impaired speech and even to result in a catatonic state.

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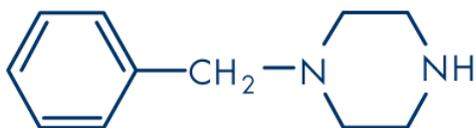
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Synthetic Piperazines

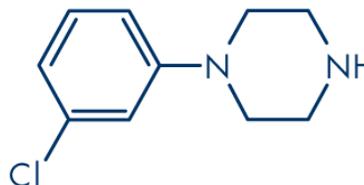
Synthetic piperazines have stimulant properties and include multiple compounds: BZP, CPP, MBZP, MeBP, MeOPP, MeP, and TFMPP. These drugs have been used most commonly in nightclub and rave scenes as alternatives to ecstasy and other amphetamines. Brand names include Benzo Fury, Head Rush, Exotic Super Strong, and XXX Strong as Hell. The sympathomimetic clinical effects may be similar, and users may report euphoria, anxiety, palpitations, paranoia, or hallucinations. Vomiting, seizures, QT prolongation, or hyponatremia are possible toxic effects. Supportive care may include intravenous fluids, cooling measures, and benzodiazepines as needed for sedation.^[1]

These drugs may be sold as pills, in capsules or as liquids. They are often found in combination with other drugs or chemicals. Basically, when a person begins abusing synthetics, he (or she) will have no idea what he is taking or how dangerous it is. Some of these substances are legitimately used in manufacturing, so eliminating them from the market is impossible.

1: 1-benzylpiperazine (BZP)



1-(3-chlorophenyl)piperazine (mCPP)



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Fentanyl

Fentanyl is the most potent opioid available for medical use and is commonly laced in heroin. Concerns have been raised about rising overdose deaths linked with fentanyl, particularly in intravenous drug users. Street names for the drug include Apache, China girl, China white, dance fever, friend, goodfella, jackpot, murder 8, TNT, and Tango and Cash.^[7] Fentanyl's potency is significantly greater than that of morphine and heroin, and even low doses may be fatal. Clinicians treating possible heroin overdoses or narcotic overdoses should consider this trend, as increasing doses of opioid antagonists may be necessary to reverse opioid effects of respiratory depression.^[8]

On 18 MAR 2015, the DEA issued a Nationwide Alert on Fentanyl as a Threat to Health and Public Safety. <http://www.dea.gov/divisions/hq/2015/hq031815.shtml>

“Drug incidents and overdoses related to fentanyl are occurring at an alarming rate throughout the United States and represent a significant threat to public health and safety,” said DEA Administrator Michele M. Leonhart. “Often laced in heroin, fentanyl and fentanyl analogues produced in illicit clandestine labs are up to 100 times more powerful than morphine and 30-50 times more powerful than heroin. Fentanyl is extremely dangerous to law enforcement and anyone else who may come into contact with it. DEA will continue to address this threat by directly attacking the drug trafficking networks producing and importing these deadly drugs. We have lost too many Americans to drug overdoses and we strongly encourage parents, caregivers, teachers, local law enforcement and mentors to firmly and passionately educate others about the dangers of drug abuse, and to seek immediate help and treatment for those addicted to drugs.”

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Dextromethorphan

Dextromethorphan (DXM) is one of the active ingredients in over-the-counter cough medications and is available in liquid and capsule/tablet formulation. DXM abuse is most common in teens and has been referred to as Robotripping, in reference to Robitussin, and using Skittles (Skittling) or Triple C's because of the red-pill formulation in Coricidin Cough & Cold products. In higher doses, clinical effects of DXM may mimic those of ketamine or PCP, including euphoria, dissociative effects (ie, feeling detached from one's body), hallucinations, nystagmus, vomiting, tachycardia, or hypertension. Supportive care should include checking for salicylate or acetaminophen intoxication, as cough syrup preparations are often coformulated. If the product is coformulated with diphenhydramine, look for evidence of sodium channel blockade on the ECG (manifested as QRS prolongation and/or an abnormal R wave in aVR).^[9] Treatment for sodium channel blockade toxicity includes intravenous sodium bicarbonate.

When taken in high doses, DXM acts on the same cell receptors as dissociative hallucinogenic drugs like PCP or ketamine. Users describe effects ranging from mild stimulation to alcohol- or marijuana-like intoxication, and at high doses, sensations of physical distortion and hallucinations.

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Promethazine-Codeine Cough Syrup

Codeine-containing cough syrup has been a popular drug of abuse, particularly in youths, because of its affordability and accessibility. When mixed with soda, the combination is also referred to as Syrup, Purple Drank, Sizzurp, and Lean. Codeine is an opioid with cough suppressant effects, and in higher doses, it causes relaxation and euphoria. Promethazine HCl is an antihistamine that has additional sedating effects. Codeine-containing syrup is commonly used in combination with alcohol to enhance its effects. Treatment should include supportive care, airway management, and an opioid antagonist (eg, naloxone) in cases of overdose. Investigation for evidence of salicylate toxicity and acetaminophen is also indicated, as cough syrup products are often coformulated with these ingredients.^[10,11]

Drinking promethazine-codeine cough syrup mixed with soda was referenced frequently in some popular music beginning in the late 1990s and has become increasingly popular among youth in several areas of the country. A variation of “purple drank” is promethazine-codeine cough syrup mixed with alcohol. Users may also flavor the mixture with the addition of hard candies.

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MDMA (Ecstasy or Molly)

MDMA (methylene-dioxy-methamphetamine) is commonly known as Ecstasy or, more recently, as Molly. It has been most popular in the nightclub and "rave" scenes. Taken orally in capsules or tablets, MDMA has both sympathomimetic and hallucinogenic effects. Users report feelings of euphoria, empathy, increased energy, emotional closeness, and altered perceptions. Clinically, signs of serotonin syndrome may be observed (hyperthermia, hypertension, tachycardia, altered mental status, hyperreflexia, clonus, and/or muscle rigidity), as well as bruxism (users have been known to use pacifiers). MDMA may also cause hyponatremia either directly or secondary to excessive water intake (in the context of all-night dancing).^[12] Supportive care should include intravenous fluid resuscitation, benzodiazepines as needed for sedation, and possible cooling in severe cases of hyperthermia.

The DEA estimates that only 13% of the Molly seized in New York state the last four years actually contained any MDMA, and even then it often was mixed with other drugs. The drugs frequently found in Molly are Methylone, MDPV, 4-MEC, 4-MMC, Pentedrone and MePP. Molly can take many different forms, although it's most often found in a capsule or powder. The DEA has also seen Molly applied to blotting paper, like LSD, and in injectable form.

Molly is dangerous because of the toxic mix of unknown chemicals; users have no idea what they're taking or at what dose. Unlike MDMA and other illegal drugs that have known effects on the body, the formulas for these synthetic drugs keep changing.

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Kratom

Kratom is a Southeast Asian native plant with weak opioid effects. It has been used to treat chronic pain and opioid withdrawal, but abuse of Kratom for its psychoactive effects is also on the rise. Kratom is often smoked or brewed in a tea, but users may also chew the leaves. Reportedly, users experience stimulant-like effects at lower doses and opioid effects at higher doses, including withdrawal symptoms upon discontinuation of use. Withdrawal symptoms may be treated with supportive care and opioid replacement therapy; opioid antagonists (ie, naloxone) may be indicated in cases of overdose.^[1,13]

Effects occur within 5 to 10 minutes after ingestion and last for 2 to 5 hours. Acute side effects include nausea, itching, sweating, dry mouth, constipation, increased urination, and loss of appetite.

Kratom consumption can lead to addiction. In a study of Thai kratom addicts, it was observed that some addicts chewed kratom daily for 3 to 30 years (mean of 18.6 years). Long-term use of kratom produced anorexia, weight loss, insomnia, skin darkening, dry mouth, frequent urination, and constipation. A withdrawal syndrome was observed, consisting of symptoms of hostility, aggression, emotional lability, wet nose, achy muscles and bones, and jerky movement of the limbs. Furthermore, several cases of kratom psychosis were observed, where kratom addicts exhibited psychotic symptoms that included hallucinations, delusion and confusion.

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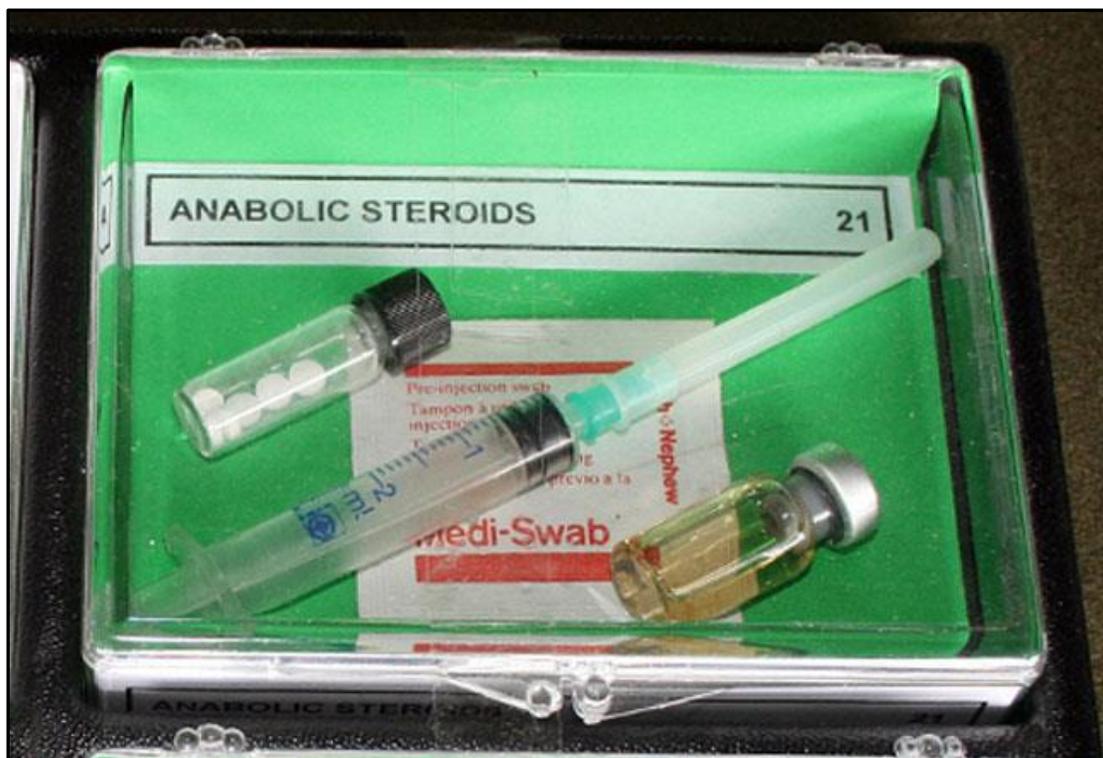


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Anabolic Steroids

Anabolic steroids are synthetic analogs of testosterone. They are used medically to treat hormone problems or delayed puberty in men, or muscle wasting from some diseases. Athletes and bodybuilders may abuse steroids to enhance muscle mass and improve athletic performance, often in excessive doses. Commonly referred to as "roids" or "juice," brand names include Androsterone, Winstrol, Oxandrin, Dianabol, and Equipoise. Users may consume steroids orally or via intramuscular injection. Cycling is a common use pattern involving weeks of use followed by rest periods in order to reduce tolerance. Stacking refers to use of multiple steroids, with or without other supplements, to maximize their efficacy. Psychiatric manifestations of use may include aggression, violence (roid rage), mania, psychosis, or suicidal ideation. Symptoms of dependence and withdrawal may be observed. Medical consequences of prolonged steroid use include liver or renal damage, elevated blood pressure, hypercholesterolemia, and cardiomegaly. In men, steroid abuse may cause testicular atrophy or gynecomastia; women may experience male-pattern baldness, hirsutism, and menstrual cycle abnormalities. Treatment involves supportive care targeting hormonal imbalances and withdrawal symptoms, in addition to tapering and discontinuation of steroids.^[14]

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