



Designer Drugs: What Drug Court Practitioners Need To Know

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Designer drugs are a growing challenge for Drug Courts. Legal barriers intended to slow the advance of these chemicals are constantly developing and changing to keep pace with the creativity of chemists operating illicitly and with the rapidly evolving landscape of designer drugs. Drug-testing laboratories struggle to keep detection capabilities current with new designer formulas. Further complicating the role of the Drug Court is the quasi-legal status of some of the new designer drugs, which a myriad of e-commerce sites offer as “legal.” All these factors combine to create a complex moving target that can be challenging for Drug Courts. This fact sheet provides basic information on the rapidly evolving class of psychoactive substances known as designer drugs to assist Drug Courts with developing abstinence-monitoring strategies.

History of Designer Drugs

Designer drugs are not a new phenomenon. Morphine, an important pain-relieving medication created from opium in the 1800s, could be classified as one of the original designer drugs (UNODC, 1953). However, in 1925, heroin and a number of other chemically altered forms of morphine were banned. In the 1960s and 1970s, a group of new synthetic hallucinogens became popular. These included LSD (lysergic acid diethylamide) and STP (serenity, tranquility, and peace; a.k.a. DOM, or 2,5-Dimethoxy-4-methylamphetamine), a psychedelic substituted amphetamine (Henderson, 1988; Snyder et al., 1967). Manufacturing advanced considerably with the next wave of illegal pharmaceuticals introduced in California in 1979. Illicitly synthesized derivatives of the drug fentanyl (a powerful narcotic painkiller) appeared under

the name *China White*, reportedly causing over 100 overdose deaths in the United States in a few months (Henderson, 1988; Baum, 1985). In the mid-1980s, a chemically altered form of methamphetamine, known as *Ecstasy* (MDMA), gained widespread popularity (Gallagher, 1986).

About 2006, a variety of new psychoactive drugs not previously known in the United States began to appear in the recreational drug marketplace. Because the new compounds were not on any controlled-substances lists, they were available commercially, often being sold as products having uses other than consumption. For example, synthetic stimulant cathinone derivatives as a group were referred to as *bath salts*. These cathinone derivatives and synthetic cannabinoid preparations exploded onto the drug landscape with epidemic speed. In many ways this blindsided law enforcement, poison control centers



and hospital emergency departments, treatment professionals, the federal government and legislative bodies, the courts, and an ill-prepared public (Madras, 2012; McElrath & O'Neill, 2011; Buchanan & Brown, 1988; CDC, 2011; Winder et al., 2013). Today, the fast-moving designer drug evolution continues largely unabated.

The Internet has transformed the designer drug trade. Web sites provide accessibility, affordability, and anonymity, promoting products as “legal” and taking advantage of the lag between a drug’s introduction and the enactment of a law against it. These sites contain detailed information on newly created drugs and provide venues for purchasing designer drug products (Uchiyama et al., 2008, 2009). The sites attempt to circumvent existing laws with a ploy that nearly all synthesized-drug marketing uses—the deceptive promotion of the product for some purpose other than its specified use. Designer drugs are sold under such false pretenses as “herbal incense,” “bath salts,” “plant food,” “research chemicals,” and “novelty collector’s items” (Madras, 2012). Despite this seemingly outright fraudulent activity, these Web sites are, for the most part, impervious to legal sanction.

What Is a Designer Drug?

Many designer drugs begin as legitimate pharmaceuticals, or medicines, created or discovered as part of drug manufacturers’ research and experimentation. Existing drugs routinely undergo minor alterations for many reasons: to evaluate their potential use as new medicines, to reduce the side effects of prescribed medications, to understand the effect of molecular structure on biological activity (the structure-activity relationship), to investigate interactions within the human body, or to increase a drug’s potency or effectiveness (Huffman, 1994). The modification of current pharmaceutical products is a necessary step in the development of new medications.

Other designer drugs started as botanicals. These plants, both legal and illegal, are grown worldwide and harvested for their naturally occurring chemicals that produce psychoactive affects when

consumed. Designer drug chemists reformulate these chemicals found in nature to produce “legal” products with increased potency.

The creation of illicit versions of these drugs and botanicals, produced in clandestine labs, has specific motivations (Combs & Morris, 2012). Designer drug chemists illegally reformulate existing drugs and botanicals to produce new and unique psychoactive agents with the intention of evading laws that control the designer drug distribution, possession, and use. By modifying the molecular structures of existing drugs, these chemists strive to create new substances of abuse that are not currently regulated by the government. Creating new illicit designer drugs may also be driven by the desire for more potent substances with prolonged effects. Altering the chemistry of abuse substances often renders current drug-testing procedures ineffective—a marketing side benefit for “legal” distribution. Making an illegal drug “legal” is largely motivated by profit. The demand for designer drugs and the profits to be made have resulted in a staggering number of these compounds.

In recent years, designer drug abuse has increased dramatically. Calls to poison control centers and visits to hospital emergency rooms related to the harmful effects of synthetic cannabinoids (such as K2 and Spice) and stimulants (such as bath salts) increased at an alarming rate. In 2011, the first year that synthetic-cannabinoid-related calls were tracked, the American Association of Poison Centers reported receiving 9,992 calls corresponding to products containing synthetic cannabinoids (Madras, 2012).

Consumers of these newly synthesized chemicals may misperceive these drugs as “legal highs” and therefore assume them to be less hazardous than traditional street drugs—when exactly the opposite may be true. Because of the unknown chemical composition of these agents and the uncertainty of their potency, the ramifications for users’ health are proven to be dangerously unpredictable. Ingestion of these products continues, despite the warning on each packet—*Not for human consumption*.

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The laboratory for the production of these newly synthesized drugs can be situated just about anywhere. Although unregulated laboratories in Asia represent a primary source of designer drugs, a July 2012 raid by the Drug Enforcement Administration (DEA) uncovered laboratory operations in thirty U.S. states (Madras, 2012). Some designer drug chemists operate from sophisticated laboratories with legitimate commercial missions. Others conduct business in basements, garages, or other small venues.

On March 1, 2011, the DEA used its temporary scheduling authority to place five synthetic cannabinoids on Schedule I of the Controlled Substances Act. Initially, the true dimensions of this epidemic were difficult to quantify, but the picture became clearer as the health risks reported by poison control centers and hospital emergency departments began to accumulate (Smith & Roberts, 2014). The DEA followed up on October 21, 2011, banning three synthetic cathinone stimulants, and the race was on (USDOJ, 2011). These restrictions cover the manufacture, distribution, possession, importation, and exportation of the listed chemicals. However, the ramifications have been mixed. Some of the designer drug trade has gone underground. Many creative chemists have simply migrated from manufacturing the banned substances to formulating new unique compounds not yet regulated. As the DEA increased control efforts, international, state, and local governmental agencies also instituted their scheduling measures (NCSL, 2012; Vardakou et al., 2010).

The number of individual designer drugs currently available in some form likely numbers in the hundreds, perhaps thousands. For the purposes of this fact sheet, we will evaluate three major classifications of designer drugs: synthetic cannabinoids, designer stimulants, and other miscellaneous designer drugs.

Synthetic Cannabinoids

Smokable herbal blends, sold most commonly under the names Spice and K2, have been available on the Internet and in local convenience stores (or *head shops*) in the U.S. since at least 2004 (Deprez & Roelands, 2008). While Europe was the first target market and misuse of herbal incense was widespread there by 2008, its manifestation in this country did not lag far behind (ACMD, 2009). Reports of synthetic cannabinoid use in the U.S. began in earnest in 2008, and by 2009 products like Spice and K2 were nearly epidemic

in parts of the country. The first Spice trafficking case was reported in 2008 with a shipment of herbal incense that was seized in Dayton, Ohio (White House ONDCP, n.d.). In late 2008, University Hospital in Freiburg, Germany, released the first article to appear in the scientific literature describing the chemical analyses linking the incense to synthetic cannabinoids (Auwärter et al., 2009). The article revealed that products being sold as legal alternatives to marijuana contained a variety of cannabinoid compounds including the now famous JWH-018; JWH-073; JWH-200; CP-47,497; and cannabicyclohexanol. The DEA's Office of Diversion Control published a one-page update on Spice in its *National Forensic Laboratory Information System Year 2008 Annual Report* (USDOJ/DEA, 2009).

A Spice package contains a variety of dried botanicals and herb-like material not unlike loose-leaf tea products. While some of the plant material may produce mild psychoactive or hallucinogenic effects if consumed, the significant marijuana-like effects are not associated with the plant materials themselves (Baselt, 2011). The dried crushed or chopped botanicals are sprayed with a liquid form of synthetic cannabinoid chemicals that greatly enhances potency and creates the classic marijuana "high" when smoked. One of the most significant dangers associated with the ingestion of synthetic cannabinoids is that inconsistency in manufacture results in varied amounts of drug concentrations from batch to batch and even within batches. As a result, the user cannot reliably anticipate the intensity of the pharmacological effect (Lindigkeit et al., 2009).

The reported pharmacological effects of smoked synthetic cannabinoids are very similar to that of 9-tetrahydrocannabinol (THC), the primary psychoactive chemical found in marijuana. This comes as no surprise given that Spice, K2, and similar synthetic cannabinoids are THC agonists, meaning they chemically bind to the same brain/central nervous system receptor, CB1, and trigger many of the same responses as marijuana (Huffman, 1994). The physiological effects of synthetic cannabinoids include the following (Madras, 2012; Zawilska & Wojcieszak, 2014; Hermanns-Clausen et al., 2013):

- Increased heart rate and blood pressure
- Altered state of consciousness
- Perceptual alterations (time distortions)
- Intensification of sensory experiences



- Pronounced cognitive effects
- Impaired short-term memory
- Increased reaction times
- Shortness of breath or depressed breathing
- Hypertension
- Tachycardia
- Anxiety
- Agitation
- Psychosis
- Suicidal ideation

Some reports indicate that several synthetic cannabinoid variations bind to the CB1 receptor with greater affinity than even marijuana (Huffman, 1994). Researchers have surveyed dozens of herbal preparations on the market and determined that the concentration of synthetic cannabinoids can vary by a factor of fifteen, which likely explains the variability of the intensity of effects reported by users (Madras, 2012). Publications further indicate that prolonged use of Spice and like synthetic cannabinoids can produce withdrawal symptoms and dependency syndromes similar to those identified in chronic marijuana smokers (Zimmermann et al., 2009).

Some epidemiological studies indicate that users of synthetic cannabinoid smoking mixtures exhibit untoward behavioral changes that lead to predictable consequences. Herbal incense smokers display increased anxiety, paranoia and panic attacks, and a rise in restlessness and aggressive behavior (Hermanns-Clausen et al., 2013). These studies support the findings that users of synthetic cannabinoids have increased emergency room admissions, assaults, homicides, and arrests for driving under the influence of drugs and generally have more contact with law enforcement than marijuana smokers (Musshoff et al., 2014). The long-term health ramifications of smoking synthetic cannabinoids remain unclear.

In a recent publication, Gurney and colleagues (2014) documented the following adverse effects:

- Kidney damage (from XLR-11)
- Pulmonary effects (lung dysfunction)
- Cardiovascular issues (tachycardia)
- Increases in blood pressure
- Gastrointestinal problems (pain, nausea, vomiting)
- Seizures
- Chemically induced psychosis
- Driving under the influence of drugs (DUID)
- Deaths (three cases: cardiac arrest, suicide, and OD)

This 2014 report concluded:

Because the safety profile of the compounds is largely unknown, the ability to do human studies to determine their effects presents an ethical challenge. By considering how these compounds bind to and act at cannabinoid receptors, and by evaluating existing information on their effects in animal models, scientists can begin to develop a picture [of] their effect profile. This information provides a basis for interpreting human effects of synthetic cannabinoids in the absence of controlled administration studies. A review of the literature that exists to date suggests that synthetic cannabinoids may have side effects that are more severe than that of marijuana.

Enhanced delivery methods for synthetic cannabinoids such as vape (vaporizer) pens and e-cigarettes also add to concerns about potency and thus side effects. These alternative consumption devices deliver high-concentration hash oils such as BHO (butane hash oil, butane honey oil) and full-extract cannabis oils. Some of these products are purported to have THC concentrations exceeding fifty percent.

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A comprehensive study from the Intramural Research Program at the National Institute of Drug Addiction and the program in toxicology at the University of Maryland, Baltimore, concluded the following:

Epidemiological data suggest that the majority of SC [synthetic cannabinoid] users are young adults who perceive SC as safer than noncannabinoid illicit drugs and a favorable cannabis alternative eliciting cannabis-like “high” while avoiding detection by standard drug screens. However, data suggest that many SC users prefer cannabis over SC [because of] the drugs’ negative effects. SC are readily accessible, sold under several names and packaging with smoking as the most common route of administration. Most SC smokers are men from 13 to 59 years old, many with a history of polydrug use such as cannabis, alcohol, and nicotine (Castaneto et al., 2014).

Because of the explosive growth of synthetic cannabinoids in recent years, laboratories specializing in drug testing for these agents routinely screen for up to fifty parent compounds and metabolites (Logan et al., 2013).

Designer Stimulants

Khat (*Catha edulis*) is a flowering plant that grows abundantly on the Horn of Africa and in parts of the Arabian Peninsula (Kalix & Braenden, 1985). The khat (pronounced *cot*) plant contains a naturally occurring cathinone with amphetamine-like properties (Goodnough & Zezima, 2011). Khat chewing by the residents of these regions has a history dating back thousands of years. The potentially harmful and addictive effects of cathinone first came to the attention of international organizations in 1935 when the advisory committee of the League of Nations on the traffic of dangerous drugs reviewed reports on the social and economic problems associated with khat use. No action was taken at that time, but in 1956, the concerns were again raised during a session of the United Nations commission on narcotic drugs. The commission recommended that the World Health Organization study the medical aspects of khat use, and thus the world’s attention became focused on the dimensions of the cathinone challenge (Kalix & Braendent, 1985).

As is often done with designer drugs, chemists reformulated cathinone into a synthetic version, manufacturing a new psychoactive compound that produces similar

physiological effects while circumventing the legal bans on the original drug; thus, bath salts were born. Recent additions to the bath salt class of drugs have broadened the category to include noncathinone compounds with chemical structures similar to amphetamine and cocaine (Kehr et al., 2011).

Between 2009 and 2010, significant increases in the abuse of synthetic cathinones occurred first in Europe and subsequently in the U.S. (ACMD, 2010) Quickly, the bath salt drugs came to the attention of authorities following an exponential rise in reports to poison control centers. Data indicate that visits to emergency departments linked to synthetic stimulants reached 23,000 in 2011 (SAMHSA, 2013). During this period, the three primary chemicals contained in bath salt products were methyldone, mephedrone, and methylenedioxypropylvalerone (MDPV) (Miller & Stogner, 2014). As noted earlier, all three were banned by the DEA in October 2011.

Scant information is available on exactly how bath salt drugs interact with the brain or how they are metabolized in the body. However, because these drugs produce exaggerated brain stimulation similar to amphetamines, scientists suggest that the stimulant effects of bath salts are caused by increased concentrations of neurotransmitter monoamines, such as dopamine, serotonin, and norepinephrine, in brain synapses (Prosser & Nelson, 2012). Given the similarities in effects that these drugs have to other stimulant drugs of abuse, scientists also are inclined to believe that bath salts have a powerful addictive potential and can cause increased tolerance in frequent users (Paillet-Loilier et al., 2014).

The reported pharmacological effects of synthetic stimulants include the following (Spiller et al., 2011; Coppola & Mondola, 2012):

- Increased heart rate and blood pressure
- Pupil dilation
- Hyperactivity
- Arousal and overstimulation
- Increased energy and motivation
- Euphoria and agitation
- Dizziness
- Nausea
- Breathing difficulties



- Diminished perception of the requirement for food and sleep
- Anxiety
- Psychosis
- Suicidal thoughts

The evolution of designer stimulants is strikingly similar to the pattern seen with other designer drugs. While synthetic cathinones were the original compounds used in the bath salt drugs, the designer chemists have moved on. By altering the chemical formulations in subtle ways, bath salt chemists rapidly create new substances that do not classify as currently banned (NIH/NIDA, 2012). Like other designer drugs, bath salts can be produced by professional and amateur chemists (USDOJ, 2011).

Comprehensive bath salt screening now includes the phenethylamine drug class (e.g., 2C-B, 2C-E, 2C-I, NBOMe), new analogs of methamphetamine (4-MA), ketamine derivatives (e.g., methoxetamine, MXE, Mexxy, Kmax), methylhexanamine (Pump-It Powder), dimethylamylamine (DMAA; introduced as a dietary supplement following the banning of ephedrine), pyrovalerone-related compounds (alpha-PVP), and the list goes on (Madras, 2012; De Boer & Bosman, 2004). Even the 1980s stimulant Ecstasy (MDMA) is making a comeback under its new moniker *Molly*.

Miscellaneous Designer Drugs

The depth and breadth of newly created designer drug products yields compounds that do not easily fit into either the synthetic cannabinoid or designer stimulant categories, although some of these agents have overlapping physical effects. Many of these compounds combine the psychoactive effects of synthetic cannabinoids or designer stimulants with hallucinogenic effects.

The miscellaneous designer drug category includes the following:

Tryptamine-Based Drugs (e.g., Foxy, AMT, and DMT)—This drug produces multiple effects. It is

primarily a hallucinogenic, but it also produces euphoria, visual and auditory disturbances or distortions, and emotional distress. Tryptamines as a class include neurotransmitter serotonin and the hormone melatonin, which regulates the sleep-wake cycle (Madras, 2012).

Mitragynine (Kratom)—Botanical in origin, this drug comes from a tropical tree native to Thailand and Malaysia. Although it produces stimulation at low doses, its effects are primarily sedative at higher doses because it binds with opioid receptors. Users report a combination of both stimulation and sedation simultaneously (Babu et al., 2008).

Desomorphine (Krokodil)—Russian for *crocodile*, this derivative of morphine is easily synthesized from codeine, which is available over-the-counter in many Eastern European countries. The “high” associated with desomorphine is similar to that of heroin but much shorter in duration. The impurities commonly found in homemade Krokodil and dirty-needle reuse has made this drug notorious for producing severe tissue damage and gangrene in long-term users (Gahr et al., 2012).

Benzofurans (6-APB, or Benzo Fury)—A spectrum of psychological effects is associated with these agents, from significant stimulation, such as with methamphetamine and MDMA, to hallucinogenic responses similar to psychedelic drugs such as LSD (Musselman et al., 2014).

Piperazine-Based Drugs (e.g., BZP, TFMPP, and MeOPP)—These drugs primarily stimulate the central nervous system producing euphoric effects comparable to those produced by amphetamine. Reported adverse effects following use include acute psychosis, renal toxicity, and seizures. Interestingly, piperazine is in the same class of drugs as Viagra (Musselman & Hampton, 2014).

Phenethylamine-Like Drugs (e.g., Bromo Dragonfly, B-Fly, Fly, and 3CB-Fly)—This potent synthetic hallucinogen is a psychedelic drug with effects that can last up to several days. Unlike stimulants and opioids, which induce familiar states of consciousness, psychedelics affect the mind,

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resulting in a qualitatively different experience from ordinary consciousness (e.g., trance or dream-like states). Bromo-Dragonfly reportedly has caused multiple deaths in the U.S. and Europe (Cole et al., 2002; Andreasen et al., 2009).

Sedative-Class Drugs (1,4-B and BDO)—Most of the substances in this classification are derivatives of GHB (gamma hydroxybutyrate, or the “date-rape” drug), but also included are analogs of methaqualone (Quaaludes) and benzodiazepines. The GHB analogs are categorized as depressants, and like GHB, their effects are enhanced by alcohol. All of the compounds in this class cause major sedation (Musselman & Hampton, 2014).

Dissociative Psychedelic Class (e.g., 3-MeO-PCP, 4-MeO-PCP Methoxetamine, MXE, Mexxy, Roflcopter)—Synthetic dissociative psychedelics are similar in activity to PCP and ketamine. Hallucinogenics distort perceptions of sight and sound and produce feelings of detachment from the environment and self (Musselman & Hampton, 2014).

FAAH Inhibitors—This enzyme is responsible for regulating brain chemicals such as those that induce sleep and those that control cannabinoid receptors (Logan et al., 2013).

The list above is not comprehensive but offers a glimpse at the staggering complexity of current designer drug trends. What is most unsettling about these designer drugs is how much is unknown. For the most part, scientists and researchers do not know the short- or long-term health ramifications of using these compounds. They do not understand exactly how these drugs affect the brain. No one knows how long these substances remain in the human body or if these drugs produce even more harmful by-products. Not enough research exists to predict the addictive consequences of abusing these drugs. Further complicating how much a user can understand his or her choice to use these drugs is that the user cannot know if the drug being consumed is the actual substance that is named on the label of the package and therefore cannot understand the potential for harmful impurities.

Legal Controls

In the congressional report *Synthetic Drugs: Overview of Issues for Congress*, Sacco and Finklea (2014) provide a detailed review of current federal synthetic drug control options:

Scheduling of Synthetic Drugs: Controlled Substances Act

The Controlled Substances Act (CSA) was enacted as Title II of the Comprehensive Drug Abuse Prevention and Control Act of 1970 (PL 91-513). It regulates the manufacture, possession, use, importation, and distribution of certain drugs, substances, and precursor chemicals. Under the CSA, there are five schedules under which substances may be classified—Schedule I being the most restrictive. Substances placed onto one of the five schedules are evaluated on

- actual or relative potential for abuse;
- known scientific evidence of pharmacological effects;
- current scientific knowledge of the substance;
- history and current pattern of abuse;
- scope, duration, and significance of abuse;
- risk to public health;
- psychic or physiological dependence liability; and
- whether the substance is an immediate precursor of an already-scheduled substance.

There are designated procedures under which the scheduling of substances normally occurs. Specifically, the Attorney General—through the Drug Enforcement Administration (DEA), and in consultation with the Secretary of [Health and Human Services]—may place a drug or substance on Schedule I if it meets all of the following criteria:

- A. The drug or other substance has a high potential for abuse.
- B. The drug or other substance has no currently accepted medical use in treatment in the United States.
- C. There is a lack of accepted safety for use of the drug or other substance under medical supervision.

Controlled Substances Analogue Enforcement Act of 1986

The Controlled Substances Analogue Enforcement Act of 1986 (Analogue Enforcement Act) was enacted as Subtitle E of the Anti-Drug Abuse Act of 1986 (PL 99-570). This law amended the Controlled Substances Act to treat a controlled substance analogue (intended for human consumption) as a controlled substance under Schedule I. Under this law, a controlled substance analogue is defined as a substance if



- 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.

Of note, many of the synthetic cathinones marketed under household names such as “bath salts” or “plant food” are stamped with “not intended for human consumption.” This action is intended to circumvent the Analogue Enforcement Act under the CSA.

Temporary Scheduling

Because policymakers were concerned about the effects of pharmaceutically created and other modified drugs, Congress gave the Attorney General the authority to temporarily place a substance onto Schedule I of the CSA to “avoid imminent hazards to public safety.” When determining whether there is an imminent hazard, the Attorney General (through the DEA) must consider the drug’s history and current pattern of abuse; scope, duration, and significance of abuse; and risk to public health.

Once scheduled through this temporary scheduling process, a substance may remain on Schedule I for two years. The Attorney General then has the authority to keep the substance on Schedule I for an additional one year before it must be removed or permanently scheduled. The Synthetic Drug Abuse Prevention Act of 2012...extended the DEA’s temporary scheduling authority. Prior to enactment of this act on July 9, 2012, the DEA was able to

temporarily place a substance on Schedule I of the CSA for one year, with a potential extension of six months.

Because of the rapid evolution of designer drug trends, legal responses to control the availability and use of designer drugs have struggled to keep pace with their emergence (Fass et al., 2012). However the federal government now has latitude in addressing emerging designer drug chemicals, and governmental response has accelerated significantly.

States have also been swift to respond to the upsurge in designer drugs. Prior to 2010, not a single state controlled synthetic cannabinoids. Three years later, forty-three states had taken action to control synthetic cannabinoids, and forty-four states had taken action to control synthetic cathinones (NCSL, 2012; USDOJ/NDIC, 2011). See “Resources” at the end of this fact sheet for a Web site listing all currently controlled substances.

Drug Testing for Designer Drugs

As for other substances of abuse, urine is the specimen of choice for designer drug detection. The reference method for the abstinence monitoring of designer drugs is liquid chromatography-tandem mass spectrometry (LC/MS/MS). LC/MS/MS is considerably more costly than screening methods available for conventional street drugs and is available only through laboratories. However, Spice and similar synthetic cannabinoids will not produce positive drug test results with traditional marijuana screening methods.

The majority of designer stimulants also do not react with current screening methods for either amphetamine or cocaine. Because of this, several companies have developed new immunoassay-based screening methods for designer stimulants and synthetic cannabinoids. Information on the efficacy of this new-generation testing approach is limited at present.

Though LC/MS/MS is considered to be a scientifically reliable and forensically dependable drug-testing method for the detection of designer

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drugs, Drug Courts need to be aware that this testing is new, and many global issues remain: Cutoff levels for these emerging psychoactive chemicals have not been standardized. No independent quality control products and no proficiency testing is available to laboratories performing these tests. One of the most important issues for Drug Courts is the lack of dependable and consistent information on the detection window of designer drugs in urine.

Despite the issues, laboratory-based methods are preferable. Anecdotal reports suggest that point-of-collection testing alternatives have yielded disappointing results. The lead-time to produce an on-site, rapid, point-of-collection test (POCT), taking it from research and development through approval, manufacturing, and distribution, disadvantages POCT technology when it comes to detecting designer drugs in urine. The rapid reformulation of these emerging substances makes keeping pace with the ever-evolving chemistry of designer drugs difficult for POCTs. There is a dearth of scientific publications on the effectiveness of the POCT approach for designer drugs.

To combat designer drug use, Drug Courts need to partner with laboratories to take advantage of the most reliable designer drug detection methods. Because not all laboratories are equal, Drug Courts are encouraged to evaluate laboratory services carefully: Seek recommendations for laboratories from other programs. Consider which laboratories offer more comprehensive testing and cover a wide range of designer drugs. Evaluate which remain current with the emerging trends by updating their testing panels frequently to address new chemical challenges. Review the labs' access to and quality of scientific experts that the labs use to interpret designer drug results.

The nation's forensic laboratory community is devoting considerable time and resources to the designer drug problem. For years the cheminformatic databases used by forensic chemists to identify and catalog substances remained relatively static. With the emergence of designer drugs, scientific groups and researchers have renewed their efforts to expand the forensic databases and upgrade access to critical detection information, resulting in significant technological and informational advances (Stout et al., 2012).

Drug Court Response to Designer Drugs

The scientific literature provides a significant amount of information on the synthetic pathways and pharmacological properties of thousands of drugs, including narcotics, stimulants, hallucinogens, and other psychoactive drugs. Creative chemists will continue to exploit the pharmaceutical literature and easily available expert knowledge. Legislative initiatives have failed to keep pace with the rapid evolution of emerging drugs, and new laws have been minimally effective at stemming the tide. Drug-testing laboratories struggle to remain current with the advancing sophistication of these chemists synthesizing illicit drugs (Wohlfarth & Weinmann, 2010).

So what steps can Drug Courts take to respond to this daunting challenge?

Step 1: Acknowledge the Problem

As with any substance use disorder, the first step is recognition of the problem. Drug Courts should understand the complexity and rapid evolution of designer drugs. They need to be aware of the challenges associated with addressing designer drug use within their courts, challenges such as failure of new laws and screening to keep pace with the ever-evolving designer drugs.

Step 2: Ban Designer Drugs

The court must unequivocally ban the use and possession of designer drugs, even if purchased as "legal." The court should prohibit the use or possession of herbal incense and all smoking mixtures other than products containing only tobacco. The court should prohibit the use or possession of all products sold or marketed under false pretenses with the warning, Not for human consumption.

Step 3: Put it in Writing

The best practice research indicates that outcomes for participants are significantly better in Drug Courts that clearly state their policies and procedures in the participant manual, contract, or handbook (Carey et al., 2012). Participants are more likely to react favorably to an adverse judgment if they are given advance notice on how such judgments will be reached. Therefore, Drug Courts are strongly encouraged to be on record as prohibiting any chemical falling into the designer drug domain by placing specific, written prohibitions against them into participant informational materials.



Step 4: Abstinence Monitoring

Although testing for designer drugs has its shortcomings, primarily because of the evolutionary landscape of these synthesized chemicals, abstinence monitoring of participants has proven effective in many Drug Courts. Because testing all participants for designer drugs is likely cost prohibitive, Drug Courts should consider screening a subset of participants. Whether caseworkers target suspected designer drug users or whether the selection is random, testing, even on this limited basis, can successfully detect the use of designer drugs. Following the identification of participants using designer drugs, the court may consider a limited amnesty initiative to encourage other participants to self-report designer drug use. This approach has significant therapeutic implications and potential deterrent benefits.

Step 5: Community Supervision

Because of the legal constraints and drug-testing limitations resulting from the evolving nature of designer drugs, community supervision by probation and law enforcement officers, court personnel, caseworkers, and marshals can be the crucial component when monitoring participants for designer drug use. Most Drug Court programs require participants to waive their Fourth Amendment rights as a condition of participation, providing Drug Courts with the power to search participants, their residences, and their belongings without a warrant for the period of participation. Drug Courts must be aware of and work within all laws pertaining to search and seizure, probationary conditions, and parties who are authorized to search prior to using this strategy.

The value of supervision in the community has been demonstrated by best-practices research (Bourgon et al., 2010). Home visits (announced or unannounced) and proactive supervision activities (including searches of persons, places, vehicles, and items under participants' control) are highly supportive of recovery principles. Community supervision is the first line of defense against designer drugs. Officers should examine not only

the standard areas, but also participants' computers and smart phones. Inspections of the participants' texts, photos, Internet ordering practices, receipts, ATM records, shipping labels, shipping materials, packaging items, and Internet cache history can reveal designer drug purchases. Officers should also track social media platforms if participants are using them. When it comes to monitoring for designer drugs, community supervision provides the Drug Court with additional monitoring capabilities that can compensate for the diminished role of drug testing.

Conclusion

The Drug Court model has enabled criminal justice practitioners to combat this nation's struggles with substance use disorders. Effectively responding to the designer drug challenge will require creativity, vigilance, and the productive use of all of the Drug Court tools that have already led to great success in leading people to recovery. While designer drugs may represent a greater challenge to the Drug Court system because of the quasi-legal status of and difficulty of screening for the newly evolved designer drugs, the essential struggle remains the same as those posed by alcohol, heroin, cocaine, or misused prescription drugs. The Ten Key Components and best practices still apply—designer drugs do not change the foundation of Drug Court policies or practices.

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Resources

Designer Drug Trends—Operated by NMS Labs, this site catalogs informational materials on designer drugs from people in a variety of disciplines, people such as scientists, law enforcement, and policy makers. Interactive links to state policies and timely webinars are available. <http://designerdrugtrends.org/>

Drug Enforcement Administration (DEA)—Provides updates to the CSA and notices of rule changes and legislative initiatives. <http://www.justice.gov/dea/index.shtml>

Erowid—Documents information on both legal and illegal substances gathered from diverse sources including published literature, experts in related fields, and the experiences of the public. Erowid is a 501(c)(3) nonprofit educational organization. <http://www.erowid.org/>

Office of Diversion Control—This office under the DEA provides a list of all currently controlled substances on their Web site. <http://www.deadiversion.usdoj.gov/schedules/>

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