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THE ASANTE EAT, SLEEP, CONSOLE MODEL –

FOR OPIOID EXPOSED INFANTS

WHAT IS NEONATAL ABSTINENCE SYNDROME (NAS)?

A group of symptoms that occur in a newborn who was exposed to drugs in utero.

WHICH SUBSTANCES CAUSE NAS?

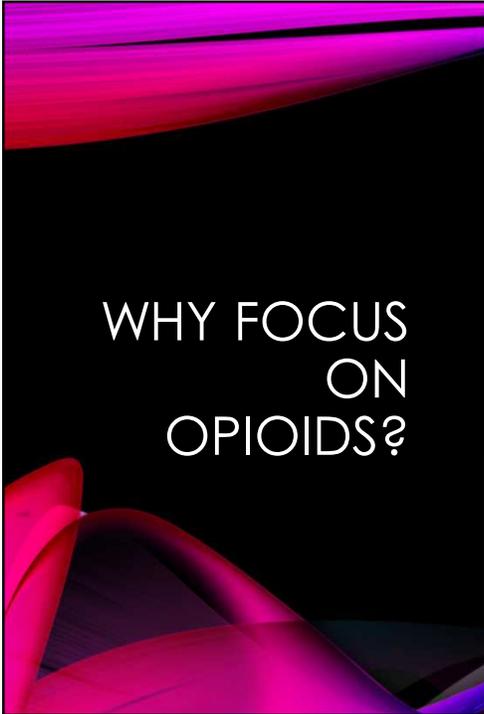


- Many substances can cause symptoms of withdrawal in a newborn
 - Barbiturates
 - Benzodiazepines
 - SSRIs
 - Alcohol
 - **OPIOIDS**
 - Tobacco
 - Amphetamines
 - Cocaine

WHAT IS AN OPIOID?



- Derivative of Opium
 - Primarily used for pain relief
 - Illegal drug – Heroin
 - Synthetic opioids – Fentanyl
 - Prescription opioids – Vicodin & Oxycodone
 - Medications used to treat opioid addiction
 - Long acting & stable opioid - Methadone
 - Opioid agonist - Buprenorphine - Subutex
 - **Preferred med for pregnancy & breastfeeding**
 - Opioid antagonist - Suboxone (not as safe during pregnancy or breastfeeding)



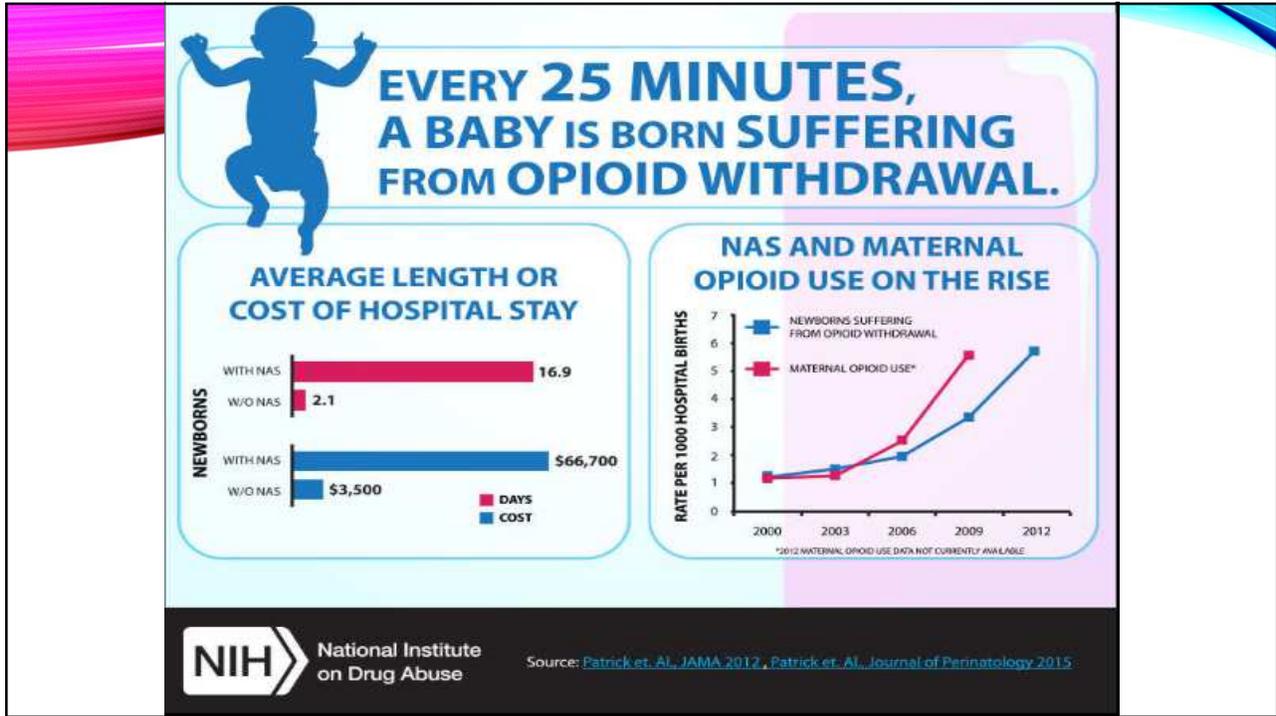
WHY FOCUS ON OPIOIDS?

- Opioid Use Disorder – National Epidemic that crosses all demographic lines
- Delayed onset of symptoms
- Long- lasting symptoms
- Long-term effects

Heroin Use Has INCREASED Among Most Demographic Groups

	2002-2004*	2011-2013*	% CHANGE
SEX			
Male	2.4	3.6	50%
Female	0.8	1.6	100%
AGE, YEARS			
12-17	1.8	1.6	--
18-25	3.5	7.3	109%
26 or older	1.2	1.9	58%
RACE/ETHNICITY			
Non-Hispanic white	1.4	3	114%
Other	2	1.7	--
ANNUAL HOUSEHOLD INCOME			
Less than \$20,000	3.4	5.5	62%
\$20,000-\$49,999	1.3	2.3	77%
\$50,000 or more	1	1.6	60%
HEALTH INSURANCE COVERAGE			
None	4.2	6.7	60%

CDC DATA – WHO IS AFFECTED BY OPIOID ABUSE?



SYMPTOMS OF NAS

Irritability with excessive or high pitched cry

Excessive sucking with poor feeding and slow wt gain

Diarrhea and/or vomiting

Fever

Hyperactive reflexes and increased muscle tone

Rapid breathing

Tremors and/or seizures

UNDERSTANDING THE SYNDROME

55-94% of exposed neonates will develop NAS

Cannot correlate use patterns with withdrawal symptoms

Opioid receptors are concentrated in the CNS and GI tract

NAS symptoms are exacerbated by stimuli and hunger

The baby struggles to function in the key areas...

Eating
Sleeping
Consolability

THE TIMING OF OPIOID WITHDRAWAL SYMPTOMS IN A NEWBORN

Drug	Onset of Symptoms (hours)	Duration (days)	
Heroin	24-48	8-10	
Methadone	48-72	Up to 30 or more	
Buprenorphine	36-60	Up to 28 or more	
Prescription opioids	36-72	10-30	

Kocherlakota, P. Neonatal Abstinence Syndrome. *Pediatrics*, Volume 134, Number 2, August 2014

THE REAL DANGERS FOR NAS BABIES

If the baby can't ...

- Eat
- Sleep
- Be Consoled

And the Family doesn't learn the skills to help...

The largest risks are...

- Child abuse
 - Shaken Baby
- Neglect
 - Failure to Thrive
- The incidence of child abuse is tripled with drug using caregivers and / or environmental stressors

THE OLD / CURRENT MODEL OF NAS CARE

Use of the Finnegan scoring tool to assess

Score of 24 – 2 scores of 12 or 3 scores of 8 = NICU

NICU = morphine q 3 hours for up to 30 days +

May be discharged with morphine drops for treatment at home

THE RESULTS OF THE OLD MODEL ON THE FAMILY

- Family is unprepared for NAS to occur
- Family feels guilty
- Family is disconnected from baby
- Staff provide care for baby in NICU = staff fatigue
- Major risk for relapse
- Diminishes family bonding
- Increases family stress
- Increased risk of abuse and neglect
- Long term opioid exposure may put the baby at risk for opioid addiction later in life

An Initiative to Improve the Quality of Care of Infants With Neonatal Abstinence Syndrome

Matthew R. Grossman, MD,^a Adam K. Berkwitz, MD,^a Rachel R. Osborn, MD,^a Yaqing Xu, MS,^b
Denise A. Esserman, PhD,^b Eugene D. Shapiro, MD,^{a,c} Matthew J. Bizzarro, MD^a

Population: Infants \geq 35 weeks gestation whose mothers took methadone daily for at least 1 month before delivery
421 infants with NAS \rightarrow 287 inclusion criteria (55 baseline, 188 intervention, 44 in post-implementation period)

Results:

- Average LOS decreased from 22.4 days to 5.9 days (74% reduction)
- Proportion of infants treated with morphine decreased from 98% to 14%
- Proportion of infants that took majority of their feeds from breastmilk increased from 20% to 45%
- Infants admitted directly to NICU decreased from 100% to 20%.

No patient admitted to inpatient unit required transfer to NICU. No seizures reported. No readmissions within 30 days of discharge related to withdrawal.

CRITERIA FOR THE EAT, SLEEP, CONSOLE MODEL

Can the baby eat?

• **1 oz or breast feed effectively**

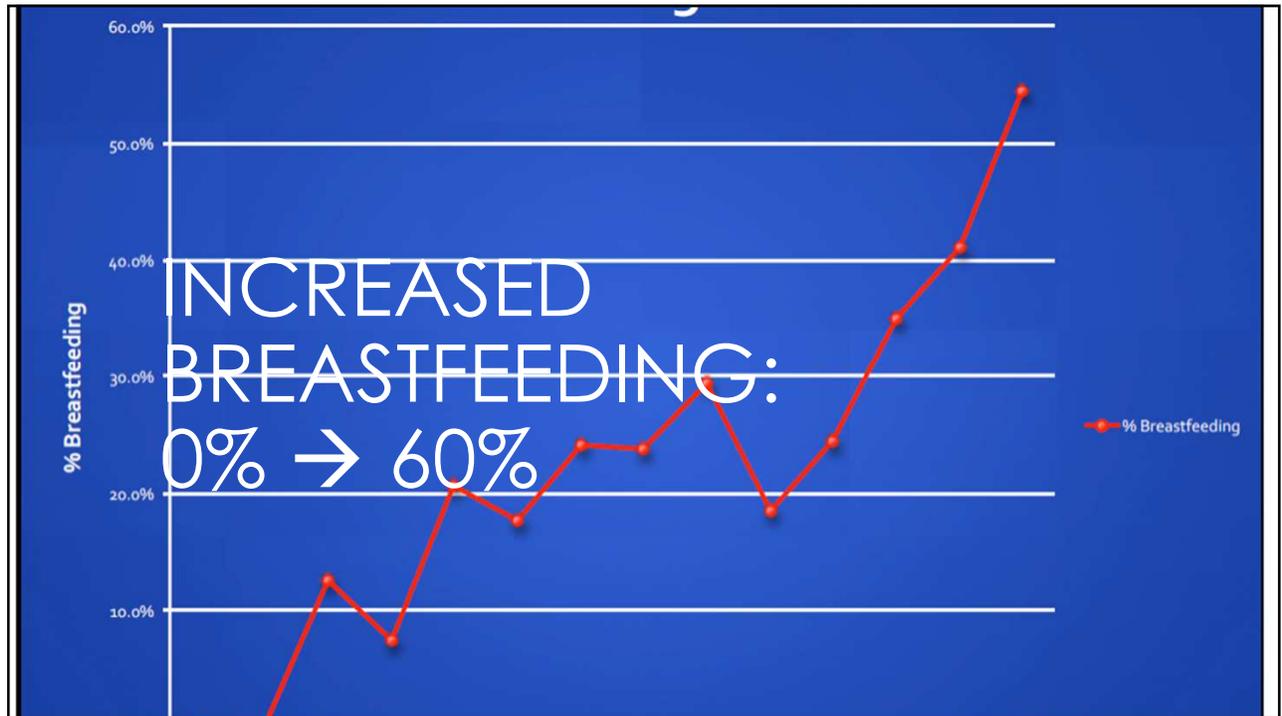
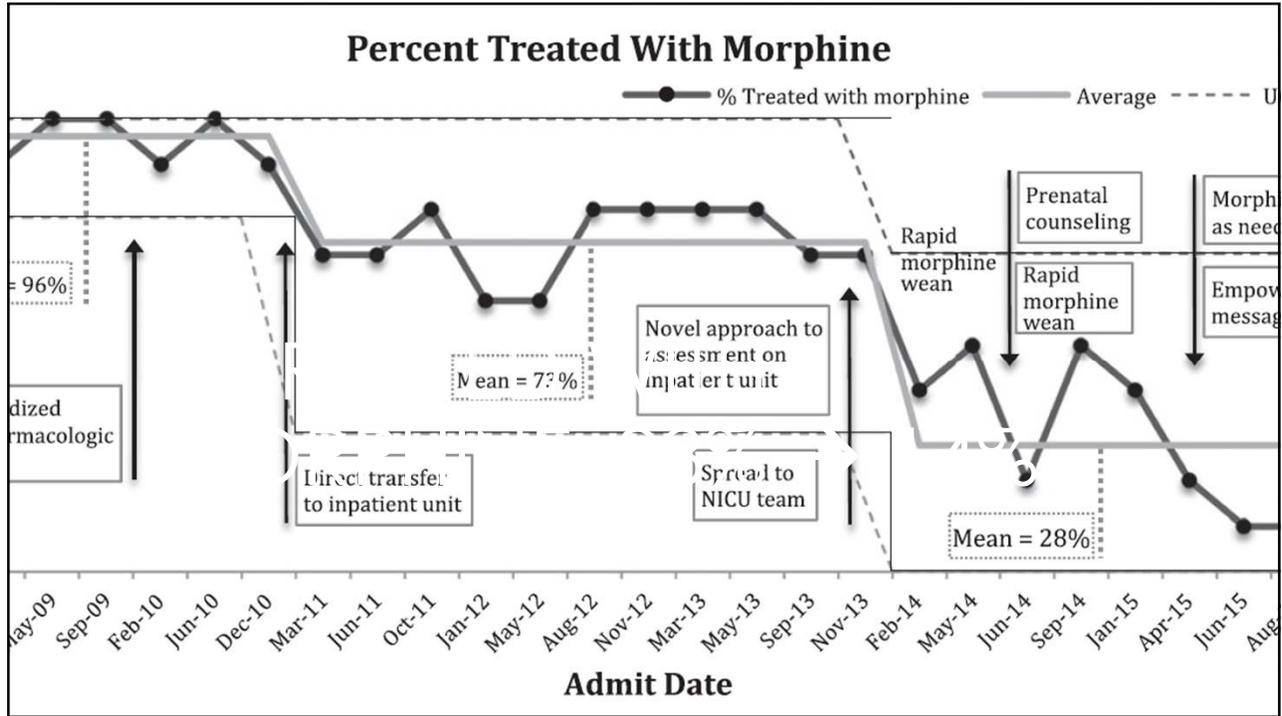
Can the baby sleep?

• **Undisturbed for 1 hour**

Can the baby be consoled?

• **Within 10 minutes**



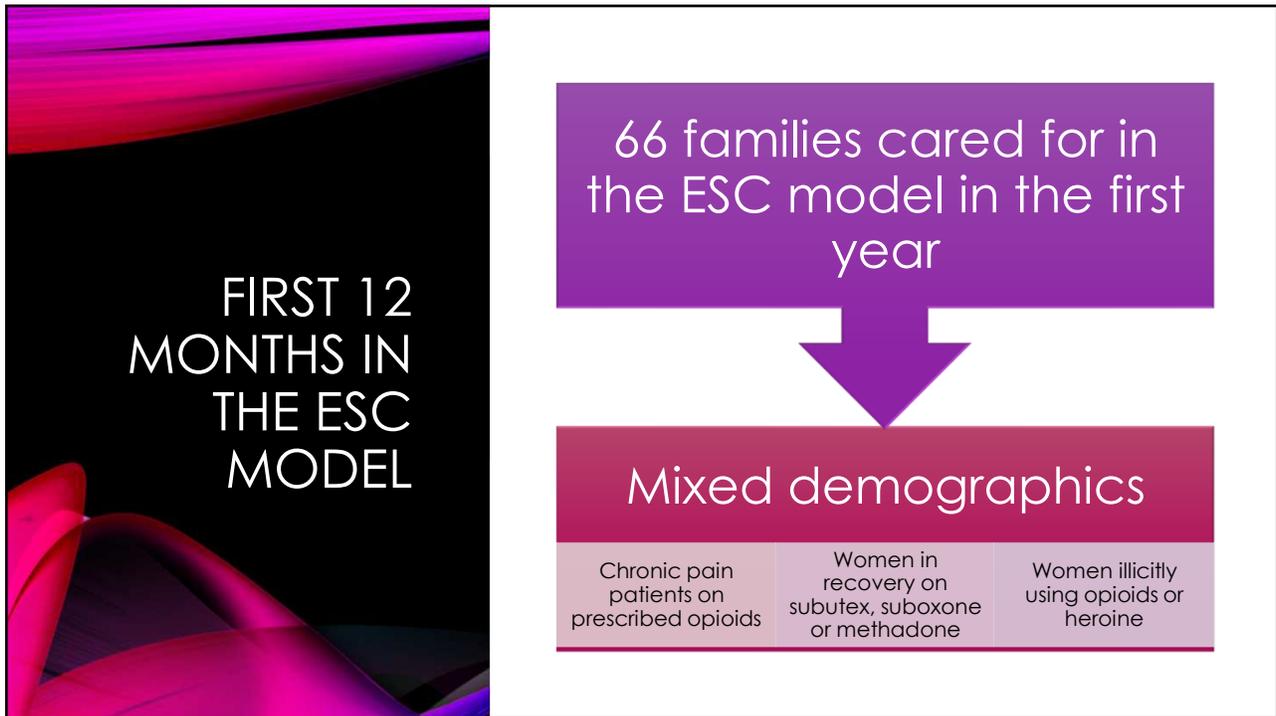
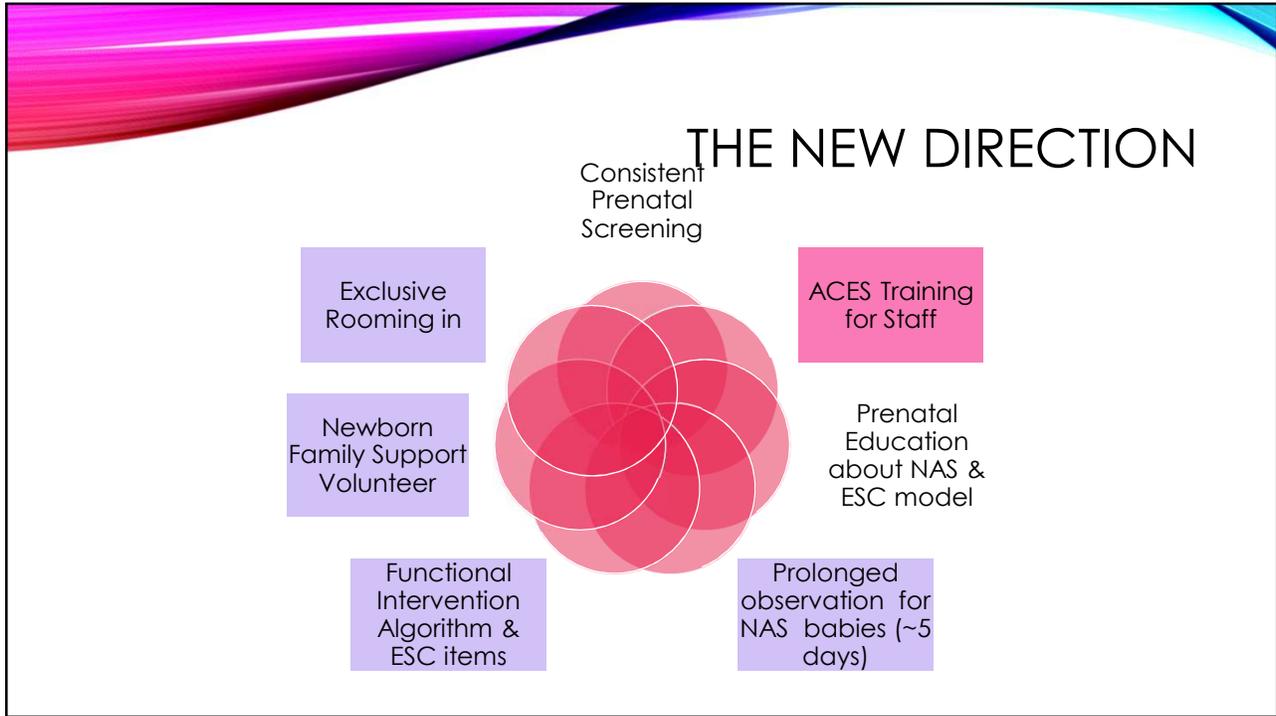


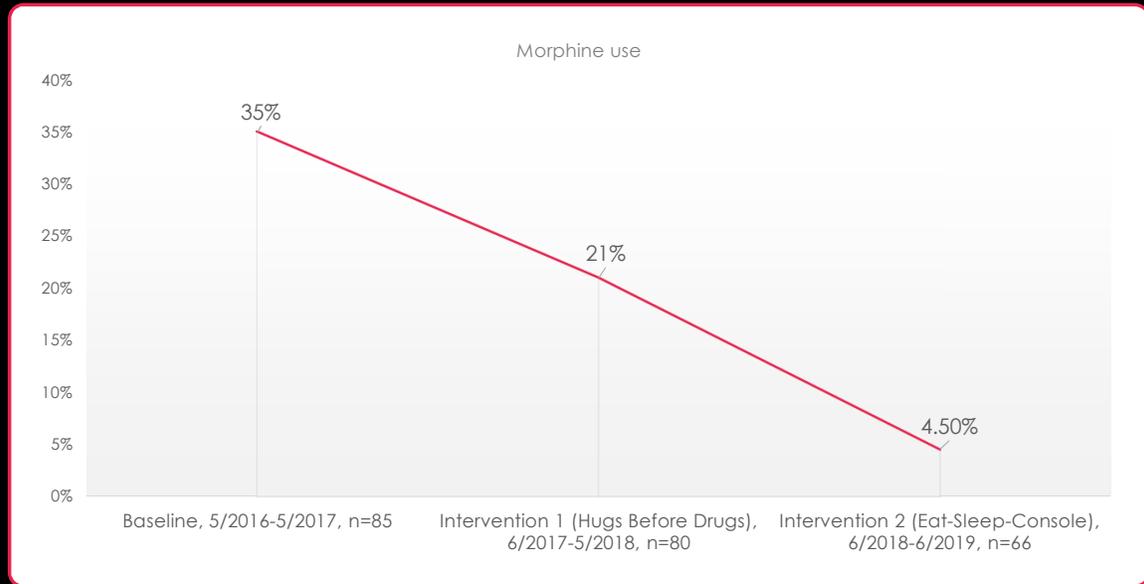
MEASURES	BEFORE	AFTER
Decreased Length of Stay	22.5 days	5.9 days
% Treated with Morphine	98%	14%
Increased Breastfeeding	0%	65%
Total Average Cost	\$44,824	\$9,572



THE ASANTE
APPROACH
TO THE ESC
MODEL







	Baseline 5/2016-5/2017 n=85	Intervention 1 Hugs Before Drugs 6/2017-5/2018 n=80	Intervention 2 Eat-Sleep-Console 6/2018-6/2019 n=66
Length of stay (LOS), days, avg	7.67 days	7.18 days	5.5 days
Morphine use	35% (30/85)	21% (17/80)	4.5% (3/66)
Admitted to NICU	48% (41/85)	30% (24/80)	30.3% (20/66)
NICU for NAS only	27% (23/85)	11% (9/80)	1.5% (1/66)

NAS INTERVENTION RESULTS

IT ALL STARTS WITH EDUCATION

- ASANTE'S NAS TOUR VIDEO

[https://www.asante.org/
services/women-and-
children/family-birth-
center/](https://www.asante.org/services/women-and-children/family-birth-center/)

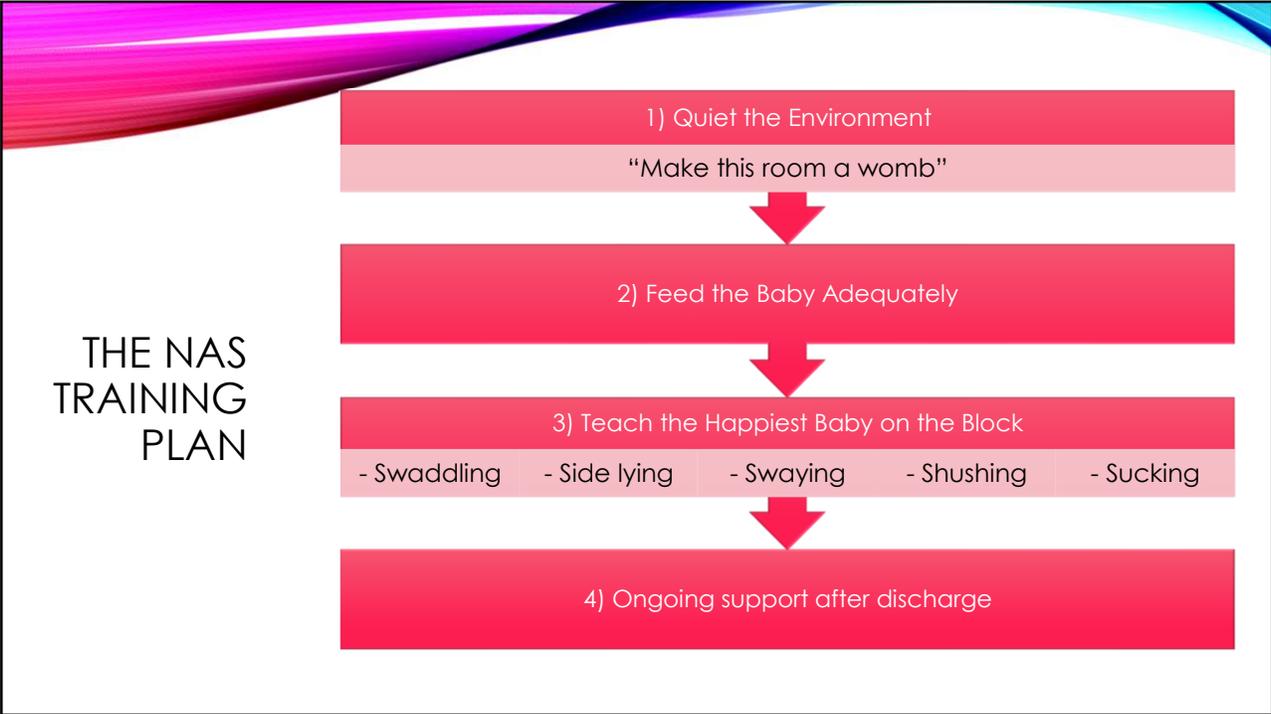
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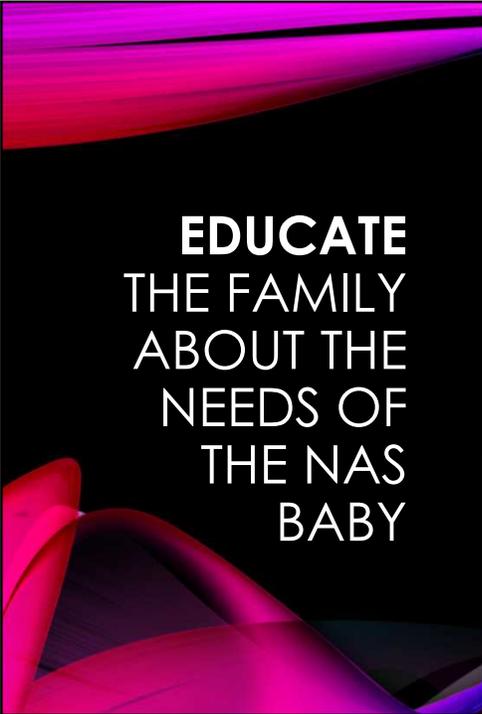
Asante.org FBC page

WELCOME TO YOUR 5 DAY PARENTING BOOT CAMP

- Consistent messaging from healthcare team
 - - Support & Empowerment
- 2) Baby care provided by family
 - - Nurse is coach / educator / support person
- 3) Who is in this support system? Empower and educate the support people to provide 24 hour care



DISCUSSION &
QUESTIONS



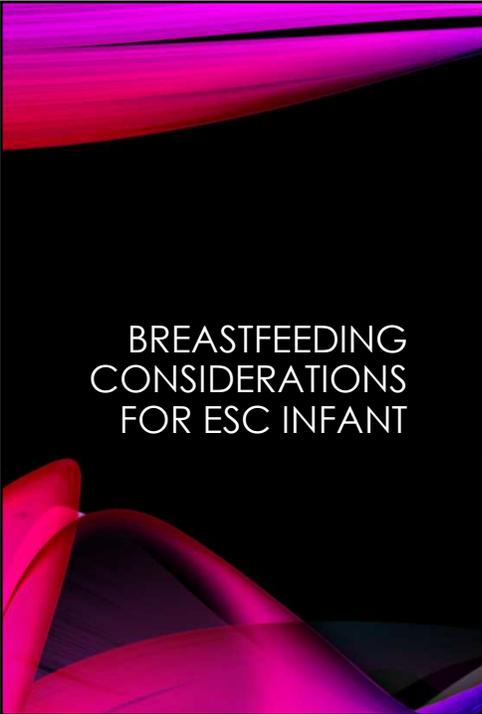
EDUCATE THE FAMILY ABOUT THE NEEDS OF THE NAS BABY

Increased need for skin-to-skin

- Barriers to providing 24 hour support

Increased drive to suck

- Nipple protection for prevention of skin breakdown
- Pacifier use

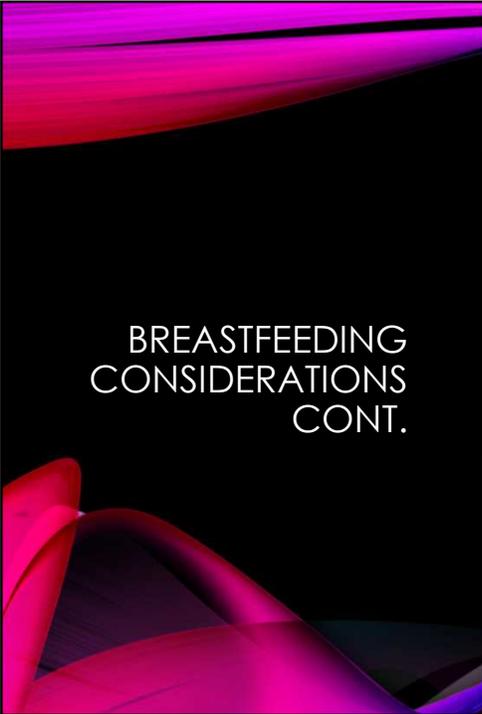


BREASTFEEDING CONSIDERATIONS FOR ESC INFANT

Excessive sucking: Babies are unable to self soothe and are ALWAYS sucking. Scheduled feedings and use of pacifier can help compensate for this.

Excessive rooting: frantic at breast for latch often misinterpreted by mom as rejection "my baby doesn't want to feed, my baby doesn't like me".

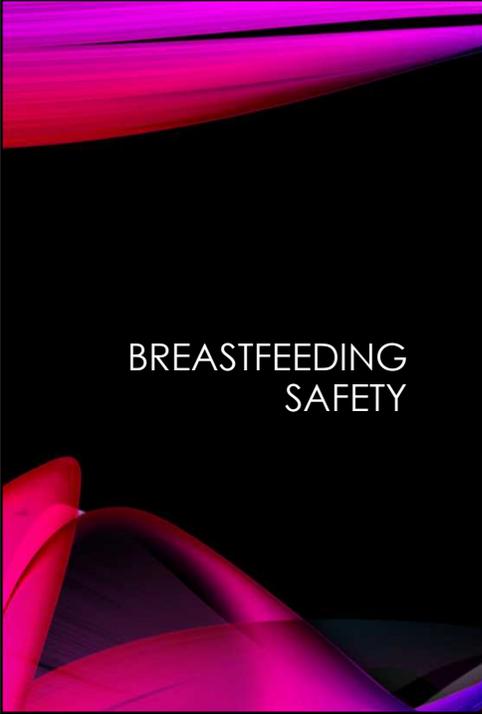
Structured feeding position, use of swaddling in flexed position, use of nipple shield for additional oral stimulation, sidelying for tolerance of sometimes fast milk flow.



BREASTFEEDING CONSIDERATIONS CONT.

Baby may be uncoordinated and need additional support, nipple shield or supplemental feeding at breast

Baby many need referral for feeding specialist for uncoordinated feeding issues or dysphagia, which can be a direct result of IUDE



BREASTFEEDING SAFETY

Maternal milk is BEST for baby

Breastfeeding provides confidence and empowerment. Direct breastfeeding provides skin to skin contact which is an important console technique for an infant who may have withdrawal symptoms.

Breastfeeding / use of maternal breastmilk can decrease the symptoms in babies with NAS

A mother who is able to console her infant during withdrawal will feel more successful and better prepared to manage infant after discharge.

Breastfeeding can be THE MOTIVATION and reason for change in parent lifestyle

ESTABLISH BREASTFEEDING SAFETY & PLAN



- Breastfeeding while on methadone or buprenorphine is recommended as long as the mother is using medications as prescribed and not using illicit substances and has tested negative for contraindicated infections
- Pharmacy consultation can be ordered to evaluate safety of breastfeeding with related substances

INCREASED CALORIC DEMAND

- Evaluate each NAS baby for the following:
 - Sufficient milk quantity
 - Need for supplementation?
 - Need for fortification?
 - Donor Breastmilk
 - 24 Cal Formula
 - Adequate milk transfer
 - Need for tools to assist in milk transfer?
 - Need for nasogastric tube?

WHEN BREAST ALONE IS NOT ENOUGH

Supplementation may be needed to fill stomach for comfort

Considerations: Mom should be pumping once supplementation is initiated to help increase her supply.

She will need good double electric pump during this time. She may need to pump to soften breast prior to feed as these babies cannot tolerate full/firm breast

SUPPLEMENTATION WITH DONOR MILK

Use of donor breast milk as “bridge” while maternal supply is increasing. Can be served at breast via tube and syringe if baby tolerates or post breastfeed by bottle. Easier to digest for already compromised gut.



FORMULA CONSIDERATIONS

- The length of additional caloric need will depend on the onset and length of active withdrawal.
- Need to identify caloric need to increase weight. A baby should not need to lose weight in order to be put back on higher calorie formula.
- MD order for additional calorie formula to assist babies increase calories while using WIC provided formula.

FEEDING WITH 24 CALORIE FORMULA

Need for formula: Yale model includes use of 24kcal formula if not breastfeeding to support the additional caloric need due to hypertonia, fussiness, constant agitated state, and excessive sucking.

Kcal/oz	BM* +Prolacta	BM*+HMF	BM* + 22kcal Powder (Neosure/ Enfacare)	BM* + 19 kcal powder (Sim Adv)	Similac 19kcal/oz	Neosure/ Enfacare
20	_____	_____	_____	_____	2ozs water + 1 scoop	4 ½ oz water + 2 scoops
22	_____	100mL BM + 2 pk HMF	2ozs BM + ½ tsp Neosure	3 oz BM +1/2 tsp Sim	6 ¼ oz water + 4 scoops	2ozs water + 1 scoop
24	80 mL BM + Prolacta ^{†4} (20mL)	100mL BM + 4 pk HMF	2 ozs BM + 3/4 tsp Neosure	3 oz BM + 1 tsp Sim	7 ¾ oz water + 5 scoops	5 ½ oz water + 3 scoops

24KCAL RECIPES FOR USE WITH NEOSURE AND SIMILAC

EDUCATION FOR NAS FAMILIES

- Hunger Cues
- Cluster feeding
- Avoid gastric discomfort
 - Slow flow nipples
 - Teach how to pace feeds
 - Small frequent meals
- Feeding positions
 - Accommodate excessive suck and allow for drainage of excess milk
 - Elevated side-lying



PATS SERVICES

- Neurodevelopmental evaluation at discharge
- Neonatal massage as needed
- Feeding Evaluations by referral
- Parent teaching
- Developmental Follow up Clinic (visits at 3, 12, 24 months)
- Referrals to Early Intervention if significantly delayed
- Outpatient Pediatric Feeding Clinic
- Out patient therapy (SLP, OT, PT)

CRITERIA FOR DEVELOPMENTAL FOLLOW UP AFTER DISCHARGE

In Utero Exposure to

- marijuana
- opiates
- alcohol
- methamphetamines
- cocaine
- prescribed drugs such as seizure medications and antidepressants
- such as Zoloff

Other Criteria

- 31 weeks gestation or less
- Birth weight under 1500 grams
- Small for gestational age (less than or equal to 3rd percentile)
- BPD at discharge
- Microcephaly (head circumference less than or equal to 3rd percentile)
- Low Apgars (5 minute Apgar of 3 or less)
- HIE, CNS infection, seizures

COMMON FINDINGS ON NEURODEVELOPMENTAL EVALUATIONS AT DISCHARGE IN INFANTS WITH NAS

- Sub-optimal score on Hammersmith Neonatal Neurological Examination
- Hypertonia
- Tremors
- Frequent startles
- Irritability
- Poor state regulation- inability to achieve quiet alert
- Inability to self soothe
- High pitched cry
- Gaze aversion
- Hyperreflexia
- Poor feeding
- Poor visual tracking
- Hyperreactivity to sensory input
- Disorganization of movement and state, especially when unswaddled

VOLUMETRIC CEREBRAL CHARACTERISTICS OF CHILDREN EXPOSED TO OPIATES AND OTHER SUBSTANCES

“The sample studied is rare and hence small, so conclusions cannot be drawn with certainty. Morphometric group differences were observed, but associations with previous behavioral assessment were generally weak. Some of the volumetric differences, particularly **thinner cortex in part of the right lateral orbitofrontal cortex, may be moderately involved in cognitive and behavioral difficulties more frequently experienced by opiate and poly-substance-exposed children**”

Tonnessen Bjornerud A. , Dale M.

NeuroImage : Clinical

Volume 18 2018 pg. 9-14

MALFORMATIONS AND ADVERSE OUTCOMES OF PRENATALLY EXPOSED INFANTS

- ❖ In case controlled studies, there were statistically significant associations with oral clefts and heart defects.
- ❖ Among cohort studies, club foot was most frequently reported
- ❖ **Adverse neonatal outcomes:** preterm birth, small for gestational age, lower birth weight, reduced birth weigh and sudden death
- ❖ **Neurodevelopmental outcomes:** significant impairments in cognitive, psychomotor, and observed behavioral outcomes of infants and preschoolers with chronic intra uterine exposure to opioids.

Lind, J. N.; Interrante, J.D.

Maternal Use of Opioids During Pregnancy and Congenital Malformations: A Systematic Review

Pediatrics June 2017, Vol. 139/issue 6

DEVELOPMENTAL OUTCOMES IN CHILDREN WITH IN UTERO EXPOSURE TO OPIATES

- Study in Michigan found that Bayley scores were normal in 1st year of life and had a significant decline in the 2nd year for performance on mental development on Bayley and psychomotor development indices on the Infant Behavior Record Ratings.
- **Conclusion:** Poorer performance for mental development was due to social environmental risk factors and delay in psychomotor was due to reduced birthweight.

Hans, Sydney L., Jeremy, Rita J 09 May2001 <https://doi.org/10.1002/imhj1003>

Posineonatal mental and motor development of infants exposed in utero to opioid drugs

DEVELOPMENTAL OUTCOMES IN CHILDREN WITH IN UTERO EXPOSURE TO OPIATES

- In Israel, a study found children born to heroin-dependent mothers had a lower birth weight and a lower head circumference at examination when compared to controls. The children born to heroin-dependent parents also had a high incidence of hyperactivity, inattention, and behavioral problems. The lowest DQ or IQ among the children with cognitive levels above 70 was found in the children with environmental deprivation, next was the DQ.
- **Conclusion:** The specific role of the in-utero heroin exposure in the determination of the developmental outcome of these children (if they do not have significant neurological damage), seems to be less important in comparison to the home environment.

Ornoy A., Michailivskaya V, Lukashov I, Bar-Hamburger R, Harel S.

[The Developmental Outcome of Children born to heroin dependent mothers, raised at home and adopted](#)

Child Abuse Negl. 1996 May 20 (5) 385-96 PMID 8735375

POLYDRUG USE

Developmental Effects:

Nicotine: impulsivity, attention problems, negative behaviors, poor language development

Alcohol: lower IQ scores, development and use of language, poorer memory, academic problems, and executive functioning

Marijuana: deficits in problem solving skills that require visual memory, Sustained attention, and integration

Methamphetamine: affects fetal growth and infant neurobehavior. Further study needed regarding long term effects

Behnke, Marylou, Smith, Vincent C. (2013)

[Prenatal substance abuse: short and long-term effects on the exposed fetus](#)

Technical Report American Academy of Pediatrics

ONGOING COMMUNITY PARTNERSHIP

- The Eat, Sleep, Console model should continue at home
- Community partners can reinforce model
- We should all be on the same page with our messaging to decrease stress and confusion
- We are all a part of the same team working to support this family

REFERENCES

- Ornoy A., Michailovskaya V, Lukashov I, Bar-Hamburger R, Harel S.
The Developmental Outcome of Children born to heroin dependent mothers, raised at home and adopted
Child Abuse Negl. 1996 May 20 (5) 385-96 PMID 8735375
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Postneonatal mental and motor development of infants exposed in utero to opioid drugs
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Technical Report American Academy of Pediatrics