

Testimony of Debra L. Bogen, MD, FAAP, FABM

To The PA House, Children and Youth Committee

Regarding Public Hearing on the Opioid Abuse Epidemic's Impact on Infants and Children

Date of April 26, 2017

Good morning Chairman Watson, Chairman Conklin and members of the Committee. I truly appreciate the opportunity to speak at this hearing today. My name is Dr. Debra Bogen, and I am both a primary care pediatrician and clinical research scientist. I practice and teach pediatrics at UPMC. I care for newborn infants at the Magee-Womens Hospital and provide outpatient pediatric care for primarily low-income children at the Primary Care Center of the Children's Hospital of Pittsburgh of UPMC. For more than 15 years, I have provided medical care to and conducted research with mother-infant dyads impacted by opioid use. It is based on this experience that I provide my testimony today.

As you know, the nationwide epidemic of opioid use has significantly affected pregnant women and their infants and children. The number of infants exposed to opioids during pregnancy has tripled in the last decade.[1] Chronic use of opioids in pregnancy leads to Neonatal Abstinence Syndrome (NAS) in 45-90% of exposed infants [2, 3], resulting in an average hospital cost of \$53,400 for infants with NAS - five times the cost for healthy infants.[4]

Pregnancy offers a special opportunity for women with substance use disorder (SUD) to change the trajectory of their addictive behavior. Most women with SUD make significant health behavior changes during pregnancy. Many seek medication-assisted therapy during pregnancy with either methadone (MTD) or buprenorphine (BUP). The goal of medication-assisted therapy during pregnancy is to prevent withdrawal, craving and drug seeking behavior of mothers to optimize the uterine and maternal environment for fetal/infant development.

While many women stop all substance use by mid pregnancy, unfortunately, many women return to unhealthful behaviors within the first year after delivery. Medication assisted therapy is critical and effective, but medication alone cannot address the myriad of emotion regulation and interpersonal problems that accompany maternal addiction and is unlikely, by itself, to improve the developmental trajectory of offspring. In fact, mothers with SUD continue to have high rates of poverty, homelessness, violent relationships, alcoholism [5], in addition to a persistence of interpersonal problems, chaotic lifestyles, and depression. Furthermore, children born to addicted mothers are more likely to have disorganized and avoidant styles of attachment [6, 7] and problems with inhibitory control that are not fully accounted for by genetic and prenatal risk.[8]

That is why, as you consider legislation to address the opioid epidemic, I implore you to include funding for programs that address the maternal-child relationship – such as quality longer-term residential treatment programs that allow mothers-children to stay together (such as those funded by Act 65 – initially passed in 1993), validated parenting programs that focus on attachment, as well as long term evaluation.

Developing stable and secure relationships with their infant/child is a key factor for favorable outcomes for women and their children. Providing women recovering from SUD with a supportive environment in which to develop stable and secure relationships for at least the first few years after birth, is of utmost importance to ensure the parent's and the young child's healthy development. To improve upon maternal and infant outcomes beyond the benefits conferred by medication-assisted treatment, interventions that address maternal attachment and family functioning have the potential to directly address the core interpersonal deficit that contributes to ongoing maternal and infant/child adverse outcomes.

With your support for funding for programs that address the maternal-child relationship – the quality longer-term residential treatment programs that allow mothers-children to stay together, validated parenting programs that focus on attachment, and long term evaluation – you will help ensure that these mothers continue the significant health behavior changes they made during their pregnancies – and with that, the healthy development of their children.

I would also like to thank you for passing House Bill 235 which creates the Opioid Abuse Child Impact Task Force Act. I completely support this effort and would be happy to help in any way I can.

- Please note that I have also submitted slides from a presentation I delivered at the PA American Academy of Pediatrics Medical Home Meeting in Harrisburg this past Friday that may be helpful for additional background information.
1. Patrick, S.W., et al., *Increasing incidence and geographic distribution of neonatal abstinence syndrome: United States 2009 to 2012*. J Perinatol, 2015. **35**(8): p. 650-5.
 2. Dryden, C., et al., *Maternal methadone use in pregnancy: factors associated with the development of neonatal abstinence syndrome and implications for healthcare resources*. BJOG: An International Journal of Obstetrics & Gynaecology, 2009. **116**(5): p. 665-671.
 3. Logan, B.A., M.S. Brown, and M.J. Hayes, *Neonatal abstinence syndrome: treatment and pediatric outcomes*. Clinical Obstetrics & Gynecology, 2013. **56**(1): p. 186-92.
 4. Patrick, S.W., et al., *Neonatal abstinence syndrome and associated health care expenditures: United States, 2000-2009*. JAMA, 2012. **307**(18): p. 1934-40.
 5. Llewelyn, R.W., *Substance abuse in pregnancy: the team approach to antenatal care*. The Obstetrician & Gynaecologist, 2000. **2**(1): p. 11-16.
 6. Goodman, G., S.L. Hans, and S.M. Cox, *Attachment behavior and its antecedents in offspring born to methadone-maintained women*. Journal of Clinical Child Psychology, 1999. **28**(1): p. 58-69.
 7. Seifer, R., et al., *Attachment status in children prenatally exposed to cocaine and other substances*. Child Development, 2004. **75**(3): p. 850-68.
 8. Ackerman, J.P., T. Riggins, and M.M. Black, *A review of the effects of prenatal cocaine exposure among school-aged children*. Pediatrics, 2010. **125**(3): p. 554-65.

Clinical Management of NAS in Primary Care

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No conflicts of interest



National Scientific Council on the Developing Child says...

- Safe, strong and healthy relationships help to activate connections in developing brain that enable communication among neurons that specialize in different kinds of brain functions.
- This developing brain architecture provides the foundation for all future learning, behavior & health
- Relational health is a key driver in brain building.
- The earlier in a child's life we focus on mental health, the better.

Positive stress response

is a normal part of healthy development and refers to the transient increases in heart rate and hormonal levels that occur when a child is first left with a new caregiver or is given a shot at the doctor's office.

Tolerable stress response

refers to significant activation of the body's "alert systems," as might occur after the loss of a loved one or a natural disaster, *in the presence of adult support*. If the child is cared for by at least one responsive adult who provides a sense of security and protection, the stress response doesn't last for an extended period of time, and the child's brain and other organs can recover from potentially damaging effects.

Toxic stress response is

the unrelenting activation of stress response systems in the absence of adequate support or protection from adults. It can be precipitated by serious adversity, such as extreme poverty, frequent neglect, physical or emotional abuse, or maternal substance abuse and can lead to stress-related diseases or deficits in learning and behavior across the lifespan.

- We must focus on parent-child relationships to achieve optimal child and societal outcomes.
- How do we achieve this goal for those families impacted by the opioid epidemic?



SAMHSA Center of Excellence for Infant and Early Childhood Mental Health Consultation from https://www.samhsa.gov/sites/default/files/programs_campaigns/IECMHC/development-center-excellence-iecmmhc-toolbox.pdf

Duration of NAS Symptoms

- Issues persist for 6-12 months – relevant to primary care providers
 - Skin mottling
 - Exaggerated reflexes
 - Digestive complaints
 - Cry and fuss
 - Sleep issues
 - Behavior

Presentation Outline

1. Nutrition
2. Sleep
3. Maternal support
4. Mother-child attachments
5. Behavior & Development

1. Nutrition

- Difficult to feed because...
 - Disorganized
 - Rapid state changes
 - Abnormal suck-swallow patterns
 - Increased tone
 - Excess stool and diaper rash
- No research/guidance on infant feeding



Breastfeeding

- Breastmilk fed infants
 - ↓ NAS treatment rate
 - ↓ MSO4 dose and need for 2nd med
 - ↓ treatment and LOS
- Mechanism for improved outcomes with BF?
 - Frequent small feedings
 - Breast milk more easily digested
 - Skin to skin time
 - Small amount of drug in milk

Pregnancy Great Motivator



Breastfeeding motivator too?



Variation in Care for NAS is Common among BORN Nurseries

Have policy or guideline re: breastfeeding / feeding expressed breastmilk in infants being observed or treated for NAS?

Yes	70%
No	13%
Unsure	17%

Bogen DL, Whalen B, Kair LR, Vining M, King BA. Wide Variation Found in Care of Opioid-Exposed Newborns. *Academic Pediatrics* (in press)

Calorie-enhanced BM or special formula for infants observed or treated for NAS?

Yes	33%
No	57%
Unsure	10%

How often infants observed/treated for NAS routinely fed calorie-enhanced BM or formula?

<10%	22%
10-25%	26%
26-50%	26%
51-75%	13%
76-100%	9%

Type of special formula usually used	%
Calorie-enhanced donor breastmilk	4
Calorie-enhanced mother's breastmilk	44
Calorie-enhanced standard formula	61
Elemental formula	9
Lactose-reduced cow milk based formula	22
Soy formula	9
Protein hydrolysate formula (e.g. Alimentum)	17
Preterm formula 22 kcal/oz (e.g. Neosure)	30
Preterm formula 24 kcal/oz	4
Other	4

Do Women on Methadone BF

- BF eligibility determined by negative urine tox on admission, no illicit drug use in 3rd tri, HIV -
- 276 mother-infant pairs
- 40% mothers ≥ 1 psych dx; 24% ≥ 2 psych meds
- 65% Hep C +
- 68% mothers eligible to breastfeed
 - 40% BF some during infant's hospitalization.
 - 60% of these stopped BF early (5.9 d (SD 6.5))

Wachman, EM. Breastfeeding Medicine. August 2010, 5(4): 159-164

Breastmilk Feeding (BMF)

	Control (n=15)	Intervention (n=13)	P
Ever received BMF	80%	85%	1.00
Hospital days all BMF	5%	15%	.20
Hospital days any BMF	43%	73%	.05
Any BMF at hospital discharge	47%	64%	.5
Mean proportion of BMF 0-7 days of life	27%	63%	<.001
Any BMF feeding at 4 wks	46%	58%	.70
At least 80% BMF at 4 wks	8%	42%	.07

Feeding Recommendations

- Support ongoing breastfeeding
 - Wean naturally
 - Concerns for acute NAS with abrupt weaning
 - Counsel: What to do in case of relapse
- Watch growth curves carefully
 - Continue high calorie formula until gaining well
 - Counsel on feeding cues

2. Sleep

- One component of Finnegan scale
- Common complaint of parents (20-30%)
 - Association with maternal depression
- Ongoing complaint in outpatient setting
- Increased risk of SUID among substance exposed infants *

* Ward, S. L., et al. (1990). "Sudden infant death syndrome in infants of substance-abusing mothers." *Journal of Pediatrics* 117(6): 876-881.

Opioids Impact Sleep Architecture

- **Induction:** reduced REM sleep and slow wave sleep; increased wakefulness and arousals
- **Maintenance:** Vocalization during REM sleep, increased daytime sleepiness
- **Withdrawal:** insomnia, frequent arousals and decreased REM sleep, decreased total sleep
- **Abstinence:** rebound REM and slow wave sleep takes 3-6 months (with chronic methadone)
 - Infants demonstrate changes in sleep breathing patterns with maternal drug use

Wang, D. and H. Teichtahl (2007). "Opioids, sleep architecture and sleep-disordered breathing." *Sleep Med Rev* 11(1): 35-46

Sleep Recommendations

- Emphasize safe sleep
 - No co-bedding, couches, or recliners
- Teach 5 S's (Happiest Baby)
 - Swaddle, ssshh, suck, side lying, shimmy
- Sleep strategies (Mindell Review 2006)
 - Preventive: bedtime routine, consistent schedule, parental handling and parental response to awakening - put to bed "drowsy but awake"
 - Graduated extinction (not Ferber) – low maternal tolerance for crying

Sleep Interventions

- Post sleep interventions, mothers (parents) consistently showed
 - Rapid and dramatic improvements in their overall mental health status
 - Fewer symptoms of depression
 - Increased sense of parenting efficacy
 - Enhanced marital satisfaction
 - Reduced parenting stress

* Mindell, J. A., et al. (2006). "Behavioral treatment of bedtime problems and night wakings in infants and young children." *Sleep* 29(10): 1263-76.

3. Maternal Support

- Maternal behavioral health issues
 - Mood disorders
 - Trauma history (abuse, neglect, foster care system, trafficking, etc...)
 - IPV and unhealthy relationships
- Pediatric providers should...
 - Recognize these potential challenges
 - Ask how mother/parents are doing?
 - Screen for depression and other BH conditions
 - Offer support and referral to treatment

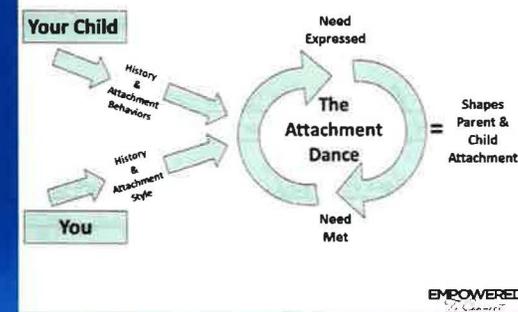
4. Mother-Child Attachment

- SUD interferes with relational competences and parenting
 - Impairs attachment → relational development
- Addiction associated with dysregulation of balance between reward and stress pathways
- Same pathways undergo significant changes in parenthood
- Drug exposure may decrease sensitivity to rewarding values of infants cues
 - May be seen as stressful instead

Parenting and SUD

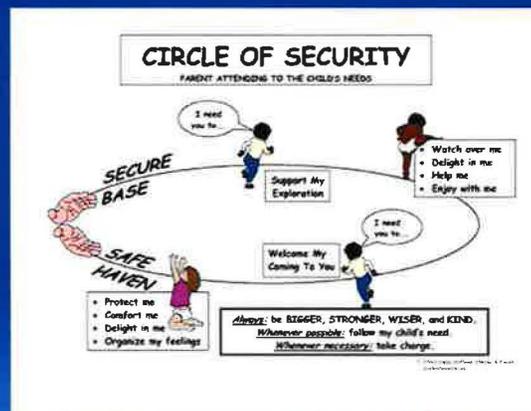
- Among child victims of maltreatment, 43-79% have at least 1 parent with SUD
- Mothers with SUD 2-3x more likely to maltreat their children or lose custody
- Children experience recurring episodes of loss of consistent parental care (during relapse and other interruptions)
- However, SUD does not always impact parenting Pregnancy great motivator!!
- Attachment theory basis for much work

The Attachment Dance



Interventions

- Obstacles for Rx – maternal/child separation
- Newer approaches recognize need for integrated treatment – meet needs of both
- Children serve as motivators for treatment
- Studied interventions based on attachment
 - BTC: Breaking the Cycle (Canada): prenatal - 6y
 - MTP: Mother and Toddler Program (Yale): 12m - 3y
 - ABC: Attachment and -Catch-up (CYF ref): 6m - 2 y
 - Tamar's Children (Circle of Security): prenatal – 12m
 - Cherish the Family: birth - 5y



(Almost)
Everything I Need to Know
About Being a Parent
in
25 Words or less

- Always: be **BIGGER, STRONGER, WISER, and KIND.**
- Whenever possible: follow your child's need.
- Whenever necessary: take charge.

© Cooper, Hoffman, Marvin, & Powell - 1998 - circleofsecurity.org

Parenting Recommendations

- Integrate effective parenting strategies into substance use treatment programs
- Incorporate into EI services
- Pediatric providers facilitate and reinforce skills

Grants Totalling \$485 Million Available Soon To Combat Opioid Crisis

Health and Human Services Secretary Tom Price, M.D., announced that HHS will soon provide \$485 million in grants to help states and territories combat opioid addiction. The funding will be provided through the State Targeted Response to the Opioid Crisis Grants administered by SAMHSA.

5. Behavior and Development

Literature Review: Effects of Prenatal Substance Exposure on Infant and Early Childhood Outcomes

- National Abandoned Infants Assistance Resource Center; Univ CA at Berkeley
- http://aia.berkeley.edu/media/pdf/prenatal_substance_exposure_review.pdf
- Most data on cocaine exposure

Studying Fetal Drug Exposure

- Challenging because...
 - Women may not disclose use
 - Multiple drug exposures
 - Exposure varies across pregnancy
 - Impact of pre-pregnancy exposure
 - Child outcomes impacted by many factors - not just drug exposure

Literature Findings

- Motor development
 - Factors other than cocaine/opioid stronger predictors (tobacco, care-giving environ, LBW)
 - One study suggested quantity cocaine important
- Cognitive development
 - Discrepant results; maybe early effect that wane and child's environment become more significant (care-giving environ, mother's vocabulary)
- Language development
 - Same as above - discrepant

Literature Findings

- Behavior
 - Discrepant – some report gender specific
- Attachment
 - Prenatal alcohol negative impact
- School performance
 - Cognitively stimulating environment important
- Physical growth
 - Tobacco negative effect on all parameters
 - Cocaine, alcohol, methamphetamine, also negative

“What is the long term impact of my drug use on my baby?”

- Literature suggests home environment can overcome prenatal exposure
- Provide child with stimulating environment
- Stay drug free so can attend to baby's needs
- Talk to baby, make good eye contact, provide consistent care
- Read to baby, avoid TV as babysitter
- Take advantage of programs to help you!!

Key Recommendations for Outpatient Pediatric Providers

- Monitor growth, development, behavior
- Counsel on sleep – decrease SUID risk and sleep strategies
- Attend to mother's needs - be kind, patient and supportive of mother / father
- Refer to effective programs
 - Early intervention
 - Home visiting programs (Allegheny County LINKS)
 - Family support centers
 - Preschool programs (e.g.. Head Start)

State of NAS Many Remaining Questions

- Wide variation in NAS care in US
 - Observation time
 - Medications - different for different exposures
 - Treat in NICU or nursery - home vs. hospital
 - Impact of supportive measures
- Treatment of mother
 - Dosing during and after pregnancy
 - How to maintain women in treatment
 - Provide comprehensive care in context of family and community

