Neonatal Abstinence Syndrome: Resident Lecture

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Background

- **Nationally, opioid exposure during pregnancy affects 5.6 infants per 1,000 births, and 18 per 1000 in Massachusetts *(MA NeoQIC NAS Project)***
- **Neonatal Abstinence Syndrome (NAS) affects 60-80% of infants exposed to chronic in-utero opioids**
- **Incidence has increased 5 fold in the past decade**
- **From 2004 – 2013, NICU admissions for NAS increased from 7 to 27 cases per 1000 admissions**
- **Average hospitalization: 22 days**
- **Increasing healthcare costs: $93,000 per infant; 80% Medicaid patients**

Patrick SW, *JAMA,* May 2012; Tolia VN, *NEJM*, 2015

RESEARCH ARTICLE

Impact of Parental Presence at Infants' Bedside on Neonatal Abstinence Syndrome

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- **N=86 treated infants 2015-2016**
- **Document parental presence in EPIC q4 hrs**
- **Average parental presence 54.4%**
- **Barriers to being at the bedside**
- **Maximum parental presence was associated with a 9 day shorter LOS, 8 fewer days of infant opioid therapy, and low Finnegan scores**
- **Independent of breastfeeding and co-variates**

Hospital Pediatrics
AN OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Howard MB, Wachman EM, et al, *Hosp Pediatr*, 2017

Changes in NAS CARE 2016-2017

Finnegan Scale

Central Nervous System Disturbances	Metabolic, Vasomotor, and Respiratory Disturbance	Gastrointestinal Disturbance
Excessive High Pitched Crying – 2 Continuous High Pitched Crying - 3	Sweating – 1	Excessive Sucking – 1
Sleep < 1 Hr After Feeding – 3 Sleep < 2 Hr After Feeding – 2 Sleep < 3 Hr After Feeding – 1	Fever < 101 (37.2 – 38.3 C) – 1 Fever > 101 (38.4 C) – 2	Poor feeding – 2
Hyperactive Moro Reflex – 2 Markedly Hyperactive Moro Reflex – 3	Frequent Yawning (>3) – 1	Regurgitation – 2 Projective Vomiting – 3
Mild Tremors Disturbed – 1 Mod – Severe Tremors Disturbed – 2	Mottling – 1	Loose Stools – 2 Watery Stools – 3
Mild Tremors Undisturbed – 3 Mod – Severe Tremors Undisturbed - 4	Nasal Stuffiness – 1	
Increased Muscle Tone - 2	Sneezing (>3) – 1	
Excoriation – 1	Nasal Flaring – 2	
Myoclonic Jerk – 3	Respiratory Rate (>60) – 1 Respiratory Rate (>60 with Retractions) – 2	
Seizures – 5		

The Old Way

- **Baseline: 82% Rx meds, 30% 2 meds, LOS 18 days**
- **Old algorithm:**
  - **Original Finnegan scale**
  - **Two 8s or one 12**
  - **Morphine (0.3-0.9mg/kg/day) -> Clonidine / Phenobarbital**
- **Morphine vs Methadone**
- **Finnegan scale: Validated? Why “8”?**
- **Function-based NAS assessments**

Finnegan LP, 1974; Holmes AV, *Pediatrics*, 2016; Grossman M, *Hosp Pediatr*, 2017; Grossman M, *Pediatrics*, 2017; Jones HE, *Am J Addict*, 2016; Brown MS, J Perinatol, 2015; Hall ES, *Pediatrics*, 2015

What is a baby's job?

- **Eat**
- **Sleep**
- **Console**

- **Withdrawal from in-utero exposure is a self-limited process**
- **Finnegan score cut-off is 8 was never validated**
- **Iatrogenic withdrawal**
- **Non-Pharmacologic care is FIRST line treatment for NAS, before medication is considered**

YALE-NEW HAVEN HOSPITAL

Yale NAS QI Project

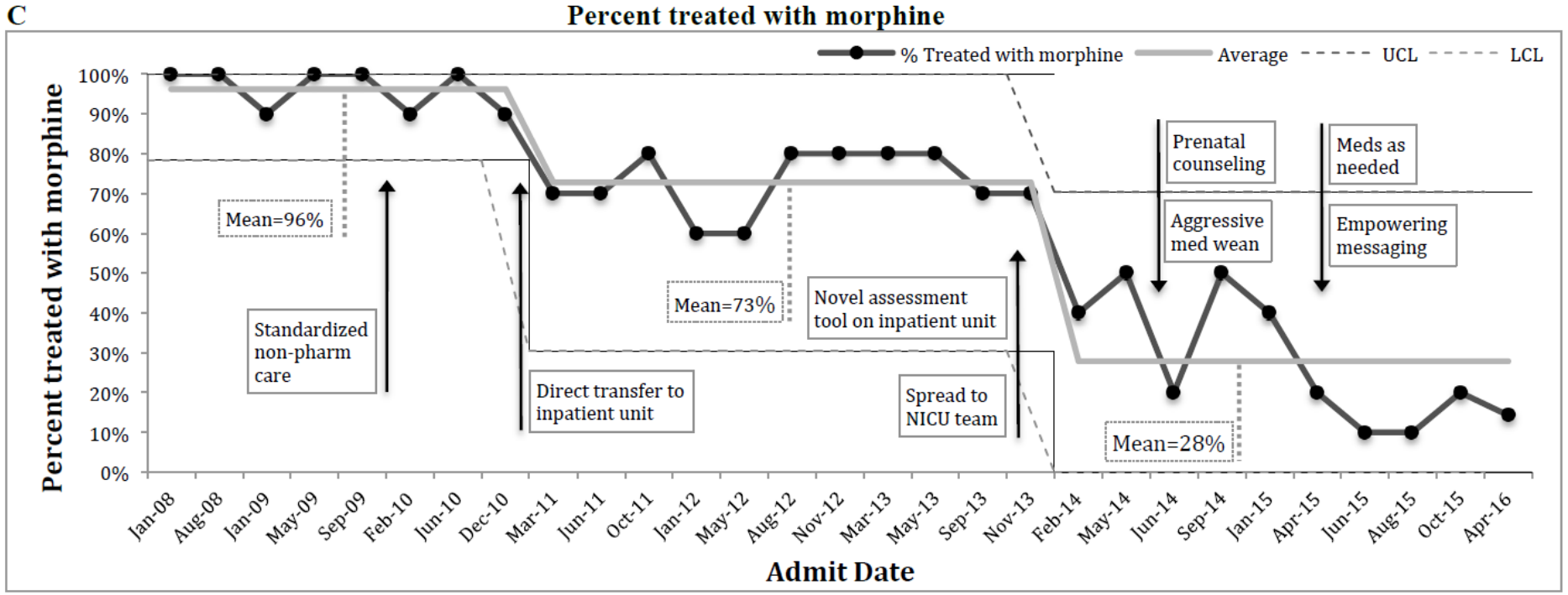
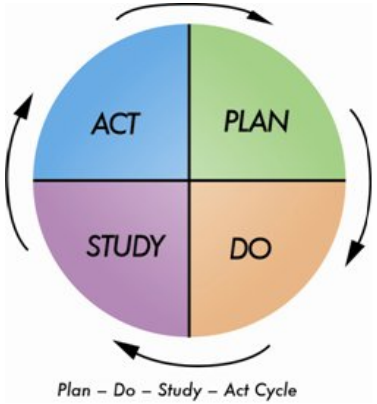


Figure 2: Charts A (LOS) and B (Cost) are XmR statistical process control charts (SPC) where each dot represents a patient exposed to methadone prenatally. Chart C (Treated with morphine) is a p-chart where each dot represents 10 patients exposed to methadone prenatally. The centerline for Charts A and B shifted downward (8 consecutive points below the mean) in March 2010, January 2012 and May 2015. Chart A also shifted downward in June 2014. Centerline for Chart C shifted in March 2010 and January 2014.

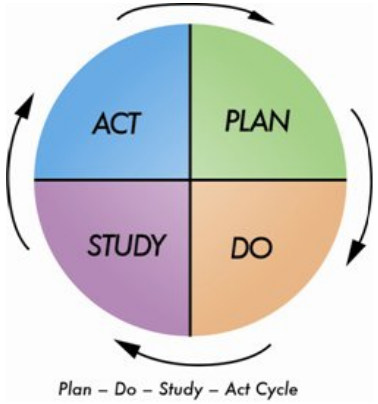
Grossman M, et al, *Pediatrics*, June 2017

PDSA Cycles

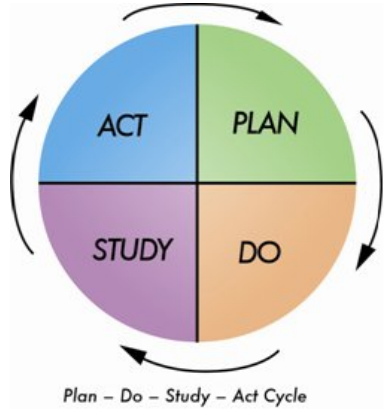
Cycle 1: May 2016
- Staff education
- Prenatal messaging
- Non-pharm care bundle
- Finnegan symptom prioritization



Cycle 2: July 2016
- Methadone
- No Tx in the first 24 hours



Cycle 3: Dec 2016
- Eat, Sleep, Console (ESC)
- Cuddlers

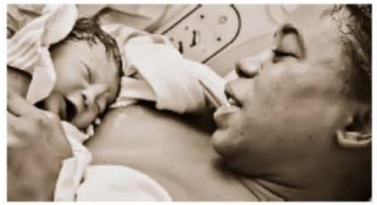


PDSA 1: Bundle of Care

BOSTON MEDICAL CENTER
EXCEPTIONAL CARE. WITHOUT EXCEPTION.

RESPECT

SUPPORTIVE BUNDLE OF CARE



Be with your baby:

You are part of your infants treatment!

1. **Skin-to-skin:** Hold your baby skin-to-skin as much as possible. The whole family can join in the fun. Be careful though - if you are feeling sleepy, place your baby in the bassinette.
2. **Feed on Demand:** If you can, feed your baby breast milk and feed on demand. This means don't watch the clock; watch the baby for feeding cues.
3. **Calming Techniques:**
   - **Swaddle:** Tightly wrap your baby to help soothe them. Ask your nurses to show you!
   - **Pacifiers:** non-nutritive sucking
   - Shooshing
   - Slow, rhythmic up & down movements
4. **Quiet room:** keep the noise level as low as possible by limiting visitors, asking your adults friends and hospital staff to speak softly. keeping the TV volume low, talking on the phone quietly
5. **Dim the lighting** in your room.
6. **Cluster care** – ask your providers to group things together that need to be done to limit the interruptions to your baby.
7. **Medications** – Half of babies require medication to help with their withdrawal, to allow them to sleep, eat, and be comfortable.

PDSA 2: Pharmacologic Treatment

- No treatment in the first 24 hours of life
- Consider medication after a team huddle if not eating, sleeping, or consoling well, AND non-pharmacologic care optimized first
- Methadone dosing:
  - 0.2-0.8mg/kg/day divided q8 hours
- Weaning:
  - 10% max dose daily down to 20% max
  - Watch for 48 hours off

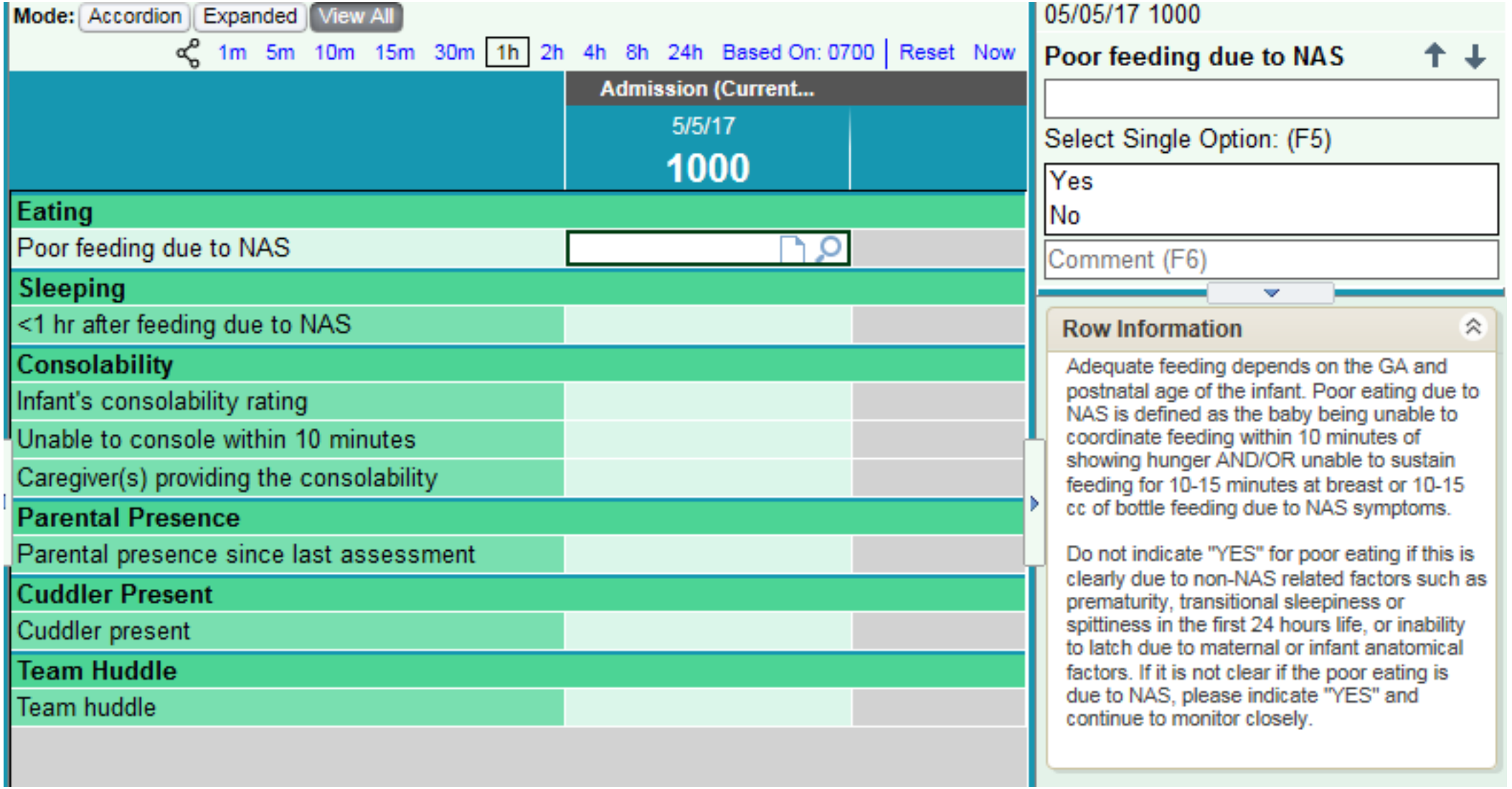
PSDA 3: Eat, Sleep, Console

TIME	
EATING	
Poor feeding due to NAS – Y/N	
SLEEPING	
< 1 hr after feeding due to NAS – Y/N	
CONSOLABILITY	
<u>Please rate the infant's consolability:</u> Soothes with little support – 1 Soothes with some support – 2 Soothes with great support – 3	
Did the infant require >10 minutes to console – Y/N	

CALM
Cuddling Assists in Lowering Maternal and Infant Stress

- **Yale-> Nursing flowsheet**

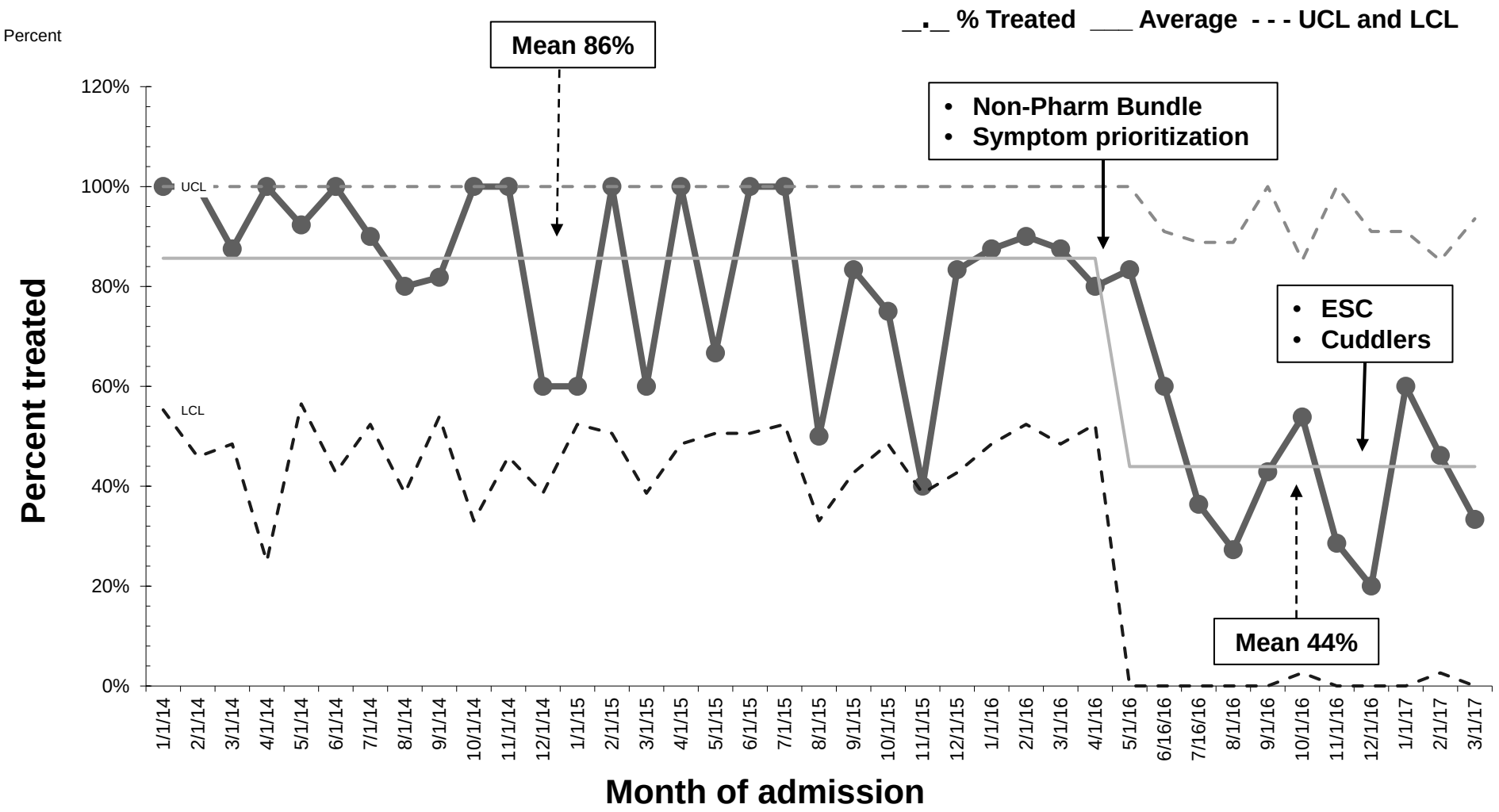
ESC EPIC flowsheet: “NAS”



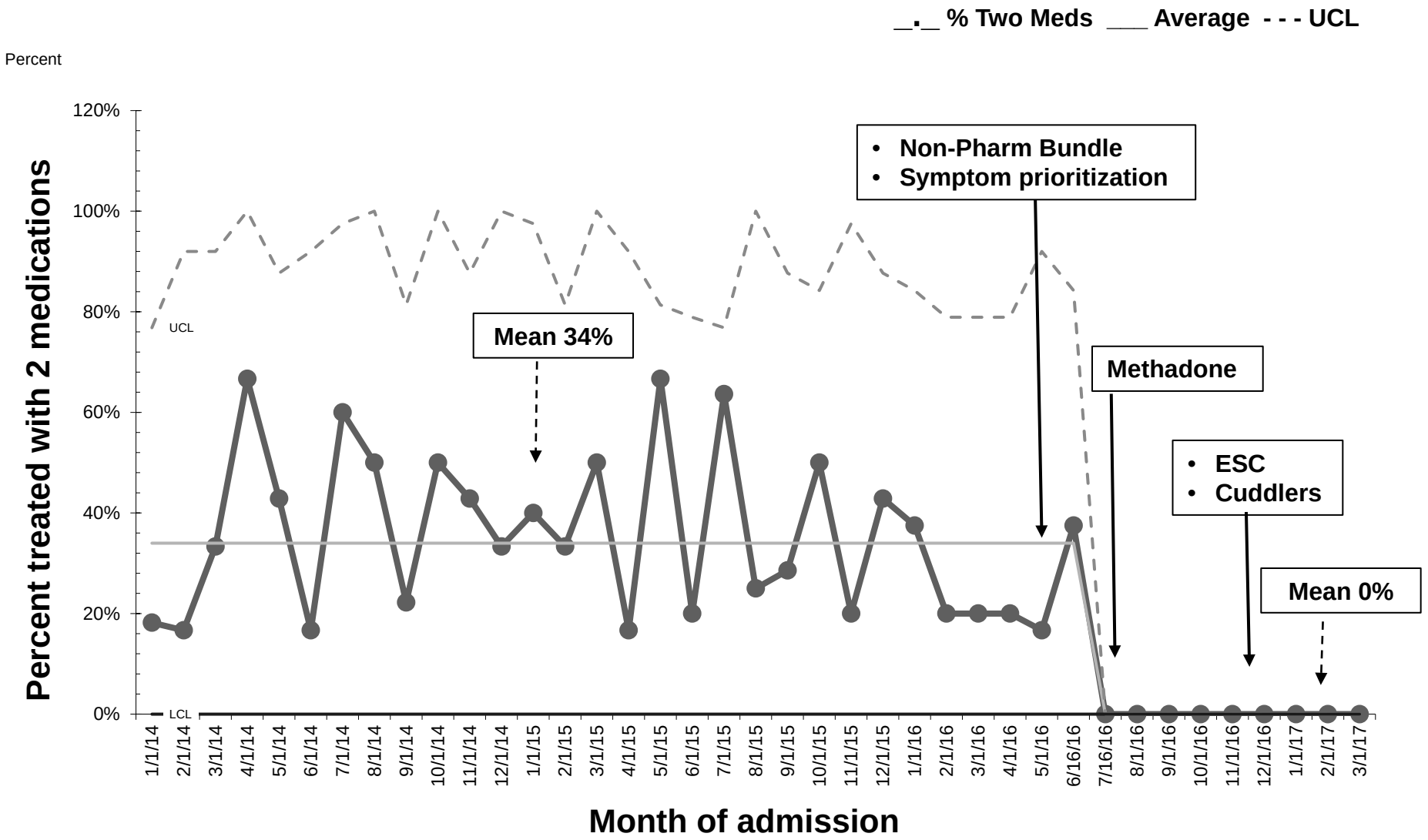
The Huddle

- “YES” to **ESC items** may warrant a **bedside team discussion**
- **Team members**: Resident physician or nurse practitioner, attending physician (as needed), nurse, parent
- **Things to discuss and review:**
  - The **ESC** questions
  - Has non-pharmacologic care been optimized?
  - If non-pharmacologic care has been optimized, does the baby require medication initiation?

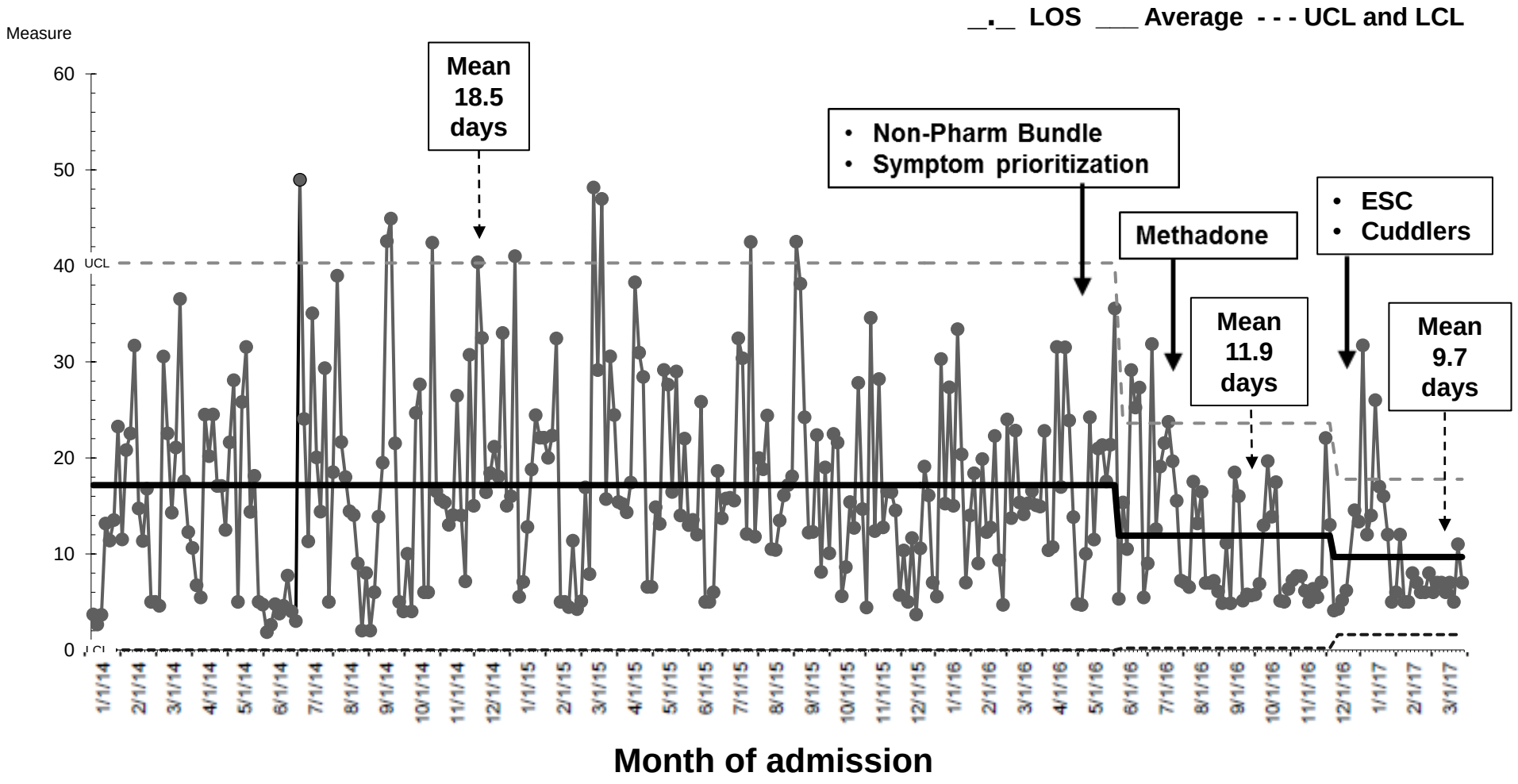
Percentage of infants pharmacologically treated



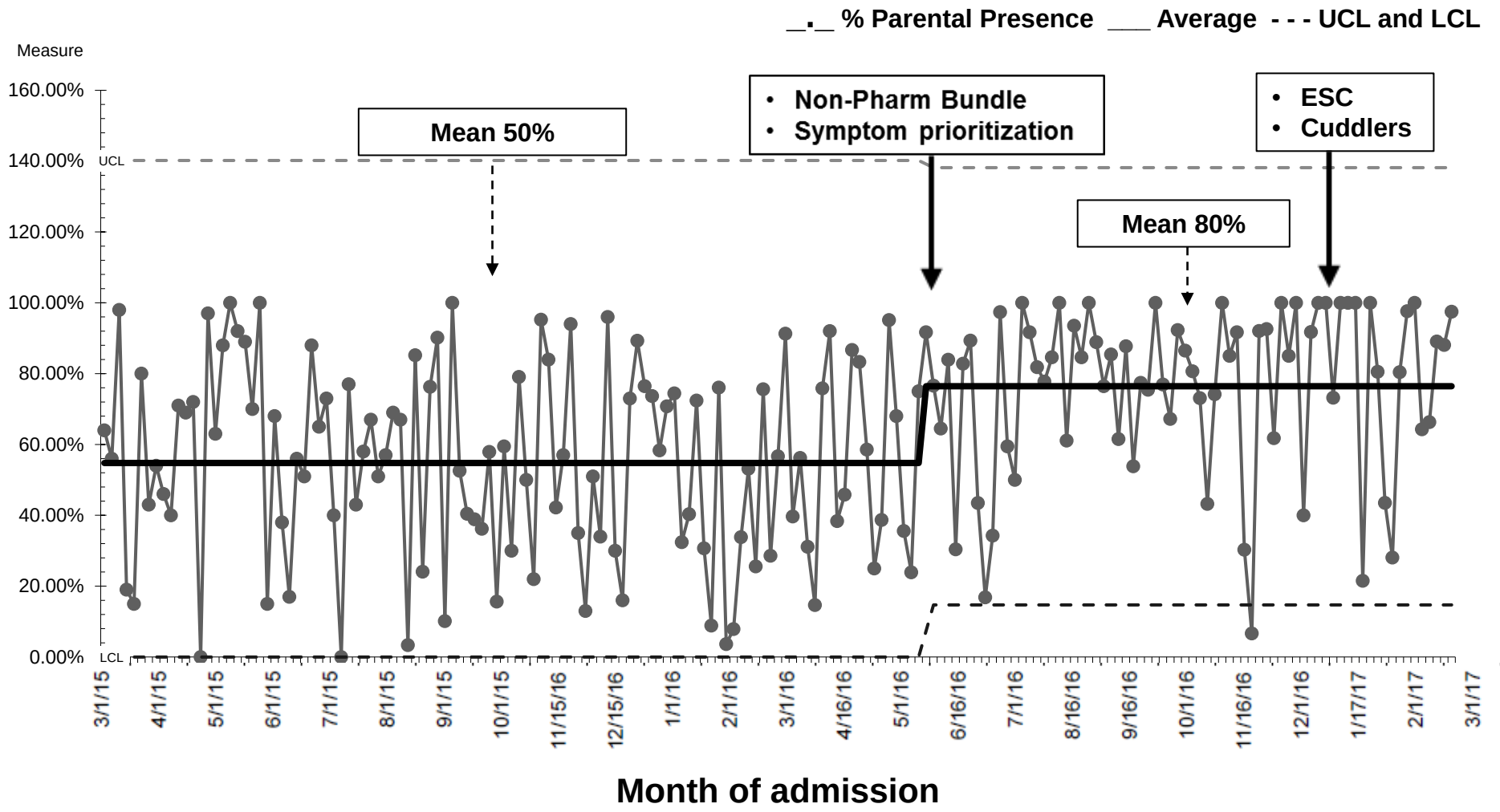
Percentage of treated infants who received two medications



Length of hospital stay all opioid-exposed infants



Percent Parental Presence



Take Home on the new approach

- **The parent = the primary treatment for the baby**
- **Non-pharmacologic care first**
- **Team huddle**
- **30-40% of infants will still require methadone, usually on day 3-4**
- **Watch for 5-7 days prior to discharge home**
  - **Depends on the baby (exposures, feeding, ESC assessments)**

Discharge Planning

- 51A to DCF for all (state mandate)
- Hep C Follow-up with Pediatric ID
- Ophthalmology Follow-up at 4-6 months of age
- Baby Steps Follow-Up at 1 month
- Early Intervention Referral for all (eligible up to 12 months)