

## ABSTRACT

Title of Document: THE ECSTASY AND METHAMPHETAMINE  
DRUG EPIDEMICS: IMPLICATIONS FOR  
PREVENTION AND CONTROL

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This thesis is a review of the ecstasy and methamphetamine epidemics. It attempts to discern the differences between the two drug epidemics and compare the possible reasons why the ecstasy epidemic was somewhat limited while methamphetamine use continues to be a growing concern in many areas. Evidence for the epidemics, as well as the responses to the epidemics, will be discussed. This will include responses from local, state and federal government, communities, and the media. Prevention programs and treatment will also be addressed.

THE ECSTASY AND METHAMPHETAMINE DRUG EPIDEMICS:  
IMPLICATIONS FOR PREVENTION AND CONTROL

By

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Thesis submitted to the Faculty of the Graduate School of the  
University of Maryland, College Park, in partial fulfillment  
of the requirements for the degree of  
Master of Arts  
2005

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## Dedication

To my wonderful family, and most of all, my loving husband. Thank you.

## Acknowledgements

Thank you to all of my amazing committee members for their ideas and help, and much appreciation to Britton and my mom, the best editors ever!

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# Chapter 1: Epidemics

While the term “epidemic” is commonly used in the public health field to describe the spread of infectious disease when it occurs at a greater rate than expected based on prior experiences, it may also explain other phenomena. An epidemic is a phenomenon that affects a large number of people, animals, plants, or things and while it could be a disease or ailment, it could also be another sort of problem or issue. Epidemics vary in intensity and sometimes it is difficult to tell whether an occurrence may be labeled one. One focus of epidemiology is to seek out the foundation of preventative measures to aid in curbing an epidemic (McMahon & Pugh, 1970). This thesis will concentrate on ecstasy and methamphetamine and the actions generated to help alter these two major drug epidemics facing the United States. These two distinct epidemics were picked because, while they are both major, one has greatly increased while the other has decreased and somewhat stabilized. In order to perform a comparative analysis of these two epidemics, each drug will be examined separately and each of the major elements of prevention will be reviewed. The main purpose of this thesis is to understand ecstasy and methamphetamine in the context of general responses to drug epidemics.

## 1.1 Models of Drug Epidemics

In understanding drug epidemics, general models of these epidemics and the responses to them must be discussed because they are the basis for recognizing and responding to drug epidemics. Jonathan Caulkins (2001) has noted that drug

epidemics may fit into five different models. The first model assumes that legislative drug prevention efforts are in control; if drug use is declining then policy is doing its job. Model two shows that the only stable level of drug use is a high one. When use is low it is merely a fleeting and unbalanced period; drug control strategies are of no use. Model three states that initially there are no drug users. However, many people are susceptible to use so when the opportunity arises they begin to use drugs. Nevertheless, prevention programs can immunize people from use and treatment programs can help those who have already used. The fourth model is a “Tipping Model” which supposes that there is persistently either a high or low level of use. It claims that conservative policy will not help, and lawmakers should not attempt to tip the scale either way. In the final model, word of mouth is the key. Here, Caulkins shows how drug use may grow quickly at first because users may relay positive feedback about the effects of a drug to their peers. However, after some time negative effects will arise and, as those are passed on, use of the drug declines.

There is the possibility that each drug will follow a different model and that some may follow either a combination model or none of the above. In any event, drug epidemics do follow a pattern and Marcia Chaiken (1993) has described these typical steps which were apparent in the crack and ice epidemics:

1. Use is confined to small, isolated communities or subcultures
2. Users switch to various types of drugs or preparation
3. Local opinion coalesces around a specific drug preparation
4. Distribution by enterprising drug dealers accelerates
5. Drug use increases precipitously
6. Drug use reaches epidemic proportions and overloads public agencies and health systems
7. The media reports on the drug

She acknowledges that drug epidemics do not occur spontaneously; rather they are the result of numerous actions and influences. In addition, she notes that early recognition of a drug epidemic is vital to the reduction of use. However, in order to identify a drug epidemic early on, proactive measures must be taken. Multiple agencies and organizations need to work together to coordinate information from varying sources as well as cooperate in the analysis of the data. Information could come from surveys, media reports, law enforcement, medical evidence, anthropological and ethnographic studies, drug treatment counselors, and the street (Chaiken, 1993).

### 1.2 Examples of Drug Epidemics

While use of each drug can have varying potential to become an epidemic, some become more high profile than others do. The heroin and cocaine outbreaks are examples of prominent drug epidemics. Other significant drug epidemics include the crack epidemic, which some consider to be part of the cocaine epidemic, the hallucinogen epidemic in the 1960s and 70s, and, an epidemic that has recently been on the rise, the non-medical use of prescription drugs.

In order to understand drug epidemics, past and present epidemics must be examined. Both heroin and cocaine have been used for over 100 years and during this time their use has waxed and waned. Brief summaries of these two prominent epidemics follow, each showing the cyclical nature of drug use. When prevention efforts and/or negative media attention are high, drug use tends to decline, but when

the drug becomes largely ignored, use begins to increase again (Musto, 1992). This information is pertinent to the ecstasy and methamphetamine epidemics because it shows that prevention efforts must continue, even after the epidemic has been reduced.

Heroin is a powerful narcotic derived from the opium poppy, first used to treat morphine addiction in the late 1800s (Musto, 2002a). In 1910 it began to be used on the street for pleasure (Jonnes, 2002) and by 1919 it was known as the “American Disease (Musto, 2002a).” Then, throughout the 1920s and 30s availability declined drastically and addiction rates did as well. Unfortunately, there was an upsurge in accessibility in the 1950s and by the 60s and 70s there were highly publicized cases of celebrity and black youth deaths due to heroin use. This negative media attention aided in the decline of willing heroin users (Jonnes, 2002). However, a resurgence is thought to have occurred when veterans returned from Vietnam addicted to heroin, but this only led to another downward swing when the emergence of AIDS in the 1980s began to dampen heroin use (Jonnes, 2002). Regrettably, this did not endure. In the early 90s, Colombians began to import heroin of high purity into the United States. Movies such as *Pulp Fiction* glorified heroin use and “heroin chic (the waif look)” became the craze amongst fashion models. However, as heroin killed high profile entertainment figures, use declined again (Jonnes, 2002). Despite its peaks, heroin use has remained a low stable percentage of the total United States population over the past 25 years (See Figure 1).

Cocaine’s first recorded use was in the mid 19<sup>th</sup> century by South Americans to alleviate fatigue. It was then used as a surgical anesthetic in the 1880s (Office of

National Drug Control Policy, 2003a) and although cocaine was widely used in beverages at the start of the twentieth century (Siegel, 1985); it became a prohibited substance in the 1920s and use quickly declined. Decades later, in the 1970s, it began to be widely used in the entertainment industry (Chaiken, 1993). At first the cost of cocaine was high, but as its price fell, cocaine became more widely used as a party drug. In the mid 1980s negative reports surrounding cocaine began to emerge and in 1986, Len Bias, a college basketball player who had been drafted by the Boston Celtics, died of a cocaine overdose while celebrating his new contract. This widely publicized event showed the public that even the casual cocaine user could experience lethal effects (Musto, 2002b) and use rapidly declined (See Figure 1). Today, cocaine is a Schedule II drug because despite its high potential for abuse, it is still used as a local anesthetic for some eye, ear, and throat surgeries (National Institute on Drug Abuse, 1999a).

### 1.3 Measuring Drug Use

When studying a drug epidemic, programs that monitor drug use can be extremely helpful. Some pertinent studies of drug use funded by the federal government include Monitoring the Future (MTF), the Drug Abuse Warning Network (DAWN), the National Survey on Drug Use and Health (NHSDA/ NSDUH), and Arrestee Drug Abuse Monitoring (ADAM) (Mieczkowski, 1996; Yacoubian, 2001). These studies measure drug use, each in a different way. Monitoring the Future is a self report study designed to gauge both substance use and attitudes of young people.

It is an annual survey of about 16,000 students. The Drug Abuse Warning Network collects data from emergency departments, medical examiners, and coroners in 21 metropolitan areas regarding the mentions of drug and alcohol use in patients and the deceased. The National Survey on Drug Use and Health is the largest source of self report information on drug use in the United States. Every year, approximately 70,000 persons aged 12 or older are administered this survey. The Arrestee Drug Abuse Monitoring program collects drug use information through both urine samples and self report surveys given to arrestees. It is a continuation of the Drug Use Forecasting (DUF) program that started in 1987 (Wish, 1990).

#### 1.4 Prevention Messages

Many prevention methods are used to help curb a drug epidemic including media campaigns, legislation, law enforcement, curriculum development, education, resistance and life skills training, etcetera. While none of these techniques are the “be all end all” of drug use prevention methods, they can work together to help target different areas of the population. A comprehensive discussion of each prevention method is beyond the scope of this thesis; however, several methods will be briefly described.

Media campaigns are extremely important in the dissemination of drug use prevention messages to raise awareness. Youths who remembered seeing a media prevention message are significantly less likely to binge drink or use other drugs (Substance Abuse and Mental Health Services Administration, Office of Applied

Studies, 2005a) and Sly and colleagues found that the “truth” campaign lowered the smoking initiation rates of youths (Sly, et al., 2001). However, we are unable to determine exactly how many people saw the various advertisements. A successful campaign requires the ability to target the correct audience, excellent marketing skills to obtain donated airtime and advertising space, and sufficient funds to purchase time and space when donations are low. All of these techniques aid in ensuring that the media campaign is widespread and the audience has extended exposure to the message at hand (Palmgreen and Donohew, 2003). Circulated messages must keep up with the audience in order to be effective. They need to be exciting, fast-paced, intense and creative to not only get the audience’s attention, but also hold onto it and deliver the message (Palmgreen and Donohew, 2003). A one billion dollar investment was placed into the National Youth Anti-Drug Media Campaign by Congress, illustrating a high degree of confidence placed in media strategies to combat drug use (Stephenson, 2003). However, while many media campaigns do help in combating public health concerns, it is not clear that all campaigns will be effective and while the process is very costly, it usually only produces short-term results (Sly, et al., 2001).

The SENTAR approach is one method used by substance abuse prevention specialists. Sensation-seeking targeting (Stephenson, Morgan, and Lorch, 2002) is a method which targets high sensation-seeking individuals who are more susceptible to high risk behavior – including drug use – (Barnea, Teichman, and Rahav, 1992), with advertisements which play on their need for stimulation with the prevention message buried within (Stephenson, 2003; Palmgreen and Donohew, 2003). These types of

messages require pre-campaign research to determine their effectiveness, but they are usually seen to be successful. Examples of successful SENTAR prevention messages include a hotline anti-drug ad campaign (Palmgreen, et al., 1995), a short-term anti-marijuana media campaign (Stephenson, et al., 1999), and a study of anti-heroin public service announcements (Stephenson, 2002).

Informational approaches are also used. Through campaigns and other media outlets, results of drug research are also disseminated. While some of these findings may be a part of the media campaign itself, others are dispersed through news and entertainment outlets. Some of these items even become headlines and the basis of storylines; unfortunately, not all of the released items are correct and when they are publicly retracted, a cloud of doubt can form over the area of drug research.

Unfortunately, not all drug prevention strategies are successful. Some major initiatives, such as the Drug Abuse Resistance Education program (D.A.R.E.), have been shown to be ineffective (Ennett, et al., 1994; West and O'Neal, 2004). However, implementation and research regarding varying programs is necessary to discover which methods are effective and even when a successful method is found, changes must be made to keep up with changing times and attitudes.

### 1.5 Legislation

Legislation is also an important response to aid in reducing a drug epidemic. It defines what is acceptable and creates a foundation for what can be done. The following summarizes important legislation used in reducing drug epidemics,

especially regarding ecstasy and methamphetamine. Title II and Title III of the Comprehensive Drug Abuse Prevention and Control Act of 1970, known as the Controlled Substances Act, is the groundwork for the battle against substance use in the United States. It combined numerous laws regarding the possession, sale and manufacture of illicit substances and classified all controlled substances into five categories (Joseph, 2005). Table 1 illustrates the five schedules, with Schedule I substances having no accepted medical use and the highest abuse potential while Schedule V substances have a medicinal purpose and a much lower potential for abuse. Since the Controlled Substances Act was passed, numerous other laws concerning illicit drugs have passed through the walls of Congress. Two other notable pieces of drug legislation are the Anti-Drug Abuse Acts of 1986 and 1988. The former was written to increase federal efforts and foreign cooperation in the fight against drug use while the latter focused more broadly on the prevention of manufacturing, distribution and use of illicit substances (Musto, 2002b). While some legislation is more general, some may specifically focus on one type of drug, or its precursor chemicals, and the lessening of its availability and manufacture or the increasing of penalties for crimes involving that substance.

Some drug legislation has affected the manufacturing of ecstasy and methamphetamine more than other illicit substances. The federal Analogue Act of 1986 (United States Government, 1986), also known as the Designer Drug Law (Erowid, 2001), was enacted to allow the government to prosecute manufacturers of drugs that were chemically close, but not identical, to those already scheduled by the DEA. This act is extremely pertinent to ecstasy and methamphetamine due to the tiny

variations that exist in the manufacturing processes of the two drugs, as it made it impossible for chemists to slightly chemically alter an illegal drug for legal use and distribution.

In 1989 the federal Chemical Diversion and Trafficking Act of 1988 (United States Government, 1988a) went into effect, which provided record-keeping guidelines for those involved in a “transaction involving a listed chemical, a tableting machine, or an encapsulating machine (United States Government, 1988b).” These precise records had to be kept on file and accessible for a certain amount of years dependent on the chemicals involved. This act also describes guidelines for reporting of the anomaly and what action will then be taken. It also went into regulations for shipping, importation and exportation of 12 precursor chemicals and 8 essential chemicals (United States Government, 1988c) in hope of limiting access to designer drug manufacturers.

In response to the Chemical Diversion and Trafficking Act, manufacturers of designer drugs, such as ecstasy and methamphetamine, began to use over-the-counter sources of ephedrine tablets and capsules (United States Government, 1988c). The federal Domestic Chemical Diversion and Control Act of 1993 went into effect in 1994, removing the loophole regarding over-the-counter ephedrine and also required record keeping for any single-entity ephedrine purchase. However, manufacturers reacted quickly and moved on to using pseudoephedrine products (United States Government, 1996). The government counteracted again with the Comprehensive Methamphetamine Control Act of 1996 (United States Government, 1996) that expanded regulations to include all products that contain ephedrine, pseudoephedrine,

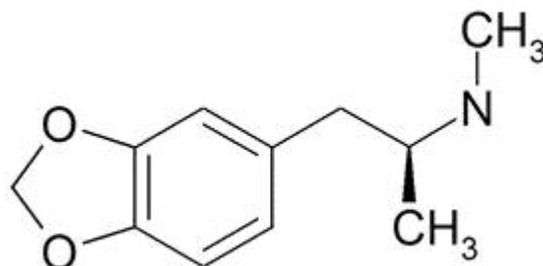
or phenylpropanolamine. The criminal penalties for trafficking and manufacturing methamphetamine or any of the listed chemicals were raised as well. More legislation specific to ecstasy and methamphetamine will be discussed later. Unfortunately, while many bill proposals are introduced and referred to subcommittees, many never make it out of the committees and are cleared off the books when that Congressional session concludes.

### 1.6 Treatment

Treatment is another strategy for reducing drug use. It has been found that when larger amounts of money are spent on treatment options, drug related deaths decrease (Shepard and Blackley, 2004). While treatment does not in itself reduce an epidemic, it may help to reduce the number of repeat users of a drug, either through personal experience with drug treatment or second hand from knowing someone who experienced it. Methods of treatment include detoxification, where the illicit substance is purged from the body; pharmacology, a method where addiction is treated with medication (such as the methadone treatment for heroin addicts); psychotherapy, a technique during which the patient undergoes psychiatric sessions; support groups, where patients band together to discuss their addictions and problems; (National Institute on Drug Abuse, 2005a) and even viruses, which have begun to be used to cleanse the body of cocaine (Carrera, et al, 2004). Treatment choices may be singular or a combination of a few techniques. The National Institute on Drug Abuse (1999b) has developed principles needed for effective substance

abuse treatment. These include the ideas that treatment must be widely available, treatment does not have to be voluntary, more treatment is needed than detoxification, ample time in treatment is vital, numerous needs must be addressed (psychological, social, legal, vocational, etc.), and addiction recovery is a long and difficult process which may take several rounds of treatment (National Institute on Drug Abuse, 1999b). Both inpatient and outpatient treatment centers are available throughout the country.

## Chapter 2: Ecstasy (MDMA)



### 2.1 The Basics

This section discusses the basics of ecstasy, including its history, cultural surroundings, ingredients, cost, short and long term effects, and its dependence liability. Each piece contributes in its own way to the analysis comparing ecstasy and methamphetamine. 3, 4-Methylenedioxymethamphetamine (MDMA), or ecstasy, as it is more commonly known, is a methamphetamine derivative that has both stimulant and mild hallucinogenic effects (National Drug Intelligence Center, 2003). It is part of a class of drugs known as entactogens (Nichols and Oberlender, 1989) and was first synthesized in 1912 by two German chemists working for the pharmaceutical corporation Merck. They submitted for a patent for the drug, which was granted in 1914 (Saunders, 1993).<sup>1</sup> Subsequently, the drug was forgotten until the 1950s when the United States Government briefly researched it for possible use in brainwashing and mind-control (Gahlinger, 2001). Ecstasy then resurfaced in the mid 1970s when

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<sup>1</sup> Merck in Darmstadt, Germany filed for a patent for MDMA on December 24, 1912. The patent was granted on May 16, 1914. The issue number is 274350.

therapists discovered the field of psychedelic psychotherapy (see for example, Naranjo, 1973; Stolaroff, 1997; Yensen, et al., 1976). It was thought to heighten introspection and facilitate honesty which made therapy, especially marital counseling, more fruitful (Yew, 2004). Through this channel, ecstasy became exposed as a psychedelic drug and public use began to spread.

Ecstasy is one of several “club drugs” (e.g., methamphetamine, LSD, GHB, and ketamine) which all became popular among youth and young adults during the past decade. In most geographical regions of the United States, ecstasy was the most frequently used of the “club drugs,” so named because of their consumption at all-night dance parties or “raves” (Arria, et al., 2002). Ecstasy is usually taken orally in tablet or capsule form, but it can also be snorted, injected, or taken rectally (Coalition for a Drug Free Hawaii, 2005). However, since ecstasy is usually taken in pill form, it may alleviate the stigma of injection or snorting and this in turn may encourage a wider variety of people to use the drug.

The rave subculture, which took root in the early 80s, consists of young people participating in warehouse parties with loud music and psychedelic lighting (Cohen, 1998). The scene started underground in Britain, and then moved to more public places (Joseph, 2000). However, before long it became more prevalent in the United States. People would hold secret, illegal parties, which hundreds of ravers would attend (Saunders and Doblin, 1996). They would dance to the thumping beat all night while using ecstasy. Secret clubs also started popping up in New York, LA, Orlando, and Washington, DC. In the ‘80s, people had to have connections to find these parties since they were always in obscure places. The rave scene became the big

thing of the 90's and could be found in clubs, open fields, and even empty warehouses (Cohen, 1998).

Unfortunately, while ecstasy pills typically include about 100 mg of MDMA (United States Drug Enforcement Administration, 2001); numerous adulterants can also be used in its manufacture. Anything ranging from other illicit drugs such as ketamine or PCP to legal substances like caffeine may be used in the creation of ecstasy (Community Epidemiology Work Group, 2000). Common precursor chemicals used to manufacture ecstasy include safrole, isosafrole, MDP-2-P, piperonal, and beta-nitroisafrole. It has been noted that just a few years of chemistry training and the proper supplies can be enough to synthesize ecstasy (Taylor, 1994). Books are available to facilitate the home manufacture of ecstasy (see for example, Shulgin and Shulgin, 1991) and the manufacturers can sell their product for a large markup. While it may only cost 25 to 50 cents to manufacture one dose of ecstasy, it is usually sold for \$20 to \$30 dollars per pill (United States Department of Justice, Drug Enforcement Administration, 2001). Local pill prices range from \$5 in El Paso and \$7 in New Orleans to \$100 in St. Louis, but the most common prices are about \$20-25 per pill (Office of National Drug Control Policy, 2002). A typical clandestine lab could manufacture up to 200,000 pills per day (Hutchinson, 2002).

Ecstasy has many short and long term effects on the user and they are important because they form the foundation of the information to be disseminated in prevention messages. However, its true impact is clouded by uncertainties. First of all, since widespread use of ecstasy has been a recent development, many long term

effects are still being studied and conclusive research is not readily available. Another complication in this research is that, as mentioned earlier, some tablets of “ecstasy” may not really be MDMA at all. The tablets can be cut with other drugs or adulterants to minimize the amount of pure MDMA in the pill (Parrott, 2004). Due to the lack of consistency among ecstasy pills, it is difficult to determine if effects are related to the MDMA itself or the other ingredients (Irvine, 2001). Another obstacle is that many ecstasy users also use alcohol, tobacco, and/or other drugs (National Institute on Drug Abuse, 2001).

Ecstasy has many acute effects, including nausea, muscle cramping, eye fluttering/disturbed vision, hallucinations (both auditory and visual), increased body temperature, dehydration, chills/sweats, suppressed appetite, jaw clenching and tremors (National Institute on Drug Abuse, 2004a). The immediate aftermath of using MDMA may also include depression, paranoia, and difficulty sleeping (National Institute on Drug Abuse, 2004a). However, many who use ecstasy do not realize the harmful effects that it can have (Revill, 1998). Ecstasy raises blood pressure and heart rate, which causes heat to build and, in some cases, can cause heat stroke (Aschwanden, 2002). MDMA dehydrates the body very quickly; so increased water intake is needed. Users are advised not to participate in strenuous activity without frequent breaks (e.g., dancing). MDMA involved deaths can be caused by the rare occurrence of excess fluid intake (Joseph, 2000), where water is retained by cells in the body which in turn causes the brain to swell. The increase in pressure will shut down the vital functions of the brain (Joseph, 2000).

The long term effects of ecstasy include sleeping problems, memory loss, anxiety, depression, and even brain damage (Mathias and Zickler, 2001). “MDMA works in the brain by increasing the activity levels of at least three neurotransmitters: serotonin, dopamine, and norepinephrine (National Institute on Drug Abuse, 2001).” Ecstasy dumps large amounts of serotonin into the user’s brain all at once. It is a difficult substance to replenish and there is only a limited amount available at one time. Deficient serotonin levels can lead to depression and lack of self-confidence. While the changes in the dopamine system can be fleeting, the alterations to the serotonin system persist much longer (National Institute on Drug Abuse, 2001).

Dependence liability is defined as the likelihood of dependence given exposure to a drug and is sometimes expressed simply as the ratio of the number of dependent individuals to the number of users. Many of the individuals who take ecstasy utilize it solely as a party enhancer. Dr. Alexander Shulgin, a psychedelic scientist and expert drug trial witness, is considered to be the “stepfather of MDMA” and while he works under a license from the Drug Enforcement Administration (DEA), his life’s work is devoted to creating and testing psychedelic drugs (Romero, 1995). Through his research, Dr. Shulgin (date unknown) has found that, “If you do use (MDMA) with some degree of regularity, for example every week over a period of many weeks, that remarkable empathic magic is lost. Most people only have remarkable experiences with MDMA the first couple of times they use it. After that, the magic is somehow gone. The people in the rave scene are often over-using it to try to re-experience the original effects.” Eventually, many people give up trying to achieve their original high. Many stop doing the drug all together because it has been

found that no amount of hiatus from the drug will bring back the original high once it is gone (Erowid, 2000). This implies that the average user of ecstasy only uses for a short time, not over a lifetime.

Seminal work by Anthony, et al. (1994), using data from the National Comorbidity Survey, quantified this ratio for ten classes of drugs. Tobacco was found to have the highest dependence liability, with one in three users exhibiting signs of dependence, followed by heroin (23%), cocaine (17%), alcohol (15%), stimulants other than cocaine (11%), cannabis (9%), anxiolytics, sedatives, and hypnotic drugs (9%), analgesics (9%), psychedelic drugs (5%), and inhalants (4%). Data were not presented for ecstasy in this study, due in part to the low prevalence of use at the time the study was conducted (1990-1992). Later work by Cottler and colleagues (2001) focused on applying standard measures of drug dependence to ecstasy in particular and found 59% of their participants reported experiencing withdrawal symptoms from ecstasy while 35% admitted to developing a tolerance to the drug. In addition, they found that 43% of their sample met the DSM-IV criteria for ecstasy dependence while 34% met the criteria for abuse. Additionally, von Sydow and colleagues (2002) found that the probability of becoming addicted to ecstasy is rather low. Last, according to the Substance Abuse and Mental Health Services Administration (2002), there are no ecstasy-induced admissions into drug treatment centers, which may also indicate a low rate of ecstasy dependence. While the above evidence is contradictory, it does show that more work on the dependence liability of ecstasy is needed.

Some of the best evidence about the psychological effects of ecstasy originates from qualitative research conducted by McElrath and McEvoy (2002). Their studies show that the greater number of times ecstasy is consumed, the less likely a user experiences the original euphoric experience associated with their first use of ecstasy. Users in their studies consistently report that no amount of ecstasy will reproduce the feelings and sensations that occurred during their first experience using ecstasy. They state that “tolerance to the psychoactive properties of MDMA develops rapidly, and an increase in adverse effects is reported because of frequent use. Repeated doses cause sympathomimetic responses to predominate and can result in amphetamine-like toxicity (Yew, 2004).” Caulkins (2001), in his discussion of the dynamics of drug problems in the population, describes how drug tolerance usually reinforces consumption by causing users to seek out ever-increasing doses to achieve the same subjective experience or level of intoxication, as in the case of heroin. Consistent with the evidence presented by McElrath (2002), he argues that ecstasy is unique in that the development of tolerance appears to dampen its consumption. This conclusion is supported by the 2002 National Survey on Drug Use and Health. When examining the data for use of ecstasy in the past 30 days, there is consistently a low frequency of occurrence among all groups, indicating that repeated use of ecstasy is fairly uncommon.

## 2.2 The Ecstasy Epidemic

The ecstasy epidemic will be described in this section by examining data from several national studies of drug use. According to the National Survey on Drug Use and Health (NSDUH; formerly the National Household Survey on Drug Abuse) in 2003, slightly more than ten million persons (4.6% of the total US population, 12 years and older) had used ecstasy at least once in their lifetimes. An additional way of measuring the magnitude of ecstasy use is to examine the trends in the number of new users over time. In 1993, it was estimated by the National Survey on Drug Use and Health that 168,000 had tried ecstasy for the first time. By 1998 that number jumped to 700,000; in 2000, it sharply increased to 1.9 million, and then dropped to 607,000 by 2004. Older adolescents, particularly those who are 18-25 years old, are the most likely to have used ecstasy. College students, in particular, are considered to be at high risk for ecstasy use with 13.7% of 18-20 year olds and 16% of 21-25 year olds admitting to trying the drug (National Survey on Drug Use and Health, 2002). However, there is the purported availability of a wide variety of illicit substances on college campuses (Office of National Drug Control Policy, 2004). Robert Mathias (2001), a writer for the National Institute on Drug Abuse (NIDA), purports that, “MDMA users are predominantly white, but ethnically and racially diverse groups of people are now using the drug.” NIDA (2001) has also commented that, “African Americans show considerably lower rates of MDMA use than do either whites or Hispanics.” Ecstasy use seems to be split equally among genders and tends to occur in middle class socioeconomic settings (Office of National Drug Control Policy,

2002). However, there is a small group of older people who take ecstasy to bring about spiritual insight or revelation (Adamson and Metzner, 1988).

The annual *Monitoring the Future Study* (2003) of high school students is the largest study in the United States for estimating the prevalence of several classes of illicit drug use among school-attending youth. It began asking questions pertaining to college students in 1987 and high school students in 1996. Figure 2 displays trend data in the annual prevalence of ecstasy use from the *Monitoring the Future Study* for 12<sup>th</sup> graders. It shows that ecstasy use began to rise in 1998, peaked in 2001 (with 9.2% of the high school seniors having used ecstasy in the past year), and then declined since that time to levels equivalent to that of the mid-1990s.

Other national evidence for the decline in the use of ecstasy comes from the Drug Abuse Warning Network (DAWN, 2002) which estimates the number of emergency department mentions in 21 metropolitan areas. Figure 3 is consistent with the data presented earlier from school surveys, showing a dramatic rise in 1998, a peak in emergency department mentions of ecstasy in 2001, and a declining trend thereafter. However, the current number of emergency department mentions of ecstasy, just over 4,000, is still well above the estimates prior to 1998 when it first reached over 1,000.

Ecstasy use, manufacture, and sale is a not a contained problem in the United States; its use has spread all over the world. For example, in August 2003, *Operation Candy Box*, a vast initiative that included both the United States and Canada, shut down three large clandestine labs which were capable of distributing up to one million ecstasy tablets per month (United States Department of Justice, Drug

Enforcement Administration, 2005a). There have been ecstasy seizures on six continents, with many countries seizing millions of doses every year (United Nations Office on Drugs and Crime, 2005). In addition, it has been noted that both Russian and Israeli organized crime groups have taken to trafficking ecstasy (United States Department of Justice, Drug Enforcement Administration, 2002a). Eighty percent of the ecstasy found in the United States has been imported from the Netherlands or Belgium (United States Department of Justice, Drug Enforcement Administration, 2003). However, when looking at annual ecstasy use statistics from 2002 and 2003, three countries boast more than 2% of their population aged 15-64 having used ecstasy in the past year. Australia has the most with 4.2%, the Czech Republic follows with 2.5%, New Zealand comes in third with 2.2% and the United Kingdom is a close fourth with 2%. The United States is further behind at 1.1% (It is tied for eighth place with Belgium and Ireland (United Nations Office on Drugs and Crime, 2005)).

### 2.3 Prevention Messages

Prevention messages, through both prevention campaigns and media attention, are an important factor in reducing a drug epidemic. Prevention messages regarding the dangers of ecstasy were very prevalent during the rise of this epidemic and this section describes some of the main actions taken. Starting in the late 1990s, a variety of prevention programs were initiated at the national level by the United States government and by local communities in response to the increased use of ecstasy

reported in several epidemiologic studies described above. Emerging clinical and pre-clinical research, including a number of case studies, documented a variety of physical risks associated with ecstasy use including sleeping problems, cardiovascular problems, memory loss, anxiety, depression, and brain damage (National Institute on Drug Abuse, 2004a). Dissemination of these findings increased concern about ecstasy and a variety of prevention efforts ensued.

While a complete review of the studies that were used by the National Institute on Drug Abuse (NIDA) to initiate prevention efforts is beyond the scope of this thesis, it is important to highlight a few findings that served as the basis for the messages that were delivered through the news media and through print materials that were eventually distributed to schools and other venues. First, deficient serotonin levels secondary to ecstasy use were observed in a number of animal studies (National Institute on Drug Abuse, 2004a). While several studies have indicated that changes in the dopamine system can be fleeting, the alterations to the serotonin system appear to last much longer (National Institute on Drug Abuse, 2001). Ecstasy was believed not only to deplete the receptors that carry the serotonin through the brain but also to dissolve the vesicles that store it (National Institute on Drug Abuse, 2004a). Because of the link between decreased serotonin and depression, it was postulated that ecstasy use might increase the risk for depression.

A series of studies conducted by Ricaurte and his colleagues originally claimed that MDMA caused brain damage to the neocortex and the hippocampal regions of the brain. One such study observed some improvement in serotonin neurons in the brains of monkeys given MDMA six to seven years previously, but

noted that the recovery occurred only in certain regions and was not always complete (Jackson and Muth, 1999). The results of this study on ecstasy and decreased learning and memory subsequent to ecstasy use were shared by Dr. Leshner, then Director of NIDA, in a 1999 news release that said: "At the very least, people who take MDMA, even just a few times, are risking long-term, perhaps permanent, problems with learning and memory (Jackson and Muth, 1999)."

Further research by Ricaurte and his colleagues (2002) concluded that MDMA use diminishes the amount of dopamine in the brain and could increase the likelihood of Parkinson's disease later in life. However, on September 5, 2003, after considerable controversy regarding these findings, Ricaurte's team (2003) issued a retraction of their results in *Science*. The authors stated that they had actually injected extremely high amounts of methamphetamine into the primates, not MDMA, due to an inadvertent vial mix-up in the laboratory that provided the drug for this research. Other research done by NIDA supports the hypothesis that MDMA was related to brain damage in humans, as evidenced by positron emission tomography (PET) scans of ecstasy users (Mathias, 1999). Although these studies were limited to subjects that were self-referred, prohibiting generalizability of the findings to the general ecstasy-taking population, Nora Volkow, Director of NIDA, issued a statement in 1999 saying: "Chronic abuse of MDMA, for example, appears to produce long-term damage to serotonin-containing neurons in the brain." The current NIDA position is reflected in the following statement (National Institute on Drug Abuse, 2001):

"As much as the data collected so far largely supports the proposition that MDMA damages the serotonin system in the brain and produces long-lasting behavioral deficits, researchers agree that methodological issues, such as limited sample size and difficulties controlling for the

possible influence of other illicit substances, have made it difficult to move beyond generalities and unequivocally prove a cause and effect relationship between MDMA use and specific cognitive or psychological damage in humans.”

One of the first major prevention messages released by NIDA was in March 2000 when they launched a website for teens ([www.clubdrugs.org](http://www.clubdrugs.org)) and placed over 330,000 free cards, which pictured half of a healthy brain and half of a brain that has been exposed to ecstasy, in restaurants, bars, coffee shops, and bookstores known to be frequented by teens (Zickler, 2000). These images made the ecstasy-exposed brain appear to have black holes in it. Subsequently, the television show *48 Hours* collaborated with MTV to produce two specials on ecstasy that aired consecutively on the evening of November 30, 2000. In the MTV special, entitled *True Life: I'm on Ecstasy*, images suggested that using ecstasy could put holes in your brain. Both specials presented what users felt were the benefits and the deleterious effects of ecstasy.<sup>2</sup> SAMHSA also released information regarding the dangers of ecstasy use including a club drugs version of their *Tips for Teens* pamphlet and a half hour video *Ecstasy: What's All the Rave About?* from their *Myths, Facts, and Illicit Drugs: What You Should Know* series.

Other research demonstrated that ecstasy could result in acute hypertension, increased heart rate, hyperthermia, heat stroke, dehydration, and cardiac arrhythmia (Freese, et al., 2002). Some ecstasy-related deaths were caused by excess fluid intake following dehydration (Joseph, 2000). Prevention messages of water intoxication, heat stroke, and cardiovascular problems were spread through commercials by the Partnership for a Drug Free America and the Office of the National Drug Control

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<sup>2</sup> Several unsuccessful attempts were made to learn the viewing numbers of these specials.

Policy (ONDCP) warning teens of the dangers of using ecstasy. In addition, beginning in 1998, there was a five-year, \$2 billion media-based campaign led by the ONDCP that was aimed at reducing illicit drug use in teens (Palmgreen and Donohew, 2003).

Besides the findings of purported health risks of ecstasy use, an additional piece of data that was used for prevention messages pertained to the adulterants that were likely to be present in ecstasy tablets. Numerous adulterants are added to pills, ranging from amphetamines to ephedrine to ketamine, a veterinary anesthetic with effects similar to PCP. While some of these adulterants may not increase the risk associated with ecstasy use, some adulterants, such as PMA (paramethoxyamphetamine), can have lethal consequences (Community Epidemiology Work Group, 2000). Studies conducted in the United Kingdom suggest that the levels of adulterants in ecstasy tablets were the highest in the mid-to-late 1990s (Parrott, 2004). In a study conducted by Baggott and colleagues (2000) between February 1999 and March 2000, 107 ecstasy pills from all over the US had their content tested. They found that 63% of the pills contained at least some MDMA or one of its analogues (MDEA, MDA), 29% of the pills contained identifiable drugs, but no MDMA, and 8% of the pills contained no known drugs whatsoever. Dextromethorphan (DXM) was the drug most commonly found in ecstasy pills (other than MDMA). Materials distributed by NIDA (2004b) stated that data from both Australia and the United States showed multiple fatalities had been associated with ecstasy adulterants.

Figure 4 summarizes the temporal association between the trends in use of ecstasy among students and the responses that ensued by the federal government and the popular media. Also included in the figure is the number of ecstasy-related pieces of legislation and NIDA activities that occurred between the years 1996-2004. As can be seen, a temporal relationship appears to exist between the implementation of these activities and the decline of adolescent ecstasy use.

#### 2.4 Legislation and Law Enforcement

Numerous legislative efforts were pursued in order to reduce the spread of ecstasy use. This section describes the actions taken by legislators to help curb the ecstasy epidemic. As mentioned in chapter 1, the history of legislation on the possession, distribution, and sale of ecstasy begins with the federal Controlled Substances Act, which was Title II of the Comprehensive Drug Abuse Prevention and Control Act of 1970 (United States Government, 1970). This act merged numerous federal laws regarding the manufacture, distribution, and use of controlled substances. Its guidelines schedule all “club” drugs (See Table 1). Ecstasy has officially been on Schedule I since 1988, after being temporarily placed there by emergency DEA action in 1985 (United States Department of Justice: Drug Enforcement Administration, 1986). Lloyd Bentsen, senior Senator from Texas, put in a formal request to the DEA in 1984 to ban ecstasy and place it on Schedule I due to its increasing sales in his home state (Cohen, 1998). The qualifications for Schedule I are that the drug has a high potential for abuse, the drug has no currently accepted

medical use in treatment in the United States, and there is a lack of accepted safety for use of the drug under medical supervision (United States Government, 1970). Interestingly, ecstasy was actually removed from Schedule I on December 22, 1987 and temporarily placed under the regulation of the Analogue Drug Act by the United States Court of Appeals for the First Circuit after a petitioner approached the court in September claiming that ecstasy did have an accepted medical use and therefore should not be placed on Schedule I.<sup>3</sup> The court requested that the DEA create a standard for the term “accepted medical use” (Lawn, 1988) and after this was accomplished, ecstasy was reinstated onto Schedule I by the same court in February of 1988, effective March 23, 1988 (United States Department of Justice, Drug Enforcement Administration, 1988).

Numerous pieces of legislation have been proposed and passed throughout the rise of the ecstasy epidemic. The following paragraphs describe some of these acts and briefly touch on their individual controversies. These acts are also summarized in Table 2. The Club Drug Anti-Proliferation Act of 2000 and the Ecstasy Anti-Proliferation Act of 2000 (United States Government, 2000a) were written to fight importation, sale, and use of ecstasy within the United States. These acts were considered controversial due to their consolidation of legislation regarding ecstasy and methamphetamine (Sententia, 2000). It made the punishment for selling 20 doses of ecstasy equivalent to selling 500 doses of methamphetamine because penalty levels were based the weight of the drug (Boire, 2000). The original bill also made it a federal crime to distribute information about the use or production of MDMA

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<sup>3</sup> Coffin, Torruella, and Pettin. United States Court of Appeals for the First Circuit. Lester Grinspoon, Petitioner, v. Drug Enforcement Administration, Respondent. September 18, 1987.

(Sententia, 2000). In the end the consolidation of the two drugs was deemed inappropriate and after much revision, and finally deciding to concentrate on ecstasy, the acts were passed in September of 2000 as part of the Children's Health Act of 2000 (United States Government, 2000b). It was signed into law by President Clinton in December.

In March of 2001 the Sentencing Commission stiffened guidelines for the punishment of crimes involving ecstasy. These guidelines, which went into effect in May of 2001, increased the penalty for the sale of 800 pills from 15 months to 60 months in jail. Meanwhile, the incarceration time for the sale of 8,000 pills rose from 41 months to 120 months (Murphy, 2001). In response to the tougher guidelines, the National Association of Criminal Defense Lawyers reported that, "[this] change makes ecstasy five times more serious to possess or sell than heroin on a per-dose basis (Associated Press, 2001)." Also in response to these changes, William D. McColl (2001), the Director of Legislative Affairs at the Lindesmith Center Drug Policy Foundation in Washington, DC stated, "Since most MDMA offenders are nonviolent, incapacitation of offenders has no impact on violent crime."

The Ecstasy Prevention Act of 2001 was introduced to the Senate on July 19, 2001 in response to the elevated problem of MDMA importation, use, and possible health risks (United States Government, 2001). The next day, it was presented in the House of Representatives and in December the act was passed (Boire, 2001).<sup>4</sup> The provisions of this act restricted rave clubs, increased law enforcement against ecstasy production, sale, and use, established a task force, added ecstasy to the list of drugs

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<sup>4</sup> Attached by amendment to the 21st Century Department of Justice Appropriations Authorization Act (H.R. 2215 Title VIII Secs. 8001-8007).

tested for in the workplace, and ordered that research be done on the health effects of ecstasy use (Boire, 2001). Opponents of this act spoke out that the United States is, “employing more police and filling more prison cells with otherwise law-abiding citizens who use MDMA without causing harm to others (Boire, 2001).”

The RAVE (Reducing Americans' Vulnerability to Ecstasy) Act of 2002 was another attempt to reduce the use of ecstasy (United States Government, 2002). There was strong opposition to the legislation within this act. A rave and protest occurred on the lawn of the United States Capitol on September 6, 2002. Opponents claimed that this act was unfair and condoned the prosecution of innocents. However, the bill clearly stated that its purpose was, “to prohibit an individual from knowingly opening, maintaining, managing, controlling, renting, leasing, making available for use, or profiting from any place for the purpose of manufacturing, distributing, or using any controlled substance.” This act expanded on legislation within the Controlled Substances Act (1970), section 416(a), also known as the “Crack House Statute.” By passing this act, the government would be able to prosecute business owners, property owners and managers for not trying to prevent drug activity on their property during a targeted venue which tends to promote electronic music and dance. However, this act was not passed prior to the adjournment of the 107<sup>th</sup> Congress.

The Illicit Drug Anti-Proliferation Act of 2003 is considered to be the RAVE Act of 2002 renamed (United States Government, 2003a). It became law on April 30, 2003, as part of the PROTECT Act (United States Government, 2003b). The PROTECT Act also secured the government’s role in the AMBER Alert system, used for locating kidnapped children. Opponents claim that the Illicit Drug Anti-

Proliferation Act of 2003 has no place within the PROTECT Act and was only written this way to ensure passage due to the importance of other legislation within the PROTECT Act (EMDEF, 2003). Those who believe that the Illicit Drug Anti-Proliferation Act of 2003 is wrong also maintain that, “It will not eliminate drug use or raves – it will just drive them underground and discourage basic health precautions. It will have the perverse effect of making raves even more dangerous (EMDEF, 2003).”

The CLEAN-UP (Clean, Learn, Educate, Abolish, Neutralize, and Undermine Production of Methamphetamines) Act is in pending legislation.<sup>5</sup> If passed, this act could penalize rave/dance music event promoters for up to nine years in prison, “where the promoter ‘knows’ or ‘reasonably ought to know’ that a controlled substance will be illegally distributed or consumed (United States Government, 2003c).” Overall, the CLEAN-UP Act is an expansion on the RAVE Act of 2002.

The Ecstasy Awareness Act of 2003 is also in pending legislation<sup>6</sup> to prevent the use of MDMA. The act, which was introduced on July 25<sup>th</sup>, states,

“[w]hoever profits monetarily from a rave or similar electronic dance event, knowing or having reason to know that the unlawful use or distribution of a controlled substance occurs at the rave or similar event, shall be fined not more than \$500,000 or imprisoned not more than 20 years, or both. If the defendant is an organization, the fine imposable for the offense is not more than \$2,000,000 (United States Government, 2003d).”

This act will set aside increased funding for law enforcement training regarding the prosecution of ecstasy offenses and amend the Elementary and Secondary Education Act of 1965 (United States Government, 2003e) by adding the following statement at

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<sup>5</sup> On March 10, 2003 this bill was referred to the House Subcommittee on Education Reform.

<sup>6</sup> On September 4, 2003 this bill was referred to the House Subcommittee on Crime, Terrorism and Homeland Security.

the end, “include activities to prevent or reduce the use of the illegal drug commonly called ecstasy (United States Government, 2003d).”

Numerous other federal legislative acts have influenced ecstasy use as well. These pieces of legislation, along with others, enabled enforcement agencies to step up their investigations of ecstasy related activities with programs such as *Operation X-Out*, created by the Drug Enforcement Administration in 2002(b). This initiative focuses on identifying and disbanding organizations that manufacture and sell ecstasy in the US and internationally. The exploratory methods include increasing DEA investigations involving MDMA and other club drugs, enhancing airport security and drug surveillance, creating new task forces in major cities and on Internet drug trafficking, and expanding coordination with international law enforcement. Seizures of ecstasy tablets by the United States Drug Enforcement Administration (2003) have risen dramatically from 11,913 doses in 1996 to over 9 million pills in 2001 (Hutchinson, 2002). One of the largest seizures of ecstasy tablets took place July 22, 2000 when 2.1 million tablets were seized in Los Angeles (United States Department of Justice, Drug Enforcement Administration, 2001).

Numerous other countries have developed their own laws to combat the problem and world agencies have tried to help as well. In response to the need for precursor chemical control, the United Nations International Narcotics Control Board created Project PRISM (Precursors Required In Synthetic Manufacture) whose goal is to halt the supply of chemical precursors to persons who manufacture MDMA and other synthetic drugs (Bureau for International Narcotics and Law Enforcement Affairs, 2003). The project also strives to identify and arrest major traffickers. Project

PRISM stresses the need for governments to communicate with each other in order to fight production of these drugs. Some manufacturers obtain the necessary chemicals by diverting them from legal sources or by engaging companies to produce the precursor chemicals illegally. A task force has been formed and through consistent communication between governments and law enforcement agencies a more effective method of investigating and identifying manufacturers and traffickers may be developed (Bureau for International Narcotics and Law Enforcement Affairs, 2003).

### 2.5 Treatment Information

As mentioned earlier, treatment is a response to an epidemic. Overall, treatment options for ecstasy dependence are limited. In fact, there are no treatment options specific to ecstasy use (National Institute on Drug Abuse, 2004a). While this may stem from the fact that many ecstasy users do not get addicted to the drug (Sterk, 2001, McDowell, 1999), it is also caused by the problem that ecstasy is often adulterated (Baggott, et al., 2000). Since numerous other substances may be used in an ecstasy tablet, it is difficult to establish a treatment designed for ecstasy users (Irvine, 2001). In addition, ecstasy users tend to be poly-drug users, which also complicates treatment (Sterk, 2001), so it is suggested that standard treatment approaches should be used (McDowell, 1999).

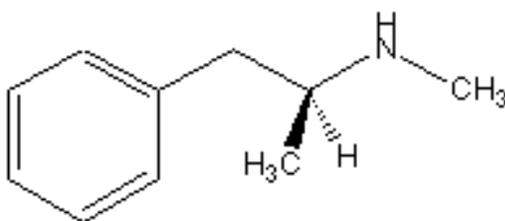
The most effective treatment type for ecstasy users is cognitive behavioral interventions. There are no pharmacological treatments currently available, but anti-depressants are sometimes used to battle depression episodes that may occur after

extensive ecstasy use. Generally, support groups, along with interventions to help change the patient's mode of thinking, behaviors, and ways of dealing with stress, are the most common methods of treatment used (National Institute on Drug Abuse, 2004a).

Unfortunately, data on ecstasy users who seek treatment is rare. In the Treatment Episode Data Set (TEDS), which covers close to two million treatment center admissions per year, ecstasy is lumped in with other amphetamines, phenmetrazine, and "other unspecified amines and related drugs (Substance Abuse and Mental Health Services Administration, Office of Applied Studies, 2005b)." Due to this categorization, there is no distinction for those seeking treatment for ecstasy use.

Other treatment admissions data have also seen minimal mentions of ecstasy as the primary substance for entering treatment. However, there are a few places which have it noted as a secondary or tertiary reason. *Pulse Check* (Office of National Drug Control Policy, 2002) treatment sources have seen ecstasy use as the non-primary drug in about 10% of Seattle, 8% of Philadelphia, and 4% of Miami treatment admissions.

## Chapter 3: Methamphetamine



### 3.1 The Basics

This chapter is presented similarly to the previous chapter on ecstasy. This first section will cover the basics of methamphetamine to aid in the comparative analysis of the two epidemics. The history of methamphetamine, its ingredients, costs, cooking methods, and effects will be discussed. Methamphetamine is an extremely addictive stimulant that greatly affects the central nervous system (National Institute on Drug Abuse, 2002) and it is the most widely abused amphetamine (Pennell, et al., 1999). It was first synthesized as an amphetamine derivative in 1919 by a Japanese pharmacologist and, in the 1930s, it was used to treat nasal congestion, asthma and narcolepsy. Methamphetamine was used as an appetite suppressant and to treat Attention Deficit Disorder (ADD) in children (Office of National Drug Control Policy, 2003b). While abuse of methamphetamine began almost immediately after its introduction to the market (it was documented as a problem during World War II (Miller and Kozel, 1991)), it was during the 1950s and 1960s that methamphetamine was more widely used than cocaine in several countries, including Great Britain and

the United States (Seiden, 1991). Methamphetamine was also cheaper than cocaine (Herz, 2000). In 1967 there were 31 million prescriptions for methamphetamine written in the United States (Anglin, et al., 2000). Users of methamphetamine at this time were mainly truck drivers, students, and housewives who used the drug to stay awake or lose weight (Heischober and Miller, 1991). Just a few of the numerous street names used for methamphetamine are speed, meth, crank, jet fuel, lemon drop, and chicken feed (Pennell, et al., 1999).

Methamphetamine is easily manufactured in clandestine labs by cooks with minimal chemistry knowledge (National Institute on Drug Abuse, 2002). Recipes can be found in books and online; some even include the legal status of the chemicals involved (Burton, 1991). These labs are normally in residences, vans, trailers, rented storage space or motel rooms where they can be moved easily to avoid detection by authorities. The early cooks of methamphetamine were typically members of motorcycle gangs because they were highly mobile (Pennell, et al., 1999). Labs also tend to be in more rural areas to get better ventilation. Producers of methamphetamine have also been known to set dangerous booby traps to destroy the labs if discovered (Irvine and Chin, 1991).

Mexican drug cartels have now begun to get into the mix of trafficking methamphetamine (Suo, 2005). Recently, they have become the main producer of methamphetamine sold in the West and Midwest and they have the capability to produce large amounts of the drug in short periods of time (Office of National Drug Control Policy, 2003b). In addition, Mexican labs are usually more secure than those in the United States because some precursor chemicals, such as ephedrine, are legal in

Mexico (Pennell, et al., 1999). However, some cartels cut the methamphetamine with methylsulfonylmethane (MSM, a dietary supplement) in order to increase the volume of the drug produced without raising costs (Office of National Drug Control Policy, 2003b). The typical dose of methamphetamine is between 10 and 40 milligrams (Erowid, 2003) while the retail cost for a gram of methamphetamine varies between \$20 and \$300 for powder and \$60 and \$700 for ice (National Drug Intelligence Center, 2005).

While methamphetamine is most efficiently transported to the body when smoked through a glass pipe (Cook, 1991), it can also be injected, snorted or orally ingested (Herz, 2000). Other methods of using methamphetamine involve inhaling the vapors of heated methamphetamine. “Hot rolling” uses an eye dropper (Pennell, et al., 1999) while “chasing the dragon” heats methamphetamine on foil (Heischober and Miller, 1991). This variety of ingestion methods may make it easier for a wider variety of people to use the drug since the stigma of drug injection may not apply. When smoked in a crystallized form, methamphetamine is known as “ice.” This is a very pure form of methamphetamine that is affordable, reusable, and gives a long lasting high (Chaiken, 1993). In addition, methamphetamine may be used in combination with other drugs. For example, a “meth speedball” is a methamphetamine and heroin combination (Pennell, et al., 1999).

Currently, there are three types of methamphetamine, which vary in strength, production method, and effects. The most popular version, dextro-meth (d-meth), is the most pure, so injection is not necessary, and it does not produce unwanted side effects (Pennell, et al., 1999). Levo-meth (l-meth) is the least used type and it has the

most severe effect on the cardiovascular system. This decreases the pleasurable effects, which stem from the nervous system (Pennell, et al., 1999). The third type, dextro-levo-meth (dl-meth) is the most difficult to manufacture because it uses the phenyl-2-propanone (P2P) method. It also has a lower purity level and more side effects than d-meth (Pennell, et al., 1999). Purity levels of street methamphetamine have decreased from 71.9% in 1994 to just over 40% in 2001; international supervision of precursor chemicals may have assisted in this decrease (Office of National Drug Control Policy, 2003b).

There are also multiple cooking methods. In the past, the two predominant methods have been amalgam (P2P) and ephedrine. These methods are based on the ingredients used (Irvine and Chin, 1991). However, as time passes, more methods are discovered. One of the newer and more desirable methods is “cold cooking.” This method eliminates the smell and the heat usually found with traditional manufacture of methamphetamine. This decreases the chance of explosion and makes the labs even more mobile (Singh, 2001). Another popular method is the “Nazi method” or “dry cook” method, a quick and inexpensive method with high production rates (Pennell, et al., 1999).

Chemicals used in methamphetamine manufacture are highly flammable and explosive (Irvine and Chin, 1991). While some can be bought at a local hardware store, others are illegal or may be difficult to find (laws regarding precursor chemicals will be discussed later). However, it has been found that some precursors, such as pseudoephedrine, can be found on eBay, an Internet auction site (Associated Press, 2005). The chemicals needed for producing methamphetamine include ingredients

from four categories; metal or salt reagents, solvents, precursors, and acid-based reagents. Examples of metal or salt reagents include aluminum foil, magnesium, sodium cyanide, iodine, and lead acetate. Some of the various solvents used are freon, chloroform, acetone, benzene, and ethyl ether. The precursor chemicals in methamphetamine manufacture include ephedrine, pseudoephedrine, methylamine, phenyl-2-propanone, and phenylacetic acid while examples of acid based reagents include hydrochloric acid, hydrogen peroxide, ammonia, sulfuric acid, and acetic acid (Hall and Broderick, 1991). There are also substances used to dilute methamphetamine for sale. These include caffeine, quinine, lactose, and sodium bicarbonate (Burton, 1991).

Chemically, methamphetamine is similar to adrenaline (Pennell, et al., 1999). It stimulates the nervous system to create both positive and negative effects. Soon after ingesting methamphetamine, the user feels euphoria and energy due to the high levels of dopamine that are released into the brain (Herz, 2000). The pleasurable effects of methamphetamine can last up to twelve hours (Office of National Drug Control Policy, 2003b). However, the feelings that follow may include paranoia, depression, and memory loss (Herz, 2000). Other short-term effects of methamphetamine use include tremors, insomnia, irritability, increased sex drive, convulsions, and even heart spasms (Pennell, et al., 1999). In addition, methamphetamine can also cause increased heart rate and blood pressure. This, in turn, can damage blood vessels in the brain, which can cause a stroke (National Institute on Drug Abuse, 2005b).

Users of methamphetamine will experience withdrawal symptoms including severe anxiety and fatigue that quickly set in when methamphetamine use has ceased (Office of National Drug Control Policy, 2003b). Two parts of withdrawal have been noted, the acute and subacute phases. The acute phase lasts approximately seven to ten days with the most severe symptoms occurring within the first day or two (McGregor, et al., 2005). Symptoms include depression, anxiety, increased appetite, and change in sleeping patterns. An intense craving for the drug may also occur (National Institute on Drug Abuse, 1998). The subacute phase lasts for approximately two weeks after the conclusion of the acute phase. During this phase withdrawal symptoms typically remain at a low but constant level (McGregor, et al., 2005). Tolerance to methamphetamine has also been documented. Tolerance occurs when more methamphetamine is needed to produce the same effects (Office of National Drug Control Policy, 2003b).

Some users of methamphetamine are considered to be binge users. These people continually ingest methamphetamine until there is no longer a high. The phase that occurs at the end of the high is commonly known as tweaking. During this stage, severely unpleasant feelings occur, similar to the feelings of withdrawal. Much of the time the user will take another drug or drink alcohol to soothe these feelings. The third stage, known as a crash, will occur after the user finally sleeps. This includes feelings of severe depression, paranoia, and anxiety (Ells, et al., 2002).

Extended use of methamphetamine can also cause chronic psychological effects (Miller, 1991). Besides paranoia and depression, prolonged use is associated with permanent brain damage and even death (Herz, 2000). It has been noted that

methamphetamine is neurotoxic to brain cells in that irreversible damage to the dopamine and serotonin neurons in the brain can occur (Seiden, 1991). Inflammation of the heart lining or lead poisoning can also occur, due to the mode of production (Office of National Drug Control Policy, 2003b). In addition, methamphetamine abuse is associated with delusions, weight loss, suicidal and homicidal thoughts, drastic mood swings, and nerve damage. Abusers of methamphetamine are also more likely to abuse or neglect their children or spread blood born viruses such as hepatitis and HIV than the average person (Pennell, et al., 1999).

In addition to the harm caused by ingesting methamphetamine, it is also risky to be around methamphetamine production. Besides the elevated chance of fire and explosion, cooks, and others around the lab, are exposed to many possible injuries from the massive amounts of chemicals which can lead to anxiety, nausea, dizziness, and numerous irritations of the skin, eyes, lungs, nose, etc. Additionally, if the recipe calls for cyanide, death or coma could result (Irvine and Chin, 1991). Chemical exposure can also cause chemical pneumonia or even cancer (Pennell, et al., 1999). These effects also go on to affect the surrounding community. For example, methamphetamine production creates enormous amounts of toxic waste. The manufacture of one pound of methamphetamine produces between five and seven pounds of toxic waste (National Office of Drug Control Policy, 2003b) and many cooks tend to bury the evidence, pour it down drains or dump it in fields. This can contaminate the water supply, which is a very expensive thing to correct (Pennell, et al., 1999). The Drug Enforcement Administration has a \$20 million program which aids in the initial cleaning of clandestine labs and the removal of precursor chemicals,

but each site will cost local law enforcement an additional \$3,000 to \$8,000 to properly clean the area (Fleming, 2005). Unfortunately, without adequate resources it is extremely difficult for local communities to afford these exorbitant costs.

### 3.2 The Methamphetamine Epidemic

In this section the methamphetamine epidemic will be described using data from several drug use monitoring programs. Then, since many national programs do not cover rural areas, a closer examination of methamphetamine use in certain states will be conducted. According to the National Survey on Drug Use and Health (2002), over 12 million people aged twelve or older in the United States have tried methamphetamine at least once in their lifetime (approximately 5% of the nation's population). Of those who had used methamphetamine at least once in their lifetime, only 5% used it in the past month. While methamphetamine use was somewhat level in the early and mid 1990s, there has been a steady increase in the number of people using the drug since then. The largest increase in the United States occurred between 1998 and 1999 when the percentage of those aged 12 and older using methamphetamine rose from about 2% to just over 4% (National Survey on Drug Use and Health, 2000).

Traditionally, methamphetamine users are white, blue-collar males (Heischober and Miller, 1991). While males are still more likely to use methamphetamine, more and more women are beginning to use the drug (National Survey on Drug Use and Health, 2002). In addition, methamphetamine users are

predominately white and between the ages of 18 and 50 (Substance Abuse and Mental Health Services Administration, Office of Applied Studies, 2005b).

Methamphetamine use has also become popular in the gay and bisexual male communities to augment sexual activity (Hunt, et al., 2005).

Methamphetamine was first included in the Monitoring the Future survey in 1999. As depicted in Figure 2, past year use of methamphetamine by twelfth graders declined between 1999 and 2003, from just under 5% to just over 3%, but then there was a slight increase in 2004. This pattern is similar for the eighth and tenth grade data as well. In 2003, the highest methamphetamine use was in the West (5.5%) and North Central (4.5%) regions as compared to the low usage in the Northeast (1.6%).

Consistent with these findings, data from the Arrestee Drug Abuse Monitoring program (ADAM) shows that the highest percentages of methamphetamine use among male arrestees occurred in the West, particularly in these cities: Honolulu (40.3%), Phoenix (38.3%), Sacramento (37.6%), San Jose (36.9%), and San Diego (36.2%). Among female arrestees the results were similar, showing a high prevalence of methamphetamine use in the West and a comparatively low prevalence of use in the East. However, data from the ADAM program is limited to major cities. The exclusion of arrestees from rural areas severely limits generalizability to those areas.

The Drug Abuse Warning Network is similar to ADAM in that its data only covers large urban areas in the United States. However, data from its 2002<sup>7</sup> release shows that while methamphetamine mentions in emergency departments had an

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<sup>7</sup> As of November 2005, DAWN had only released interim estimates for 2003.

erratic pattern from 1995 to 1999, they have been on the rise ever since (See Figure 3).

Since national drug use monitoring programs cannot provide a complete story of drug use across the United States, methamphetamine use in certain parts of the country should be examined. The use, sale, and production of methamphetamine have an extensive history in the United States. In the late 1960s and early 1970s, methamphetamine use was mainly seen in San Francisco and the Pacific Northwest (Hall and Broderick, 1991). It was during this time that injectable methamphetamine became popular and the term “speed freak” began to be widely used (Burton, 1991). Then, throughout the 70s and early 1980s, use began to spread throughout the Midwest, Philadelphia, and Minneapolis (Hall and Broderick, 1991). It was not until the past few years that methamphetamine began to become more prevalent in the Northeast (Hunt, et al., 2005).

While some states are almost unaffected by the drug, others have been devastated by it. For example, in Hawaii, smoked methamphetamine, or “ice” as it is more commonly known, has been popular among local ethnic groups since the 1970s, especially on the island of Oahu (Chaiken, 1993). The smoking of methamphetamine was exclusive to Hawaii until 1989 (Miller, 1991) when it began to spread into San Diego (Pennell, et al., 1999). Popularity of the drug greatly increased in Hawaii in the mid 80s and, by 1986, law enforcement began to observe methamphetamine activities closely. In 1988, ice began to make headlines in the Oahu papers and, by 1989, organized dealing seemed to greatly decrease (Chaiken, 1993). Unfortunately, even after this drastic decrease, methamphetamine use in Hawaii remains a significant

problem after a resurgence in the mid 1990s. Between 1994 and 2000, treatment admissions for adults addicted to methamphetamine in Hawaii more than doubled (Substance Abuse and Mental Health Services Administration, Office of Applied Studies, 2005b). In addition, Hawaii has nearby access to the main suppliers of methamphetamine: Mexico, California, and Asia (National Drug Intelligence Center, a component of the United States Department of Justice, 2002).

The production of methamphetamine was also noted as a significant problem in California as early as 1983 (Pennell, et al., 1999). Unfortunately, the problem in California has continued and counties surrounding the San Francisco Bay area have been a huge production area in the past few years. They supply much of the methamphetamine used in the United States (National Drug Intelligence Center, a component of the United States Department of Justice, 2001).

A study done in Nebraska (Herz, 2000) used results from local divisions of the Arrestee Drug Abuse Monitoring program (ADAM) to check for methamphetamine use in male arrestees. Between 1990 and 1998, Herz found that arrestees who tested positive for methamphetamine rose from less than 1% to over 10% in four rural counties and the city of Omaha. For the rural areas, methamphetamine was noted to be the most popular drug among arrestees behind marijuana and, in Omaha, it was the third most popular, behind marijuana and cocaine. Methamphetamine users in Omaha tended to first use the drug sometime after their 21<sup>st</sup> birthday while rural users were inclined to try methamphetamine between their 18<sup>th</sup> and 19<sup>th</sup> birthdays. In addition, rural arrestees who used methamphetamine were more likely to also sell

methamphetamine than the urban arrestees were. Methamphetamine was the only drug whose prevalence in rural areas rivaled that of Omaha's.

Another state devastated by methamphetamine is Wyoming. As the least populated state, with less than 500,000 residents and only 5 people per square mile (United States Census, 2000), Wyoming is ideal for clandestine labs. The problem was first noticed by law enforcement in the early 1990s when drug arrests in Casper jumped 321%, with most of them being methamphetamine related. Self report studies were done with 80% of the junior high and high school population in Wyoming. Researchers found that eighth graders in Wyoming had higher drug use rates than twelfth graders nationwide, more than 40% of the students met the DSM-IV criteria for drug abusers, and 10% of those students were considered drug dependent (Singh, 2001).

The use, sale, and production of methamphetamine are not exclusive to the United States. The drug, its precursors, and the problems they bring to society affect many other nations. Canada has a problem similar to the United States. Use of methamphetamine tends to be centralized along the west side of the country but it is starting to spread eastward. In addition, the methamphetamine is produced locally in small rural labs (Walters, 2005). Abuse of methamphetamine has also been prominent for decades in several Asian countries (Miller and Kozel, 1991). For the Japanese, methamphetamine use became a problem in the late 1940s. There was no legislation regarding methamphetamine use and production so it quickly spread, even though Japan has not had substance abuse problems (Suwaki, 1991). In Korea, methamphetamine was first manufactured during World War II, but production did

not become a problem until the 1970s. This occurred when Japan increased enforcement against methamphetamine production. Therefore, production increased in Korea and manufacturers began to smuggle methamphetamine into Japan until the late 1970s when the border was made more secure between the two countries (In Cho, 1991). Almost all of the methamphetamine in Japan is imported by organized crime groups (Suwaki, 1991). Methamphetamine use and sale is also a problem in Thailand. It is the drug of choice among users and 60% of incarcerated drug offenders are in prison due to methamphetamine possession (Drug Policy Alliance, 2005).

### 3.3 Prevention Messages

Prevention messages regarding the dangers of methamphetamine use and manufacture have become more prevalent over the past few months. This section will highlight some of the recent prevention initiatives. The Methamphetamine Interagency Task Force suggests prevention strategies which are more focused towards certain populations such as whites, women, and adults. In addition, they recommend focusing on the risks of drug use, such as losing touch with family and the community. They believe that every aspect of the community should be involved in preventing methamphetamine use, from teachers to parents to businesses, in order for the methods to be effective (Travis, et al., 2000).

While numerous rural areas are affected by methamphetamine use and production, some have worked diligently to create plans to deal with the problem. For example, in 1998, the state government in Wyoming assigned \$3.2 million to develop an initiative to help fight the local methamphetamine problem. Then, in 1999, an

additional \$5.2 million dollars was given to continue the program. The initiative's goals are outlined here (Singh, 2001):

1. Develop a long-term care residential treatment facility.
2. Establish a supporting intensive outpatient treatment program for those in the criminal justice system.
3. Establish a committee to oversee the implementation of methamphetamine related initiatives.
4. Create and distribute information to parents, addicts, and students.
5. Develop a specialized foster care program for mothers in need of methamphetamine treatment.
6. Establish a drug court.
7. Preventative education for children about methamphetamine use.

Other communities have developed prevention initiatives as well. The Kansas Methamphetamine Prevention Project (KMPP) was founded in 2002 to help fight methamphetamine use and manufacture across the state. The group provides materials to educate children, offers assistance in legal matters, holds conferences, tenders community grants, and holds training sessions (Kansas Methamphetamine Prevention Project, 2005). While the Sampson County, North Carolina Methamphetamine Task Force has posted a website ([www.methdeath.org](http://www.methdeath.org)) which offers links to methamphetamine resources on the internet, Oregon Partnership has created the Methamphetamine Awareness Project (MAP). MAP puts students in charge and has created several documentaries and public service announcements warning other teens about the dangers of methamphetamine (Oregon Partnership, 2005). The Meth Free Indiana Coalition was formed in 2005 to aid in enforcing new laws which place methamphetamine ingredients, such as cold medicine, behind pharmacy counters (Meth Free Indiana Coalition, 2005). In June 2001 the Methamphetamine Awareness and Prevention Project of South Dakota was developed. Its main focuses are raising awareness and educating people on the dangers of methamphetamine. It also provides

information to the law enforcement, education, and medical communities to help them identify clandestine labs and methamphetamine use (Prairie View Prevention Services, 2004). Illinois has developed a creative, if not fragrant, tactic; scratch 'n sniff cards which smell like anhydrous ammonia, or as the stench is more commonly referred to, cat urine. These cards would be handed out to school and daycare employees to aid in detecting children who have been exposed to methamphetamine (Gustin, 2005). Other information dispersed in schools originates from the Substance Abuse and Mental Health Services Administration (SAMHSA) who offers videos and DVDs highlighting the dangers of methamphetamine as well as several pamphlets including methamphetamine specific ones in their *Mind over Matter* and *Tips for Teens* series. The federal government also provides a comprehensive website concerning methamphetamine resources ([www.methresources.gov](http://www.methresources.gov)).

Parental prevention groups are establishing themselves throughout the entire country as well. While some are methamphetamine specific, others have a more general concentration of preventing drug use all together. Mothers Against Methamphetamine (MAMa) was organized in 2002 to help distribute materials educating the public regarding the dangers of methamphetamine. The pamphlets are written by the organizations founder, Dr. Mary Holley, and they are religion based in the Christian faith claiming that Jesus Christ can help you defeat addiction (Holley, 2005). Parents Helping Parents has several chapters in Oklahoma that provide support outlets for parents who have a child addicted to drugs or alcohol (Parents Helping Parents, 2005). The Partnership for a Drug Free America also offers an online parent support group called Parent Partners. They provide information regarding numerous

drugs, offer email newsletters, and supply discussion boards for parents to converse with each other (Partnership for a Drug Free America, 2005).

Another community initiative, Companies Helping Eliminate Meth (CHEM), is a group of retailers who have been brought together to help law enforcement by reporting suspicious purchases of ingredients used for methamphetamine production. In addition, the program requires that retailers place certain items in easily monitored areas, educate their employees regarding methamphetamine, and post window clings, stickers, and tags in various places throughout the store (Companies Helping Eliminate Meth, 2005). The Clandestine Laboratory Investigator's Association (CLIA) was formed in 1988 in Nevada to aid in training law enforcement regarding how to deal with clandestine labs while following the Occupational Safety and Health Administration's (OSHA) guidelines. They have yearly training conferences throughout North America to disseminate this information to law enforcement agencies (Clandestine Laboratory Investigator's Association, 2005).

Products to deter methamphetamine cooks are also beginning to be available. GloTell, a product marketed towards those people with anhydrous ammonia tanks (farmers, dealers, etc.), is a chemical that is injected into the tank to make the normally colorless and odorless gas a vibrant pink. While this color does nothing to the ammonia, it does stain anything and everything it comes in contact with and even after the substance is washed off it is visible with an ultraviolet light for up to 72 hours. This product may discourage manufacturers of methamphetamine from stealing ammonia from the local farmers tanks (GloTell, 2004).

In addition to government and community initiatives, some researchers have also developed plans to combat methamphetamine use and production. Hall and Broderick (1991) describe four sectors of the community and how each could help in the battle against methamphetamine. They note that since private sector coalitions have an extensive group of members, they could organize and promote public policy. Addiction treatment and mental health professionals could work together to provide community treatment centers and the different sectors of the criminal justice community could work together to promote cooperation between the local, state, and federal levels. In addition, a committee of members from the healthcare, criminal justice, and other sections of the community could collect and analyze data while being an overall communication link between the sectors. Between these four groups, Hall and Broderick (1991) hope to accomplish the following things:

1. Conduct continuing surveillance, especially regarding precursor chemicals. The earliest detection stems from hotlines, counselors, and school personnel.
2. Plan and implement prevention programs.
3. Develop intervention strategies, private counseling, and self help groups to educate users of the dangers of methamphetamine
4. Develop effective addiction treatment.
5. Enforce legal sanctions.

In addition to communities, government, and research response, media attention has also been focused on methamphetamine. On May 13, 2005 an episode of the *Oprah Winfrey Show* helped to arouse awareness of methamphetamine. It featured interventions with two female methamphetamine addicts, one, a normal looking teenager, the other, a suburban mom who lost custody of her daughter due to her methamphetamine use. The show also aired pictures of the brain, a normal one versus a methamphetamine ridden one. The brain affected by methamphetamine had black

spots all over it and the speaker, addiction specialist and author Debra Jay, said that methamphetamine, “literally puts holes in your brain.” Methamphetamine earned its first major magazine cover in August 2005 when it graced the cover of *Newsweek* with the headline, “The Meth Epidemic: Inside America’s New Drug Crisis.” Inside, the story, “America’s Most Dangerous Drug,” told disturbing tales of methamphetamine users and how they just may be your next door neighbor (Jefferson, 2005). The article also showed pictures of people who have been burned badly by methamphetamine lab explosions (Campo-Flores, 2005) and before and after photographs of methamphetamine users. These photos highlighted premature aging, lack of dental hygiene, and skin sores (Jefferson, 2005). In addition, methamphetamine labs have been portrayed as dangerous on popular primetime television shows such as *CSI: Crime Scene Investigation*, *Numb3rs*, and *Crossing Jordan*.

### 3.4 Legislation and Law Enforcement

There have been numerous pieces of legislation proposed in the United States Congress regarding methamphetamine use, sale, and production and many of these laws are in conjunction with, or similar to, the acts regarding ecstasy. While this cannot be a comprehensive list of every piece, this section will highlight the main parts. These pieces of legislation are also summarized in Table 3. In 1970, the Controlled Substances Act limited access to methamphetamine and street sales began to be less than 10% pure (Burton, 1991). Methamphetamine was placed on Schedule

II in 1971 as part of the Controlled Substances Act (See Table 1) (Pennell, et al., 1999). A Schedule II drug is highly addictive and can lead to severe physiological problems, but it does have some accepted medical use (Joseph, 2005).

In 1996 the Comprehensive Methamphetamine Control Act was passed. It tightened the reigns on the mail order industry and chemical supply companies by increasing punishment for possession, trafficking, and manufacture of precursor chemicals needed in methamphetamine production. In addition, this act gave the government the capacity to sue persons or companies who sell lab supplies to someone who in turn uses the supplies to illegally produce a controlled substance (Pennell, et al., 1999).

Representatives from Iowa proposed several pieces of legislation in 1999 to the 106<sup>th</sup> Congress. The Comprehensive Methamphetamine Abuse Reduction Act (United States Government, 1999a) and the Rural Methamphetamine Use Response Act (United States Government, 1999b) were aimed at creating a coordinated effort and obtaining more funding to combat the use and production of methamphetamine. This shows that legislators were concerned about methamphetamine use in rural states early on. Both acts were referred to subcommittees and never passed.

The Methamphetamine Anti-Proliferation Act was passed in July of 2000. This act stiffens the sentencing guidelines for crimes involving methamphetamine and it aids in providing training for law enforcement regarding methamphetamine investigations and the handling of clandestine labs. It also lays the groundwork for controlling the circulation of precursor chemicals used in methamphetamine production (Office of National Drug Control Policy, 2003b).

As mentioned in the legislation section in the Ecstasy chapter, the CLEAN-UP Act of 2003 also includes goals oriented towards the decrease of methamphetamine use, production, and sale. In fact, the main purpose of the CLEAN-UP Act is that it,

“[a]uthorizes the Secretary of Agriculture and the Secretary of the Interior to carry out environmental cleanup and remediation programs involving specified lands that are contaminated with hazardous substances associated with illegal methamphetamine manufacture (United States Government, 2003c).”

The CLEAN-UP Act also indicates that the byproducts of manufacturing methamphetamine are hazardous and likely to cause continuing environmental harm. Because of this, the act also calls for allotment of funds for specialized training of law enforcement to deal with these chemicals and byproducts (United States Government, 2003c).

Several other methamphetamine related acts have been introduced in Congress but never passed. In 2004, the Combat Meth Act was supposed to help curb the methamphetamine epidemic but it was referred to the Subcommittee on Health in October, never to reemerge (United States Government, 2004). Other pieces of legislation introduced to the 108<sup>th</sup> Congress, which endured this same fate, were the Stop Crystal Meth Act, the Methamphetamine Remediation Act, the Methamphetamine Abuse Prevention Act, and the Rural Safety Act (GovTrack, 2005a). The Arrest Methamphetamine Act of 2005 was introduced to the 109<sup>th</sup> Congress in February. While the main goal of this act is to curb the methamphetamine epidemic by providing funding to local law enforcement agencies, it also aims to create an agreement between the United States and Canada in order to lessen the trafficking of precursor chemicals through our northern border. This bill

was referred to the Committee on the Judiciary in mid February (United States Government, 2005). Yet again several other methamphetamine bills were introduced in this session but none have made it out of committee referrals, including a proposed amendment to the Controlled Substances Act of 1970 to regulate the sale of products containing ephedrine and pseudoephedrine (GovTrack, 2005b).

Despite the lack of federal laws being passed to help reduce the use and production of methamphetamine, numerous states have taken it upon themselves to pass legislation to reduce methamphetamine use. In 2005, Maryland passed a law that requires a licensed pharmacist to supervise the sale of any product containing pseudoephedrine. In addition, the buyer must be over 18 years old, show a valid government issued photo identification card, and sign a log to ensure a person does not buy more than nine grams of pseudoephedrine in a 30-day period (Maryland State Government, 2005). Nine grams of pseudoephedrine is the equivalent of 367 30-milligram tablets, 184 60-milligram tablets or 92 120-milligram tablets (Jones, 2003). Numerous other states have similar legislation restricting the sale of pseudoephedrine and other products that may contain methamphetamine precursor chemicals. Some of these states include Washington, Oklahoma, Georgia, Mississippi, Alabama, Missouri, Montana, Texas, and Virginia (Meth Resources, 2005). Other important legislation that has been passed by various states has been regarding the cleaning up of methamphetamine laboratories. Idaho, among others, set forth a series of guidelines that define terms, set up rules, and outline responsibilities of law enforcement in order to promote more regulated cleaning of methamphetamine labs (Idaho State Government, 2005). Some states, such as South Dakota, have even

passed legislation where methamphetamine use, sale and production by a parent are considered to be child abuse (Bryan, 2005).

Seizures of clandestine labs producing methamphetamine have been increasing rapidly over the past few decades. For example, in 1981 there were 81 methamphetamine producing lab closures in the United States. However, in 1989 there was a 600% increase when 652 labs were seized. Seventy-six percent of these labs were located in California, Texas, and Oregon (Irvine and Chin, 1991). In Wyoming only 3 labs were busted in 1997, but in 1999 law enforcement efforts shut down 20 labs (Singh, 2001). In 2003 over 9,000 methamphetamine labs were shut down in the United States and when dumpsites and chemical and equipment seizures are included, 2003 saw over 16,000 site closures. Missouri had the most with over 2,700 site closures; Iowa and California came in second and third with slightly over 1,200 site closures each (El Paso Intelligence Center, 2004).

In addition to seizing labs, chemicals, and equipment, law enforcement also works towards seizing physical amounts of methamphetamine and arresting persons guilty of methamphetamine related crimes. In the fiscal year 2001 (October 2000 through September 2001), the Drug Enforcement Administration (DEA) made over 7,000 methamphetamine arrests. This represented 22% of the DEA's drug arrests for 2001 with the vast majority being white males (United States Department of Justice, Bureau of Justice Statistics, 2003). In 2004 and 2005 the DEA conducted a ten month investigation entitled *Operation Three Hour Tour* that dismantled three major drug trafficking rings which could have supplied methamphetamine to almost 23,000 users every month (United States Department of Justice, Drug Enforcement

Administration, 2005b). Other major Drug Enforcement Administration investigations that ended in large scale seizures of methamphetamine included *Operation Global Warming*, *Operation Black Ice*, and *Operation Replacements* (United States Department of Justice, Drug Enforcement Administration, 2005c).

### 3.5 Treatment Information

While the national Treatment Episode Data Set (TEDS) combines both amphetamines and methamphetamine into one category, it is noted that methamphetamine admissions account for approximately 95% of the category. These admissions, under the amphetamine/methamphetamine category, have been on the rise over the past decade. In 1992 amphetamines only represented 1.4% of treatment admissions while in 2002 the number rose to 6.6% (Substance Abuse and Mental Health Services Administration, Office of Applied Studies, 1992-2002). The geographical distribution of treatment admissions for amphetamines is also skewed. In 1992 the national average for amphetamine treatment admissions was 10 persons per 100,000 population aged 12 and older. At this time nine states exceed the national average with the highest being Oregon who had 72.4 amphetamine admissions per 100,000. The national average in 2002 was 52 admissions per 100,000 with 19 states exceeding the average. Twelve of these states had at least double the average with Oregon coming in first place again with 323.6 amphetamine admissions per 100,000 persons aged 12 or older. In addition, the method in which amphetamines are taken has changed for those entering treatment. In 1992, the most popular modes of

ingestion were inhalation and injection (a close second) while in 2002 smoking is by far the most popular method with injection coming in a distant second (Substance Abuse and Mental Health Services Administration, Office of Applied Studies, 2004).

Treatment for methamphetamine use can be difficult. Overall, methamphetamine users have a higher rate of overall drug use than non-methamphetamine users (Pennell, et al., 1999) and they tend to use methamphetamine for a longer period of time than they do other drugs (Travis, et al., 2000). The vast majority of rural areas do not have substance abuse treatment centers and when they do they are usually under-funded and/or the staff lacks skill regarding treatment for methamphetamine use. Moreover, health care centers may lack knowledge needed to diagnose methamphetamine addiction properly in order to obtain treatment for those who need it (Travis, et al., 2000).

Methamphetamine users are usually treated via outpatient treatment because the dropout rate tends to be lower than in inpatient facilities. The average length of the treatment is 150 days with 24% of those enrolled leaving after one month, 33% leaving after three months, and 44% staying more than three months (Pennell, et al., 1999). Research has shown that for the average patient, marked improvement is seen after three months in treatment (National Institute on Drug Abuse, 1999b). Currently, there are no medications available to treat methamphetamine addiction, but there are some cognitive-behavioral interventions which are used to change a patient's behavior and increase their coping skills. This type of treatment has been found to be effective (National Institute on Drug Abuse, 1998; National Office of Drug Control Policy, 2003b) and it is based on treatment methods used for cocaine use

(Cretzmeyer, et al., 2003). In addition, antidepressant drugs are available to help treat depressive symptoms from withdrawal (National Office of Drug Control Policy, 2003b). The treatment of the psychological side effects of use is vital in successful methamphetamine treatment (Travis, et al., 2000).

The Matrix Model was developed to provide a framework for treating stimulant addicts in an outpatient setting. It combines several treatment approaches during a sixteen week period including cognitive behavioral therapy, family and addict education, urine and breath testing, social support groups, counseling and positive reinforcement for behavior change, and treatment compliance (National Institute on Drug Abuse, 1999b; Obert, et al., 2000). The Methamphetamine Treatment Project, funded by the Center for Substance Abuse Treatment (CSAT), compares the Matrix Model to other forms of outpatient treatment for methamphetamine addicts in a multi-site project in California, Montana, and Hawaii (Huber, et al., 2000). Patients who were treated under the Matrix Model were 38% more likely to stay in treatment, 27% more likely to complete treatment, and 31% more likely to have negative urine test results for methamphetamine than patients who attended a routine outpatient program (Rawson, et al., 2004).

Other treatment related endeavors, such as the Iowa Case Management Project, have shown micro-managing patients by visiting them in their homes, offering transportation, and providing controlled emergency funds can be a successful supplement to outpatient treatment by lessening depression and increasing chances of employment (Cretzmeyer, et al., 2003). Other institutes, such as the Walden House in San Francisco, offer educational and vocational training as part of the treatment

process (Walden House, 2004). Voucher programs where the patient can earn coupons to exchange for money or other items conditional on program compliance have also been found to be effective (Hunt, et al., 2005). In addition, support groups are an excellent treatment supplement. Moms Off Meth (MOM) is a support group specific to mothers who are trying to get over their methamphetamine addiction and rebuild their lives. The first group was started in Iowa in 1999 (Crary, 2005). Crystal Meth Anonymous (CMA) is a Twelve-Step program based on the principles set forth in Alcoholics Anonymous. All members are people who have had major problems with methamphetamine (Crystal Meth Anonymous, 2005). Narcotics Anonymous (NA) is also an available choice for those seeking support from other drug addicts in general. It was founded in the 1950s in Los Angeles (Narcotics Anonymous, 2005).

While treatment for methamphetamine may be difficult, statistics reporting its success have been noted. Tennessee's Bureau of Alcohol and Drug Abuse reported in 2003 that 65% of people who went through treatment for methamphetamine remained abstinent after six months. Iowa's Division of Health Promotion, Prevention, and Addictive Disorders noted that in 2003, 71.2% of people in treatment for methamphetamine use were abstinent after six months following treatment, and 75.4% continued to abstinent after a year. Additionally, the Texas Division of Mental Health and Substance Abuse released information that 88% of patients who were in methamphetamine treatment between 2001 and 2004 reported abstinence 60 days after the treatment's conclusion (Gallant, 2005).

## Chapter 4: Comparative Analysis of the Ecstasy and Methamphetamine Epidemics

Having discussed the general properties of ecstasy and methamphetamine, the characteristics of the epidemic nature of their use patterns, and the cultural and governmental responses, this chapter will consist of a comparative analysis of the two epidemics. It is puzzling how ecstasy use started to rise drastically in the mid 1990s before peaking in 2001, and then decline, while, methamphetamine use has been somewhat more stable with a rise occurring in the past few years (See Figures 2 and 3). However, while much of the ecstasy use was concentrated in cities and suburbs, methamphetamine is found mostly in rural areas. Its use originated in the western United States and it has progressively moved eastward over the past 20 years (see section 3.2). This chapter will first discuss the salient similarities and differences between the two epidemics, followed by a discussion of how this knowledge can help to improve the response to future drug epidemics.

### 4.1 Comparison

Ecstasy is a methamphetamine derivative (Kalant, 2001), and both are considered to be “club drugs” (Maxwell and Spence, 2005), so in many ways the two drugs are similar. While both drugs were synthesized in the early 1900s, only methamphetamine was used for medical purposes (see section 3.1) and whereas abuse

of methamphetamine started almost immediately (Miller and Kozel, 1991) ecstasy did not emerge into the “recreational drug scene” until the early 1980s (Peroutka, 1987). Users of both drugs are able to avoid the hazards and stigma associated with injection since ecstasy is usually taken orally (Coalition for a Drug Free Hawaii, 2005) and methamphetamine is widely smoked (Cook, 1991); however methamphetamine injection is common in some areas of the United States (Community Epidemiology Work Group, 2003). Both drugs can be manufactured in small, mobile spaces without much chemistry training (Taylor, 1994; National Institute on Drug Abuse, 2002), but clandestine labs are most often associated with methamphetamine manufacture and are more widespread (Scott, 2002).

Because users of both drugs are likely to have a history of other drug use and use other drugs concurrently, it is difficult to determine the specific acute effects of ecstasy and methamphetamine (National Institute on Drug Abuse, 1998; 2001). Moreover, because both drugs can be adulterated during the manufacturing and distribution process, acute effects may vary widely (Irvine, 2001; Pennell, et al., 1999). However, many of the long term effects of ecstasy and methamphetamine are analogous. Both ecstasy and methamphetamine are considered to be sympathomimetic drugs (Kolecki, 2004) so they affect the brain in similar ways. Both drugs are neurotoxic to brain cells in that irreversible damage to the dopamine and serotonin neurons in the brain can occur (Seiden, 1991). Other long term effects of these two drugs include depression, paranoia, anxiety, sleeping problems, and memory loss (Mathias and Zickler, 2001; Herz, 2000).

A particularly important difference between ecstasy and methamphetamine is their dependence liability. While methamphetamine is an extremely addictive stimulant (National Institute on Drug Abuse, 2002), the probability of becoming addicted to ecstasy appears to be very low (von Sydow, et al., 2002). As discussed in section 2.1, with repeated use, ecstasy users do not report sustained feelings of euphoria. Rather, sensitization to the adverse effects of ecstasy often strengthen (McElrath and McEvoy, 2002), leading some users to decrease their use of ecstasy over time. Methamphetamine users, on the other hand, experience binging and tweaking cycles which promote continual extended use with severe withdrawal symptoms when the cycle ends (Ells, et al., 2002). This in turn may promote even more use.

Both ecstasy and methamphetamine have been used by approximately 5% of the United States population, aged 12 or older, once in their lifetime (National Survey on Drug Use and Health, 2003). However, the demographics of the users for each drug differ. Ecstasy users tend to be middle to upper class (Office of National Drug Control Policy, 2002), white (Mathias, 2001), college students (National Survey on Drug Use and Health, 2002), and they are equally split between genders (Office of National Drug Control Policy, 2002). In comparison, methamphetamine users are usually male blue collar workers between the ages of 18 and 50 (Substance Abuse and Mental Health Services Administration, Office of Applied Studies, 2005b). However, there is also a strong methamphetamine community within the gay and bisexual male culture (Hunt, et al., 2005).

Responses to the ecstasy and methamphetamine epidemics have also been quite different from each other. In the late 1990s and the beginning of the 21<sup>st</sup> century, a barrage of prevention messages were released to reduce ecstasy use (see section 2.3) but the release of messages regarding the dangers of methamphetamine did not develop as quickly (see section 3.3). Prevention initiatives regarding ecstasy were quickly disseminated, specifically targeted, multi-faceted, and large in number while methamphetamine initiatives have been slower to emerge and fewer in number. Many of the initiatives aimed at reducing methamphetamine use are community-based and, without support from federal agencies, they are unable to spread to wider areas to be more effective. It may be possible, however, that the methamphetamine epidemic was largely ignored for many years due to use being concentrated in rural America. Many of the national drug monitoring programs measure drug use in densely populated urban areas and therefore cannot estimate drug problems in rural areas as well as might be necessary when a drug like methamphetamine emerges into the drug scene. In addition, the government may have felt that since big cities in the Northeast were not being affected by methamphetamine, it was not truly a problem and funding could be used elsewhere. However, rural areas comprise a large part of this country and they need to be exposed to drug prevention messages too. It is still possible to curb this epidemic, but action must be taken now.

Both drugs have had much attention in legislation. During the past several Congressional sessions, numerous acts and amendments regarding ecstasy and methamphetamine have been proposed and passed (see sections 2.4 and 3.4).

The most similar legislation regarding the reduction ecstasy and methamphetamine are the pieces which regulate precursor chemicals needed to manufacture both drugs and the ones which tighten the borders to reduce importation of each drug.

Lastly, treatment admissions for methamphetamine use have been increasing (Substance Abuse and Mental Health Services Administration, Office of Applied Studies, 1992-200) while admissions for ecstasy use are nil (Office of National Drug Control Policy, 2002). As mentioned in section 3.5, treatment options for methamphetamine use are usually cognitive-behavioral interventions, but therapy, counseling, support groups, and education may also be included. Ecstasy use has no specific treatment options (National Institute on Drug Abuse, 2004a), but long-term psychological effects of both drugs, such as depression and anxiety, can be treated pharmacologically (National Institute on Drug Abuse, 2004a; National Office of Drug Control Policy, 2003b).

#### 4.2 Discussion

As mentioned previously, ecstasy use increased rapidly in the late 1990s before reaching its summit in 2001. One can argue that the barrage of prevention messages, legislation, and law enforcement, coupled with the low dependence liability of ecstasy are responsible for the decline of ecstasy use.<sup>8</sup> This section will discuss possible implications and lessons learned from this epidemic and conclude

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<sup>8</sup> While ecstasy's low level of dependence liability is helpful in restricting some repeat users, there are still many people who use ecstasy repeatedly.

with a recommendation of what should be done for the methamphetamine and future drug epidemics.

Millions of dollars are spent on prevention messages highlighting the dangers of drugs, but are they effective? Throughout the research done for this thesis dozens of different ecstasy related radio, television, and print advertisements from the Partnership for a Drug Free America (PDFA) were found but unfortunately, no tracking device is in place to estimate the number of messages distributed, or their impact. The PDFA had no estimate of the number of people who were exposed to these advertisements or the amount of actual airtime given. They claimed it is a difficult task because airtime and print space is both bought and donated (with many instances of “match time” where the station donates the same amount of time the organization buys), and all they could release was a conservative ballpark estimate showing that over \$80 million was spent on ecstasy related advertisements between 2002 and 2004 (Lilliston, 2005). If a system were to be put in place that measured the amount of airtime and print space, the money spent and the cost of the time a space donated, and the number of people who are exposed to each advertisement (number of viewers, listeners, readers, subscribers, etc.), there would be a foundation for researching the effectiveness of the ecstasy-related ads. Therefore, an implication of this research would be that a comprehensive system should be developed for monitoring media prevention messages and their impact, cost, and coverage.

Legislative actions related to curbing a drug epidemic are important to increase awareness of the problem. Whether or not a particular piece of proposed legislation is passed, the process highlights the need for a response to the drug

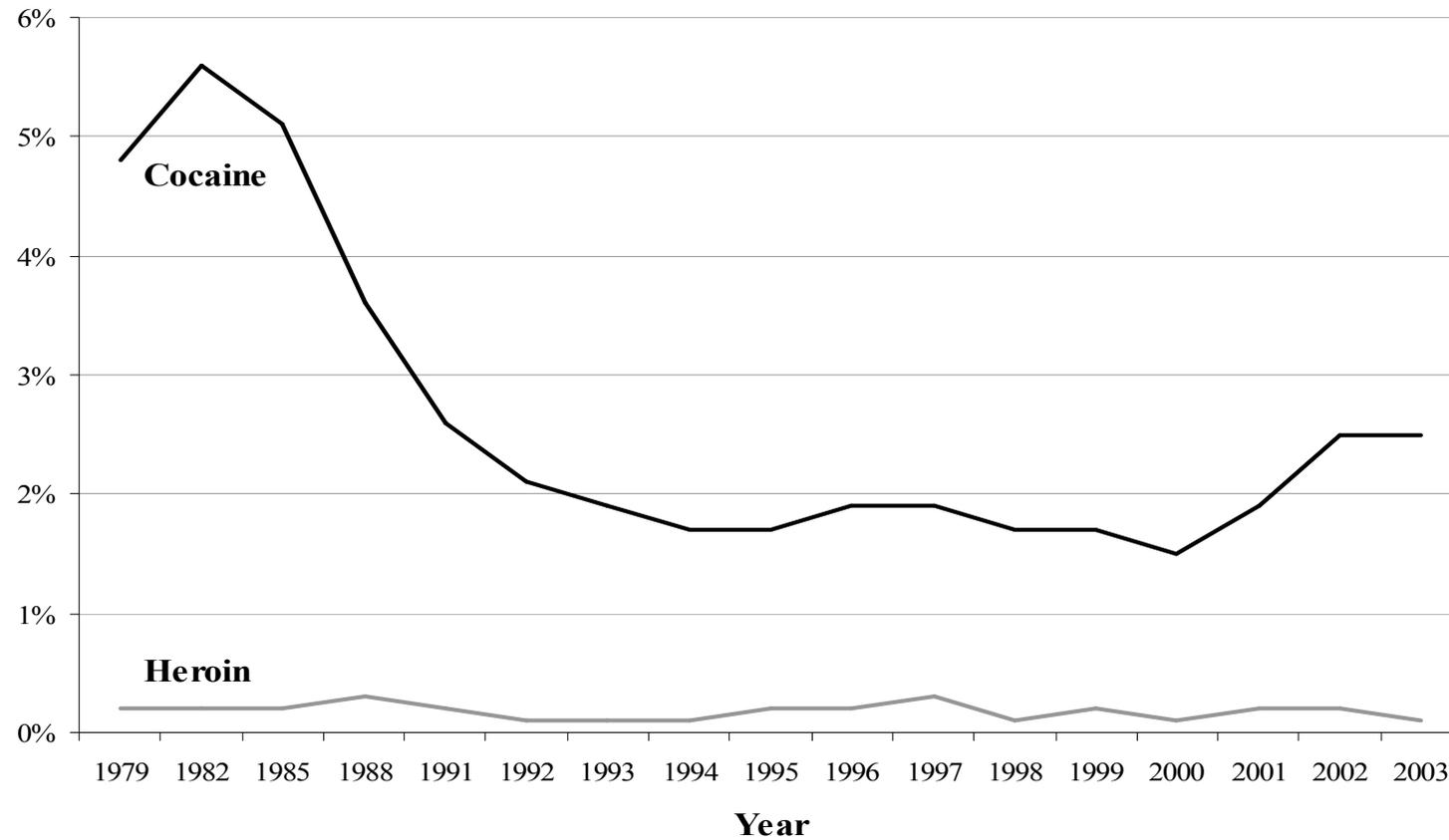
problem by lawmakers. Bills that eventually are passed act as a signal to the community that the problem has reached a critical point that requires action. Media attention regarding a potential law also increases awareness of the problem.

Law enforcement goes hand in hand with legislation and policy. Without it laws would only be written statements, not ways of life. Law enforcement agencies from the federal level all the way down to small town departments have a pertinent position in the fight against drugs. They can form initiatives to aid in increasing laboratory raids and seizures, design operations to capture key players, and equip agents with the latest information and terminology used in the drug world. However, the first step that each agency can take is to keep an open eye and mind and enforce the laws when crimes occur. Even the smallest prevention initiatives can help, such as publicizing laws and visibly enforcing them (Johannessen, et al., 2001). For example, as mentioned in section 3.4, many states now require that products with pseudoephedrine be kept behind the pharmacist counter and paperwork must be filled out upon purchase. Not only may this deter methamphetamine cooks from buying these products, but it also raises awareness about methamphetamine and enforces that production of it is illegal.

In conclusion, it seems that the early, large scale, multi-faceted but targeted approach taken by government in developing prevention initiatives for reducing the ecstasy epidemic may be the most helpful approach in both the methamphetamine and future drug epidemics. This is in agreement with Marcia Chaiken's (1993) ideals for limiting a drug epidemic; discover it early, be proactive, and multiple agencies need to work together to release prevention initiatives quickly. While other things, such as

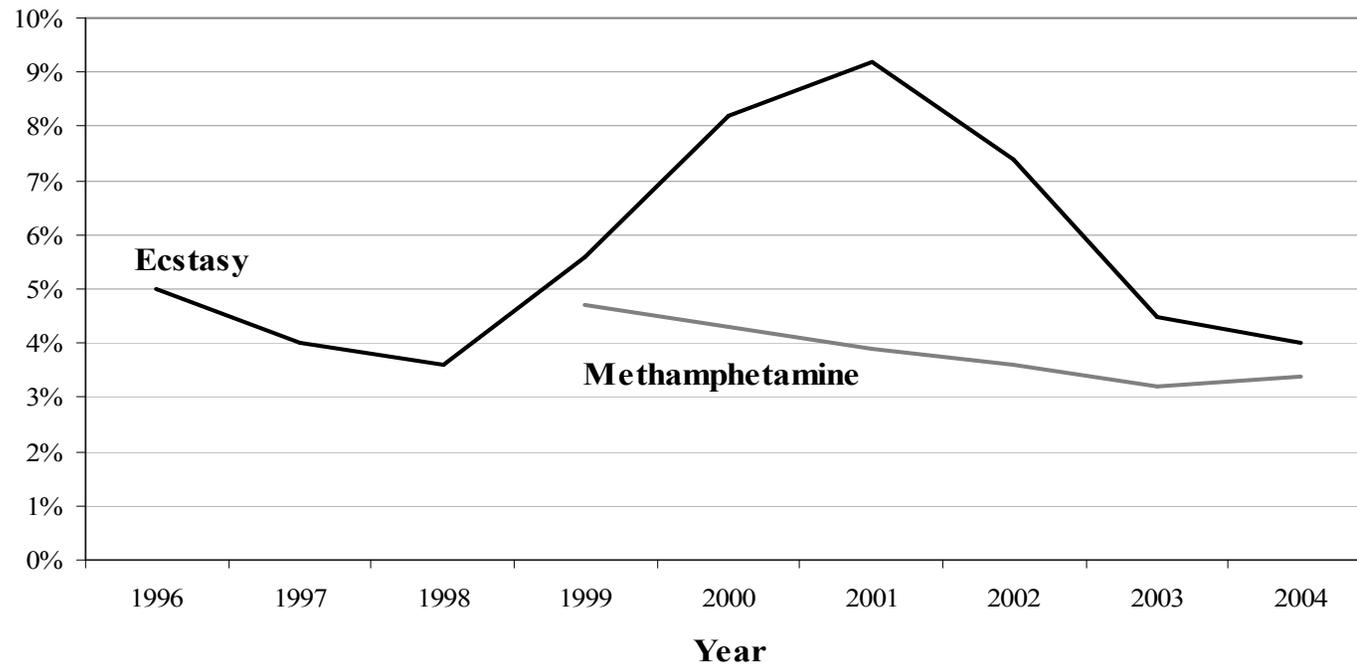
legislation and the dependence liability of ecstasy, contribute to the decrease in use it seems likely that prevention messages and media attention may have been the most important. However, since minimal tracking is done regarding the penetration of the ecstasy prevention messages, we cannot determine precisely the degree of their impact and it may be more difficult to target messages towards methamphetamine users since they tend to be older and no longer in school. A retrospective study to evaluate what happened with the ecstasy messages could be interesting and future research is necessary to determine the reach of the messages, the depth in which they penetrate, and the reduction in drug use associated with them.

Figure 1. Trends in Percentage of Respondents Aged 12 or Older Reporting Cocaine or Heroin Use in the Past Year: 1979-2003<sup>9</sup>



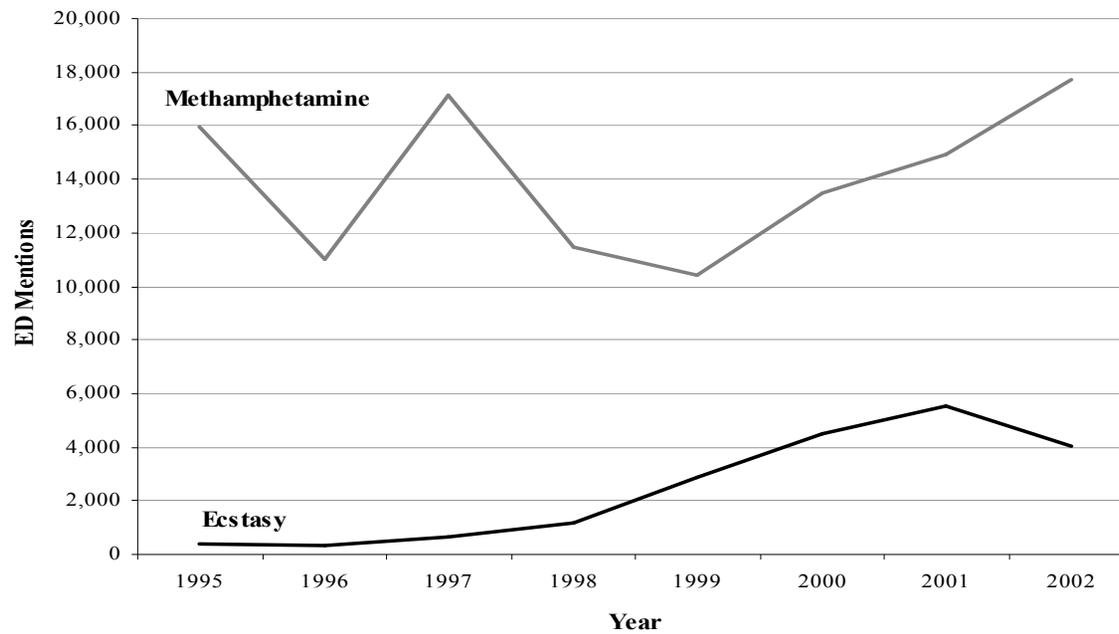
<sup>9</sup> National Survey on Drug Use and Health. (1979-2003). *Illicit Drug Use in Lifetime, Past Year, and Past Month among Persons Aged 12 or older: Percentages*. Retrieved December 20, 2004 from <http://oas.samhsa.gov/nhsda.htm#NHSDAinfo>

Figure 2. Trends in Annual Prevalence of Use of Ecstasy and Methamphetamine for Twelfth Graders<sup>10</sup>



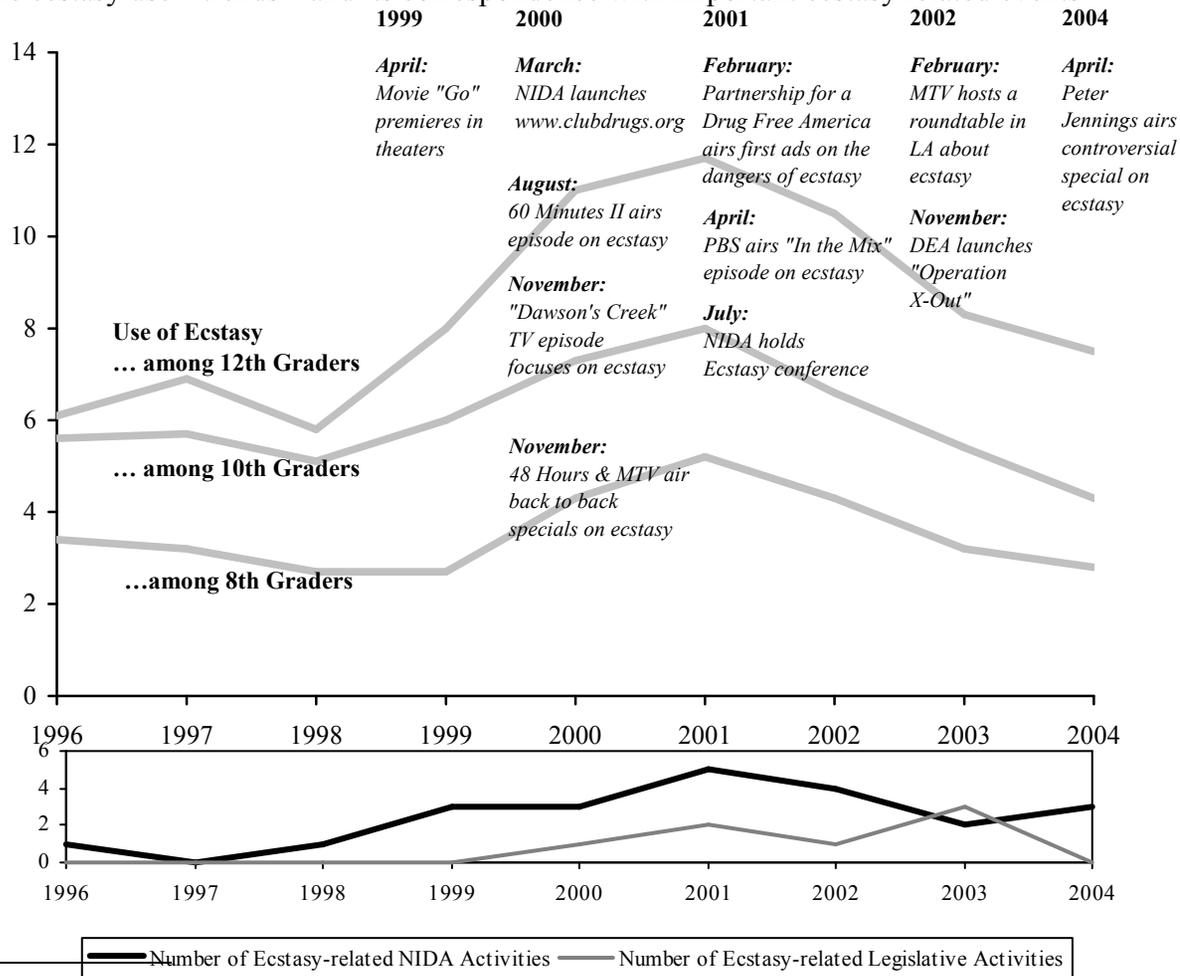
<sup>10</sup> Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2004). *Overall teen drug use continues gradual decline; but use of inhalants rises*. Retrieved April 14, 2005 from [http://www.monitoringthefuture.org/pressreleases/04drugpr\\_complete.pdf](http://www.monitoringthefuture.org/pressreleases/04drugpr_complete.pdf)

Figure 3. Emergency Department Mentions for Ecstasy and Methamphetamine, Total ED Drug Episodes and Mentions, & Total ED Visits: Estimates for the Coterminous United States by Year<sup>11</sup>



<sup>11</sup> Drug Abuse Warning Network. (2003). *Emergency Department Trends From DAWN: Final Estimates 1995 – 2002*. Retrieved December 22, 2004 from [http://dawninfo.samhsa.gov/old\\_dawn/pubs\\_94\\_02/edpubs/2002final/](http://dawninfo.samhsa.gov/old_dawn/pubs_94_02/edpubs/2002final/)

Figure 4. Lifetime ecstasy use<sup>12</sup> trends<sup>13</sup> and its correspondence with important ecstasy related events



<sup>12</sup> Lifetime use is defined as using ecstasy at least once.

<sup>13</sup> Johnston LD, O'Malley PM, Bachman JG, Schulenberg JE. Overall teen drug use continues gradual decline; but use of inhalants rises. Monitoring the Future Website. 2004. Available at: [http://www.monitoringthefuture.org/pressreleases/04drugpr\\_complete.pdf](http://www.monitoringthefuture.org/pressreleases/04drugpr_complete.pdf). Accessed January 11, 2005.

Table 1. Chart of Drug Schedules for the United States<sup>14</sup>

Schedule	Abuse Potential	Substance Examples	Medical Use
I	Highest	Heroin, LSD, Marijuana, Hashish, MDMA, other designer drugs, Methaqualone	No accepted use; some are legal for limited research use only
II	High	Morphine, PCP, Codeine, Cocaine, Methadone, Demerol, Benzedrine, Dexedrine, Methamphetamine	Accepted use with restrictions
III	Medium	Codeine with Aspirin or Tylenol, some Amphetamines, Anabolic Steroids, Hydrocodone	Accepted Use
IV	Low	Darvon, Talwin, Phenobarbital, Equanil, Miltown, Librium, Diazepam, Xanax, Valium	Accepted Use
V	Lowest	Over-the-counter or prescription compounds with Codeine, Lomotil, Robitussin A-C	Accepted Use

<sup>14</sup> Joseph, DE. (2005) Drugs of Abuse. United States Department of Justice, Drug Enforcement Administration. Retrieved August 15, 2005 from <http://www.usdoj.gov/dea/pubs/abuse/doa-p.pdf>

Table 2. Ecstasy Legislation

<b>Act</b>	<b>Purpose</b>	<b>When Passed</b>
<i>Club Drug/Ecstasy Anti-Proliferation Act</i>	Fight importation, sale, and use of ecstasy within the U.S.	September 2000
<i>Harsher sentencing guidelines for crime involving MDMA</i>	Incarceration time for the sale of 800 pills increased from 15 to 60 months and for 8,000 pills it rose from 41 to 120 months	May 2001
<i>Ecstasy Prevention Act</i>	Restricted rave clubs, created a task force, increased law enforcement, included MDMA in workplace drug testing, and ordered research be done on the health effects of MDMA use	December 2001
<i>Reducing Americans' Vulnerability to Ecstasy Act (RAVE Act)</i>	Allows prosecution of business owners, property owners and managers for ignoring drug activity on their property during a venue which promotes electronic music and dance (expansion of the "Crack House" statute)	Introduced June 2002 <sup>15</sup>
<i>Clean, Learn, Educate, Abolish, Neutralize, and Undermine Production of Methamphetamines Act (CLEAN-UP Act)</i>	To tighten legislation to prosecute promoters of raves because they reasonably ought to know that drug activity will be taking place at their event	Introduced February 2003 <sup>16</sup>
<i>Illicit Drug Anti-Proliferation Act</i>	The RAVE Act reincarnated, it made it possible to prosecute business owners and managers for not trying to prevent drug activity on their property during raves	April 2003
<i>Ecstasy Awareness Act</i>	Lays out guidelines for punishment for those who profit from raves; maximum penalty for an individual would be \$500,000 fine or 20 years in prison; for an organization the fine cannot exceed \$2,000,000	Introduced July 2003 <sup>17</sup>

<sup>15</sup> Was not passed by the time of adjournment of the 107<sup>th</sup> Congress

<sup>16</sup> March 2003: Referred to Subcommittee of Education Reform

<sup>17</sup> September 4, 2003: Referred to the Subcommittee on Crime, Terrorism, and Homeland Security

Table 3. Methamphetamine Legislation

<b>Act</b>	<b>Purpose</b>	<b>When Passed</b>
<i>Comprehensive Methamphetamine Control Act</i>	Increase punishment for possession, trafficking, and manufacture of precursor chemicals needed in methamphetamine manufacture	October 1996
<i>Comprehensive Methamphetamine Abuse Reduction Act/Rural Methamphetamine Use Response Act</i>	To create a coordinated effort to combat the use and production of methamphetamine and to obtain more funding for rural areas to aid in reducing methamphetamine presence	Introduced in March <sup>18</sup> and July <sup>19</sup> 1999
<i>Methamphetamine Anti-Proliferation Act</i>	Stiffen penalties for crimes involving methamphetamine and aids in providing clandestine lab training for law enforcement	July 2000
<i>Clean, Learn, Educate, Abolish, Neutralize, and Undermine Production of Methamphetamines Act (CLEAN-UP Act)</i>	Authorize the Secretary of Agriculture and the Secretary of the Interior to use environmental cleanup programs on land areas which are contaminated with substances associated with methamphetamine manufacture	Introduced February 2003 <sup>20</sup>
<i>Arrest Methamphetamine Act</i>	Provide funding for local law enforcement to combat methamphetamine, create an agreement between the United States and Canada to lessen trafficking of precursor chemicals across the northern border	Introduced February 2005 <sup>21</sup>
<i>Amendment to the Controlled Substances Act of 1970</i>	Regulate the sale of products containing ephedrine and pseudoephedrine	Introduced March 2005 <sup>22</sup>

<sup>18</sup> March 1999: Referred to Subcommittee on Crime

<sup>19</sup> August 1999: Referred to Subcommittee on Finance and Hazardous Materials

<sup>20</sup> March 2003: Referred to Subcommittee of Education Reform

<sup>21</sup> February 2005: Referred to the Committee of the Judiciary

<sup>22</sup> April 2005: Referred to the Subcommittee on Crime, Terrorism, and Homeland Security

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