THE UNIVERSITY OF ARIZONA
COLLEGE OF MEDICINE TUCSON
ArizonaLEND

A Transdisciplinary Model of Change: A Family-Centered Approach to Treating Neonatal Abstinence Syndrome

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No relevant financial or nonfinancial relationships exist.

Objectives

Identify	Identify opportunities for program development of a family-centered NAS care program in other NICUs
Describe	Describe the benefits of keeping families unified for positive long-term outcomes.
List	List current biases and changes needed in hospital culture to support families in transition, to allow for individualized care.
Summarize	Summarize the long-term effects of intrauterine drug exposure

NAS and the National Epidemic

Definition of Neonatal Abstinence Syndrome

- Constellation of symptoms and signs of withdrawal in the newborn due to intrauterine exposure to addictive substances, usually opioids

- Peak symptoms occur within 3-4 days

Pathophysiology

- Noradrenaline ↑
- Dopamine ↓
- Serotonin ↓
- Corticotrophin ↑
- Acetylcholine ↑
- Other receptors ↑

Kocherlakota P. 2014. Neonatal Abstinence Syndrome. Pediatrics, 134(2):e547-e561.

Definition of Addiction

Addiction is a primary, chronic disease of brain reward, motivation, memory and related circuitry. Dysfunction in these circuits leads to characteristic biological, psychological, social and spiritual manifestations. This is reflected in an individual pathologically pursuing reward and/or relief by substance use and other behaviors.

American Society of Addiction Medicine, 2018

Newborns are not addicted.

The National Epidemic

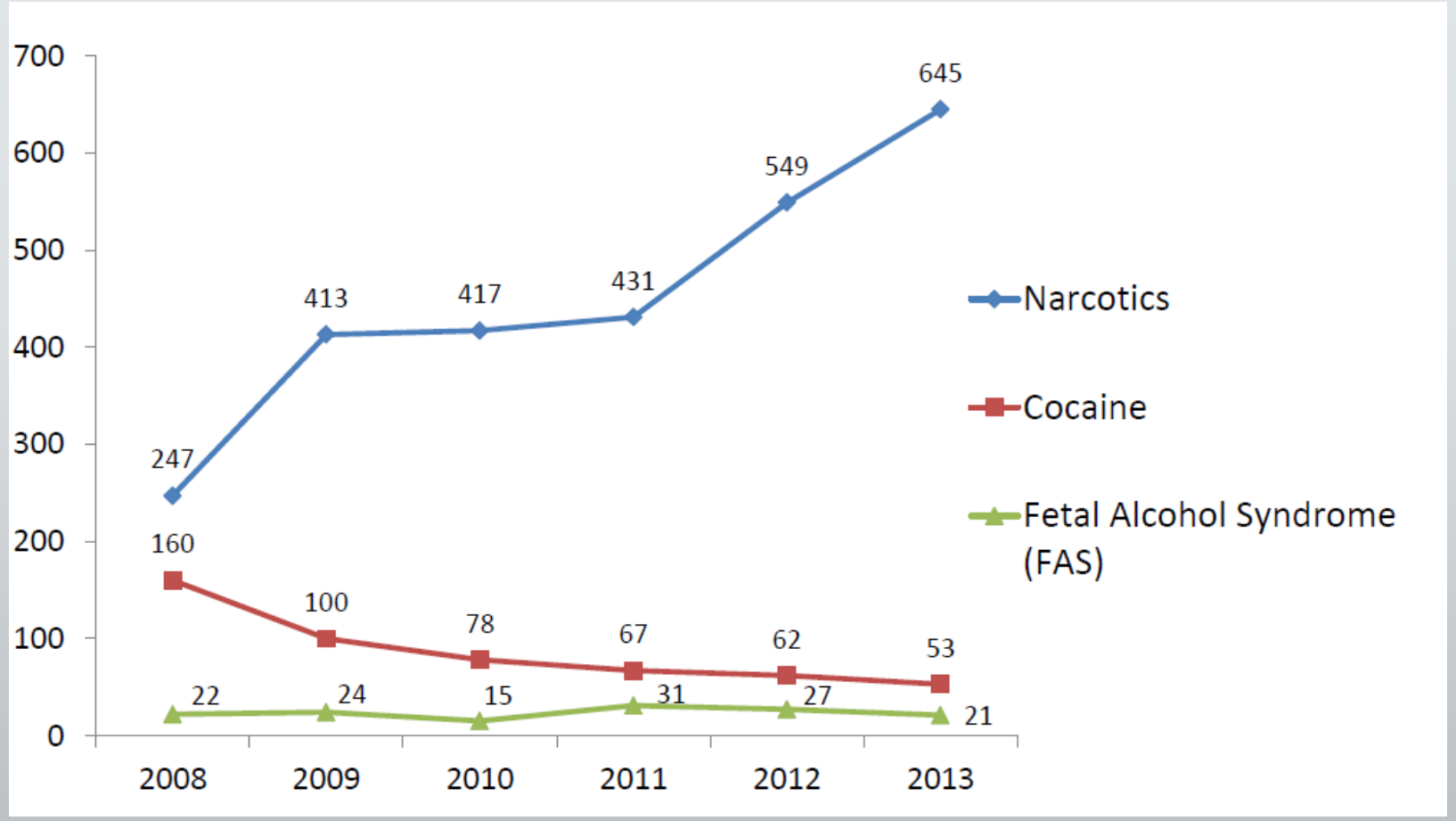
- Data from 2014 indicates a 5-fold increase in NAS from 2000-2012
- Estimated 20 per 1000 live births
- 1 baby every 15 seconds
- Average hospitalization length: 23 days
- Average hospitalization charge: $94,400
- Medicaid costs: $1.2 billion
- 77% covered by Medicaid

The Regional Problem

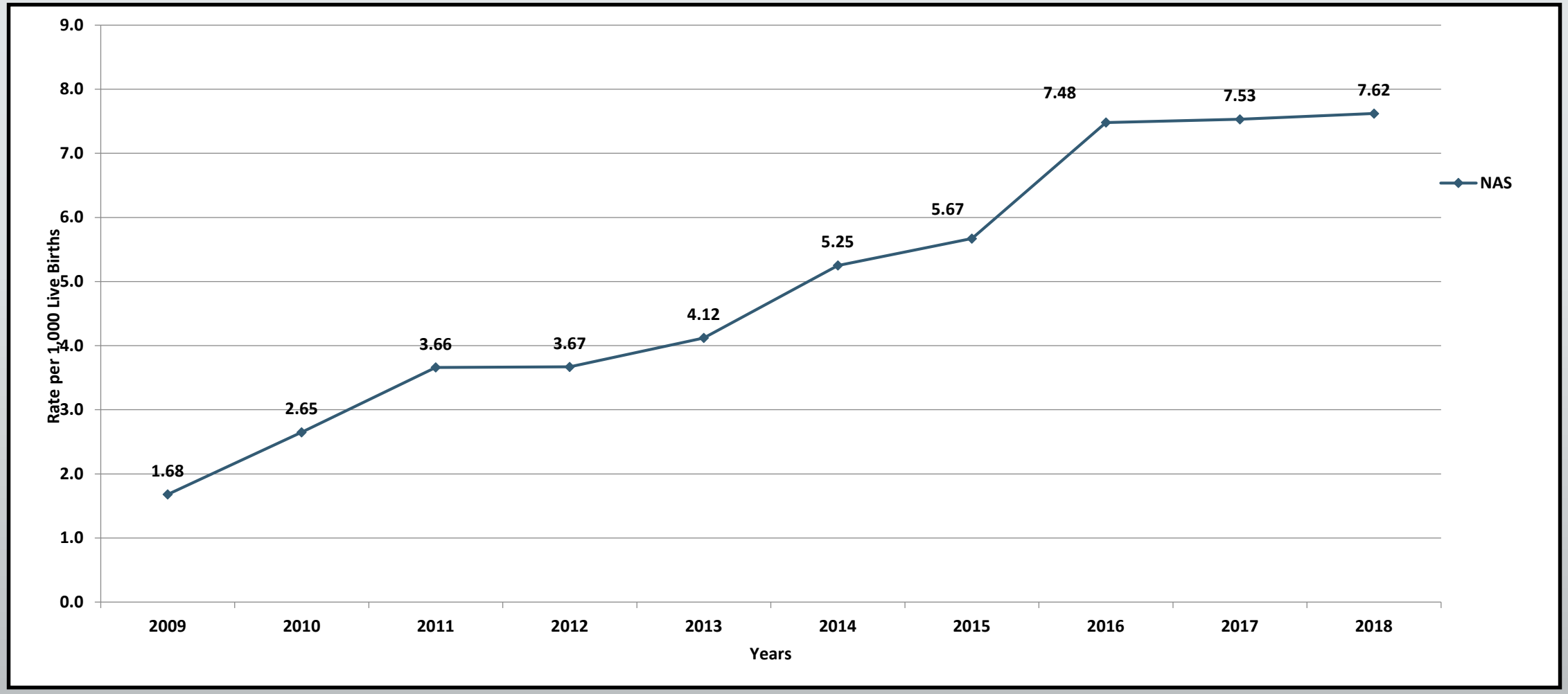
- “Arizona currently ranks 6th highest in the nation for individuals misusing and abusing prescription drugs”
    - National Survey on Drug Use and Health, 2012
- In 2017, Arizona Governor Ducey declared a Public Health State of Emergency due to the opioid epidemic
- Any suspected case of NAS, regardless of treatment with medication, is reportable to the State of Arizona

- AZ Dept of Health

Number of Arizona Newborns Exposed to Drugs

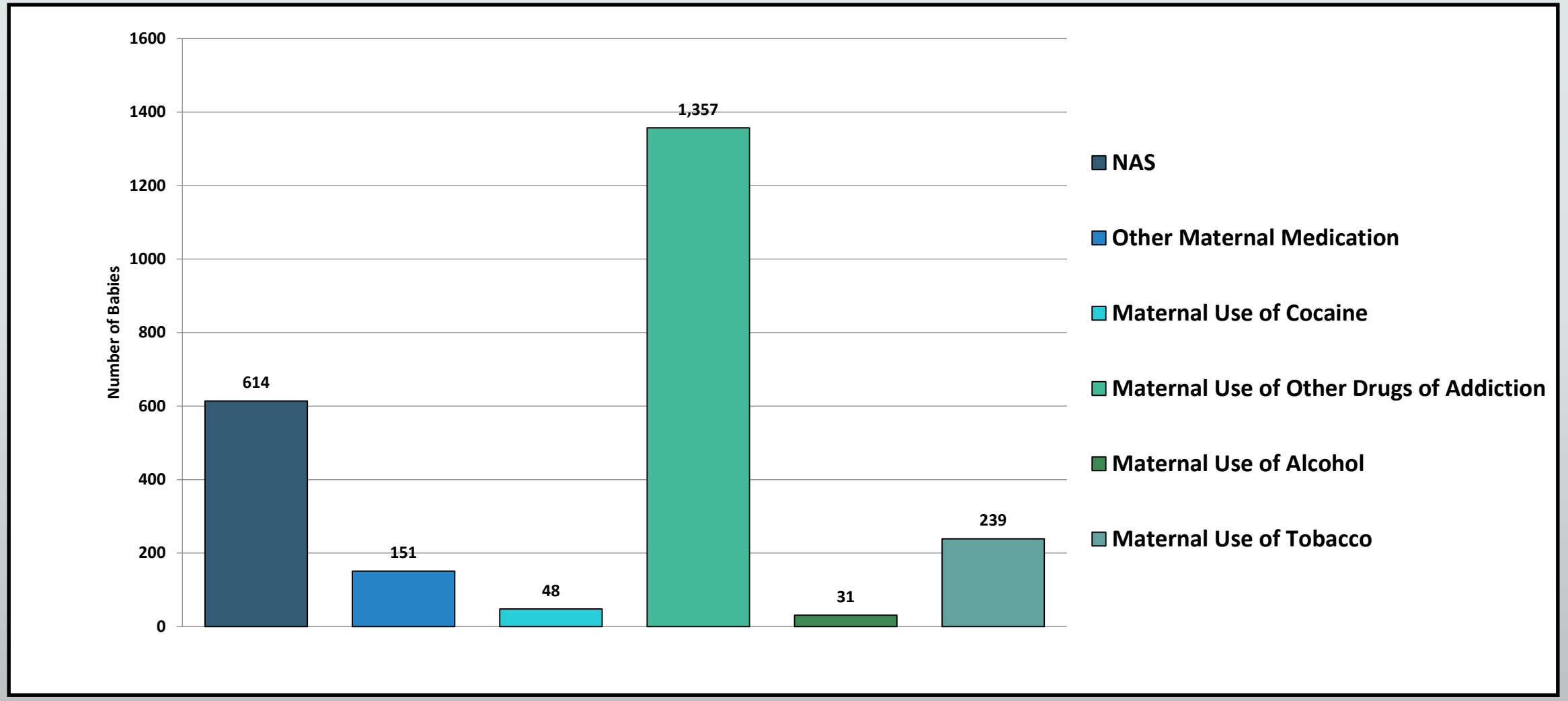


Neonatal Abstinence Syndrome (NAS) Rates per 1,000 hospital births in Arizona, 2008-2018



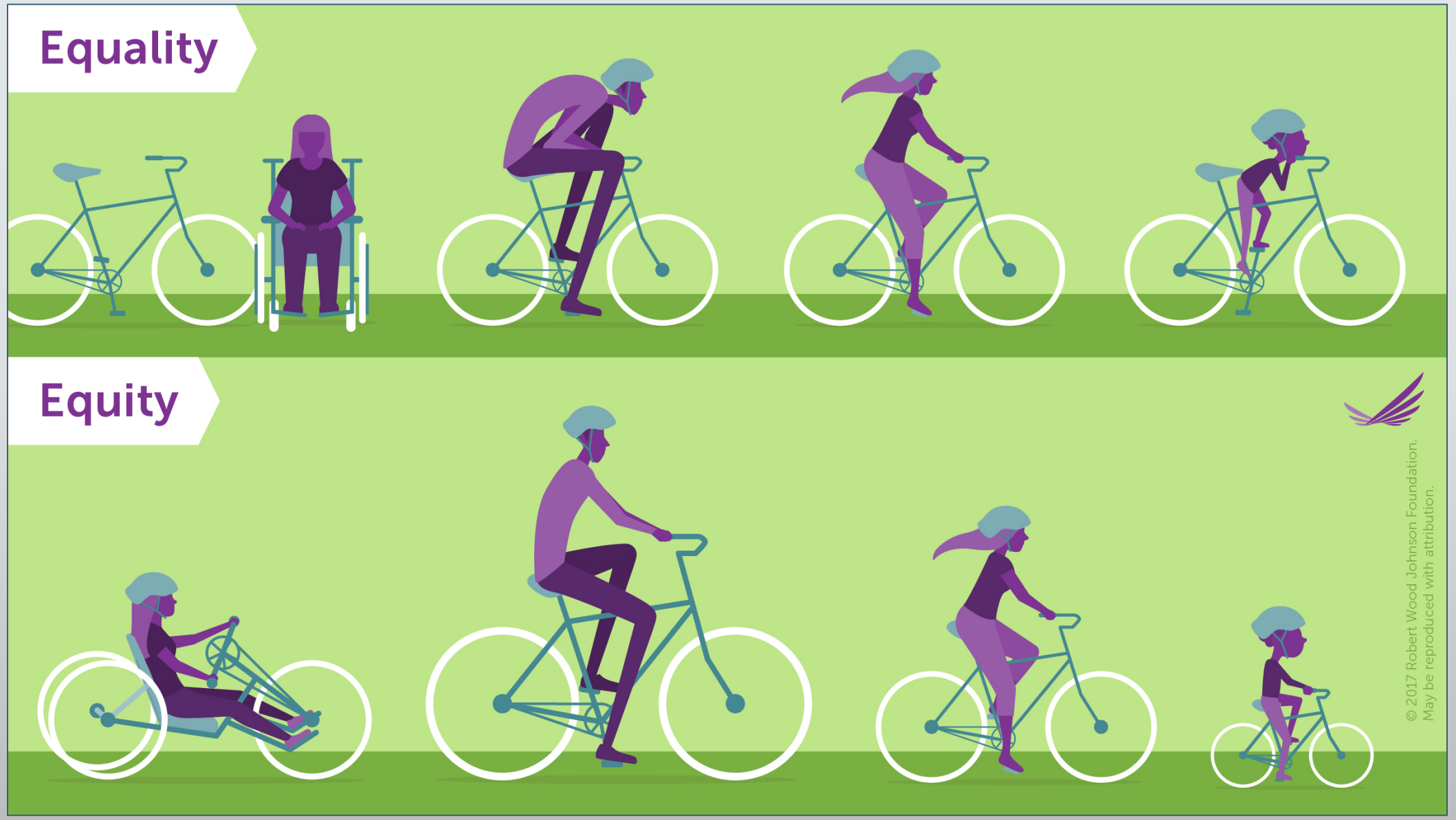
Credit: Sara Rumann, ADHS

Neonatal Abstinence Syndrome and Noxious Substances Affecting Newborns in Arizona, 2018



Credit: Sara Rumann, ADHS

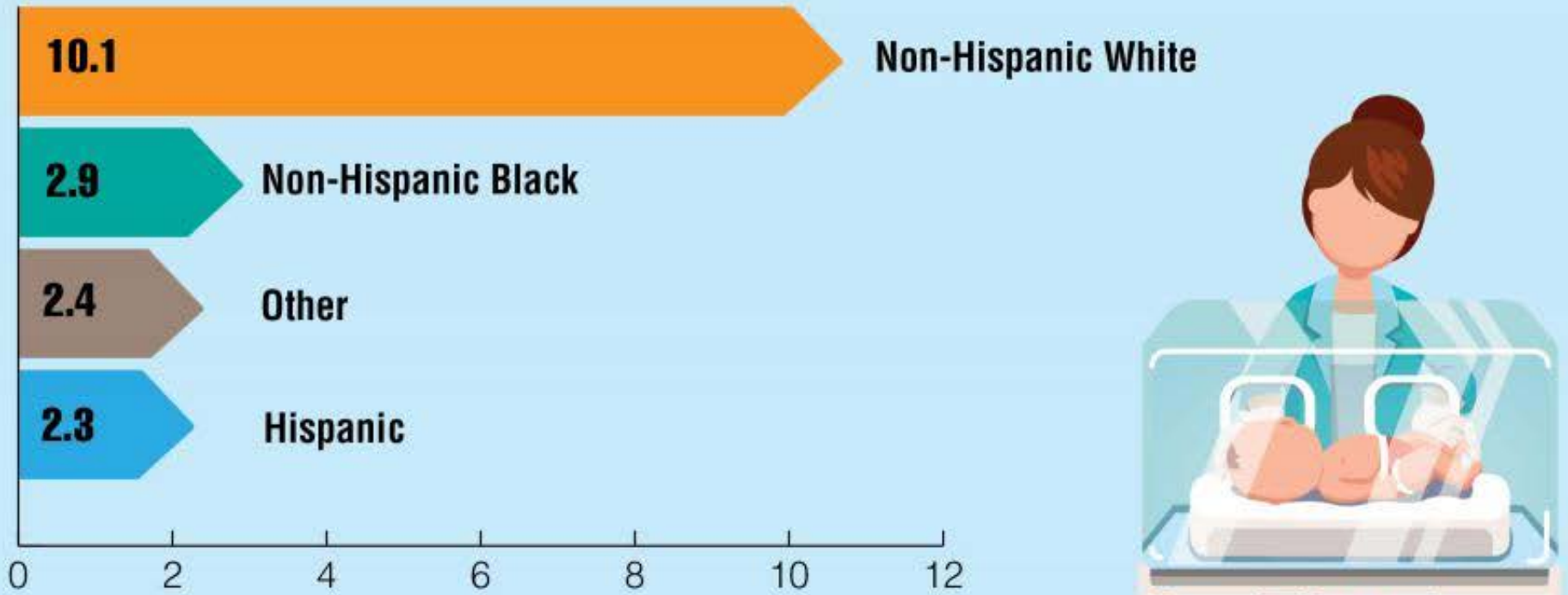
Source: ADHS Hospital Discharge Data Base, Population Health and Vital Statistics, 2018



Robert Wood Johnson Foundation

Neonatal Abstinence Syndrome Rates Per 1,000 Births by Race/Ethnicity, 2015 (Q1-Q3)

Whites have higher rates of babies born with neonatal abstinence syndrome than other races/ ethnicities.



Source: Healthcare Cost and Utilization Project, State Inpatient Databases, 21-38 States, 2015 Q1-Q3

Program Development

Banner Children's Hospital

Tucson, Arizona

Program Development

- Standard of care was previously pharmacological treatment
- In early 2017, visited Yale New Haven, Dr. Grossman's program: Eat, Sleep, Console Method
- First baby admitted into the program in summer 2017

Short Term Goals

Reduce the amount of continued exposure to drugs

Reduce length of stay

Keep family and baby together

Long Term Goals

Improve developmental outcomes over the life course

Determine if parent/infant bonding can assist with overcoming some of the negative effects of intrauterine exposure

Culture Change through Education

- Development of a core group
  - Survey
  - Monthly meetings
- 1:1 education
- Culture of acceptance
- Addiction education

Collaboration is Key

Antepartum

- OB/GYN
- Social work
- Family Medicine
- Medication Assisted Treatment (MAT) Centers

Inpatient

- L&D
- Postpartum
- Newborn Nursery
- NICU
- DCS

Post-Discharge

- DCS
- ADHS
- Inpatient Rehab
- Developmental Follow Up Clinic

Prenatal

Prenatal Identification

- High Risk OBGYN Social Worker identifies pregnant women who
  - Are struggling with substance abuse
  - Are on physician prescribed substance
  - Are currently enrolled in a Medication-Assisted Treatment program or are interested in enrolling in treatment

- MAT Clinics and Rehab Facilities that provide treatment services for pregnant women

Prenatal Identification

- Identification of the family as a candidate
  - NAS team notified at time of delivery
  - Ideally, multiple family members are available

Goals of Early Intervention During Prenatal Care

- Define and reach goals
- Build trusting relationships
- Empower the Mother
- Reduce guilt by being the solution
- Remain involved in prenatal care

Goals of Early Intervention During Prenatal Care

- Facilitate enrollment into a Medication-assisted treatment (MAT) service, sobriety support and/or behavioral health service
- Reduce the affects of emotional traumas
- Create opportunities for change

Hospitalization

NICU Stay

Labor and Delivery

- At birth both Mother and Baby are drug tested
- **Routine newborn care – non-judgmental care for mother and education on infant care**
- When Finnegan scores exceed threshold then transfer infant to NICU
- Once mother is discharged, she stays in the NICU with her infant in nesting room

NICU Stay

Family education:

- 5 S's
  - Holding/ Baby Wearing
  - Feeding
  - Immediate intervention when crying
  - Low stimulation environment
  - Ensure safe sleep environment

Eat, Sleep, Console Method

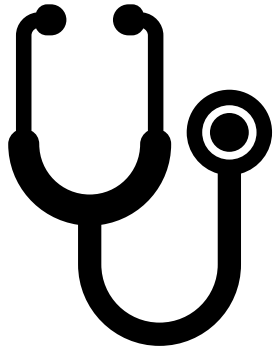
- Able to eat at least 1 ounce/feed or breast feed well.
- If unable to eat (too sleepy or uncoordinated), consider placing a NG tube for feeding

Eat, Sleep, Console Method

- Able to sleep for at least 1 hour undisturbed
- May have to be held to sleep)

Eat, Sleep, Console Method

- Should be able to be consoled within 10 minutes.
- Another person should try to console baby after 10 minutes.
- If still not able to console, a one-time dose of morphine can be given (0.05mg/kg).



NICU Stay

Remove barriers to family's presence:

- Provide meals
- Visitation of other children
- Coordinate trips to the MAT centers
- Provide breaks
- Dedicated cuddlers

Key Points for Family Success

- Family needs to feel welcomed
- Empower the caregiver
- Culture of acceptance and teamwork
- Encourage breastfeeding

Everyone Pitches In!

Discharge and Outcomes

Discharge

- When baby is past the peak of withdrawal symptoms
- Family shows competency in caring for their NAS infant.
- Disposition oversight is controlled by DCS

Outcomes: 48 babies

Family-Centered Care

Length of Stay

- 6.23 days for uncomplicated babies
- 7.3 days for complex babies

Cost per day: $3,432

Traditional Treatment

Length of Stay

- Morphine: 28 days
- Morphine and clonidine: 22 days

Cost per day: $5,545

Disposition on 42 Babies

Placement

- 33 with mother/father
- 4 with family members
- 3 with adoptive parents
- 2 with foster care

4 have had a change in placement since DC

No readmissions due to abuse or neglect

2 readmissions due to feeding difficulties/poor weight gain

Cost Savings

- Pharmacologically managed infant – daily charge $5,545 x average stay of 22 days = $121,990
- Family-Centered NAS managed infant – daily charge $3,432 x average stay of 6 days = $20,592

Mean savings for 1 NAS infant = $101,398

33 Infants though FC-NAS equals a cost savings=

$3,346,134.00

Lessons Learned

- Importance of early program contact with mothers
- Meaningful historical information
- Recognizing biases
- Normalization

Lessons Learned

- Importance of initial and continuing contact for attachment
- Significance of before and after care for these families
- Community partnerships
- Pharmacological treatment may still be needed

Continuing Challenges

- TIME
- Ability to have early program contact with families
- Extending program to all substance exposed infants
- Room and unit constraints
- Continuing staff education and ongoing bias
- Establishing community partnerships
- Follow up Clinic and attrition rate

Follow Up and Developmental Outcomes

Life Course Implications

Developmental Follow Up

Developmental Follow Up Clinic: TIMP and/or BAYLEY Assessment

Incentives built in through research partners

Follow up phone calls

Developmental Follow Up

37 REFERRED TO CLINIC

12 RETURNED TO CLINIC

32% SHOW RATE
HIGH ATTRITION

Developmental Risks and Outcomes

- Long-term NAS studies report:
  - Chronic Stress
  - Family Instability
  - Mistrust of healthcare
  - Inconsistent caregiving
  - Out-of-home placement

- Evidence that NAS has long-term impact
  - Behavioral and developmental problems are common

Developmental Risks and Outcomes

Specific long-term problems include:

- Otitis media is common with methadone use
  - Severe or chronic otitis media can cause hearing impairments, developmental and learning disabilities

- Visual impairments

  - Strabismus, nystagmus, reduced acuity, refractive errors and cerebral visual impairment

Developmental Risks and Outcomes

- Risk of SIDs or SUID
- Child abuse and neglect
  - ACE can cause obesity, cardiovascular disease and psychiatric disorders
  - Intergenerational trauma is commonly seen

Developmental Risks and Outcomes

- Cognitive delays and disabilities
  - Infants exposed to heroin exhibit poor cognitive skill development, poor perceptual skill development and poor memory skills.

  - Infants exposed to methadone exhibit hyperactivity, poor verbal skills, poor memory and poor perceptual skills

Developmental Risks and Outcomes

- Motor skill delays
  - Inconsistent evidence:
    - Methadone exposed infants tend to develop typically
    - Buprenorphine (Subutex) exposed infants tend to have significant motor skill delays, impulsivity and hyperactivity as well as significant memory skill delays

Development Risks and Outcome

- Behavioral problems include: impulsivity, hyperactivity, and aggression
- Anxiety

- Risk of future drug use
  - dysregulation of the hypothalamic-pituitary-adrenal axis, increased sensitivity to opioids, and blunted response to dopamine agonists

Developmental Risks and Outcomes

- 3 to 6 year olds exposed to heroin performed more poorly on the general cognitive index, the perceptual, quantitative, and memory subscales of the McCarthy Scales of Children's Abilities

Developmental Risks and Outcomes

- 10-year Follow Up: Children studied were more likely to receive ADHD and diagnoses related to disruptive behaviors; also found to exhibit more errors with attentional tasks

- 8 to 17 year olds: Absences, failure, and behavior problems in school.

The staff of the hospital was amazing. They taught us everything we need to know as first time parents. Although our stay was a bit longer than anticipated, they made us feel welcome and involved us entirely in our son's care. They took not only his needs, but our worries and concerns into consideration and found the best outcome we all agreed to. I am truly blessed and extremely thankful to have had the option to have our baby here at Banner UMC.....

...Not every hospital offers the chance to stay/room in with your baby while needing to be treated in the NICU and have the option to have your baby off medicine and use hands on treatment, which I felt bonded us to the baby even more than if we had just chosen the other way. It also taught us how to deal with and comfort our son at home without the help of hospital staff. Absolutely loved it!!"

-FCNAS Care Program Participant

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