



# Factors Associated with Child-Welfare Involvement among Prenatally Substance-Exposed Infants

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**Objective** To assess factors impacting child-welfare involvement and child abuse and neglect outcomes among prenatally substance-exposed infants.

**Study design** This was a retrospective review of case registry data regarding substance-exposed infants tracked statewide in Delaware from 2014 to 2018. Differences in maternal, infant, and substance exposure factors by level of child-welfare involvement (screened-in vs screened-out case status) and child abuse and neglect outcomes were examined. Screened-in status was defined as case acceptance for investigation, family assessment, or treatment referral. Using logistic regression, associations between factors and screened-in status and between factors and child abuse and neglect outcomes were assessed. Cases involving child abuse and neglect were analyzed qualitatively.

**Results** Among 1222 substance-exposed infants, 70% were screened-in by child welfare for ongoing involvement; 28 (2.3%) of substance-exposed infants were identified as child abuse and neglect victims sustaining serious physical or fatal injury before 1 year of age. Most substance-exposed infants remained with caregivers; few entered foster care. Polysubstance exposure and maternal mental health condition were factors associated with screened-in status. Neither substance exposure type nor maternal mental health condition reliably predicted future child abuse and neglect.

**Conclusions** Substance-exposed infants had a significant risk for child abuse and neglect. Although maternal and substance exposure factors were associated with screened-in case status, they unreliably predicted future risk of child abuse and neglect. (*J Pediatr* 2020;222:35-44).

Caregiver substance use negatively impacts families and increases the likelihood that infants and children experience child abuse or neglect.<sup>1-10</sup> More than 25% of substantiated child abuse and neglect cases nationally involve caregiver substance use concerns.<sup>11</sup> Substance use may impair the ability to appropriately parent,<sup>2,12,13</sup> impact child permanency,<sup>3,4,14</sup> and result in removal and placement into foster care for nearly twice as long as children from families without substance use.<sup>15</sup> Families affected by substance use often face significant co-occurring adversities, including psychological trauma, mental health conditions, economic insecurity, and domestic violence that impact child safety and pose challenges to reunification and substance use disorder recovery.<sup>1,13,16-19</sup>

Recent national trends in substance use reveal women of childbearing age are disproportionately affected, and growing numbers of infants are born prenatally substance exposed. Maternal substance use has been identified as a key factor predictive of increased reports to child-welfare agencies,<sup>4,6,7,13,20</sup> and infants specifically prenatally substance-exposed may be at greater risk for child maltreatment than nonsubstance-exposed peers.<sup>4-7,21-24</sup> Although this suggests prenatal exposure confers unique vulnerability to child abuse and neglect that requires enhanced child-welfare involvement and protection, ensuring safety for substance exposed infants poses complex challenges. Likelihood and level of involvement with child welfare is highly variable<sup>4</sup> across jurisdictions despite federal mandates through the Child Abuse Prevention and Treatment Act (CAPTA) that state child-welfare agencies comprehensively address needs of substance-exposed infants and their families.<sup>25</sup> Protocols for maternal/infant toxicology testing and drug screening, treatment programming, child-welfare hotline notification, and criminal prosecution<sup>1,4,14,26,27</sup> lack uniformity.

State-specific data from Delaware indicate that substance-exposed infants were disproportionately represented among child abuse and neglect victims in 2014, including abuse fatalities. As a result, development and implementation of a case registry system to track substance-exposed infant-related safety outcomes specifically was undertaken through an innovative partnership between the statewide child-welfare system and Office of the Investigation Coordinator,

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CAPTA Child Abuse Prevention and Treatment Act  
POSC Plans of Safe Care

an oversight body for child safety investigations. The primary aim of the case registry system was to inform child-welfare policy around substance-exposed infants at the state level by analyzing data trends and identifying risk and protective factors associated with child abuse and neglect outcomes. Using this state case registry system, we aimed to describe the maternal, infant, and substance-exposure factors associated with level and type of involvement by the state child-welfare agency and describe maternal, infant, and substance-exposure factors associated with child abuse and neglect outcomes—specifically, serious physical and fatal injury—among substance-exposed infants previously reported to the child-welfare agency at birth.

## Methods

For this study, we retrospectively reviewed hotline notifications received by Delaware's statewide child-welfare agency and case-specific data entered into the statewide case registry regarding substance-exposed infants born between November 12, 2014, and March 27, 2018. The case registry included substance-exposed infant birth notifications and any subsequent hotline reports for child abuse and neglect, serious physical injury, or fatalities involving substance-exposed infants within the first 12 months after birth/registry entry. Infants were tracked specifically throughout the first year of life because rates of physical abuse are greatest in this age group.

Use of an evidence-based, Structured Decision Making (SDM)<sup>28</sup> algorithm by child-welfare services in Delaware had been implemented previously in 2013 to provide clearly defined, consistent criteria for screening hotline reports, determining priority response for screened-in reports, identifying immediate harm, and estimating the risk of future child abuse and neglect at the time of initial child-welfare notification. Levels of child-welfare involvement were categorized as "screened-in" if child welfare accepted the case for investigation, family assessment, and/or treatment after conducting a risk assessment or "screened-out" if nature of the concern failed to meet accepted threshold definitional criteria in use at the time of the study<sup>28</sup> (Figures 1 and 2; available at [www.jpeds.com](http://www.jpeds.com)). Cases were screened in if the following criteria were met: the infant or mother had positive toxicology screening at birth, the infant was symptomatic/substance affected, the mother had a positive toxicology within 60 days before birth, or the mother disclosed using substances within 60 days before the substance-exposed infant's birth (Figure 1). Cases were screened out if the identified concerns were linked to a duplicate report or active child-welfare case, if insufficient information existed to locate the family, or if the substance-exposed infant was prenatally exposed to a prescription medication used as prescribed and there were no other risk factors present (Figure 2). Notably, structured decision-making algorithms in use by child-welfare hotline personnel at the time of this study did not

risk-stratify hotline reports by substance exposure type (ie, reports involving cocaine were not considered greater risk than marijuana exposures), and identified parental risk factors were not weighted cumulatively (although presence of multiple risk factors could change the timing/priority of response).

Substance exposure was determined before the hotline report either through results of maternal verbal drug screening or toxicology performance, infant toxicology performance, or identification of infant symptoms consistent with prenatal substance exposure at/immediately after birth.

Variables abstracted from the registry included infant date of birth, sex, medical condition (defined as prematurity vs other), child abuse and neglect or fatality outcome, age at injury, and type of substance exposure. Abstracted variables regarding type of child-welfare involvement included visiting home nursing referrals, foster care placements, and safety plan implementation. A safety plan was defined as an agreement by child welfare and the substance-exposed infant's caregiver that a supervising party would be required to monitor their caregiving activities for a specified period due to safety concerns. Substance exposure type was categorized as marijuana, non-medication-assisted treatment opiates (ie, excluding methadone and Suboxone/Subutex), methadone, Suboxone/Subutex, cocaine, benzodiazepines, amphetamines, phencyclidine, barbiturates, and alcohol. Infants may have been exposed to 1 (single substance) or more than 1 (polysubstance) exposure type. Maternal variables included race, number of previous substance-exposed infant births, mental health condition, personal childhood child-welfare history, and previous child-welfare case substantiation of child abuse and neglect.

## Statistical Analyses

The primary outcome of interest was screened-in status; the secondary outcome was child abuse and neglect, defined as either serious physical injury or fatality. Data were analyzed using statistical software R, version 3.4.4 (R Foundation for Statistical Reporting, Vienna, Austria). Descriptive statistics were computed for all maternal and infant factors using frequencies and proportions for categorical variables and medians and IQR for continuous variables. Differences in maternal, infant, and substance-exposure factors by screened-in vs screened-out status (ie, level of child-welfare involvement) and child abuse and neglect were examined using chi-square or Fisher exact test, as appropriate, for categorical variables and Mann-Whitney *U* test for continuous variables. Univariable and multivariable logistic regression models were used to examine the associations between these factors and screened-in vs screened-out status and between these factors and child abuse and neglect. Cases involving child abuse and neglect also were analyzed qualitatively for trends.

## Ethical Considerations

The hospital institutional review board approved the study protocol.

## Results

The case registry included 1222 unique infants born between November 12, 2014, and March 27, 2018, who were subjects of substance-exposed infants hotline notifications to child welfare (Table I). Of these, 70.0% of infants were screened in for investigation and/or treatment; 61.6% were exposed to a single substance. Visiting nurse referrals were arranged for 65.7% of infants who were screened in for investigation and/or treatment, and safety plans were instituted for 33.7% screened in.

For 56.1% of infants, maternal race was white and 36.6%, African American. For 24.7% of infants, mothers had mental health diagnoses, and for 28.6%, mothers had personal previous child-welfare involvement in Delaware during their childhood. Greater than 75% of mothers had not delivered a previous substance-exposed infant, although 232 (19%) had delivered 1 previous substance-exposed infant, 48 (3.9%) had delivered 2, and 16 (1.3%) had delivered 3 or more. Although only 4.8% of infants had mothers with previous substantiations for child abuse and neglect, one-half of infants had unknown/missing maternal information around prior abuse substantiations.

The 4 most common categories of substance exposure were marijuana, non-medication-assisted treatment opiates, methadone, and cocaine (Table II). Most infants exposed to marijuana (68.9%) were not exposed to additional substances.

### Characteristics Associated with Case Disposition and Child Abuse and Neglect

Distribution of maternal and infant factors by screened-in vs screened-out status (level of child-welfare involvement) and child abuse and neglect outcomes is included in Table III. In univariate analysis, polysubstance exposure, prescription drug misuse, maternal mental health conditions, and previous maternal substantiation for child abuse and neglect were all associated with screened-in status; race, previous substance-exposed infants birth, and maternal personal childhood child-welfare history were not (Table IV). In multivariable analysis, only polysubstance abuse and maternal mental health conditions were associated with screened-in status (Table V). None of the examined variables were statistically associated with child abuse and neglect in either univariate or multivariate analysis.

### Characteristics of Infant Child Abuse and Neglect Victims

In qualitative analysis, 28 substance-exposed infants were victims of serious physical or fatal child abuse and neglect injury during the study period (Table VI). Most infant victims of serious physical or fatal child abuse and neglect injuries (66%) were exposed to a single substance. Most victimized infants were screened in (86%), but most did

**Table I. Maternal and infant characteristics**

Characteristics	n (%)
<b>Infant</b>	
Sex	
Female	582 (47.6)
Male	640 (52.4)
Unknown/missing	0
Medical condition	
Yes	79 (6.5)
No	873 (71.4)
Unknown/missing	270 (22.1)
Medical condition type	
Prematurity	53 (4.3)
Others	28 (2.3)
Unknown/missing	1141 (93.4)
Reports screened in for investigation/treatment by child welfare	855 (70.0)
Reports screened out by child welfare	367 (30.0)
Infants with single substance exposure	753 (61.6)
Infants with polysubstance exposure	469 (38.4)
Serious physical injuries or fatalities	
Yes	28 (2.3)
No	1192 (97.5)
Unknown/missing	2 (0.2)
Infant placement in out of home/child welfare custody	
Yes	210 (17.2)
No	1010 (82.6)
Unknown/missing	2 (0.2)
Infant visiting nurse referrals	
Yes	803 (65.7)
No	314 (25.7)
Unknown/missing	105 (8.6)
Infant safety supervision plan	
Yes	412 (33.7)
No	741 (60.6)
Unknown/missing	69 (5.7)
<b>Maternal</b>	
Race	
White	704 (57.6)
African American	461 (37.7)
Hispanic	39 (3.2)
Other	5 (0.4)
Unknown/missing	13 (1.1)
Mental health condition	
Yes	302 (24.7)
No	644 (52.7)
Unknown/missing	276 (22.4)
Maternal childhood child-welfare involvement	
Yes	350 (28.6)
No	583 (47.8)
Unknown/missing	289 (23.6)
Maternal previous prenatally substance-exposed infant delivery	
Yes	296 (24.2)
No	920 (75.3)
Unknown/missing	6 (0.5)
Maternal prenatally substance-exposed infant delivery	
1 previous infant delivery	232 (19.0)
2 previous infant deliveries	48 (3.9)
3	9 (0.7)
4	4 (0.3)
5	1 (0.1)
6	1 (0.1)
7	1 (0.1)
No previous substance-exposed infant deliveries	920 (75.3)
Unknown/missing	6 (0.5)
Maternal previous substantiation for abuse/neglect	
Yes	59 (4.8)
No	544 (44.5)
Unknown/missing	619 (50.7)

**Table II. Categories of substance exposure**

Categories	n (%)
Marijuana	627
Marijuana only	432 (68.89)
Marijuana plus 1 other drug	119 (18.99)
Marijuana plus 2 other drugs	76 (12.12)
Opiates (excluding medication-assisted treatment)	443
Opiate only	128 (28.89)
Opiate plus 1 other drug	193 (43.57)
Opiate plus 2 other drugs	122 (27.54)
Opiate medication-assisted treatment: methadone	312
Methadone only	86 (27.56)
Methadone plus 1 other drug	126 (40.38)
Methadone plus 2 other drugs	100 (32.06)
Cocaine	206
Cocaine only	40 (19.42)
Cocaine plus 1 other drug	166 (80.58)
Cocaine plus 2 other drugs	0 (0)
Benzodiazepine	78
Benzodiazepine only	13 (16.67)
Benzodiazepine plus 1 other drug	28 (35.90)
Benzodiazepine plus 2 other drugs	37 (47.43)
Opiate medication-assisted treatment: Subutex/Suboxone	70
Subutex/Suboxone only	15 (21.42)
Subutex/Suboxone plus 1 other drug	36 (51.43)
Subutex/Suboxone plus 2 other drugs	19 (27.15)
Amphetamines	55
Amphetamines only	9 (16.36)
Amphetamines plus 1 other drug	25 (45.45)
Amphetamines plus 2 other drugs	21 (38.19)
PCP	24
PCP only	9 (37.5)
PCP plus 1 other drug	5 (20.83)
PCP plus 2 other drugs	10 (41.67)
Barbiturate	11
Barbiturate only	3 (27.27)
Barbiturate plus 1 other drug	2 (18.18)
Barbiturate plus 2 other drugs	6 (54.55)
Alcohol	11
Alcohol only	0 (0)
Alcohol plus 1 other drug	3 (27.27)
Alcohol plus 2 other drugs	8 (72.73)≤

PCP, Phencyclidine.

not have a safety plan instituted (61%). Mental health conditions were diagnosed among 32% of mothers of victimized infants. Eight of the 28 infants (28%) were exposed to marijuana; 10 of 28 (36%) were exposed to methadone, and 5 of 28 (18%) were exposed to cocaine. Eight of 28 (28%) sustained head trauma, 7 of 28 (25%) sustained fractures, and 2 of 28 (7%) sustained abusive cutaneous injury. Four of 28 (14%) suffered opiate toxicity, including 3 infants younger than 2 months and 1 older infant (age 9 months, whose developmental status may support exploratory ingestion). Six infants (21.43%) died related to bed-sharing or hazards in the sleep environment. Almost one-half (46%) of the 28 infants experienced child abuse and neglect within the first 7 weeks of life, and most (85%) were victimized by age 4 months.

## Discussion

How best to ensure the safety of children in families affected by substance exposure and level of support and involvement

by child-welfare agencies has become a critical but controversial public health issue and national policy priority. Statistics for child abuse and neglect in Delaware alone from 2014 to 2018 indicate approximately one-third of serious or fatal child abuse and neglect involved substance-exposed infants; in 2017, substance-exposed infants notifications were received for 4.1% of all births statewide, but substance-exposed infants were associated with 30% (4 of 13) and 27% (8 of 30) of child abuse and neglect-associated deaths and serious injuries respectively that year in the state.<sup>29,30</sup> This suggests substance-exposed infants are at uniquely heightened risk for poor safety outcomes and that enhanced involvement, scrutiny, and support by child-welfare agencies may potentially benefit and protect this vulnerable population. Of the 28 substance-exposed infants in our study who experienced serious or fatal child abuse and neglect injury, 85% were injured by age 4 months, suggesting very young infants were at greatest risk.

Maternal substance use has been identified as a key factor predictive of increased reports to child-welfare agencies,<sup>4,6,7,13,20</sup> and previous studies suggest prenatal exposure confers unique vulnerability to child abuse and neglect.<sup>4-7,21-24</sup> Our study supports this hypothesis and concludes that identification of this risk factor warrants universal, supportive, child welfare-based protective intervention to reduce risk of infant harm. Specifically, study results suggest that maternal and substance-exposure factors influence child-welfare involvement (screened-in status), but are not universally predictive of future risk of harm to substance-exposed infants during the first year of life. Risk to infant safety is likely multifactorial, and evaluation of maternal and substance exposure factors alone may provide an inappropriate basis for decision-making around level and type of child-welfare interventions for substance-exposed infants. Infants exposed to any substance are at risk for child abuse and neglect; as evidenced by this study, no single substance-exposure type was considered protective against future child abuse and neglect, and child abuse and neglect outcomes occurred among infants with heterogeneous, variable substance-exposure types.

At the time of this study, substance-exposed infants cases reported to the state child-welfare agency had only 2 levels of involvement: screened in for investigation/treatment or screened out. The majority of cases reported to the hotline were screened in for ongoing services and monitoring, which may explain why most substance-exposed infants did not experience child abuse and neglect or fatal outcomes. Notably, in contrast to data indicating caregiver substance use impacts permanency<sup>3</sup> and recent data indicating disproportionate placement of infants into foster care due to caregiver substance use concerns,<sup>31</sup> the majority of substance-exposed infants in this study (82.6%) were not placed into kinship care or foster care. Safety plan implementation and visiting nurse referrals were likely appropriate and protective interventions for the majority of infants, suggesting that this level and type of involvement by child-welfare

**Table III.** Distribution of maternal and infant factors by screen-in, screen-out, no fatality or abuse, and fatality or abuse

Variables	Level	Screen-out	Screen-in	<i>P</i>	No fatality or abuse	Fatality or abuse	<i>P</i>
Total n		367	855		1194	28	
Infant characteristics							
Sex (%)	Female	182 (49.7)	399 (46.7)	.358	570 (47.9)	11 (39.3)	.48
	Male	184 (50.3)	456 (53.3)		621 (52.1)	17 (60.7)	
Medical condition/prematurity (%)	No	273 (93.2)	600 (91.0)	.332	847 (91.9)	25 (89.3)	.495
	Yes	20 (6.8)	59 (9.0)		75 (8.1)	3 (10.7)	
Infants with polysubstance exposure (%)	No	300 (81.7)	453 (53.0)	<.001	732 (61.4)	19 (67.9)	.619
	Yes	67 (18.3)	402 (47.0)		460 (38.6)	9 (32.1)	
Infant safety supervision plan (%)	No	359 (98.6)	383 (48.5)	<.001	723 (64.3)	17 (63.0)	.99
	Yes	5 (1.4)	407 (51.5)		402 (35.7)	10 (37.0)	
Infant visiting nurse referrals (%)	No	101 (28.3)	214 (28.1)	1	309 (28.2)	6 (28.6)	.99
	Yes	256 (71.7)	547 (71.9)		786 (71.8)	15 (71.4)	
Infant placement in out of home/child-welfare custody (%)	No	345 (94.0)	665 (78.0)	<.001	993 (83.4)	16 (57.1)	.001
	Yes	22 (6.0)	188 (22.0)		197 (16.6)	12 (42.9)	
Maternal characteristics							
Mother race (%)	White	196 (53.4)	508 (59.4)	.086	686 (57.6)	18 (64.3)	.883
	African American	148 (40.3)	313 (36.6)		449 (37.7)	10 (35.7)	
	Hispanic	14 (3.8)	25 (2.9)		39 (3.3)	0 (0.0)	
	Other	9 (2.5)	9 (1.1)		18 (1.5)	0 (0.0)	
Maternal previously prenatally substance exposed infant delivery (%)	No	292 (79.6)	628 (74.0)	.044	898 (75.7)	20 (71.4)	.764
	Yes	75 (20.4)	221 (26.0)		288 (24.3)	8 (28.6)	
Mother mental health condition (%)	No	312 (85.0)	608 (71.1)	<.001	901 (75.6)	19 (67.9)	.473
	Yes	55 (15.0)	247 (28.9)		291 (24.4)	9 (32.1)	
Maternal childhood child-welfare involvement (%)	No	268 (73.0)	604 (70.6)	.438	854 (71.6)	17 (60.7)	.292
	Yes	99 (27.0)	251 (29.4)		338 (28.4)	11 (39.3)	
Maternal previous substantiation for abuse/neglect (%)	No	359 (97.8)	804 (94.0)	.007	1136 (95.3)	26 (92.9)	.388
	Yes	8 (2.2)	51 (6.0)		56 (4.7)	2 (7.1)	

*P* generated by the Fisher exact test.

agencies with families affected by substance use were effective strategies to mitigate risk of child abuse and neglect.

Cases involving maternal polysubstance exposure and mental health issues were highly associated with screened-in level of child-welfare involvement. Polysubstance use complicates treatment and recovery for the mother,<sup>2,13</sup> and previous studies have well-established that caregivers with substance use are likely to have co-occurring mental health issues threatening child permanency and warranting more substantial supportive service delivery, policy development and intervention by child welfare.<sup>13,32-36</sup> The fact that these factors were associated with increased child-welfare involvement suggests they were recognized appropriately as substantial impediments to family stability. Supportive child welfare-based services were prioritized to address co-occurring adversities in these families.

Study results support that substance exposure type, including single or polysubstance use, however, does not inform future child abuse and neglect risk. Eight of 28 cases were associated with marijuana exposure (which is legal in many jurisdictions and culturally perceived as low risk with minimal negative health and safety outcomes), whereas only 5 cases involved cocaine. Serious child abuse and neglect and child abuse and neglect fatalities similarly occurred in infants exposed to methadone; 10 of 28 cases were associated with methadone, and 6 cases involved

single-substance exposure to methadone only. Methadone is commonly prescribed as medication-assisted treatment for opioid dependence among mothers stably in recovery from substance-use disorders, but it is perceived to be high risk for abuse and diversion.<sup>2,3</sup> These results support the hypothesis that use of any substance can put children at risk for child abuse and neglect,<sup>3</sup> as substance use generally has been associated with risk-taking behaviors in the user<sup>2</sup> that negatively impact child safety. Attempts to risk-stratify substances to confer a safety profile have hinged primarily upon scientific understanding of physiologic dependence, risks of addiction potential, or behavioral effects in the user.<sup>37,38</sup> Although medically and psychiatrically relevant, such criterion may be inappropriate in characterizing the safety of a substance when creating child-welfare policy to prevent maltreatment outcomes as it fails to consider the broader impact of any substance use on caregiver risk-taking behaviors.

Data on substance-specific influence to child abuse and neglect risk are limited, although in one study, methamphetamine use evidenced greatest risk for child abuse and neglect.<sup>39</sup> Marijuana-specific risk posed to substance-exposed infants remains unclear, but notably cases existed in our state registry with serious physical or fatal injury outcomes wherein sole substance of exposure was marijuana. Algorithmic decision-making at the hotline level based

**Table IV. Univariable logistic regression to determine the association with outcomes**

Variables	Screen-in by CPS		Child abuse, neglect, or fatality output	
	OR* (95% CI)	P	OR† (95% CI)	P
Maternal race/ethnicity				
White	Referent		Referent	
African American	0.82 (0.64-1.06)	.13	0.76 (0.37-1.59)	.472
Hispanic	0.7 (0.36-1.37)	.296		
Others/missing	0.39 (0.15-1.00)	.05		
Single substance exposure				
No	Referent		Referent	
Yes	0.26 (0.19-0.35)	<.001	1.1 (0.54-2.26)	.795
Polysubstance exposure				
No	Referent		Referent	
Yes	3.89 (2.9-5.22)	<.00	0.91 (0.44-1.87)	.795
Prescription drug use				
Appropriate Use	Referent		Referent	
Misuse	1.5 (1.17-1.93)	.002	2.03 (0.87-4.71)	.1
Previous substance exposed infant delivery				
No	Referent		Referent	
Yes	1.32 (0.99-1.77)	.063	1.56 (0.75-3.25)	.237
Maternal mental health issue				
No	Referent		Referent	
Yes	2.28 (1.66-3.14)	<.001	1.35 (0.63-2.86)	.44
Maternal childhood CPS history				
No	Referent		Referent	
Yes	1.12 (0.85-1.46)	.431	1.86 (0.92-3.76)	.083
Maternal previous substantiation for abuse/neglect				
No	Referent		Referent	
Yes	2.88 (1.35-6.12)	.006	1.31 (0.31-5.61)	.717

CPS, Child Protective Services.

\*OR of screen-in.

†OR of fatality (yes). In multivariable model, the polysubstance cannot be included as this variable is the complementary of single substance. Missing OR indicates that there was insufficient data to estimate OR for that group.

primarily on substance-exposure type, without additional involvement or monitoring by child welfare and without additional caregiver, family, and environmental psychosocial

risk factor screening, may presume safety and miscalculate future risk of harm to the child. Had protocols been in place in Delaware automating the screening out of cases based on

**Table V. Multivariable logistic regression to determine the association with outcomes**

Variables	Screen in by child welfare		Child abuse, neglect, or fatality outcome	
	OR* (95% CI)	P	OR† (95%)	P
Maternal race				
White	Referent		Referent	
African American	1.17 (0.89-1.55)	.257	0.65 (0.3-1.4)	.27
Hispanic	0.97 (0.48-1.97)	.931		
Other/missing	0.51 (0.19-1.37)	.18		
Single substance exposure				
No	Referent		Referent	
Yes	0.26 (0.19-0.36)	<.001	1.43 (0.67-3.06)	.361
Prescription drug use				
Appropriate use	Referent		Referent	
Misuse	1.12 (0.85-1.49)	.417	1.77 (0.72-4.34)	.21
Maternal previous substance exposed infant delivery				
No	Referent		Referent	
Yes	1.02 (0.74-1.4)	.908	1.45 (0.68-3.11)	.337
Maternal mental health condition				
No	Referent		Referent	
Yes	1.96 (1.38-2.78)	<.001	1.03 (0.47-2.28)	.939
Maternal childhood CPS history				
No	Referent		Referent	
Yes	0.89 (0.66-1.20)	.44	1.62 (0.78-3.40)	.198
Maternal previous substantiation for abuse/neglect				
No	Referent		Referent	
Yes	1.82 (0.83-4.00)	.138	0.99 (0.22-4.4)	.985

\*OR of screen-in.

†OR of fatality (yes). In multivariable model, the polysubstance cannot be included as this variable is the complementary of single substance. Missing OR indicates that there was insufficient data to estimate OR for that group.

**Table VI.** Qualitative case review: substance-exposed infants with child abuse and neglect outcomes (n = 28)

Single/polysubstance exposures	Substances identified	Screen in or out	Safety plan instituted	Maternal mental health condition	Maternal childhood CPS history	Maternal previous substantiation for abuse/neglect	Child abuse/neglect type	Age at injury
Single substance	Marijuana	In	Yes	No	No	No	Homicide (drowning)	3.5 mo
Polysubstance	Opiates, benzos	In	No	No	Yes	Yes	Homicide (blunt force trauma)	7 mo
Single substance	Benzos	In	No	Yes	No	No	SUID (cause/manner undetermined)	5 wk
Polysubstance	Opiates, cocaine	In	No	Yes	No	No	SUID (cause/manner undetermined)	2.5 mo
Single substance	Methadone	In	No	Yes	Yes	No	Bed-sharing/unsafe sleep	4 wk
Single substance	Opiate	Out	No	No	No	Yes	Bed-sharing/unsafe sleep	2 mo
Polysubstance	Cocaine, marijuana	In	Yes	No	Yes	No	Bed-sharing/unsafe sleep	4 mo
Polysubstance	Methadone, cocaine, benzos	In	No	No	No	No	Bed-sharing/unsafe sleep	2 wk
Polysubstance	Methadone, opiates, benzos	Out	Yes	Yes	No	No	Bed-sharing/unsafe sleep	3 wk
Single substance	Methadone	In	No	No	No	No	Bed-sharing/unsafe sleep	3 wk
Single substance	Methadone	In	No	Yes	No	No	Head trauma	7 wk
Single substance	Methadone	In	No	No	Yes	No	Head trauma	2 mo
Single substance	Marijuana	In	No	Yes	No	No	Head trauma	7 mo
Polysubstance	Opiates, cocaine, methadone	In	Yes	No	No	No	Head trauma	5.5 mo
Single substance	Methadone	Out	No	No	Yes	No	Head trauma	4 mo
Single substance	Opiates	In	No	No	No	No	Head trauma, fractures	2.5 mo
Single substance	Marijuana	In	Yes	Yes	Yes	No	Head trauma, fractures	5 wk
Polysubstance	Methadone, opiates, cocaine, benzos, marijuana	In	Yes	Yes	No	No	Head trauma, fractures	3 mo
Single substance	Marijuana	In	No	No	No	No	Fractures	7 wk
Single substance	Marijuana	In	Yes	No	Yes	No	Fractures	3 wk
Single substance	Marijuana	Out	No	No	Yes	No	Fractures	3.5 mo
Polysubstance	Opiates, subutex	In	Yes	No	Yes	No	Fractures	4 wk
Single substance	Methadone	In	Yes	Yes	No	No	Bruising, bite	7 wk
Polysubstance	Methadone, suboxone	In	Yes	No	No	No	Burns	2 mo
Single substance	Opiates	In	No	No	Yes	No	Opiate toxicity*	2 wk
Single substance	Opiates	In	No	No	Yes	No	Opiate toxicity*	9 mo
Single substance	Opiates	In	Yes	No	No	No	Opiate toxicity*	2 mo
Single substance	Opiates	In	No	No	No	No	Opiate toxicity*	1 wk

SUID, Sudden unexpected infant death.

\*Opiate toxicity implies ingestion, poisoning, or other administration.

substance type, such as marijuana, it is likely infants at child abuse and neglect risk would have been missed.

Previous studies indicate families affected by substance exposure have received differing child-welfare agency resources based on perceived risk of the substance exposure involved. Agencies have historically provided more resources and supportive services to individuals who use illicit or non-prescribed substances other than marijuana and alcohol,<sup>40</sup> extending enhanced protections to these infants traditionally perceived by child-welfare agencies to be at greater risk for child abuse and neglect. Child-welfare agencies have also historically used the type of parental substance use to guide child placement and removal recommendations<sup>41</sup>; however, this could underestimate risk to children whose caregivers are perceived arbitrarily as using “lower-risk” substances. No single substance type was more protective against child abuse and neglect vs another in our study cohort, contraindicating this pattern of historical behavior by child welfare and supporting instead that substance-exposure type alone should not be a criterion impacting the degree and level of child-welfare involvement and provision of supportive services. Instead, study results suggest a universal, supportive services child welfare–based approach, irrespective of substance exposure type, may be most effective to mitigate future risk of harm.

Likelihood and level of involvement with substance-exposed infants by child-welfare agencies generally varies by jurisdiction despite recent amendments to federal CAPTA and *Comprehensive Addiction and Recovery Act 2016* legislation requiring states implement policies, known as Plans of Safe Care (POSC), to address needs of substance-exposed infants and their families. POSC include an in-depth inventory of maternal substance use that does not discriminate based on identified substance-exposure type. A statutory change in language removed the term “illegal” from the types of substances warranting POSC development, broadening the potential exposure types amenable to supportive service planning. A comprehensive assessment of substance-exposed infants and family needs identifies which services and supports should be included in individualized program development. Agency notifications regarding substance-exposed infants are increasing exponentially, and states are struggling to comply with CAPTA requirements and align systems and stakeholders with differing perspectives through community partnerships. The data in this study were collected before the implementation of POSC supportive services for substance-exposed infants and their families in Delaware, where POSC was disseminated statewide late 2018.

As one of the first states in the nation to comply with current federal mandates, Delaware is leading research efforts to understand the impact of this universal, family-centered programming on rates of child abuse and neglect among substance-exposed infants. Our case registry currently tracks the impact of POSC programming on child abuse and neglect outcomes; we are particularly interested in identifying which types of POSC supportive programming may be associated

with reductions in child abuse and neglect outcomes. Data from this current study indicate that more than 80% of substance-exposed infants with child abuse and neglect were actually screened in, indicating that child welfare was appropriately discerning infants with safety risks, although type of involvement was ultimately inadequately protective against child abuse and neglect. Tracking specific supportive service programmatic delivery to substance-exposed infants through our state case registry is underway and may aid future prevention efforts against child abuse and neglect among substance-exposed infants. Notably, POSC implementation statewide has also resulted in practice change by Delaware’s child-welfare agency. Although positive maternal/infant toxicology studies generally result in screened-in hotline reports in almost every situation, currently those reports involving marijuana only or mothers who are adherent to medication-assisted treatment where no other risk factors are present are contracted to providers external from the statewide child-welfare agency. How these changes have impacted child abuse and neglect outcomes in Delaware is also under study.

A universal maternal drug screening protocol existed in Delaware at the time of this study, but universal screening did not necessarily indicate universal toxicology performance, nor universal notification of child-welfare agencies around substance-exposed infant birth if clinically suspected or confirmed by screening or toxicology. The decision to report substance-exposed infant birth to child welfare was variable across the state, and our study population only assessed those infants reported to child welfare. Therefore, it is possible this underestimates the true proportion of substance-exposed infants in the state or that included substance-exposed infants differ from nonreported infants by undetermined maternal, psychosocial, or substance exposure characteristics that skew data interpretation. Factors influencing health care provider decision to report substance-exposed infants to child welfare was not specifically assessed, but study results do not support an association with maternal race and likelihood of screened-in status. Previous literature suggests minority infants with prenatal substance exposure are no more likely than white infants to be reported to child welfare,<sup>27</sup> but child abuse and neglect outcomes for substance-exposed infants based on race and substance exposure remain understudied.

Second, the small sample size of child abuse and neglect-victimized infants limited our ability to identify characteristics predictive of abuse. It is possible that results of our qualitative case review are not nationally representative or generalizable and instead reflect nuances specific to substance-exposed infants from Delaware.

Third, we cannot estimate the magnitude of the effect of child-welfare involvement or safety plans on subsequent child abuse and neglect victimization in our study. Seventy percent of the infants were screened in for services, and about one-half of those screened in had safety plans instituted as part of child-welfare involvement. To what degree



child-welfare interventions and safety plans prevented child abuse and neglect in these cases is not measureable. In addition, the effect of specific interventions (safety plan vs home nursing vs other supportive services) requires further study, and impact of results is unknown.

Finally, our study does not provide any estimate of risk of abuse for substance-exposed infants beyond the first year of life. Prospective data collection may provide information on continued level of risk and factors predictive of future child-welfare involvement. Further study is needed to better understand the impact of level and type of supportive services by child welfare on child abuse and neglect outcomes for substance-exposed infants. ■

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DELAWARE DEPARTMENT OF SERVICES FOR CHILDREN, YOUTH AND THEIR FAMILIES  
SDM® SCREENING ASSESSMENT

r. 03-19

**SECTION 1: CHILD ABUSE/NEGLECT REPORT TYPE**

- Reports that require SDM screening (*Complete SDM screening assessment*)
  - Intrafamilial
  - Human trafficking
  - Sexual abuse by relative of child or by a person while exercising care, custody, and control
- Reports that do not require further SDM screening (*Document report and take further action if required*)
  - Extrafamilial not listed above (*Refer to law enforcement*)
  - Institutional abuse
  - Out-of-state allegation
  - Adult victim
  - Child victim now an adult

**SECTION 2: MALTREATMENT TYPES** (*Select only if definitional threshold is met. Select all that apply. Person causing harm must be a caregiver or household member having care, custody, and control except where noted.*)

<b>Death of Child</b>	<input type="checkbox"/> Death due to abuse <input type="checkbox"/> Death due to neglect <input type="checkbox"/> Sudden, unexpected, AND unexplained death of child age 3 or younger
<b>Physical Abuse</b>	<input type="checkbox"/> Child injury <ul style="list-style-type: none"> <li><input type="checkbox"/> Serious non-accidental injury</li> <li><input type="checkbox"/> Other non-accidental injury</li> </ul> <input type="checkbox"/> Excessive discipline/bizarre treatment <input type="checkbox"/> Dangerous behaviors involving child <input type="checkbox"/> Risk of physical abuse
<b>Neglect</b>	<input type="checkbox"/> Injury/illness resulting from medical neglect <input type="checkbox"/> Injury/illness due to other neglect <input type="checkbox"/> Neglect (without injury/illness) <ul style="list-style-type: none"> <li><input type="checkbox"/> Basic needs (food/clothing/shelter)</li> <li><input type="checkbox"/> Mental health care neglect</li> <li><input type="checkbox"/> Inadequate supervision</li> <li><input type="checkbox"/> Abandonment/no caregiver available/lockout</li> <li><input type="checkbox"/> Educational neglect</li> <li><input type="checkbox"/> Risk of neglect</li> </ul> <input type="checkbox"/> Reckless behavior involving child <input type="checkbox"/> Failure to protect <input type="checkbox"/> Exploitation
<b>Infant With Prenatal Substance Exposure</b>	<input type="checkbox"/> Infant or mother with positive toxicology at birth <input type="checkbox"/> Infant is substance affected <input type="checkbox"/> Mother with positive toxicology within 60 days prior to birth <input type="checkbox"/> Mother discloses using substances within 60 days prior to birth
<b>Emotional Abuse/Neglect</b>	<input type="checkbox"/> Child emotionally harmed <input type="checkbox"/> Suspected emotional harm <input type="checkbox"/> Risk of emotional harm
<b>Parental Risk Factors</b>	<input type="checkbox"/> Chronic and severe substance abuse <input type="checkbox"/> Domestic violence <input type="checkbox"/> History of serious child abuse and neglect or prior child fatality <input type="checkbox"/> Caregiver mental health problem <input type="checkbox"/> Caregiver cognitive or physical disability

**Figure 1.** Text. Sample safety assessment tool (Sections 1 and 2) in use by Delaware Child Protective Services at the time of study completion.

**SECTION 4: OVERRIDES**

**Override to Screen In Report**

- Court order to investigate.
- Discretionary override (*specify*): \_\_\_\_\_

**Override to Screen Out Report**

- The report is in relation to an active treatment case and the treatment unit is addressing the issue. Complete treatment response event in treatment case.
- Insufficient information to locate family.
- The information is identical to another accepted report (same alleged victim(s), same alleged perpetrator, same incident or behaviors).
- The alleged incident occurred more than one year ago. (Exception: Allegations of sexual abuse.)
- Infant prenatally exposed to medication as prescribed or MAT AND there are no other risk factors AND the provider is

**Figure 2.** Text. Sample safety assessment tool (Section 4) in use by Delaware Child Protective Services at the time of study completion.