



# **LONG-TERM OUTCOMES OF NEONATAL ABSTINENCE SYNDROME: IMPLICATIONS FOR PROVIDERS AND CAREGIVERS**

October 29, 2018  
*2:30 pm – 3:30 pm EST*



# Today's Speakers



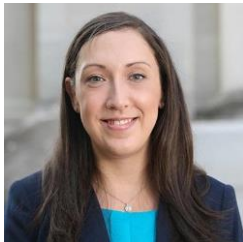
**Peggy Honein, PhD, MPH**

Director, Division of Congenital and Developmental Disorders



**Michael Warren, MD, MPH, FAAP**

Associate Administrator, Maternal and Child Health  
Bureau, Health Resources and Services Administration



**Mary-Margaret A. Fill, MD**

Medical Epidemiologist, Tennessee Department of Health

# Introduction and Welcome

**Rebecca Russell, MSPH**

SVP (Interim) Science and Strategy Senior Director,  
Applied Research and Evaluation, March of Dimes

# **Maternal and Child Health Impact of the U.S. Opioid Epidemic**

**Margaret (Peggy) Honein, PhD, MPH**

Director, Division of Congenital and Developmental Disorders  
National Center on Birth Defects and Developmental Disabilities  
Centers for Disease Control and Prevention

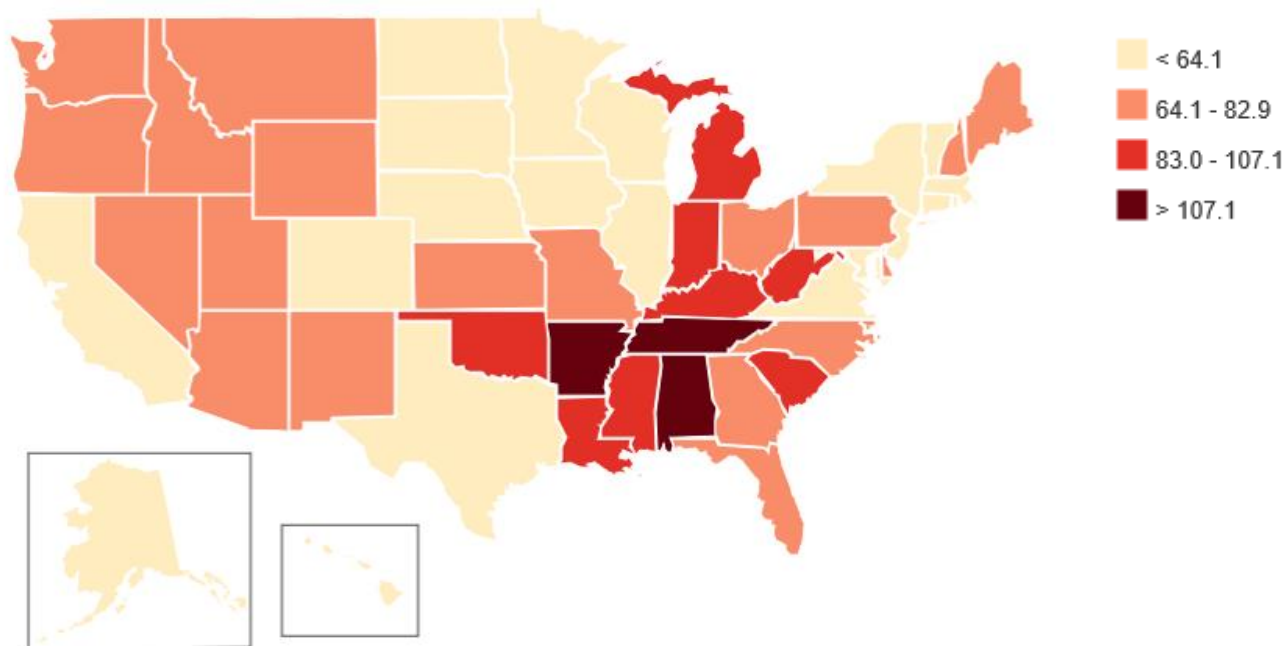
*October 29, 2018*

# Overview of the Opioid Epidemic

- In 2016, about 11.8 million people in the U.S. misused opioids in the past year, including:
  - 11.5 million pain reliever misusers
  - 948,000 heroin users
- Increase in drug overdose deaths
- Vulnerable populations affected include pregnant women and infants



# U.S. State Opioid Prescribing Rates, 2016

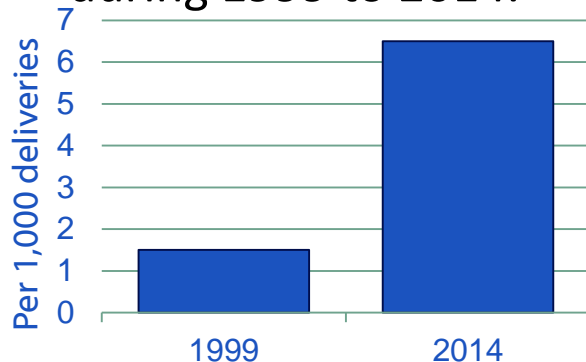


# Opioid Use among Women

About **1** in **3**  
women of reproductive  
age  
filled an opioid  
prescription  
between 2008 – 2012.

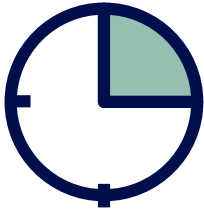


Opioid use disorder rates at  
delivery increased by more than  
**4-fold**  
during 1999 to 2014.



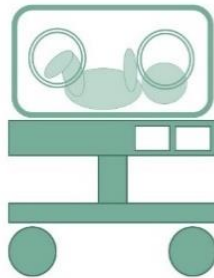
# Babies Born with Neonatal Abstinence Syndrome (NAS)

Every **15** minutes,  
a baby was born  
with NAS



Nearly **100** babies  
each day

Babies born with **NAS**  
experience  
**serious medical  
problems**



In 2014, for NAS total  
**hospital costs**  
in the US were over  
**\$563 million**



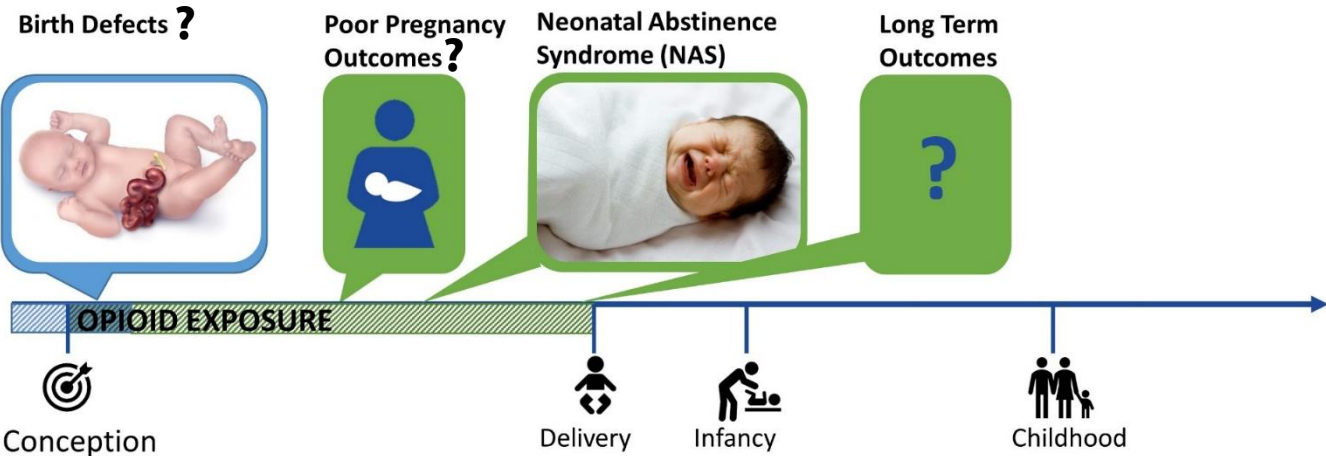


# Protecting Our Infants Act, 2015



- Department of Health and Human Services:
  - Review and improve coordination
  - Develop a strategy to address gaps in research and federal programs
  - Study and develop recommendations for preventing and treating prenatal opioid use and neonatal abstinence syndrome
  - Improve data and public health response by supporting states and tribes

# Outcomes Associated With Prenatal Opioid Exposure



# Current NCBDDD-Supported Efforts

- With March of Dimes on two NAS pilot projects
  - NAS surveillance based on birth defects surveillance
    - Grantees: Illinois, New Mexico, Vermont
    - Readmissions and adverse outcomes through one year of age
    - Inform NAS surveillance and prevention efforts in other states
  - Understanding the long-term outcomes of NAS: Tennessee Pilot
- With other groups at CDC and other partners
  - Assess various aspects about NAS across the U.S.
  - Broader impact of prenatal opioid exposure on the infant



# FY19 Budget Initiatives

- \$10 million for surveillance of emerging threats to mothers and babies
  - Leverage Zika pregnancy and birth defects surveillance system
  - Capture real-time data that can rapidly be translated into clinical guidance
  - Understand long-term implications of known or emerging threats, including infectious agents, vaccines, or medications, such as opioids
- \$2 million for surveillance of neonatal abstinence syndrome

## PROGRAM HIGHLIGHT

### Emerging Threats to Mothers and Babies Initiative

Mothers and babies are often at higher risk during any kind of public health crisis. Supported through supplemental Zika response funding, the innovative Zika pregnancy and infant registry was established to ensure that mothers and babies are adequately monitored and quickly informed about the impact of an emerging threat. The continuation and expansion of this surveillance system is critical to better understanding the long-term implications of not only Zika, but also for other emerging infectious diseases, such as pandemic influenza, and other emerging threats, including prenatal exposure to opioids. The FY 2019 Budget includes an additional \$10 million to support an initiative that will enable CDC to continue to work with states to maintain ongoing registries and continue to monitor mothers and babies for the impact of Zika and serve as a tool for other emerging public health threats.

This additional surveillance will inform public health action for mothers and babies, including prevention strategies, clinical guidance, enhanced follow-up, targeted screening and evaluation, and identification of medical and early interventions to help children thrive. In addition, CDC will work collaboratively with state, local, and territorial health departments to extend the monitoring of babies born to mothers with evidence of Zika infection to better understand the full impact of Zika on child development, and work with healthcare providers and others to develop better assessment and communication tools.

<https://www.hhs.gov/sites/default/files/fy-2019-budget-in-brief.pdf>

# Leverage Zika Infrastructure for Prenatal Opioid Exposure

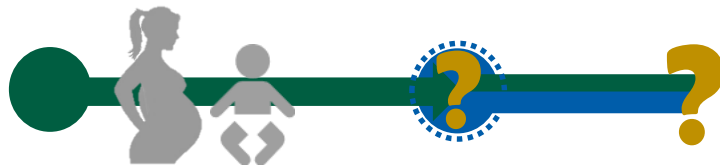


2009  
H1N1



Anecdotal reports, but no  
formal data collection on  
impacts during pregnancy

2015  
Ebola



2016  
Zika

Opioid  
crisis?

# State Spotlight: Pennsylvania

**Background:** On January 10, 2018, PA Governor added neonatal abstinence syndrome (NAS) as a reportable condition as part of a 90-day state of emergency for the opioid epidemic. Prior to the 2017 implementation of PA's Zika Birth Defects Surveillance (ZBDS), the state had never collected data on birth defects or NAS.

## Methods

- Developed **strategy for facility outreach** based on live birth counts and reported neonatal intensive care units (NICUs)
- Created a brief **one-page NAS case report**
- Created **electronic survey** using REDCap Cloud

## Results

- REDCap Cloud survey for **NAS** surveillance created in **2** days
- After 1 month: **342** cases of **NAS** reported from **57** (61% of) facilities
- 7 weeks after distribution: **520** cases of **NAS** reported



**Rapid tracking of NAS** data within the short 90-day timeframe of the opioid state of emergency



Fast turn-around to inform **targeted community outreach**



**Blueprint for Pennsylvania's disaster preparedness** for other emerging surveillance needs

# Aligns with CDC's Mission

- Protect the health, safety, and security of the nation
- Put science into action

## **Bottom line:**

- Pregnancy and birth defects surveillance are key components of CDC's preparedness work.
- Birth defects can be the first sign that an emerging infection causes serious harm.

# Questions?



## Thank you

For more information, contact CDC  
1-800-CDC-INFO (232-4636)  
TTY: 1-888-232-6348 [www.cdc.gov](http://www.cdc.gov)

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.





# Long-Term Outcomes of Neonatal Abstinence Syndrome: Implications for Providers and Caregivers

**Mary-Margaret A. Fill, MD**

**Michael D. Warren, MD, MPH, FAAP**

**Tennessee Department of Health**

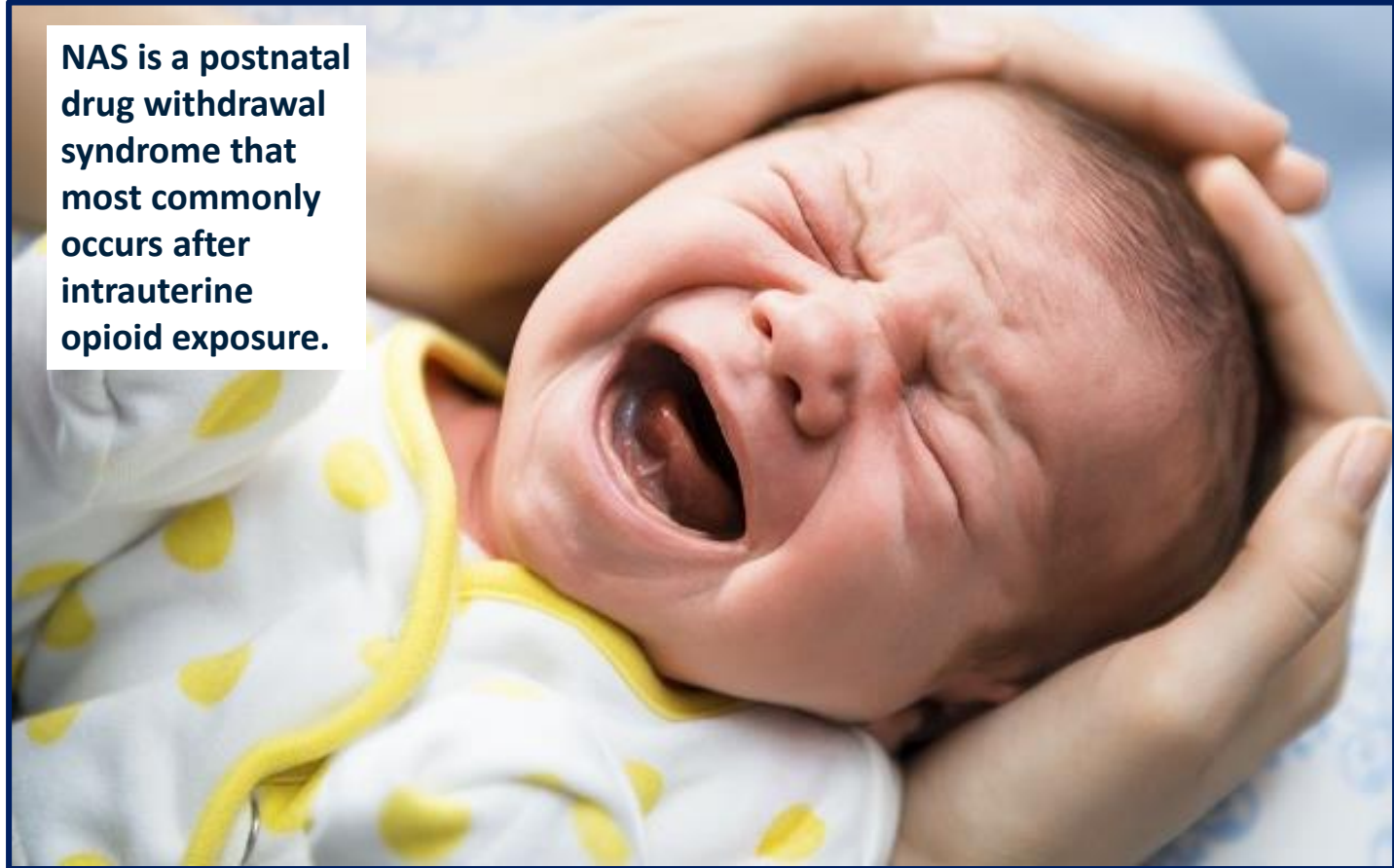


# Objectives

- **Review the clinical presentation and treatment options for infants with NAS**
- **Discuss possible long-term outcomes of NAS**
- **Outline opportunities for prevention or early intervention in children and families at risk for NAS**

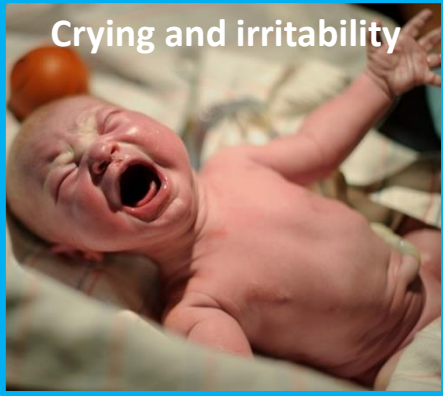
# Neonatal Abstinence Syndrome (NAS)

**NAS is a postnatal drug withdrawal syndrome that most commonly occurs after intrauterine opioid exposure.**



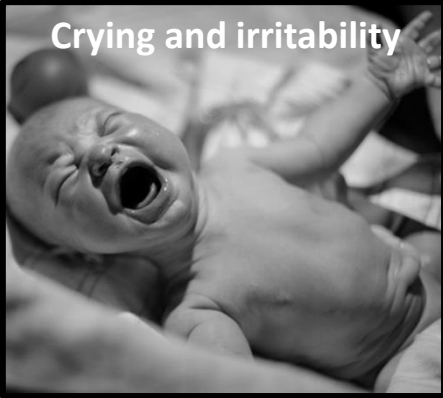
# Common Symptoms of NAS

Crying and irritability



# Common Symptoms of NAS

Crying and irritability

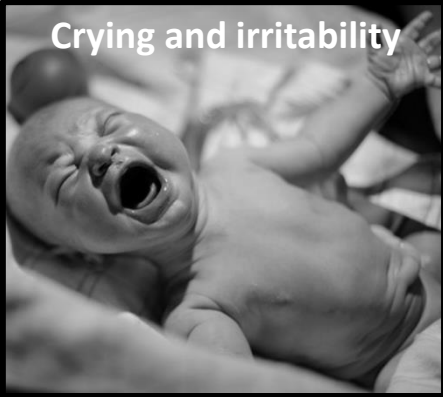


Feeding difficulties



# Common Symptoms of NAS

Crying and irritability



Tremors or hyperactive reflexes

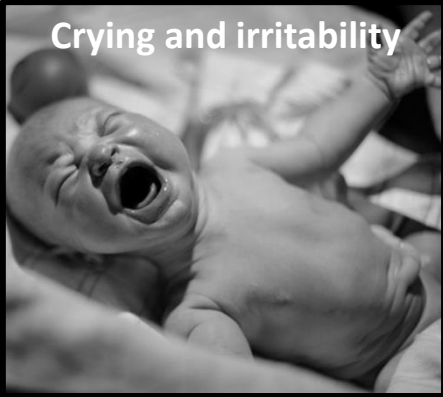


Feeding difficulties



# Common Symptoms of NAS

Crying and irritability



Tremors or hyperactive reflexes



Feeding difficulties

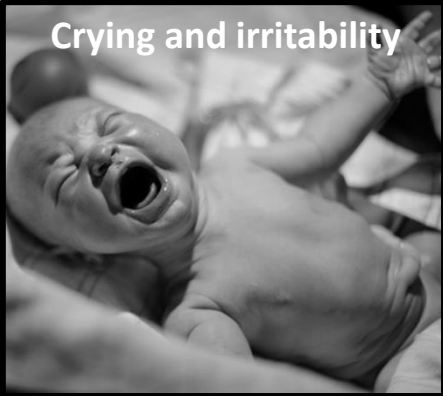


Yawning and sneezing

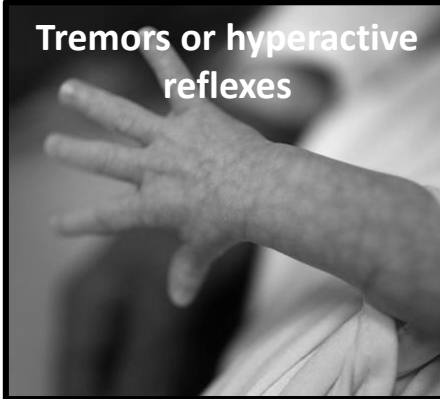


# Common Symptoms of NAS

Crying and irritability



Tremors or hyperactive reflexes



Failure to thrive



Feeding difficulties



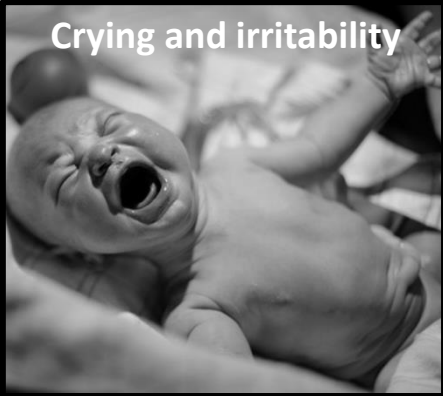
Yawning and sneezing





# Common Symptoms of NAS

**Crying and irritability**



**Tremors or hyperactive reflexes**



**Failure to thrive**



**Feeding difficulties**



**Yawning and sneezing**



**Temperature instability**

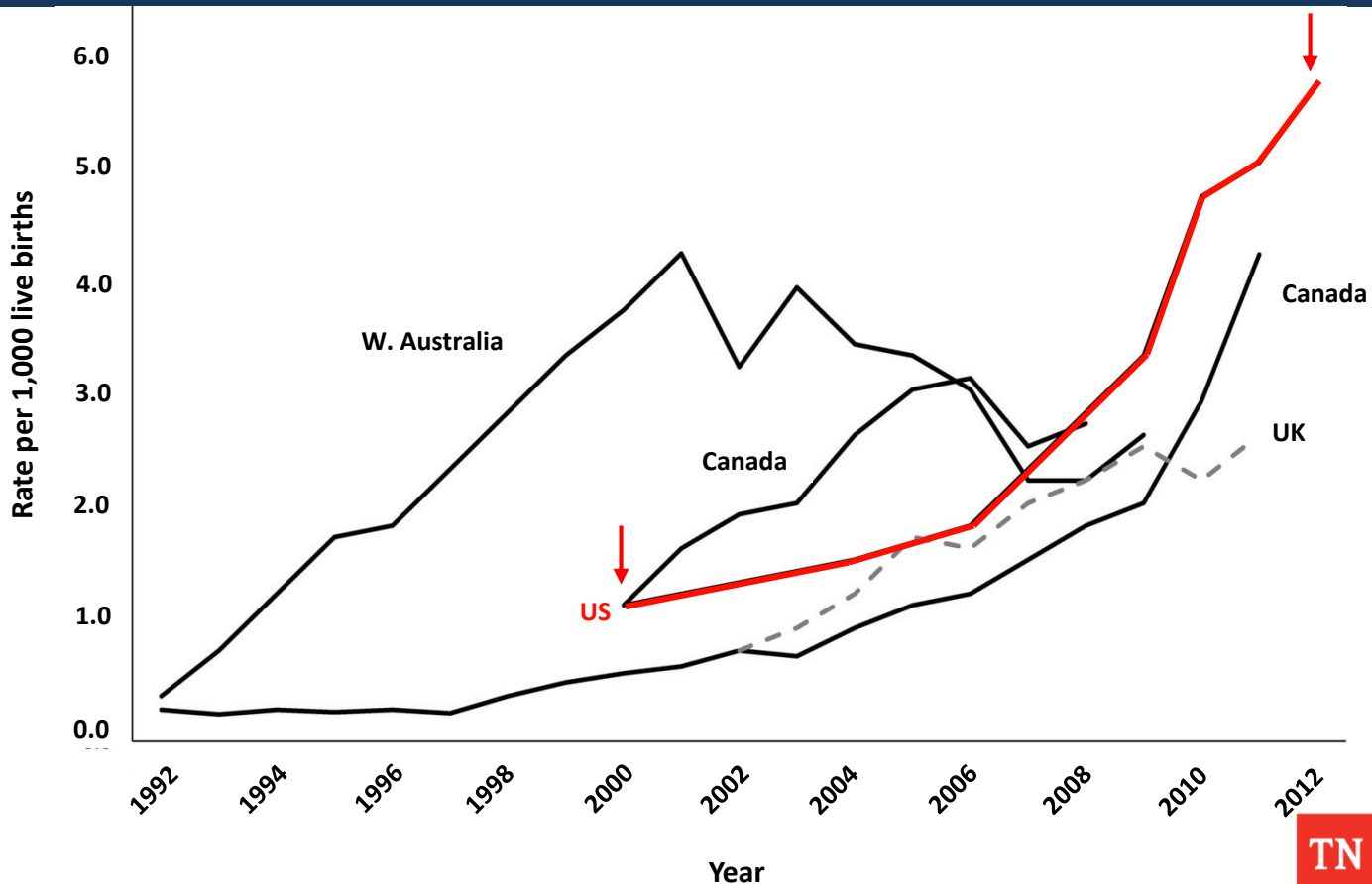


# NAS Treatment

- **Nonpharmacologic supportive care**
  - Swaddling
  - Minimize environmental stimuli
- **Pharmacologic therapy**
  - Morphine
  - Buprenorphine
  - Methadone



# A Problem of Pandemic Proportions



**In the United States, every**

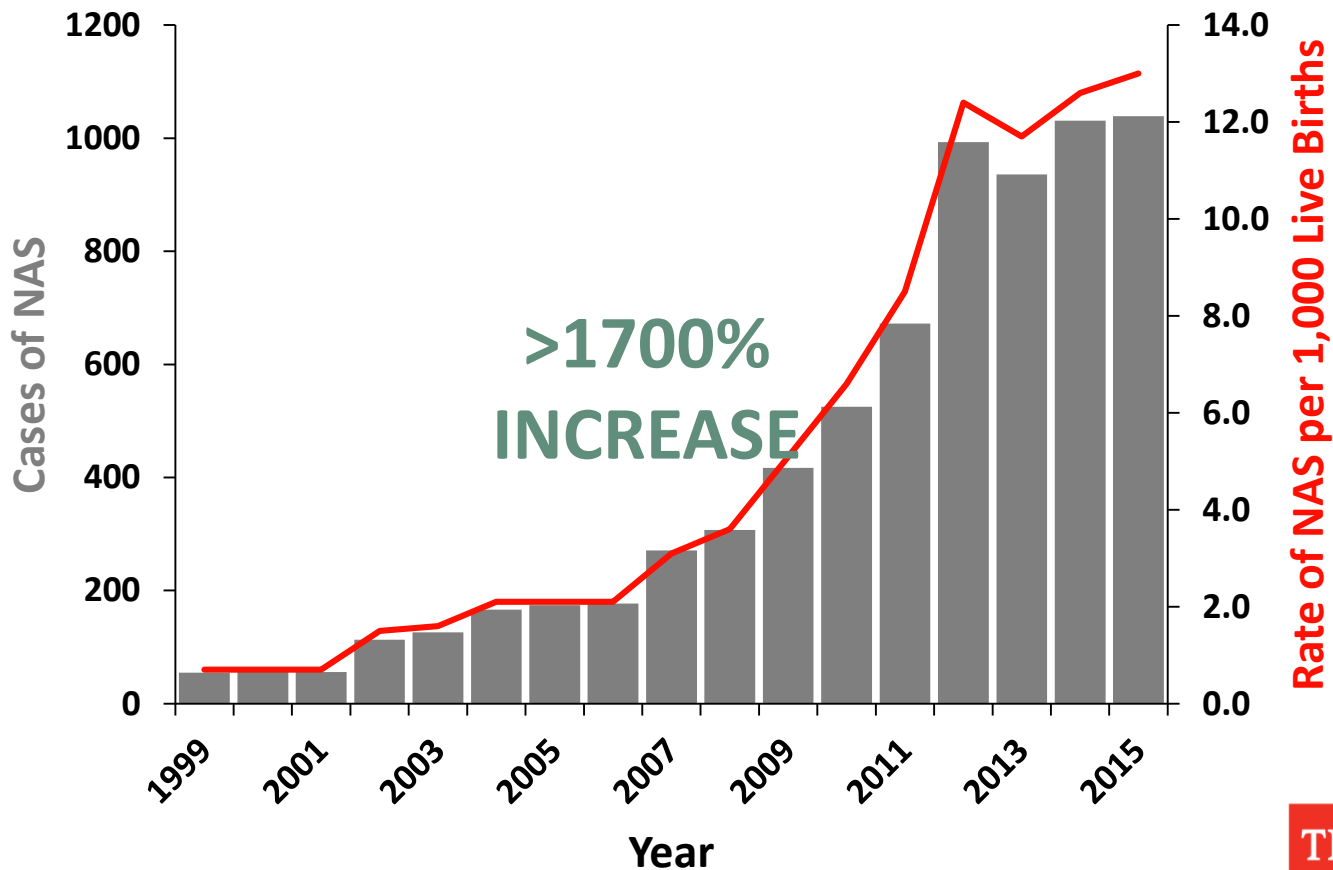


**25**

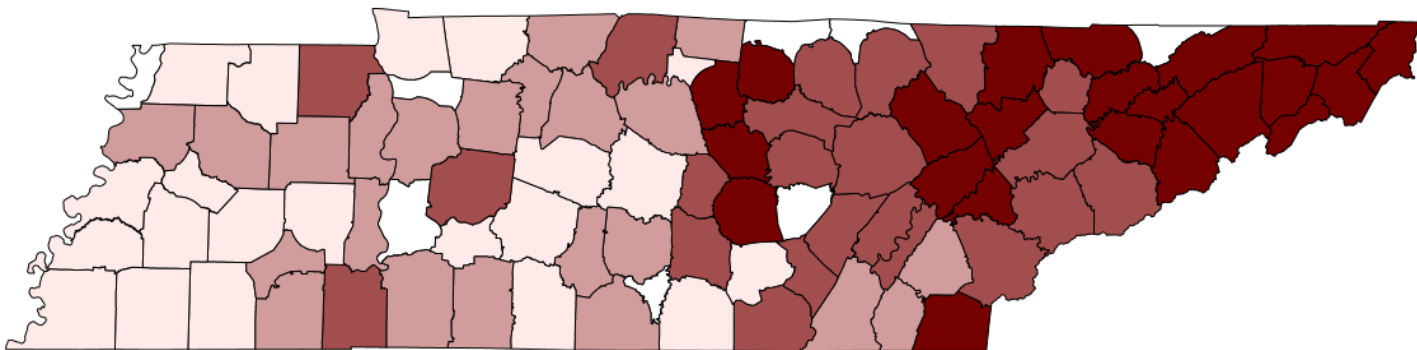
**MINUTES**

**a baby is born affected by opioid withdrawal**

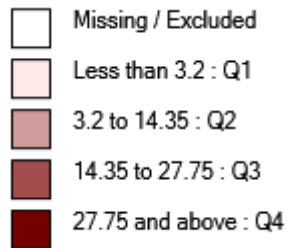
# NAS: A Growing Problem in Tennessee



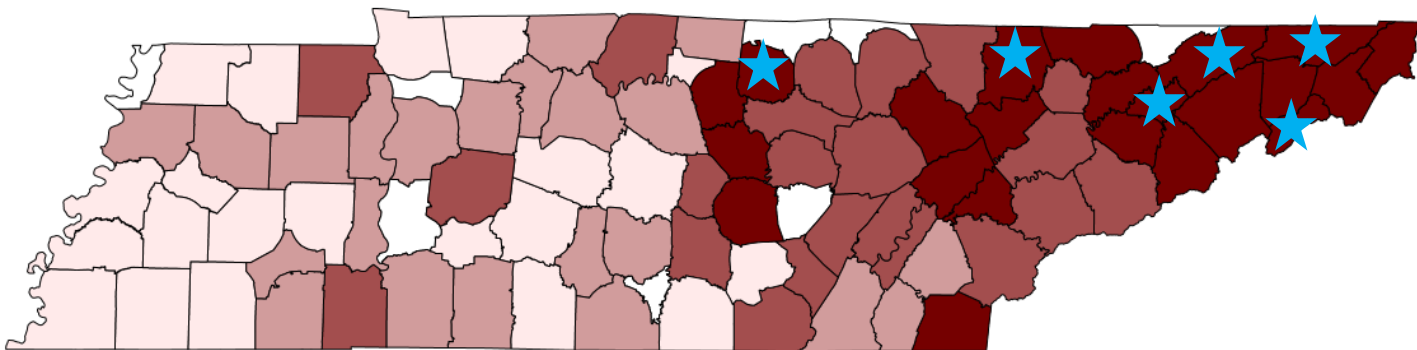
# East Tennessee Disproportionately Impacted



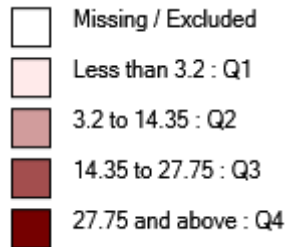
Rate of NAS per 1,000 live births



# East Tennessee Disproportionately Impacted



Rate of NAS per 1,000 live births



# “The Call”

- Anecdotal reports from educators in east Tennessee
- Children with a history of NAS had learning challenges
- No studies examining educational outcomes in the United States





# Objective

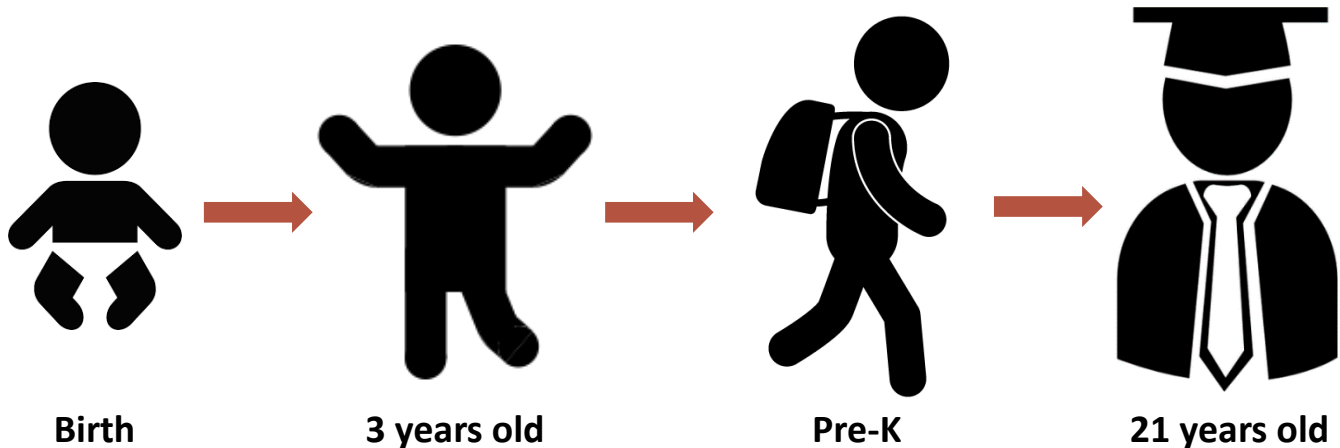
**Examine associations between a history of NAS and educational outcomes.**



# Potential Educational Data

- **Standardized reading / math test scores**
  - TN Comprehensive Assessment Program: statewide (3<sup>rd</sup> grade)
  - Stanford Achievement Test: optional in some districts (K, 1<sup>st</sup> & 2<sup>nd</sup>)
- **Absenteeism data**
  - Excused / unexcused
- **Disciplinary data**
  - Suspension / expulsion
- **Special education data**
  - IEP
  - Accommodations
  - Therapies (PT/OT/ST)

# Special Education Services in Tennessee



**TEIS**

**Special Education**

# Qualifying Educational Disabilities in TN

**Autism**

**Intellectually Gifted**

**Deaf-Blindness**

**Multiple Disabilities**

**Deafness**

**Orthopedic Impairment**

**Developmental Delay**

**Other Health Impairment**

**Emotional Disturbance**

**Specific Learning Disabilities**

**Functional Delay**

**Speech or Language Impairment**

**Hearing Impairment**

**Traumatic Brain Disorder**

**Intellectual Disability**

**Visual Impairment**

# Process Flow

**Referral**

# Process Flow

Referral

**Evaluation**

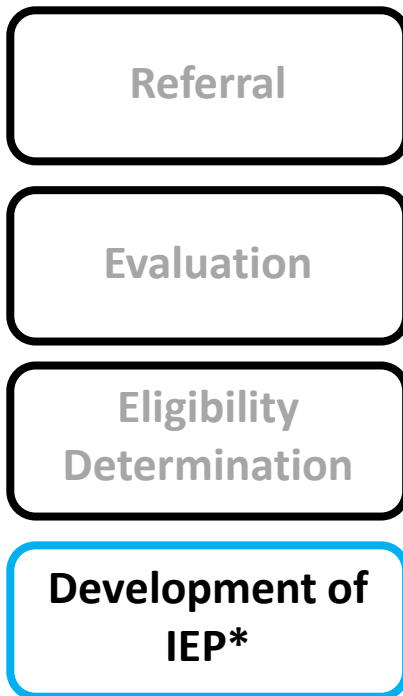
# Process Flow

Referral

Evaluation

**Eligibility  
Determination**

# Process Flow



*\* Individualized  
Education Program*



# Process Flow

Referral

Evaluation

Eligibility  
Determination

Development of  
IEP

**Implementation  
of Services**

# Methods: Creation of Dataset

**Tennessee Birth Cohort**  
***2008–2011***



**TENNCARE**

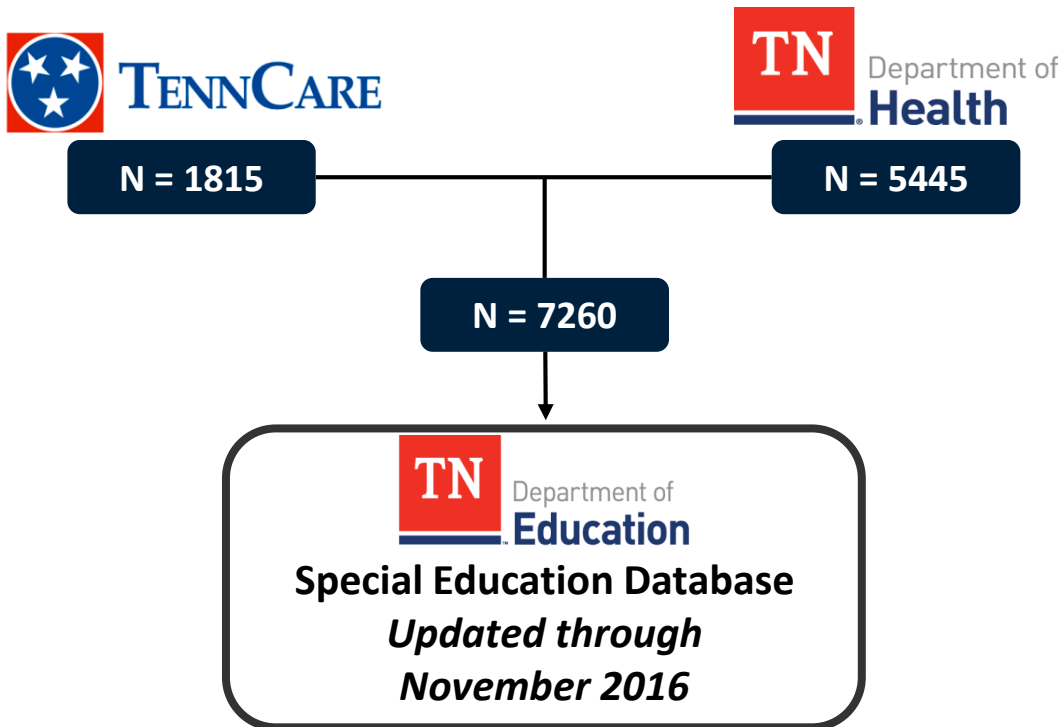
**ICD-9 Diagnosis Code:**  
**779.5**  
**(Drug withdrawal  
syndrome in newborn)**



Department of  
**Health**

**1:3 matched pairs**  
**Birth certificate data**  
**Enrolled in TennCare**

# Methods: Creation of Dataset



# Outcomes of Interest

**Referral**

**Evaluation**

**Eligibility  
Determination**

**Development of  
IEP**

**Implementation  
of Services**

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# Outcomes of Interest

**Referral**

**Evaluation**

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IEP**

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of Services**

# Data Analysis

- **Pearson's Chi Square**
  - **Descriptive comparisons between groups**
- **Conditional multivariable logistic regression**
  - **Associations between a history of NAS and outcomes of interest**
- **SAS 9.4**



# Matched Demographic Characteristics

	NAS (+)	NAS (–)
Characteristic	N = 1815 n (%)	N = 5441 n (%)
Male	967 (53.3)	2898 (53.3)
White	1694 (93.4)	5080 (93.4)
DOB 8/2010–8/2011	631 (34.8)	1893 (34.8)
East TN residence	1405 (77.4)	4213 (77.4)
TennCare insurance	1815 (100.0)	5441 (100.0)

# Delivery and Birth Characteristics

	NAS (+)	NAS (–)	
Characteristic	n (%)	n (%)	<i>P</i> Value
Birth weight <2500g	435 (24.0)	500 (9.2)	<0.0001
Gestational age <37 weeks	392 (21.6)	625 (11.5)	<0.0001
NICU admission	379 (20.9)	315 (5.8)	<0.0001
Maternal tobacco use in pregnancy	1196 (65.9)	1640 (30.1)	<0.0001

# Outcomes of Interest

**Referral**

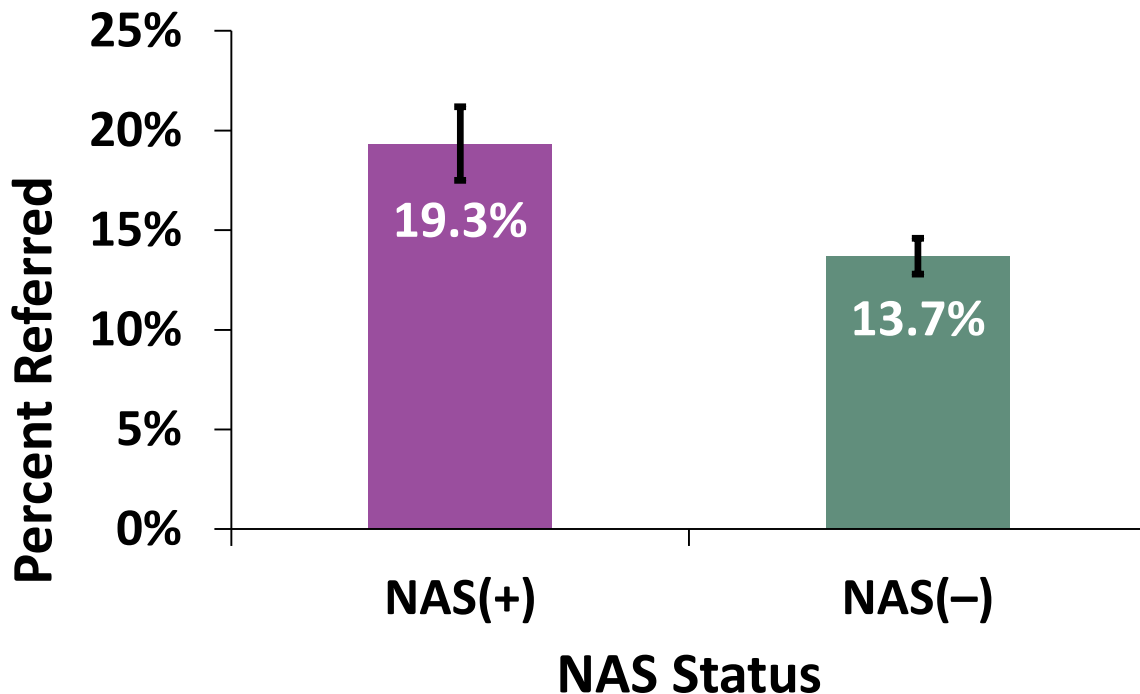
**Evaluation**

**Eligibility  
Determination**

**Development of  
IEP**

**Implementation  
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# Outcome #1: Referral for Evaluation



# Outcomes of Interest

**Referral**

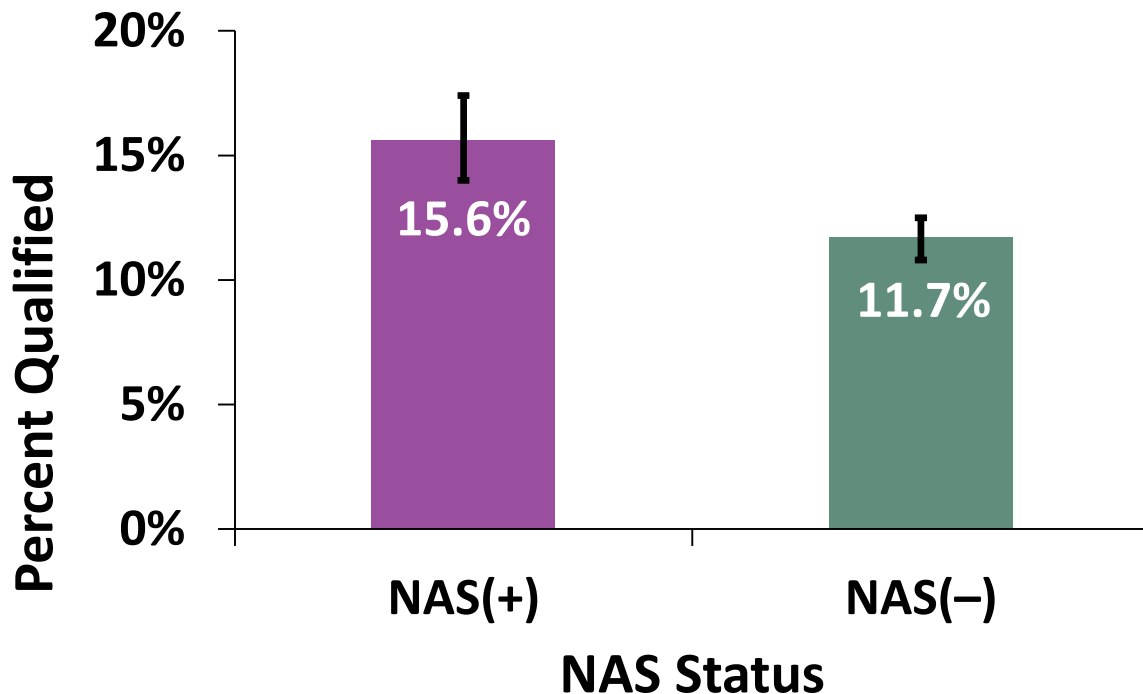
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## Outcome #2: Eligibility Determination



# Qualifying Educational Disabilities in TN

**Autism**

**Intellectually Gifted**

**Deaf-Blindness**

**Multiple Disabilities**

**Deafness**

**Orthopedic Impairment**

**Developmental Delay**

**Other Health Impairment**

**Emotional Disturbance**

**Specific Learning Disabilities**

**Functional Delay**

**Speech or Language Impairment**

**Hearing Impairment**

**Traumatic Brain Disorder**

**Intellectual Disability**

**Visual Impairment**

# Qualifying Educational Disabilities in TN

## Autism

Deaf-Blindness

Deafness

## Developmental Delay

Emotional Disturbance

Functional Delay

Hearing Impairment

Intellectual Disability

Intellectually Gifted

Multiple Disabilities

Orthopedic Impairment

## Other Health Impairment

## Specific Learning Disabilities

## Speech or Language Impairment

Traumatic Brain Disorder

Visual Impairment



# Special Education Exceptionalities

Outcome	NAS (+) n (%)	NAS (–) n (%)	<i>P</i> Value
Autism	6 (0.3)	22 (0.4)	0.8
Developmental Delay	96 (5.3)	193 (3.6)	0.001
Other Health Impairment	12 (0.7)	27 (0.5)	0.5
Specific Learning Disability	7 (0.4)	16 (0.3)	0.6
Speech / Language Impairment	187 (10.3)	451 (8.3)	0.009

# Outcomes of Interest

**Referral**

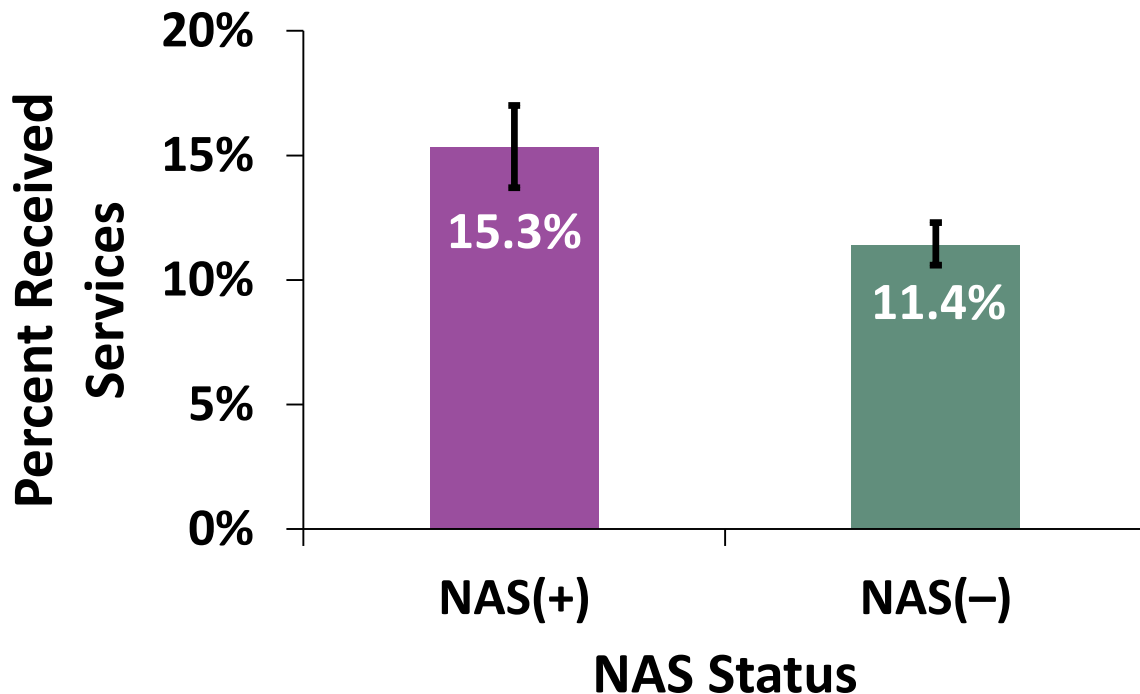
**Evaluation**

**Eligibility  
Determination**

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**Implementation  
of Services**

## Outcome #3: Implementation of Services



# Types of Services Received

Service	NAS (+) n (%)	NAS (–) n (%)	<i>P</i> Value
Accommodations	98 (5.4)	225 (4.1)	0.02
Aide / Paraprofessional	3 (0.2)	12 (0.2)	0.2
Occupational Therapy	55 (3.0)	126 (2.3)	0.09
Physical Therapy	17 (0.9)	54 (1.0)	0.8
Speech Therapy	255 (14.0)	586 (10.8)	0.0002

# Types of Services Received

Service	NAS (+) n (%)	NAS (–) n (%)	<i>P</i> Value
Accommodations	98 (5.4)	225 (4.1)	0.02
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# Conditional Logistic Regression

Outcome	Adjusted Odds Ratio	95% CI
Referred for evaluation	1.44	1.23–1.67
Eligible for services	1.36	1.15–1.60
Received therapies/services	1.37	1.16–1.61

\* Controlled for matching factors, maternal education status, and maternal tobacco use during pregnancy.

# Conditional Logistic Regression

Outcome	Adjusted Odds Ratio	95% CI
Developmental Delay	1.34	1.03–1.76
Speech / Language Impairment	1.26	1.04–1.52

**\* Controlled for matching factors, maternal education status, and maternal tobacco use during pregnancy.**

# Conditional Logistic Regression

Outcome	Adjusted Odds Ratio	95% CI
Accommodations	1.32	1.03–1.69
Speech Therapy	1.33	1.12–1.57

**\* Controlled for matching factors, maternal education status, and maternal tobacco use during pregnancy.**



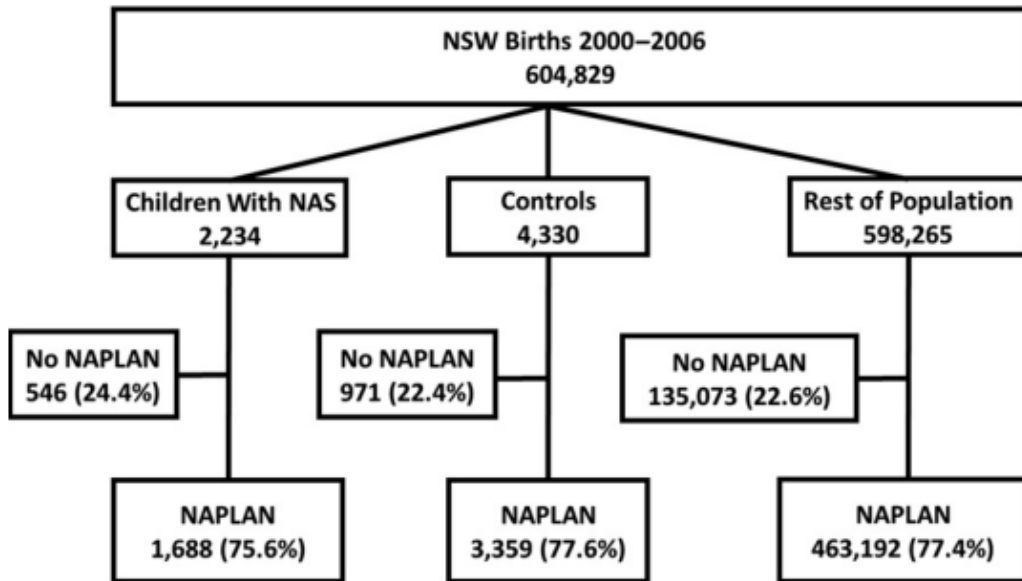
# Additional Regression Models

Outcome	aOR	95% CI
<i>Model: maternal education, maternal tobacco, birthweight, NICU</i>		
Referred for evaluation	1.32	1.13–1.55
Eligible for services	1.26	1.07–1.49
Received therapies/services	1.27	1.07–1.51
<i>Model: maternal education, maternal tobacco, gestational age, NICU</i>		
Referred for evaluation	1.37	1.17–1.60
Eligible for services	1.30	1.10–1.54
Received therapies/services	1.31	1.10–1.55
<i>Model: maternal education, maternal tobacco, birthweight, gest age</i>		
Referred for evaluation	1.34	1.14–1.58
Eligible for services	1.28	1.08–1.51
Received therapies/services	1.28	1.09–1.52

# Growing Body of Evidence?

## Neonatal Abstinence Syndrome and High School Performance

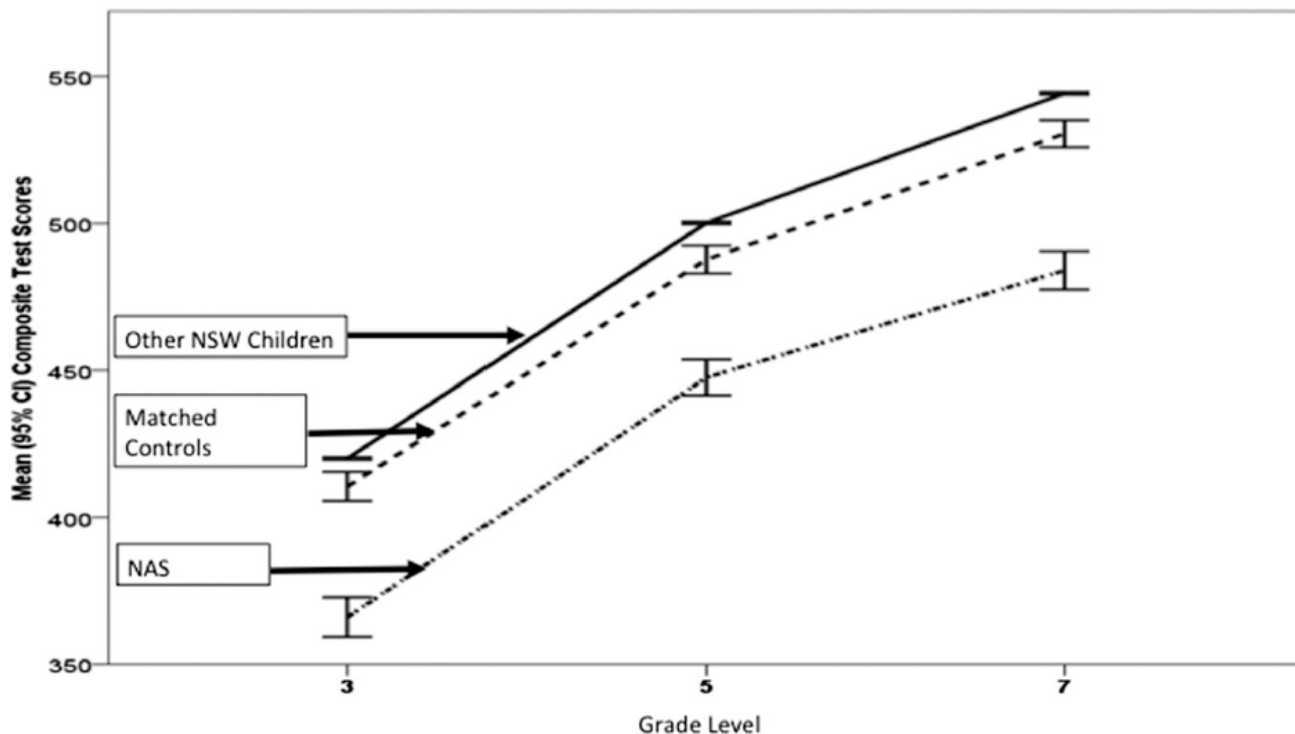
Ju Lee Oei, MD,<sup>a,b,c</sup> Edward Melhuish, PhD,<sup>d,e,f</sup> Hannah Uebel,<sup>g</sup> Nadin Azzam,<sup>g</sup> Courtney Breen, PhD,<sup>g</sup> Lucinda Burns, PhD,<sup>g</sup> Lisa Hilder, MBBS,<sup>h</sup> Barbara Bajuk, MPH,<sup>i</sup> Mohamed E. Abdel-Latif, MD,<sup>j,k</sup> Meredith Ward, FRACP,<sup>g,p</sup> John M. Feller, FRACP,<sup>g,q</sup> Janet Falconer, CNC,<sup>m</sup> Sara Clews, CNC,<sup>m</sup> John Eastwood, FRACP, PhD,<sup>n,o,p,q</sup> Annie Li,<sup>g</sup> Ian M. Wright, FRACP<sup>d,o,r</sup>



**FIGURE 1**

Linkage rates between children with NAS, control, and rest of NSW population to NAPLAN results.

# Composite Test Score Differences



**FIGURE 2**

Composite NAPLAN test scores between children with NAS, control, and other NSW children.

# Limitations

- 1. Unable to analyze all children born with NAS in Tennessee during 2008–2011**
- 2. Could not validate that all children in our sample had in utero opioid exposure**
- 3. Matching to special education database may have failed to match some children who had indeed been referred**
- 4. Unable to control for some factors which have been shown to increase the risk of NAS**
- 5. Potential differential referral patterns among children with a history of NAS compared to those without**
- 6. Unable to verify the diagnostic coding of NAS, or stratify results based on severity of NAS**

# Summary of Results

- **Novel analysis linking health and education datasets**
- **Children with a history of neonatal abstinence syndrome were significantly more likely to**
  - **be referred for evaluation of an educational disability**
  - **meet criteria for a disability, specifically developmental delay, or speech or language impairment**
  - **receive therapies or services, specifically accommodations or speech therapy**

# Public Health Implications

- **Ongoing primary prevention efforts are needed to reduce intrauterine opioid exposure and NAS.**
- **Identification of infants with a history of NAS, and prompt referral to early intervention services is important for the early diagnosis and treatment of possible developmental or learning disabilities.**
- **Additional resources may be needed for school systems in areas with high rates of NAS in order to provide students with needed services**

# Individuals with Disabilities Act (IDEA)

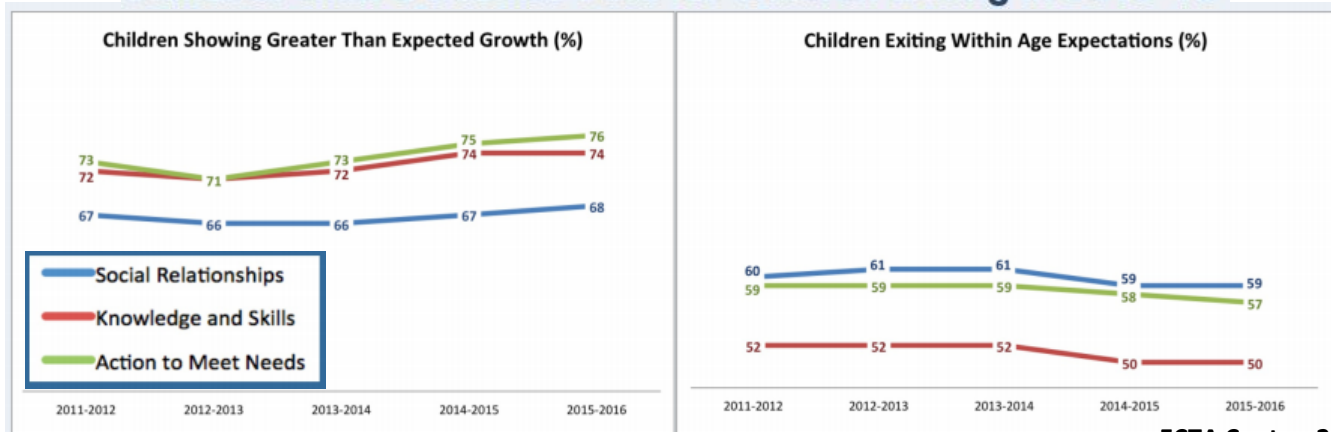
- **Federal law**
- **Originally established 1975**
  - **Last reauthorized 12/2004**
- **Ensures that children (3–21 years of age) with disabilities have the opportunity to receive free, appropriate public education (Part B)**
- **Provides assessments and early intervention services to children with disabilities as early as birth through 2 years of age (Part C)**



# Benefits of Early Intervention ...

- Infants/toddlers participating in Part C demonstrate:
  - Increased motor, social, and cognitive functioning
  - Acquisition of age-appropriate skills
  - Reduced negative impacts of their disabilities
  - Greater than expected growth in social relationships, use of knowledge & skills, taking action to meet needs

## National Child Outcomes Data for Children Exiting in 2015-16





# NAS: Opportunities for Intervention



**Preconception**



**Prenatal**



**Birth**



**Infancy/early  
childhood**



**School-aged**

# NAS: Opportunities for Intervention



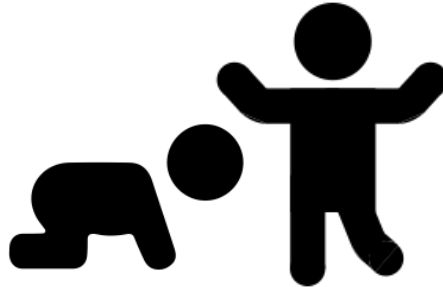
**Preconception**



**Prenatal**



**Birth**



**Infancy/early  
childhood**



**School-aged**

**Prevention of  
substance abuse**

**Prevention of  
unintended  
pregnancy among  
at risk women**

# NAS: Opportunities for Intervention



Preconception



**Prenatal**



Birth



Infancy/early  
childhood



School-aged

Identification of  
maternal risk  
factors

Evidence-based  
treatment (MAT ...)

Delivery at  
appropriate facility

# NAS: Opportunities for Intervention



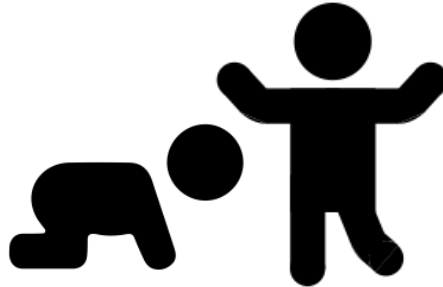
Preconception



Prenatal



**Birth**



Infancy/early  
childhood



School-aged

Prompt diagnosis

Evidence-based  
treatment

Social/family  
support

# NAS: Opportunities for Intervention



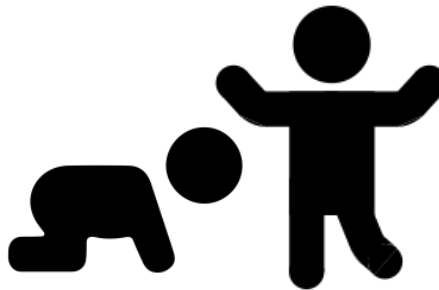
Preconception



Prenatal



Birth



Infancy/early  
childhood



School-aged

Part C referral

Awareness &  
monitoring by  
family/healthcare  
providers for dev  
delay or other  
issues

# NAS: Opportunities for Intervention



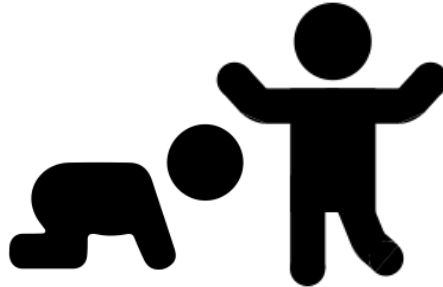
**Preconception**



**Prenatal**



**Birth**



**Infancy/early  
childhood**



**School-aged**

**Consider Part B  
referral**

**Ongoing  
monitoring by  
family/healthcare  
providers**

# Acknowledgments

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# Thank You!



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**Health**

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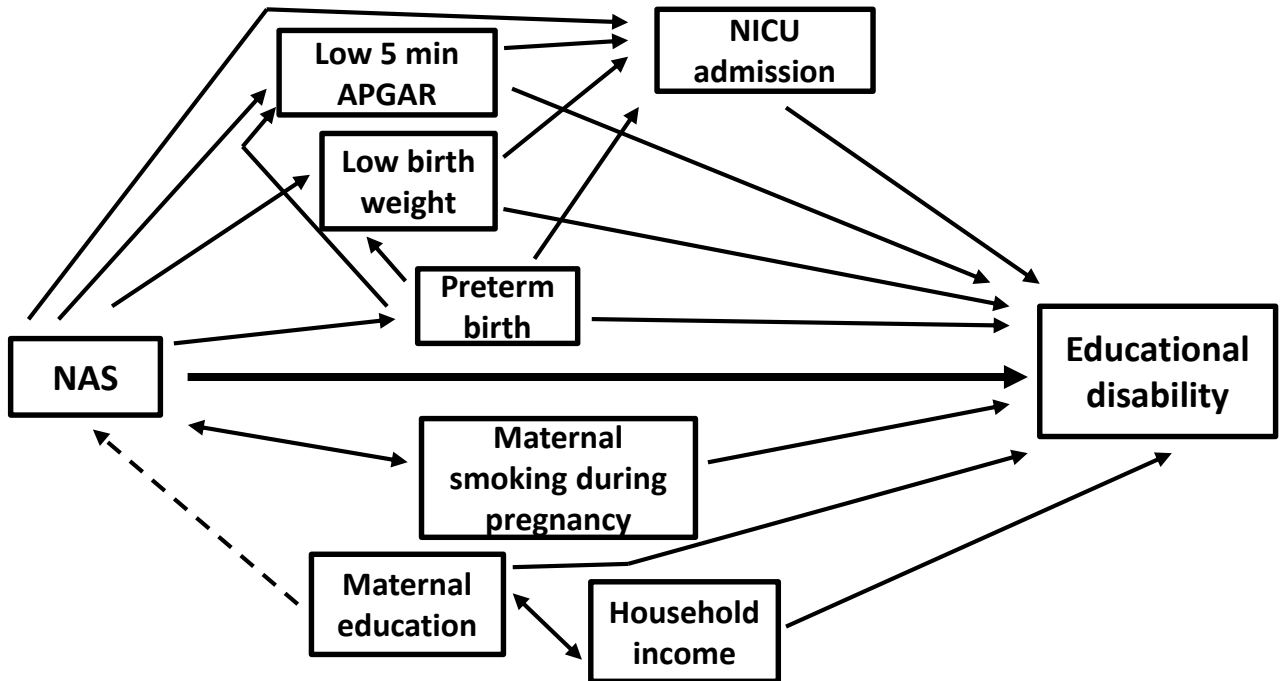
# **THANK YOU**

**[marchofdimes.org](http://marchofdimes.org)**

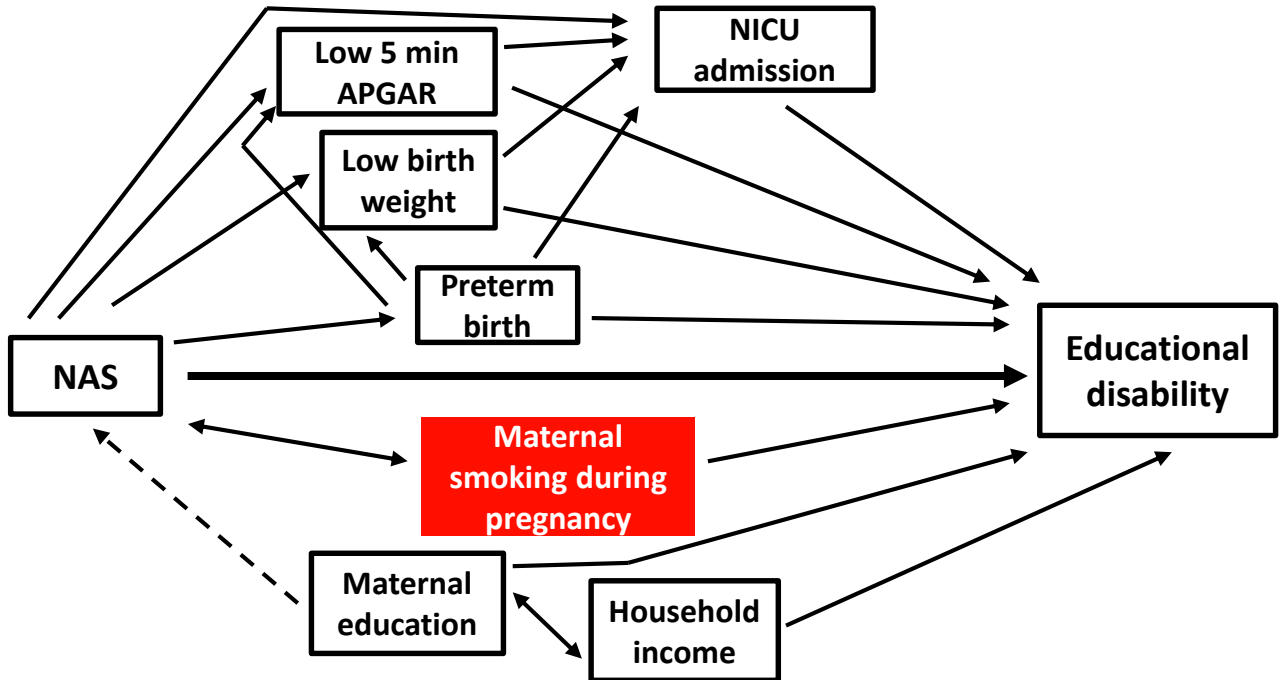


**Extra Slides**

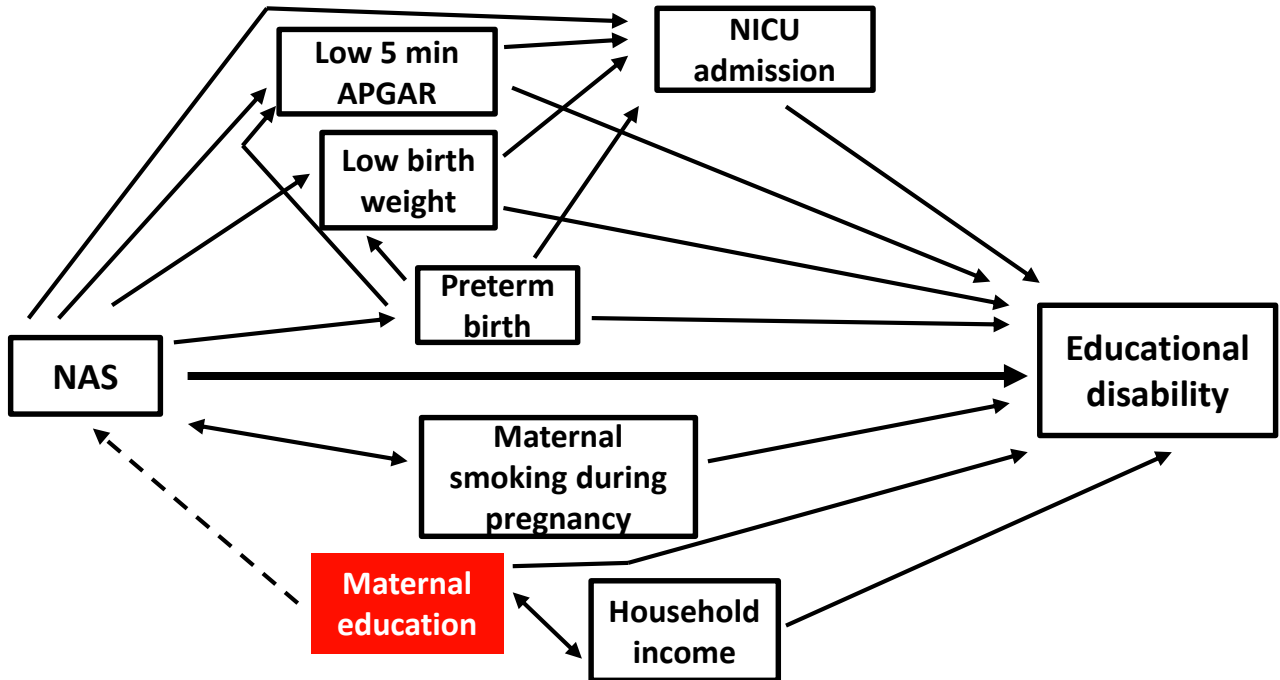
# Directed Acyclic Graph (DAG)



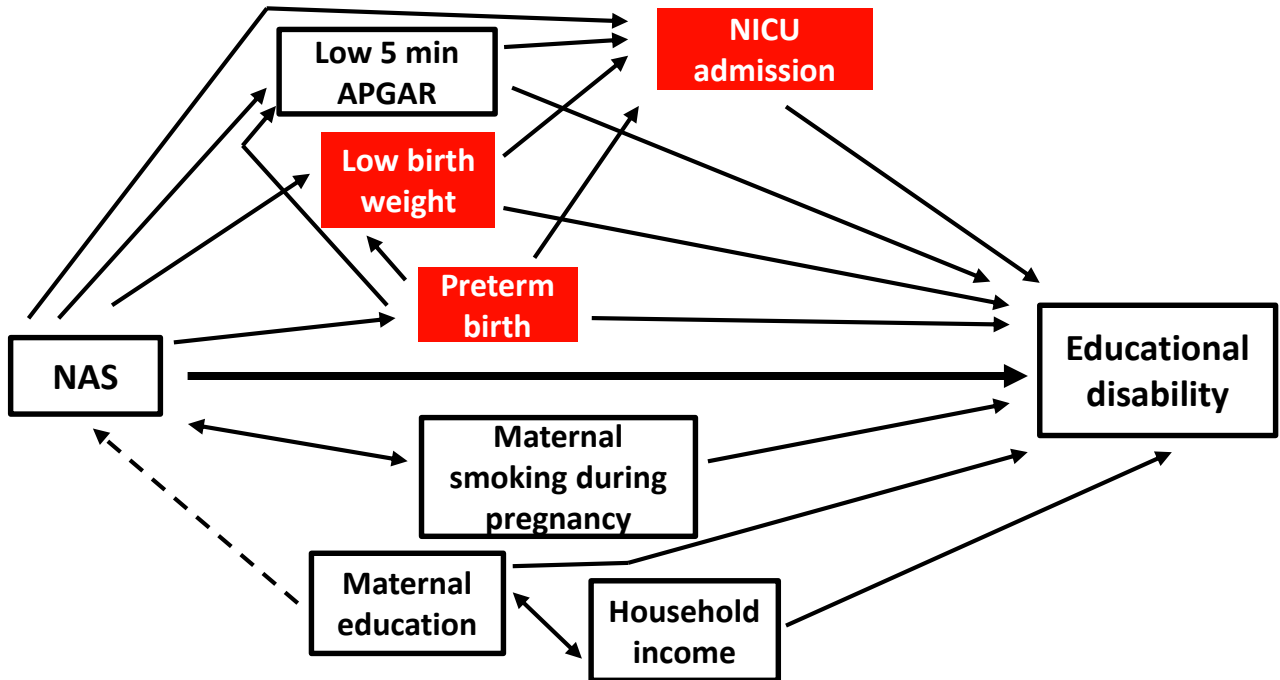
# Directed Acyclic Graph (DAG)



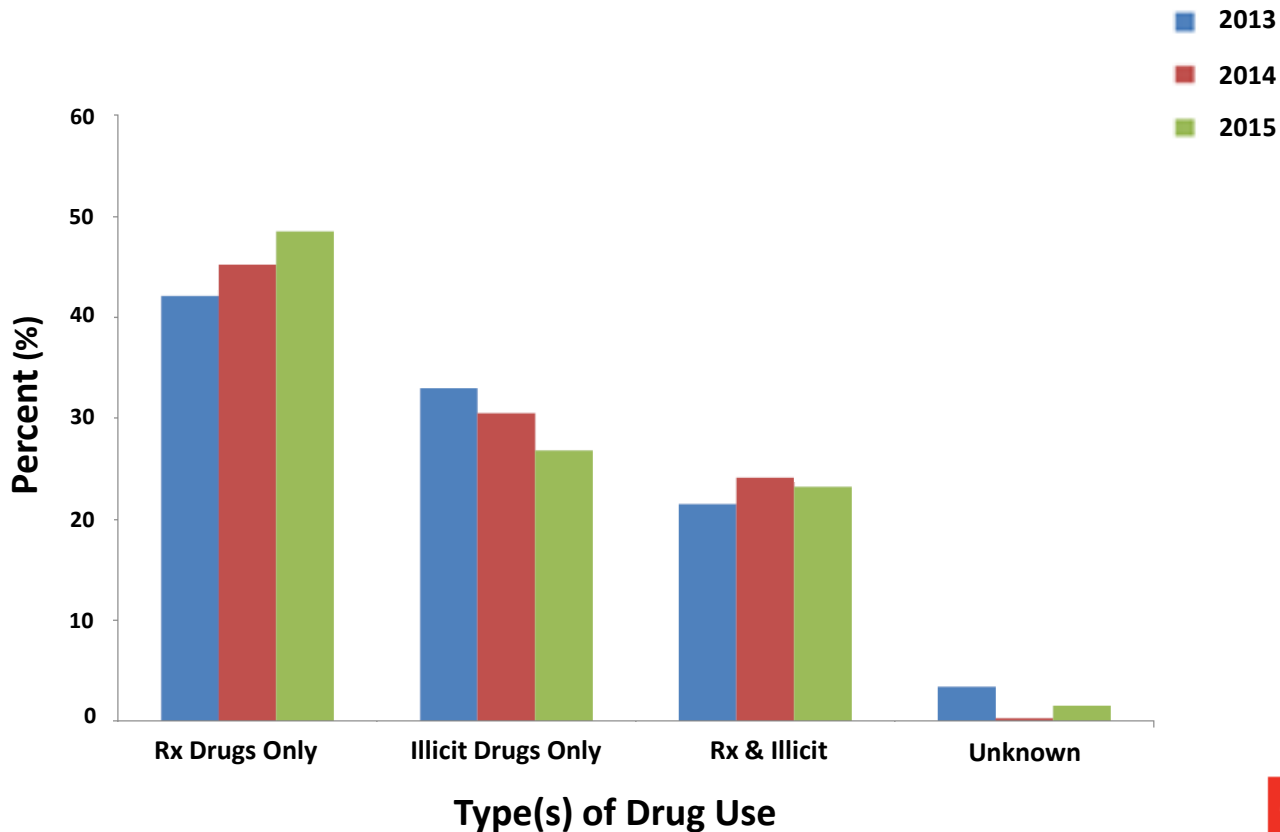
# Directed Acyclic Graph (DAG)



# Directed Acyclic Graph (DAG)



# Types of Prenatal Opioid Exposure in TN



# Examples of Classroom & Assessment Accommodations

## 1. Presentation

- Repeat directions, read aloud, use of larger bubbles on answer sheet

## 2. Response

- Use of computer, use reference aids, mark answers in book

## 3. Timing/Scheduling

- Extended time, frequent breaks

## 4. Setting

- Study carrel, special lighting, separate room



# Other Demographic Characteristics

	NAS (+)	NAS (–)	
Characteristic	n (%)	n (%)	<i>P</i> Value
Household Income <\$35,000	1184 (95.6)	3440 (89.7)	<0.0001
Mother married	532 (29.3)	2182 (40.1)	<0.0001
Mother education <HS degree	611 (33.7)	1571 (28.9)	<0.0001
Enrolled in WIC	1281 (70.6)	4358 (80.1)	<0.0001

# Prenatal Care

	NAS (+)	NAS (–)	
Characteristic	n (%)	n (%)	<i>P</i> Value
Prenatal care	1677 (92.7)	5351 (98.6)	<0.0001
Mean no. prenatal visits (range)	9.4 (9.1–9.6)	11.8 (11.6–11.9)	<0.0001

# Sub-analysis of 'Referred'

	NAS (+)	NAS (–)	
Characteristic	n/N (%)	n/N (%)	<i>P</i> Value
Referred	351/1815 (19.3)	745/5351 (13.7)	<0.0001
Eligible for Services	284/351 (80.9)	634/745 (85.1)	0.08
Receipt of Services	278/284 (97.9)	620/634 (97.8)	0.93

# Matching Factors

1. Sex
2. Race/ethnicity
3. Kindergarten cohort (~ age)
4. Public health region of residence
5. TennCare enrollment status



# RESOURCES

## MARCHOFDIMES.ORG & NACERSANO.ORG

- Neonatal abstinence syndrome
- Prescription medicine during pregnancy; includes video: Prescription medicine before pregnancy
- Prescription opioids during pregnancy; includes link to the Health Action Sheet: Are you taking any of these prescription painkillers?

## MARCHOFDIMES.ORG/NURSING

- Assessment of neonatal abstinence
- Impact of prenatal drug use: Managing the consequences of opioid and marijuana use
- Understanding addiction, drug use and abuse among women

HEALTH  
ACTION  
SHEET

### Are you taking any of these prescription painkillers?

These are prescription painkillers called opioids and some of their brand names. If you take an opioid during pregnancy, it can cause serious problems for your baby.

- **Hydrocodone** (Zelmac<sup>®</sup>, Zepexa<sup>®</sup>, Vicodin<sup>®</sup>, Probalan<sup>®</sup>)
- **Codeine**
- **Tramadol** (Actin<sup>®</sup>, Dolapap<sup>®</sup>, Solamex<sup>®</sup>)
- **Hydrocodone** (Lorcet<sup>®</sup>, Lortab<sup>®</sup>, Norco<sup>®</sup>, Vicodin<sup>®</sup>)
- **Hydrocodone** (Dulcodid<sup>®</sup>, Tydol<sup>®</sup>)
- **Morphine** (Dolophine<sup>®</sup>, Methadone<sup>®</sup>)
- **Morphine** (Avanor<sup>®</sup>, Avicor<sup>®</sup>, Duramorph<sup>®</sup>, Roxane<sup>®</sup>)
- **Oxycodone** (OxyContin<sup>®</sup>, Percocet<sup>®</sup>, Percocet<sup>®</sup>)
- **Oxycodone** (OxyContin<sup>®</sup>, Percocet<sup>®</sup>, Percocet<sup>®</sup>)
- **Tramadol** (Coo<sup>®</sup>, Kytril<sup>®</sup>, Ultram<sup>®</sup>)

The illegal drug heroin is an opioid. Heroin and other prescription opioids also are being made and sold illegally.

Your provider may prescribe an opioid for you if you've been injured or had surgery. Opioids can be dangerous and addictive. They can cause problems for a baby in the early weeks of pregnancy, even before you know you're pregnant.

If you take opioids during pregnancy, your baby can be exposed to them in the womb and go through withdrawal after birth. This is called neonatal abstinence syndrome or NAS. Even if you use an opioid exactly like your provider says to, it will may cause NAS in your baby.



If you're pregnant and using opioids:

- ✓ Don't stop or start taking an opioid until you talk to your health care provider. Stopping or starting certain medicines can be harmful to you and your baby. Quitting suddenly (called cold turkey) can cause severe problems for your baby, including death.
- ✓ Tell your prenatal care provider about any opioid or other medicine you take, even if it's prescribed by another health care provider.
- ✓ If you get a provider who prescribes you an opioid, make sure she knows you're pregnant.
- ✓ Ask your provider about other kinds of painkillers you can take instead of opioids.

If you're not pregnant and you're using opioids:

- The effective birth control until you've stopped taking the opioid.
- Talk to your provider about taking a safer pain medicine.

Write a note about prescription medicine at: [marchofdimes.org/prescriptionmeds](http://marchofdimes.org/prescriptionmeds)

Read more about NAS at: [marchofdimes.org/neonatalabstinesyn](http://marchofdimes.org/neonatalabstinesyn)

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