Issues Associated with Cathinone Derivatives (aka ‘Bath Salt”)

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Agenda item: A. Bath Salts: A Growing Drug Problem

Products marketed as ‘bath salt’, ‘plant food’, and various other inconspicuous products most likely contain synthetic cathinone derivatives, and do not contain ingredients found in standard bath salts (i.e. Epsom salts, Dead Sea salt) or plant fertilizers. Most commonly available products are encountered as white or brown powders, but have been found as granular crystal, capsules and tablets.

Cathinone is a naturally occurring psychotropic stimulant found in khat (Catha edulis), a native plant of tropical East Africa and the Arabian Peninsula.

Cathinone and cathinone derivatives are chemically similar to amphetamines. (Figure 1)

**Figure 1:** The structural similarity between amphetamines (top row) and cathinones (bottom row)

![Chemical structures](image-url)
No or extremely limited primary research is available describing pharmacokinetic, pharmacodynamic, toxicokinetic, and toxicodynamic properties of most cathinone derivatives.

Cathinone and cathinone derivatives proposed mechanism of action is similar to amphetamines and cocaine. These agents are postulated to increase central nervous system (CNS) stimulation via increased release and blocked reuptake of the major chemical messengers dopamine, norepinephrine and serotonin within the CNS. This mechanism is supported by sympathomimetic (stimulant) effects (dilated pupils, increased heart rate, increased blood pressure, agitation, etc.) described and observed after use of cathinone products by humans.

Anecdotal reports indicate some cathinone derivatives are associated with strong craving and there is some evidence to support cathinone agents being associated with a ‘high abuse potential’.

Cathinone is listed as a schedule I compound under the Federal Controlled Substance Act. The cathinone derivatives believed to be the active compounds found in ‘bath salt’ products are thought to be methylenedioxyprovalerone (MDPV) and/or 4-methylmethcathinone (mephedrone). These agents would be classified as schedule I compounds under the Federal Analog Act of the Federal Controlled Substance Act, if they were marketed or intended for human consumption. Currently marketed products utilize labeling of ‘not for human consumption’ and ‘novelty item’ to avoid regulation under the Federal Analog Act.

European reports indicate legal production and distribution of cathinones originate from China and bordering countries in South-East Asia.

Worldwide ‘Bath Salt’ product marketing and distribution trends appear to mirror those experienced with synthetic marijuana (‘K2/Spice’) from 2006-2010. Appearing first in European countries in 2007 and after attracting regulatory attention, ‘bath salt’ products were determined to rapidly change product names and active derivative content to prolong detection and legal controls. Upon increased regulatory action in Europe the market and distribution has appeared to shift focus to the United States.

The United Kingdom National Poison Information Service reported zero inquiries regarding mephedrone in 2008/2009, and 4,500 online and 292 telephone inquiries from health care professionals related to mephedrone in 2009/2010. The most recently reported number of ‘Bath Salt’ cases reported to US Poison Centers stand at a total of 235 cases for 2010 and 220 year to date for 2011. The Arkansas Poison and Drug Information Center has handled five exposures and two information calls, the first occurring in mid January 2011. Louisiana (>175) and Florida (>61) Poison Centers have reported the highest incident of ‘Bath Salt’ exposures.

These products are currently unregulated and readily available via traditional and internet retail outlets in Arkansas and sell from $20-50.

Signs and symptoms associated with use of ‘Bath Salt’ products reported to US Poison Centers include but are not limited to:

- increased heart rate
- elevated blood pressure
- increased temperature
- anxiety
- agitation
- extreme paranoia (in some cases prolonged >5 days post exposure)
- suicidal ideation
- and less commonly some cases of seizure and dysrhythmia
US Poison Centers have multiple reports of users experiencing profound and protracted neuropsychiatric effects following ‘bath salt’ use, requiring prolonged medical sedation and intensive care level intervention.

Fatalities directly related to and suspected related to cathinone derivative use have been documented in Europe. Fatalities suspected related to cathinone derivative use have been reported in US media.

United Kingdom and European Nation scientific advisory committees have reviewed some cathinone derivatives and concluded:

- Use of mephedrone and related cathinones appears to be rapidly increasing
- The cathinones have no efficacy as bath salt or plant fertilizer
- Mephedrone has no established or acknowledged medical value
- Mephedrone and/or cathinone compounds present a public health risk and should be brought under regulatory control

Regulatory Actions


- On January 6, 2011 the Louisiana Department of Health and Hospitals issued an Emergency Order placing some cathinone derivatives under Schedule I of the Louisiana Uniform Controlled Dangerous Substance Law

- On January 26, 2011 the Florida Attorney General issued an Emergency Rule placing some cathinone derivatives under Schedule I, Subsection 893.03(1) F.S.

Following regulatory action, reports indicate affected geographic areas have experienced a dramatic decrease in reported use. Following action in the United Kingdom National Poison Information Service inquires dropped from 119 in March 2010 to 19 in June 2010. Following Louisiana regulation exposure reported to Louisiana Poison Center dropped from 21 reports Jan 1-6, 2011 to four Jan 16-Feb 1, 2011. These outcomes provide anecdotal support to the assumption that many users are drawn initially to these products as they are legally available and possibly considered safe by the end users as they are sold openly.