Mental Health Disorders among Children within Child Welfare who have Prenatal Substance Exposure:

Rural vs. Urban Populations

Ira J. Chasnoff
Children's Research Triangle

Erin Telford
Children's Research Triangle

Anne M. Wells
Children's Research Triangle

Lauren King
Children's Research Triangle

This study analyzed differences in mental health diagnoses among Illinois child welfare-involved youth who have had prenatal substance exposure. Results indicate that youth from the rural area had a significantly higher rate of co-occurring mental health disorders. A multiple regression analysis revealed five significant predictors: living in a rural area, a history of neglect, having Fetal Alcohol Syndrome or an alcohol-related neurodevelopmental disorder, and age. These results have implications for adapting existing treatment models.

Funding Source: Supported in part by grant numbers 90-CU-0005 and 90-CU-0072 from the Administration for Children and Families, U.S. Department of Health and Human Services.

Prenatal substance exposure is a significant risk factor for child development. The direct biological toxicity of the drugs and the social and psychological chaos of the drug-abusing environment ultimately impede the child's growth and development and pose risk to the child's overall well-being (Chasnoff, 2011; Young, 2006). These matters frequently are complicated by the child's referral into the child welfare system, with significant numbers of infants in foster care having been prenatally exposed to alcohol and illicit drugs (Dicker & Gordon, 2004) and significant numbers of children with Fetal Alcohol Spectrum Disorders (FASDs) in out-of-home placement (Lange, Shield, Rehm, & Popova, 2013).

Multiple studies have documented the high prevalence of mental health difficulties among children and adolescents with prenatal exposure to alcohol (Fryer, McGee, Matt, & Riley, 2007; O'Connor et al., 2002), and prenatal cocaine, opiate, and marijuana use (Chasnoff et al., 1998; Fried & Smith, 2001; Meeyoung, Minnes, Yoon, Short, & Singer, 2014) have been shown to have a long-term impact on behavioral and mental health disorders as children grow older.

Prenatal substance exposure and removal from the birth home are just two of many factors that lead to the high rate of mental health difficulties among children in the child welfare system (Chasnoff, 2011). In a nationwide survey of 3,803 children 2–14 years of age who were in out-of-home placement, almost half (47.9%) had clinically significant emotional or behavioral problems (Burns et al., 2004). Youth in foster care also have been found to be more likely to experience depression, anxiety, loss of behavioral or emotional control, and poorer psychological well being than youth in the general population (Shin, 2005) and suffer greater long-term psychiatric illness (Viner & Taylor, 2005).

Additional risk factors come to bear when one considers demographically diverse populations. Several investigators have found that rural children in general are more likely to have a mental health problem and behavioral difficulties than urban children (Lenardson, Ziller, Lambert, Race, & Yousefian, 2010). Researchers have postulated that the basis of the higher rates of mental health problems in rural versus urban populations

of children primarily lies in a lack of providers and limited availability of specialty mental health providers in rural areas (Anderson, Neuwirth, Lenardson, & Hartley, 2013; Howell & McFeeters, 2008; Lambert, Ziller, & Lenardson, 2009; Sturm, Ringel, & Andreayeva, 2003).

The purpose of this study is to assess the presence of mental health disorders in rural versus urban populations of children with prenatal substance exposure who have been in custody of Illinois' child welfare system and to elucidate the factors that may differentiate risk in the two groups. Using existing research on rural populations as a basis, we hypothesized that:

1. Children in rural areas with prenatal substance exposure who have been in the custody of the Illinois child welfare system will have a significantly higher rate of mental health disorders than prenatally exposed children in the child welfare system in an urban area.

2. Children in rural areas with prenatal substance exposure who have been in the custody of the Illinois child welfare system will have increased rates of mental health disorders due to a lack of access to mental health services.

Methods

Participants

Children's Research Triangle (CRT) focuses on the evaluation and treatment of children at high risk for long-term developmental and mental health problems, including those children in the child welfare system that have been removed from their biological families due to prenatal exposure to alcohol or illicit drugs. The populations under investigation in this study were enrolled in one of CRT's two behavioral health clinics. The first group consists of 95 children, 4 to 18 years old, who had a confirmed history of prenatal substance exposure, had been in the custody of the Illinois Department of Children and Family Services (DCFS), and were evaluated at CRT's Southern Illinois clinic. This clinic is embedded

in a federally qualified Community Health Center and serves 34 rural counties in the far southern half of Illinois. The second group is composed of 175 children in the Chicago metropolitan area, ages 4 to 18, with a confirmed history of prenatal substance exposure and a history of having been in DCFS custody, who were evaluated at CRT's Chicago clinic.

Measures and Procedures

Child Assessment

Documentation of prenatal alcohol or illicit drug exposure was confirmed for all children in the study through review of the child's birth, medical, child welfare, court, and/or adoption records; however, exact dosage and patterns of maternal substance use were not consistently available. The initial evaluation for each child consisted of a full pediatric, neurological, and dysmorphology diagnostic examination, conducted by a board-certified pediatrician, and a comprehensive psychological evaluation, conducted by doctorate level psychologists. Assessment of possible facial dysmorphia related to prenatal alcohol exposure was conducted via direct examination and analysis of a digital facial photograph of each child (Astley & Clarren, 2000). Following the medical evaluation, the child and family underwent a clinical interview with a psychologist, and the child was evaluated across multiple domains. The neurodevelopmental battery with which each child was evaluated involved assessment of neurocognitive functioning, including general intelligence, memory, executive functioning, and speech and language; academic achievement; self regulation, including sensory processing, social skills, and behavior; trauma symptomatology; and adaptive behaviors (Astley et al., 2009; Chasnoff, Wells, Telford, Schmidt, & Messer, 2010; Kodituwakku, 2012).

Substance-Exposure Diagnosis

Based upon the completed comprehensive evaluation, children were assigned a substance exposure-related diagnosis as outlined in Table 1. No matter the diagnostic classification, all children with documented prenatal exposure to alcohol and/or illicit drugs were eligible for inclusion in the study.

Table 1. Criteria for diagnoses related to prenatal substance exposure (adapted from Astley & Clarren, 2000; Astley & Clarren, 2001; Centers for Disease Control and Prevention, 2005)

Diagnostic Category	Alcohol Exposure History	Dysmorphia	Growth	CNS
	Birth mother confirms; or, kinship reports; or, medical records; or, prenatal / birth records; or, DCFS confirms; or, police / court reports	Short palpebral fissures Upper lip (4, 5) Philtrum (4, 5)	Height or weight equal to or less than 3rd percentile currently or in the past	Microcephaly (equal to or more than 2SDs below normed mean); or MR or CNS problem per evaluation: >3 domains more than 2SDs below the normed mean
FAS **Fetal alcohol syndrome**	Confirmed alcohol exposure	All 3 criteria present	+	+
pFAS **Partial fetal alcohol syndrome**	Confirmed alcohol exposure	All 3 criteria present	Normal	+
ARND#	Confirmed alcohol exposure	None to 2 criteria present	±	+
ARBD **Alcohol-related birth defects**	Confirmed alcohol	Major structural abnormalities	Normal	Normal
PDE **Prenatal Drug Exposure**	Confirmed maternal use of illicit drugs with no alcohol	None	±	±

#Based on the DSM 5 *(American Psychiatric Association, 2013), the term ARND will be replaced with the term Neurodevelopmental Disorder with Prenatal Alcohol Exposure (ND-PAE).*

Mental Health Diagnosis

Mental health diagnoses were made on the basis of the *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision* (DSM-IV-TR) (American Psychiatric Association, 2000) criteria, utilizing all the

data collected from the standardized tests, questionnaires, and clinical interviews. A team of psychologists trained and supervised by the clinical director were responsible for making the mental health diagnoses.

Statistical Analysis

Frequency analyses, *t*-tests, and chi square analyses were used to analyze the descriptive data for the sample. Analysis for hypothesis 2 was completed through direct multiple regression using IBM SPSS 21.0 REGRESSION and IBM SPSS FREQUENCIES for evaluation of assumptions. The dependent variable for the regression analysis was number of mental health disorders. Independent variables were selected based on demographic, child welfare, and clinical factors: age; race; gender; site of residence (rural vs. urban); history of abuse; history of neglect; current placement; diagnosis of fetal alcohol syndrome (FAS), partial fetal alcohol syndrome (pFAS), alcohol-related birth defects (ARBD), alcohol-related neurodevelopmental disorder (ARND), or prenatal illicit drug exposure (PDE); and history of previous receipt of mental health services.

The Illinois DCFS Institutional Review Board and the Western Institutional Review Board approved research procedures for this study.

Table 2. Demographic descriptors of children

		All $N = 270$	Rural $N = 95$	Urban $N = 175$	$*t/X^2$	p
Mean age in years: Mean (SD)		9.17 (4.07)	8.77 (4.00)	9.39 (4.11)	$t = 1.20$	.23
Gender (% male)		153 (56.7%)	51 (53.7%)	102 (58.3%)	$X^2 = .53$	.52
Race/ ethnicity	African American	96 (35.6%)	19 (20.0%)	77 (60.2%)		
	Caucasian	93 (34.4%)	60 (63.2%)	33 (25.8%)		
	Hispanic	5 (1.9%)	4 (4.2%)	1 (0.8%)		
	Biracial/Other	29 (10.7%)	12 (12.6%)	17 (13.3%)		
	Missing data	47 (17.4%)	47 (17.4%)			

**Significance tests compare only rural to urban.*
***Chi square not calculated because expected count less than 5 in two cells*

Results

Demographic Descriptors

The children in the two groups were similar for mean age and for gender distribution (see Table 2). Differences in racial distribution reflected the racial and ethnic distribution of children in the child welfare system in the two areas of the state. All children in both groups had Medicaid as their primary source of insurance.

Table 3. Parental substance exposure patterns

Substance	Total *N* (%)	Rural *N* (%)	Urban *N* (%)	χ^2	*p*
Alcohol	121 (44.8%)	54 (56.8%)	67 (53.2%)	.29	.68
Tobacco	52 (19.3%)	21 (22.1%)	31 (29.5%)	1.43	.26
Opiates (heroin, methadone)	27 (10.0%)	5 (5.3%)	22 (21.85)	11.25	.001
Prescription medications	24 (8.9%)	14 (14.7%)	10 (10.1%)	.96	.39
Cocaine	113 (41.9%)	42 (44.2%)	71 (66.4%)	10.01	.002
Methamphetamine	16 (5.9%)	13 (13.7%)	3 (3.0%)	7.50	.008
Marijuana	63 (23.3%)	33 (34.75)	30 (29.4%)	.64	.45

Prenatal Substance Exposure Patterns

The majority of children (54%) were polydrug exposed, with higher rates of opiate and cocaine exposure in the urban population and a higher rate of methamphetamine exposure in the rural population (see Table 3). These differences were consistent with the patterns of substance use disorders seen in Illinois' general population in the two areas of the state.

Child Welfare Factors

Although age at time of initial removal was similar for the two groups, current placement differed significantly (see Table 4). More children in the rural population currently were in the care of their biological families, and more rural children had been adopted. The prevalence of neglect in the biological families of children in rural areas was significantly greater

than in the biological families of children in urban areas. Access to early intervention services was similar for the two groups; there was no difference in the proportion of children in each of the groups who had received early intervention or developmental or mental health interventions prior to referral to the CRT clinics.

Table 4. Child welfare factors

	All children $N=270$	Rural $N=95$	Urban $N=175$	t/X^2	p
Current placement					
Biological	12 (4.4%)	11 (11.6%)	1 (0.8%)	X^2=31.62	<.001
Guardian	14 (5.2%)	2 (2.1%)	12 (9.2%)		
Foster	87 (32.2%)	33 (34.7%)	54 (41.2%)		
Adoptive	97 (35.9%)	49 (51.6%)	48 (36.6%)		
Other	16 (5.9%)	0 (0%)	16 (12.2%)		
Incidence of neglect in the families	152 (56.3%)	61 (66.3%)	91 (52.3%)	4.82	.037
Age at time of removal (mean months)	1.94 (2.51)	2.24# (2.71)	1.79 (2.40)	t = -1.35	.18
% with previous developmental intervention before age 3	113 (41.9%)	42# (46.7%)	71 (41.5%)	X^2 = .64	.43
% with previous developmental intervention after age 3	127 (47.0%)	44# (50.6%)	83 (47.7%)	X^2 = .19	.70
% with previous mental health assessment/ intervention	217 (80.4%)	78# (82.1%)	139 (79.4%)	X^2 = .28	.63

** Missing some data on 23 children in the rural category*
 # Some variation in N for this category depending on specific factor

Medical and Neurodevelopmental Evaluation

Comprehensive evaluation of the children revealed that, while all children had confirmed prenatal substance exposure, 105 of the 270 children (38.9%) received a diagnosis within Fetal Alcohol Spectrum Disorders

Table 5. Substance exposure-related diagnoses

Diagnosis	All children *N* (%)	Rural *N* (%)	Urban *N* (%)	χ^2	*p*
Total FASDs	105 (38.9%)	32 (33.7%)	73 (42.0%)	1.77	.19
FAS	45 (16.7%)	4 (4.2%)	41 (23.6%)	16.52	< .001
ARND	58 (21.5%)	27 (28.4%)	31 (17.8%)	4.09	.06
pFAS	0				
ARBD	2 (0.7%)	1 (12.5%)	1 (1.1%)	5.08	.15
PDE	171 (63.3%)	79 (83.2%)	92 (52.6%)	24.81	< .001

(FASDs) (see Table 5). Although there was no difference in the rates of FASDs between the two groups of children, significantly more of the children in the urban population met criteria for fetal alcohol syndrome (FAS) than children in the rural population. The rural population of children had a significantly higher rate of prenatal exposure to illicit drugs without alcohol exposure than did the urban population.

Similar to previous reports of children in the child welfare system, there was a high rate of mental health diagnoses within both populations in this study (see Table 6). However, co-occurring mental health disorders occurred significantly more frequently in the rural than in the urban population of children. Consistent with this finding, children in rural areas had a significantly greater mean number of mental health diagnoses (1.89; *SD* = 0.92) as compared to the mean number of mental health diagnoses (1.60; *SD* = 1.17) in the urban population (t (235.29) = -2.28, $p < .02$). Attention-deficit/hyperactivity disorder (ADHD) was by far the most common diagnosis in both groups of children, while the internalizing behaviors (anxiety disorders and mood disorders) as well as developmental disorders were significantly more common in the rural population.

A standard multiple regression was performed with the number of mental health diagnoses as the dependent variable. Site of residence (urban vs. rural), history of receiving mental health services, abuse, neglect, ARBD, FAS, ARND, PDE, gender, race (Caucasian and African American), and age in months and current placement (biological family, guardian, foster

Table 6. Substance exposure-related diagnoses

Diagnosis	Total	Rural	Urban	X^2	*p*
ADHD	121 (44.8%)	45 (47.4%)	76 (43.7%)	0.34	.61
Anxiety Disorder	43 (15.9%)	24 (25.3%)	19 (10.9%)	9.54	.003
Disruptive Behavior Disorder	22 (8.1%)	8 (8.4%)	14 (8.0%)	0.20	1.00
Mood Disorder	59 (21.9%)	30 (31.6%)	29 (16.6%)	8.12	.006
Trauma	51 (18.9%)	17 (17.9%)	34 (19.4%)	0.10	.87
Developmental Disorders	28 (10.4%)	21 (22.1%)	7 (4.0%)	21.72	<.001
Cognitive	77 (28.5%)	23 (24.2%)	54 (30.9%)	1.33	.26
Adjustment	28 (10.4%)	5 (5.3%)	23 (13.2%)	4.17	.058
Psychosis	5 (1.9%)	1 (1.1%)	4 (2.3%)	0.53	.66
Other	24 (8.9%)	4 (4.2%)	20 (11.4%)	3.96	.07
% with one mental health diagnosis	89 (33.0%)	29 (30.5%)	60 (34.3%)	11.59	.003
% with > 2 mental	147 (54.4%)	62 (65.3%)	85 (48.6%)		

family, adoptive family) served as the independent variables. Race (Caucasian and African American) had three missing cases, abuse had eight missing cases, neglect had four missing cases and ARND and FAS had one missing case each, with a resulting *N* of 257 for the regression.

Three other variables also were initially considered for inclusion in the regression: age of entry into the child welfare system, age of removal from the home, and age of first receipt of developmental or mental health services. However, these variables were dropped because they demonstrated excessive skewness and kurtosis that were not responsive to reduction of the number of outliers and a square root transformation. These variables did not account for a significant amount of variance in the regression when included in the analysis.

Table 7 displays the correlations between the variables, the unstandardized regression coefficients and intercept, the standardized regression coefficients, the semipartial correlations, R^2, and adjusted R^2. *R* for the regression was significantly different from zero ($F(16, 240) = 4.58$,

$p < .001$). For the five regression coefficients that differed significantly from zero, 95% confidence intervals were calculated: the confidence limits for urban were -.76 to -.09, those for neglect were .07 to .63, those for FAS were .12 to .84, those for ARND were .05 to .68, and age (older children have more diagnoses) .00 to .01.

Five of the independent variables contributed significantly to prediction of the number of mental health diagnoses. Living in an urban area ($sr^2 = .02$) demonstrated a negative relationship, meaning that children in a rural area have a greater number of co-occurring mental health disorders. The other significant independent variables included children who came from families with a history of neglect ($sr^2 = .02$), children with FAS ($sr^2 = .02$) or ARND ($sr^2 = .02$), and older children age ($sr^2 = .05$). The sixteen independent variables in combination contributed another .10 in shared variability. All together, 23.0% (17.9% adjusted) of the variability in number of mental health diagnoses was predicted by the sixteen independent variables.

Discussion

The current study is the first to examine geographic disparities in mental health disorders in children in the child welfare system who have been prenatally exposed to alcohol and illicit drugs. Based on previous research demonstrating high rates of mental health disorders in children in the child welfare system (Burns et al., 2004; Shin, 2005; Viner & Taylor, 2005), it is not surprising that the rate of having at least one mental health diagnosis was similar in the two groups. However, both the rate and the mean number of co-occurring mental health disorders were significantly higher in the rural population. Contrary to our second hypothesis, as well as previous studies of general populations of children in rural areas (Anderson et al., 2013; Howell & McFeeters, 2008; Lambert et al., 2009; Sturm et al., 2003), the higher number of co-occurring mental health disorders in children in rural areas was not related to lack of access to developmental and mental health services. In fact, the vast majority of children with co-occurring mental health diagnoses in the rural population (82%) had received earlier mental health services. Rather, the driving factor for the increased

Table 7. Standard Multiple Regression of Demographic, Child Welfare and Alc

Variables	Diagnosis	Urban	Abuse	Neglect	ARBD	FAS	ARND	PDE	Bio family
Urban	-.12								
Abuse	.07	-.00							
Neglect	.21	-.14	.30						
ARBD	-.04	-.08	-.04	.05					
FAS	.11	.24	-.01	.05	-.03				
ARND	.15	-.12	.02	.06	-.03	-.24			
PDE	-.07	-.28	-.03	-.06	.05	-.14	-.05		
Bio family	.03	-.26	.03	-.03	-.01	-.10	.06	.13	
Guardian	.00	.10	-.03	.07	-.02	-.02	-.00	.00	-.05
Foster	-.09	.11	.02	.04	.07	-.01	-.11	-.09	-.18
Adopt	.12	-.16	-.10	-.08	-.05	.02	.08	.06	-.19
Gender	-.10	-.03	.05	.01	.07	-.06	-.00	.05	.02
Caucasian	.06	-.39	.17	.18	-.05	.07	.06	.08	.14
African American	.03	.40	-.12	-.18	-.06	-.05	-.05	-.12	-.17
MH	.25	-.02	.21	.15	-.12	.02	.01	-.08	.02
Age	.33	.08	.15	.07	-.08	.04	.07	-.07	-.02
Means	1.70	.65	.26	.57	.00	.17	.22	.64	.05
Standard deviation	1.12	.48	.44	.50	.06	.37	.42	.48	.21

rate of co-occurring mental health disorders in the rural population was that group's higher rate of neglect. Although federal data have indicated that 78% of the substantiated cases of maltreatment across the nation are related to neglect (U.S. Department of Health and Human Services, 2012), there has been no previous recognition of higher rates of neglect specifically within rural populations.

Chronic neglect has more long-term implications for children's mental health and development than does abuse or other forms of maltreatment

ohol Diagnosis Variables on Number of Mental Health

Guard'n	Foster	Adopt	Gend	Cauc'n	Af Am	MH	Age	B	B	sr2 (unique)
								-.42*	-.18	.02
								-.09	-.04	
								.35*	.16	.02
								-.01	-.00	
								.48*	.16	.02
								.36*	.14	.02
								-.10	-.04	
								.14	.03	
								-.12	-.02	
-.19								.04	.02	
-.20	-.67							.03	.01	
-.08	-.13	.18						-.18	-.08	
-.08	-.08	.10	.14					.13	.06	
.12	.16	-.10	-.15	-.72				.32	.14	
.04	-.07	.09	-.12	.04	-.01			.33	.12	
.09	-.34	.36	.04	.03	.10	.36		.01**	.27	.05
						Intercept = .786		R^2 = .23a		
.05	.41	.42	1.44	.36	.47	.80	110.24	*Adjusted* R^2 = .18		
.23	.52	.49	.50	.48	.50	.40	49.28	R = .48		

(Hildyard & Wolfe, 2002). Neglect alters the development of the body's stress response system, compromising a child's ability to cope with adversity (National Scientific Council on the Developing Child, 2012). Relative to children who have been physically abused, children who are neglected have more severe cognitive and academic deficits, social withdrawal and limited peer interactions, and internalizing (as opposed to externalizing) problems (Hildyard & Wolfe, 2002; Perry, 2012; Tarullo, 2012). Within the current study, and consistent with the greater prevalence of neglect, children in

the rural population exhibited higher rates of internalizing behaviors, specifically anxiety and mood disorders, as compared to the children in the urban population.

The recognition that children in rural populations have greater risk for co-occurring mental health disorders stresses the importance of child welfare and mental health professionals recognizing the impact of neglect. Children with a history of physical or sexual abuse are relatively easily identified by professionals and targeted for treatment. Neglect, however, does not trigger the same referrals, even though the long-term consequences are known to be more detrimental (Hildyard & Wolfe, 2002). Additionally, while a multitude of interventions exist to specifically treat children and youth with a history of physical or sexual abuse, there are few interventions that target the long-term impact of neglect (Widom, 2013).

As in previous studies, FAS and ARND also were significant factors in increasing risk for co-occurring mental health disorders. The assessment and treatment of neglect in the context of prenatal substance exposure requires an appreciation of the neurodevelopmental sequelae of prenatal substance exposure: neurocognitive dysfunction, attentional difficulties, and problems with mood and behavior (Chasnoff et al., 1998; Fried and Smith, 2001; Fryer et al., 2007; Meeyoung et al., 2014; O'Connor et al., 2002). The importance of early recognition of risk in this population is underlined by increasing age in the current study also being a significant contributor for increased number of mental health disorders. Previous studies (Streissguth, Barr, Kogan, & Bookstein, 1996) have documented that early recognition and intervention prior to the age of six years is a key factor in improving the long-term developmental and mental health trajectory of children with prenatal substance exposure.

Future studies investigating neglect among rural populations are needed, as is the development of treatment interventions for children with a history of neglect and prenatal substance exposure. For instance, recognizing that children who are neglected have a unique experience that is different from the child who has been physically or sexually abused is an important first step in creating treatment programs targeting their specific social, emotional, and behavioral needs. Likewise,

adapting existing treatment models to include "bottom-up" approaches that focus on the relationship between the mind and body and improve self-regulation are critical for youth who have been substance-exposed, as this will help improve the child's focus and ability to gain insight from the existing treatment approaches.

The results from this study cannot be generalized to all children in the child welfare system. It is focused on a very specific population: children in the child welfare system with prenatal substance exposure. However, the results clearly demonstrate the need for child welfare personnel to recognize differences in youth from various demographic areas. There are significant differences between youth from rural versus urban areas, both in their experience and their ultimate outcome. As youth from rural areas are more at risk for developing multiple mental health issues, the child welfare system must develop a systemic way of identifying and referring these young people and examine the allocation of financial and clinical resources to rural areas that historically have been neglected.

References

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Anderson, N. J., Neuwirth, S. J., Lenardson, J. D., & Hartley, D. (2013). *Patterns of care for rural and urban children with mental health problems* (Working Paper #49). Portland, ME: University of Southern Maine, Muskie School of Public Service, Maine Rural Health Research Center.

Astley, S. J., & Clarren, S. K. (2000). Diagnosing the full spectrum of fetal alcohol-exposed individuals: Introducing the 4-digit diagnostic code. *Alcohol & Alcoholism, 35*, 400–412.

Astley, S. J., & Clarren, S. K., (2001). Measuring the facial phenotype of individuals with prenatal alcohol exposure: Correlations with brain dysfunction. *Alcohol & Alcoholism, 36,* 147–159.

Astley, S. J., Olson, H. C., Kerns, K., Brooks, A., Aylward, E. H., Coggins, T .E., Davies, J., Dorn, S., Gendler, B., Jirikowic, T., Kraegel, P., Maravilla, K., & Richards, T. (2009). Neuropsychological and behavioral outcomes from a comprehensive magnetic resonance study of children with fetal alcohol spectrum disorders. *Canadian Journal of Clinical Pharmacology, 16,* e178–e201.

Burns, B. J., Phillips, S. D., Wagner, H. R., Barth, R. P., Kolko, D. J., Cambell, Y., & Landsverk, J. (2004). Mental health need and access to mental health services by youth involved with child welfare: A national survey. *Journal of the American Academy of Child and Adolescent Psychiatry, 43,* 960–970.

Centers for Disease Control and Prevention. (2005). Guidelines for identifying and referring persons with fetal alcohol syndrome. *Morbidity and Mortality Weekly Report, 54,* RR-11.

Chasnoff, I. J. (2011). Children prenatally exposed to alcohol: Comments on Astley, O'Brien and Mattson, and O'Connor. In R. E. Tremblay, R. G. Barr, R. DeV Peters, & M. Boivin (Eds.), *Encyclopedia on early childhood development* (pp. 1–7). Retrieved from http://www.child-encyclopedia.com/documents/ChasnoffANGxp1.pdf

Chasnoff, I. J., Anson, A., Hatcher, R., Stenson, H., Iaukea, K., & Randolph, L. (1998). Prenatal exposure to cocaine and other drugs: Outcome at four to six years. *Annals of the New York Academy of Sciences, 846*, 314–328.

Chasnoff, I. J., Wells, A. M., Telford, E., Schmidt, C., & Messer, G. (2010). Neurodevelopmental functioning in children with FAS, pFAS, and ARND. *Journal of Developmental and Behavioral Pediatrics, 31,* 192–201.

Dicker, S., & Gordan, E. (2004). *Ensuring the healthy development of infants in foster care: A guide for judges, advocates and child welfare professionals.* New York: Zero to Three Policy Center.

Fried, P., & Smith, A. (2001). A literature review of the consequences of prenatal marijuana exposure: An emerging theme of a deficiency in aspects of executive function. *Neurotoxicology and Teratology, 23,* 1–11.

Fryer, S. L., McGee, C. L., Matt, G. E., & Riley, E. P. (2007). Evaluation of psychopathological conditions in children with heavy prenatal alcohol exposure. *Pediatrics, 119*, 733–741.

Hildyard, K. L., & Wolfe, D. A. (2002). Child neglect: Developmental issues and outcomes. *Child Abuse & Neglect, 26*, 679–695.

Howell, E., & McFeeters, J. (2008). Children's mental health care: Differences by race/ethnicity in urban/rural areas. *Journal of Healthcare for the Poor and Underserved, 19,* 237–247.

Kodituwakku, P. W. (2012). Defining the behavioral phenotype in children with fetal alcohol spectrum disorders: A review. *Neuroscience & Biobehavioral Reviews, 31*, 192–201.

Lambert, D., Ziller, E. C., & Lenardson, J. D. (2009). *Rural children don't receive the mental health care they need.* Portland, ME: University of Southern Maine, Muskie School of Public Service, Maine Rural Health Research Center.

Lange, S., Shield, K., Rehm, J., & Popova, S. (2013). Prevalence of Fetal Alcohol Spectrum Disorders in child care settings: A meta-analysis. *Pediatrics, 132*, e980.

Lenardson, J., Ziller, E.C., Lambert, D., Race, M. M., & Yousefian, A. (2010). *Access to mental health services and family impact of rural children with mental health problems* (Working Paper #45). Portland, ME: University of Southern Maine, Muskie School of Public Service.

Meeyoung, O. M., Minnes, S., Yoon, S., Short, E. J., & Singer, L. T. (2014). Self-reported adolescent behavioral adjustment: Effects of prenatal cocaine exposure. *Journal of Adolescent health, 55,* 167–174.

National Scientific Council on the Developing Child. (2012). *The science of neglect: The persistent absence of responsive care disrupts the developing brain* (Working Paper #12). Retrieved from http://www.developing child.harvard.edu

O'Connor, M. J., Shah, B., Whaley, S., Cronin, P., Gunderson, B., & Graham, J. (2002). Psychiatric illness in a clinical sample of children with prenatal alcohol exposure. *The American Journal of Drug and Alcohol Abuse, 28*, 743–754.

Perry, B. (2012). Supporting maltreated children: Countering the effects of neglect and abuse. *Adoption Advocate.* Retrieved from https://www.adoptioncouncil.org/images/stories/documents/NCFA_ADOPTION_ADVOCATE_NO48.pdf

Shin, S. H. (2005). Need for and actual use of mental health service by adolescents in the child welfare system. *Children and Youth Services Review, 27,* 1071–1083.

Streissguth, A. P., Barr, H.M., Kogan, J., & Bookstein, F. L. (1996). *Understanding the occurrence of secondary disabilities in clients with fetal alcohol syndrome (FAS) and fetal alcohol effects (FAE): Final report to the Centers for Disease Control and Prevention on grant No. RO4/CCR008515* (Tech Report No. 96-06). Seattle: University of Washington, Fetal Alcohol and Drug Unit.

Sturm, R., Ringel, J. S., & Andreayeva, T. (2003). Geographic disparities in children's mental health care. *Pediatrics, 112,* e308.

Tarullo, A. (2012). Effects of child maltreatment on the developing brain. CW360. Retrieved from http://www.cehd.umn.edu/ssw/cascw/attributes/PDF/publications/ CW360-CEED_Winter2012.pdf

U.S. Department of Health and Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau. (2012). *Child maltreatment*. Retrieved from: http://www.acf.hhs.gov/programs/cb/resource/child-maltreatment-2012.

Viner, R., & Taylor, B. (2005). Adult health and social outcomes of children who have been in public care: Population-based study. *Pediatrics, 115,* 894–899.

Widom, C. S. (2013). Translational research on child neglect: Progress and future needs. *Child Maltreatment, 18,* 3–7. Retrieved from http://wf2la6.webfeat.org/f9L1F1849/url= http://web.lexis-nexis.com/unverse/printdoc

Young, N. K. (2006). *The social and economic effects of the methamphetamine epidemic on America's child welfare system.* Irvine, CA: Children and Family Futures.