

CHILDREN IN METHAMPHETAMINE "LABS" IN OREGON

ON MAY 28, four children, ages 4 to 15, were placed in protective custody after police seized a methamphetamine manufacturing operation in the home of the children and their two adult caretakers. HazMat team members, dressed in protective gear, entered the home to take samples of the numerous unlabeled hazardous chemicals, many in open containers and in easy reach of the children. The three youngest children tested positive for methamphetamine. This issue of the *CD Summary* reviews the problems faced by children in the environment of methamphetamine production.

METHAMPHETAMINE "LABS"

The use and home manufacture of methamphetamine is on the increase. The number of meth lab seizures in Oregon increased from 67 in 1995 to 591 in 2001. The number of seized labs doubled in the US between 2000 and 2002. Methamphetamine, a sympathomimetic drug, is currently an illicit "drug of choice" due to its ease of manufacture, comparatively low cost, 12-hour half-life, and the euphoria, energy, feelings of power, and sexual arousal that it produces.

Those involved in the clandestine production ("cooking") of methamphetamine select from over 30 different chemicals, 10 of which are classified as "extremely hazardous."¹ Ephedrine or pseudoephedrine serves as the starting point in a simple, highly volatile chemical reaction, in which strong acids, iodine and red phosphorus are combined and heated. Sodium hydroxide (lye), solvents, and hydrogen chloride gas complete the process. A potential by-product, phosphine gas, is extremely flammable and explosive, and is a respiratory tract irritant that causes peripheral vascular collapse, cardiac failure and pulmonary edema. Another common method of production is the "dry cook"

or "Nazi Method," which uses ephedrine or pseudoephedrine, sodium or lithium and anhydrous ammonia.¹

Three basic categories of chemicals are found at meth labs: solvents, caustics/irritants, and metals/salts. Solvents like acetone, freon, methanol, toluene, trichloroethane, white gas, and xylene are ubiquitous in meth labs. They can be absorbed after ingestion, inhalation or dermal contact. Aspiration of small quantities (<1 ml) can produce significant pneumonitis. CNS depression, hepatotoxicity and renal toxicity (pyuria, hematuria, acute renal failure) have been described. Toluene, which is volatile and heavier than air, can cause ventricular arrhythmias, respiratory depression and sudden death.

Caustics, including acids and alkalis, cause chemical burns by direct contact with the skin; by ingestion (oral burns; GI tract burns with pain, drooling, vomiting); and by inhalation (burns of eyes; respiratory tract irritation; pulmonary edema). Commonly used caustics are anhydrous ammonia, hydrochloric acid, sodium hydroxide, sodium thiosulfate, and sulfuric acid (drain cleaner).

Metals and salts routinely found at labs include iodine, red phosphorus, lithium and sodium metal. These can cause multiorgan toxicity affecting gastrointestinal, renal, hematologic and nervous systems. Skin burns, eye and respiratory tract irritation, headache, seizures and GI irritation are concerns.

THE THREAT TO CHILDREN

Between 2000 and 2002, the number of children present at seized labs has doubled,^{2,3} and Oregon was third in the nation for number of children (241) found at methamphetamine labs during 2001-2.

Every aspect of methamphetamine manufacture, distribution and use poses hazards to children. The preoccupation of users with manufacturing metham-

phetamine and staying "high" brings specific dangers to children in these environments. Decreased appetite and attentiveness of caretakers contributes to neglect of children's hygiene and nutrition. Increased sexual arousal from meth use is associated with unprotected sex, pregnancy risk, spread of STDs and sexual abuse of children present in the vicinity. Paranoia, agitation and rage put children at risk of physical abuse, exposure to domestic violence, and deadly accidents due to mishaps with firearms and "booby traps" often present in meth labs.

Children who inhabit homes with meth labs may inhale dangerous chemical fumes or second-hand methamphetamine smoke, or ingest toxic chemicals or illicit drugs (commonly excess methamphetamine powder left on surfaces, clothing or cooking utensils). They are at risk of chemical and thermal burns from processing or easy access to chemical ingredients or wastes (often stored in pop bottles and open food containers or disposed of in bathtubs, sinks or toilets, or in the yard), or injury by discarded, contaminated needles.

Where testing has been done in Oregon, one-third to one-half of the children found in meth labs have tested positive for methamphetamine in their urine because of accidental ingestion or passive inhalation of the drug. Appropriate testing of these children helps identify occult exposures in this environment.

CLINICAL FINDINGS

Some poisoned children become acutely ill after exposure to chemicals or methamphetamine, but others show few overt signs of toxicity. Children may present for medical care—but without accurate histories. In one case series, pediatric patients with methamphetamine poisoning experienced tachycardia, agitation, inconsolable crying, irritability, and vomiting. The most



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common complication of meth poisoning was rhabdomyolysis. The average hospital stay was three days. Pediatric patients who ingest methamphetamine can present with signs and symptoms similar to those of an abdominal or neurologic pediatric emergency.⁴

Neonates born to mothers using methamphetamine during gestation are small for gestational age, exhibit hypersensitivity to sound, abnormal sleeping patterns such as excessive sleepiness alternating with irritability, and increased tone.⁵ Subclinical cerebral abnormalities were detected in 35% of drug-exposed, term neonates exposed antenatally to methamphetamine.⁶ Significant concern exists regarding abnormal neurologic, cognitive, and behavioral development as these children approach school age.

GUIDELINES FOR HEALTH CARE PROVIDERS

When approaching a child who has been exposed to a methamphetamine lab, care must be taken not to exacerbate an already physically and psychologically traumatic situation. Remove contaminated clothing from the child, and decontaminate the child to prevent further absorption of toxic materials. Avoid secondary contamination of child protective services staff and vehicles, emergency department staff and equipment, and foster homes, foster parents, and other children in the home.

The history is an important guide to further work-up. Find out as much as possible about the extent and timing of exposure of the child and the type of chemical agents in the lab.

Potential medical concerns to consider include:

Acute: CNS depression, aspiration pneumonitis, upper or lower respiratory inflammation, pulmonary edema, cardiac arrhythmias, burns of eyes, mouth, skin (chemical and/or thermal), gastrointestinal irritation or burns, acute trauma from physical or sexual abuse, and psychological trauma.

Chronic: liver, kidney, neurologic and hematologic effects; developmental delays, psychological dysfunction, results of abuse and neglect.

Suggested laboratory evaluation includes testing of urine for methamphetamine within 48 hours of exposure. Two laboratories in the state (Oregon Medical Lab in Eugene and Legacy Emmanuel Hospital Lab in Portland) currently test for methamphetamine in urine at the lower levels of quantitation (near 50 ng/ml urine) needed to detect incidental drug exposure in children. This testing may confirm the presence of methamphetamine for up to 48 hours after exposure. Other tests that should be considered include a CBC, renal and liver function tests, and possibly others, depending on the type of exposure and the clinical scenario.

A child who tests positive for methamphetamine has been exposed to the drug within the past 48 hours. A positive test in a (non-breastfeeding) child recently removed from a meth lab is diagnostic for drug endangerment. Of course, be sure to talk with caseworkers about what steps need to be taken to protect the child from re-exposure.

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RESOURCES

- Occupational and Environmental Epidemiology Section, Office of Disease Prevention and Epidemiology, Oregon DHS. For assistance call Theodora Tsongas, PhD, at 503/731-4202.
- Office of Children, Adults & Families, Oregon DHS, Alcohol & Drug Services. For assistance call Jay M. Wurscher at 503/945-6634.
- Northwest Pediatric Environmental Health Specialty Unit (PEHSU), Harborview Medical Center, Seattle. For assistance call 1/877-KID-CHEM (1/877-543-2436).

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