

Spring 5-15-2020

## A Study on Early Intervention Referrals and Eligibility of Prenatal Drug-Exposed Children

Holly Nelson  
h.a.nelson@hotmail.com

Follow this and additional works at: <https://red.mnstate.edu/thesis>



Part of the [Early Childhood Education Commons](#), and the [Special Education and Teaching Commons](#)

Researchers wishing to request an accessible version of this PDF may [complete this form](#).

---

### Recommended Citation

Nelson, Holly, "A Study on Early Intervention Referrals and Eligibility of Prenatal Drug-Exposed Children" (2020). *Dissertations, Theses, and Projects*. 385.  
<https://red.mnstate.edu/thesis/385>

This Thesis (699 registration) is brought to you for free and open access by the Graduate Studies at RED: a Repository of Digital Collections. It has been accepted for inclusion in Dissertations, Theses, and Projects by an authorized administrator of RED: a Repository of Digital Collections. For more information, please contact [RED@mnstate.edu](mailto:RED@mnstate.edu).

A Study on Early Intervention Referrals  
and Eligibility of Prenatal Drug-Exposed Children

A Project Presented to  
The Graduate Faculty of  
Minnesota State University Moorhead

By

Holly Nelson

In Partial Fulfillment of the  
Requirements for the Degree of  
Masters of Science in  
Early Childhood Special Education

May 2020

Moorhead, Minnesota

### Abstract

The purpose of this study was to see what the developmental trend was among children who were prenatally exposed to drugs and early intervention services. There is not much research-based data that has been collected on this topic, even though in 2004 federal legislation was passed to improve early intervention service access for drug-exposed infants. This study was motivated by scientific evidence that maternal substance abuse and prenatal drug exposure has detrimental effects on the fetus and prolonged effects on children. This study collected data on how many prenatally drug-exposed children were referred for early intervention services and how many of them qualified for services. This was completed by surveying early childhood special education teachers about referrals they had received in the past two years. This study was tough to complete because of COVID-19. However, the study showed there were less referrals on children who were exposed prenatally to illicit drugs in 2018-2019 school year than the 2017-2018 school year. It is important to note that more than half of the children who were exposed to illicit drugs prenatally qualified for early intervention services. This shows that children who were exposed to illicit drugs prenatally should be observed and referred for early intervention services if concerns arise.

Keywords: prenatal drug exposure, early intervention, illicit drugs, drug effects

## Table of Contents

Abstract	2
Chapter 1 Introduction	
General Problem	4
Subject	5
Selection	5
Setting	5
Informed Consent	5
Chapter 2 Literature Review	
Review	6
Statement of Purpose	6
Research	6
Advances in Brain Imaging	7
How Drugs Enter the Fetus' System	7
Cocaine	8
Methamphetamine (METH)	10
Amphetamine (AMPH)	11
Methylenedioxymethamphetamine (MDMA)	11
Opioids	12
Cannabis	13
Early Intervention Referral Study	14
In Summary	15
Definition of Terms	15
Hypothesis	16
Chapter 3 Methods	
Research Question	17
Research Plan	17
Methods	17
Schedule	18
Ethical Considerations	18
Anticipated Response	18
Chapter 4 Results	
Data Collection	19
Results	21
Data Analysis	24
Conclusions	25
Chapter 5 Implications for Practice	
Action Plan	27
Plan for Sharing	27
References	28
Appendix	30

## Chapter 1 Introduction

### General Problem

A major public health concern is substance abuse disorders among pregnant women. This poses a risk to the unborn baby's development and the child's future development. In 2014, data that was compiled suggested that nearly 25 million Americans ages 12 and older were currently illicit drug users, which represented 9.2 percent of the population. Despite efforts of prevention and education programs, illicit drug use among pregnant women in 2014 remained constant at 5.9 percent (Ross, Graham, Money, Stanwood, 2014). However, the actual number of children who are exposed prenatally to illicit drugs may be higher because often mothers underreport substance abuse during pregnancy. Illicit drugs include marijuana, cocaine, heroin, hallucinogens, inhalants, or prescription-type psychotherapeutics used non-medically.

Research on prenatal drug exposure can be hard to find, especially with illicit drugs that have become popular in the past few years like methamphetamines (METH), methylenedioxmthamphetamine (MDMA) and amphetamine (AMPH), and opioids. However, the few studies that have been completed shows that prenatal drug exposure can have severe negative effects on fetal development that can follow the child throughout their whole life. Most studies agree that more research needs to be completed on this topic.

As an early childhood special education teacher, I have seen more referrals for children who were exposed prenatally to illicit drugs. A majority of children that are receiving early intervention services from me were exposed prenatally to illicit drugs. This made me wonder if other early childhood special educators are seeing more referrals

for children who were exposed prenatally to illicit drugs and if they are qualifying for early intervention services.

**Description of Subjects.** Early childhood special education teachers within the state of Minnesota provided data from referrals that have been received in the past two years by their early intervention programs.

**Selection.** Participants of this study were selected by research completed on special education programs found within the state of Minnesota. A survey was sent out to special education directors to pass onto their early childhood special education teachers.

**Setting.** This study took place within the state of Minnesota. According to the United States Census Bureau, it estimates that the population of Minnesota is 5,639,632. They state that 6.3% of the population is under the age of 5. White people make up 84.1% of that number, while African Americans make up 6.8%, American Indian make up 1.4% and Asian make up 5.1%. Hispanics or Latinos make up 2.5% of the population and people who claim 2 or more races make up 2.5% of the population. The percentage of Minnesotan's that have a high school diploma or higher is at 93.0%. The percentage of Minnesotan's that have a bachelor's degree or higher is 35.4%.

**Informed Consent.** Permission was obtained from the Institutional Review Board (IRB) at Minnesota State University and special education directors to conduct this study. Special education directors agreed to allow their early childhood special education teachers to participate in the study by passing the survey onto them to complete.

## Chapter 2 Literature Review

**Review.** In 2014, data that was compiled suggested that nearly 25 million Americans ages 12 and older were currently illicit drug users, which represented 9.2 percent of the population. Despite efforts of prevention and education programs, illicit drug use among pregnant women in 2014 remained constant at 5.9 percent (Ross, Graham, Money, Stanwood, 2014). Illicit drugs include marijuana, cocaine, heroin, hallucinogens, inhalants, or prescription-type psychotherapeutics used non-medically. This shows there is a major public health concern with substance abuse among pregnant woman, because research has shown that prenatal exposure to illicit drugs can have lasting affects throughout the child's entire life.

**Statement of Purpose.** The purpose of this study is to distinguish if there is a trend between children who were exposed to drugs prenatally and children who are receiving early intervention services.

**Research.** Research that has been completed on prenatal drug exposure varies by drug. However, the studies that have been completed seem to coincide with historical trends in drug use patterns in the United States. (Derauf, Kekatpure, Neyzi, Lester & Kosofsky, 2009) One of the main difficulties in the study of prenatal drug exposure is polysubstance abuse. Most women that used drugs while they were pregnant used multiple drugs, and this is especially true for illegal substances (Derauf, et al., 2009). To help address this complication, most studies will compare children who were exposed to multiple drugs to children who were exposed to a single drug to see what effects are the same or similar.

***Advances in Brain Imaging.*** Research in prenatal drug exposure in children has taken a big leap forward because of advances in brain imaging. This has made a significant impact on people's understanding of the effects of prenatal drug exposure on developing brains. (Derauf, et al., 2009). Magnetic resonance imaging (MRI) is the commonly used brain imaging modality that is research based. It can provide accurate neuroanatomical details about a brain's structure. When advanced methods of brain morphometry are applied, this can be used to quantitate the volume of specific brain areas for researchers to gather information on how drugs affect the brain. Magnetic resonance (MR) technology is developing at a rapid pace, which will improve the resolution of different brain structures. This will give researchers even more precise information on how different drugs affect brain structures.

***How Drugs Enter the Fetus' System.*** Any type of drug can alter fetal development through a variety of ways. A majority of drugs cross the placenta and blood-brain barrier so it directly affects the fetus, however some drugs transfer easier than others. Drugs that are easily transferred may have a greater effect on the development of the fetus, although developmental outcomes will also depend on toxicity and pharmacologic properties of the drug (Konijnenberg, 2015). The type of drug and concentration that the fetus is exposed to are also important when determining how it affects the fetus. "Drug exposure during the first weeks of pregnancy may not result in similar developmental outcomes as drug exposure during the second or third trimester or exposure throughout the pregnancy" (Konijnenberg, 2015, p. 40). Drugs can directly affect a fetus' brain growth by disrupting the normal functioning of various neurotransmitters and receptors in the fetus' brain (Gao, Lin, Grewen, Gilmore, 2017).



Drugs can also directly act on the uterus and/or placenta. This could cause altering placenta secretory activity or uteroplacental blood flow. The degree of how much illicit drugs influence fetal development depends on different factors like the physicochemical properties, dose, timing and duration of exposure (Konijnenberg, 2015). Drugs could also affect the mother's physiology. This can lead to a secondary influence on the fetus like an increased secretion of stress hormones. More research is being completed at this time that deals with paternal exposures to drugs and how it affects the fetus's brain development and neurobehavioral development, but it is not going to be reviewed in this paper.

***Cocaine.*** There have been studies completed on prenatal cocaine use and its effect on children from infancy to adolescence. However, studies on cocaine use during pregnancy have been complicated by the fact that women who used cocaine during pregnancy often used other drugs too (Grewen, Burchinal, Vachet, Gouttard, Gilmore, Lin, Johns, Elam, Gerig, 2014). To help address this complication, most studies have compared children with prenatal cocaine exposure plus tobacco, alcohol, and/or marijuana to children with prenatal exposure to the same drugs without cocaine. Research that has been done looks at prenatal cocaine use and it shows subtle cognitive, behavioral and physiological differences from infancy to adolescence. Research has also shown that all age groups of children who were exposed to cocaine prenatally have difficulty with emotional, behavioral and physiological self-regulation (Grewen, et al., 2014). Cocaine use during pregnancy has long-lasting effects on the brain.

Cocaine acts as a powerful central nervous system stimulant that works by blocking neurotransmitters in the brain. During important periods of fetal brain

development, those neurotransmitters play an important role in the growth and organization of brain tissue (Grewen, et al. 2014). When women uses cocaine during pregnancy, the cocaine can easily diffuse through the placenta into fetal circulation, where it can cross the immature blood-brain barrier. This leads to uterine contraction and umbilical artery vasoconstriction, which leads to reduced blood flow to the placenta and can create fetal hypoxia and impaired growth (Grewen, et al., 2014). Children who were exposed to cocaine prenatally usually have lower birth weight and more likely to be born premature. They have smaller head circumferences at birth (Akyuz, Kekatpure, Liu, Sheinkopf, Quinn, Lala, Kennedy, Makris, Lester, Kosofsky, 2014). Studies have found that children who were exposed to cocaine prenatally during critical periods of growth and organization of the brain can impair brain development. This results in significant structural and possibly functional differences at birth from children who were not prenatally exposed to cocaine.

At birth, infants who have been exposed to cocaine prenatally have slower auditory brainstem responses and reduced inter-hemispheric connectivity, which suggests delayed brain maturation (Grewen, et al., 2014). Studies also report prenatal cocaine exposed infants and toddlers demonstrate “impaired affect, arousal, joint attention, visual recognition, auditory comprehension and are at risk for delayed mental development” (Grewen, et al., 2014). Other research has shown that infants have abnormalities related to lower arousal, poorer quality of movement and self-regulation, higher excitability and jitteriness (Ross, Graham, Money, Stanwood, 2014).

School-aged children who have been exposed to cocaine prenatally have a “higher risk of learning disabilities and subtle deficits in attention, response inhibition,

impulsivity, language development, working memory, planning and set shifting” (Grewen, et al., 2014, p. 114). While adolescents who were exposed to cocaine prenatally demonstrate “deficits in working memory for words and faces, inhibitory control, and early sensory and higher order processing of language stimuli” (Grewen, et al., 2014). This may be associated with alterations in the adolescent’s brain structure and function. This can contribute to poorer performance on executive function tasks. They are also more likely to use cocaine and other drugs as compared to their non-exposed peers.

***Methamphetamine (METH).*** Methamphetamine, better known as METH, has a higher lipophilicity, or the ability to dissolve in fats, oils, lipids and non-polar solvents, than amphetamine, which allows a more rapid transport of the drug across the blood-brain barrier (Ross, Graham, Money, Stanwood, 2014). The most common effects that have been noted about newborns that were exposed to METH prenatally are growth restriction, decreased weight, height and head circumference. Newborns can also have congenital anomalies that can include cardiac anomalies, cranial abnormalities, and abnormal brain development that resembles those in asphyxiated infants (Ross, et al., 2014). Newborns have had mild withdrawal symptoms, although those are not common.

Research has shown that children that were exposed to METH prenatally have a modest decrease in height during the first three years of life, with no difference in weight and head circumference (Ross, et al., 2014). By age 3, children who were exposed to METH have no difference in fine and gross motor skills. When METH exposed children are older, they tend to perform worse on visual-motor tasks and have poorer sustained attention and delayed verbal memory (Ross, et al., 2014). They tend to have an increase of externalizing behavioral problems by age 5 (Finger, Jobin, Bernstein, Hans, 2017).

This leads to children having difficulties in the increasingly complex academic and social demands of their peers.

***Amphetamine (AMPH).*** Amphetamines (AMPH), or more commonly known as Speed, were widely used by women of childbearing age in 2014. AMPH can be detected in the human umbilical cord, plasma and placenta as early as the first trimester of pregnancy (Ross, et al., 2014). The cellular actions of AMPH are identical to METH, and it increases the risk of placental hemorrhage during pregnancy or preterm labor. When a fetus is exposed to AMPH, it leads to higher odds of preterm birth, low birth weight and small size for gestational age.

Research has found that children that were exposed to AMPH throughout pregnancy, they have a variety of adverse effects. These can include physical, cognitive, emotional and social effects. There is an increased prevalence of Attention Deficit Hyperactivity Disorder (ADHD) and learning difficulties that can be linked to deficits in attention, memory and motivation (Ross, Graham, Money, Stanwood, 2014).

***Methylenedioxymethamphetamine (MDMA).*** Methylenedioxymethamphetamine (MDMA), is commonly known as Ecstasy. MDMA is a derivative of AMPH and is a stimulant and hallucinogenic properties. In 2014, there have only been a few research studies that have been done that examine the effects of MDMA exposure to fetuses. The research that has been done noted that MDMA prenatal exposure leads to premature births, increased risk of congenital defects, cardiovascular anomalies and musculoskeletal anomalies, cardiac malformations and spontaneous abortions. MDMA exposure predicts poorer infant mental and motor development at 4 to 12 months of age (Ross, et al., 2014). However, it is not known if these impaired mental and motor development is long lasting.

*Opioids.* Illicit opiate use has been increasingly in the past decade and it is because of the increase of usage in the 18-25-age bracket (Ross, et al., 2014). When pregnant women use opioids it can have more distinctive effects compared with adult exposure. It raises the probability “preeclampsia, premature labor and rupture of membranes, placental insufficiency, abruption placentae, intrauterine growth retardation, and intrauterine death” (Ross, Graham, Money, Stanwood, 2014, p. 67-68). Even when there is a successful labor and delivery, babies have lower birth weight and smaller head circumference. Seventy- five percent of children who were exposed to opioids prenatally had drug withdrawal symptoms after birth (Nygaard, Slinning, Moe, Walhovd, 2016).

School aged children who were exposed to opioids prenatally show “motor and cognitive impairments, inattention, hyperactivity, and an increase in ADHD” (Ross, et al., 2014, p.68). Research has shown substantial evidence that children exposed to opioids prenatally have deficits in spatial learning and memory and can induce a morphine tolerance. Another study shows that children that were exposed to opioids or multiple substances had more regulatory problems at 8 ½ years of age as reported by caregivers and teachers (Nygaard, et al., 2016). Caregivers and teachers reported high levels of attention problems, internalized emotional regulation problems like anxiety and depression and externalized aggressive behavior. The damage from prenatal opioid exposure is debilitating and long lasting, however doctors need to continue to track children who were exposed farther to understand the impact it has into adulthood.

There is opioid maintenance therapy that is the first line of treatment for women who are opioid dependent during pregnancy. If opioid use is untreated during pregnancy, it leads to poor prenatal care, nutrition and fetal health. Opioid maintenance therapy is

not without substantial risk, because it can cross the placenta and can alter the fetus's development. There are three maintenance therapies that are used: methadone, buprenorphine, and naltrexone. Methadone is the current popular choice for pregnant women, but it can lead to an increase chance of premature birth, decreased birth weight and smaller head circumference. There is an increased risk of respiratory insufficiency at birth and myelination deficits (Ross, et al. 2014). When a child gets older, exposure to methadone during pregnancy can lead to reduced performance on learning and memory tasks. Children that were exposed to methadone prenatally showed greater anxiety and aggression problems than non-drug exposed children (Nyaagard, et al., 2016).

Buprenorphine is not a currently recommended practice in the United States, however it may produce few neurobehavioral problems, higher birth weight, and larger head circumference when compared to methadone (Ross, et al., 2014). When a child is older, who has been exposed to buprenorphine, research has shown that they can have hyperactivity, visual/motor impairment and memory problems. It can produce morphine tolerance, delayed acquisition of developmentally timed behaviors, and an increased sensitization to METH. Naltrexone is used more commonly outside the United States to prevent relapses in opioid addicts. There has been no research on humans as of 2014 to show what kind of effects it has on fetuses.

***Cannabis.*** Cannabis, also known as marijuana, is the most commonly abused form of illicit drugs in the United States and it elicits a sedative-like effect. In a recent survey reports that 10.4% of women aged 19-32 reported using cannabis and 2.9% of women delivering live-born infants in the United States reported using cannabis during pregnancy. (Dong, Chen, Harrington, Vinod, Hegde, Hedge, 2019). Pregnant women who

use illicit drugs are more likely to use cannabis than other illicit drugs because there is the perception that cannabis may be less harmful to the developing embryo and fetus compared to other illicit drugs (Dong, et al., 2019). Cannabis can cross the placenta efficiently, although the placenta limits the fetal exposure somehow. Newborns that were exposed to cannabis prenatally have sleep disturbances, a shorter-high pitched cry, altered responses to visual stimulus and increased startles and tremors, which can last up to 30 days after birth (Ross, et al. 2014). At 9 months of age, children showed decreased mental scores that went away at 19 months old. In children ages 1 -3 has shown no significant cognitive deficits, however at age 3, children demonstrated decreased short-term memory, verbal and visual skills.

School aged children start to show attention deficits, elevated impulsivity, hyperactivity, short-term memory, and verbal reasoning skills. As these children get older, depression begins and attention deficits remain. This can lead to increased delinquency and externalizing behaviors (Ross, et al., 2014). This continues all the way to early adulthood. Adults that were exposed to cannabis prenatally can still have deficits in visuospatial working memory, impulsivity, and with their executive functioning skills. They are also more likely to have substance abuse issues themselves.

***Early Intervention Referral Study.*** In 2012 a study was published in the *Maternal and Child Health Journal*, where researchers developed a Drug-Exposed Infant Identification Algorithm (DEIIA) and used it to measure Part C special education referrals and eligibility in Massachusetts over seven-year span. The DEIIA identified 7,348 drug-exposed infants from hospital records. Of the 7,348 children that were exposed to drugs prenatally, 4,482 (61%) children were referred to early intervention

services. Of the 4,482 children referred, 3,909 (87.2%) of those children were evaluated for early intervention services. Of the 3,909 children evaluated, 3,495 (89.4%) of those children qualified for early intervention services. This leaves 2,866 (39%) children that did not get referred for early intervention services before the age of 3 (Derrington, 2012). This means that 4 in 10 infants that were exposed to drugs were not accessing potentially beneficial early intervention services in Massachusetts. This shows that there needs to be improvement of identification and referral of these infants for early intervention services. Before this study, data on the rate of drug-exposed children receiving early intervention services was limited.

*In summary.* All the different studies that have been conducted throughout the years show compelling evidence that illicit drugs of abuse often have long-lasting changes in a child's brain growth, structure and function. Some studies suggest that prenatal drug exposure effects are permanent and last a person's entire life. It is important to remember research in this area is still in its formative stages and that more precise research needs to be completed to help us fully understand how being exposed prenatally to drugs effects a person throughout their lives. In Massachusetts, researchers looked at how many drug-exposed children were receiving early intervention services. However, there has been no research conducted to see if early intervention services were beneficial to children who were exposed to drugs prenatally. This is a step that should be looked at in the future.

**Definition of Terms.** For the purpose of this study, the following terms were defined:



- Illicit drugs – “include marijuana/hashish, cocaine (including crack), heroin, hallucinogens, inhalants, or prescription-type psychotherapeutics used non-medically” (Ross, et al., 2014).
- Early Intervention services – means developmental services that are provided under public supervision, provided at no cost, and are designed to meet the developmental needs of a child in one or more of the following areas: physical development, cognitive development, communication development, social or emotional development or adaptive development (Section 1432, 2019)

**Hypothesis.** In 2012 a study was published in the *Maternal and Child Health Journal*, it found that 89.4% of prenatally drug exposed children in Massachusetts who were evaluated for Early Intervention services qualified (Derrington, 2012). I believe that number is similar here in Minnesota also, because of my own experience as an early childhood special education teacher. A majority of the children I serve were prenatally exposed to illicit drugs.

## Chapter 3 Methods

### Research Question

While working as an Early Childhood Special Education teacher I have seen many referrals of children who were exposed prenatally to illicit drugs. This made me start to wonder:

1. What percentage of referrals that Early Childhood Special Education teachers are receiving that state children were exposed prenatally to illicit drugs?
2. What percentage of the referrals that dealt with drug-exposed children were moving to evaluation to see if they qualified for early intervention services?
3. What percentage of drug-exposed children are currently receiving early intervention services?

Answering these questions would help build a correlation between drug-exposed children and special education services. This information would be good to share with other professionals that work with young children, so they start to understand why it is important to refer children who have been exposed to drugs prenatally.

### Research Plan

**Methods and rationale.** Data was collected by sending surveys to Early Childhood Special Education teachers. These surveys would include questions about numbers of referrals they have received and numbers of children who are receiving special education services. I chose this method of data collection because I would receive numbers, not specific names or specific information about children who have been referred or receiving special education services. This would give me information, without breaking confidentiality.

**Schedule.** Within the first week, I would write up my survey questions and research early intervention agencies within the state of Minnesota. The second week, I would send out the surveys to the agencies that I have found. I would wait two to three weeks for responses to the surveys. During the sixth week, I would compile all the data that I have collected and interpret the results.

**Ethical Issues.** There could be an ethical issue with early intervention agencies releasing information to me, even though they are not giving me specific information about the children they are working with.

**Anticipated Response.** If ethical issues arise, they would have been figured out on an individual basis. I would answer questions or concerns that the agencies have. The survey was created to give generic information for the study, without breaking confidentiality about specific students.

## Chapter 4 Results

The purpose of this study was to see if other Early Childhood Special Education teachers were seeing the same things that I was, which is a high percentage of referrals with children who were exposed prenatally to illicit drugs. I wondered if those children were moving to the evaluation process and qualifying for Early Intervention Services. I wanted to see if there was a correlation between children who were exposed prenatally to illicit drugs and them qualifying for early intervention services like the study that was completed in Massachusetts in 2012.

**Data Collection.** The data collection for this survey was challenging. I got an exemption letter from the Institutional Review Board at Minnesota State University Moorhead in March 2020. This is when the COVID-19 pandemic started getting serious. Other states had started closing their schools buildings down and going into distance learning. Tim Walz, the governor of Minnesota, closed schools on March 18, 2020. School districts then had 7 days to figure out plans for distance learning with their students before opening up to distance learning on March 30, 2020. As an Early Childhood Special Education teacher, I was overwhelmed with the sudden changes that were being made. I knew if I was overwhelmed then other Early Childhood Special Education teachers were sure to be feeling the same ways I was. So, I did not send my survey out right away during this time. I thought that I would not get a good response back at that time.

I decided to send my survey out the second week of April. At that time, I was starting to feel more confident in what I was doing with distance learning and had gotten all of my initial paperwork completed. I felt that I would get a better response from other

Early Childhood Special Education teachers, because they had a few weeks to figure out what they were doing for distance learning. They would feel more comfortable with spending a few minutes completing my survey. I sent an email to all the Special Education Directors in the state of Minnesota which can be found in Appendix A. The email asked the Special Education Directors to forward the email that contained a link for the survey that I was conducting which can be found in Appendix B. Then I waited for responses.

I had multiple Special Education Directors email me back stating that they were not going to forward the survey to the Early Childhood Special Education teachers because they did not want to put more pressure on them at this time. Other school districts have an application process that people need to go through to conduct research at their schools. I did not realize that some schools would have an application process, and by the time I sent my surveys out I did not have time to wait for the applications to go through. So a number of Early Childhood Special Education teachers did not even receive my survey.

There were many Special Education Directors that were supportive of my research and forwarded the survey to their teachers. Most of them stated that they were not going to require their teachers to fill out my survey, and I responded that I understood because it was a difficult time for everyone. I did not get the response to my surveys that I would have liked, but with the COVID-19 pandemic and everyone working on distance learning plans from home I can understand why. I had a few Early Childhood Special Education teachers state that they did not have concrete numbers for me because their data is in the school building, which they do not have access to at this time. There were

also a few new teachers that did not know anything about referrals that had been made in the past. I am grateful for the 20 responses that I got back.

**Results.** I received responses to my survey from 20 Early Childhood Special Education teachers from the state of Minnesota. The following is information that I received. A table of all the answers that I received can be found in Appendix C.

*Research Question 1: What percentage of referrals that Early Childhood Special Education Teachers are receiving that state children were exposed prenatally to illicit drugs?*

The results from the surveys that were completed and returned show that 17.8% of referrals received by Early Childhood Special Education teachers in the 2017-2018 school year stated the child was exposed prenatally to illicit drugs. A break down of the numbers is found in Figure 1.

Figure 1  
*Survey Results for 2017-2108 School Year – Referrals of Children Exposed to Drugs Prenatally*

	Number Referrals in 2017 -2018	Number of Referrals of Children Exposed Prenatally to Drugs	Percentage of Referrals that Included Children Exposed Prenatally to Drugs
Totals	325	58	17.8%

The results from the surveys that were completed and returned show that 13.5% of referrals received by Early Childhood Special Education teachers in the 2018-2019 school year stated the child was exposed prenatally to illicit drugs. A break down of the numbers is found in Figure 2.

Figure 2  
*Survey Results for 2018-2019 School Year - Referrals of Children Exposed to Drugs Prenatally*

	Number Referrals Received in 2018-2019	Number of Referrals of Children Exposed Prenatally to Drugs	Percentage of Referrals that Included Children Exposed Prenatally to Drugs
Totals	356	48	13.5%

*Research Question 2: What percentage of the referrals that dealt with drug-exposed children were moving to evaluation to see if they qualified for early intervention services?*

From the surveys that were completed and returned, they show that 74.1% of referrals that stated the child who was exposed to drugs prenatally moved to the evaluation process in the 2017-2018 school year. The numbers are broken down in

Figure 3.

Figure 3  
*Results from Survey for 2017-2018 School Year - Children Who Moved to Evaluation Process*

	Number of Referrals of Children Exposed Prenatally to Drugs	Number of Children Exposed Prenatally to Drugs that Moved to Evaluation Process	Percentage of Children Exposed Prenatally to Drugs that Moved to Evaluation Process
Totals	58	43	74.1%

In the 2018-2019 school year 83.3% of referrals that stated the child who was exposed to drugs prenatally moved to the evaluation process. The numbers are broken down in Figure 4.

Figure 4  
*Results from Survey for 2018-2019 School Year – Children Who Moved to Evaluation Process*

	Number of Referrals of Children Exposed Prenatally to Drugs	Number of Children Exposed Prenatally to Drugs that Moved to Evaluation Process	Percentage of Children Prenatally Exposed to Drugs that Moved to Evaluation Process
Totals	48	40	83.3%

*Research Question 3: What percentage of drug-exposed children are currently receiving early intervention services?*

The surveys that were completed and returned show that 69% of children who were exposed prenatally to drugs qualified for Early Intervention services during the 2017-2018 school year. A break down of the numbers can be found in Figure 5.

Figure 5  
*Results from Survey for 2017-2018 School Year – Children that Were Referred that Qualified for Early Intervention Services*

	Number of Referrals of Children Exposed Prenatally to Drugs	Number of Children Exposed Prenatally to Drugs that Qualified for Early Intervention Services	Percentage of Children Exposed Prenatally to Drugs that Qualified for Early Intervention Services
Totals	58	40	69%

For the 2018-2019 school year, 60.4% of children who were exposed to drugs prenatally qualified for Early Intervention services. A break down of the numbers can be found in Figure 6.



Figure 6  
*Results from Survey for 2018-2019 School Year – Children that Were Referred that Qualified for Early Intervention Services*

	Number of Referrals of Children Exposed Prenatally to Drugs	Number of Children Exposed Prenatally to Drugs that Qualified for Early Intervention Services	Percentage of Children Exposed Prenatally to Drugs that Qualified for Early Intervention Services
Totals	48	29	60.4%

**Data Analysis.** I was very disappointed with the number of surveys that I received back from other Early Childhood Special Education teachers. I can understand with everything going on with COVID-19, teachers do not have time to look at past information on referrals or take the time to fill out my survey. I know there are thousands of Help Me Grow referrals every year, but according to my surveys there were 325 in 2017-2018 and 356 in 2018-2019. This shows that my sample size was very small. I think I would of gotten a better response if it was a more traditional school year. I also feel like if I had more time to do the application process to conduct research at a few more school districts I would have received more data.

According to the survey data that I received back, 17.8% of referrals made included children that were exposed to illicit drugs prenatally in 2017-2018, while it was only 13.5 % in the 2018-2019 school year. This shows that referrals on children who were exposed to drugs prenatally had gone down. This could mean that there are less children being born exposed to drugs prenatally or they are doing fine developmentally. People do not feel that they needed to be referred for Early Intervention services. However, children who were exposed prenatally to drugs that were referred for special

education services, 74.1% of them moved to the evaluation process in the 2017-2018 school year and 83.3% of them moved to the evaluation process in the 2018-2019 school year. These numbers are lower than what Massachusetts reported in their study completed in 2012. They had 87.2% of children that were referred were evaluated for services. I thought the numbers from Minnesota would reflect something higher like Massachusetts, but the lower number might be because of the lack of response to the surveys.

The survey data shows that children who were exposed prenatally to illicit drugs and referred for special education services, 69% of them qualified for early intervention services in the 2017-2018 school year and 60.4% of them qualified for early intervention services in 2018-2019 school year. This means that 93% of children who were exposed to illicit drugs prenatally that went into the evaluation process for special education qualified for early intervention services in the 2017-2018 school year. This is comparable to the study conducted in Massachusetts in 2012 where 89.4% of children who were exposed prenatally to illicit drugs that were evaluated qualified for early intervention services. In the 2018-2019 school year, 72.5% of children who were exposed to illicit drugs prenatally that went in the evaluation process qualified for Early Intervention services. This is a lower number than the Massachusetts study.

**Conclusion.** In conclusion, this study was tough to complete with the COVID-19 pandemic and Early Childhood Special Education teachers are focused on distance learning. I am grateful for the 20 responses I did get, however I was hoping for many more responses. It is hard to come to any conclusions with so little data. That data that I did get shows that there were less referrals on children who were exposed prenatally to

illicit drugs in the 2018-2019 school year then the 2017-2018 school year. This could be because of a couple of different factors. Either there are less children being born exposed to illicit drugs prenatally or children who were exposed to illicit drugs prenatally are developmentally doing fine and caregivers are not concerned. However, it is important to note that more than half of the children that were exposed prenatally to illicit drugs qualified for early intervention services. This shows that children who were exposed to illicit drugs prenatally should be observed and referred for early intervention services if concerns arise.

## Chapter 5 Implications for Practice

**Action Plan.** Even though I did not get the response that I would have liked with this study, it gave me some insights. In my Early Childhood Special Education teaching career I have evaluated and worked with many children who were exposed to illicit drugs prenatally. I was wondering if I was overidentifying children for special education services. However the data that I received, and a study completed in Massachusetts in 2012, state that over half of children who were exposed prenatally do qualify for early intervention services.

I would like to try to conduct this study again in the future, when we are not in such troubling times. It would be interesting to get more data to analyze to see how the numbers will change.

**Plan for Sharing.** While I was emailing with Special Education directors, several of them expressed interest in my study and would like a final copy of my paper. I will send this paper to them once it is completed. I would like to share this paper with other professionals that work in the same area as I do like the life nurses who do home visits with families. It is important for them to know information about prenatal drug exposure and how it can effect children. They can become more aware and refer children for early intervention services if there are concerns. I would discuss the results of this study with anyone who would be interested and willing to share the final draft of this paper with whomever would like to see it.

### References

- Derauf, C., Kekatpure, M., Neyzi, N., Lester, B., & Kosofsky, B. (2009). Neuroimaging of children following prenatal drug exposure. *Seminars in Cell & Developmental Biology, 20*(4), 441-454. doi:10.1016/j.semcdb.2009.03.001
- Grewen, K., Burchinal, M., Vachet, C., Gouttard, S., Gilmore, J. H., Lin, W., . . . Gerig, G. (2014). Prenatal cocaine effects on brain structure in early infancy. *NeuroImage, 101*, 114-123. doi:10.1016/j.neuroimage.2014.06.070
- Ross, E. J., Graham, D. L., Money, K. M., & Stanwood, G. D. (2014). Developmental Consequences of Fetal Exposure to Drugs: What We Know and What We Still Must Learn. *Neuropsychopharmacology, 40*(1), 61-87. doi:10.1038/npp.2014.147
- Gao, W., Lin, W., Grewen, K., & Gilmore, J. H. (2016). Functional Connectivity of the Infant Human Brain. *The Neuroscientist, 23*(2), 169-184. doi:10.1177/1073858416635986
- Akyuz, N., Kekatpure, M. V., Liu, J., Sheinkopf, S. J., Quinn, B. T., Lala, M. D., . . . Kosofsky, B. E. (2014). Structural Brain Imaging in Children and Adolescents following Prenatal Cocaine Exposure: Preliminary Longitudinal Findings. *Developmental Neuroscience, 36*(3-4), 316-328. doi:10.1159/000362685
- Derrington, T. M. (2012). Development of the Drug-Exposed Infant Identification Algorithm (DEIIA) and Its Application to Measuring Part C Early Intervention Referral and Eligibility in Massachusetts, 1998–2005. *Maternal and Child Health Journal, 17*(9), 1567-1575. doi:10.1007/s10995-012-1157-x
- Finger, B., Jobin, A., Bernstein, V. J., & Hans, S. (2017). Parenting contributors to early

- emerging problem behaviour in children of mothers in methadone maintenance treatment. *Infant and Child Development*, 27(1). doi:10.1002/icd.2042
- Nygaard, Egil, Slinning, Kari, Moe, Vibeke, Walhovd, Kristine B., Sasayama, Daimei (2016). Behavior and Attention Problems in Eight-Year-Old Children with Prenatal Opiate and Poly-Substance Exposure: A Longitudinal Study. *PloS one*, Vol. 11 (6). p.e0158054
- Konijnenberg, Carolien (2015). Methodological Issues in Assessing the Impact of Prenatal Drug Exposure. *Substance Abuse: Research and Treatment Vol. 9s2* (39).
- Dong, Catherine, Chen, Jingwen, Harrington, Amy, Vinod, K. Yaragudri, Hegde, Muralidhar L., Hegde, Venkatesh L. (2019). Cannabinoid Exposure during Pregnancy and its Impact on Immune Function. *Cellular and Molecular Life Sciences Vol. 76* (4). P. 729-743
- Section 1432. (2019, November 7). Retrieved April 16, 2020 from <https://sites.ed.gov/idea/statute-chapter-33/subchapter-iii/143>

## Appendix

### Appendix A

April 6, 2020

Dear (name of Special Education Director),

My name is Holly Nelson and I am a graduate student with the University of Minnesota Moorhead. I am working on my thesis project for my master's degree in Early Childhood Special Education. I am hoping that you could help me with my data collection. Here is more about my thesis.

I currently work as an Early Childhood Special Education teacher and I noticed I have been getting a significant number of referrals on children who were exposed to illegal drugs prenatally. This had me curious about research that has been done, and I found research on the effects that different drugs have on children who were exposed prenatally. However, I found only one study that was completed in Massachusetts in 2012 that looked at drug-exposed infants and early intervention services. This made me wonder how many children who were exposed to drugs prenatally were getting referred for early intervention services and how many were qualifying for early intervention services.

What I am asking for you is permission to allow your Early Childhood Special Education teachers to participate in a short survey and I will attach a link with this email. This survey is not asking for any specific information on the children you serve. I am just asking for numbers to look at. If you will allow this, please forward the survey to your Early Childhood Special Education teachers for them to fill out and return to me. If you would like a final report after all the data has been collected and organized, please let me know and I will send you one when it is finished.


If you have any questions about the study, you may contact the following people:

Holly Nelson  
Co-Investigator  
Ph. 218-255-5823  
Email: [h.a.nelson4984@gmail.com](mailto:h.a.nelson4984@gmail.com)

Ximena Suarez-Sousa  
Principal Investigator  
Associate Professor  
Department of Leadership and Learning  
Office LO 221C  
Minnesota State University Moorhead  
Email: [suarez@mnstate.edu](mailto:suarez@mnstate.edu)  
Phone: 218-477-2007

Any questions about your rights may be directed to Lisa Karch, Ph.D, Chair of the MSUM Institutional Review Board, at 218-477-2699 or by [lisa.karch@mnstate.edu](mailto:lisa.karch@mnstate.edu).

Thank you for your time and consideration,

A handwritten signature in black ink that reads "Holly Nelson". The script is cursive and fluid, with the first letters of "Holly" and "Nelson" being capitalized and prominent.

Holly Nelson



**Appendix B****Part C Early Intervention Referral and Eligibility of Prenatally Drug-Exposed Children Survey**

Dear Early Childhood Special Education Teacher,

My name is Holly Nelson and I am a graduate student with the University of Minnesota Moorhead. I am working on my thesis project for my master's degree in Early Childhood Special Education. I am hoping that you could help me with my data collection. Here is more about my thesis.

I currently work as an Early Childhood Special Education teacher and I noticed I have been getting quite a few referrals on children who were exposed to drugs prenatally. This had me curious about research that has been done, and I found research on the effects that different drugs have on children who were exposed prenatally. However, I found only one study that was completed in Massachusetts in 2012 that looked at drug-exposed infants and early intervention services. This made me wonder how many children who were exposed to drugs prenatally were getting referred for early intervention services, how many were qualifying for early intervention services, and what category they qualified for.

I have attached a short survey that I would appreciate if you will be willing to complete and send back to me for the data portion of my thesis. I am not going to be asking for any personal or specific information on any of the children that you have or are currently working with. I am just looking for general data from the past two years. By sending the survey back to me, I am taking that as acceptance in being a part of my research. If you are interesting in seeing a final report after all the data has been collected and organized, please let me know. I will send you one when it is completed.

Please feel free to email me if you have any questions or concerns. Thank you for your time and all the hard work you put in every single day.



Holly Nelson  
Email: [h.a.nelson@hotmail.com](mailto:h.a.nelson@hotmail.com)

Question	2017-2018	2018-2019
How many referrals did you receive?		
How many referrals did you receive on children who were prenatally exposed to illicit drugs (opioids, heroin, METH, marijuana, etc.) or born addicted according to medical records or parent report?		
How many referrals for the prenatally exposed to illicit drugs or born addicted moved to the evaluation process?		
How many referrals for the prenatally exposed to illicit drugs or born addicted qualified for early intervention services?		

Thanks for taking time out of your busy schedules to complete this survey for me!  
 Please email me if you have any questions at [h.a.nelson@hotmail.com](mailto:h.a.nelson@hotmail.com)

**Appendix C****Raw Data Results for the 2017-2018 School Year**

Number of Referrals in 2017-2018	Number of Referrals of Children Exposed to Drugs Prenatally	Number of Children Prenatally Exposed to Drugs that Moved to Evaluation Process	Number of Children Exposed Prenatally to Drugs that Qualified for Early Intervention Services
27	11	10	10
15	Unsure	unsure	Unsure
10	2	2	2
85	4	3	3
8	0	0	0
15	0	0	0
20	1	1	1
12	1	1	0
4	0	0	0
1	0	0	0
20	2	2	2
6	0	0	0
20	18	13	11
10	0	0	0
9	2	1	1
18	2	2	2
45	15	8	8
Not ECSE teacher at this time	-	-	-
Working out of State at this time	-	-	-
Not ECSE teacher at this time	-	-	-
Total 325	Total 58	Total 43	Total 40

**Raw Data Results for 2018-2019 School Year**

Number of Referrals in 2018-2019	Number of Referrals of Children Exposed to Drugs Prenatally	Number of Children Prenatally Exposed to Drugs that Moved to Evaluation Process	Number of Children Exposed Prenatally to Drugs that Qualified for Early Intervention Services
23	9	9	8
17	1	1	1
8	1	1	1
74	3	3	3
15	0	0	0
9	2	2	2
13	3	3	3
25	0	0	0
10	0	0	0
6	0	0	0
3	0	0	0
23	0	0	0
8	0	0	0
21	14	12	2
10	0	0	0
11	0	0	0
10	1	0	0
25	2	2	2
35	10	5	5
10	2	2	2
<b>Total 356</b>	<b>Total 48</b>	<b>Total 40</b>	<b>Total 29</b>

**Appendix D**

Figure 1  
*Survey Results for 2017-2108 School Year – Referrals of Children Exposed to Drugs Prenatally*

	Number Referrals in 2017 -2018	Number of Referrals of Children Exposed to Drugs Prenatally	Percentage of Referrals that Included Children Exposed to Drugs Prenatally
Totals	325	58	17.8%

Figure 2  
*Survey Results for 2018-2019 School Year - Referrals of Children Exposed to Drugs Prenatally*

	Number Referrals Received in 2018-2019	Number of Referrals of Children Exposed to Drugs Prenatally	Percentage of Referrals that Included Children Exposed to Drugs Prenatally
Totals	356	48	13.5%

Figure 3  
*Results from Survey for 2017-2018 School Year - Children Who Moved to Evaluation Process*

	Number of Referrals of Children Exposed to Drugs Prenatally	Number of Children Prenatally Exposed to Drugs that Moved to Evaluation Process	Percentage of Children Prenatally Exposed to Drugs that Moved to Evaluation Process
Totals	58	43	74.1%

Figure 4  
*Results from Survey for 2018-2019 School Year – Children Who Moved to Evaluation Process*

	Number of Referrals of Children Exposed to Drugs Prenatally	Number of Children Prenatally Exposed to Drugs that Moved to Evaluation Process	Percentage of Children Prenatally Exposed to Drugs that Moved to Evaluation Process
Totals	48	40	83.3%

Figure 5  
*Results from Survey for 2017-2018 School Year – Children that Were Referred that Qualified for Early Intervention Services*

	Number of Referrals of Children Exposed to Drugs Prenatally	Number of Children Exposed Prenatally to Drugs that Qualified for Early Intervention Services	Percentage of Children Exposed Prenatally to Drugs that Qualified for Early Intervention Services
Totals	58	40	69%

Figure 6  
*Results from Survey for 2018-2019 School Year – Children that Were Referred that Qualified for Early Intervention Services*

	Number of Referrals of Children Exposed to Drugs Prenatally	Number of Children Exposed Prenatally to Drugs that Qualified for Early Intervention Services	Percentage of Children Exposed Prenatally to Drugs that Qualified for Early Intervention Services
Totals	48	29	60.4%