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Forensic evaluations of drug endangered children: "My house caught on fire; my cat jumped out the window"

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ABSTRACT

Although there is a sizeable body of empirical literature examining the health consequences of exposure to drug use and manufacture in childhood, little is known about how drug endangered children themselves perceive their environment and situation. This study examines the types of information obtained from forensic medical evaluations that include the collection of verbal accounts from children about their situations. Forensic medical examination reports of 173 children removed from residences where methamphetamine manufacturing was suspected of occurring were analyzed. The children's verbal accounts highlight themes of hazards and toxins in the home, criminal and delinquent activity among children and caregivers, knowledge of drug-related activity, poor health and well-being, and traumatic law enforcement encounters. Drug endangered children represent a shadow population often overlooked in responses to the drug problem. Drug-related research and responses should prioritize children and their long-term well-being. Further research on the short- and long-term impacts of exposure as well as the social and physical development of these children is needed.

1. Introduction

An estimated nine million children live in homes with a parent or other adult who currently use illegal drugs (National Alliance for Drug Endangered Children, 2015). Drug endangered children can be viewed as a "shadow population," in that they are often overlooked in current responses to the drug problem. The Office of National Drug Control Policy (ONDCP) defines drug endangered children as those under 18 years of age living in or exposed to environments with illicit drug use or other drug-related activities; these children are at risk of abuse, harm, neglect, and delinquency (Federal Interagency Task Force for Drug Endangered Children, 2010).

Drug use continues to be a significant issue in the United States. In 2013, over 1.5 million people were arrested for drug abuse violations—the highest of any crime category (Federal Bureau of Investigation, 2014). Moreover, roughly 50% of inmates currently incarcerated in U.S. prisons are serving sentences for drug-related offenses (Federal Bureau of Prisons, 2015). According to the National Household Survey on Drug Use and Health, nearly 25 million individuals aged 12 years and older had used illicit drugs within one month of taking the survey (Substance Abuse and Mental Health Services Administration, 2014).

Despite decades of policy efforts focused on responding to the drug problem, there is limited information regarding the specific numbers and characteristics of drug endangered children. The recognition that children were at risk for harm and death due to exposure to methamphetamine use and manufacture drew national attention to this under-recognized population (e.g., see Centers for Disease Control and Prevention, 2005). Although methamphetamine manufacturing played a key role in increasing awareness about drug endangered children in the U.S., drug-related harms are not restricted to children exposed to methamphetamine production alone. As noted by the U.S. Department of Justice (2015), drug endangered children may be at risk due to "exposure to illegal drugs and those who use legal drugs for illicit purposes" (para. 1); health and safety concerns include abuse, neglect, and potential problems linked to caregivers who consume drugs and participate in other drug-related activities in the presence of children. According to the National Center on Addiction and Substance Abuse at Columbia University (1999), children of drug users are at greater risk for physical or sexual assault.

Little is known about how drug endangered children perceive their circumstances and experiences. Drug endangered children are a vulnerable cohort, and receive little attention from policy makers and practitioners in comparison to those who abuse and manufacture illicit drugs. This deficiency stems in part from a lack of funding as well as inconsistent and unsystematic policies and responses when first responders such as law enforcement and child protective services identify these children. There is a need to develop better practices and

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services for this population and enhance cooperation among first responders. Systematic collection of information is a crucial first step toward meeting this goal.

Although medical evaluations of drug endangered children are conducted in some jurisdictions, such evaluations are not systematically conducted at the local, state, or national levels. The present study examines forensic medical observation data on children removed from residences where methamphetamine manufacturing was suspected of occurring within a single jurisdiction in a Midwestern state. This observational study describes a subset of the larger population of youth whose parents abuse drugs. This research illustrates the value of gathering information directly from children as part of initial well-being assessments of drug endangered children. Gaining a better understanding of these children's needs is essential for developing responses that provide effective treatment and services aimed at supporting the healthy development of these vulnerable youths.

1.1. Parental drug abuse and child neglect

Children are especially vulnerable to the harmful effects of drug exposure (Asanbe, Hall, & Bolden, 2008; Grant, 2007; Haight, Jacobsen, Black, Kingery, Sheridan and Mulder, 2005; Haight, Marshall, Hans, Black and Sheridan, 2010; Haight, Ostler, Black and Kingery, 2009; Messina, Jeter, Marinelli-Casey, West, & Rawson, 2014; Pennar, Shapiro, & Krysik, 2012; Swetlow, 2003). These harmful effects can begin before birth. Studies of prenatal exposure to methamphetamine have found a variety of negative side-effects (Arria, Derauf, LaGasse, Grant, Shah, Smith, et al., 2006; Hohman, Oliver, & Wright, 2004). Roos, Kwaitkowski, Fouche, Narr, Thomas, Stein and Donald (2015) compared cognitive performance and physical brain structure between children exposed to methamphetamine and a control group with no such exposure. The results of cognitive tests and brain imaging revealed that those exposed to methamphetamine exhibited impaired cognitive performance and motor coordination, as well as disrupted brain matter integrity and neural connectivity. Diaz, Smith, LaGasse, Derauf, Newman, Shah, et al. (2014) examined mother-infant pairs that were exposed to methamphetamine, finding that prenatal methamphetamine exposure increased risk of cognitive problems 2.8 times over non-exposure at 7.5 years of age.

Previous research has identified numerous risk factors associated with parental drug abuse, demonstrating a strong relationship between parental drug abuse and child neglect. Famularo, Kinscherff, and Fenton (1992) explored physical or sexual abuse coinciding with parental drug or alcohol abuse by analyzing juvenile court records. An association was found between substance abuse and child maltreatment; specifically, alcohol abuse was associated with physical maltreatment and cocaine abuse with sexual maltreatment. Wolock and Magura (1996) conducted a longitudinal study to examine the causal relationship between parental drug abuse and subsequent child abuse and child protective services referrals. The findings supported the existence of such a relationship, with parental drug and alcohol abuse accounting for 60% of the variance in likelihood of a child protective services report being filed.

Parental drug abuse is generally shown to lead to negative health and behavioral outcomes later in life. Much of what is known in this regard has emerged from the ongoing adverse childhood experiences (ACE) study conducted by Felitti, Anda, Nordenberg, Williamson, Spitz, Edwards, Koss and Marks (1998). The ACE study, with over 17,000 participants, is one of the largest scientific studies to examine the relationship between multiple categories of traumatic childhood experiences and behavioral outcomes in adulthood. Although the sample was originally drawn from a disproportionately middle-class population, this research suggests a link between the number of negative or adverse childhood experiences and an increased likelihood of drug abuse and mental health problems in adulthood. Among males, those who had been exposed to six or more adverse experiences in childhood (e.g., physical or sexual abuse, parental drug abuse or imprisonment, parents not present in the home) were 46 times more likely to use drugs intravenously (IV) compared to those with no such experiences (Felitti, 2004). Moreover, of those who indicated that they experienced trauma during childhood, 27% specified that their trauma was related to growing up with drug use in the home (Felitti et al., 1998).

Dube, Felitti, Dong, Chapman, Giles and Anda (2003) provide evidence that ACE score and drug initiation can be multigenerational. Other research conducted using data from the ACE study suggests that childhood maltreatment and trauma are associated with age of substance use initiation, lifetime severity of substance use (Hyman, Garcia, & Sinha, 2006), and relapse-related experiences among cocaine users (Hyman, Paliwal, & Sinha, 2007; Hyman, Paliwal, Chaplin, Mazure, Rounsaville and Sinha, 2008). These findings support the increasing breadth and depth of knowledge on negative outcomes linked to drug exposure in utero and childhood (for more findings regarding this relationship, see Table 1).

Children of methamphetamine abusers and manufacturers may also develop a variety of problems resulting from the negative environmental factors to which they are exposed. Much of what is known regarding this relationship comes from data provided by parents, caregivers, child welfare workers, other professionals, and the children themselves. While a small number of studies are based solely on data from children themselves, more commonly, research incorporates the perspectives of other caregivers and first responders. The following two sections present the research findings from this body of literature divided by the party who provided the information (i.e., others or children themselves).

1.2. Others' perspectives on DEC

Those who encounter and interact with drug endangered children serve as an important source about this population. Haight et al. (2005) interviewed adults (e.g., child welfare workers, foster caregivers, and community professionals) who had experience with families involved with methamphetamine, focusing on perceptions of children's experiences, behaviors, and functional ability. The adults described that children are exposed to a generally antisocial and deviant lifestyle in methamphetamine homes characterized by abuse, neglect, danger, and isolation. This environment predisposes children to exhibit antisocial behavior and practices (e.g., lying, stealing, and drug use) and display signs of psychological, educational, and social deficiencies.

In another study, Haight et al. (2010) assessed children's behavior by having foster caregivers complete the Child Behavioral Checklist for Children (CBCL) for a sample of 15 children ages 7 to 15 years old removed from methamphetamine homes. These children were separated into experimental and control groups, with the experimental group being exposed to an intervention. The findings suggest that children from methamphetamine homes scored higher on externalizing behaviors and aggression. Ultimately the intervention seemed promising but more research is needed.

To gain insight into the maternal perspective, Haight, Carter-Black, and Sheridan (2009) interviewed four mothers recovering from methamphetamine abuse regarding their parenting during drug abuse and their recovery processes. The interviews revealed that three of these mothers were raised by methamphetamine-abusing parents and themselves experienced trauma as children associated with this. The mothers reflected on how the drug becomes more important to them than anything else, including their own children. They recognized that their children experienced physical and emotional abuse, neglect, and trauma due to violence, antisocial behavior, and substance abuse occurring in the home. These negative outcomes persisted even after the mothers had desisted from use.

Haight et al. (2010) and Haight, Marshall, et al. (2010) interviewed the caregivers of 41 children ages 6 to 14 years old from 27 methamphetamine-involved families and reviewed child welfare

Table 1
Observations and outcomes associated with drug-related abuse/neglect in childhood.

Dimension	Factor	Reference(s)
Cognitive	Post-traumatic stress disorder	Sprang, Staton-Tindall and Clark (2008)
	Anxiety disorders	Grant (2007)
	Antisocial personality disorder	Messina et al. (2014)
Behavioral	Drug abuse	Felitti (2004)
	Alcoholism	
	Early death	
	Aggression	Pennar et al. (2012); Haight, Black, and Sheridan (2010); Haight, Marshall, et al. (2010)
	Attempted suicide	Messina et al. (2014)
	Delinquent behavior	Altshuler and Cleverly-Thomas (2011)
Physiological	Ataxia	Grant (2007)
	Respiratory disease	Grant (2007); Hohman et al. (2004)
	Kidney & liver disease	
	Immune system impairment	
	Cancer	Anda (n.d.)
	Sexually transmitted infections	Messina et al. (2014)
	Tooth decay	Kirlic, Newman, LaGasse, Derauf, Shah, Smith, et al. (2013)
	Cortisol hyperactivity	
	Altered brain development	
Environmental	Exposure to toxic chemicals	Grant (2007); Pennar et al. (2012)
	Serious injury and trauma	
	Foster care placement	Sprang et al. (2008)
	Poly-victimization	
	Previous exposure in utero	Arria et al. (2006)
	Educational deprivation	
	Sexual abuse	
	Physical abuse	
	Emotional abuse	Messina et al. (2014)
	Unclean living environment	
	Ingestion of rotten food	
	Contaminated food	
In utero	Low birth weight	Hohman et al. (2004); Messina et al. (2014)
	Premature delivery	
	Smaller head circumference	
	Tremors	Colby, Smith, O'Connor, Brookheimer, Van Horn and Sowell (2012); Roos et al. (2015)
	Altered brain development	

Note. Some research reported numerous risk factors. In some cases, more than one study reported the same risk factors.

records. Part of this research examined parental perspectives on how methamphetamine use had impacted their children's lives. One mother's response illustrates her awareness of the power of her addiction and its impact on her children:

> I just had them all messed up and confused. And they didn't know how to act. I mean, they don't know how to act… From the ups and downs from that…You know, happy one minute and mean as hell the next. You know, I got them confused and scared…I feel like I put my kids in a corner…I just more or less ignored them…I shunned 'em. I was always on the run for meth. I'd come home, crash, maybe eat something, maybe shower. (p. 1230).

In research on protective factors for children from methamphetamine environments, Sheridan, Haight, and Cleeland (2011) examined data from the various caregivers of 41 children ages 6 to 14 years old from 21 families. Researchers conducted semi-structured interviews with the caregivers. Primary caregivers assessed the children's mental health and behavioral functioning. The data indicated that the children were exposed to multiple adverse situations including maltreatment, violence, drug use, and criminal behavior. This research also showed the importance of grandparents in providing drug endangered children with shelter, along with social and emotional support.

1.3. Children's perspectives

There is a small, but growing body of research that incorporates data from drug endangered children themselves. Using semi-structured interviews with 18 drug endangered children ages 7–14 years old, Haight, Ostler, Black, Sheridan, and Kingery (2007) demonstrated that drug endangered children can provide valuable information regarding their experiences. The interviews revealed a number of themes among the children's experiences, including parental methamphetamine abuse and exposure to illegal and anti-social behavior. Children also indicated that their encounters with law enforcement and child protective services were unpleasant. The children reflected on their parents' drug abuse behaviors as negative, using descriptors such as "sad," "scary," and "horrible" (Haight et al., 2007, p. 6).

Ostler et al. (2007) explored children's perspectives of their experiences and their mental health needs by interviewing 23 children in protective custody whose parents were abusing methamphetamine. The children were asked to describe their families, their emotional responses to their situations, and the behaviors of their parents and themselves. Through the interviews, children expressed a variety of negative emotions, such as fear, misery, tension, anger, and sadness. They commonly reported experiencing post-traumatic stress, nightmares, and suicidal tendencies.

In their study of protective factors for children, Sheridan et al. (2011) conducted semi-structured interviews with 41 children ages 6 to 14 years old from methamphetamine-involved families. This research highlighted individuals in the children's lives who provided them with support, guidance, and other prosocial interactions. One example is when a juvenile relied on a Drug Abuse Resistance Education (D.A.R.E.) officer as "a lifeline of sorts" during a traumatic experience.

> On Tuesday, it was church night, I went to church and I came back and I seen cop cars. And everything and I already knew. I already knew that this was going to happen. Cuz I already told (D.A.R.E officer) before this…and (D.A.R.E. officer) already told me what was going to happen and told me that he was going to be there (p. 1587).

Despite the fact that much of what is known about children from methamphetamine homes is based on a limited number of studies that utilize small sample sizes from a few geographical areas, the findings demonstrate that children are able to provide useful information regarding their experiences.

1.4. Responses to drug endangered children

Medical examinations are important for evaluating drug endangered children and are useful for more than just assessing physical well-being. The exams shed light on other issues facing these youths. Forensic nurses or other medical professionals working with emergency departments and law enforcement often conduct such examinations. A number of states implement responses for evaluating drug endangered children. Sixteen states publish data online regarding the types of

information currently being collected about these children (i.e., Arizona, Florida, Illinois, Kansas, Michigan, Minnesota, Missouri, Montana, Nebraska, North Carolina, Oklahoma, Oregon, Tennessee, Utah, Washington, and Wisconsin). Over 40 different types of data are collected in these states, with the five most common elements being urine for toxicology, vital signs, signs of abuse, motor and language development, and respiratory condition.

State-level responses to drug endangered children vary considerably, with some state's programs being more formal and standardized than others. Nebraska, for example, developed a specific protocol—the CHEM-L Protocol—for assessing children exposed to methamphetamine laboratories. This evaluation instrument consists of a primary data collection instrument and feedback forms to help improve data collection (CHEM-L Medical Working Group, 2004). Based on what data is publicly available, it is not clear how many other jurisdictions implement this type of internally-developed, systematic response with provisions for reassessment. A starting point for the development of medical evaluation responses for drug endangered children would be the medical evaluation protocol available on the National Alliance for Drug Endangered Children website (www.nationaldec.org).

Despite a degree of variability among state-level responses, there is consistency in that most initial evaluation procedures focus on physiological indicators of well-being. This is partly due to the value of such information for determining immediate well-being and documenting physical evidence for use in judicial trials. In contrast, little focus is placed on collecting information from children on their situations and circumstances during initial screenings. Data from children can inform justice personnel on the best stipulations to ensure safety and family reunification. As evidenced by previous research (see Haight, Carter-Black, et al., 2009; Haight, Ostler, et al. 2009), such information can be of great value for assessing the conditions to which these children are exposed, relating those conditions to established indicators of abuse and neglect, and informing future responses aimed at protecting this vulnerable population.

1.5. The present study

The study described herein explores the types of information that can be obtained through evaluations that collect verbal accounts from drug endangered children about their perceptions and experiences, in addition to physiological data. Data were collected from a Midwestern metropolitan police department with a forensic evaluation program. The department developed this program in response to the ongoing removal of children during raids on homes where methamphetamine manufacturing was suspected of occurring.

The program was adapted from a response protocol outlined in the *Drug Endangered Children Health and Safety Manual* published by California's Drug Endangered Children Resource Center (Oishi, West, Stuntz, Miller & Noble, 2000). It is unique in that it collects verbal accounts from children regarding the reasons they were brought in for the evaluation and the circumstances surrounding their removal. This research adds to the body of literature on drug endangered children by describing children's perspectives and experiences. Specifically, this study addresses the following questions: 1) What are the physiological, behavioral and environmental characteristics of the sample? and; 2) What and how do children describe the reasons for their experiences leading up to their removal from their homes?

2. Method

2.1. Sample

Reports from one hundred seventy-three children (98 boys, 75 girls) removed from 96 methamphetamine-related incidents that occurred between April 2001 and February 2015 were provided by a Midwestern U.S. police department. A mean of 1.8 children were removed from each home. Ages ranged from 16 days to 17 years ($M = 7.04, SD = 4.58$).[1] See Table 2 for detailed demographical information.

Table 2
Demographics of Sample.

Category	*n*	%
Sample size	173	100.0
Gender		
Male	98	56.6
Female	75	43.2
Race/ethnicity		
African American	3	1.8
American Indian	21	12.4
Hispanic	3	1.8
Multiracial	13	7.6
White	120	70.6
Unknown/missing	13	7.5
Family in household		
Both parents	72	41.6
No father	77	44.5
No mother	7	4.0
No parents	12	6.9
Other/unknown	5	2.9
Siblings in home		
Yes	138	79.4
No	35	20.6

Note. Non-parental family members included siblings, cousins, aunts, uncles, grandparents, and children. Non-familial members of the household included godparents, stepparents, guardians, or friends. Categories totaling less than 173 cases indicate missing data for that category.

2.2. Data collection

2.2.1. Examination facility

The examinations occur in a dedicated forensic medical-examination room at a hospital in a Midwestern U.S. city. Inside the hospital is a suite containing an examination room, bathroom, and waiting room. The evaluation room includes equipment necessary for the evaluation process (e.g., desk, computer, camera, pulse oximeter, thermometer, and urine collection equipment). The bathroom includes a shower and decontamination materials for initial treatment. The waiting room is used to facilitate contact between child protective services and law enforcement. Clothing is provided for dressing the children after the evaluation, along with toys to minimize trauma.

2.2.2. Data

The data collection instrument consisted of a paper examination form on which the forensic nurse examiner hand notated the child's demographic information, results of the physical examination, and observations during the drug exposure examination. See the Appendix for a list of data collected during the evaluation.

2.2.3. Medical examination procedure

Forensic observations of children were conducted at varying times of day following removal from a suspected methamphetamine manufacturing residence or other location (e.g., vehicle). Law enforcement officers transported children directly from the location of exposure to the examination facility. Upon arrival, children had the opportunity to shower and change clothes, after which a urine sample was collected to test for drug toxicity. As part of gathering medical history and to obtain a verbal account of the events surrounding removal, the nurse asked the child to describe what led to his or her being brought in, specifically inquiring, “What happened that you came to

[1] Data on a 90-year-old man was received but was not included herein because it was outside the scope of this study. However, the presence of an evaluation conducted on a senior victim brings to light another population—drug endangered elders—who may be an unrecognized group of drug abuse victims.

see me?" or "Why did you have to come see me?" A combination of paraphrases, direct quotes, and third-person notes were recorded.

2.2.4. Data analysis

Quantitative data were analyzed using IBM SPSS and qualitative data were transcribed into Microsoft Excel for thematic analyses. To compare the content of verbal accounts between age groups, data were divided into two categories: those ages six years and under and those ages seven years and older. This division was chosen because it is a common age at which children enter elementary school in the U.S. Through repeated readings of the medical notes, a thematic analysis was conducted by three independent reviewers to enhance the credibility of the coding scheme. Using an inductive open-coding scheme (Strauss & Corbin, 1998), common patterns and themes were identified, which are discussed in Section 3.2. The coding scheme was created, critiqued, and revised as needed. Any disagreements between coders were resolved through discussion. To compare the amount of tissue mass to national averages, body mass index (BMI) was calculated using the provided height and weight data for each child. Information on calculating BMI and national percentiles were obtained from Koldobsky and Thompson (2014).

3. Results

3.1. Physiological, behavioral, & environmental observations

A majority of children exhibited adequate hygiene, nutrition, and clothing. Of those for whom inadequacies were noted, poor hygiene was most commonly mentioned (see Table 3). Roughly half of the children above two years of age were deemed healthy in terms of BMI (46%), with 10% being underweight (see Table 4). Nurse observations included reports of poor speech relative to age, inability to share personal information, and abnormally small stature. However, it is important to note that no developmental screening tool was employed. Specific observations of inadequate hygiene included an 18-month-old girl whose diaper was soiled with feces, a 13-year-old boy who was very eager to take a shower, and a 12-year-old girl with head lice. The reports documented a variety of skin conditions, including cuts, scabs, and scars (see Table 5). According to household composition data 97.1% of the reports indicate familial presence at the time of the child's removal and 58.6% of children were not accompanied by both parents ($n = 101$; see Table 2). In instances with no family members around at the time of the child's removal, other individuals were present, such as friends, parents of friends, godparents, or legal guardians. While the reports do not explicitly indicate who in the house was engaging in drug-related activities, observation that a great majority of children were in the presence of other family members at the time of their removal indicates that drug-related activities were likely occurring within the family.

3.2. Verbal child account observations

A majority of the reports (69.4%; $n = 119$) included verbal accounts from or about the children themselves. The reports documented verbal accounts for children ranging in age from 3 to 17 years. Of those containing a verbal account, 58.6% were verbatim accounts (i.e., written in first person) of what the child said, and 41.4% were paraphrased summaries of what the child said or reports taken from another individual (e.g., police officer or guardian).

Table 4
Body mass index (BMI).

Category	*n*	%	Notes
Underweight	14	10.4	BMI under the 5th percentile constitutes underweight.
Healthy	62	46.0	BMI between the 5th and 85th percentile constitutes healthy.
Overweight	27	20.0	BMI between the 85th and 95th percentile constitutes overweight.
Obese	32	23.7	BMI over the 95th percentile constitutes obese.
Total	135		

Note. BMI was calculated for children over two years old that included both height and weight data. Percentiles are based on national averages reported in *The Harriet Lane Handbook: A Manual for Pediatric House Officers* (Koldobsky & Thompson, 2014). Although BMI is recommended as a screening method by the Centers for Disease Control and Prevention, it is not a diagnostic tool. Thus, no inferences into a child's health can be made (About Child and Teen BMI, 2015).

3.2.1. Age differences in verbal accounts

No verbatim or paraphrased verbal accounts were recorded for children under three years of age. In cases where reports documented qualitative information for those under three years of age, it summarized the nurse's or first responder's general observations of the child's well-being. For a 2.5-month-old boy, the nurse recorded, "Was in car with active lab." In another case, the nurse recorded for a one-year-old girl that the police officer reported, "[the] child was in a meth lab in a car." One report documented that a two-year-old boy used vulgar language, spit at and hit the child protective services worker and forensic nurse examiner, and threw toys. Although he did not give his name or a verbal account, he yelled "Shut the fucking door" during the exam.

For children ages three to six years, there were increased instances of verbatim and paraphrased verbal accounts recorded. These reports were consistent in providing general information. For example, one four-year-old boy stated, "My dad is sick; they took him to jail." In another case, a four-year-old boy screamed throughout the exam and exclaimed, "I don't like people". In a number of reports for this age group, children did not know why they had been brought in for an examination.

For children greater than six years of age, verbal accounts contained more detail about the circumstances surrounding their removal. Children in this age group tended to give accounts of suspicious activities in the home. For example, one 13-year-old boy stated that he "had noticed a smell for a while…cops said evidence of drugs [were] in [my] mom's room." In another case a 16-year-old girl stated, "the police busted in and found drugs. My fiancé was complaining of a smell there this morning." Additionally, children older than six years tended to report instances of adults other than parents being in the home, who were directly involved in drug use and/or manufacture, and in some cases were arrested.

Similarly, some children gave accounts of unrelated adults being in the home and engaging in drug-related behavior. For example, a 10-year-old boy described a non-familial father figure in the house, stating, "not really my dad, but we call him that. He was doing bad things in the

Table 3
Hygiene, nutrition, & clothing.

Category	*n*	%	Example
Hygiene, nutrition, & clothing Adequate	132	76.30	Within normal limits.
Hygiene inadequate	38	21.20	Odor, dirty skin, clothing, or diaper.
Nutrition inadequate	8	4.62	Complaints of hunger, descriptions of poor diet, or audible stomach growling.
Clothing inadequate	21	12.14	Missing garments, inadequate insulation factor in winter months.
Total	199		

Note. Multiple categories could have been selected per child, therefore total percentage exceeds 100%.

Table 5
Skin conditions.

Category	*n*	%	Explanations provided
Abrasions	14	8.1	Playing, bicycle accidents, and falling.
Bruising	8	4.6	Falling while playing, fighting, etc.
Bug bites	2	1.2	Playing outside, bed bugs, and mites.
Cuts/scratches	10	5.8	Playing, pets, sports.
Needle marks	2	1.2	Sites of self-injecting methamphetamine.
Rashes	16	9.2	Clothing rubbing against skin (e.g., diaper pin area).
Scabs	2	1.2	Bicycle, sport, and skateboard injuries.
Scars	3	1.8	Attempted suicide, prior injuries, surgical operations, rashes, and bites.
Multiple	42	24.3	A combination of rashes, cuts, bruises, abrasions, etc.
Other	15	8.7	Unidentifiable marks which did not fit into one of the above categories (e.g., discoloration, bumps, bites, scars, birth marks).
Within normal limits/not reported	59	34.1	Small, insignificant marks that the nurse determined were within normal limits.
Total	173	100.0	

garage while we were asleep. He was drinking some bad stuff. He was smoking too." In another report, a six-year-old boy stated, "The police came because they was smoking. There was my dad, my sister, and Angela. Two more people but I didn't know their names."

3.2.2. Odors, chemicals, & fire

Children discussed unpleasant odors from methamphetamine laboratories, harmful chemicals, and/or fires in their home; all represent immediate dangers to children and other occupants of the home. For example a 15-year-old girl remembered, "[an] acidic smell, funnels and water bottles, a greyish liquid in my mom's bathroom." Odors in the home often resulted in children being forced out of their home to avoid exposure. One eight-year-old girl said, "There is a bad smell in it. Dad makes us go outside." Children who experienced harmful chemicals frequently responded with this as the reason for being brought for an examination. For example, when asked why he was brought in, an eight-year-old boy answered, "so I won't get hurt by the chemicals." Witnessing fires in the home demonstrates the direct risk of injury associated with methamphetamine manufacturing. A ten-year-old boy told the nurse, "[My mom's] foot…and Mark's hand [caught on fire] when they were trying to put the fire out" and a three-year-old girl stated, "My house caught on fire; my cat jumped out the window."

3.2.3. Functional drug knowledge

Some children displayed knowledge of involvement in drug consumption and manufacturing by others, as well as knowledge of chemicals, drugs, and drug paraphernalia. One eleven-year-old girl recalled, "[The police] found white powder in my mom's purse; there is needles in my uncle's room." A thirteen-year-old boy stated, "There was weed in his room." A six-year-old boy told the nurse that his mother's boyfriend "smokes dope." Another six-year-old mentioned his mom was "smoking the good ones." A 10-year-old said he was there because his aunt had been "doing meth," and added, "She is in the back room and puts this salt stuff on; she smokes it."

3.2.4. Criminal and delinquent activity

Forensic nurse examiners documented children's references to criminal and delinquent behaviors. Although most references referred to behaviors of others, in a few cases the children themselves reported methamphetamine use. For example, in two separate incidents, two 13-year-old boys admitted to using methamphetamine intravenously, with one disclosing that he self-injected methamphetamine and was using other drugs and the other admitting to using methamphetamine for the past three months. Below is the nurse's paraphrased verbal account taken from one of these 13-year-old boys:

States that he has been using meth for the past three months. Usually uses 3–4×/week. Sometimes goes 2–3 weeks to heal injection site. States he uses the same needle over and over but others too. Stated specifically Willie has used the same needle. We got in an argument with some people. There was a big ole fight. An anonymous caller said there was a meth lab there. Child says he shot up meth last night about 0030. After that I went in my room listening to music. He states he has been using for the last three months. Know that Willie knows he has been using but not sure about Pam. Use [recently] and before that not exactly sure when.

One use of these evaluations and verbal accounts is illustrated through these two, young, IV drug users. With the implementation of these types of evaluations, children in need of drug treatment could be identified and provided with treatment services.

3.2.5. Police encounters

Children also gave accounts of their encounters with law enforcement and other first responders. Three children reported seeing their caretaker handcuffed, and seven were aware that their caregivers were going to jail. One four-year-old boy said "The cops came and handcuffed my mom and took her to jail; they took me 'cause they needed me, my mom's been bad." Another six-year-old boy remarked, "My mom got arrested." An eight-year-old boy reported, "Jacob got up, [the police] pushed him down and mom was on the floor, police told her to." A fourteen-year-old boy said "[The police] put me in cuffs 'cause it looked like I was squaring off with one of them to keep me safe." Another eight-year-old girl reported being scared when the police had their guns out. A 16-year-old girl's account of her experience, as paraphrased by the nurse, follows:

> She was at dad's. She was trying to go to sleep. The police knocked on the door and had a warrant for Marcus (her dad's friend). There was a meth lab going there. She would see people acting weird and looked high and there was a funny smell in the house. The police came in between nine and ten. It was really scary. There were 5–6 guns pointed at her when she opened the door.

3.2.6. Poor health and well-being

Some of the children examined lacked appropriate medical care and proper nutrition. One thirteen-year-old boy reported that his last meal was half of a hamburger and fries the day before the exam; he had split the meal in half to save the rest for the following day, saying he only eats once-per-day. The mother of a two-year-old boy reported that he had never seen a doctor. A five-year-old boy stated he did not have a "brush tooth" and had never been to a dentist. A sixteen-year-old girl, who reported being diagnosed with depression and bipolar disorder, had scars on her arm from self-cutting and stated that she may be pregnant.

4. Discussion

These observations provide unique insight into the health and well-being of drug endangered children, the situations to which they are exposed, and their abilities to understand their experiences. The children's verbal accounts provided vital information to medical professionals and child protective services. These verbal accounts systematically provided

details about a child's social environment, with whom he or she interacts, and family composition, as well as risk factors such as exposure to toxic chemicals, inadequate hygiene and nutrition, and interfamilial drug use and manufacture. As this research demonstrates, children can provide valuable information about their experiences and inform potential service or treatment needs beyond the documentation of physiological health and well-being. Even young children (i.e., under 6 years) are capable of providing valuable information about this often-overlooked shadow population. Due to fiscal and logistical constraints, not all drug endangered children receive structured forensic interviews or advanced mental health screenings. Thus, although alternative mechanisms for obtaining the types of information documented in this study exist, they are not likely to be implemented systematically.

4.1. Physiological, behavioral, & environmental indicators

Observations of children's physiological and behavioral state reinforce the potential harm that can be brought about through exposure to methamphetamine use and manufacture, including exposure to toxic, drug-related chemicals and neglect on the part of caregivers. It is important to note that many of the physical conditions, such as cuts or bruises, were reported to have occurred as children were playing or partaking in other normal childhood activities. Nevertheless, it is concerning that a majority of the children in these reports had at least one skin condition and that several were documented as having inadequate clothing, hygiene, nutrition, and medical care during the examination. The consequences of such inadequacies during critical developmental stages could be detrimental, as many of these children may be at risk for future problems and may be in need of follow-up treatment and care (e.g., see Grant, 2007; Messina et al., 2014; Pennar et al., 2012; Swetlow, 2003). Many cases, such as those in which children admitted to using methamphetamine and were exposed to toxic chemicals and other hazards, exemplify the need for treatment and follow-up.

As indicated by data on family composition, the children in these situations may be living in unstable home environments that involve family members engaging in methamphetamine use and manufacture, as well as involuntary interactions with unfamiliar individuals who come into the home to engage in drug use and manufacturing with the parents. Combining demographic data on family composition with the children's verbal accounts of their home environment, in some cases non-family members were the only adults in the home and may or may not have been acting as caregivers. As documented by empirical literature, such environments can place the children at increased risk for numerous problems including the potential for abuse or neglect (e.g., see Felitti et al., 1998).

4.2. Themes in verbal accounts

This research is unique in its focus on verbal accounts from children immediately following their removal from a residence where methamphetamine manufacturing was suspected of occurring. Observations from the verbal accounts indicate that the children's abilities to understand the situations to which they were exposed and the circumstances surrounding their removal varied, yet the insight they provided is valuable. It is important to consider the context within which the examinations occurred—these children were observed in the midst of potentially traumatic and life-altering experiences that involved involuntary separation from their family, home environment, and personal belongings.

Criminal and delinquent activity among some of the children, their caregivers, and others in their home sheds light on the potential type of environment from which these children were removed. Furthermore, as demonstrated by the youths who were regularly abusing methamphetamine, parental drug abuse can potentially open doors leading children to the same drug-immersed lifestyle with which their parents are involved. This supports the findings of previous research (Black, Haight, & Ostler, 2006; Haight, Carter-Black, et al., 2009; Haight, Ostler, et al., 2009). Gaining familiarity with drug terminology, desensitization to illegal activity, and—for older children—being networked with those in the drug world may facilitate future involvement in drugs and criminal activities surrounding its use. The observation that some children were using methamphetamine intravenously is demonstrative of the urgency of the situation and the concerns related to individual health, involvement with crime, and broader public health. Indeed, several studies link poor well-being in childhood with parental drug abuse and subsequent drug abuse and delinquent activity in adulthood (e.g., Felitti, 2004; Felitti et al., 1998). These findings reinforce empirical documentation of health risks among children living in homes where methamphetamine is manufactured. Exposure to noxious odors, as well as harmful chemicals and fire, represent some of the most direct and immediate dangers to this sample of drug endangered children. Previous research has demonstrated that exposure to toxic chemicals and harmful environmental conditions, whether in utero or childhood, is associated with numerous deleterious outcomes (e.g., see Grant, 2007; Pennar et al., 2012).

These children were able to provide useful descriptions of their home circumstances and the situations that led to them being brought to the examination facility. As children increased in age, they appeared to be better able to give detailed descriptions of their situations and preliminary insight into their home circumstances. However, it is noteworthy that even children as young as three years were sometimes able to provide details about their environment. This demonstrates the value of collecting verbal accounts during forensic examinations of drug endangered children, regardless of the child's age. Indeed, in cases where the child's developmental level was insufficient for providing a verbal account, the nurse or first responder was able to document qualitative data that provided insight into the circumstances surrounding the child's removal.

The children's descriptions of their situations demonstrated their ability to talk about drugs in a detailed manner. Children whose caregivers are illicit drug users and manufacturers may be more familiar with terminology than those who do not. Furthermore, with these children associating with teachers and peers who may not have this knowledge and who likely express negative attitudes toward drug abuse, these drug endangered children may be faced with internal conflict over the trustworthiness of authority figures. Drug-abuse awareness programs for children often begin early in a child's education. The D.A.R.E. program, for example, recommends beginning anti-drug education as early as kindergarten (D.A.R.E. America, n.d.). This, in combination with stigmatization and demonization of illicit drug users in society, has the potential to augment the cognitive dissonance that may arise from this situation. Previous research has even found that drug abuse may be taboo for discussion and that children may fear consequences for disclosure of parental drug behaviors (Ostler et al., 2007).

Traumatic encounters with law enforcement during childhood could potentially shape their subsequent attitudes and perceptions of law enforcement. If a child's first or early experience with law enforcement or child protective services is negative, there is a greater risk that they will be distrustful of these services and less likely to seek their assistance when it is needed. Indeed, it is inherently necessary for law enforcement to use force when conducting drug-related arrests and seizures; however, it is important to increase awareness of potential presence of children in the environment who may require trauma-minimizing responses. First responders such as law enforcement and child welfare should be trained on how to handle children in these circumstances. With one of the primary goals of law enforcement being to secure trustworthiness within the community, the potential loss of trust brought about due to parental illegal and negligent activity is worth addressing.

Although the observations have implications for real-world outcomes, this research has several limitations. The data presented here describes a small sample of children from a single jurisdiction in the

Midwest United States, who comprise only a small subsample of drug endangered children. Thus, no conclusions can be drawn regarding the national population of drug endangered children or national patterns of drug abuse and child neglect. Since the data were not originally collected for research purposes, the discussions with children were not audio-recorded. Furthermore, it is not possible to establish a causal relationship between drug endangerment and the observations discussed herein, as the nature of the data do not permit predictions on how specific observations in the reports relate to child endangerment or exposure to toxic chemicals and illegal activities. Additionally, skin conditions, nutrition, and BMI cannot be linked to the drug-related activities. For example, in several reports children remarked that they received cuts, scrapes, and bruises while playing.

4.3. Conclusions

The innovative program that provided the data analyzed here was ahead of its time in that it examined drug endangered children before this issue gained national attention. The realization by these law enforcement officials and administrators that children should be assessed and examined after they are removed from suspected methamphetamine manufacturing sites is to be commended. Although such a program requires investment in specialized personnel and equipment, the costs of not adequately assessing these children, providing short-term and long-term care, and following up could be much higher. When not taken into consideration in advance through systematic training and standardized responses, drug endangered children are placed in the line of fire between first responders and drug-abusing caregivers.

The complex interactions between parental drug use, criminal activity, and the mental and physical health issues of drug endangered children require the intervention of many types of professionals. Forensic nurses and other medical professionals play a key role in identifying and treating drug endangered children. It is important that these professionals are able to recognize signs of contamination and toxicity, collect specimens for drug testing and exposure to chemicals, as well as provide a safe and therapeutic environment. In order to respond appropriately, these medical professionals should have an understanding of childhood developmental stages. Crisis interventions are necessary because of the traumatic nature of being removed from a known environment and placed in an unfamiliar setting. Cooperation and collaboration with others through the clarification of boundaries and clear communication is essential to minimize the risks of these children being overlooked.

Although parents and caregivers are ultimately responsible for their children, the potential consequences of traumatic encounters with law enforcement could subsequently affect children. As evidenced here, children are not only at risk of exposure to trauma as a result of the dangerous and criminal environments within the home, but also due to encounters with law enforcement. Although the data discussed here are from a small number of examinations from a single jurisdiction, they point to the need for improvement in responses and services statewide and nationwide. Even though the sample contained herein is a subset of a larger population, it still sheds light on an important issue where improvements can be made. This study points to three primary implications, supporting the need for: a) increased awareness and improved training among first responders; b) incorporation of verbal accounts into evaluations of drug endangered children, and; c) national implementation of immediate and follow-up evaluations of drug endangered children.

Increased awareness and improved training is needed for first responders to better address children's needs. Specialized training and the development of protocols aimed at minimizing the risk for trauma from such encounters could reduce the risk of these children experiencing negative outcomes such as those documented here. There is also a need to develop response strategies that maintain safety while minimizing unintended harms or dangers to children who may be present in such situations.

A systematic evaluation procedure for drug endangered children which incorporates a psychological assessment should be developed. This is particularly important considering the trauma documented in this research. Though the immediate consequences of child abuse and neglect often involve physical trauma, the psychological trauma they experience may persist into adulthood (Kirlic et al., 2013). Furthermore, these systematic evaluation procedures should include the collection of verbal accounts from the children themselves of the circumstances surrounding the removal from their homes. As demonstrated here, this type of information provides invaluable insight into the potential trauma and risks to drug endangered children.

Immediate and follow-up evaluations of drug endangered children should be implemented nationally. This detailed information has short and long-term benefits. In the short term this information could identify immediate needs of a drug endangered child (e.g., physical and mental health, and trauma). Long-term this information could inform policy efforts aimed at minimizing trauma during encounters with first responders. The examination program discussed here serves as an excellent example of the importance of this type of response. It is unfortunate that medical evaluations, assessments, and follow-up evaluations are not systematically conducted for each child removed from a drug home. The costs of developing and implementing such a system would be minimal compared to the potential costs of inadequate responses to this vulnerable population. The reality is that in the absence of such medical evaluation programs for drug endangered children, a large void exists.

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Appendix A. Appendix

Data collected on forensic examination reports.

Category	Data collected
Demographics	Age
	Gender
	Race
	Location of exposure
	Time of removal
	Time of examination
	Number of siblings
	Age of siblings
	Persons living in household
	General comments about child
Physical examination	Heart rate
	Respiratory rate
	Blood pressure
	Body temperature
	Height
	Weight
	Head, eyes, ears, nose and throat exam
	Heart beat pattern
	Lung fields
	Abdomen condition
	Skin condition
	Extremities
	Neurological condition
	Genitalia condition
	Developmental level
	Behavioral observations

(*continued*)

Category	Data collected
Drug exposure examination	Hygiene, nutrition, and clothing observations Pulse oximeter test result and location Time of DHS report Clothing itemization Urine test and visual notes Photographs taken (yes/no) Verbal account given by child Medications taken Physical marks notation diagram General comments regarding physical marks

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