



July 2011

# Situation Report

Product Number 2011-S0787-004

## Synthetic Cathinones (Bath Salts): An Emerging Domestic Threat



Cox Broadcasting

### Executive Summary

The National Drug Intelligence Center (NDIC) assesses with high confidence that the distribution and abuse of synthetic cathinones will increase in the United States in the near term, posing yet another challenge to U.S. law enforcement officials. Poison control centers and medical professionals around the country are increasingly reporting patients suffering adverse physical effects associated with abuse of these drugs, further compounding the problem.

Available data and law enforcement reporting suggest increasing levels of synthetic cathinone availability and abuse, but such information is limited and precise levels are unknown. U.S. Customs and Border Protection (CBP) currently tracks seizures of synthetic cathinones at U.S. ports of entry (POEs), but many synthetic cathinone products are disguised or mislabeled to impede detection. Because common field test kits, drug-detecting canines, and routine urine drug screens do not detect synthetic cathinones, law enforcement officials are challenged in interdicting such drugs and prosecuting their manufacturers and distributors.

Synthetic cathinones, typically marketed as “bath salts” and “plant food,” are sold legally under various names (Ivory Wave, Blizzard, etc.) in most areas of the United States. The products are generally sold in retail establishments such as adult stores, independently owned convenience stores, gas stations, head shops, and skateboard shops. The products, as well as their raw chemical components, are also sold on many Internet sites, including popular Internet auction sites. Additionally, synthetic cathinones have been sold by independent dealers as ecstasy<sup>a</sup>—in powdered form, in single-component tablets and capsules, and in tablets and capsules containing cathinones combined with MDMA (3,4-methylenedioxymethamphetamine) or other illicit controlled substances. Abusers typically ingest, inhale, inject, smoke, or snort (insufflate) the drugs to experience stimulant effects similar to those induced by amphetamine.

Manufacturers and distributors of synthetic cathinone products evade U.S. Drug Enforcement Administration (DEA) regulation and enforcement because synthetic cathinones are not scheduled under the Federal Controlled Substances Act (CSA). However, possession and distribution of the synthetic cathinones may be prosecuted, albeit with greater difficulty, under the Federal Controlled Substance Analogue Enforcement Act of 1986 (as amended)<sup>b</sup> of the CSA. The availability and suitability of a prosecution under the analogue statute depends on the particular compound being trafficked and the facts of the case. Further, distributors deceptively market synthetic cathinone products as “not for human consumption” to evade U.S. Food and Drug Administration (FDA) scrutiny. Cathinone products that are introduced into interstate commerce and promoted as alternatives to illicit street drugs may be prosecutable under the Federal Food, Drug, and Cosmetic Act as unapproved new drugs and misbranded drugs. (See the offenses at 21 U.S.C. 331(a), (d) and penalties at 21 U.S.C. 333.)<sup>1</sup> Additionally, members of the Congress have introduced legislation to nationally ban the sale of certain synthetic cathinones,<sup>c</sup> and, as of April 2011, all 50 states and the District of Columbia have introduced or announced plans to introduce legislation banning or restricting the distribution and possession of certain synthetic cathinones and cathinone derivatives. As synthetic cathinones become more regulated, abusers will likely use the Internet with greater frequency to purchase cathinone products, the raw chemicals used in their production, and products that contain cathinones not specifically prohibited by enacted legislation.

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a. Ecstasy tablets typically contain MDMA (3,4-methylenedioxymethamphetamine) but can contain various other drugs in place of or in combination with MDMA. Other drugs commonly identified in ecstasy include methamphetamine, amphetamine, BZP (N-benzylpiperazine), and caffeine.

b. The Federal Controlled Substance Analogue Enforcement Act, enacted in 1986 as Pub. L. 99-570, title I, subtitle E, provides: “[a] controlled substance analogue shall, to the extent intended for human consumption, be treated . . . as a controlled substance in Schedule I.” The term “controlled substance analogue” is defined as a substance: (i) the chemical structure of which is substantially similar to the chemical structure of a controlled substance in schedule I or II; (ii) which has a stimulant, depressant, or hallucinogenic effect on the central nervous system that is substantially similar to or greater than the stimulant, depressant, or hallucinogenic effect on the central nervous system of a controlled substance in schedule I or II; or (iii) with respect to a particular person, which such person represents or intends to have a stimulant, depressant, or hallucinogenic effect on the central nervous system that is substantially similar to or greater than the stimulant, depressant, or hallucinogenic effect on the central nervous system of a controlled substance in schedule I or II.”

c. S. 409, the “Combating Dangerous Synthetic Stimulants Act of 2011”.

### Background

*Synthetic cathinones* are central nervous system stimulants. They are chemically similar to cathinone, a Schedule I controlled substance that occurs naturally in the khat<sup>2</sup> plant (*Catha edulis*). The category of synthetic cathinones includes a number of drugs, such as MDPV (3,4-methylenedioxypyrovalerone) and mephedrone (which have been identified by the FDA Office of Criminal Investigations in illicit “bath salt” products;<sup>3</sup> [see Appendix A](#)) as well as *N*-methylcathinone (also known as methcathinone or cat),<sup>4</sup> 4-fluoromethcathinone (also known as flephedrone or 4-FMC),<sup>5</sup> and 3,4-methylenedioxy-*N*-methylcathinone (also known as methylone, MDMC, bk-MDMA, or M1).<sup>6</sup>

NDIC uses the term *synthetic cathinone products* to refer to synthetic cathinones packaged as authentic commercial products. These products include purported beauty and household goods such as “bath salt” products sold as Bliss, Blizzard, Blue Silk, Charge+, Hurricane Charlie, Ivory Snow, Ivory Wave, Ocean Burst, Pure Ivory, Purple Wave, Red Dove, Snow Leopard, Star Dust, Vanilla Sky, White Dove, White Knight, White Rush, and White Lightening.<sup>7</sup> Synthetic cathinone products are also marketed as plant food/fertilizer, insect repellent, pond cleaner, and vacuum fresheners.<sup>8</sup>

Synthetic cathinones are commonly distributed in powder, crystal, and liquid forms, but they are also available and abused in tablet and capsule forms.<sup>9</sup> Some synthetic cathinone tablets and capsules have been marketed by distributors as ecstasy—forensic laboratories analyzing seized ecstasy tablets have reported that some tablets contain synthetic cathinones, alone or in combination with other drugs.<sup>10</sup> However, these tablets and capsules have not been marketed in retail outlets or on the Internet in conjunction with the more widely recognized “bath salts.”<sup>11</sup>

Abusers typically ingest, inhale, inject, smoke, or snort (insufflate) synthetic cathinone products to experience effects similar to those of amphetamine abuse. Some abusers dissolve the drugs in water or other solvents and proceed to atomize<sup>i</sup> and inhale them, while others apply the solutions to their mucus membranes by placing drops in their eyes or spraying the solutions in their noses.<sup>12</sup>

The term *synthetic cathinone products*, as used in this report, is not meant to refer to legal pharmaceuticals. The prescription drugs bupropion (Zyban®, Wellbutrin®), diethylpropion (Tenuate®), and pyrovalerone (Centroton®) are legal synthetic cathinone products—diethylpropion is a Schedule IV controlled substance, and pyrovalerone is a Schedule V controlled substance under the Federal CSA.

i. Atomizers are devices that use heat, pressure, or vibration to convert a liquid into a vapor or an aerosol mist so it can be inhaled and absorbed through the lungs. Electronic cigarettes are a common type of atomizer that uses heat. Nebulizers—often used by individuals with respiratory disorders and diseases—use vibration or pressure.

## Synthetic Cathinone Availability and Abuse

*NDIC assesses with high confidence that the availability of synthetic cathinone products in the United States is high.*

**State and local law enforcement information indicates that synthetic cathinone products are readily available in retail establishments and over the Internet, and some local independent dealers sell the products.** Synthetic cathinone products, most marketed as “bath salts,” are distributed across the country in small, independently owned retail establishments such as adult stores, independently owned convenience stores, gas stations, head shops, and skateboard shops.<sup>13</sup> The products, as well as their raw chemical components, are also sold on many Internet sites, including popular Internet auction sites and global marketing sites.<sup>14</sup> The products are typically “branded” under the names previously listed. Some local independent drug dealers also distribute the products directly to users.<sup>15</sup>

**Available seizure information indicates that significant quantities of synthetic cathinones and synthetic cathinone products are shipped to the United States from foreign countries.** CBP seized many shipments of synthetic cathinones and synthetic cathinone products at U.S. POEs from July 2009 through April 2011; the products were laboratory tested and found to contain MDPV, mephedrone, and other synthetic cathinones that have not yet been identified in synthetic cathinone products distributed in the United States.<sup>16</sup> Synthetic cathinone products are often packaged in such a way that they appear to be authentic beauty and household goods.<sup>17</sup> As such, they pose a particular challenge for law enforcement officials in detection and interdiction efforts.

**Cathinones are sometimes sold in combination with other synthetic drugs or marketed as different drugs altogether.**

- In January 2011, the Centralia (MO) Police Department arrested three men in a school parking lot after they attempted to sell “Bliss,” a synthetic cathinone product mixed with methamphetamine, to an undercover officer. The 1/8-ounce powdered mixture was priced at \$200.<sup>18</sup>
- In September 2010, the **San Luis Obispo (CA)** Sheriff’s Department reported that two 15-year-old boys who thought they were consuming MDMA fell violently ill and developed small holes in their lungs after consuming mephedrone. The two boys also experienced symptoms of sore throat, violent vomiting, euphoria, elevated body temperature, and agitation. A nearby university student was arrested and charged with child endangerment and selling a narcotic substance to the teens.<sup>19</sup> Later that same month, the university student’s mother was arrested after an investigation revealed that she had accepted and signed for a 2-pound package of mephedrone that had originated in China and had been delivered by the U.S. Postal Service.<sup>20</sup>

Synthetic cathinone abuse has caused users throughout the country to experience severe adverse effects, and the number of “bath salt” calls to U.S. poison control centers has trended upward. On December 21, 2010, the American Association of Poison Control Centers (AAPCC) issued its first warning regarding the dangers of synthetic cathinone abuse, particularly for products marketed as “bath salts.” The warning informed the public that as of that date, at least 156<sup>d</sup>

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d. While the warning indicated at least 156 calls had occurred as of December 21, 2010, the AAPCC reported on May 12, 2011, that 302 “bath salt” calls were ultimately recorded for 2010.

“bath salt”-related calls had occurred in 2010—85 from Louisiana alone. Effects reported to the centers included increased blood pressure, increased heart rate, agitation, hallucinations, extreme paranoia, and delusions; no deaths were reported.<sup>21</sup> The Louisiana Department of Health and Hospitals also issued a warning regarding synthetic cathinones (bath salts), mentioning several symptoms experienced by hospitalized patients in addition to those mentioned above, including chest pain, headache, and suicidal thoughts.<sup>22</sup> From January 1 through May 12, 2011, the AAPCC received 2,237 “bath salt”-related calls from poison control centers in 47 states and the District of Columbia—a significant increase from the 302 calls recorded for all of 2010.<sup>23</sup> (See Table 1.)

**Table 1. “Bath-Salt”-Related Calls Reported to U.S. Poison Control Centers**

Year	Number of Calls
2009	0
2010	302
2011*	2,237

Source: American Association of Poison Control Centers, data run by AAPCC on May 12, 2011.

\*Data reflect calls received and reported from January 1, 2011, through May 12, 2011.

**Synthetic cathinones are used by a geographically and demographically diverse abuser population.** No current U.S. population, household, or user survey contains questions regarding synthetic cathinones or synthetic cathinone products, but some indicators suggest the demand for and use of synthetic cathinone products are widespread. The AAPCC has issued multiple “bath salt abuse” press releases since December 2010, state health departments are posting “bath salt” warnings on their web sites,<sup>24</sup> and state<sup>e, 25</sup> and local<sup>f</sup> governments are introducing legislation and ordinances to reduce the availability of synthetic cathinones in their areas.<sup>26</sup> In addition, DEA National Forensic Information System (NFLIS) is receiving increasing reports of synthetic cathinone seizures. In 2009, NFLIS received 14 reports of analyzed seizures related to synthetic cathinones from 8 states; however, in 2010, NFLIS received 290 reports of analyzed seizures from 21 states.<sup>27</sup> The AAPCC reports that “bath salts” abuse patients seeking medical attention range from teenagers to those in their 40s.<sup>28</sup> Moreover, synthetic cathinone abusers likely are individuals who seek stimulant effects similar to those produced by cocaine, amphetamine/methamphetamine (illicit and prescription), and MDMA.<sup>29</sup>

**Synthetic cathinones abusers likely are attracted to the drugs because they can evade most drug testing.** Most current routine drug testing screens do not detect the presence of synthetic cathinones. Consequently, the drugs may appeal to some abusers who are subject to mandatory drug testing. While synthetic cathinones are not detected by routine screens,<sup>g, 30</sup> some commercial drug testing laboratories are beginning to offer specialized synthetic cathinone

e. As of May 4, 2011, according to the National Conference of State Legislatures, a total of 15 states had taken action to ban at least one of the chemicals used in drugs labeled as “bath salts,” either through legislative or administrative action; and 31 state legislatures have introduced legislation to restrict these substances.

f. Contact your county government for local “bath salt” ordinances.

g. Most drug testing companies offer an expanded test that includes a few additional drugs in the testing process. Typically the tests will look for a few of the following: ethanol (alcohol), hydrocodone (Lortab, Vicodin), barbiturates, methaqualone (Quaaludes), methadone, benzodiazepines (e.g., Valium), MDMA (ecstasy), propoxyphene (Darvon).



testing.<sup>31</sup> One commercial toxicology laboratory offers two “designer stimulant drug test” panels—one for MDPV and mephedrone and one for an expanded panel of 14 synthetic stimulants.<sup>32</sup>

**Synthetic cathinone abusers who operate motor vehicles while under the influence will likely go undetected during traffic stops unless toxicology testing for the drugs is specifically requested.** Many synthetic cathinones produce stimulant effects that appear to be similar to cocaine, amphetamines/methamphetamine, and MDMA. As such, abusers who operate motor vehicles after using synthetic cathinones likely present similar dangers as those who operate motor vehicles while under the influence of controlled stimulants. However, the presence of synthetic cathinones in the systems of these “drugged drivers” likely will go undetected if they are stopped for a traffic offense unless the officer making the stop is aware of the signs of stimulant abuse and orders a specialized synthetic cathinone laboratory test.

## Synthetic Cathinone Production and Distribution

**Synthetic cathinone products are manufactured internationally.** According to very limited domestic and European law enforcement reporting, synthetic cathinones are synthesized primarily in foreign countries, including China, India, and Pakistan. Cathinones are generally synthesized by rogue chemists in foreign countries and are shipped directly to distributors or acquired by distributors and abusers over the Internet. The United Kingdom has been identified as a principal transit country of some synthetic cathinones destined for the United States.<sup>33</sup> Synthetic cathinones are also marketed and sold on international and domestic web sites.<sup>34</sup>

**Synthetic cathinones are deliberately labeled and marketed to circumvent sales restrictions and evade prosecution.** Manufacturers and distributors often advertise synthetic cathinone products as bath salts or plant food that are “not for human consumption” to evade FDA scrutiny.<sup>35</sup> However, if synthetic cathinone products are marketed or sold with the inference that they are “legal cocaine, methamphetamine, MDMA, LSD, etc.,” they can be regulated by the FDA as *street drug alternatives*.<sup>36</sup> The FDA considers any product that is promoted as a street drug alternative to be an unapproved new drug and a misbranded drug in violation of the Federal Food, Drug, and Cosmetic Act.<sup>37</sup> In addition, synthetic cathinones are not scheduled under the Federal CSA; however, possession and distribution of the synthetic cathinones may be prosecuted, albeit with greater difficulty, under the CSA’s Analogue Enforcement Act of 1986 (as amended), which states that the controlled substance analogues shall, “to the extent intended for human consumption,” be treated as Schedule I controlled substances.

## Synthetic Cathinone Legislation and Regulations

**State and local governments are adopting legislation and local ordinances to reduce the availability of synthetic cathinones in their jurisdictions, and members of the United States Congress have introduced legislation to nationally ban the sale of certain synthetic cathinones<sup>h</sup>.** As of May 2011, all 50 states and the District of Columbia had introduced legislation to restrict or ban some synthetic cathinones and cathinone derivatives.<sup>38</sup> Some legislation places specific cathinones on state lists of controlled substances.<sup>39</sup> Additionally, some local governments are banning synthetic cathinones or synthetic cathinone products ahead of state legislatures. As state legislation and local ordinances are enacted, abusers will likely travel to neighboring areas

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h. S. 409, the “Combating Dangerous Synthetic Stimulants Act of 2011.”

without such legislation or ordinances to purchase synthetic cathinone products or acquire them via the Internet.

**The DEA is gathering information on the pharmacology, toxicity, and abuse of synthetic cathinones and synthetic cathinone products to support possible scheduling under the Federal CSA.** On March 31, 2011, the Drug and Chemical Evaluation Section (ODE) of the DEA Office of Diversion Control issued a public request for information on the following synthetic cathinones:

- **MDPV** *synonym* 3,4-methylenedioxyprovalerone
- **Mephedrone** *synonyms* 4-methylmethcathinone, 4-MMC
- **Methylone** *synonyms* 3,4-methylenedioxymethcathinone, MDMC
- **Naphyrone** *synonyms* naphthylpyrovalerone, NRG-1
- **4-Fluoromethcathinone** *synonyms* 4-FMC, flephedrone
- **3-Fluoromethcathinone** *synonym* 3-FMC
- **Methedrone** *synonyms* 4-methoxymethcathinone, BK-PMMA, PMMC
- **Butylone** *synonyms* bk-MBDB, beta-keto-N-methylbenzodioxolylpropylamine

Any information collected pursuant to ODE's request, particularly that related to law enforcement encounters, drug identification, toxicology reports, medical examiner reports, and abuse will be used to support appropriate administrative modification to the drug schedules—or proposed statutory revisions to the CSA—to include synthetic cathinones, if warranted.

**Use of synthetic cathinones by members of the U.S. Armed Forces is prohibited.** U.S. Armed Forces' offices have distributed general orders<sup>40</sup> prohibiting the use of intoxicating substances—substances that are inhaled, injected, consumed, or otherwise introduced into the body for the purpose of becoming intoxicated, high, altering mood or function, or achieving a psychoactive effect. Abuse of synthetic cathinones violates this order. Failure to obey this general order is a violation of Article 92, Uniform Code of Military Justice (UCMJ), and may result in disciplinary or administrative action including, but not limited to, trial by military court-martial, nonjudicial punishments under Article 15 of the UCMJ, reprimand, admonishment, administrative demotion, security clearance revocation, and involuntary separation with an adverse characterization of service.

## Outlook

***NDIC assesses with high confidence that the distribution and abuse of synthetic cathinones in the United States will increase in the near term.*** As of the date of this report, synthetic cathinone-related calls to U.S. poison control centers continue to increase. Despite previously described legislation and orders, no substantial law enforcement or regulatory action has significantly prevented synthetic cathinone products from reaching distributors or consumers, partly due to availability of the chemicals, drugs, and products on the Internet. Until effective policies become widespread and applied consistently and enforcement and regulatory actions begin to effect the supply-demand balance, demand for the products will continue to fuel their production and distribution.

***NDIC assesses with high confidence that more synthetic cathinones will be abused in the long term.*** Dozens of different synthetic cathinones have been developed, but only 12 have been seized and publicly identified.<sup>41</sup> Other synthetic cathinones are likely to be exploited in reformulated products or as new products. The vast profit margin associated with these products and the ability of manufacturers and traffickers to sidestep international chemical regulations will inevitably increase the availability of these drugs and their marketing to susceptible abusers.

***As commercial drug testing companies develop drug screens to detect synthetic cathinone abuse, different synthetic cathinones will surface.*** Commercial drug testing companies are developing drug screens to detect certain synthetic cathinones. However, because many distinct synthetic cathinones exist and their metabolism in the human body is not fully understood, the timely development of these tests will be difficult and the accuracy of initially developed tests will be limited. As tests are developed to screen for and detect the presence of the currently identified synthetic cathinones, manufacturers will synthesize additional synthetic cathinones, as manufacturers have done with other synthetic drugs. For instance, in response to testing and enforcement efforts, manufacturers of synthetic cannabinoids introduced lesser-known JWH-019 after widely used JWH-018 was able to be detected by tests and law enforcement placed pressure on manufacturers and distributors.<sup>42</sup> (JWH-018 and JWH-019 are synthetic cannabinoids.)

***The global nature of Internet chemical sales, particularly of synthetic cathinones, will present increasing challenges to U.S. law enforcement in the long term.*** If distribution of specific synthetic cathinones is successfully controlled in the United States through appropriate administrative control actions and legislation, producers will market other, unregulated synthetic cathinones and chemicals, particularly through the Internet and global shipping networks. Long-term control of synthetic cathinones will require significant international cooperation and coordinated enforcement efforts.



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## Appendix A. Common Synthetic Cathinones

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Mephedrone (commonly known as 4-MMC, Bubbles, Drone, M-Cat, Meow Meow, and Meph) typically has little or no odor.<sup>43</sup> It is commonly available as a fine, white, off-white, or yellowish powder; in crystal form; as a tablet; or in capsules.<sup>44</sup> Mephedrone is sold in retail (1, 5, or 10 grams) and/or in bulk quantities. Effects are usually experienced 15–45 minutes after ingested and last approximately 2–5 hours. After snorting, effects are usually experienced in 30 minutes and last approximately 2–3 hours. After an intravenous injection, the effects last approximately 10–30 minutes.<sup>45</sup>

MDPV is a drug variant of pyrovalerone and was first detected in Germany in 2007.<sup>46</sup> It is commonly available as a gray-colored substance with a granular consistency (the chemical form of its free base), a white powder (hydrochloride salt form), or as a tablet. Effects usually occur 15–30 minutes after ingestion and last approximately 2–7 hours. After snorting, effects are usually experienced in 5–20 minutes and last approximately 2–3.5 hours. Abuse of pyrovalerone has been reported in drug addicts,<sup>47</sup> so MDPV addiction may be possible.



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## Appendix B. Scope and Methodology

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**Scope:** This situation report examines the threat that synthetic cathinone abuse poses to the United States and the difficulty that U.S. law enforcement faces in preventing the manufacture and distribution of synthetic cathinones and synthetic cathinone products. This report does not examine the threat posed by prescription drugs that contain cathinones.

**Source Summary Statement:** The analysis in this situation report is primarily derived from data posted publicly by official U.S. and European Union Government agencies and international organizations, as well as studies published in peer-reviewed journals. The NDIC regards these sources as highly reliable and authoritative.

The cutoff date for all source reporting used in this assessment is May 18, 2011.

**High Confidence** generally indicates that judgments are based on high-quality information from multiple sources, from a single highly reliable source, or that the nature of the issue makes it possible to render a solid judgment. **Medium Confidence** generally means that the information is credibly sourced and plausible, but can be interpreted in various ways or is not of sufficient quality or corroborated sufficiently to warrant a higher level of confidence. **Low confidence** generally means that the information's credibility or plausibility is questionable, the information is too fragmented or poorly corroborated to make solid analytic inferences, or that NDIC has significant concerns or problems with the sources.



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U.S. Department of Health and Human Services  
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        National Institute on Drug Abuse  
    U.S. Food and Drug Administration  
        Office of Criminal Investigations  
U.S. Department of Homeland Security  
    U.S. Customs and Border Protection  
U.S. Department of Justice  
    Drug Enforcement Administration  
        Office of Diversion Control  
U.S. District Court for the District of Minnesota

### State and Local

#### California

San Luis Obispo Sheriff's Department

#### Georgia

Atlanta Bureau of Investigation

#### Louisiana

Louisiana Department of Health & Hospitals

#### Missouri

Centralia Police Department

### International

European Monitoring Centre for Drugs and Drug Addiction  
United Kingdom Advisory Council on the Misuse of Drugs

### Nongovernmental Organizations

American Association of Poison Control Centers  
National Alliance for Model State Drug Laws  
National Conference of State Legislatures  
Redwood Toxicology Laboratory

## Print and Online Publications

*Addiction Biology*

*Annals of Medical Psychology* (Paris, France)

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Drug Testing and Analysis

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