

## Emergency Department Visits After Use of a Drug Sold as “Bath Salts” — Michigan, November 13, 2010–March 31, 2011

On February 1, 2011, in response to multiple news reports, the Michigan Department of Community Health (MDCH) contacted the Children’s Hospital of Michigan Poison Control Center (PCC) regarding any reports of illness in the state caused by the use of recreational designer drugs sold as “bath salts.” Unlike traditional cosmetic bath salts, which are packaged and sold for adding to bath water for soaking and cleaning, the drugs sold as “bath salts” have no legitimate use for bathing and are intended for substance abuse. These products can contain stimulant compounds such as 3,4-methylenedioxypyrovalerone (MDPV) or 4-methylmethcathinone (mephedrone). The PCC told MDCH that, earlier in the day, the PCC had learned that numerous persons had visited the local emergency department (ED) in Marquette County with cardiovascular and neurologic signs of acute intoxication. This report summarizes the subsequent investigation, which identified 35 persons who had ingested, inhaled, or injected “bath salts” and visited a Michigan ED during November 13, 2010–March 31, 2011. Among the 35 patients, the most common signs and symptoms of toxicity were agitation (23 patients [66%]), tachycardia (22 [63%]), and delusions/hallucinations (14 [40%]). Seventeen patients were hospitalized, and one was dead upon arrival at the ED. The coordinated efforts of public health agencies, health-care providers, poison control centers, and law enforcement agencies enabled rapid identification of this emerging health problem. Mitigation of the problem required the execution of an emergency public health order to remove the toxic “bath salts” from the marketplace. Lessons from the Michigan experience could have relevance to other areas of the United States experiencing similar problems.

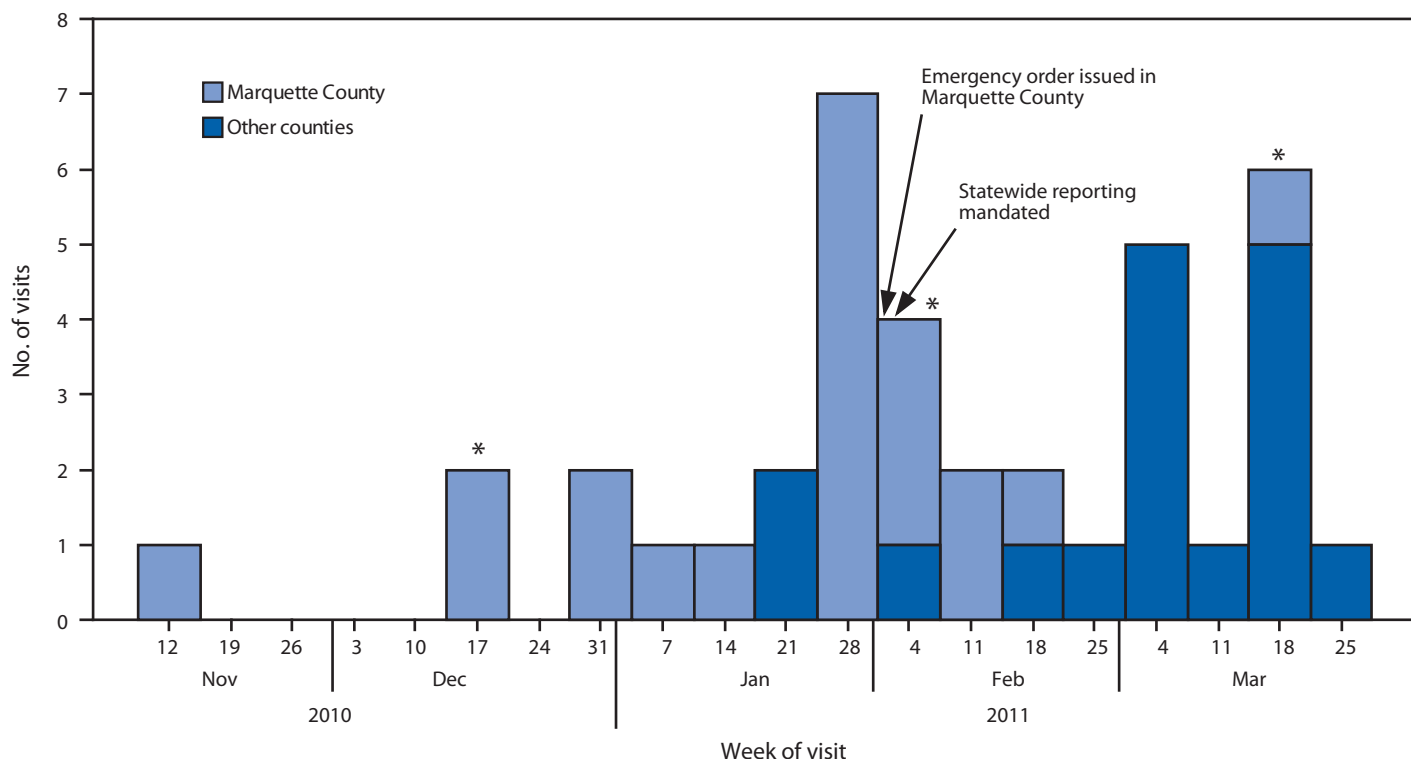
From November 2010 to January 2011, the Marquette County ED treated seven patients who arrived at the ED with hypertension, tachycardia, tremors, motor automatisms, mydriasis, delusions, and paranoia. Some patients were violent, placing increased demand on ED staff members. Responding to the cluster also placed additional demands on local law

enforcement and foster care, because many patients had young children who needed care while their parents were incapacitated. The patients reported using “bath salts” purchased at a local store for about \$20 a package and labeled “not intended for human consumption.” By February 3, a total of 13 cases in Marquette County and one death had been reported to the PCC. Efforts by the local ED, law enforcement, and prosecuting attorney’s office led to the execution of an emergency public health order on February 4 by the Marquette County Health Department. The proprietor of the store was ordered to immediately remove from sale and turn over to government authorities any and all products known as White Rush, Cloud Nine, Ivory Wave, Ocean Snow, Charge Plus, White Lightning, Scarface, Hurricane Charlie, Red Dove, White Dove, and Sextasy. The Michigan Department of State Police laboratory tested the White Rush seized from the store and detected the presence of MDPV.

Concurrently, the PCC became aware of two cases elsewhere in the state. On February 5, MDCH used its chemical poisoning regulations to mandate statewide reporting by hospitals of cases of possible “bath salts” intoxication so that cases could be identified and characterized. Health-care providers were notified via the Michigan Health Alert Network about new cases and the potential for severe physical and psychological effects of “bath salts” abuse, and were provided a standardized reporting form. The PCC was designated as an agent of the state so it could receive case reports directly, allowing for mandatory reporting 24 hours a day, 7 days a week. As part of the investigation, patient information for Marquette County cases occurring before mandatory reporting was abstracted from medical charts by a MDCH staff member. A case was defined in a person who visited a Michigan ED during November 13, 2010–March 31, 2011, after self-reported or suspected use of “bath salts” (traditional cosmetic bath salts were excluded), with cardiovascular, neurologic, or psychological signs or symptoms consistent with acute intoxication.



**FIGURE.** Number of patient visits to emergency departments (N = 38) after exposure to drugs sold as “bath salts,” by county and week of visit — Michigan, November 13, 2010–March 31, 2011



\* Second emergency department visit by patient.

Overall, the investigation identified 35 patients in Michigan, including three who visited the ED twice for “bath salt” abuse (Figure). The patients were aged 20–55 years (median: 28 years) (Table). Nineteen (54%) were men, and 16 (46%) were women. Twenty-four persons (69%) had a self-reported history of drug abuse, with 11 (31%) reporting polysubstance abuse and 12 (34%) intravenous drug abuse. Sixteen persons (46%) had a history of mental illness (e.g., bipolar disorder, schizophrenia, or depression) in their medical records, and six had suicidal thoughts or suspected attempts that might have been related to “bath salts” abuse. Twenty-seven cases (77%) occurred in Michigan’s Upper Peninsula region, with 18 cases (51%) occurring in Marquette County. Ten (12%) of Michigan’s 83 counties reported cases.

Clinical findings were consistent with intoxication with stimulants. Of the 35 patients, 32 (91%) had neurologic, 27 (77%) had cardiovascular, and 17 (49%) had psychological symptoms. Seventeen patients were hospitalized, 15 were treated and released from the ED, two left the ED against medical advice, and one was dead on arrival at the ED. Twenty-two of the patients (63%) had injected the drug, nine (26%) had snorted it, and four (11%) had ingested it. For five patients (14%), including the patient who died, the exposure route was

unknown, and five patients had more than one exposure route (Table). No relationship was found between the exposure route and severity of illness. Of the 17 patients with known drug test results, 16 (94%) tested positive for other drugs (e.g., marijuana, opiates, benzodiazepines, cocaine, or amphetamines). Toxicology results for the person who died revealed a high level of MDPV, along with marijuana and prescription drugs. Autopsy results revealed MDPV toxicity to be the primary factor contributing to death. The manner of death was ruled accidental, consistent with an attempt to get high.

Of the 17 hospitalized persons, nine were admitted to the intensive care unit (ICU), five were admitted to a general floor, and three were admitted directly to a psychiatric unit. Four persons who were first hospitalized in the ICU or a general floor later were transferred to a psychiatric unit. Treatment generally included a benzodiazepine such as lorazepam to control signs of toxicity; low or moderate doses usually were sufficient. Antipsychotics were used as secondary agents when benzodiazepine sedation was ineffective.

Of three patients who revisited the ED, one had rhabdomyolysis, chest pain, and dizziness but left against medical advice. Two months later, the patient was admitted to the ICU, moved to a psychiatric floor for 12 days, and then transferred to a

**TABLE. Demographic and clinical characteristics for 35 patients evaluated in emergency departments (EDs) after exposure to drugs sold as “bath salts” — Michigan, November 13, 2010–March 31, 2011**

Characteristic	No.	(%)
<b>Sex</b>		
Women	16	(46)
Men	19	(54)
<b>Age group (yrs)</b>		
20–29	22	(63)
30–39	5	(14)
40–49	6	(17)
≥50	2	(6)
<b>Exposure route*</b>		
Injected	22	(63)
Snorted	9	(26)
Ingested	4	(11)
Unknown	5	(14)
<b>Additional drug use†</b>		
Marijuana	10	(29)
Opiates	8	(23)
Benzodiazepines	5	(14)
Cocaine	4	(11)
Amphetamines	2	(6)
<b>Signs and symptoms</b>		
Agitation	23	(66)
Tachycardia	22	(63)
Delusions/hallucinations	14	(40)
Seizure/tremor	10	(29)
Hypertension	8	(23)
Drowsiness	8	(23)
Paranoia	7	(20)
Mydriasis	7	(20)
<b>Disposition‡</b>		
Treated in ED and released	15	(43)
Admitted	17	(49)
Dead upon arrival	1	(3)
Left against medical advice	2	(6)

\* Five patients reported two exposure routes.

† Seventeen patients had known drug test results.

‡ Most severe disposition was chosen for three patients who revisited the ED.

different hospital for liver failure. The second patient was admitted to the hospital, discharged, and revisited the ED the same day of discharge after again using “bath salts.” The third patient was treated in the ED twice, with the visits 1 month apart.

The investigation by MDCH and the PCC is continuing. As of May 16, 2011, a total of 71 emergency department visits by 65 patients who had used “bath salts” had been reported in Michigan since November 13, 2010.

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### What is already known on this topic?

Designer drugs sold as “bath salts” are available at “head shops,” convenience stores, gas stations, and on the Internet for recreational drug use.

### What is added by this report?

This report is the first public health investigation of emergency department (ED) cases resulting from the use of “bath salts.” A total of 35 patients were identified at Michigan EDs during November 13, 2010–March 31, 2011; 17 patients were hospitalized, and one died.

### What are the implications for public health practice?

Coordination between public health departments, poison control centers, health-care providers, and law enforcement is important for timely detection that will prevent further drug-related morbidity and mortality.

### Editorial Note

Through March 22, 2011, poison control centers representing 45 states and the District of Columbia had reported receiving telephone calls related to “bath salts” in 2011 (1). By April 6, centers had already received five times more “bath salts” calls in 2011 than in 2010 (2). Although “bath salt” abuse has been documented nationwide, this report is the first to summarize the epidemiology of a number of ED cases. Of note in this investigation, nearly half the patients had a history of serious mental illness (e.g., bipolar disorder, schizophrenia, or depression) in their medical records, and 16 of 17 patients with known drug test results tested positive for drugs other than those in the “bath salts.”

Drug overdose, including from designer drugs, continues to grow as a public health concern. Multistate investigations have been conducted as a result of exposure to nonpharmaceutical fentanyl (3), levamisole-contaminated cocaine (4), and opiates (5,6). Classes of designer drugs like “bath salts” are intended to have pharmacologic effects similar to controlled substances but to be chemically distinct from them, thus avoiding legal control. “Bath salts” for recreational use are sold at “head shops” and on the Internet with names such as Zoom and White Rush. These products also have been labeled as “plant food” and “pond water cleaner” and sold in ways to circumvent detection or enforcement. Some products are labeled as “novelty collector’s items,” despite additional, pharmaceutical-like labels that indicate dosage. Before “bath salts,” synthetic marijuana (e.g., K2 or Spice) was sold legally in convenience stores and gas stations as “incense.”

Designer drugs present an enforcement dilemma. Although MDPV and other chemical constituents of “bath salts” are not listed on state and federal controlled substances schedules, they could be included because of their structural similarity

to scheduled chemicals under the analogue provisions of those laws. However, inclusion is problematic because the structure of MDPV is similar to that of medications used to treat conditions such as depression and anaphylaxis. Furthermore, laws also require that scheduled substances be intended for consumption. “Bath salts” typically are labeled “not for human consumption,” and thus fail to meet all attributes of a scheduled substance. Therefore, Michigan and other states have pursued legislation to add these chemicals to the state’s Schedule I list of controlled substances.

Michigan’s investigation involved collaborators from public health, law enforcement, and health care. An emergency order issued by the Marquette County Health Department was effective at stemming “bath salts” abuse locally, and statewide mandated reporting helped detect cases in other counties. These methods might be useful to other jurisdictions where emergent problems need to be addressed quickly. Poison control centers and emergency departments can act as sentinels for discovering new drugs of abuse. Drug treatment programs also might be effective as warning networks. The PCC was designated as an agent of the state to receive mandated reports supporting joint reporting and provision of medical toxicologic consultation. Planning among collaborating agencies is critical to implementing appropriate strategies to reduce drug-related morbidity and mortality.

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