Recipe for Disaster: Mexican Methamphetamine

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U.S. methamphetamine use was, in its early stages, predominant on the West Coast, in the Southwest, and in Hawaii. While these areas still have a high prevalence, use has spread throughout the U.S. According to the U.S. Department of Health and Human Services' *Results from the 2002 National Survey on Drug Use and Health: National Findings,* more than 12 million people 12 years of age and older (5.3%) reported that they had used methamphetamine at least once in their lifetime. In a CDC report from 2002, 9.8% of U.S. students had used methamphetamines during their lifetime. A survey (in January 2002) of treatment providers showed that 92% of providers saw the same number or more of methamphetamine addicts.

American entrepreneurs and drug addicts quickly recognized the ease of producing methamphetamine at home. The primary ingredients, pseudoephedrine or ephedrine, hydriodic acid, and red phosphorus were easily obtainable over the counter. After ephedrine was removed from the market, the "cookers" quickly adapted by substituting pseudoephedrine. Due to the rampant increase of methamphetamine home laboratories, Oklahoma (in April 2004) was the first state to pass legislation to crackdown on the purchase of pseudoephedrine. While this resulted in a decrease of clandestine supplies, the "marketplace" equilibrated with the import of Mexican methamphetamine. As more than 30 states have followed Oklahoma's legislative crackdown to limit the availability of pseudoephedrine, the production of Mexican methamphetamine continues to increase and greater quantities are smuggled into the U.S.

"Superlabs" in Mexico can produce over 12 pounds of methamphetamine every day, which translates to 18,000 quarter gram doses—more than $50,000 per day. Other countries, including China and India, have increased production of pseuodoephedrine and ephedrine for export to Mexico. Of the methamphetamine abused in the U.S., approximately 35% comes from home labs and 65% from Mexican cartels. Mexican methamphetamine most commonly comes in the crystal form known as "ice," with an estimated purity ranging from 75% to 90%.

The primary, direct effect of methamphetamines is a release of catecholamines at the neuronal presynaptic terminal. Indirectly, amphetamines increase postsynaptic catecholamines. Central and peripheral norepinephrine and dopamine neurotransmitters are affected. The chemical changes result in generalized sympathetic stimulation, producing an increase in heart rate and blood pressure, bronchodilation, diaphoresis, mydriasis, excitation, elevation in mood, and a decrease in appetite.

Toxicity affects most organ systems, including the central nervous system. Aggressive and psychotic behavior can also occur with acute exposures. Agitation, hallucinations, altered mental status, movement disorders, headaches, and seizures can occur. Intracerebral hemorrhage, ischemic stroke, and cerebral vasculitis have been reported. Cardiovascular effects include hypertension, tachycardia, chest pain, dysrhythmias, cardiomyopathy and myocardial infarction. Massive overdoses can also result in catecholamine depletion. Toxicity can also affect the pulmonary, hematological, gastrointestinal, and endocrine systems. Because Mexican methamphetamine is generally of higher purity than that produced in the U.S., the risk of overdose is increased.

While medical toxicologists are well informed about the physical effects of methamphetamines, the social effects are more insidious. After Oklahoma enacted legislation to control the availability of pseudoephedrine, the number of home laboratories decreased, but there was no concomitant decrease in the jail population or the social effects of methamphetamine use. The number of children removed from homes that were producing methamphetamine decreased, yet those removed from homes of addicted parents increased. And crime and the associated effects related to smuggling are difficult to estimate.

It is estimated that for every pound of methamphetamine produced, 5 to 6 pounds of toxic waste are generated. A multicomponent federally funded project addressing the environmental health consequences of clandestine methamphetamine laboratories is currently being formed. Under the auspices of the American College of Medical Toxicology's (ACMT) Cooperative Agreement with ATSDR, ACMT has received funding to develop and implement two components of the project during the next 8 months. The first component will consist of two symposia on the topic in Atlanta and Washington, DC, in fall of 2006. The second component is the creation of a "toolbox" of internet documents, such as medical evaluation and residential clearance protocols, which can assist local health officials in the management of methamphetamine lab-related environmental health concerns.

There is no doubt that Mexican organizations now supply a major portion of the methamphetamine to the United States. What can be done to stop it is a difficult question. But medical

toxicologists continue to play a role in educating the public and medical professionals of the dangers and treatment of methamphetamine toxicity by keeping abreast of the changing social and cultural trends of drug abuse.

The author has no potential financial conflicts of interest to report.

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