Published in final edited form as:

Child Abuse Negl. 2014 November ; 38(11): 1872–1883. doi:10.1016/j.chiabu.2006.06.009.

Children exposed to methamphetamine use and manufacture

Nena Messina^a, Patricia Marinelli-Casey^a, Kathleen West^b, and Richard Rawson^a

^a UCLA Integrated Substance Abuse Programs, 1640 S. Sepulveda Boulevard, Ste. 200, Los Angeles, CA 90025, USA

^b World Health Organization (WHO), Geneva, France

Introduction

The reported number of children present at seized methamphetamine labs across the United States has increased dramatically, from 950 in 1999 to approximately 3,000 in 2004 (El Paso Intelligence Center [EPIC] National Clandestine Laboratory Seizure System, 2004). These figures are recognized as underreported because many states do not keep records on the children who are present when methamphetamine labs are seized or who are medically evaluated for the presence of drugs or chemicals (EPIC National Clandestine Laboratory Seizure System, 2003). Increased methamphetamine use and home-based production have further resulted in an escalation in reports of serious child abuse and neglect. Children living in settings of methamphetamine labs are at extremely high risk of a wide range of serious negative consequences including poisoning, homicides, and accidental deaths and burns due to home-based methamphetamine lab fires and explosions.

Methamphetamine is a highly addictive psychoactive stimulant that produces an intensely euphoric high, followed by a “crash” that causes depression, irritability, insomnia, nervousness, and paranoid aggressive behaviors (Office of National Drug Control Policies [ONDCP], 1999) - all of which present a risk of serious neglect and abuse to the children of methamphetamine-dependent parents. Children who live in home-based methamphetamine labs are not only exposed to their parents' chaotic and drug-focused lifestyles, but also to the highly psychoactive stimulant and the toxic precursor chemicals associated with methamphetamine production. In fact, approximately 55% of children removed from home-based methamphetamine labs test positive for toxic levels of chemicals in their bodies (EPIC National Clandestine Laboratory Seizure System, 2003).

Correspondence to: Nena Messina.

The implications and conclusions of this paper are those of the authors and do not necessarily represent the National DEC Alliance. The study of children endangered by parental methamphetamine use and manufacture currently underway at UCLA is funded by the National Institute on Drug Abuse. Findings will be available in late 2007.

For more information on National Medical Protocols for Drug-Endangered Children, on what to do if you suspect a methamphetamine lab, for training, and other general information, contact the National Drug Endangered Children Alliance at www.nationaldec.org. Or for detailed answers to Frequently Asked Questions regarding methamphetamine lab exposure and children go to <http://www.colodec.org/decpapers/decpapers.htm>.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Clearly, the combination of exposure to the toxic effects of the drug itself and to the aberrant behavior of the adult methamphetamine users puts children living in these settings in a uniquely dangerous and damaging environment. However, no empirical studies to date have measured the impact of this circumstance. Thus, the medical, developmental, and placement outcomes of these children remain unknown. The fields of pediatrics, criminal justice, law enforcement, and child welfare could all benefit from comprehensive documentation of the needs and outcomes of this special population of children. Research in this area could further guide policy decisions regarding communities, families, children, treatment, and adoption guidelines affected by the growing epidemic of home-based methamphetamine labs.

This comment will provide important information on methamphetamine use and manufacture, the direct and indirect effects the drug and its manufacture has on children, and a description of a pilot program started in California to serve the needs of children rescued from methamphetamine labs. The spread of the methamphetamine epidemic across the United States has led many states to develop and operate similar programs for children. As methamphetamine becomes a major problem worldwide, the need to develop specialized services for children impacted by methamphetamine may become necessary.

Methamphetamine use, manufacture, and associated dangers

Methamphetamine now ranks as the most widely abused illicit drug in California and much of the western U.S., with use increasing in nationally (ONDCP, 2003; Rawson, Anglin, & Ling, 2002). Internationally, methamphetamine is a growing problem as well. In Eastern Europe and South Africa the drug is also being cooked in home-based labs, endangering the well-being of children present. According to the World Health Organization, over 35 million individuals regularly use methamphetamine. In comparison, cocaine is used by approximately 15 million people worldwide, and heroin is used by fewer than 10 million people (United Nations Office for Drug Control and Crime Prevention, 2000). Methamphetamine can be smoked, inhaled, or injected, and the effects are long lasting (10-12 hours). Moreover, methamphetamine is particularly favored by women of child-bearing age (Hohman, Oliver, & Wright, 2004), as it is viewed as a readily available, inexpensive appetite suppressant and energy enhancer (Joe, 1995).

Over the past 10 years, knowledge of how to manufacture methamphetamine has been disseminated from a few “biker gang cooks” to two very important new groups: home-based chemists and organized drug trafficking cartels. With the addition of these two groups into the world of methamphetamine manufacture and supply, the availability of methamphetamine is likely to increase as new markets are created. In fact, methamphetamine lab seizures in the US by the Drug Enforcement Administration (DEA) rose from 549 in 1990 to 2,155 in 1999 (DEA, 2000). The increase in the number of methamphetamine lab seizures during this time is most likely due a combination of increased demand for the drug and improvement in law enforcement strategies to identify methamphetamine labs. With widely available methamphetamine recipes on the Internet and elsewhere, a virtual cottage industry of home-based methamphetamine labs has emerged.

Methamphetamine is easily manufactured with inexpensive over-the-counter ingredients. The ephedrine or pseudoephedrine reduction method is the most commonly used MA production process in California (L. Birkmeyer, Assistant District Attorney, personal communication, 5/25/2004). In this process, over-the-counter cold and allergy tablets containing ephedrine or pseudoephedrine are placed in a solution of water, alcohol, or other solvent for several hours until the ephedrine or pseudoephedrine separates from the tablet. Then, using common household products and equipment the ephedrine or pseudoephedrine is converted into methamphetamine in makeshift, illegal labs. Pressurized hydrogen gas, sodium hydroxide, red phosphorous, sulfuric acid, lithium, aluminum hydride, chloroform, alcohols, ethers, acetone, and other chemicals are used as precursors, catalysts, reagents, and solvents as part of this manufacturing process.

Many of the precursor chemicals used to manufacture methamphetamine are highly toxic, corrosive, and/or flammable. In fact, in some areas in California, one in six labs are found because of fire or explosion (Drug Endangered Children, 2000). In several states methamphetamine production is legally categorized as an “inherently dangerous felony” because of these known dangers. In addition, many of the chemicals used in methamphetamine production are restricted by Occupational Safety and Health Administration regulations, which require that hazardous materials teams clean up methamphetamine lab sites. Reports indicate that at least five pounds of toxic waste are generated for every pound of methamphetamine produced (Governor's Office of Criminal Justice Planning Guidebook, 1999). This waste is commonly disposed of in backyards, dumpsters, storm drains, parks, or along roadsides and farm fields, where it is a source of long-lasting and toxic pollution.

Growing concern about the methamphetamine problem has spurred political officials to reduce the supply of illicit methamphetamine by imposing restrictions on the retail sale of cold medications and products that contain pseudoephedrine. A review of state bills and regulations on over-the-counter purchases of these products reveals that as of 2005, 34 of the 50 states have passed bills to restrict access to and/or purchase of cold medications that include pseudoephedrine. A range of strategies for restricting the purchase of pseudoephedrine include placing products behind the counter in retail stores, selling only to customers with a prescription, minimum age requirements with photo identification, and restrictions on the maximum amount of pseudoephedrine products that can be purchased within 30 days.

Preliminary reports from newspaper articles have documented the positive effects that precursor control laws have in reducing the supply of methamphetamine and reducing the number of home-based methamphetamine labs. In addition, a few empirical studies have examined the impact of precursor regulation at the federal level on methamphetamine arrests (Cunningham & Liu, 2005) and methamphetamine-related hospital admissions (Cunningham & Liu, 2003a). Both studies found positive associations between precursor restriction laws and reductions in methamphetamine-related legal and medical incidents. However, the effects of these laws were transitory, disappearing within 6 to 24 months for both studies (Cunningham & Liu, 2005; 2003b). In addition, although home-based methamphetamine production was reduced, treatment admissions remained constant.

Furthermore, an article in the New York Times (2006) presents the troubling aspects of precursor restriction laws passed in Iowa and other states. Although the seizure rate of home-based methamphetamine labs plummeted after implementation of the law, officials were then faced with a flood of methamphetamine coming into their communities from Mexico. Observers say that the law has the unfortunate side effect of increased drug trafficking by the Mexican drug cartels with a more potent form of methamphetamine to fill the void. The form of the drug brought in from Mexico is viewed as purer which could lead to a higher risk of overdose.

Methamphetamine use and manufacture poses special risks to children

One of the most pernicious and little examined consequences of the methamphetamine abuse/production epidemic is the endangerment of children. According to both researchers and law enforcement reports, increased use and manufacture of methamphetamine across the U.S. has resulted in a dramatic escalation in the severity of child abuse crimes and abuse-related deaths (Petit & Curtis, 1997). Over 2,800 children were affected by methamphetamine lab incidents across the nation in 2004 (EPIC National Clandestine Laboratory Seizure System, 2004). The state reporting the highest number of children removed from home-based methamphetamine labs over the past 4 years was California (356 children in 2004), and those children were typically under 5 years old (EPIC National Clandestine Laboratory Seizure System, 2003; 2004). However, because statewide data collection and reporting protocols are not yet in place, the exact number of children exposed to these hazardous environments is unclear and experts believe that the problem is seriously underestimated.

What is clear is that these children are the victims of their parents' drug-focused lifestyles, which are often characterized by neglect, physical or sexual abuse, domestic violence, and other criminal activities (Hampton, Senatore, & Gullota, 1998; Shillington, Holman, & Jones, 2001; Rosas, 2003a; 2003b). Developmental theorists assert that an accumulation of multiple risk factors, such as prenatal exposure to drugs and alcohol, ongoing parental substance abuse, childhood maltreatment, and exposure to violence, all have a greater negative impact on children's psychological development than any specific risk factor (Hilyard & Wolfe, 2002). Moreover, children of drug-dependent parents are at high-risk to continue intergenerational patterns of drug abuse, criminal behaviors, and neglectful parenting (Dunn et al., 2002; Greene, Haney, & Hurtado, 2000; Sheridan, 1995). Recent evidence identifies a strong link between domestic violence and methamphetamine use specifically. For example, police in Contra Costa County, California, report that methamphetamine use is involved in almost 90% of the domestic dispute cases investigated by that agency (Drug Enforcement Agency [DEA], 2000).

In addition to parental neglect and abuse and exposure to domestic violence, these young children are further exposed to the highly psychoactive stimulant and the toxic precursor chemicals associated with methamphetamine production. The available literature on the effects of exposure to methamphetamine manufacture are discussed in detail below.

Exposure to methamphetamine manufacture

The immediate dangers that home-based methamphetamine labs pose to children move beyond the violence, neglect, and abuse associated with drug-abusing and selling activities (Figure 1). Children who live in home-based methamphetamine labs are exposed to the toxic precursor chemicals, waste, and filth associated with methamphetamine production, as well as to the highly psychoactive stimulant itself. Psychoactive compounds can cause psychosis, seizures, and death from accidental ingestion (NIDA, 1998; Perez, Arsura, & Strategos, 1999). Consequences of exposure to the toxic precursor chemicals can include poisoning, burns, and lung irritation; damage to the liver, kidneys, heart, brain, and immune system; cancers such as lymphoma and leukemia; bone marrow suppression resulting in anemia and increased risk of infections; and developmental and growth problems (Drug Endangered Children, 2000; Irvine & Chin, 1997; NIDA, 1998). The conditions of the typical methamphetamine home environment can further increase a child's risk of infection and illness. Lack of cleanliness is customary, providing an atmosphere for bacteria to thrive. Domestic animals contribute to the filth. Commonly, animal feces, ticks, fleas, garbage, rotten food, cockroaches, and discarded drug paraphernalia are present in the child's living areas (Manning, 1999; E. Mendoza, personal communication, 5-15-2004). Lack of parental supervision contributes to a high percentage of children ingesting spoiled, rotten, or chemically contaminated food, as methamphetamine solutions are often stored in real food containers (Department of Justice Information Bulletin, 2002; Manning, 1999) (Table 1).

Empirical research on general developmental outcomes of pre- or post-natal drug-exposed children is sparse with regard to methamphetamine exposure. Much of the literature on drug-exposed children focuses on the effects of prenatal cocaine or opiate exposure (Barth & Needell, 1996; Lester et al., 2002; Lester et al., 2003; Lester, Andreozzi, & Appiah, 2004). However, some studies have assessed the effects of methamphetamine-exposed infants compared with non-methamphetamine exposed infants in utero. Findings indicate that prenatal exposure to methamphetamine is associated with an increase in premature delivery, complications during pregnancy, altered neonatal behavioral patterns (e.g., abnormal reflexes and extreme irritability), low birth weight, and smaller head circumference (Eriksson, Larsson, & Zetterstrom, 1981; Hohman et al., 2004; Lester et al., 2006; Oro & Dixon, 1987; Smith et al., 2003). Oro and Dixon (1987) further reported that neonates exposed to methamphetamine demonstrated neurologic and physiologic abnormalities such as disruptive sleep patterns, state disorganization, poor feeding, and tremors. While Lester and associates (2006) found that effects methamphetamine exposure differed with regard to specific trimesters. For example, methamphetamine use during the first trimester of pregnancy was related to more signs of stress in infants. Use during the second trimester was associated with more lethargy in infants. Use in the third trimester was related to poorer quality of movement and greater physiological stress.

It is not clear whether these early symptoms of methamphetamine exposure resolve over time, or lead to long-term developmental problems. Preliminary data (N = 14) from the Prenatal Methamphetamine Project found that prenatal exposure to methamphetamine was associated with small, but significant decrements in cognitive, language, and behavioral functioning in children at ages 3 to 6 years old (Rawson, 1999). These pilot data provide

support for a more complete and definitive examination of the impact of pre- and post-natal methamphetamine exposure on child development. However, interpretation of the research on drug-exposed children is difficult because of numerous confounding factors such as poor maternal health, inadequate nutrition, and overall family dysfunction (Barth, 2001; Barth & Needell, 1996; Brooks & Barth, 1998; Rawson, 1999; Young, 1997).

Drug Endangered Children (DEC) pilot project

In 1997, the California Governor's Office of Criminal Justice Planning funded a 3-year pilot of the DEC project. Seven county-based multidisciplinary DEC Response Teams were developed and trained to protect the children found living in drug-manufacturing, selling, and abusing homes. The pilot DEC Teams were composed of narcotic officers, child protective services (CPS) personnel, medical professionals, and prosecutors. The Teams provided "24/7" on-scene response to seizures of methamphetamine labs to reduce child trauma and provide timely medical evaluations of children, as well as to ensure the commitment by prosecutors to file felony child endangerment charges against defendants. In addition, a DEC Resource Center provided ongoing training, educational materials, and medical protocols to the DEC Teams.

Since the initiation of the DEC program in California, the pilot response teams have served nearly 4,000 children, many of whom have needed special counseling and developmental services. Preliminary data from some of the counties indicated that 38% of the children removed from home-based methamphetamine labs tested positive for methamphetamine and exhibited a higher than expected incidence of respiratory, dermatological, and dental problems (Drug Endangered Children, 2000). Reports indicated that inhalation from second-hand smoke, accidental ingestion, skin absorption through direct contact, and food and beverage contamination were the primary routes of exposure among young children. Preliminary analysis of the medical and developmental exams for 95 DEC cases from San Bernardino County found that 43% revealed abnormal initial medical exam results following the lab seizure, and 42% (N=50) revealed developmental delays or cautions. In San Diego County, 472 children were found in 176 homes during methamphetamine lab seizures and were removed by child welfare officials during a 2-year period (1997-1999). Over one-third of these children tested positive for illicit drugs. Of these children, 386 had dependency petitions filed and sustained in juvenile court (Hohman et al., 2004).

Funding for the DEC pilot project ended before standardized data collection procedures or a comprehensive analysis of outcomes could take place. However, preliminary findings from the DEC pilot counties' that did collect data emphasize the need for comprehensive standardized data collection procedures across counties and long-term evaluation of DEC cases. Long-term effects on these children, including their placement, medical, and developmental outcomes, remain unknown as only minimal or anecdotal data collection and follow-up have occurred. The risks that these children face also include the unknown incidence of physical and sexual abuse, post-traumatic stress disorder (PTSD), neurological problems, and learning disabilities. Findings on these risks could guide policy and provide information for public education, prevention, and treatment services that reach beyond the individual drug-involved offender to his/her children, family, and local community.

Child welfare and legal climate changes coincide with the DEC project

As a result of the numerous reports of explosions, child poisonings, burns, neglect, and abuse, the response to children found in California methamphetamine labs changed from filing juvenile court dependency (W&I Code 300) alone to adding Health & Safety Code 11379.7 and Penal Code Section 273a, felony child endangerment charges. This 2001 California legislation regarding drug-endangered children provided for harsher prison sentences for those caught manufacturing methamphetamine in the presence of children under age 16 (up to 2 years per child), with an additional 5-years for those who injure children due to manufacturing (Manning, 1999). As a result, parents are arrested, and children are removed from parental custody, placed in foster care pending results of parent's criminal proceedings, and may be placed for adoption.

Coinciding with the California legislation was the November 1997 passage of the federal Adoption and Safe Families Act (ASFA - P.L. 105-89). ASFA provides the current child welfare policy context in which DEC Response Teams are operating. Some highlights of ASFA include: 1) A focus on the health and safety of the child as paramount, not reunification with biological parents; 2) Promotion of timely judicial decision-making through shortened time frames within which to hold child dependency hearings; 3) Clarification of "reasonable efforts" that creates a new requirement for states to finalize a permanent placement for every child declared a dependent of the court within a federally specified timeline; and 4) New requirements and shortened timelines for filing petitions to terminate parental rights in specified circumstances.

Child welfare system workers, policymakers, and substance abuse treatment providers are concerned about the unintended consequences of new policies for families suffering from substance abuse (Kerman, Wildfire, & Barth, 2002). While it is obvious that removing a child from a dangerous home environment is the right course of action, what is in the best interest of the child after removal is often less obvious. Critics argue that termination of parental rights does not necessarily lead to adoption of children in foster care (Webster, Barth, & Needell, 2000) and that parental incarceration can negatively affect emotional, behavioral, and psychological development (Erickson, 2000; Johnson & Waldfogel, 2002). However, research also indicates that children of substance-abusing parents are at risk long before their parents are incarcerated (Johnson & Waldfogel, 2002).

Current status of the DEC initiative

DEC training originating from the California DEC Resource Center has occurred in 20 states to date, and DEC programs currently operate formally in California, Washington, Oregon, Idaho, Arizona, Utah, Colorado, Oklahoma, Missouri, and Illinois. Since the 1997 DEC pilot study, the DEC Response Teams have continued to operate as a collection of local initiatives without the benefit of standardized data collection and reporting procedures. DEC Teams in California currently collect data relevant to each agency as part of their program protocol; however, there is no system for data entry or analyses. A national DEC Alliance was established in 2004, and members are moving forward with standardized medical protocols and data collections procedures (for more information visit www.nationaldec.org).

Public health significance

There is currently no comprehensive information about the needs of this special population of drug-endangered children or the implications of California legislation and the federal ASFA regulations on their cases in juvenile dependency court settings. Data collection documenting seizures of methamphetamine labs in California as it relates to child endangerment from the 1997 DEC pilot project has been minimal (Drug Endangered Children, 2000; Hohman et al., 2004), and the lack of statistical data to validate the extent of the drug-endangered children problem has masked its significance from policy makers.

The UCLA Integrated Substance Abuse Programs have recently begun a 2-year pilot study, in cooperation with the Los Angeles County Department of Children and Family Services and the Los Angeles County DEC Team, to analyze Los Angeles County DEC case data to provide comprehensive information about these children so that services for drug-endangered children can be developed to meet the identified needs. Findings from the study may strengthen existing state policies regarding child abuse and neglect reporting and response procedures. Furthermore, the pilot study will provide the research foundation to expand the expertise and knowledge needed to protect drug-endangered children and to break the cycle of child abuse, neglect, and endangerment caused by those who manufacture, sell, and use illicit drugs.

Acknowledgments

The authors wish to thank Emilio Mendoza, the Los Angeles County DEC Training and Gang Task Force Coordinator, and Rod Mullins, the National DEC Alliance Coordinator, for sharing their expertise, stories, and photographs with us. We would also like to thank Adrienne Isaac for perfecting tables and figures and literature citations.

References

- Barth RP. Research outcomes of prenatal substance exposure and the need to review policies and procedures regarding child abuse reporting. *Child Welfare*. 2001; 80(2):275–296. [PubMed: 11291905]
- Barth RP, Needell B. Outcomes for drug-exposed children four years post-adoption. *Children and Youth Services Review*. 1996; 18(1&2):37–56.
- Brooks D, Barth RP. Characteristics and outcomes of drug-exposed and non drug-exposed children in kinship and non-relative foster care. *Children and Youth Services Review*. 1998; 20(6):475–501.
- Cunningham JK, Liu LM. Impacts of federal ephedrine and PE regulations on methamphetamine-related hospital admissions. *Addiction*. 2003a; 98:1229–1237. [PubMed: 12930210]
- Cunningham JK, Liu LM. Guidelines for measuring impacts of methamphetamine chemical precursor regulations: A reply to Reuter & Caulkins. *Addiction*. 2003b; 98:1463–1464. [PubMed: 14519184]
- Cunningham JK, Liu LM. Impacts of federal precursor chemical regulations on methamphetamine arrests. *Addiction*. 2005; 100:479–488. [PubMed: 15784062]
- Department of Justice Information Bulletin. Children at risk (No 2002-L0424-001). 2002.
- Drug Endangered Children. Drug Endangered Children Health and Safety Manual. (Previously available from the Drug Endangered Children Resource Center, 14622 Victory Blvd, Van Nuys, CA 91411). 2000.
- Drug Enforcement Agency. 2000Statistics. Available at www.usdoj.gov/dea
- Dunn M, Tarter R, Mezzich A, Vanyukov M, Kirisci L, Kirillova G. Origins and consequences of child neglect in substance abuse families. *Clinical Psychology Review*. 2002; 22:1063–1090. [PubMed: 12238246]

- El Paso Intelligence Center National Clandestine Laboratory Seizure System. 2003Statistics. Available at www.usdoj.gov/dea
- El Paso Intelligence Center National Clandestine Laboratory Seizure System. 2004Statistics. Available at www.usdoj.gov/dea
- Erickson P. Federal child abuse and child neglect policy in the United States since 1974: A review and critique. *Criminal Justice Review*. 2000; 25(1):77–92.
- Eriksson M, Larsson G, Zetterstrom R. Amphetamine addiction and pregnancy. *Acta Obster Gynecol Scand*. 1981; 60:253.
- Governor's Office of Criminal Justice Planning Guidebook. Linking drugs with child endangerment. Sacramento: CA: 1999.
- Greene S, Haney C, Hurtado A. Cycles of pain: Risk factors in the lives of incarcerated mothers and their children. *The Prison Journal*. 2000; 80(1):3–23.
- Hampton, RL.; Senatore, V.; Gullota, TP. Substance abuse, family violence, and child welfare: Bridging perspectives. Thousand Oaks, CA: Sage Publications; 1998.
- Hildyard K, Wolfe D. Child neglect: Developmental issues and outcomes. *Child Abuse & Neglect*. 2002; 26:679–695. [PubMed: 12201162]
- Hohman M, Oliver R, Wright W. Methamphetamine abuse and manufacture: The child welfare response. *Social Work*. 2004; 49(3):373–379. [PubMed: 15281692]
- Irvine GD, Chin L. The environmental impact and adverse health effects of the clandestine manufacture of methamphetamine. *Substance Use and Misuse*. 1997; 32(12 & 13):1811–1812.
- Joe KA. Ice is strong enough for a man but made for a woman: A sociocultural analysis of crystal methamphetamine use among Asian Pacific Americans. *Crime, Law, and Social Change*. 1995; 22:269–289.
- Johnson E, Waldfogel J. Parental incarceration: Recent trends and implications for child welfare. *Social Services Review*. 2002; 76(3):460–481.
- Kerman B, Wildfire J, Barth RP. Outcomes for young adults who experience foster care. *Children and Youth Services Review*. 2002; 24(5):319–344.
- Lester B, Andreozzi L, Appiah L. 2004Substance abuse during pregnancy: Time for policy to catch up with research. *Harm Reduction Journal*. Available at www.harmreductionjournal.com/content/1/1/5
- Lester B, Arria A, DeRauf C, Grant P, LaGasse L, Newman E, Shah R, Stewart S, Wouldes T. Methamphetamine exposure: A rural early intervention challenge. *Zero to Three*. 2006:30–36.
- Lester B, LaGasse L, Seifer R, Tronick E, Bauer C, Shankaran S, Bada H, Wright L, Smeriglio V, Liu J, Finnegan L, Maza P. The maternal lifestyle study: Effects of prenatal cocaine and/or opiate exposure on auditory brain response at one month. *Journal of Pediatrics*. 2003; 142(3):279–285.
- Lester B, Tronick E, LaGasse L, Seifer R, Bauer C, Shankaran S, Bada H, Wright L, Smeriglio V, Liu J, Finnegan L, Maza P. The maternal lifestyle study: Effects of substance exposure during pregnancy on neurodevelopmental outcome in 1-month-old infants. *Pediatrics*. 2002; 110(6): 1182–1192.
- Manning T. Drug labs and endangered children. *FBI Law Enforcement Bulletin*. 1999:10–14.
- Zernike, Kate. New York Times. Potent Mexican Meth Floods. *States Curb Domestic Variety*. Jan 23.2006
- National Institute on Drug Abuse, Research Report Series. Methamphetamine, abuse and addiction (NIH 98-4210). 1998.
- Office of National Drug Control Policies, Drug Policy Information Clearinghouse. Methamphetamine. 1999.
- Office of National Drug Control Policies, Drug Policy Information Clearinghouse. Trends in drug abuse. 2003.
- Oro AS, Dixon SD. Perinatal cocaine and methamphetamine exposure: maternal and neonatal correlates. *Journal of Pediatrics*. 1987; 111:57–58. [PubMed: 3598791]
- Perez JA, Arsura EL, Strategos S. Methamphetamine-related stroke: Four cases. *Journal of Emergency Medicine*. 1999; 17(3):469–471. [PubMed: 10338241]
- Petit, M.; Curtis, P. Child abuse and neglect: A look at the states. Washington, DC: Child Welfare League of America; 1997.

- Rawson, R. A pilot study on the impact of prenatal methamphetamine exposure on the cognitive, language, and behavioral development of pre-school aged children. Presented at the Regional Methamphetamine Conference: Knowledge, Strategies, and Treatment for a Growing Community Problem; Kapolei, HI. December 1999; 1999.
- Rawson R, Anglin D, Ling W. Will the methamphetamine problem go away? *Journal of Addictive Diseases*. 2002; 21:5–19. [PubMed: 11831500]
- Rosas, A. Child sexual abuse. In: Durfee, M.; Peterson, M., editors. *Child abuse and neglect: Guidelines for the identification, assessment, and case management*. Volcano, CA: Volcano Press; 2003a. p. 82-90.
- Rosas, A. Sexually transmitted diseases. In: Durfee, M.; Peterson, M., editors. *Child abuse and neglect: Guidelines for the identification, assessment, and case management*. Volcano, CA: Volcano Press; 2003b. p. 91-95.
- Sheridan MJ. Proposed intergenerational model of substance abuse, family functioning, and abuse/neglect. *Child Abuse and Neglect*. 1995; 19(5):519–530. [PubMed: 7664133]
- Shillington A, Hohman M, Jones L. Women in substance use treatment: Are those involved in the child welfare system different? *Journal of Social Work Practice in the Addictions*. 2001; 1(4):25–46.
- Smith L, Yonekura ML, Wallace T, Berman N, Kuo J, Berkowitz C. Effects of prenatal methamphetamine exposure on fetal growth and drug withdrawal symptoms in infants born at term. *Journal of Developmental and Behavioral Pediatrics*. 2003; 24:17–23. [PubMed: 12584481]
- United Nations Office for Drug Control and Crime Prevention. *World Drug Report*. New York: Oxford University Press; 2000.
- Webster D, Barth RP, Needell B. Placement stability for children in out-of-home care: A longitudinal analysis. *Child Welfare*. 2000; 79(5):614–632. [PubMed: 11021350]
- Young NK. Effects of alcohol and other drugs on children. *Journal of Psychoactive Drugs*. 1997; 29(1):23–42. [PubMed: 9110264]

Figure 1.

Photo: Courtesy Rod Mullins, National DEC Training Coordinator

WWW.NATIONALDEC.ORG

Table 1
Additional Health Risks to Children, Compared to Adults

<p><u>Growing and Developing Organisms</u>: Children's body size, higher rate of growth and development, and faster metabolism and breathing rate mean that children are more likely to absorb more of the chemicals and drugs into their bodies than adults. The developing brain and other organ systems are more susceptible to damage at specific maturational levels. Children may not be able to process and eliminate the chemicals as well as adults and are therefore also at risk of neurological and developmental problems.</p>
<p><u>Specific Behaviors</u>: Methamphetamine and many of the chemicals involved in its manufacture are absorbed directly through the skin. Because young children especially have more contact than adults with their physical environment, such as the floor, soil, and other surfaces, like beds, countertops, and low tables, children are likely to be exposed to more of the drug and contaminants in their homes. Young children are also much more likely to put their hands or chemically-contaminated objects in their mouths and to be accidentally poisoned by ingesting the drug, an intermediate solution of methamphetamine, or chemicals that can be fatal or life threatening.</p>
<p><u>Differential Life Span</u>: Children have a much longer life span than adults in which to develop acute or chronic effects of chemical exposure or cancers.</p>
<p><u>Vulnerability</u>: Children are more likely to be neglected, abused, or molested in the chaotic, and drug-focused environment that often characterizes homes of methamphetamine "cookers" since the lifestyle associated with severe methamphetamine dependency tends to be one of disorganization, irritability, instability, and violence.</p>
<p><u>Inexperience</u>: Young children are less likely to be able to escape from or survive a lab-related fire or explosion due to their inexperience in emergencies and are less likely to be rescued due to their parents' inability to think clearly when under the influence of methamphetamine.</p>

Note: From Drug Endangered Children Health & Safety Manual, 2000.