Opioid use in pregnancy and Neonatal Opioid Withdrawal Syndrome (NOWS)

Morissa Ladinsky, MD
Assoc. Professor of Pediatrics
Division of General Pediatrics and Adolescent Medicine
UAB
2002 | US: 23,518 deaths | 8.2 per 100,000
Rate of women addicted to opioids during pregnancy quadrupled in 15 years, CDC says

By Susan Scutti, CNN
Updated 17:06 GMT (01:06 HKT) August 9, 2018
Objectives

1. Understand the magnitude, medicine and scope of neonatal abstinence syndrome.

2. Learn concrete, data driven public health measures and best practice approaches to the immense challenge of care for opioid exposed infants.

3. View current and future trends in comprehensive management of NOWS.
THIS IS A BRAIN ON DRUGS.
Dopamine

- Central power driver. Essence of being human
- Memory (if DA is present, we remember it).
- Regulates how we perceive pleasure.
- Sleep and wakefulness
- Cognition (DA in frontal lobe)
- Pleasure and drive to seek it.
- Food
- Sex
- Winning a competition
- Cocaine
- Meth
- Opioids
- Heroin
Methamphetamine in pregnancy

- Low birthweight
- Shorter gestational age
- Maternal HTN/pre-e
- Abruption (10%)
- Rare reports of ICH
- Rare and brief withdrawal
- Longer term learning disability
- ADHD

“STOPPING MA AT ANY TIME DURING PREGNANCY IMPROVES OUTCOMES”

Negative outcomes on the developing child are due to the meth’s effect on mother’s systems.
Opioids work via specific RECEPTORS

- Brainstem: Basic life sustaining functions (sleep, breathing, HR)
- Limbic System: Emotional center (pleasure, mood, attitude)
- Cerebral Cortex
- Autonomic neurons (GI, skin, muscle)
Why do only some progress to addiction?

• Over 50% of one’s propensity to addiction is under the control of our genes.

• GENETICS +
• PAST AND PRESENT ENVIRONMENT +
• EXPOSURE TO THE DRUG
ACE’s

• Alcoholism and alcohol abuse
• Chronic obstructive pulmonary disease (COPD)
• Depression
• Fetal death
• Health-related quality of life
• Illicit drug use
• Ischemic heart disease (IHD)
• Liver disease

• Risk for intimate partner violence
• Multiple sexual partners
• Sexually transmitted diseases (STDs)
• Smoking
• Suicide attempts
• Unintended pregnancies
• Early initiation of smoking
• Early initiation of sexual activity
• Adolescent pregnancy

Maladaptive neural connections in the developing brain.

Adverse effect of early toxic stress on brain development.
Opioid/heroin dependence in pregnancy

- Developing baby experiences daily highs, lows and withdrawal.
- Withdrawal for mom is passed to developing infant.
- Premature delivery, fetal demise.
- “Pregnant women who are physically dependent on opioids should receive treatment using methadone or buprenorphine monoprocessor rather than withdrawal management or abstinence.”

- NIDA, ACOG, NICHD, HHS consensus 7/2016
Neonatal Opioid Withdrawal Syndrome

• The clinical findings associated with opioid withdrawal has been termed the neonatal opioid withdrawal syndrome (NOWS).

• Nearly all exposed infants will display some symptoms, but only a subset require treatment.

  Opioid receptors concentrated in CNS and GI tract. 
  NAS affects baby’s ability to be alert, sleep, eat, communicate cues 

  1 every 15 minutes
<table>
<thead>
<tr>
<th>Neurological Excitability</th>
<th>Autonomic Instability</th>
<th>GI Dysfunction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperirritability</td>
<td>Apnea</td>
<td>Diarrhea → electrolyte disturbances, dehydration, perianal skin excoriation</td>
</tr>
<tr>
<td>High-pitched inconsolable crying</td>
<td>Bradycardia</td>
<td>Hyperphagia (may require up to 150 kcal/kg/d)</td>
</tr>
<tr>
<td>Agitation/Restlessness</td>
<td>Tachypnea</td>
<td>Regurgitation</td>
</tr>
<tr>
<td>Exoriation</td>
<td>Nasal flaring</td>
<td>Vomiting</td>
</tr>
<tr>
<td>Difficulty sleeping</td>
<td>Nasal stuffiness</td>
<td>Poor feeding</td>
</tr>
<tr>
<td>Tremors</td>
<td>Temperature instability</td>
<td>Poor weight gain/FTT</td>
</tr>
<tr>
<td>Exaggerated Moro reflex</td>
<td>Sweating</td>
<td></td>
</tr>
<tr>
<td>Hypertonia</td>
<td>Sneezing</td>
<td></td>
</tr>
<tr>
<td>Excessive motor activity</td>
<td>Mottling</td>
<td></td>
</tr>
<tr>
<td>Myoclonic jerks</td>
<td>Yawning</td>
<td></td>
</tr>
<tr>
<td>Uncontrolled, constant sucking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seizures (2-11%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Clinical Timeline

<table>
<thead>
<tr>
<th>SUBSTANCE</th>
<th>ONSET (hours)</th>
<th>DURATION (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heroin</td>
<td>24-48</td>
<td>8-10</td>
</tr>
<tr>
<td>Methadone</td>
<td>48-72</td>
<td>Up to 30+</td>
</tr>
<tr>
<td>Buprenorphine</td>
<td>36-60</td>
<td>Up to 28</td>
</tr>
<tr>
<td>Prescription opioids</td>
<td>36-72</td>
<td>10-30</td>
</tr>
<tr>
<td>Polypharmacy</td>
<td>??</td>
<td>??</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>??</td>
<td>??</td>
</tr>
</tbody>
</table>
Discharge at 48 hrs???

- AAP (2014 and 2017)
- WHO (2014)

- Known fetal exposure: 4-7 days!

- 1 in 5 has onset after 48 hrs

- Withdrawal at home...
  - Poor feeding
  - Vomiting and diarrhea
  - Extreme irritability
  - Sleep challenges

- DEHYDRATION
- SEIZURES
- RISK FOR CHILD ABUSE

Neonatal Abstinence Syndrome (NAS)

**NAS** Drug withdrawal syndrome in newborns caused primarily by *in utero* exposure to opioids. [CDC]

**Medicaid Infants with NAS by Race**
In 2016 per 1,000 Births

<table>
<thead>
<tr>
<th>Race</th>
<th>2016 per 1,000 Births</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>26.9</td>
</tr>
<tr>
<td>Black</td>
<td>5.7</td>
</tr>
<tr>
<td>Hispanic</td>
<td>2.7</td>
</tr>
<tr>
<td>Other</td>
<td>15.7</td>
</tr>
</tbody>
</table>

**Infants Diagnosed with NAS**
Mothers' Medicaid Opioids Claims Status

- 2010
- 2011
- 2012
- 2013
- 2014
- 2015
- 2016
## Medication Assisted Treatment (MAT)

<table>
<thead>
<tr>
<th></th>
<th>Buprenorphine (Subutex)</th>
<th>Buprenorphine/Naloxone (Suboxone)</th>
<th>Methadone</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MECHANISM</strong></td>
<td>Binds partially to the same opioid receptors with a longer dissociation period.</td>
<td>Trace doses of opioid antagonist.</td>
<td>Synthetic opioid agonist. Occupies same receptors but activates them very slowly.</td>
</tr>
<tr>
<td><strong>IMPACT</strong></td>
<td>No high. No withdrawal. No craving. Clear mind.</td>
<td>If heroin or opioid used also, instant withdrawal symptoms.</td>
<td>No high, no withdrawal if used in correct doses.</td>
</tr>
</tbody>
</table>
MEDICATION IS NOT THE TRADING OF ONE ADDICTION FOR ANOTHER

"People ask me all the time, 'well, aren't they just substituting one drug for another?' The answer is no. These are evidence-based treatments and they work,"

**Patrice A. Harris**, Chair AMA Opioid Task Force
MAT changes the outcome

![Diagram showing the benefits of Mothers' Buprenorphine Treatment During Pregnancy on Hospital Stay, Duration of Withdrawal (Neonatal Abstinence Syndrome) Treatment, and Total Dose of Morphine. The diagram compares Methadone (n=73) with Buprenorphine (n=58).]

Jones et al., 2010, Kaltenbach et al., 2017
BREASTFEEDING
It Rocks!
Breastfeeding and Substance Use

• AAP committee recommends all mothers in methadone/buprenorphine treatment be allowed to breast-feed regardless of dose.

• Data suggests a **protective effect on the rate of NOWS**.

• HCV and HBV **not** contraindication for breast feeding

• HIV contraindication in developed countries

*AAP: Committee on Drug. Pediatrics 2001 and 2013*
Rooming in

ROOMING-IN MAY BE ASSOCIATED WITH EVEN GREATER SAVINGS

- Decreased need for pharm Rx:

- Decreased LOT by:

- Decreased LOS by:

Benefits of the Approach in this Study Site

- Length of hospital stay for infants 22.4 to 5.9 days
- Infants receiving pharmacological treatment 98% to 14%
- Hospital costs per family $44,824 to $10,289

No infants were readmitted for treatment of NAS and no adverse events were reported

Evolution of Federal Protections and $$$$$$

1974
Child Abuse Prevention and Treatment Act (CAPTA)

2003
The Keeping Children and Families Safe Act

2010
The CAPTA Reauthorization Act

2016
Comprehensive Addiction and Recovery Act (CARA)

Primary Changes in CAPTA Related to Infants with Prenatal Substance Exposure

Important to note that Tribes don’t participate in the CAPTA grant thus do not make assurances regarding programs and policies
A COLLABORATIVE, NON-PUNITIVE APPROACH

- Women with SUD are identified during pregnancy.

- Engaged into prenatal care, medical care, substance use treatment, and other needed services.

- Plans address the needs of BOTH INFANTS AND PARENTS/CAREGIVERS.

- NOWHERE IS REMOVAL FROM HOME A FIRST OR CRITICAL STEP.
Longitudinal effects of prenatal exposure

• Mixed results from retrospective cohort studies.
• Heterogeneity of prenatal exposure and environmental risks.
• AAP 2013 “no consensus on the effects...on cognitive abilities”

• Norwegian prospective study
• Youth age 17-22 prenatally exposed to
  • heroin alone
  • polypharmacy
  • unexposed

• Decreased cognitive ability
• Minimal executive function decline
• Envtl post natal factors + factors before birth

AAP Committees on Substance Abuse and Fetus and Newborn. 2013, Nygaard, et al Child Neuropsychology 2017
Comprehensive, pro-active care

- Early Intervention
- Close wraparound care
- Continued recovery
- Family planning
Felony Chemical Endangerment

_AL Code Section 26-15-3.2_

• Variable testing
• Variable enforcement
• Variable interpretation
• VARIABLE FEAR

• Avoidance of prenatal care
• Missed opportunities
• Missed cases of withdrawal
Child endangerment.
Uniform clear transparent dictate

- Accessing prenatal care will not bring incarceration.
- Disclosure of opioid use will not bring incarceration.
- Adherence to CARA will involve DHR to facilitate access to comprehensive care. Not incarceration or separation.
Better tomorrows for our kids and those who love them.