



# **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**

# 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**

# **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		

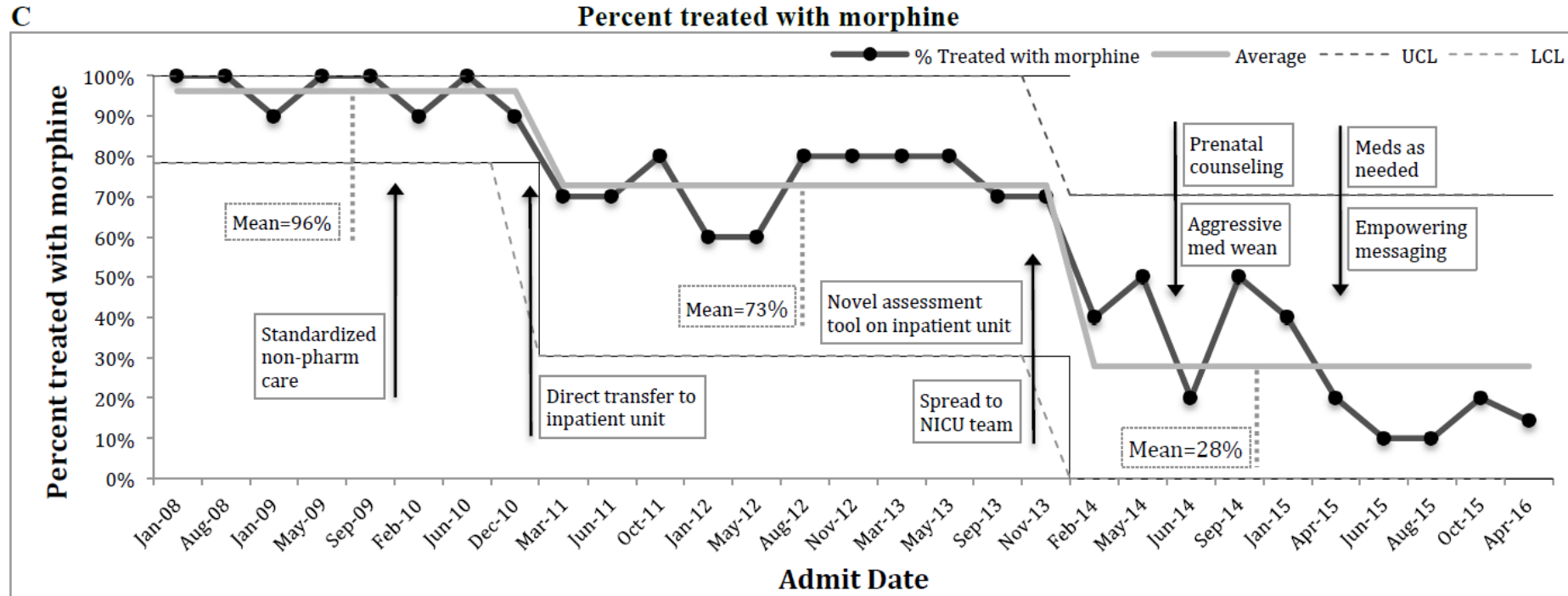
# The Old Way

- **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**

# 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 NAS QI Project



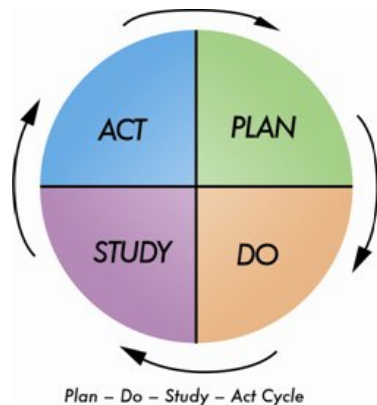
**Figure 2:** Charts A (LOS) and B (Cost) are XmR statistical process control charts (SPC) where each dot represents a patient exposed to methadone prenatally. Chart C (Treated with morphine) is a p-chart where each dot represents 10 patients exposed to methadone prenatally. The centerline for Charts 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.



# PDSA Cycles

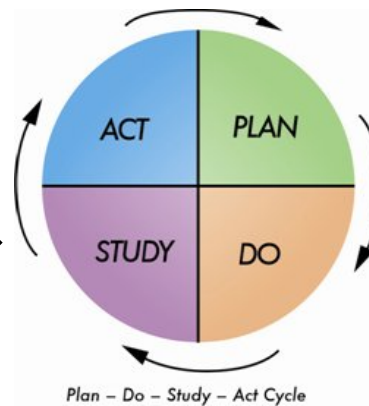
## Cycle 1: May 2016

- Staff education
- Prenatal messaging
- Non-pharm care bundle
- Finnegan symptom prioritization



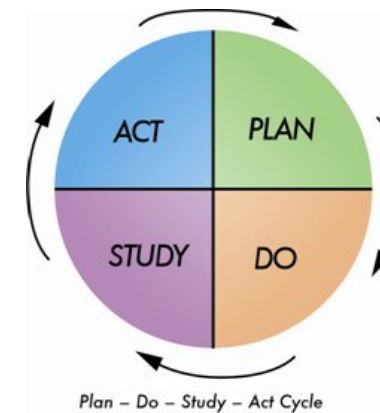
## Cycle 2: July 2016

- Methadone
- No Tx in the first 24 hours



## Cycle 3: Dec 2016

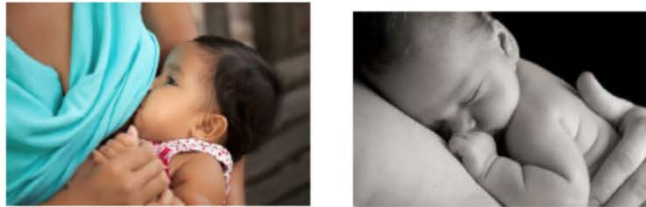
- Eat, Sleep, Console (ESC)
- Cuddlers



# PDSA 1: Bundle of Care



## 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

<b>TIME</b>	
<b>EATING</b>	
Poor feeding due to NAS – Y/N	
<b>SLEEPING</b>	
< 1 hr after feeding due to NAS – Y/N	
<b>CONSOLABILITY</b>	
<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	



- **Yale-> Nursing flowsheet**

# ESC EPIC flowsheet: "NAS"

Mode: **Accordion** Expanded View All

1m 5m 10m 15m 30m **1h** 2h 4h 8h 24h Based On: 0700 | Reset Now

Admission (Current...)	
5/5/17	1000

**Eating**

Poor feeding due to NAS

**Sleeping**

<1 hr after feeding due to NAS

**Consolability**

Infant's consolability rating

Unable to console within 10 minutes

Caregiver(s) providing the consolability

**Parental Presence**

Parental presence since last assessment

**Cuddler Present**

Cuddler present

**Team Huddle**

Team huddle

05/05/17 1000

**Poor feeding due to NAS** ↑ ↓

Select Single Option: (F5)

Yes

No

Comment (F6)

**Row Information** ⤴

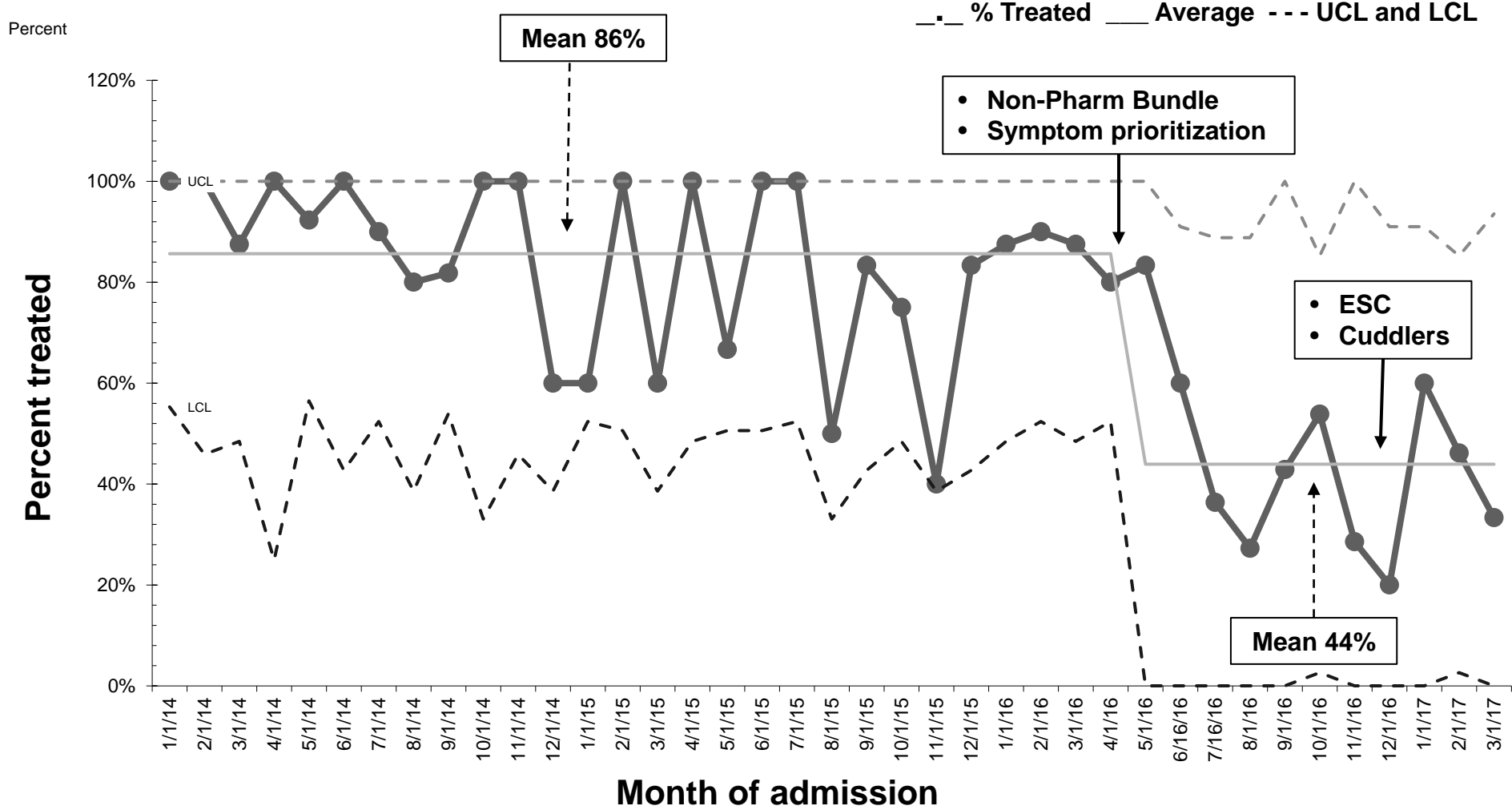
Adequate feeding depends on the GA and postnatal age of the infant. Poor eating due to NAS is defined as the baby being unable to coordinate feeding within 10 minutes of showing hunger AND/OR unable to sustain feeding for 10-15 minutes at breast or 10-15 cc of bottle feeding due to NAS symptoms.

Do not indicate "YES" for poor eating if this is clearly due to non-NAS related factors such as prematurity, transitional sleepiness or spittiness in the first 24 hours life, or inability to latch due to maternal or infant anatomical factors. If it is not clear if the poor eating is due to NAS, please indicate "YES" and continue to monitor closely.

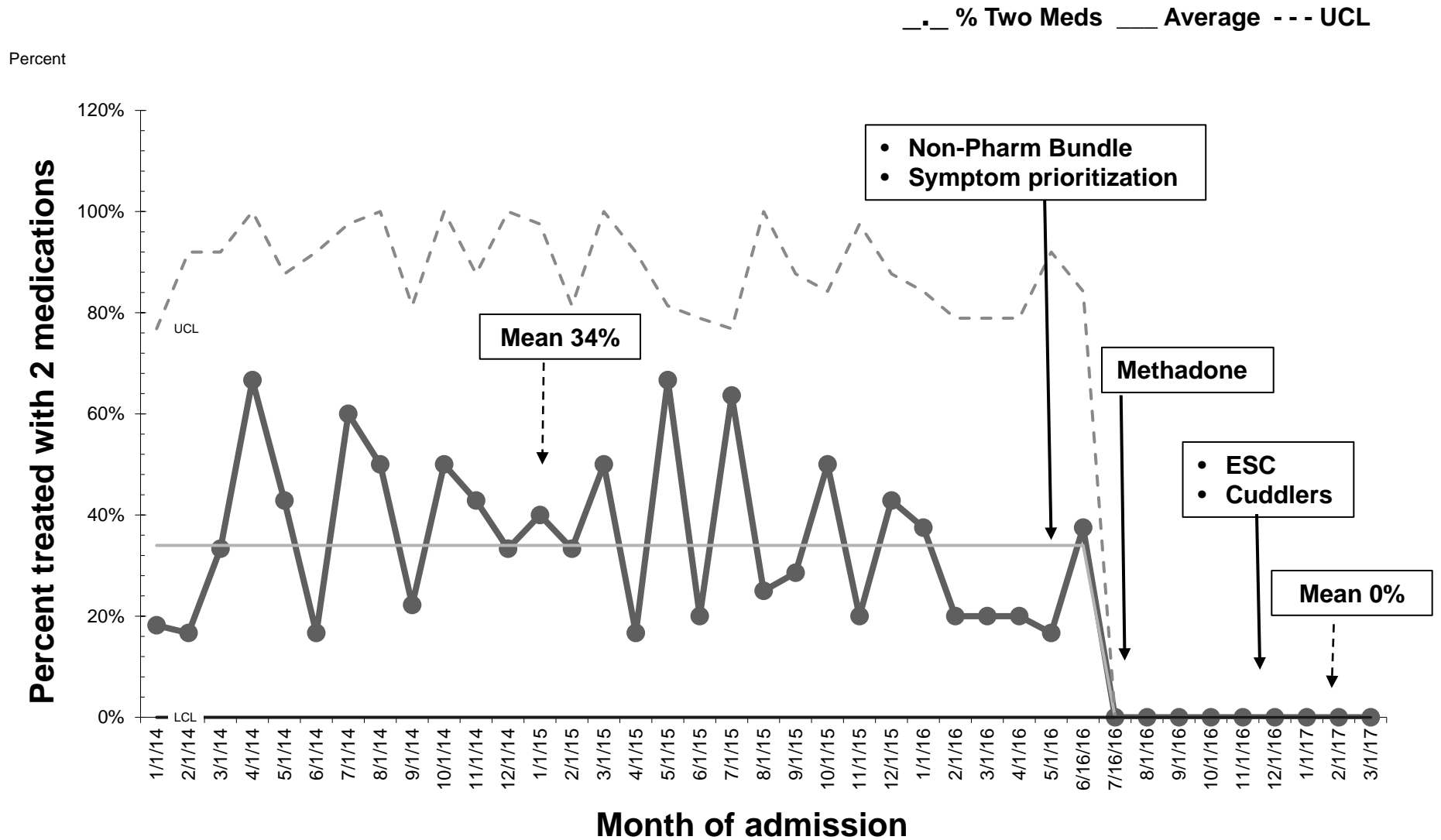
# The Huddle

- **“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

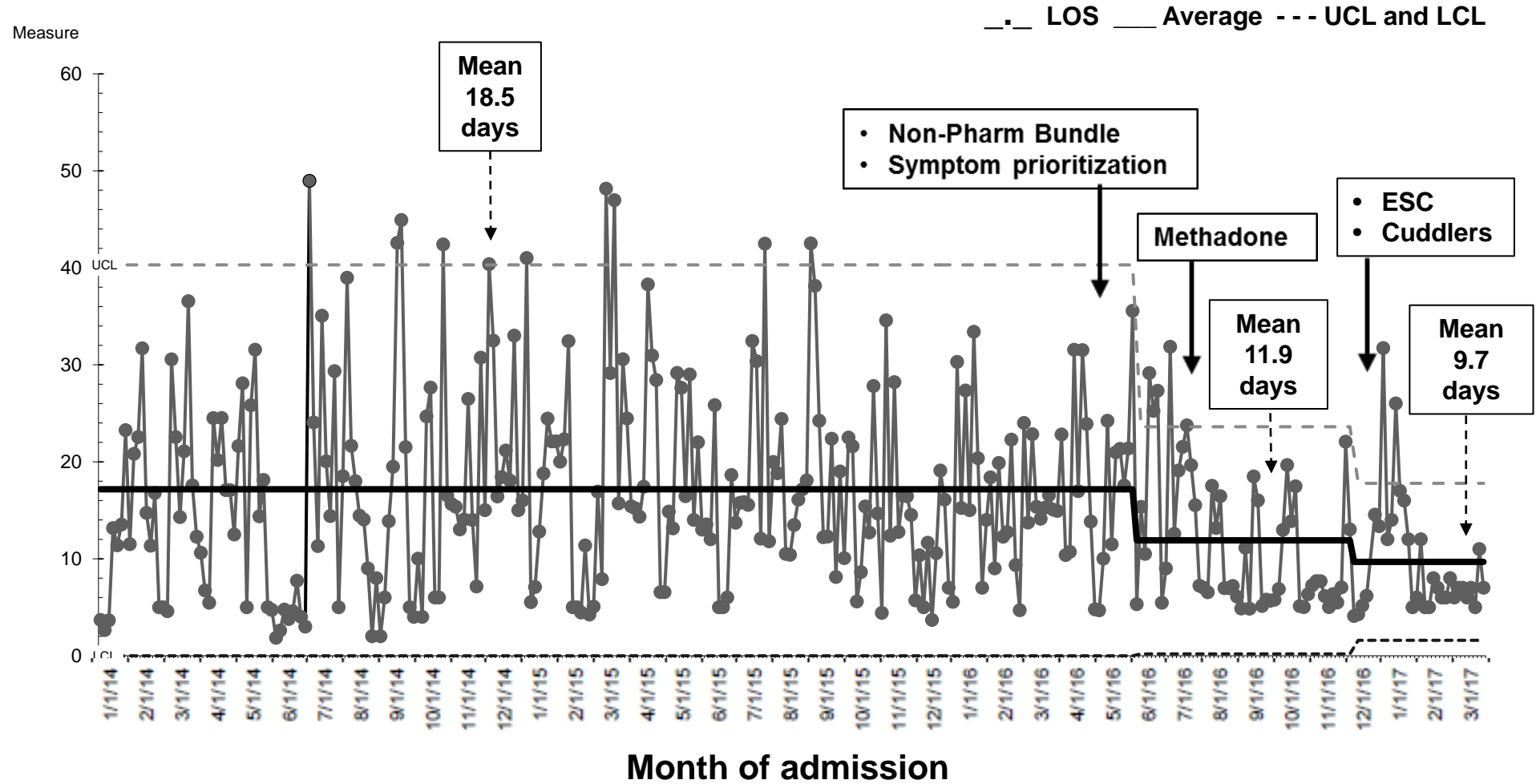


# Percentage of treated infants who received two medications

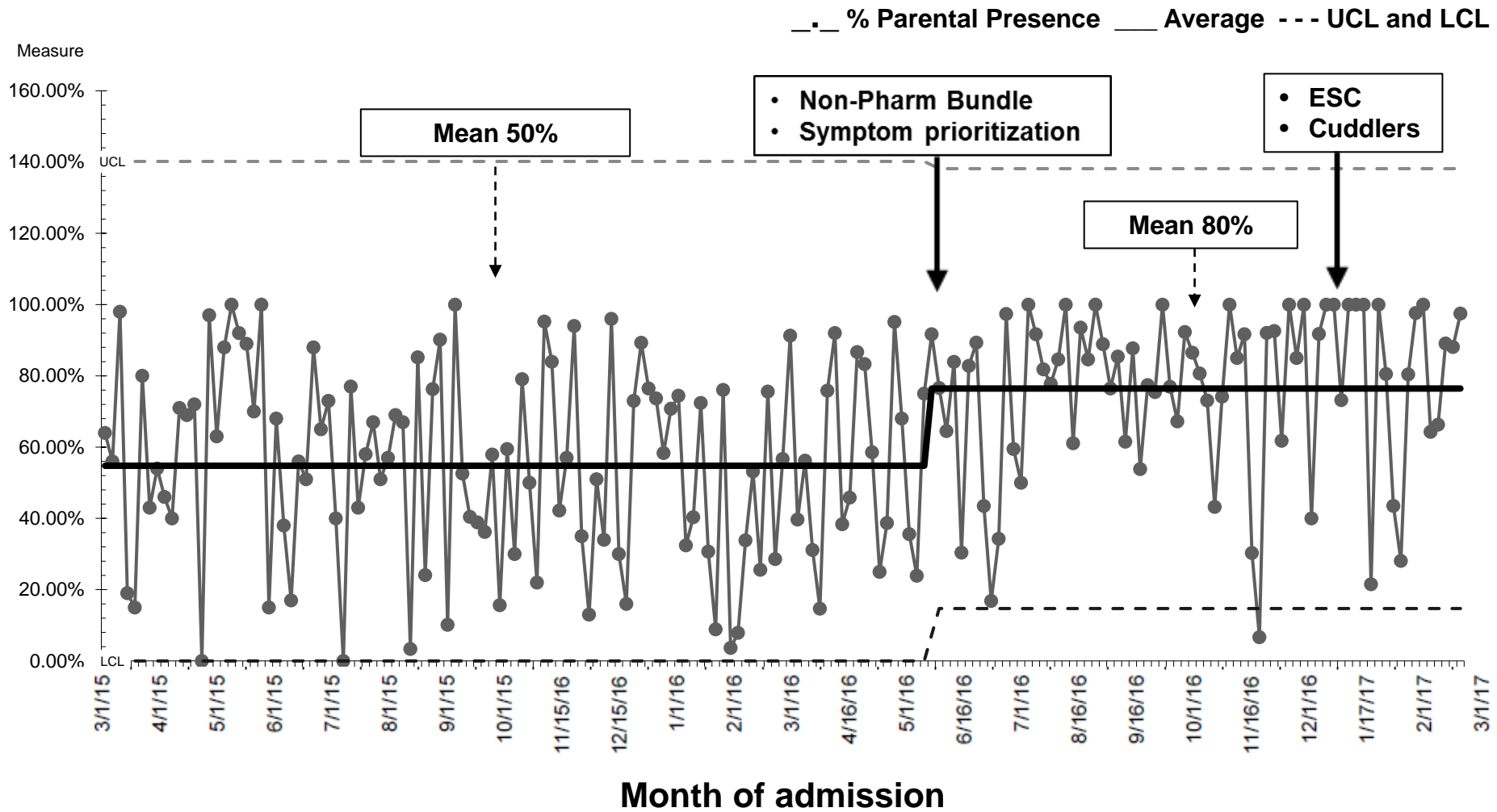




# Length of hospital stay all opioid-exposed infants



# 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)



The image shows three informational cards for Baby Steps appointments. The first card on the left is titled "Things to remember:" and lists items to bring and when to schedule another appointment. The middle card is titled "Baby Steps" and provides the address (5th Floor Yawkey Ambulatory Care Center, Boston Medical Center, 850 Harrison Avenue, Boston, MA 02118) and a map. The third card on the right is titled "BOSTON MEDICAL CENTER" and "Baby Steps" and provides contact information for questions or rescheduling.

**Things to remember:**

**What should I bring?**

- Name of Early Intervention coordinator, if you have one.
- Baby bottle and formula brand that you use, if bottle feeding.
- Any questions that you have.
- Other family members are welcome.

**When do I make another appointment?**

- If you need another appointment, we will schedule it before you leave.

**Will my baby keep seeing their regular pediatrician?**

- Yes, Baby Steps will **NOT** take the place of your baby's regular doctor.

**Baby Steps**  
5<sup>th</sup> Floor Yawkey Ambulatory Care Center  
Boston Medical Center  
850 Harrison Avenue  
Boston, MA 02118

Enter Yawkey through BMC's main entrance on Harrison Avenue

**BOSTON MEDICAL CENTER**

**Baby Steps**

Developmental & Behavioral Pediatrics  
5<sup>th</sup> Floor Yawkey Ambulatory Care Center  
Boston Medical Center  
850 Harrison Avenue  
Boston, MA 02118

If you have any questions or need to reschedule your appointment, call: (617) 414-4841, ext 2.

If you need taxi service to your Baby Steps appointment, call: (617) 414-4841, ext 2.

Revised: JUNE 2014

