

Review

An evolving problem: Methamphetamine production and trafficking in the United States

Rashi K. Shukla*, Jordan L. Crump, Emelia S. Chrisco

University of Central Oklahoma, School of Criminal Justice, 100 N. University Drive, Edmond, OK 73034, USA

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ABSTRACT

Background: Methamphetamine is a serious illicit drug problem in the United States and globally. For decades, methamphetamine has been supplied to the illicit market through local clandestine manufacturing and trafficking. In the early stages, illicit methamphetamine was produced and trafficked by motorcycle gangs and Mexican criminal groups. Over time, local clandestine manufacturing increasingly contributed to the illicit supply and broader methamphetamine problem. This review examines the evolution of the illicit methamphetamine supply in the U.S. **Methods:** A review of the literature on methamphetamine production and trafficking was conducted. Information was obtained from numerous sources including governmental reports, books and academic articles. **Results:** Attempts to control the supply of methamphetamine have only led to short term disruptions in availability. Clandestine manufacturing and trafficking have undergone significant changes over the past several decades. Shifts in local production have regularly been counterbalanced by changes in production and trafficking from criminal organizations in Mexico. Transnational criminal organizations now control much of the methamphetamine supply in the U.S. and methamphetamine remains widely available. **Conclusions:** The supply of methamphetamine in the United States is dynamic. Producers and traffickers have adapted to control efforts and the problem continues. Control efforts focused on eliminating supply are limited at best.

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Introduction

Despite years of efforts to control its supply, methamphetamine continues to be widely available in the United States. This is the result of continued domestic production as well as increases in imported methamphetamine. In recent years, methamphetamine prices have declined while purity levels have increased (National Drug Intelligence Center [NDIC], 2011). This is significant because methamphetamine availability enhances the potential for upward shifts in demand for the drug. The evolution of the methamphetamine supply and use in the U.S. and globally serves as an example of the challenges of responding to illicit drug use. Drug networks, both large and small throughout the world, have managed to create a dynamic global market that adapts and responds to control efforts at various levels of government.

Methamphetamine has been called one of “the most poorly understood major drugs of abuse” (Hunt, Kuck, & Truitt, 2005, p. 1), and has become one of the most serious illicit drug problems within the U.S. (NDIC, 2009, 2011) and internationally (United Nations Office on Drugs and Crime [UNODC], 2011). Methamphetamine

is a highly addictive, synthetic central nervous system stimulant that can be ingested, snorted, smoked, and injected. It is manufactured locally in clandestine laboratories and also transported into the United States (NDIC, 2006a, 2007a, 2007b, 2011). Due to its synthetic nature, many variations of methamphetamine are produced. It is referred to by numerous street names including speed, crank, ice, meth and crystal (Drug Enforcement Agency [DEA], 2010).

It has been stated that “certain aspects of the manufacturing, trafficking, and use of the illegal drug methamphetamine (meth) have consequences and ramifications that are quite different from those of other illegal drugs” (Pennell, Ellett, Rienick, & Grimes, 1999, p. 1). Methamphetamine is synthetically manufactured with toxic chemicals that can adversely affect the brain and body. Methamphetamine can be made using products and chemicals that are easy to obtain due to their licit uses. In comparison to cocaine, methamphetamine users experience potent stimulant effects that can last for hours or days. Long term use can result in serious, negative consequences including psychosis, aggression and physical deterioration (National Institute on Drug Abuse [NIDA], 2006, 2010). In addition, the fact that it can be locally manufactured creates a number of unique problems (Hunt, 2006; Weisheit, 2008; Weisheit and Wells, 2009).

There is a need to understand how the methamphetamine supply has changed over time. This review examines the evolution

* Corresponding author. Tel.: +1 405 947 5278; fax: +1 405 974 3871.

E-mail addresses: rshukla@uco.edu (R.K. Shukla), jcrump1@uco.edu (J.L. Crump), echrisco@uco.edu (E.S. Chrisco).

of the illicit methamphetamine supply in the United States. The research aims of this review are: (1) to describe how the illicit methamphetamine market initially developed and (2) to explore how methamphetamine manufacturing and trafficking in the U.S. have changed in response to control efforts over the past several decades. Adaptations to control efforts aimed at eliminating the methamphetamine supply will be described, and the interconnections between changes in local production and trafficking will be discussed.

Methamphetamine serves as an example of the limitations of control efforts focused on supply and the dynamic nature of illicit drug markets. Manufacturers and suppliers of methamphetamine have continually adapted in response to efforts to limit production and availability. This review describes how the sources of methamphetamine in the United States have evolved in response to policies and controls at various levels over the past few decades.

Methodology

A review of the literature on methamphetamine trafficking, production, and control efforts (e.g., federal legislation) in the United States was conducted. Information was obtained from numerous sources including scholarly articles, government reports, books, and various Internet sources. To conduct this review, the topic of the U.S. methamphetamine supply was divided into the following: the history of the methamphetamine use, the evolution of the illicit supply, and recent shifts in the international supply to the U.S. The depth and breadth of information available and sources of that information varies for each of these different aspects.

Research on the history of methamphetamine involved the examination of academic articles, books, and Internet sources. Few government sources were available to document the beginning stages. Many of the available sources were authored by medical doctors and scholars dedicated to researching, recording data, and theorizing about early American drug issues. Research was conducted on the following subtopics: the beginning stages of use and abuse of amphetamines in the U.S., shifts in legal classification and the implementation of controls, and early clandestine production and trafficking.

Information on the evolution of clandestine manufacturing and trafficking was obtained primarily from U.S. governmental reports and academic sources. Government agencies such as the DEA, the NDIC, and the Office of National Drug Control Policy (ONDCP) report on illicit drugs in the U.S. Reports from these agencies provided some of the most detailed and up-to-date information on the methamphetamine supply and changes that occurred over the past few decades.

The most recent information concerning the transnational expansion of the methamphetamine supply in the U.S. is based heavily on law enforcement drug reports, congressional hearings, and reports specifically produced to inform the U.S. Congress. Additionally, academic resources on U.S.-Mexico drug relations were referenced. Current statistics on some aspects of the situation were drawn from newspaper reports and other media accounts.

There are two types of indicators associated with methamphetamine: supply (e.g., seizure data) and demand (e.g., use/treatment data). Both types of indicators are utilized to document changes in the methamphetamine market. Detailed information on production and trafficking is available from a limited type of sources, specifically government sources. Law enforcement agencies have access to data concerning methamphetamine lab seizures, methamphetamine product seizures, and trafficking and distribution networks in the United States and Mexico. Their specialized access allows them to report on these indicators. The main limitations of governmental sources include

the potential for bias, reporting errors, and the flaws of official records. Given that certain government agencies are charged with tracking illicit drug indicators, these sources provide some of the most detailed information currently available. Drug monitoring systems that collect demand data focus on prevalence of use, treatment admissions, and drug-related emergency room visits (see Maxwell & Brecht, 2011). These indicators are designed to reflect demand, however, they provide context for understanding fluctuations in supply.

The emergence of illicit production and trafficking

Understanding the history and background of narcotic controls is critical to explain the current issues with the methamphetamine market. Early American narcotic controls established a trend in how the U.S. government approaches the issue of illicit drug markets. Beginning in the 1890s, the U.S. and international governments set out to manipulate the licit and illicit drug markets in various ways. These methods included limiting access and distribution of certain drugs, implementing legislation that required record-keeping by doctors and manufacturers, and criminalizing the use of certain drugs like opium, heroin, and cocaine (The National Alliance, 2011). These suppression methods occurred decades before amphetamines became a powerful fixture in the illicit drug industry.

The current methamphetamine situation began as a broad issue with amphetamines (see Rasmussen, 2008b). Since amphetamines were first synthesized in the late 1880s, they have been produced in many different forms, including methamphetamine. As early as the 1930s, amphetamines began being marketed as treatments for asthma, obesity, narcolepsy, and numerous other ailments. The first over-the-counter sales of nonprescription amphetamine inhalers were available to the public by 1932, and by 1937, amphetamine tablets were also available (Grinspoon & Bakalar, 1979).

Dangers of indiscriminate use of amphetamine sulphate, an ingredient in asthma inhalers, were reported in the medical literature of the 1930s and 1940s (Monroe & Drell, 1947). Abuse of Benzedrine inhalers increased during the 1940s as state laws made it more difficult to obtain amphetamines in pill form. It was not until 1959 that the Food and Drug Administration (FDA) mandated that inhalers containing Benzedrine and dextroamphetamine be available only through prescription while all other forms of amphetamine inhalers were left unregulated (Jackson, 1978).

Methamphetamine spread internationally during World War II (WWII). Soldiers and pilots used many varieties of amphetamines to stay awake for long periods of time. Injectable methamphetamine was used in large doses by Japanese kamikaze pilots, just prior to taking off for their terminal missions. After the war, U.S. soldiers returned home with casual attitudes concerning the prolific use of amphetamines. This changed the culture of amphetamine use and increased awareness of its different applications (Jackson, 1975).

The popularity of licit amphetamine use during WWII allowed a small illicit market to develop. This modest black market was supplied by diversion from drug manufacturing companies and prescriptions, and was growing. In 1949, 16,000 pounds of amphetamine products were sold. In 1958, over 75,000 pounds were sold, and the FDA estimated that over half of that was sold on the illicit market (Jackson, 1975). In the 1950s and 1960s, amphetamine use became more popular in the U.S. (Brecher, 1972); “fierce commercial competition helped drive amphetamine consumption higher still” (Rasmussen, 2008a, p. 976). By the late 1960s, 8–10 billion 10-mg amphetamine tablets were being manufactured in the U.S. annually, compared to 2.8 billion in the mid-1940s (Rasmussen, 2008a).

During the late 1950s and into the 1960s, the U.S. government put pressure on licit manufacturers and pharmacies to more accurately record sales (Brecher, 1972). The focused interest by the FDA motivated the pharmaceutical companies to withdraw injectable methamphetamine from the market. This left methamphetamine users without a legal supply (Miller, 1997). The demand for a supply of amphetamines was recognized by individuals in California who began to experiment with methamphetamine recipes. Clandestine laboratory operations were discovered as early as 1962 in the San Francisco Bay area (Brecher, 1972). As amphetamine users could no longer obtain supplies through prescriptions they turned to these illicit manufacturers.

In response to the abuse of a variety of barbiturates, opiates, and narcotics, the U.S. government passed the Controlled Substances Act in 1970. This classified a large selection of drugs, including methamphetamine, into five schedules which rated them on abuse and addiction levels, as well as placed restrictions on their use. This legislation classified amphetamine as a Schedule II drug (FDA, 2009), which made it illegal to possess without a prescription. Those restrictions on the licit supply gave way to higher prices within the illicit market, which allowed underground drug sales to become a profitable business.

In 1970, an estimated 9.7 million Americans used amphetamines, while 2.1 million of those individuals had abused them. During this time the FDA and the Bureau of Narcotics and Dangerous Drugs Administration (BNDDA) imposed a series of controls on the sale of amphetamines, reducing their abuse to minimal levels. With this brief lull in amphetamine use, illicit cocaine use grew (Rasmussen, 2008a), acting as a short term replacement for the high achieved by amphetamine use.

Tight controls on legal manufacturing of narcotics and the removal of amphetamines from over-the-counter sales while mandating a prescription were a few of the standard tactics used by the government in early drug control efforts in the U.S. In their efforts to curb illicit drug consumption, the government facilitated the creation of a larger black market that supplied more potent variations of illicit drugs to a broader consumer base (Brecher, 1972). When amphetamines became a controlled substance in the early 1970s, the illicit market expanded (Owen, 2007). The potential for profit coupled with consumer demands stimulated the illegal manufacturing of amphetamines.

The emerging illicit methamphetamine market had a growing consumer base and the potential for profit was attractive to the early California Outlaw Motorcycle Gangs (OMGs). Although the OMGs started out as nonviolent clubs, they evolved into law-breaking, violent gangs who played a large role in the distribution of many illicit drugs. The early participation of the California OMGs in the illicit drug trade, mainly the Hell's Angels, led to a natural introduction into the illicit manufacturing and distribution of methamphetamine (De Amicis, 2009).

In the 1980s, OMGs began to conduct drug transactions in a very business-like manner. Drug dealing was no longer just an outlaw way of life; it was a business venture to be taken seriously with adept skill and control. OMGs "have evolved over the last 50 years to become highly organized crime units with operations, in some cases, rivaling the Mafia" (State of Oregon Department of Justice, 2006, p. 17). OMGs are involved in crime and violence across the United States and globally. Estimates suggest there are over 300 OMGs operating in the U.S. (NDIC, 2005a).

The manufacturing and distribution of illicit narcotics by OMGs is an integral part of their existence. Income from drug manufacturing and sales is the primary funding for their operations (National Gang Intelligence Center [NGIC], 2009). "The Angel's by-laws clearly defines that members will distribute drugs to remain a member of the gang, and will maintain a specific quantity and quality of those specified drugs" (De Amicis, 2009, p. 13). By 2009, the Hell's

Angels controlled 90% of the methamphetamine trade in northern California (De Amicis, 2009); they also worked in conjunction with Mexican drug trafficking organizations (DTOs) to distribute Mexican methamphetamine.

Networks developed between OMGs and Mexican DTOs within the U.S. prison system. This facilitated an increase in production and distribution of methamphetamine (NGIC, 2011). As evidenced in the 2009 indictment of 28 defendants in a large-scale methamphetamine operation spanning from Modesto, California, all the way to Lubbock, Texas (U.S. Department of Justice, United States Attorney's Office, 2009), OMGs continue to play an important role in manufacturing and distributing methamphetamine. Many OMGs operate between the U.S. and Mexico, providing a perfect opportunity to partner with other drug trafficking organizations (NDIC, 2008a).

The evolution of illicit methamphetamine supply

The illicit supply of methamphetamine in the United States evolved in the decades following the classification of methamphetamine as a controlled substance. Clandestine laboratories changed along multiple dimensions including manufacturing processes, laboratory capacities, and level of organization among producers. Shifts in illicit production within the U.S. were linked to broader changes in production and trafficking in the global drug market. These adaptations have helped to make methamphetamine one of the most serious illicit drug issues today.

With the emergence of clandestine manufacturing in the U.S., the illicit supply of methamphetamine was transformed. In the early stages, methamphetamine was illicitly produced in small laboratories in the 1960s (Brecher, 1972), and later in 'superlabs', which were concentrated primarily in California (DEA, 1996; Scott & Dedel, 2006). Superlabs are highly organized laboratories, capable of producing large quantities (i.e., 10 pounds or more) of methamphetamine (Scott & Dedel, 2006).

The processes used to manufacture methamphetamine locally have changed over time. During the late 1970s and early 1980s, methamphetamine was primarily being manufactured via the P2P method (i.e., Phenyl-2-Propanone) (NDIC, 2003). The P2P manufacturing process was time-consuming and required special equipment. This method began to decline following the classification of P2P as a Schedule II controlled substance in 1980 (DEA, 1996). Two years later, ephedrine/pseudoephedrine laboratories began to emerge (Weisheit, 2008). Between 1982 and 1989, seizures of clandestine laboratories in the U.S. increased steadily from 225 to 852 (U.S. General Accounting Office, 1991). By the mid-1990s, the majority of P2P laboratories had been replaced by ephedrine/pseudoephedrine-based laboratories (DEA, 1996).

Cooks¹ who were supplying methamphetamine to West Coast motorcycle gangs began producing it using ephedrine, which they found to be much more potent (Timeline, 2011). Two primary processes began to be utilized: the red phosphorous method and the Nazi or anhydrous ammonia method (Owen, 2007). These were less time-consuming, simpler, and used precursor chemicals that were easier to obtain than P2P (DEA, 1996). While the newer production methods differed slightly from one another, both processes involved the use of chemicals and products that were legally available due to their legitimate uses.

Methamphetamine was increasingly being produced locally in smaller "mom-and-pop" laboratories (Scott & Dedel, 2006), also known as "small toxic labs" (STLs) (McBride, Terry-McElrath, Chriqui, O'Connor, & VanderWaal, 2008). This change had serious

¹ The term "cook" is a slang term commonly used to refer to clandestine methamphetamine manufacturers.

implications. While these laboratories produced smaller quantities (e.g., 1–4 ounces) of methamphetamine than superlabs (Scott & Dedel, 2006), they created numerous problems for local communities. The manufacturing process was highly volatile; the ignitable, corrosive and toxic chemicals used often resulted in toxic fumes, fires, and explosions. Environmental contamination and dangers to first responders, law enforcement, and others exposed to these laboratories became serious concerns (DEA, 1996).

Manufacturing escalated as methamphetamine use spread. From 1992 to 1996, the number of persons admitted to treatment for methamphetamine as their primary substance of abuse more than tripled, increasing from 14,400 to 42,300 (Office of Applied Studies, Substance Abuse and Mental Health Services Administration [SAMSHA], 1998). From 1997 to 2004, reports of methamphetamine use in the month prior to offense among incarcerated state offenders rose from 7% to 11%. During this time period prior methamphetamine use increased among this population in comparison to all other drugs, for which use remained stable (Mumola & Karberg, 2006). Additionally, the number of methamphetamine laboratories increased, rising from 6777 in 1999 to 8290 in 2001 (NDIC, 2003).

By 2004, methamphetamine had become “the most widely used and clandestinely produced synthetic drug in the United States” (ONDCP, 2004, p. 1). Clandestine laboratories, which had once been restricted to specific regions in the U.S., were being seized in more states. Law enforcement agencies reporting high methamphetamine availability in their areas increased to 65% by 2004 (NDIC, 2005b). While Mexican criminal groups and outlaw motorcycle gangs were still responsible for controlling much of the methamphetamine trafficked in the United States, local production in smaller laboratories was on the rise (ONDCP, 2004). According to federal reports, “low capacity labs accounted for 83.4% (7667 of 9192) of all seized labs in 2002 and 91.3% (9297 of 10,182) in 2003” (NDIC, 2005b, p. 33).

The development of local drug networks, the availability of necessary chemicals and products, and a growing demand for methamphetamine contributed to the growth in clandestine manufacturing. The emergence of the Internet further facilitated clandestine manufacturing, making it easier for manufacturers to share recipes and access necessary chemicals. An upsurge in the amount of methamphetamine that was being produced locally in mom-and-pop laboratories occurred as a result. The methamphetamine produced in smaller laboratories primarily supplied individuals and their networks of associates (Scott & Dedel, 2006). Local manufacturers could produce methamphetamine, making access cheaper and more profitable. The move to smaller labs changed the nature of manufacturing and ancillary concerns related to the methamphetamine supply.

Despite their growth, mom-and-pop laboratories only minimally contributed to the methamphetamine supply in the U.S.; smaller laboratories simply produced less manufactured product. This supply of methamphetamine existed parallel to trafficked methamphetamine manufactured elsewhere. While the manufacturers involved with producing methamphetamine in these smaller laboratories were less organized than larger scale producers and traffickers, they quickly became a major part of the illicit drug supply. The number of laboratory seizures began to dramatically increase and by 2004, federal law enforcement officials in the U.S. had seized 18,113 clandestine methamphetamine laboratories (DEA, n.d.a).

In response, numerous states and the federal government began to enact various laws designed to inhibit clandestine manufacturing (see ONDCP, 2006). Legislative efforts restricted access to precursor chemicals, controlled key ingredients, and enhanced penalties for manufacturing-related activities. In 2004, several states began enacting legislation restricting access to pseudoephedrine, the key

Table 1
Methamphetamine laboratory incidents, United States, 2004–2011.

Year	DEA
2004	18,091
2005	12,974
2006	8181
2007	6095
2008	7334
2009	10,822
2010	11,868
2011	10,287

The data were obtained from the Drug Enforcement Administration (n.d.a).
Note. Values represent number of laboratory incidents as reported by DEA.

precursor chemical being used to manufacture methamphetamine in the U.S. Federal controls were enacted in 2005. Within a period of a few years nearly every state had implemented some form of legislative restrictions on access to pseudoephedrine (ONDCP, 2006).

In the years that followed (i.e., 2005–2007), clandestine laboratory seizures decreased, at least for a period of time (see Table 1). Federal law enforcement noted a “significant disruption in the U.S. market for methamphetamine” that was “driven by increases in price and decreases in purity” (ONDCP, 2007, p. 1). During the same time period, seizures of methamphetamine declined from 2161 kg in 2005 to 1113 kg in 2007 (DEA, n.d.b) and the number of people seeking treatment for methamphetamine began to decline for the first time in years (Office of Applied Studies, SAMSHA, 2011). However, it soon became evident that the problem was changing once again. Local production of methamphetamine in the U.S. was declining; concurrently, methamphetamine was increasingly being imported into the U.S. from Mexico (ONDCP, 2007).

By 2007, “significant strategic shifts” in the distribution and production of methamphetamine were being observed (NDIC, 2006b, p. i). The decreases in domestic production that had been occurring since 2003 were being countered by increased production in Mexico. Mexican DTOs were becoming even more involved in trafficking methamphetamine into the U.S. Law enforcement reports indicated a dramatic increase in the amount of methamphetamine production in Mexico based on seizures at the U.S.–Mexico border since 2003 (NDIC, 2006b). Officials warned of the expanding role of Mexican DTOs and criminal groups in the distribution of methamphetamine (NDIC, 2006c). Mexican DTOs were “producing and distributing higher purity ice methamphetamine, supplanting local independent powder methamphetamine producers and dealers” (NDIC, 2006b, p. 1).

DTOs were getting stronger and expanding their presence in drug markets across the United States. They began to appear in smaller communities that had not traditionally been associated with these distribution networks. These changes created new challenges for local law enforcement officials because the distribution groups were “stronger, more organized, and insulated” making them more difficult to identify and disrupt than the dealers they replaced (NDIC, 2006b, p. i). Shifts in the methamphetamine supply that occurred led to a growing infiltration of DTOs throughout the U.S. By 2008, DTOs were operating in the majority of the states; only three did not have any type of DTO presence (NDIC, 2008d). While Canadian OMGs and Asian DTOs were expanding their involvement in large-scale methamphetamine production, Mexico had become the primary source for methamphetamine in U.S. drug markets (NDIC, 2007b).

By 2009, clandestine laboratory seizures in the United States were on the rise (see Table 1, provided earlier). Small networks of manufacturers and their associates began adapting to the controls on pseudoephedrine. Local manufacturers began circumventing restrictions on access to pseudoephedrine via “smurfing” (i.e., making purchases at multiple retail outlets), and trading money or

drugs for pseudoephedrine (NDIC, 2008b, 2008c). A new illicit market for pseudoephedrine emerged. The method by which methamphetamine was manufactured adapted as well. Low-yield laboratories that produced even smaller quantities of methamphetamine than mom-and-pop laboratories became popular. With these new, smaller “one pot” or “shake and bake” laboratories, very small quantities of methamphetamine could be produced in a 2 litre bottle in approximately 30 min (NDIC, 2008c). By 2009, many states were reporting that large percentages of lab seizures were the result of shake and bake operations and many of these seizures were of transportable, or mobile, labs (Saulny, 2010). While this manufacturing process was a variation of an older recipe used to make methamphetamine, these laboratories were also highly toxic and volatile. Clandestine manufacturing was reemerging.

The resurgence of methamphetamine in parts of the U.S. is evidenced by trends in both supply and demand data. In a recent historical review, Maxwell and Brecht (2011) found that states that had experienced significant methamphetamine problems in the past were beginning to experience increases in demand indicators, which had been declining from 2005 to 2008. Further, they found evidence supporting the return of P2P laboratories. “By the first quarter of 2011, 77% of the domestic and Mexican samples examined by the DEA Special Testing and Research Laboratory were produced using the P2P method” (p. 1169).

Efforts to stop clandestine production over the past several decades have included the passage of various federal laws aimed at restricting and placing controls on access to precursor chemicals. In every decade since the enactment of the 1970 Controlled Substances Act, the U.S. government has passed legislation directed at controlling the illicit drug supply in one or more ways. Acts that targeted methamphetamine included the 1988 Chemical Diversion and Trafficking Act, the Domestic Chemical Diversion Control Act of 1993 (DEA, 1996), the Comprehensive Methamphetamine Control Act of 1996, and the Combat Methamphetamine Act of 2005 (see DEA, n.d.c; Dobkin & Nicosia, 2009; Owen, 2007; Table 2).

While these laws were directed at stopping methamphetamine production by controlling chemical diversion and enhancing record keeping requirements for distributors, laboratory operators circumvented these controls in various ways. Manufacturers began making their own chemicals, experimenting with non-regulated alternatives, and obtaining controlled substances in other licit and illicit ways (DEA, 1996). Furthermore, these legislative efforts have not significantly reduced the overall quantities of methamphetamine seized in the U.S. over time. As demonstrated by Fig. 1, data on methamphetamine seizures in the U.S. have followed a general upward trend from the mid-1980s to 2010. While short term reductions can be observed, the general trend is indicative of an increase in methamphetamine seizures over time. To the extent that methamphetamine seizures serve as an indicator of the methamphetamine supply, an increase in seizures may suggest an increase in the overall supply.

Legislative controls have resulted in limited and only short-term impacts on the methamphetamine supply in the U.S. In an evaluation of the impact of enforcement efforts that occurred in mid-1995, Dobkin and Nicosia (2009) found that these efforts significantly disrupted the methamphetamine supply in California. While the disruption resulted in price increases and purity reductions, both recovered within a short period of time (i.e., 4 months and 18 months, respectively). The disruption additionally impacted methamphetamine consumption, hospital and treatment admissions, and use among arrestees. However, reductions were found to be temporary; indicators returned to “preintervention levels within eighteen months” (p. 324).

Similar findings on the limited impact of legislative controls have been illustrated in other evaluations. Cunningham and Liu found that controls targeting large scale producers resulted

in reductions in methamphetamine-related acute care hospital admissions in California, Arizona and Nevada (Cunningham & Liu, 2003), and arrests for methamphetamine in California (Cunningham & Liu, 2005). However, once again reductions were only temporary. In explaining the resurgence in hospital admissions, Cunningham and Liu (2003) hypothesized that the “resurgences were probably due in large part to producers accessing alternative supplies of precursor chemicals” (p. 1235).

Criminal adaptations to methamphetamine supply control efforts have been recognized for years. Fifteen years ago drug enforcement authorities in the U.S. noted the futility of efforts to control the illicit methamphetamine market.

“Drug law enforcement efforts against clandestine methamphetamine producers constitute a ‘cat and mouse’ game between efforts to cut off chemical supplies and efforts to obtain them from non-regulated sources. Past experience has demonstrated that methamphetamine traffickers are relentless, flexible, and creative in finding new ways to obtain chemicals by evading the network of international controls that has been established (DEA, 1996, p. vii).”

It is interesting that while this was stated even before the enactment of more recent and significant legislative controls aimed at stopping the production of methamphetamine, this statement remains true today.

The interconnections between controls on local manufacturing and broader shifts in production and trafficking are summarized by Weisheit and White (2009),

“If precursor regulation has had an unclear effect on overall levels of methamphetamine consumption, the effects of these regulations on production patterns seem clearer. It appears that various efforts to regulate methamphetamine production through restrictions on precursors have had the unintended consequence of centralizing production and enriching powerful drug trafficking organizations (p. 128).”

Based on the most recent federal drug intelligence reports, that is exactly what is occurring.

A shift in markets: Increasing international supply

Mexican DTOs have played a central role in the development of the U.S. methamphetamine market. However, their involvement in this trade has changed in both scope and intensity during the past several years. Mexican-based organizations now dominate the U.S. illicit drug market on all levels, including trafficking, supply, and wholesale distribution (NDIC, 2011).

The progression of drug trafficking organizations' activities from primarily drug-related to poly-criminal is reflected in a change in terminology used to describe them. In the most recent drug threat assessment, the term “Transnational Criminal Organization” (TCO) is used to describe Mexican drug trafficking organizations (NDIC, 2011). While this term is not new, it has only recently been adopted by the U.S. government as a descriptor for Mexican criminal groups who are involved in the illicit drug trade.²

This change in terminology first appeared in the *National Drug Threat Assessment 2011* and is likely the result of a shift in behaviors within the Mexican trafficking organizations. As early as 2003, a federal research report refers to Mexican drug trafficking organizations as transnational criminal enterprises (Federal Research

² From this point forward, the term TCO will be used to refer to DTOs.

Table 2
Summary of federal legislation related to methamphetamine precursor controls.

Legislation	Year	Purpose
Chemical Diversion and Trafficking Act (CDTA)	1988	An amendment to the Controlled Substances Act of 1970; federal control of precursor and essential chemicals used to manufacture drugs; enhanced record keeping and import/export requirements and registration.
Domestic Chemical Diversion Control Act (DCDCA)	1993	Ephedrine and pseudoephedrine tablets were classified as listed chemicals; registration requirements for supplies; increased record keeping and reporting requirements for ephedrine products.
Comprehensive Methamphetamine Control Act (CMCA)	1996	Pseudoephedrine classified as a listed chemical; enhanced penalties for trafficking in precursor chemicals and manufacturing methamphetamine.
Combat Methamphetamine Epidemic Act (CMEA)	2005	Passed as part of the USA Patriot Act Improvement and Reauthorization Act; restricted retail access to pseudoephedrine products, placed limitations on purchases and monitoring of sales, increased regulation for distributors; enhanced penalties for offenders.

Adapted from DEA (n.d.c), Owen (2007), and U.S. Department of Justice (2006).

Division, Library of Congress, 2003). Their transnational qualities have always been recognized; however, the escalation of their criminal activities has led to a more encompassing descriptor. Their illegal involvement has broadened in scope and the new term appears to encapsulate this shift. The criminal activities of Mexican trafficking organizations have changed over recent years and the violence associated with those activities has increased. They were once involved almost exclusively in drug-related offenses, but they now regularly engage in criminal activity such as kidnapping, rape, extortion, human trafficking, and murder (Beittel, 2011; Llana, 2010).

It is clear that throughout the evolution of the methamphetamine situation in the United States, Mexican criminal groups have remained a constant influence in terms of supply. In the past they played a lesser role, but this has changed in recent years. The significance of this today is that not only do these groups control the vast majority of the U.S. illicit drug supply, but they are able to mass produce quantities of methamphetamine with which manufacturers in the U.S. cannot compete (NDIC, 2011). The changing dynamics of the drug market in the past several years have resulted in Mexico's TCOs becoming the predominant suppliers of methamphetamine to the United States.

Despite very high levels of small-scale production in the U.S., clandestine labs have virtually no impact on the larger methamphetamine market. Some sources estimate that criminal groups in Mexico controlled as much as 70–90% of the U.S. methamphetamine market by the early 2000s (as cited in Brouwer et al., 2006). Between 2006 and 2010, 81% of the laboratory seizures in the United States were small-scale; however, they accounted for a relatively insignificant amount of the methamphetamine being

trafficked and distributed (NDIC, 2011). DEA reporting indicates that “there was a 180% increase of meth seized along the southwest border between 2007 and 2009” (Research and Policy Analysis Group of Carnevale Associates, LLC, 2011). The methamphetamine that comes from Mexico is cheap and it is pure – the lowest price and the highest quality seen in recent years. Mexican producers are able to offer a high-quality product that is competitive with the local market.

Legislation that had been implemented in the mid-2000s was designed to reduce domestic methamphetamine manufacturing. As the crackdown on precursor chemicals reduced the number of local manufacturing operations, Mexican trafficking organizations began to fill the void that had been created in the domestic market. Production and distribution by Mexican trafficking groups continued to expand in an effort to meet the demand that had previously been met by local manufacturing operations (NDIC, 2006b).

As a result of decreased local production, Mexican TCOs were able to establish dominance in the U.S. market. The initial void in the methamphetamine market provided an opening for trafficking organizations to establish control; however, the resources of the various organizations allowed them to maintain that control after local production began to reemerge.

The Mexican-based organizations' preeminence derives from a competitive advantage based on several factors, including access to and control of smuggling routes across the U.S. Southwest Border and the capacity to produce (or obtain), transport, and distribute nearly every major illicit drug of abuse in the United States (NDIC, 2011, p. 7).

Mexican criminal groups' access to existing cocaine and cannabis distribution chains and market outlets in the U.S., as well

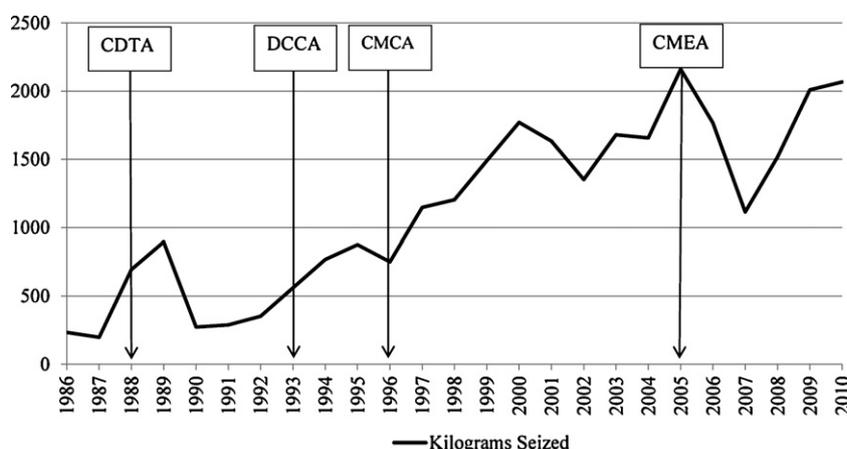


Fig. 1. Federal legislation by year of enactment and DEA methamphetamine seizures, 1986–2010.

Adapted from the DEA (n.d.b, n.d.c) and Owen (2007).

as their production capabilities both in the U.S. and Mexico, provide them with opportunities that other criminal organizations may not have. Methamphetamine is also produced in Canada and Southeast Asia, but Mexico is the only country that is able to distribute it on a national scale (NDIC, 2005b, 2007b, 2011).

Mexican TCO's domination of the drug market is not limited to the methamphetamine drug trade. "There are no current estimates for the amount of drugs available in U.S. drug markets, nor are there sufficient data to more accurately measure quantities of specific drugs nationally" (NDIC, 2010, p. 27). However, it is known that the various drug cartels are involved in the manufacture or sale of several illicit drugs including cannabis, cocaine, heroin, and MDMA. Each of these drugs is widely available in the U.S. (NDIC, 2011).

Legislation that was developed by the government to control the methamphetamine supply helped to shape the way the drug market responded in order to meet the demand. When precursor chemicals became difficult to obtain domestically, manufacturers and distributors had to find alternative sources for the chemicals needed to produce the drugs or suppliers of the finished product. Mexican criminal groups began to see an opportunity to supplement a faltering supply in the U.S. after the implementation of pseudoephedrine control laws. This opportunity had the potential to yield extraordinary profits and the TCOs took immediate advantage of the opening in the market (NDIC, 2006a). Initially, Mexico lacked the precursor controls that were already in effect in the United States and TCOs were able to react effectively to the methamphetamine shortage. The U.S. was unable to meet the broad-scale domestic methamphetamine demand and Mexico became the primary supplier (NDIC, 2006a).

Mexican drug traffickers' capabilities to adapt to control efforts have been recognized for years. At the 1997 National Methamphetamine Conference, a Senior Research Specialist in the NDIC stated that "Mexican organizations have managed to remain steps ahead of law enforcement in developing and maintaining sources of supply for both ephedrine and pseudoephedrine. They have answered every attempt at regulation with an almost immediate shift to an alternate source" (Weaver, 1997, para. 6). Based on the most recent trends, this statement remains true today. Mexican TCOs have access to precursor chemicals that are difficult to obtain in the U.S. as well as the ability to smuggle them into their country. This helps to explain why so much of the methamphetamine that is supplied to U.S. consumers is produced outside of the country. "South Asia has become one of the main regions used to obtain ephedrine and pseudoephedrine for the illicit manufacture of methamphetamine. India is one of the world's largest manufacturers of precursor chemicals and Bangladesh also has a growing chemical industry" (UNODC, 2011, p. 17–18). The ability to smuggle illegal precursor chemicals in from foreign countries offers Mexican TCOs major advantages over other countries who might potentially contribute to the U.S. methamphetamine supply.

Mexican TCOs have infiltrated the U.S. on a major scale and "are increasingly gaining control of U.S. retail level distribution through alliances with local U.S. gangs" (Beittel, 2011, p. 3). Collaborative efforts between these groups have made it possible for Mexican criminal groups to establish themselves as the primary suppliers in the U.S. and also as major players within the methamphetamine distribution infrastructure. The networking capabilities of these organizations are instrumental for the mass distribution of drugs in the United States. "Criminal gangs—that is street, prison, and outlaw motorcycle gangs—remain in control of most of the retail distribution of drugs throughout much of the United States, particularly in major and midsize cities" (NDIC, 2011, p. 11). While Mexican TCOs are the primary suppliers of the U.S. illicit drug market, it is clear that allies to these organizations are still responsible for distributing the drugs to small-scale suppliers and users.

The political conditions that currently exist in Mexico may help to shape the future of the U.S. drug trade. Since the mid-2000s, Mexico has become increasingly unstable due to the violent warring between various criminal trafficking organizations (Rios & Shirk, 2011). There are very few places in Mexico that have not been touched by the violence. The cartels have managed to create political instability in a system that is rife with corruption and the power struggles between these groups have led to a terrifying epidemic of drug violence (Molzahn, Rios, & Shirk, 2012).

In recent years, Mexico has seen "mass-casualty shoot-outs in the public square, bodies hanging from bridges, decapitated heads placed in front of public buildings, mass grave sites, and birthday party massacres" (Rios & Shirk, 2011, p. 4). The drug-related violence in Mexico has increased steadily since the current president, Felipe Calderon, was inaugurated in 2006. "Since Calderon's war on drugs began, more than 47,500 people have been killed" (Bruton, 2012, para. 10). The escalation in violence is believed by some to have occurred as a result of the government crackdown on drug organizations. The capture or killing of cartel leaders has led to warring both within and between the various TCOs. Leadership is unclear and the tactics of the organizations have changed as they battle for control of various trafficking routes (Beittel, 2011).

There is evidence that the TCOs have become involved in a variety of criminal activities that are not drug-related and it is clear that some of this activity is beginning to spill over the border into the United States (A call to action, 2011). As Mexican TCOs increase their collaboration with U.S.-based gangs, it is possible that the violence will become a larger part of the drug trade within U.S. borders. The *National Drug Threat Assessment 2011* verified that "Mexican-based TCOs were operating in more than a thousand U.S. cities during 2009 and 2010" (p. 8). They are here, they are active, and it is likely they will continue to solidify their dominance over the U.S. illicit drug market.

Mexican TCOs have established themselves as a global threat. They control the drug trade in one of the largest countries of consumers in the world and it seems unlikely that this dominance will end soon.

"The influence of Mexico on the U.S. drug trade is truly unmatched: the result of a shared border; Mexico's strategic location between drug-producing and drug-consuming countries; a long history of cross-border smuggling; and the existence of diversified, poly-drug, profit-minded DTOs (*Drug trafficking violence in Mexico, 2010, p. 2*)."

The U.S. will continue to provide a demand that must be met and Mexican TCOs will continue to find new ways of supplying that demand, even as their government battles against them to regain control of the country.

The violence in Mexico and the potential for that violence to spread to the U.S. has become increasingly worrisome. This problem has come to the attention of the U.S. Congress in the form of reports and hearings (see *A call to action, 2011*; Beittel, 2011; Cook, 2008). As this issue gains national attention, the government may soon be called upon to respond to it with countermeasures.

Discussion

The supply of methamphetamine in the United States is ever-changing. At every step, offenders adapt, markets shift, and supply continues. The lesson of history is that the methamphetamine market will continue to evolve and change in response to control efforts. Attempts to eliminate methamphetamine use through attempts to stop the illicit supply are limited at best. While such efforts may

impact the illicit supply of methamphetamine in various ways, these impacts are generally short-term and temporary.

The illicit methamphetamine market emerged following the enactment of legislative controls on amphetamines. In the earliest stages, methamphetamine was produced and trafficked by motorcycle gangs in California and Mexican criminal groups. Over time, local clandestine manufacturing became important. Methamphetamine remains widely available in the U.S. The most recent reports indicate that in 2011, methamphetamine available in U.S. markets was purer and cheaper than in recent years (NDIC, 2011). This is problematic due to the potential impact this may have on the number of persons who use to this drug. In 2012, law enforcement officials made one of the largest seizures of small laboratories in the U.S. (Pere, 2012) and a record seizure of finished methamphetamine product in Mexico (Casey, 2012).

Manufacturing underwent several shifts as offenders adapted to legislative controls. Shifts in local production were regularly counterbalanced by changes in production and trafficking from Mexico. The end result has been increased control of the methamphetamine supply in the U.S. by criminal organizations operating out of Mexico. It appears that those involved in the illicit drug market are capable of responding and adapting to changes in a timely manner. When reductions in the methamphetamine supply have occurred, they have proven to be only temporary (see Dobkin & Nicosia, 2009; ONDCP, 2010).

The Mexican drug organization element of the methamphetamine problem is not new; however, it has now reached the point of urgency. The focus is now on the issue of foreign supply coupled with domestic demand. This is exacerbated by the mounting violence in Mexico and the imminent danger that it presents along the southwest border of the United States. It will take a new approach to illicit drug supply to regain control of this situation.

The ongoing issue of clandestine manufacturing serves as a reminder of the challenges of eliminating supplies in the face of an ongoing demand. While the quantities of methamphetamine being produced in local laboratories are smaller than before, clandestine manufacturing continues to pose significant challenges for law enforcement, first responders, and local communities. Not only are these smaller laboratories toxic and dangerous, but they contribute to the development of new markets for methamphetamine in areas where it had been unavailable (NDIC, 2011). In an attempt to thwart the clandestine manufacturing that remains, several states are enacting legislation to reschedule pseudoephedrine as a prescription drug; it is hoped that more stringent controls on pseudoephedrine will reduce the clandestine manufacturing of methamphetamine. In Oregon, pseudoephedrine became available only by prescription in 2006. While lab incidents decreased from 467 in 2004 to 12 in 2010, there is controversy about whether this decline can be attributed to the prescription-only legislation (Stomberg & Sharma, 2012). While history suggests that offenders will likely adapt to new controls, only time will tell if these provisions prove effective.

There is great reason for concern regarding the unintended consequences of efforts to control the manufacture of methamphetamine in the U.S. In particular, increases in the control of methamphetamine production and trafficking by violent TCOs, more collaboration between TCOs and local gangs, and the ongoing infiltration of drug traffickers in the United States serve as a warning of future challenges. There is potential for increased violence in the U.S. as drug cartels become a more integral part of the illicit drug supply. As has been noted by others, “trying to stop the production and trafficking in illicit drugs is like trying to grab a balloon – squeeze in one place and it bulges out in another. One solution sometimes leads to new problems” (Weisheit & White, 2009, p. 125).

Methamphetamine is increasingly part of the illicit drug situation on a global scale. According to the United Nations, the use of amphetamine-type stimulants (ATS) has been a significant part of the illicit drug situation worldwide for over two decades (UNODC, 2011). While ATS are not restricted to methamphetamine, the illicit production of methamphetamine comprises a disproportionate part of the illicit production problem. “Methamphetamine is still, by far, the most widely manufactured amphetamine-type stimulant worldwide” (UNODC, 2011, p. 146). The challenges of responding to this extend beyond the United States (e.g., see Ransley et al., 2011).

For decades, the U.S. government has implemented legislative controls that focused on attempting to keep suppliers from producing methamphetamine. In retrospect, the failure of these drug control efforts was inevitable. Over sixteen years ago, in the midst of the domestic manufacturing problem, government officials recognized the limitations of efforts to stop the supply of methamphetamine, noting “it is likely that increasingly strict chemical controls and enforcement efforts in the United States will result in an additional increase in production of methamphetamine in Mexico, depending upon access to chemicals in that country” (DEA, 1996, p. 8).

Further research is needed to understand the demand that underlies methamphetamine use in the United States. The historical development of methamphetamine suggests that in the face of an ongoing demand for methamphetamine, there will always be someone who will supply it. More research on the inter-relationship between supply and demand is needed. While the illicit supply of methamphetamine may meet existing demand, increases in availability of methamphetamine may also be facilitating a growth in demand.

Additionally, there is a need to develop a greater understanding of the methods by which illicit drug markets evolve at local, national, and international levels. Knowledge of the processes by which producers and traffickers in the illicit drug market adapt (Wilson & Stevens, n.d.) and the factors that underlie the resiliency of illegal drug markets in general (Bouchard, 2007) is needed. The history of the evolution of the U.S. methamphetamine supply is supportive of the notion of criminal adaptation (Clarke, 2008). The shifts in clandestine production processes over time, in response to controls on precursor chemicals, serves as an example of how offender populations reacted to preventive measures aimed at stopping methamphetamine manufacturing. The nearly sixty-year evolution of the methamphetamine production and supply serves as an indication that there is no easy solution to the multi-faceted and dynamic illicit drug market.

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