

# Synthetic Cathinones ('Bath Salts')

## Legal and Health Care Challenges

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### INTRODUCTION

The abuse of synthetic stimulant drugs known as "bath salts" has become a major public health threat across the U.S. Unlike traditional cosmetic bath salts, which are made to be added to bath water, toxic bath salt products have no legitimate use for bathing and are produced specifically for recreational drug abusers as legal substitutes for cocaine, ecstasy (MDMA), and amphetamines.<sup>1,2</sup> Case reports and clinical studies have shown that the use of these designer drugs can cause severe psychiatric symptoms and possibly death.<sup>3</sup> Individuals abusing bath salts have ranged in age from teenagers to adults in their forties.<sup>3</sup>

The synthetic powder contained in bath salt products is typically taken by inhalation (snorting), by ingestion, or by intravenous (IV) injection.<sup>4</sup> The powder produces stimulant effects similar to those of methamphetamine and methylenedioxymethamphetamine (MDMA).<sup>3</sup>

Bath salt products are available legally online as well as at drug paraphernalia stores ("head" shops), tobacco shops, convenience stores, adult book stores, gas stations, and truck stops under a variety of street names, such as Bloom, Ivory Wave, Vanilla Sky, White Lightning, Red Dove, Cloud 9, Cotton Cloud, Snow Day, and Ocean Snow.<sup>4,5</sup> These products are usually sold in the form of 200-mg and 500-mg packets, which often contain a note declaring that the contents are "not for human consumption" to prevent regulatory actions being taken against the manufacturers and distributors.<sup>2</sup>

In October 2011, the Drug Enforcement Administration (DEA) temporarily banned three synthetic stimulants commonly found in bath salts—methylenedioxypropylvalerone (MDPV), 4-methyl-*N*-methylcathinone (mephedrone), and 3,4-methylenedioxy-*N*-methylcathinone (methylone)—as Schedule I substances under the Substance Control Act.<sup>3,6</sup> Schedule I status is reserved for substances with a high potential for abuse, no currently accepted use for medical treatments in the U.S., and a lack of acceptable safety for use under medical supervision.

In this article, we briefly describe the legal and health care challenges of bath salts abuse.

### BATH SALTS COMPONENTS

MDPV, mephedrone, and methylone—the principal active ingredients of bath salts products—are synthetic cathinones (also known as substituted cathinones or cathinone derivatives) that share many similarities with other Schedule I and II stimulants, such as cathinone, methcathinone, and amphet-

amine. MDPV is also structurally related to pyrovalerone (e.g., Thymergix), a psychoactive drug that was used to treat chronic lethargy and fatigue. All three drugs have stimulant and hallucinogenic effects, and are highly addictive. None is approved for medical use in the U.S.<sup>5</sup>

"Cutting agents," such as the local anesthetic lidocaine, may also be added to the active ingredients in bath salts.<sup>2</sup>

### ADVERSE EFFECTS

The signs and symptoms of bath salts abuse include cardiovascular abnormalities, insomnia, agitation, anxiety, delusions, hallucinations, muscle spasms, seizures, severe paranoia, and aggression (Table 1).<sup>3</sup> The duration of the stimulant effects of these drugs is approximately 3 to 4 hours.<sup>2</sup>

The severe adverse effects associated with the use of bath salts have caused numerous individuals to present at hospital emergency departments.<sup>5,7</sup> The number of calls to U.S. poison control centers related to exposure to these products increased dramatically from 304 in 2010 to 6,138 in 2011.<sup>8</sup> As of September 10, 2012, a total of 2,251 calls related to exposure to bath salts were received in 2012 at poison control centers across the U.S.<sup>9</sup>

**Table 1 Adverse Effects of Synthetic Cathinones (Toxic Bath Salts)**

#### Serious Side Effects

- Blood circulation problems (e.g., increased blood pressure)
- Kidney failure
- Seizures
- Muscle spasms
- Muscle damage
- Loss of bowel control
- Hallucinations and delusions
- Aggression
- Severe paranoia
- Panic attacks
- Sharp increase in body temperature

#### Short-Term, Less Serious Side Effects

- Increased heart rate
- Chest pains
- Agitation
- Insomnia
- Lack of appetite
- Increased alertness and awareness
- Anxiety
- Nosebleeds

Data adapted from U.S. Air Force;<sup>2</sup> Fass JA, et al. *Ann Pharmacother* 2012;46:436–441;<sup>3</sup> National Institute on Drug Abuse;<sup>4</sup> and U.S. Department of Justice.<sup>5</sup>

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A report from the Centers for Disease Control and Prevention (CDC) described 35 cases of people who used bath salts and who visited Michigan emergency departments (EDs) from November 2010 to March 2011. One of these patients was dead on arrival. Of the remaining 34 patients, 17 (50%) were hospitalized, 15 were released, and two left against medical advice. The patients' primary presenting symptoms included agitation, tachycardia, delusions, hallucinations, seizures, and tremor.<sup>10</sup>

Psychotic symptoms are common in bath salts users who present to EDs, occurring in up to 40% of cases.<sup>10,11</sup> According to a report from the U.S. Department of Justice, individuals under the influence of synthetic cathinones are prone to violent and unpredictable behavior and have caused harm and even death to themselves and others.<sup>5</sup> In a typical case, a man shot and killed himself and his wife after the police had tried to pull him over for speeding. Afterward, the couple's 5-year-old son was found dead at home. Bath salts packaging was discovered on the adult male decedent and at his residence. Toxicology specimens obtained from the deceased couple showed the presence of MDPV and lidocaine.<sup>5</sup>

In another case, a 21-year-old man committed suicide after snorting bath salts sold under the name Cloud 9. Family members described the man as paranoid before he killed himself. A toxicology report confirmed the presence of MDPV and citalopram (Celexa, Forest) in specimens from the decedent.<sup>5</sup>

### DETECTION AND TREATMENT OF BATH SALTS INTOXICATION

Routine toxicology screenings are unable to detect all of the chemical substances that constitute the various bath salt stimulant drugs.<sup>7</sup> Although hundreds of bath salt compounds are available, toxicologists are able to identify no more than 40.<sup>12</sup> As new tests are developed, basement chemists tweak existing compounds or introduce new ones to avoid detection.

Physicians in EDs, urgent-care centers, and other settings might consider bath salts intoxication in persons without a psychiatric history who present with agitation, anxiety, and psychosis.<sup>7</sup>

Benzodiazepines, especially lorazepam (Ativan, Pfizer), are commonly used to treat the agitation and seizures associated with the use of bath salts. Restraints may be needed if the patient's agitation cannot be controlled with these drugs.<sup>7</sup>

Because antipsychotic agents have the potential to lower the seizure threshold, they should be administered with caution in patients suspected of having used bath salts.<sup>7</sup> If the patient or other sources indicate that a bath salts stimulant was taken, a urine toxicology sample may be tested for the more common substances found in these products.<sup>7</sup>

After recovery, bath salts abusers should be referred for psychiatric consultation. Many of these individuals have a history of polysubstance abuse.<sup>3</sup>

### SYNTHETIC DRUG ABUSE PREVENTION ACT OF 2012

On July 9, 2012, President Barack Obama signed the Synthetic Drug Abuse Prevention Act of 2012. This law increases the time, from 18 months to 36 months, that a substance may be temporarily assigned to Schedule I. Most of the permanently banned substances under this act are synthetic cannabinoid

agents. The only permanently banned bath salts substances are MDPV and mephedrone.<sup>12</sup> This act is a promising step forward, but more stringent federal regulations are needed to curtail the bath salts epidemic.

### ADDRESSING THE PROBLEM

As leading members of the health care community, P&T committee members are in a position to help meet the challenges posed by bath salts abuse. Both physicians and pharmacists can play an important role in increasing public awareness of the dangers of these products through patient counseling and participation in community outreach programs.<sup>3</sup> Prevention programs would be particularly useful in high schools because teenagers are potential abusers of these drugs. The free online resource "Just Think Twice" ([www.justthinktwice.com](http://www.justthinktwice.com)) offers educational materials on the dangers of bath salts written specifically for teens.<sup>13</sup>

In turn, health care professionals may benefit from continuing education programs on synthetic stimulants. With this increased awareness, clinicians would be better able to question patients and family members regarding bath salts abuse when individuals present with psychiatric symptoms without a history of psychosis.

Pharmacists in health care settings would also benefit from keeping abreast of the legal and medical ramifications of bath salts abuse. These practitioners may be called upon to consult with physicians on suspected cases of bath salts intoxication and may be involved in the referral of patients for substance abuse treatment.

### CONCLUSION

Toxic bath salt stimulants remain legally available despite legislative attempts to control these dangerous substances. The tide of addiction, injury, and death resulting from the use of these drugs will not be stemmed until federal laws have permanently banned their sale. As key health care practitioners, physicians and pharmacists can help promote awareness of this problem in their communities. Professional continuing education is extremely important in this regard.

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