

# Washington Department of Public Health

## Methamphetamine Labs Community Risks and Public Health Responses

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### Case Report

A man reeking of chemicals walked into a hospital emergency department for treatment of burns that he claimed occurred in a car fire. The staff contacted the local fire department, who advised that the patient may have been burned in an explosion at a methamphetamine lab. Several hospital personnel reported illness including headache, nausea, vomiting, and burning eyes and throat. The local fire department hazardous materials team closed the emergency department for seven hours during decontamination activities. Advice from the Washington Poison Center and state and local agencies helped guide the decision to reopen the emergency department. Later analysis of chemicals in the clandestine drug lab confirmed acetone, hydrochloric acid, sodium hydroxide, toluene, and ephedrine.

Methamphetamine is a stimulant similar to amphetamine, but with longer lasting clinical effects. It is synthesized, most commonly from ephedrine, in illicit or "clandestine" drug laboratories. Concern about exposure to chemicals in methamphetamine labs is growing as the number of these illegal labs increases in Washington, and the public and medical professionals are becoming more aware of the hazards they pose. This awareness has resulted in improved diagnosis and treatment of persons exposed to methamphetamine labs, but has also frequently led to overly aggressive treatment.

Methamphetamine labs first proliferated in California, where they were operated by motorcycle gangs, and criminals have since established labs throughout the United States. Rural areas that offer privacy are favored locations. Houses, apartments, hotel rooms, trailers, vans, and storage units are just some of the structures used for laboratories, which may be moved frequently to prevent detection. Although complete statistics are not available, law enforcement agencies in Washington State investigated more than 200 suspected methamphetamine labs in 1996. The Washington State Department of Health has information on at least 59 residential structures that were declared unfit for use as a result of chemical exposure contamination by clandestine drug labs in 1996, most of which were in Pierce, King, and Clark counties.

Operating laboratories present the greatest exposure hazard from release of reagent chemicals and their byproducts and potential for fire or explosion. Less hazardous are lab materials stored in boxes or labs that have been set up but are not actively producing drugs, although exposures may still occur from opening containers of volatile materials or from spills. Former labs, where all the reaction vessels have been removed, pose little acute exposure hazard but may still cause illnesses in subsequent inhabitants.

### Chemical Toxicity

The recipes used to manufacture methamphetamine change over time as sales restrictions have made it more difficult to purchase various precursor chemicals. Recipes may be passed from person to person, obtained from publications, or transmitted over the Internet. The exact hazards present in any particular methamphetamine lab vary unpredictably. However, most

labs contain corrosives, solvents, drugs, and potentially other poisons. Corrosives include strong acids and bases, often hydrochloric acid and sodium hydroxide. Many types of solvent may be found in methamphetamine labs - ether, toluene, denatured alcohol, freon, and more recently a type of gasoline used in camping stoves. Methamphetamine, ephedrine, and pseudoephedrine are also common. Other poisons include mercury and lead. The laboratories also may contain explosives or toxic "booby-traps." Thus, only specially trained investigators should enter methamphetamine labs.

### **Potential Health Effects**

Explosions and fires in illicit drug laboratories cause injuries that prompt contaminated patients to seek treatment in emergency departments. Exposure to corrosive substances may produce symptoms ranging from shortness of breath and cough or chest pain to skin burns. Many solvents are absorbed into the body through inhalation and dermal exposure, and may cause dizziness, disorientation, headache, and nausea. Puncture by contaminated needles carries risks of exposure to blood-borne pathogens. Our study of law enforcement personnel involved in the investigation of methamphetamine labs indicated that their symptoms were primarily headache and respiratory, mucous membrane, and skin irritation.

Anecdotal reports indicate that chronic exposure to methamphetamine labs can cause multiple illnesses, but it is difficult to sort out the effect of methamphetamine use and associated lifestyle from the effects of chemical exposure during drug manufacture. Certainly the "cooks," those directly involved in the chemical synthesis of methamphetamine, are at the highest risk of chemical exposure. Lead-contaminated methamphetamine has caused lead poisoning in methamphetamine users, but lead poisoning has not otherwise been reported from exposure to methamphetamine labs.

Children living in methamphetamine lab are at risk for inhalation, transdermal skin absorption, and ingesting chemicals. Some children have tested positive for methamphetamine on urine analysis, most likely from environmental contamination rather than direct methamphetamine use or abuse. In most cases laboratory tests are normal. Children exposed to methamphetamine labs may develop respiratory symptoms, mucous membrane irritation, nausea, and headache.

Adverse health effects have been reported in subsequent occupants of labs that have not been adequately cleaned up. Examples include throat irritation, respiratory difficulties, and headache in families who unknowingly moved into houses that previously contained methamphetamine labs. Residual chemicals such as mercury, lead, methamphetamine, and caustic substances may pose health concerns in residential structures even after the laboratory equipment has been removed.

### **Treatment**

Most chemicals used in clandestine labs have no antidotes treatment primarily involves decontamination and alleviation of symptoms. The need for decontamination should be determined individually. Areas of skin exposed to hazardous chemical liquids and solids should be thoroughly washed with soap and water. Persons performing decontamination should wear suitable protection, such as chemically protective clothing, gloves, and respiratory protection when appropriate. Decontamination is recommended for patients who report skin irritation, but may not be necessary for exposures to a gas or vapor. The clothing of patients, who smell strongly of the chemical exposure should be removed and bagged. Minimal exposures such as walking near drug lab do not require decontamination.

The treatment of short-term exposures to methamphetamine labs should be guided by the symptoms of each individual. Generally, asymptomatic persons may not require evaluation. Those with symptoms should receive supportive care. Specific blood testing usually does not reveal abnormalities related to methamphetamine lab exposure, and should be reserved for appropriate patients. If forensic documentation is important, then biological samples should be collected under a chain of custody protocol.

A laboratory investigator wearing protective clothing removes chemicals and equipment from a house used for a methamphetamine lab.

### **Public Policy**

The public health risks from potential chemical contamination in methamphetamine labs vary tremendously from site to site and with differences in chemicals used, quantity of manufacture, extent of ventilation, and other factors. Public regulations are designed to provide adequate protection against adverse health effects from the most contaminated sites and thus may be overly protective for less contaminated ones. Appropriate chemical protection is certainly indicated for police and other investigators.

The Washington State Department of Health and selected local health departments have regulations covering the condemnation of suspected labs. Prior to reoccupation, the structure must be cleaned. The process involves initial determination of the extent of contamination, followed by thorough cleaning, primarily with detergent and water, and retesting to determine the adequacy of cleanup. Typical cleanup costs range from \$3,500 to \$5,000, but in certain cases may exceed \$20,000. Reoccupation testing used in Washington includes wipe samples for pH and methamphetamine levels, and air sampling for volatile organic compounds, and lead and mercury when indicated. Property owners may hire certified environmental firms to check for contamination and clean the laboratory structure prior to reoccupancy.

### **Information Resources**

The Washington Poison Center (1-800-732-6985) answers questions about the medical effects of exposure to methamphetamine labs and can provide treatment recommendations. The Washington State Department of Health, Office of Toxic Substances, has information and several publications on methamphetamine labs. Many local health departments have extensive experience with methamphetamine labs, and the Department of Ecology may conduct environmental risk assessments and assist in disposal of large quantities of hazardous materials.

## **Recommended Reading**

Burgess JL, Barnhart S, Checkoway H: Investigating clandestine drug laboratories: Adverse medical effects in law enforcement personnel. *Am J Ind Med* 1996; 30:488-494.

Burton BT: Heavy metal and organic contaminants associated with illicit methamphetamine production. *NIDA Res Monogr* 1991; 115:47-59.

Centers for Disease Control (CDC): Lead poisoning associated with intravenous methamphetamine use-Oregon, 1988. *JAMA* 1990; 263:797.

Irvine GD, Chin L: The environmental impact and adverse health effects of clandestine manufacture of methamphetamine. *NIDA Res Monogr* 1991; 115:33-46

Skeers VM: Illegal methamphetamine drug laboratories: A new challenge for environmental health professionals. *J Environ Health* 1992; 55:6-10.

Washington State Interagency Steering Committee on Illegal Methamphetamine Drug Labs: Model Local Health Department Response to Illegal Methamphetamine Drug Labs. Olympia, WA: Department of Social and Health Services, Toxic Substances Section LD- 11, 1989.

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