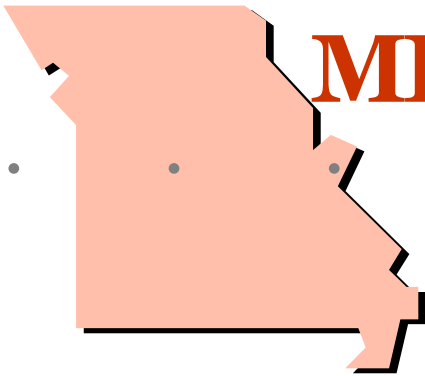




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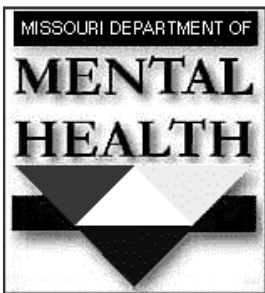
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MDMA in Missouri

A Policy Brief Exploring Patterns of Abuse

Prevention, Treatment and Interdiction Strategies



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Introduction

Teenagers and young adults across the nation are experimenting with MDMA, more commonly referred to as “Ecstasy”. MDMA is the most popular of the “club drugs”, a group of illicit drugs often used in conjunction with alcohol and other substances at nightclubs and raves to allow prolonged dancing and to heighten the experience of light and sound. However, recent reports indicate the use of these substances is rapidly spreading beyond these settings into schools, neighborhoods, and other locales. Further, while use of other illicit drugs among teenagers is remaining level, use of MDMA is increasing.

Although MDMA is often touted as being relatively non-addictive and harmless, emerging evidence suggests that there are many health consequences associated with its use, especially when it is used in conjunction

with alcohol or other drugs. Studies sponsored by The National Institute on Drug Abuse (NIDA) have found evidence that long-term brain damage may result from extensive and prolonged MDMA use. Finally, MDMA use seems to be spreading from large urban areas on the East and West Coasts to rural settings and small communities, making this an important emerging issue for Missouri.

This policy brief discusses the history of MDMA, its relationship to other drugs, its manufacturing and trafficking, and the physiological reactions and health consequences associated with its use. A review of national and Missouri epidemiological data describes the prevalence and patterns of its use. Recommendations for treatment, prevention, and policy are also discussed. Finally, resources for additional study are provided.

Quick facts: MDMA Terminology

Club drugs: Illicit, primarily synthetic drugs with hallucinogenic and stimulant properties that are most often used at nightclubs and raves. Examples include PCP, Rohypnol, and GHB (the “date rape drug”).

Raves: Large all-night dance events that feature loud, synthesized rock music or “techno or house” music accompanied by laser lights, primarily attended by youth and young adults. Raves may be held in nightclubs, auditoriums, warehouses, or barns.



MDMA

MDMA (3,4-methylenedioxyamphetamine) is chemically very similar to MDA (the counterculture “love drug” popular in the late 1960s and early 1970s) and the amphetamine/methamphetamine family of drugs. MDMA is a synthetic psychoactive drug possessing both stimulant and mild hallucinogenic properties. The name “Ecstasy” was given to MDMA primarily for marketing reasons. Most experts agree that the term “empathy” would more accurately reflect the drug’s effects on users. MDMA is often referred to by a number of other street names and comes in a wide variety of colors, shapes, and sizes.

MDMA was synthesized in the early 1900s by the German pharmaceutical firm Merck as an unplanned intermediate step in the development of medications. Its primary medicinal use is as a therapeutic aid. In the 1970s, MDMA became popular with a small group of experimental psychotherapists who administered lower doses than those currently being used for recreational purposes. Lower doses of the drug cause mild shifts in consciousness that lower patients’ defenses, facilitate the disclosure of feelings, and aid in the development of new insights.

However, MDMA’s therapeutic value was never established as the Drug Enforcement Administration (DEA) banned it in the mid-1980s. This ban temporarily placed the drug on Schedule I (highly addictive drugs, judged to have no medicinal purpose) of the Controlled Substances Act. Despite legal rulings that MDMA should be on the less restrictive Schedule III, the DEA placed it permanently on Schedule I shortly thereafter. The publicity resulting from this controversy exaggerated MDMA’s euphoric and sensual effects, which some believe led to a dramatic escalation in recreational use.

Manufacturing and Trafficking of MDMA

MDMA is relatively inexpensive to produce and is sold at a large profit margin through several tiers of wholesale and retail distribution. The profit margin, the complex distribution, and the various methods of production make interdiction difficult.

MDMA is generally produced using:

- *Safrole* (the primary constituent of sassafras oil), *isosafrole*, and *piperonal*. With this method production takes several days.
- *MDP2P*, produced overseas and imported for use in the flavoring and fragrance industry. This process is less complex and quicker.

The relative complexity of MDMA production and restrictions on the availability of the chemicals required have limited the number of MDMA production labs in the U.S., compared to methamphetamine production labs, for example. The substances needed are available from specialty chemical supply houses for industrial and research purposes only, and are therefore not readily available to the general public. These chemicals are less extensively regulated in Europe. Thus, the vast majority of the MDMA used in the U.S. is produced in clandestine European laboratories.

Quick Facts:

Street Names for MDMA

- Ecstasy
- E, Vitamin E
- X, XTC
- Adam
- M & M
- Love Drug, Lover’s Speed
- Hug Drug, Hug Beans



The completed production process yields a powder that has a distinctive licorice scent. This powder is pressed into tablets typically composed of 100 milligrams of MDMA, adulterants, and diluents. MDMA tablets come in over 100 different colors, shapes, and sizes. Identifying designs or symbols that are used by distributors to distinguish their products from their competitors' are pressed into the pills. These logos and brand names are designed to appeal to the tastes of young consumers and often refer to holidays or special events. Examples of popular logos include a butterfly, a lightning bolt, a four-leaf clover, the Pink Panther, and the trademark symbols of Mitsubishi, Rolex, Adidas, and Nike. This illicit process yields pills that resemble prescription medications, leading many users to mistakenly assume the pills were manufactured according to recognized industry safety standards, when in fact, MDMA pills are often adulterated with other harmful substances.

Quick facts:

<i>U.S. Cities</i>	<i>MDMA Prices</i>
Dallas	\$10 - \$20 per pill
Denver	\$15 - \$20 per pill
Baltimore & New York	\$20 - \$25 per pill
Phoenix	\$20 - \$40 per pill
Seattle	\$15 - \$30 per pill

Source: CEWG, 2001

MDMA is typically smuggled into the U.S. in large shipments of 10,000 or more tablets via express mail services, commercial airlines, or airfreight shipments. Distribution is a multinational phenomenon involving several European countries. Street-level dealers are frequently youth who attend raves, where they distribute MDMA. The DEA estimates that a single pill can be produced for as little as 20 to 25 cents in Europe, then sold on American streets for \$10 to \$40, depending on geographic location. Reports indicate that in St. Louis, MDMA prices range from \$15 to \$30.

Effects of MDMA

MDMA is usually swallowed in tablet form and less frequently snorted in powder form or injected in a powder-and-water mixture. Although many users take one pill a session and generally limit their use to one or two sessions per week, some users take several pills at once to aid them in dancing for long periods, a practice known as "stacking". The effects appear within 20 to 60 minutes and can last from two to six hours. Other users combine MDMA with other drugs.

MDMA's effects depend on the quantity and purity of the dose taken, in addition to the environment in which it is taken. Users of MDMA tablets initially experience a rush of energy and mild euphoria, followed by a plateau lasting two to three hours. This phase is followed by a gradual coming down, which can end in fatigue. When the drug is snorted or injected, users immediately feel an intense euphoria.

Use of MDMA results in a dramatic drop in psychological defenses and perceptions of increased empathy toward others, which, when combined with stimulant effects, tends to increase the level of intimate conversation. MDMA induces other strong positive feelings, such as closeness, trust, relaxation, awareness, feelings of pleasure, energy, sensuality, and a desire to touch. MDMA

Quick Facts:

Short-term Effects Associated with MDMA Use

- Empathy
- Trust
- Lowered inhibitions
- Relaxation
- Energy
- Desire for touch



reduces inhibitions and enhances the appreciation of touch and movement. Thus, MDMA use can encourage unplanned risky sexual behavior, increasing the risk for sexually transmitted diseases. Paradoxically, some studies show that the physical effects of MDMA often interfere with the ability to have sexual intercourse. Users consistently report that MDMA inhibits their ability to achieve erections and orgasms. However, it is equally important to note that the tactile pleasures associated with MDMA are often not related to sexual stimulation, but instead, simply related to a strong desire for touch.

Health Consequences of MDMA Use

MDMA acts by affecting chemical processes in the brain. MDMA possesses unusual pharmacological properties that simultaneously release important neurotransmitters (chemicals that help nerve cells communicate with each other) in the brain, while blocking their re-uptake. MDMA causes a rapid release of serotonin (the chemical that helps regulate mood, learning, memory, aggression, and emotions), dopamine (the chemical that helps regulate movement, emotions, and feelings of pleasure and pain), and norepinephrine. This release is coupled with an inhibition of the re-absorption of these neurotransmitters, especially serotonin.

The brain is flooded with such large amounts of serotonin that within 3-6 hours the supply of serotonin is depleted. MDMA also temporarily inactivates an enzyme needed to produce serotonin, making it temporarily impossible for the brain to replace its stores. Depleted serotonin levels may be responsible for the mood swings that are observed immediately following MDMA use. Although occasional users are able to synthesize serotonin within 24 hours after using MDMA, research indicates that long-term and heavy users' ability to produce serotonin is affected for longer periods of time, perhaps even permanently.

In addition, MDMA, like amphetamines, stimulates the central nervous system, increasing heart rate, blood pressure, and rate of respiration, while reducing the need to eat, drink, and sleep. Although the user initially feels very energetic, the increased rate of core bodily functions eventually depletes the body's energy stores, leaving the user feeling run down and tired. Changes in dopamine levels caused by stimulants appear to play a major role in the repeated use of the drug. Increases in dopamine levels cause feelings of euphoria and satisfaction. However as dopamine levels recede, users develop an intense desire to reproduce these pleasurable feelings by taking additional doses of the substance.

One of the greatest dangers associated with taking MDMA is mistakenly ingesting MDMA that is adulterated with more dangerous substances, such as LSD, amphetamines, ephedrine, and ketamine, among others. The lack of a consistent distribution network often results in suppliers substituting more harmful look-alike drugs for MDMA. At least seven other drugs are sold under the name "Ecstasy". In addition, many overdoses occur as a result of mistakenly ingesting PMA, a more powerful analog of MDMA, which quickly increases body temperature, often causing stroke and kidney or heart failure. Often, PMA and MDMA pills are so similar in appearance that they can only be differentiated through a chemical test. Medical treatment is frequently complicated by uncertainty about which substance was ingested.

Psychological Effects

MDMA has psychedelic (mind-altering) properties, but these properties are mediated by the rapid release of dopamine and serotonin. MDMA causes mild perceptual distortions, little or no hallucination (at low doses), and relatively few unpleasant side effects. MDMA seldom produces the mental confusion associated with LSD and other traditional psychedelic drugs. MDMA use

Quick facts:

Adverse Psychological Effects of MDMA Use

- Confusion
- Depression
- Sleep problems
- Cravings
- Anxiety
- Paranoia



is often self-limiting, primarily because frequent use is accompanied by increasingly strong, unpleasant side effects, and an almost total reduction of positive effects. The energy, awareness, and confidence resulting from MDMA's amphetamine-like properties may lead to psychological dependence. Although users report that their initial experience with the drug is unmatched by their subsequent experiences, they may continue to take higher doses in attempts to recreate the initial high similar to users of amphetamines and cocaine.

Physiological Effects

MDMA users may experience nausea, headaches, blurred vision, and muscle cramping. Most research indicates that that heavy or long-term use is associated with memory impairment and depression, primarily due to the depletion of serotonin.

MDMA causes paradoxical effects of relaxation and increased energy, leaving many users unaware of its negative stimulant side effects. Users may experience tension in the lower jaw area and an involuntary grinding of the teeth, leading them to use pacifiers to relieve the muscle tension in the jaw area.

MDMA suppresses the need to eat, drink, and sleep, enabling users to dance for long periods of time and to participate in parties lasting several days. Excessive dancing in the often hot, crowded, unventilated conditions characteristic of raves, together with the intake of alcohol may cause dehydration, hyperthermia (excessive body heat), or heat stroke. Some reports have noted that sponsors of raves often seek to increase their profits by turning off drinking fountains to force users to pay for overpriced bottled water. The impact of these environmental conditions is often exacerbated by the drug's tendency to "short-circuit" the body's temperature signals to the brain. A number of deaths due to MDMA have been associated with core body temperatures ranging from 107 to 109 degrees Fahrenheit.

On the other hand, some users suffer from another complication, hyponatremia, when they consume too much water in an attempt to avoid dehydration. Hyponatremia, low plasma sodium level due to the dilution of blood with water, is caused by drinking large amounts of water without a corresponding loss of fluid through sweat. Low levels of sodium in the body may cause cerebral edema (swelling of the brain with water), a major cause of death in hyponatremia. Although there has been at least one reported death from hyponatremia, deaths due to hyperthermia far outnumber deaths due to this phenomenon.

Emerging Issues

Examination of recreational users indicates that use of MDMA is associated with memory impairment. Most experts believe that chronic use of MDMA destroys serotonin-producing cells and the neurons regulating serotonin. The extent of memory impairment and brain damage is related to the frequency and heaviness of use; more frequent users show more impairment. Reduced levels of serotonin may lead to adverse psychological effects such as depression, anxiety, paranoia, memory loss, and learning difficulties (DEA, Feb. 2000).

The effects of long-term MDMA use are just beginning to be established. There is mounting evidence that MDMA users risk long-term neurological damage, especially in the hippocampus, the part of the brain that is thought to play a major role in memory and learning functions. Recent research also suggests that both current Ecstasy users and those who have not taken it for as long as two years on average show elevated anxiety, depression, obsessiveness, somatization,

Quick facts:

Adverse Physical Effects of MDMA Use

- Muscle tension
- Nausea
- Faintness
- Chills and sweating
- Increased heart rate
- Increased blood pressure
- Overheating
- Liver damage



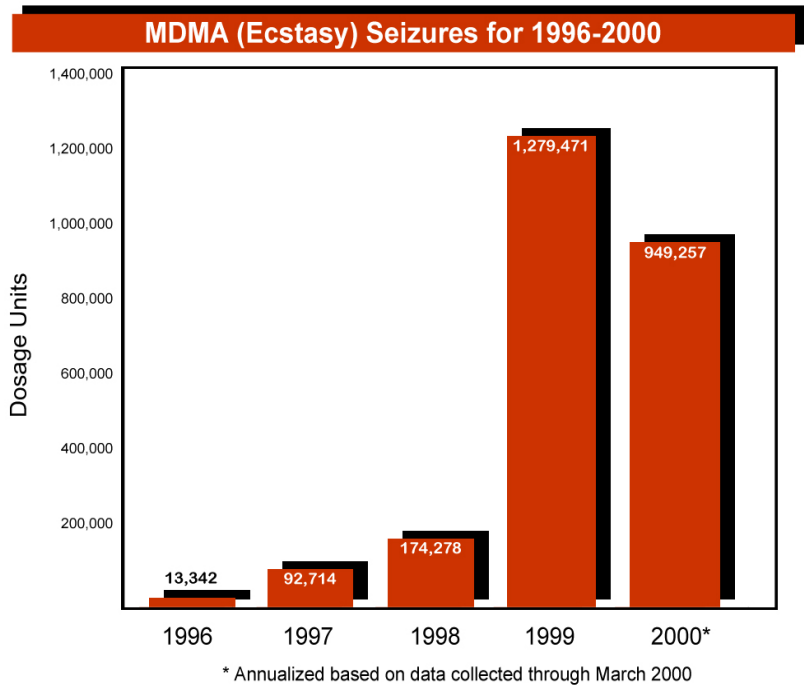
phobic anxiety, interpersonal sensitivity, appetite problems, and sleep problems, compared to poly drug users and control groups. However, researchers are unsure whether the damage is permanent or cells can regenerate. The legal and ethical problems of controlled laboratory studies that examine the impact of repeated use on the brain mean that long-term effects have yet to be determined. In light of this evidence, there is growing concern that young people whose brains may have not fully developed, may be stunting their neurological development.

Other experts caution that claims that MDMA causes long-term brain damage are premature. They maintain that the methodologies employed in many of the studies were not scientifically rigorous; therefore, the findings from these studies were inconclusive. They argue that these studies failed to separate the effects of MDMA from the effects of other drugs that subjects may have also ingested. Some critics argue that the neurological damage noted was induced in a laboratory setting by giving the drug several times per day in unrealistically high doses.

National Indicators of Abuse

How Prevalent is MDMA?

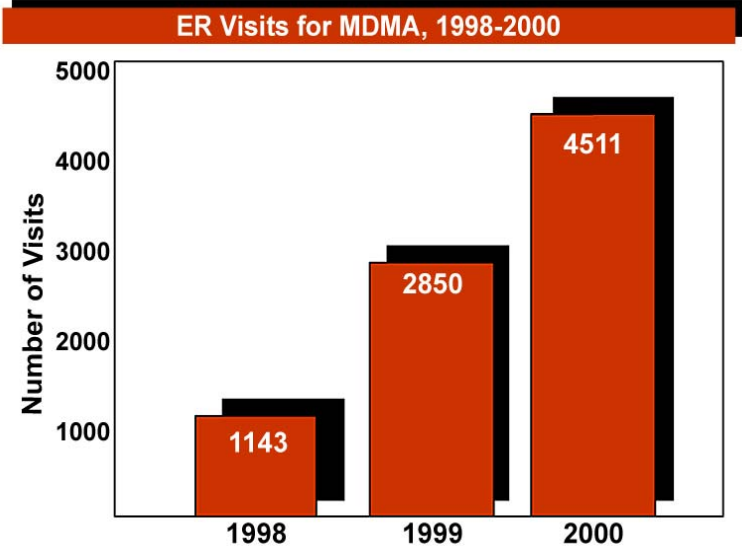
In 2000, an estimated 6.4 million Americans had used MDMA at least once during their lifetime, up from 5.1 million in 1999, and 3.4 million in 1998 (National Household Survey on Drug Abuse). MDMA is being seen in many cities as an “emerging drug,” more easily available and more frequently abused than in recent years. Further evidence of the increased prevalence in MDMA is found in interdiction records. Ecstasy tablets seized by the DEA increased from 13,342 in 1996 to 949,257 in 2000. U.S. customs officials seized 3.5 million Ecstasy tablets in 1999, and 9.3 million tablets in 2000.



Graph 1 Source: DEA 2000 STRIDE Data



With these increasing levels of availability and use, there has also been a sharp increase in emergency room visits. Emergency room data from the Drug Abuse Warning Network (DAWN) shows an increase from 1,143 mentions in 1998, to 2,850 in 1999, to 4,511 in 2000. The figures from 1999 to 2000 reflect a 58% increase in mentions by emergency room personnel. For these emergency room drug contacts, MDMA ranks 28 out of the top 102 drugs mentioned. While users overwhelmingly report their motives for use are “recreational”, the two most commonly mentioned reasons for MDMA users coming to emergency rooms were “overdose” and “unexpected reactions” (1,742 and 1,289, respectively, of 4,511 mentions in year 2000 emergency room data).



Graph 2 Source: DAWN, 2000

Who Uses MDMA?

While adults also use Ecstasy, it is especially popular among youth. By age group, the heaviest use (5% percent or 1.4 million people) reported is among 18- to 25-year-olds. Also, this age group is disproportionately represented among those seeking emergency services related to MDMA use. Among all other substances, thirty-one percent of emergency contacts are from those under 25 years old, whereas with MDMA, eighty percent were from those 25 years of age and under (statistics for the year 2000). MDMA is the thirteenth most frequently mentioned drug for those in this age group who seek emergency services.

Contrary to some perceptions however, MDMA is not used exclusively among the college-aged population. Greater numbers of high school and junior high school students are reporting MDMA use. Both MDMA use and the perceived availability of MDMA seem to be increasing among 8th, 10th, and 12th grade students. Recent surveys conducted in Massachusetts and Seattle show that lifetime Ecstasy use is increasing in young populations. A Massachusetts survey shows that Ecstasy use increased sharply among high school students, from 6 percent in 1996 to 15 percent in 1999.

Quick Facts:

Who uses MDMA (use in past year)?

- Young adults (19-28)... 3.6%
- College students 5.5%
- 12th graders 8.2%
- 10th graders 5.4%
- 8th graders 3.1%

Source: National Household Survey on Drug Abuse, 2000

Where is MDMA Used?

MDMA use has primarily been a coastal phenomenon, prevalent in East and West Coast cities. However, it is now moving toward the center of the United States, as can be seen in the table



below, detailing MDMA trends in national cities. While once primarily an urban phenomenon, MDMA is now becoming popular in rural and suburban regions as well. In many metropolitan areas, MDMA, once used primarily at dance clubs, raves, and college scenes, is now being used in a number of other social settings. There are at least 17 cities in which Ecstasy use has become more widespread.

Reports of Ecstasy Use across the Nation

East Coast	Baltimore	<i>Ecstasy use emerged in mid-1999 and has increased dramatically by individuals “just hanging out.” It is used to relieve depression and to enhance sexual feelings. It is widely believed by users that Ecstasy pills contain drugs such as heroin, cocaine, or speed.</i>
	Boston	<i>Ecstasy use has moved outside the rave, dance, and club scenes and is used by adolescents in other settings. In the first three quarters of 2000, MDMA was the most frequently mentioned drug in telephone calls to the Poison Control Center in Boston.</i>
	New York	<i>Most Ecstasy dealing and use takes place in nightclubs, but use is also being reported in locations throughout the city. Use is increasing: the Street Studies Unit continues to report Ecstasy use in several areas of the city.</i>
	Philadelphia	<i>Feedback from focus groups indicates that Ecstasy is used by white college-age young adults and typical club-goers in their 20s.</i>
	Washington, D.C.	<i>MDMA has become a “drug of choice” among white middle-class young adults in the District and surrounding areas. There is a wide range of users, including high school and college students and adults.</i>
Southern	Atlanta	<i>MDMA is popular with a wide variety of age groups and in a number of social settings. Ecstasy use is hidden in suburban areas.</i>
	Miami	<i>Ecstasy use has increased dramatically, particularly among teenagers and young adults. In 1999, there were eight MDMA-related deaths in Miami/Dade County.</i>
	New Orleans	<i>Police narcotics units have confiscated substantial quantities of Ecstasy in two nearby parishes, East Baton Rouge and Lafayette. Three rave bars have been opened near Louisiana State University.</i>
Midwest	Chicago	<i>Ecstasy is the most prominent stimulant used in Chicago. It is now more available in mainstream dance clubs and house parties.</i>
	Minneapolis/St. Paul	<i>Five recent deaths were associated with Ecstasy use.</i>
	St. Louis	<i>Ecstasy is freely available in the rave scene. There is sporadic use of Ecstasy in urban areas, and use is increasing in rural areas. Ecstasy is now more available in high schools.</i>
West Coast	Denver	<i>In addition to being readily available in the rave scene, Ecstasy is being sold in many singles bars in the Denver metropolitan area.</i>
	San Francisco	<i>According to street observers, MDMA use is increasing, especially among young people between 15 and 25 years of age.</i>
	Seattle	<i>The use of Ecstasy and other club drugs appears to be widespread</i>



Indicators of Abuse for the State of Missouri

Why is MDMA a threat to Missouri?

In addition to the statewide data discussed below, there is evidence of increased MDMA activity in states that surround Missouri. For example, in Illinois club drugs are becoming more readily available, particularly in the Chicago area. O'Hare International Airport is a major hub for MDMA trafficking and accompanying customs seizures. Outside Chicago, jurisdictions in central Illinois, particularly those that include colleges and universities, have also reported that incidents of MDMA use are on the rise. In Nebraska, MDMA use at raves continues to be a problem, particularly in Omaha. And in Kansas, the cities of Olathe, Kansas City, and Lawrence are dealing with problems related to MDMA use. Missouri's central location and interstate highways allow for easy trafficking of drugs from the Mexican border to Chicago¹ (north and south) and across the nation (east and west). Thus, there is reason to believe that Missouri is at high risk for increasing prevalence of MDMA.

Overview

Until recently, MDMA had primarily been a problem in Missouri's large urban areas. For example, DAWN data indicates that for the St. Louis metro area, 2.1 mentions of MDMA were made per 100,000 persons in the year 2000. The majority of raves and dance clubs, where MDMA use largely occurs, had been located in urban centers; however, MDMA is appearing more frequently in rural areas and in settings outside of raves and clubs. Users, usually teens, gather in places like barns or machine sheds for shared group experiences, akin to urban raves. Use is also on the rise in affluent suburban areas of Missouri such as Kansas City. Statistics compiled by law enforcement suggest that MDMA is becoming a problematic drug in Missouri: the Missouri State Highway Patrol reported 9 Ecstasy cases in all of 2000, and there have been 7 as of October 2001. Moreover, in 2000, the Highway Patrol seized 198 Ecstasy tablets; 601 have been seized thus far in 2001.

State Poison Control Center Data

The Missouri Regional Poison Center collects data on "information calls" and "exposure calls" regarding overdoses. Information calls are primarily calls requesting tablet identification, but can also include questions about a drug's effects. Exposure calls are mostly overdose related, but also can include calls related to children accidentally ingesting a substance or accidental double dosage. From 1999-2001, there has been an increasing number of exposure calls regarding MDMA (2001 data is based on year to date, projected to end of calendar year):

- 1999, 42 information calls, 34 exposure calls.
- 2000, 56 information calls, 45 exposure calls.
- 2001, 44 information calls, 52 exposure calls.

¹ The major Chicago north-south highways, Interstates 55 and 57 are the primary routes for cocaine shipments from the southwest border area into Chicago (NDIC, 2001). Interstates 44, 70, 35, and 29 are pipelines for the transportation of illegal drugs across the country, according to the Missouri State Highway Patrol. Interstate 55 intersects with Interstate 70 at St. Louis.



Statewide Survey of Drug Task Forces

To gather Missouri statewide data for MDMA use, seizures, and arrests, a one-page survey was constructed and distributed to the thirty drug task forces that make up the Missouri Drug Enforcement Meeting (MODEM). These task forces each represent a regional portion of Missouri and meet quarterly to coordinate and focus efforts on interdiction of illegal substances. The survey was also distributed to the Missouri State Highway Patrol, the attorney general's office, the Missouri National Guard, and the Missouri State Department of Public Safety. Of 34 surveys distributed, 14 were returned.

Results Aggregated for Entire State

The general findings from the statewide survey of MDMA include:

- Statewide, the number of seizures in the past year that included MDMA ranged from 0 to 15 in the regions represented by the drug task forces (see map 1).
- The number of pills seized in each of these cases ranged from 1 to 20,000.
- In the last year, the consensus (7 of 11 respondents) was that there had been a statewide increase in MDMA-related seizures (no respondents indicated that there had been a decrease in seizures of MDMA).
- Drugs most often seized in conjunction with MDMA were marijuana and cocaine. GHB, LSD, and ketamine were also mentioned.
- In terms of demographics, those most often arrested for MDMA in Missouri were Caucasian males ages 19 to 25, though teens ages 11 to 18 were also mentioned by one respondent, as were adults 26 to 40 years old.

Regional Variations in Results

Because of their urban histories, the Kansas City and St. Louis metro areas were expected to have the most MDMA-related activity. Survey results supported this expectation. The Metro Methamphetamine Task Force of Kansas City reported nine seizures and 10,000 MDMA pills seized in the prior year, the Jackson County Drug Task Force, representing the Kansas City Metro Area, reported 7,124 pills seized. Further, the Platte County task force represents an area near the Kansas City region; this task force reported 155 MDMA pills seized in the last 12 months.

The DAWN emergency room data also indicated that MDMA is prevalent in St. Louis, and data from St. Charles County (near St. Louis) showed 20,000 pills seized in the past 12 months. Further, MODEM reports indicate that MDMA and the rave scene, in general, are increasingly problematic in St. Louis.

However, MDMA is not exclusive to the large urban areas of the state. Perhaps most surprising is the prevalence of MDMA in the largely rural southwest and southeast regions of the state. Large numbers of pills were seized in these regions (3,000 pills in the southwest and 453 in the southeast).

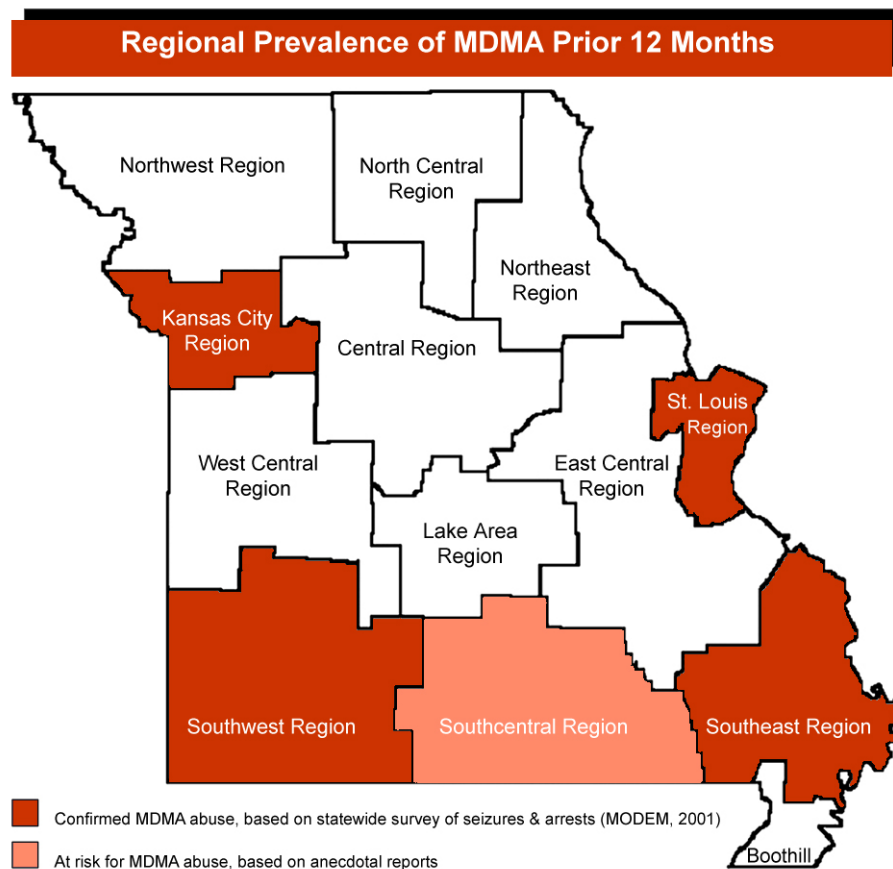
Several factors may be driving this rural phenomenon: the presence of universities, the proximity to major highways for transport of the drug, and the growing rave scene. Nationally, there is some evidence that MDMA is increasingly available in college towns that are otherwise rural.



Attention will need to be paid to the presence of the drug in rural towns and patterns of MDMA use among young people, especially in towns with college or university campuses and a “party culture” that may support the rave scene. For example, the Mustang Drug Task Force, which works in the centrally located counties of Callaway, Cooper, Cole, and Boone (the last being the location of the University of Missouri, Columbia), reports an increased flow of MDMA into its area, primarily coming from St. Louis.

Further, many rural areas that report increasing use of MDMA and increasing frequency of raves feel the drug distributors and the rave organizers/promoters are coming from the St. Louis area. A drug that had been largely confined to the state’s urban centers appears to be spreading to smaller cities and rural towns, while the locus of trafficking and use remains in the large cities.

Please see following map regarding regional variations in MDMA seizures and number of pills seized.



Map 1 Source: 2001 MODEM Survey



MDMA Prevention, Treatment and Interdiction

Prevention

Research shows that effective public education messages are tailored to specific groups of users. One study of MDMA users found that different groups of people use it for different reasons. For example, some youth use MDMA as a symbol of rebellion from parental authority, others to enhance the effects of the music/lights at dance clubs and raves. Many experts maintain that education campaigns that rely solely on scare tactics that highlight the drug's most harmful effects often lack credibility with young people who tend to be highly educated, skeptical, and tuned into popular culture. Instead, they recommend developing messages and campaigns that acknowledging that the drug "feels good" and discuss the serious consequences associated with drug use. It is also important that a different prevention model be provided for grade-school children and teenagers.

Research suggests that prevention approaches that utilize single lectures or school assemblies are largely ineffective. Interactive prevention programs are more effective than didactic approaches. For example, young people can be encouraged to work out problems in small groups. Since the biggest increase in drug use occurs between the 8th and 10th grade, prevention programs efforts can be most efficiently targeted to 7th and 9th graders.

Since Ecstasy is being used increasingly by the young, and is viewed as an "emerging drug", there has been growing policy attention on educational interventions within the school system and in the media, such as an innovative PBS series titled "In the Mix". Some states such as Florida, have proposed legislation to require more public education on MDMA and its effects. Further, public service announcements on television, educational but "hip" videos, Internet advertising, and websites are being used as media for Ecstasy education campaigns. This use of popular culture media outlets in the anti-MDMA effort is sensible, given the young, media-savvy nature of many MDMA dealers and users.

Other educational strategies rely on public outreach by providing materials and speakers for public meetings, back-to-school nights, health curricula, school health teachers, college organizations, parent groups, faith-based organizations, and others. Prevention specialists in schools, colleges, and health settings are being trained specifically about MDMA. Prevention efforts in schools should be integrated into the academic curricula, and should stress the link between prevention and academic success. It is important to note that DARE programs are shifting their focus to emphasize three major goals: 1) changing the mistaken belief that most teenagers are using drugs, 2) building problem solving and other life skills, and 3) heightening perceptions of risk by providing straightforward information about the effects of drugs on the brain.

In light of the strong relationship between MDMA use and raves, it is important to reduce the occurrence of the all-night parties. This can be accomplished by educating the public about the association between raves and club drugs and by educating the proprietors of potential venues (large warehouses or vacant barns) about what occurs during raves and the potential harm to those who attend them. In addition, families with teens should be educated about the warning signs that a rave is being held in their community. See the "interdiction" section below for more information on legal strategies to stop raves.



Harm reduction as a prevention strategy

Harm reduction is a prevention strategy that recognizes that people will engage in some harmful activities because they receive pleasure or benefits from them. Rather than emphasizing punishment when persons engage in high-risk activity, efforts are focused on helping people manage their behavior and reduce the associated risk. Examples of MDMA harm reduction efforts range from strategies to ensure *drug free* rave environments to those supporting *safer use* of MDMA at dances. Examples of the latter strategy include: providing information to users about how to use the drug more safely, providing cooling rooms and water at dances to prevent hyperthermia (excessive body heat), and offering purity testing for pills to reduce the risk of accidentally taking a more harmful look-alike drug.

Treatment

General Guidelines

Since MDMA use often occurs with that of other drugs or alcohol, polysubstance abuse and dependence should be addressed in screening and treatment. As with any other drug, if addiction is identified assessment should examine the client's reasons for using MDMA. This is important in order to determine whether he or she is self-medicating an underlying psychological disorder that needs treatment, such as depression or anxiety.

Quick Facts

The National Institute on Drug Abuse (NIDA) has established general guidelines for effective treatment (NIDA, 2001)

- Treatment should be individualized to match clients' particular problems and needs.
- Sufficient treatment options should be in place so that addicted persons can access treatment when they first become motivated, or many will lose the desire to undergo treatment.
- Treatment should be holistic in that it addresses the entire range of the clients' needs including those in the vocational, legal, medical, psychological and social realms.
- Treatment should be appropriate to the client's age, gender, ethnicity, and culture.
- Clients' needs should be continually monitored to determine whether the treatment plan needs to be modified.
- Clients must remain in treatment long enough (at least 3 months) to establish new behavior patterns. Strategies should be developed and implemented to ensure that clients engage in and remain in treatment, regardless of whether this is voluntary or involuntary.
- Relapse can occur at any time, thus mechanisms should be in place to allow multiple treatment episodes.

Following specialized assessment, the appropriate medication and treatment regimen can be implemented. Treatment should explore what need the drug is fulfilling for the client and, subsequently, address alternative ways that the individual can meet that need or attain a comparable experience. For example, one of the unique aspects of MDMA is its ability to increase the feeling of intimacy among users. Users are often seeking increased closeness to others. Other users may turn to MDMA to fulfill their need for thrill seeking. Thus, treatment will often involve the identification of healthier ways to achieve intimacy or satisfy the need for



excitement. This can include improving communication skills, socialization, and group models of treatment to encourage healthy bonding without substances.

Treatment for Amphetamine Use

Specialized protocols have yet to be established for the treatment of MDMA abuse. MDMA has stimulant-like properties; therefore, treatment guidelines can be based on those for stimulant addiction. The Center for Substance Abuse Treatment (CSAT) has developed guidelines for the treatment of amphetamine addictions which are fully described in their publication “Treatment of Stimulant Use Disorders: TIP 33.” Successful engagement of clients often depends on the treatment program’s ability to address the client’s initial priorities. These priorities might include: 1) developing a plan to deal with the problems related to their drug use in the legal, occupational, relationship, financial, and psychiatric arenas; 2) addressing the behaviors and emotional turmoil associated with obtaining, using, and recovering from the use of the drug; 3) helping clients recognize the link between their drug use and the chaos occurring in their lives. Cognitive impairment resulting from stimulant abuse may affect clients’ ability to make sense of what is happening to them; and 4) educating clients about the biological underpinnings of the craving experience, which plays an important role in continued drug use.

Other principles for effective treatment include:

- Maximize treatment accessibility in terms of location, hours, and staff diversity.
- Address clients’ concrete survival needs including childcare, financial assistance, shelter, food, etc.
- Provide treatment with minimal delay so that clients do not lose their motivation.
- Encourage attendance at a 12-Step program in conjunction with treatment, and participation in a support group following treatment. Therapeutic groups can be utilized as a social support system.
- Give clients clear, specific expectations regarding treatment via a written schedule.
- Develop an action plan for dealing with internal cues and external triggers that encourage use of the substance.

Treatment for Adolescents

Since many MDMA users are adolescents, treatment programs tailored to their special needs are critical. Teenagers’ maturity and developmental levels require intervention strategies distinct from adults’. Guidelines for adolescent treatment include:

- Like prevention efforts, treatment should emphasize active learning experiences such as practicing specific social skills, or conducting research on the consequences of drug use. Group therapy for adolescents should be more experiential and physically active than the verbal reflective groups suitable for adult use.
- Substance abuse is a family matter, so engagement of families can be crucial to the youth’s success. Family tensions often contribute to or help maintain drug use; therefore adolescent treatment programs should have a strong family component.
- Youth who are members of chaotic or ambivalent families and social institutions may achieve needed stability from clearly structured programs that hold them accountable.



- An individual treatment plan based on the youth's, rather than program's needs, should be developed. Assessment should be ongoing because youth may undergo frequent developmental changes that affect every aspect of the problem. In effect, adolescents may literally grow out of their problems.
- Linkages with adult role models or mentors can be important.
- Special care should be taken to recruit, select, and retain treatment staff to ensure that the staff is knowledgeable about adolescents' unique needs. The treatment staff should be diverse, certified, and licensed.

Medical Treatment

Julie Holland, M.D., a nationally recognized expert on MDMA, provides general guidelines for the treatment of MDMA-related medical emergencies in her book *Ecstasy: The Complete Guide*. In her book, Holland recommends against pumping patients' stomachs. Instead, she suggests giving orally activated charcoal if MDMA was ingested within the previous hour. Holland further recommends that blood pressure, body temperature, and heart rate be monitored for at least twelve hours. Antipsychotic medications (e.g., Haldol, Thorazine) should be avoided since they tend to reduce the threshold for seizures and exacerbate hypotension (low blood pressure). Adults experiencing rapid heartbeat should be treated with beta-blockers and those suffering from hypertension should be treated with calcium channel blockers or alpha-adrenergic antagonists. Graeme (2000) further notes that airway, breathing, and circulation must be assessed and maintained.

In cases where rectal temperature exceeds 102 degrees Fahrenheit, rapid cooling, monitoring of electrolytes, and rehydration should begin immediately to guard against the risk of organ damage and death. Rehydration efforts should involve sedation with benzodiazepines and occasional administration of paralytic agents to prevent further heat generation. In addition, evaporative cooling should be encouraged by the wetting of bare skin with a tepid-water mist and the use of large fans to reduce body temperature. Shivering should be prevented with pharmacologic paralysis if necessary. If rehydration measures fail, the patient should be paralyzed and ventilated. Cooling measures should be discontinued once core body temperature is 100.4 to 102 degrees Fahrenheit to prevent iatrogenic hypothermia. Suggested laboratory tests include serum sodium level, liver function tests, creatinine phosphokinase, plasma potassium, blood fibrin degradation products to test for DIC, and urine for myoglobinuria.

Interdiction

Interdiction efforts are focused on stopping the flow of MDMA (internationally, nationally, and locally) and preventing raves (as raves are the primary locations for MDMA use). Below is a summary of federal, state, and local interdiction efforts:

Federal

MDMA was placed in Schedule I in 1986, but penalties for trafficking and distribution were severely increased with the Ecstasy Antiproliferation Act of 2000. This law increased penalties for manufacture, importation, exportation, and trafficking of MDMA to levels consistent with those for heroin and more severe than those for cocaine. For example, the sentence for trafficking 800 pills increased from 15 months to 5 years. More recently, the Ecstasy Prevention Act of 2001 (S. 1208) was introduced in the Senate and the House of Representatives. As of November 2001, the bill is in committee.



Major provisions of this act include:

- Communities that pass ordinances “restricting rave clubs” and increase law enforcement efforts directed toward Ecstasy offenses will receive priority in obtaining federal grants under the Public Health Service Act.
- \$15 million will be transferred “to assist anti-Ecstasy law enforcement initiatives in high intensity drug trafficking areas” (HIDTA). Missouri is part of the Midwestern HIDTA. Another \$1 million will be allocated to establish a federal “Task Force on Ecstasy / MDMA and Emerging Club Drugs,” which will report to President Bush and to Congress on how to improve national drug-control strategy with regard to Ecstasy.
- \$7 million will be allocated to a “national youth anti-drug media campaign” that “addresses the reduction and prevention of abuse of MDMA ... among young people”.
- The Office of National Drug Control Policy (ONDCP) will be given “such sums as are necessary ... to commission a drug test for MDMA which would meet the standards for the Federal Workplace”.
- \$1.5 million will be allocated for the National Institute on Drug Abuse to conduct research on MDMA and to prepare a public report that “evaluates the effects that MDMA use can have on an individual’s health” and documents “those research findings with respect to MDMA that are scientifically valid and identify the medical consequences on an individual’s health.”

State

All states have laws regulating illicit drugs related to sale, manufacturing, possession, and use. However, most states do not have sanctions in all four of these categories: sale and manufacturing penalties are most common; use penalties are least common. All 50 states either have explicit laws regarding MDMA or treat it as a controlled substance.

Several states, including Illinois and Missouri, have recently increased penalties for trafficking in MDMA. The Missouri Club Drug Law was signed on June 18, 2001, and the Illinois law, on August 6, 2001. Both state laws make penalties for MDMA similar to those of cocaine and heroin, despite the differential violence that tends to be associated with MDMA when compared to these substances. Delaware recently proposed legislation to enact mandatory minimum sentences for possession with intent to distribute MDMA. New Jersey has proposed a bill that would substantially increase its penalties for possession and distribution of Ecstasy from a third-degree to a first-degree offense.

The California Legislature recently proposed a bill to create 90-day mandatory minimum sentence for using or “being under the influence of” MDMA. This is one of the more restrictive state proposals, as it targets users rather than traffickers. Likewise, Texas has penalties for simple possession/use, rather than for manufacture or distribution.

Further, some states and cities are targeting rave promoters and building owners with legal action. For example, in Chicago, an ordinance was enacted that will send building owners and managers to jail if they intentionally let a property be used for raves at which controlled substances are used, distributed, stored, or made. Violators could face jail terms of 2 weeks to 6



months. The state of Illinois approved a bill that would make it a crime to promote raves that feature illegal substances. While state lawmakers said they expect the bill to be amended, the goal is to make it more difficult for promoters to set up a rave.

Also, focused efforts are occurring to disrupt the flow of MDMA in the raves, bars, clubs, concerts, campuses, and high schools via law enforcement. This can include law enforcement monitoring and breaking up raves, enforcing curfews, and working to prevent the spread of the parties and MDMA activity into the streets and surrounding neighborhoods. Thus, recent policy initiatives are focusing on halting or reversing the growing popularity of the drug among other populations.

Policy Recommendations

The best state policy models addressing MDMA blend prevention, treatment, interdiction, and research strategies. In addition to general public education of the consequences of Ecstasy use, there is a need for treatment of those who are abusing multiple substances, using MDMA to treat an underlying psychological problem, or otherwise are facing consequences of their use. Attention must also be focused on controlling access to the substance through coordinated law enforcement efforts. Current data collection mechanisms (law enforcement, emergency rooms, and treatment programs) should be reconfigured to allow for tracking of specific drugs such as Ecstasy.

Policy Recommendations

1. Inform and educate the public to reduce MDMA use.

- Develop and implement targeted educational campaigns utilizing television and Internet media.
- Develop and implement interagency efforts to confine and reduce MDMA use, especially focusing on high school and junior high campuses.
- Increase funding, training, and support for prevention research.

2. Ensure proper diagnosis and treatment of Ecstasy users.

- Develop and distribute medical protocols to emergency room personnel regarding the proper assessment and treatment of MDMA toxicity.
- Initiate efforts to establish additional treatment programs that specialize in the treatment of adolescents and young adults.
- Develop and distribute protocols to aid in the proper diagnosis of polysubstance abuse/dependence.
- Develop programs assisting teens with resocialization into healthy peer groups.
- Increase funding to add MDMA-specific components to existing treatment programs or facilities.

3. Assess and monitor Ecstasy use at state level.

- Encourage the Midwest HIDTA to establish mechanisms to study MDMA trafficking patterns in collaboration with surrounding states.
- Develop and maintain state law enforcement and treatment intake measures and databases to better monitor MDMA use, arrests, and emergency room



Conclusion

Prevention, treatment, and interdiction approaches to managing this illegal drug must focus on decreasing use in the environments where Ecstasy is most popular: raves, clubs, and other youth-oriented venues. More research and better data-monitoring systems are needed so that those coordinating our prevention, treatment, and interdiction systems can understand how Ecstasy is affecting Missouri citizens. With these improved monitoring systems, practitioners, researchers, and policymakers can respond in a coordinated and comprehensive manner to this growing drug problem among our youth.

References

General Education:

Beck, J. (1997, April). Drug abuse series: MDMA. [Electronic version]. Retrieved December 2001 from: http://erowid.org/chemicals/mdma/mdma_info6.shtml.

Cohen, R. S. (1998). The love drug: Marching to the beat of Ecstasy. Binghamton, NY: Haworth Press.

Holland, J. (2001). Ecstasy, the complete guide: A comprehensive look at the risks and benefits of MDMA. Rochester, VT: Park Street Press.

McDowell, D.M., & Kleber, H.D. (1994). MDMA: Its history and pharmacology. Psychiatric Annals, 24, 127-130.

Neuroscience for Kids—Ecstasy/MDMA. (2001). [Electronic version]. Retrieved December 2001 from: <http://faculty.washington.edu/chudler/mdma.html>.

U.S. Drug Enforcement Administration (2001). MDMA (Ecstasy). [Electronic version]. Retrieved December 2001 from: <http://www.dea.gov/concern/mdma/mdma.htm>.

U.S. Drug Enforcement Administration (2000, February). Overview of club drugs. Drug Intelligence Brief. Washington, DC: U.S. Government Printing Office.

U.S. Drug Enforcement Administration (1999, June). Drug Intelligence Brief: MDMA (Ecstasy). [Electronic version]. Retrieved December 2001 from: <http://www.usdoj.gov/dea/pubs/intel/99019intellbrief.pdf>

Research:

National Institute on Drug Abuse. MDMA/Ecstasy Research: Advances, Challenges, Future Directions. A Scientific Conference, NIH Campus, July 19-20, 2001. [Electronic version]. Retrieved November 2001 from: <http://165.112.78.61/Meetings/MDMA/MDMAAbs2.html>.



Broening, H. et al. (2001). 3,4-methylenedioxymethamphetamine (Ecstasy)-induced learning and memory impairments depend of the age of exposure during early development. Journal of Neuroscience, 21, (9), 3228-3235.

Henry, J. A. (1996). Ecstasy and serotonin depletion. Lancet, 347, 833.

Mathias, R. "Ecstasy" damages the brain and impairs memory in humans. Drug Enforcement Administration. [Electronic version]. Retrieved November 2001 from: <http://www.dea.gov/concern/mdma/ecstasy020700.htm>

Mayerhofer, A., Kovar, K.-A., & Schmidt, W. J. (2001). Changes in serotonin, dopamine, and noradrenaline levels in striatum and nucleus accumbens after repeated administration of the abused drug MDMA in rats. Neuroscience Letters, 308, 99-102.

Morgan, Michael J. (1999). Memory deficits associated with recreational use of "ecstasy" (MDMA). Psychopharmacology, 141, 30-36.

NIDA. (2001, May 1). Researchers find evidence that prenatal use of ecstasy can cause long-term memory loss and other impairments in offspring. [Electronic version]. Retrieved December 2001 from: <http://www.nida.nih.gov/MedAdv/01/NR5-1.html>.

Rittoo, D. B., & Rittoo, D. (1992). Complications of "Ecstasy" misuse. Lancet, 340, 725.

Zemishlany, Z., Aizenberg, D., & Weizman, A. (2001). Subjective effects of MDMA ("Ecstasy") on human sexual function. European Psychiatry, 16, 127-130.

Zickler, P. (2001). NIDA Notes Annual survey finds increasing teen use of Ecstasy, steroids. . [Electronic version]. Retrieved December 2001 from: http://www.nida.nih.gov/NIDA_Notes/NNVol16N2/Annual.html

Interdiction:

Joint Assessment of MDMA Trafficking Trends (2000, July). [Electronic version]. Retrieved December 2001 from: <http://www.usdoj.gov/ndic/pubs/642/index.htm>.

U.S. Drug Enforcement Administration (1999, June). MDMA-Ecstasy: Drug intelligence brief. Washington, DC: U.S. Government Printing Office.

National Drug Intelligence Center (2001, January). Illinois drug threat assessment: Other dangerous drugs. [Electronic version]. Retrieved December 2001 from: <http://www.usdoj.gov/ndic/pubs/652/odd.htm>.

Prevention/Prevalence:

Drug Abuse Warning Network (DAWN) Reports [Electronic version]. Retrieved December 2001 from: <http://www.samhsa.gov/oas/dawn.htm>

National PTA (1998, Fall). Keeping youth drug-free: A guide to parents, grandparents, elders, mentors and other caregivers. [Electronic version]. Retrieved December 2001 from: <http://www.health.org/reality/ParentsGuide>

Series, H. G., Boeles, S., Dorkins, E., & Peveleer, R. (1994). Psychiatric complications of "Ecstasy" use. Journal of Psychopharmacology, 8, 60-61.



Vastag, B. (2001). Ecstasy experts want realistic messages. JAMA, 286(7), 777.

Medical Issues:

Buchanan, J. (1985). Ecstasy in the emergency department. Clinical Toxicology Update, 7, 1-4.

Cohen, R. S. (1996). Adverse symptomatology and suicide associated with the use of methylenedioxymethamphetamine (MDMA, "Ecstasy"). Biological Psychiatry, 39, 819-820.

Dar, K. J., & McBrien, M. E. (1996). MDMA-induced hyperthermia: Report of a fatality and review of current therapy. Intensive Care Medicine, 22, 995-996.

Ellis, S. J. (1992). Complications of "Ecstasy" misuse. Lancet, 340, 726.

Gaylor, D. W., & Slikker, W. (1990). Risk assessment for neurotoxic effects. Neurotoxicology, 11, 211-218.

Graeme, Kimberlie A. (2000). New drugs of abuse. Pharmacologic Advances in Emergency Medicine, 18(4), 625-636.

Holland, J. (2001). Ecstasy: The complete guide: A comprehensive look at the risks and benefits of MDMA. Rochester, VT: Park Street Press.

Kessel, B. (1994). Hyponatraemia after ingestion of Ecstasy. British Medical Journal, 308, 414.

Logan, A., Stickle, B., O'Keefe, N., & Hewitson, H. (1993). Survival following "Ecstasy" ingestion with a peak temperature of 42 degrees C. Anaesthesia, 48, 1017-1018.

Singarajah, C. & Lavies, N. G. (1992). An overdose of Ecstasy: A role for datrolene. Anaesthesia, 47, 686-687.

Wilkens, B. (1996). Hypnoatraemia must be treated with low water input. British Medical Journal, 313, 689-690.

Treatment

National Institute of Drug Abuse (NIDA). (2001). Principles of drug addiction treatment: A research-based guide. [Electronic version]. Retrieved December 2001 from: <http://www.nida.nih.gov/PODAT/PODAT1.html>

U.S. Department of Health and Human Services (1999). Treatment for stimulant use disorders. (SAMHSA, CSAT Publication TIP series, 33). Rockville, MD: R. A. Rawson.