Improving NAS Care: State Collaboratives Can Do It Better

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Neonatal Quality Improvement Collaborative of Massachusetts

Perinatal-Neonatal Quality Improvement Network of Massachusetts

GAPQC Annual Meeting, April 26, 2019

neoQIC PN QIN

Goals

1. Convince you that state-based perinatal quality collaboratives (PQCs) are pretty awesome, and that you should join.

2. Convince you that together, we can make real improvements in the care of infants with neonatal abstinence syndrome (NAS).

Outline

1. A very brief background on NAS
2. NAS improvement efforts in Massachusetts
3. What state collaboratives can do
4. Improving NAS care through a collaborative

Disclaimers

I am definitely biased.

There are many ways to “do” a PQC.

There is a lot I’m going to try to cover, and even more that I’m not.

I talk pretty fast.

1. A very brief background on NAS

Neonatal Abstinence Syndrome

- Postnatal withdrawal syndrome in newborns following intrauterine drug exposure
- Typically associated with **opioids**
- Develops in 42-94% of infants with in-utero exposure to opioids (old data)
- No clear relationship between dose of in-utero opioids and NAS severity
- “Neonatal abstinence syndrome” is not a great name

Neonatal abstinence syndrome (NAS)

or

Neonatal opioid withdrawal syndrome (NOWS)

Prenatal Substance Use in Pregnancy

	United States
Cigarettes	14.7%
Alcohol	11.5%
Illicit drugs including marijuana	8.5%
Marijuana	7.1%
Opioids (heroin or pain reliever misuse)	1.4%
Data from 2017 national survey (NSDUH, SAMHSA)	

Long-Term Outcomes

	Nicotine	Alcohol	Marijuana	Opiates	Cocaine
Short-term effects					
Fetal growth	✓	✓✓	✗	✓	✓
Anomalies	?	✓✓	✗	✗	✗
Withdrawal	✗	✗	✗	✓✓	✗
Neurobehavior	✓	✓	✓	✓	✓
Long-term effects					
Growth	?	✓✓	✗	✗	?
Behavior	✓	✓✓	✓	✓	✓
Cognition	✓	✓✓	✓	?	✓
Language	✓	✓	✗	-	✓
Achievement	✓	✓✓	✓	-	?

✓✓: strong effect
✓: effect
✗: no effect
?: no consensus
-: no data

Behnke M, **Smith VC** et al, Pediatrics 2013

NAS: Clinical Features

Neurologic	Autonomic	Gastrointestinal
Tremors	Sweating	Vomiting
Increased muscle tone	Nasal stuffiness	Diarrhea
High-pitched crying	Sneezing	Poor feeding
Irritability	Fever/temp instability	Uncoordinated sucking
Sleep/wake disturbances	Mottling	Dehydration
Hyperactive reflexes	Yawning	Failure to thrive

Other Features
SGA
Excoriations
Seizures

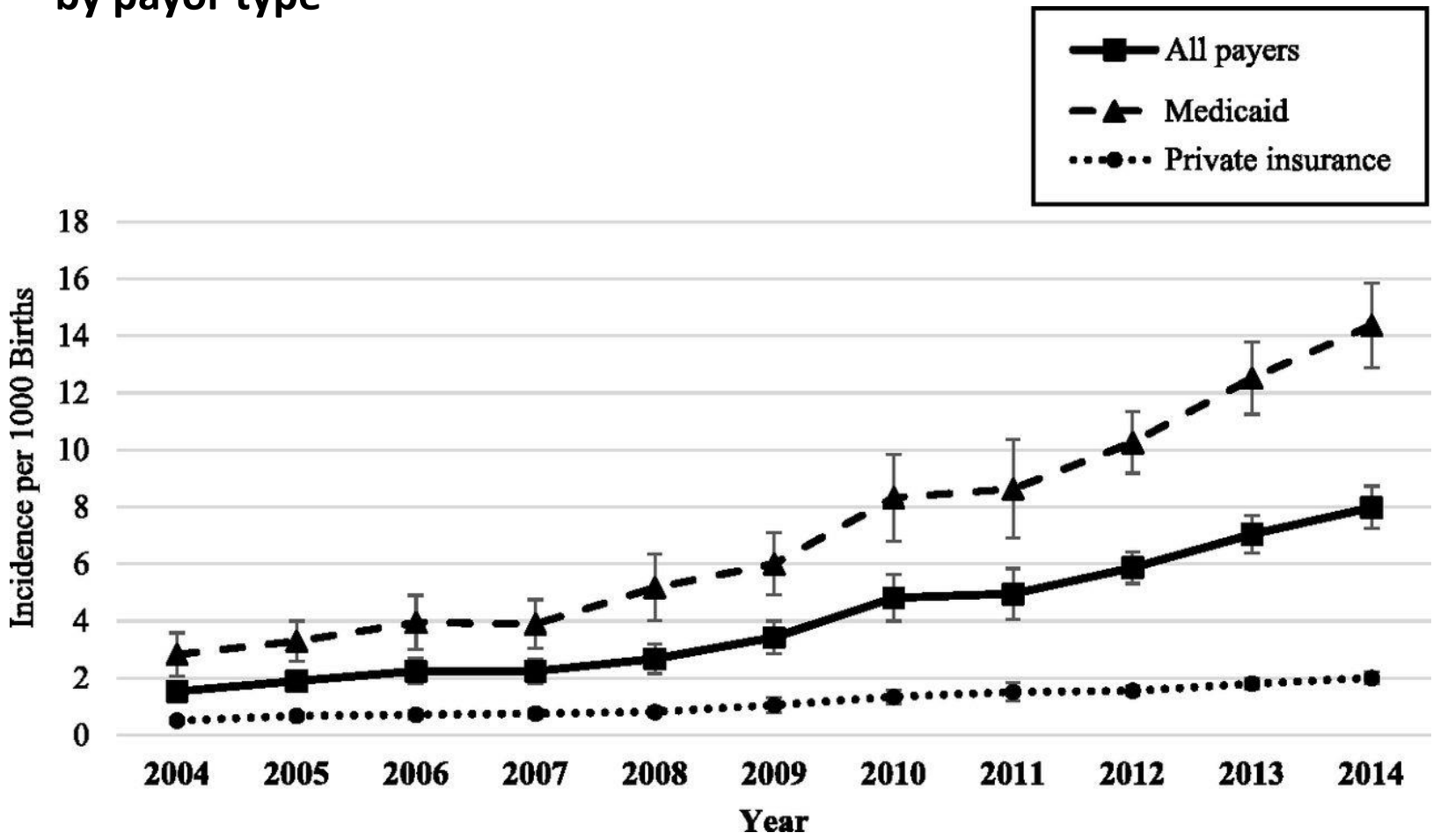
Timing of Symptoms	
Heroin	Within 24 hours
Methadone, buprenorphine	24 to 72 hours (up to 5-7 days)

Management (very basics)

Risk identification	NAS symptoms	Non-pharm care	Pharmacologic management	Family support
• Screening • Testing	• Standardized scoring scales	• Environment • Rooming-in • Breast-feeding • Nutrition • Individualized	• Morphine • Methadone • Phenobarbital • Clonidine	• Partnership • Social work • DCF • Follow-up

Epidemiology

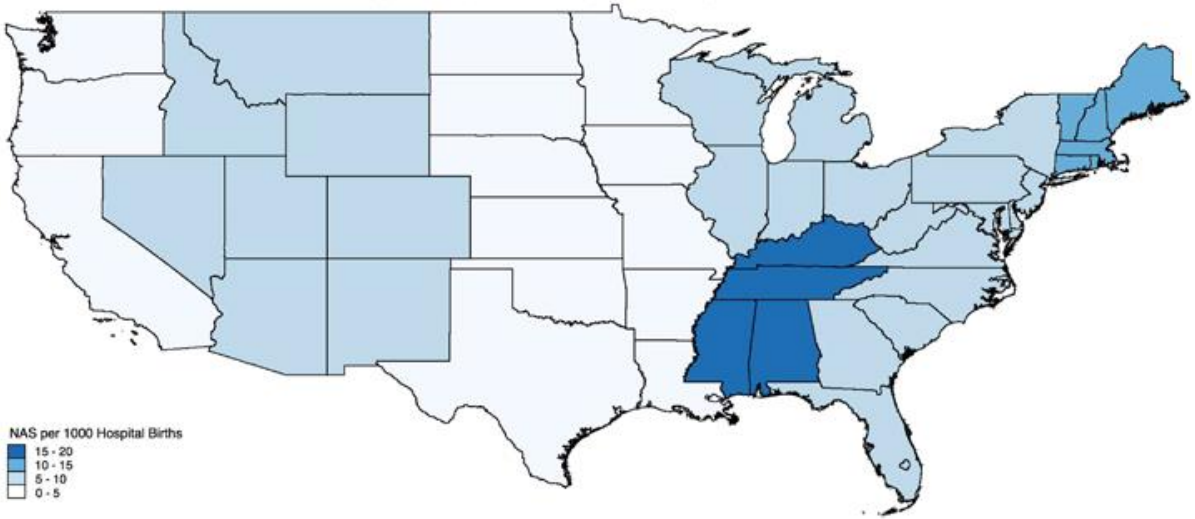
US Incidence of neonatal abstinence syndrome (NAS), 2004–2014, by payor type



Winkelman et al, Pediatrics, 2018

Epidemiology

Neonatal Abstinence Syndrome per 1000 Hospital Births by US Census Division, 2012



US Census Division	NAS Rate per 1000 Births (95% CI)
New England	13.7 (12.5-14.5)
Middle Atlantic	6.8 (5.9-7.6)
East North Central	6.9 (6.0-7.8)
West North Central	3.4 (3.0-3.8)
South Atlantic	6.9 (6.3-7.4)
East South Central	16.2 (12.4-18.9)
West South Central	2.6 (2.3-2.9)
Mountain	5.1 (4.6-5.5)
Pacific	3.0 (2.7-3.3)

Patrick et al, J Perinat, 2015

Fairly important and perhaps not-so-obvious take-home point #1:

We WANT to see the number of newborns with NAS increase, at least in the short term.

2. NAS improvement efforts in Massachusetts

Another disclaimer:

I am speaking on behalf of a BIG team.

2012-2015 → 2016-present

Improvement 1.0

- Focus on **neonatal abstinence syndrome**
- Primarily hospital-based teams
- Collaborations with DPH, BSAS, DCF, EI
- VON webinars, data audits, practice surveys, summits
- Standardizing practices, Finnegan scoring, pharm therapy, breast milk use, non-pharm care

NeoQIC!

Improvement 2.0

- Focus on **perinatal opioid use** (families)
- Primarily hospital-based teams
- Partnerships with HPC, AG, DPH, BSAS, DCF, EI, Moms Do Care, etc.
- QI training, REDCap database, data reports, practice surveys, toolkits, website, site visits, statewide summits
- Broader improveme

PNQIN!

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Version 2.0: Goals

1. Identify opioid-use-disorder in pregnancy and insure women are in treatment, including MAT
2. Strive for family-centered care after birth, including rooming-in and use of non-pharmacologic care
3. Improve support and follow-up after discharge, including enrollment in early intervention

We believe these goals will improve the long-term outcomes of opioid-exposed newborns and their families.

Statewide Efforts

Increased treatment options for women with OUD (BSAS)

Mandatory insurance coverage for OUD treatment

Family planning / LARC

The Journey Project

McPAP for Moms expansions

Inter-Agency NAS Task Force

Peer mentor moms (Moms Do Care)

HPC innovation grants for NAS

Integrated Care Models

Trauma-informed care training

Improved DCF screening and monitoring protocols

Increased EI outreach and engagement

Plans of Safe Care

Population Dashboard

State Opioid Response Grants

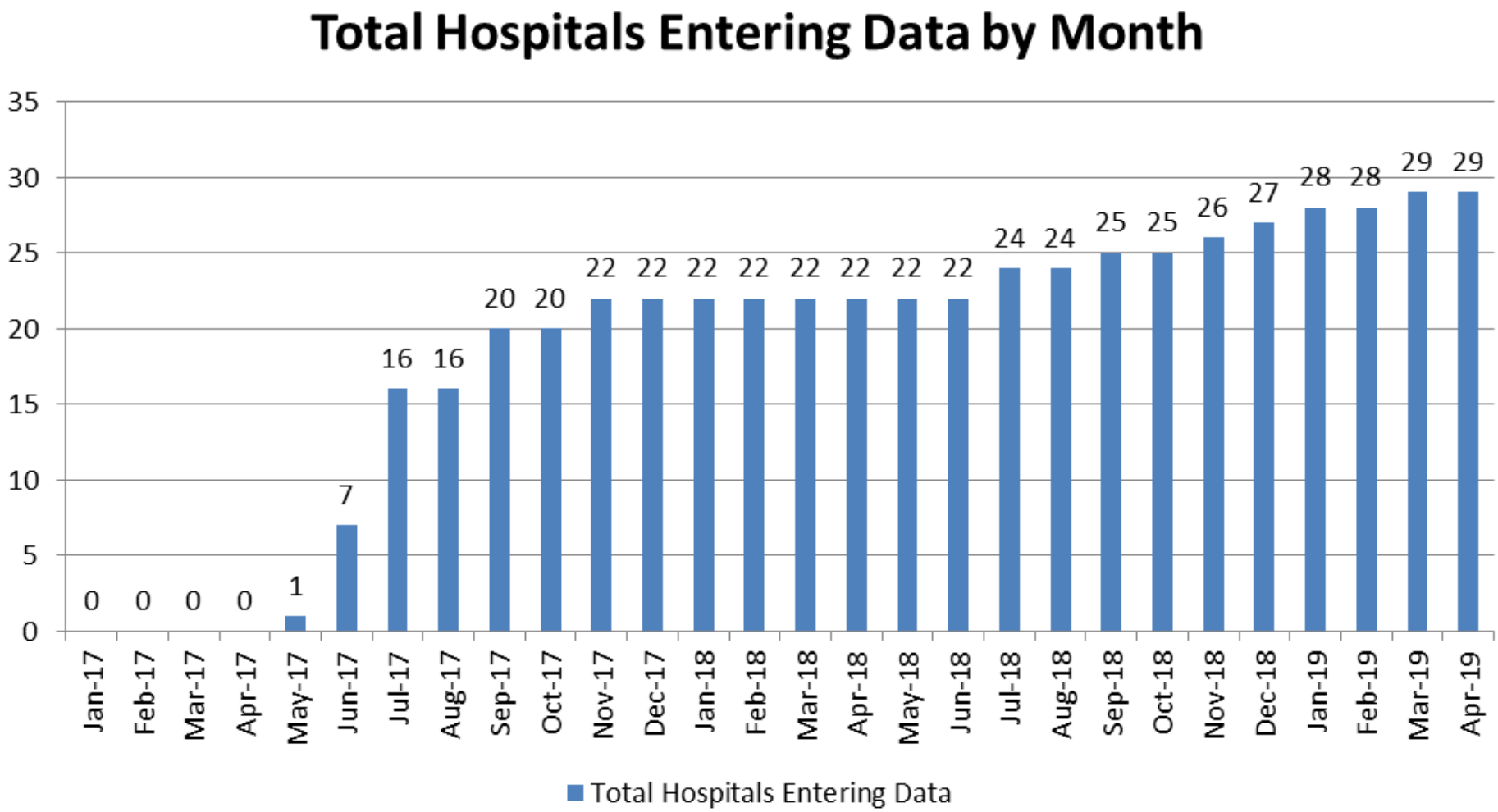
Project Components

- Partnerships! DPH, HPC, BSAS, DCF, EI, AG office, others
- Twice-yearly summits
- Website, online toolkits
- Data form, REDCap database, data reports
- QI training webinar series by NICHQ, QI training workshop
- Practice survey (structural measures)
- Hospital site visits
- OUD in pregnancy initiative
- Eat-Sleep-Console training program
- Early Intervention QI initiative
- Staff attitude survey (new), family engagement tool (pending)

Hospital Engagement

- **47** perinatal hospitals in the state (about)
- **37** hospitals in at least one component
- **29** hospitals entering data in REDCap database
- **32** hospitals represented at last summit
- **35** hospitals participating in ESC roll-out
- **17** hospitals committed to maternal OUD effort
- **5** hospitals pursuing EI QI project

Hospital Engagement

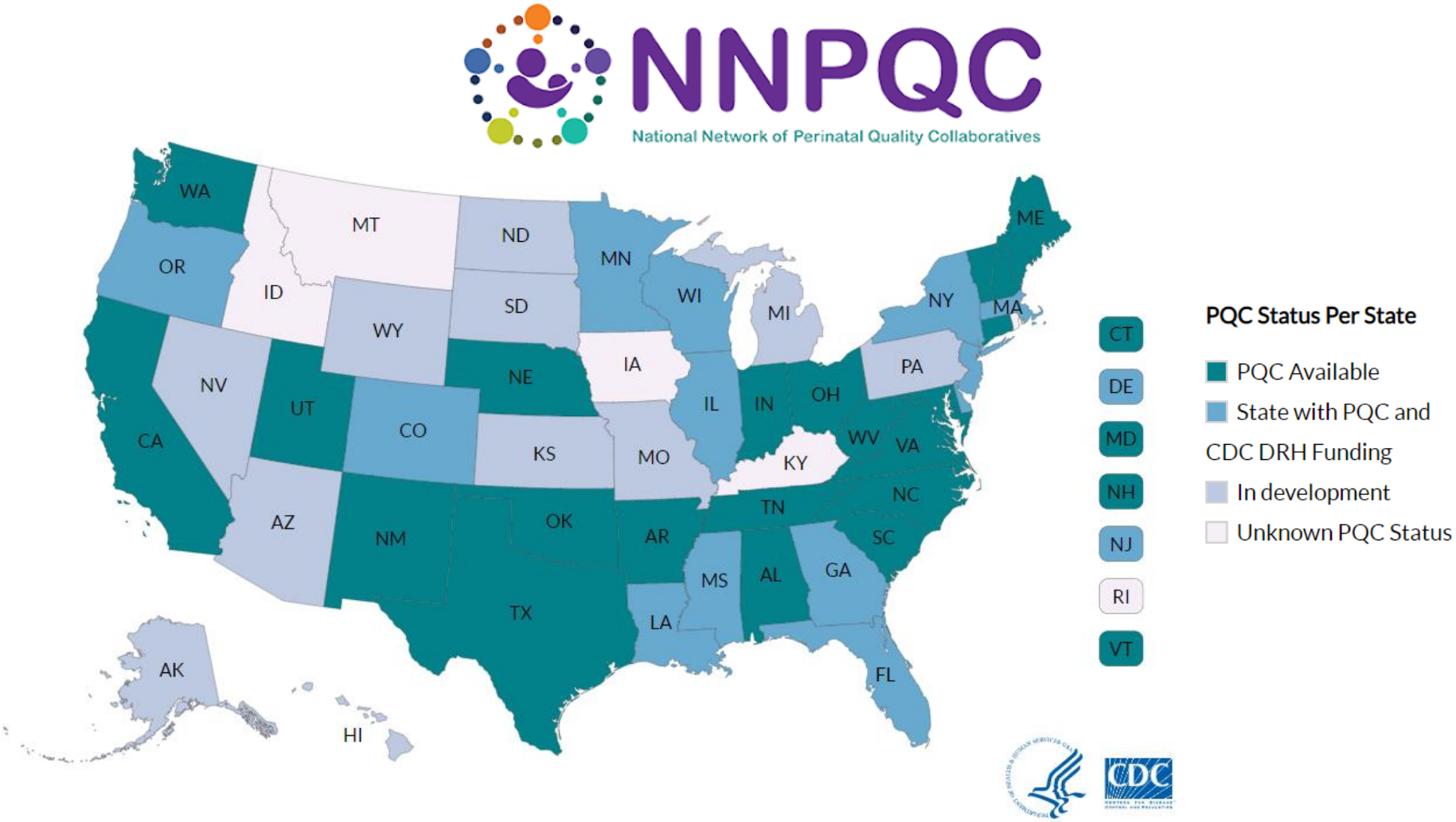


Improvement Efforts (a sample)

- Increasing screening for OUD in pregnancy
- SBIRT and MAT when maternal OUD is identified
- Improving reliability of 'scoring' for NAS
- Standardized pharm therapy protocols
- Standardized guidelines for breast milk use
- Enabling rooming-in of infants with parents
- Improving non-pharm care, including use of cuddlers
- Insuring referral to EI prior to hospital discharge
- Warm hand-offs to follow-up providers

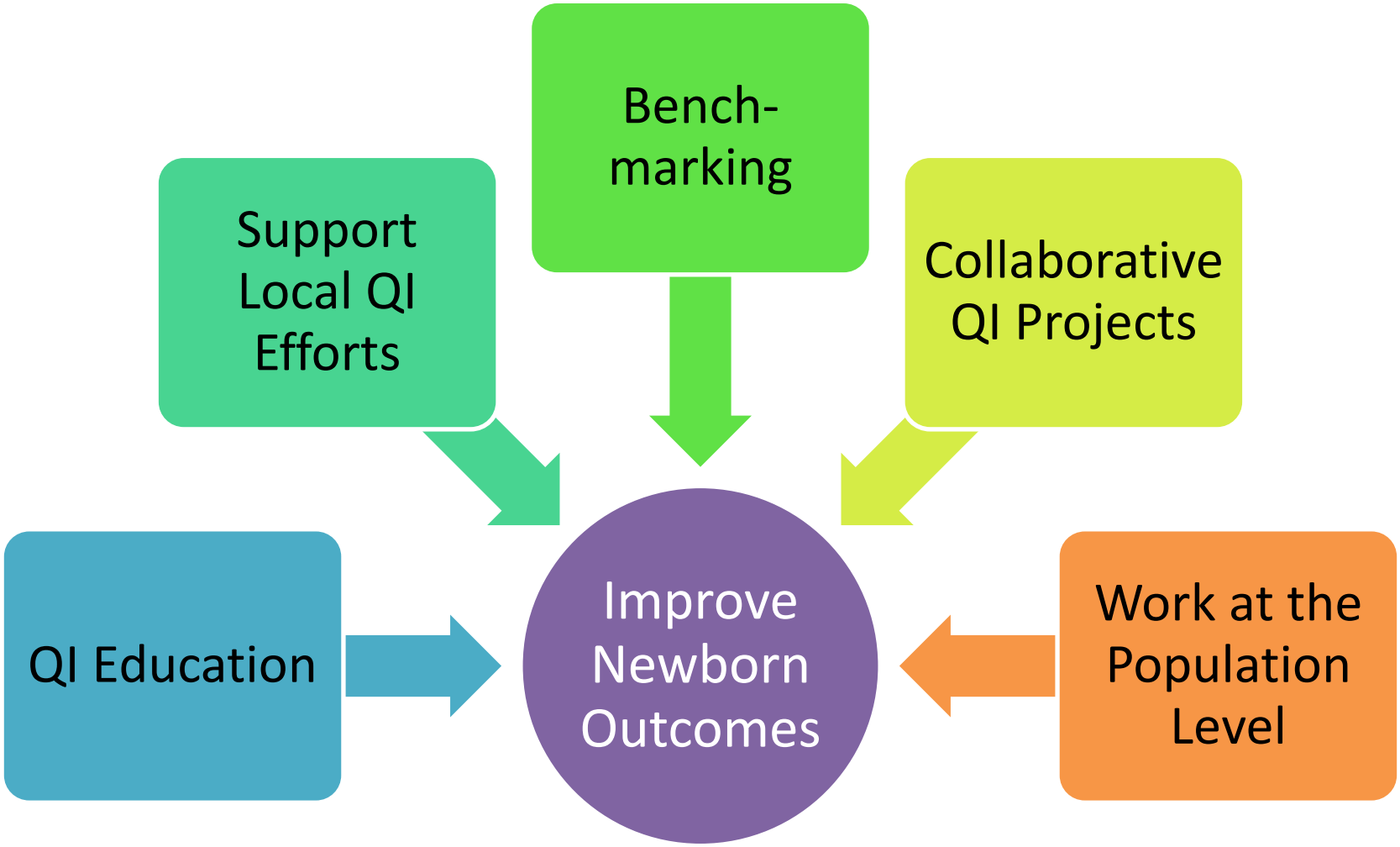
3. What state collaboratives can do

State-based PQCs are now a thing.

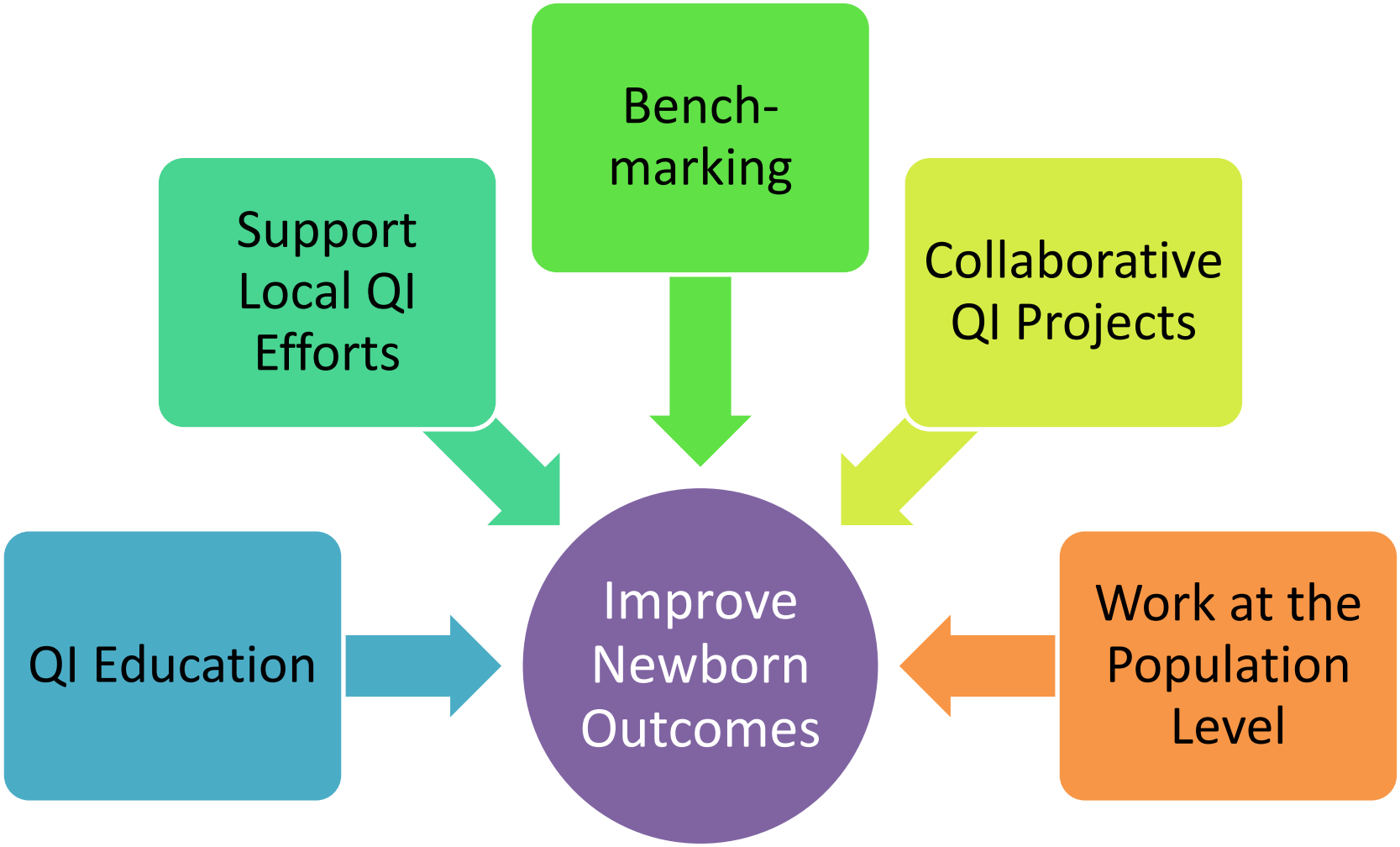


https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pqc-states.html
https://www.nichq.org/project/national-network-perinatal-quality-collaboratives

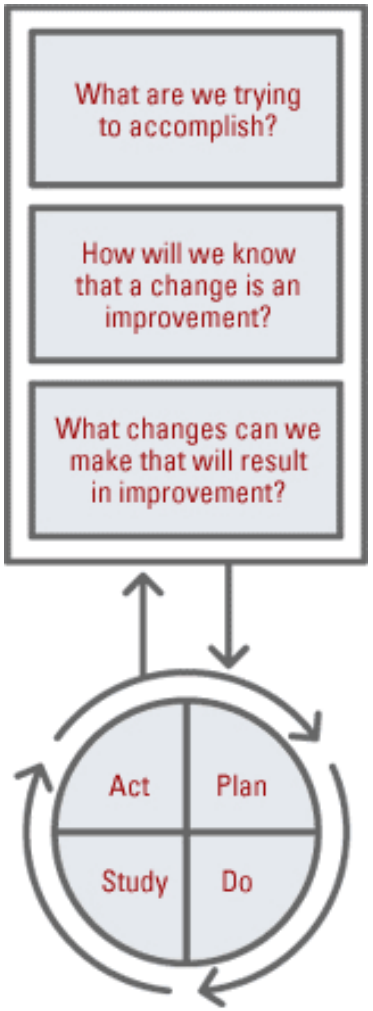
What do state-based PQCs do?

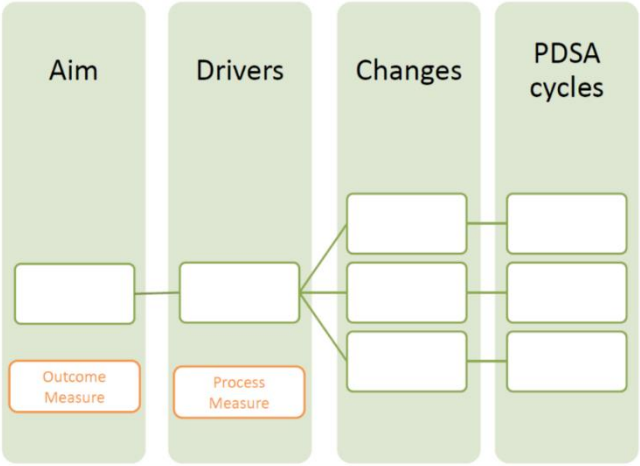


What do state-based PQCs do?

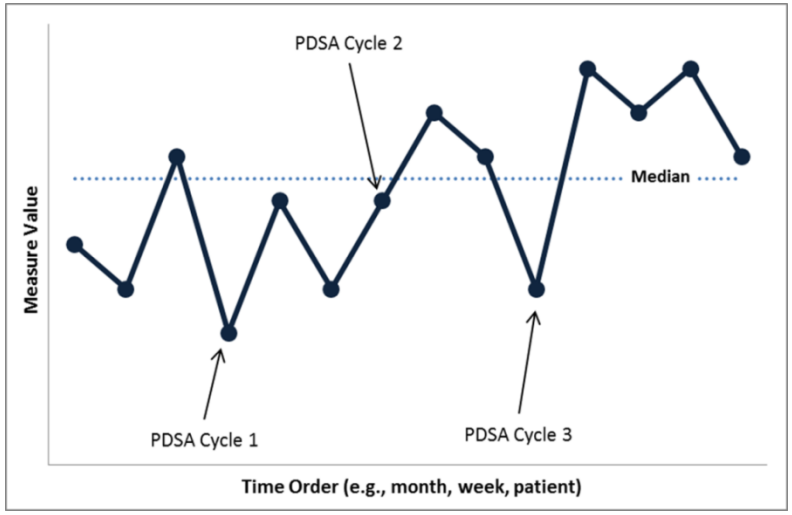


QI Education





Key Driver Template courtesy of Heather Kaplan, MD Cincinnati Children's Hospital



Common 'Mistakes' in Improvement

- Not measuring what you're improving
- Jumping to changes without defining your aim
- Implementing without testing
- Before and after analysis rather than measurement over time
- Not being able to sustain the gains

QI Education

NICHQ QI Training Webinar Series

This webinar series provided structured quality improvement education to participating teams, and will lead teams through the initial steps of formulating and conducting a quality improvement project. Please see below for to access the webinar recordings, slides, and associated documents.

Slides/Documents

Some of the following documents are password protected. Please email Mary Houghton (mhoughto@bidmc.harvard.edu) if you need access.

- SEN QI Tool: Aim Statement
- SEN QI Tool: Measurement Strategy
- SEN QI Tool: PDSA Cycle
- SEN QI Tool: Prioritization Grid

- SEN QI NICHQ Webinar Series Summary
- SEN QI Webinar 1: Inside the Model for Improvement Part 1
- SEN QI Webinar 1: Introduction
- SEN QI Webinar 2: Inside the Model for Improvement Part 2
- SEN QI Webinar 2: Introduction
- SEN QI Webinar 3: Learning from PDSA Cycles Part 1
- SEN QI Webinar 3: Introduction
- SEN QI Webinar 4: Learning from PDSA Cycles Part 2
- SEN QI Webinar 4: Introduction
- SEN QI Webinar 5: Coaching Call
- SEN QI Webinar 5: Measurement in QI
- SEN QI Webinar 6: Final Webinar

QI Education

PNQIN QI Training Workshop: May 8, 2019

This interactive workshop will focus on fundamental quality improvement methods. Through brief didactic presentations and multiple hands-on exercises, participants will dive into the steps of the model for improvement, and apply them to improvement goals from their own unit. A great group of instructors will help coach teams through the exercises. No particular quality improvement background is necessary. We encourage hospitals to send multi-disciplinary teams to participate in this workshop together.

QI Education

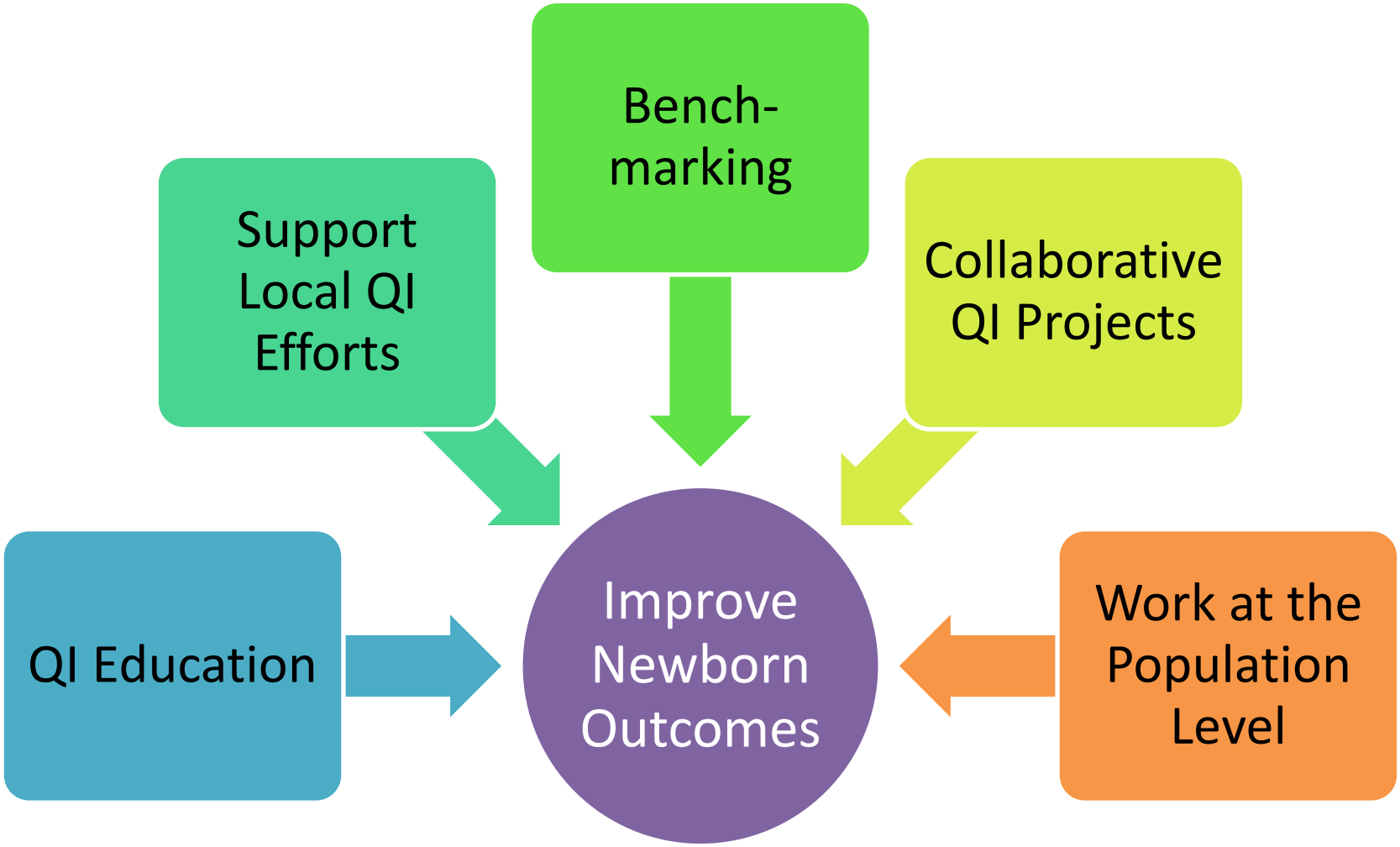
JIT TRAINING

Just-in-Time (JIT) training is a term used to describe knowledge made available just when it's needed. It is an autonomous educational system that shortens the time between learning and application. By automating the JIT Modules, groups of learners in multiple areas can gather information during team meetings, while completing assignments, or when just wanting to learn about quality improvement. No teacher is required. TIPQC has created this online resource to tap QI knowledge when and where it serves our members. Click on a topic in the Table of Contents and learn!

TIPQC
Tennessee Initiative for Perinatal Quality Care

Table of Contents

What do state-based PQCs do?



Support Local QI

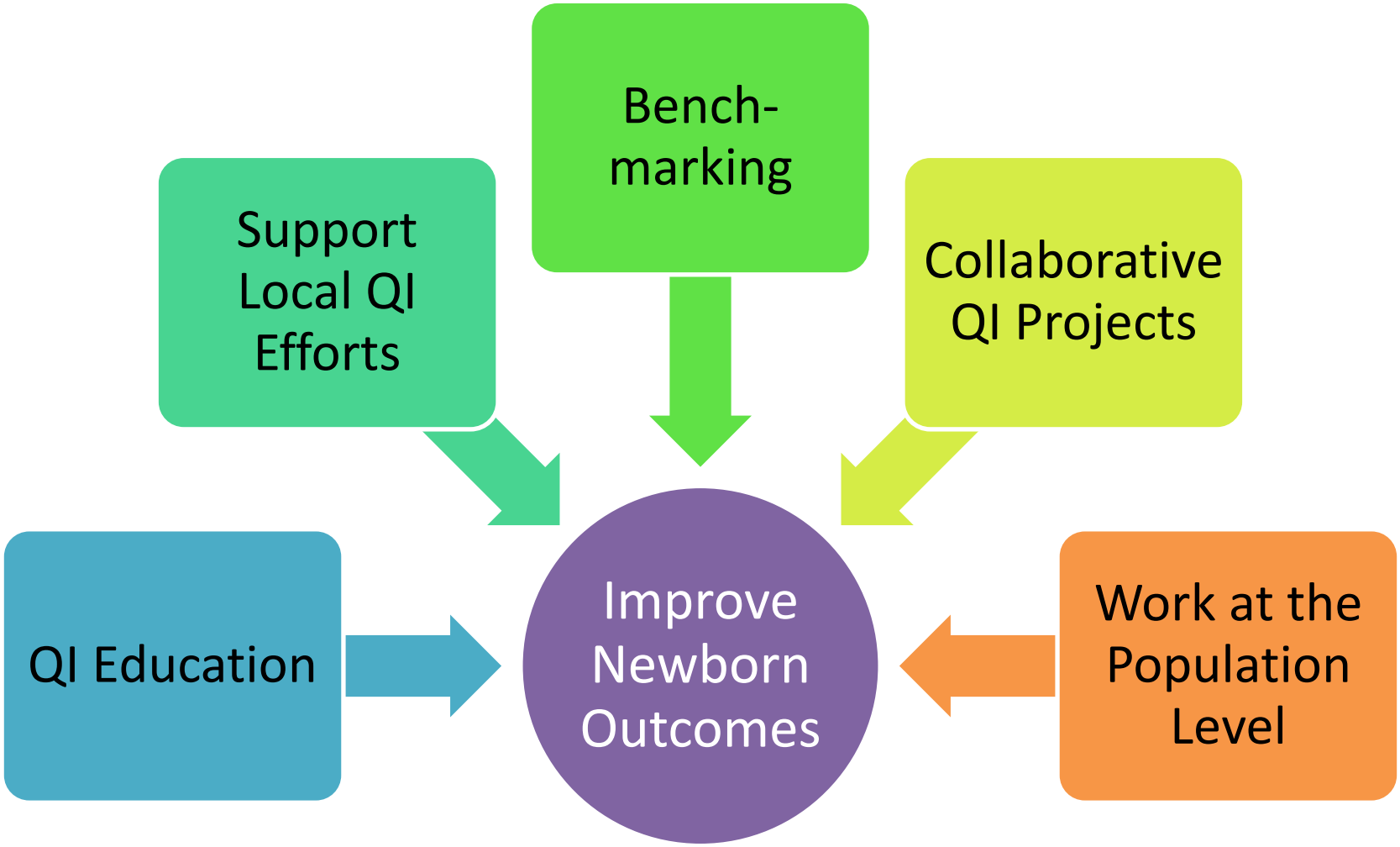
- Early NeoQIC meetings: just sharing local work!
  - Reducing ROP at UMass
  - Comprehensive CLABSI reduction at BMC
  - Redesign of CPAP delivery at St. Elizabeth's
  - IVH reduction at Tufts
  - Optimizing growth at MGH
  - Admission temperature at Baystate
  - And many others….

Poster Fair at Summits

neoQIC PN QIN

Hospital Site Visits

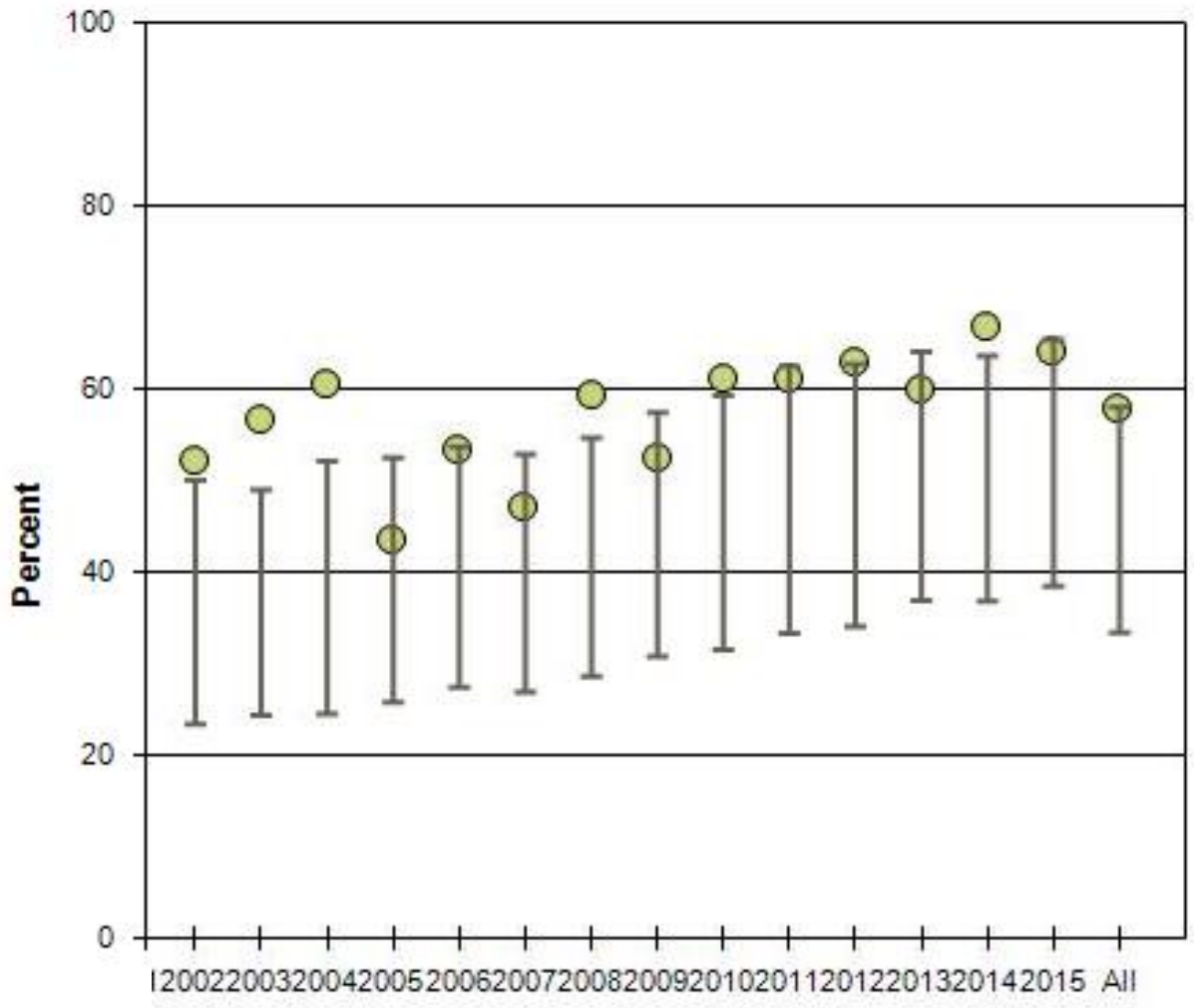
What do state-based PQCs do?



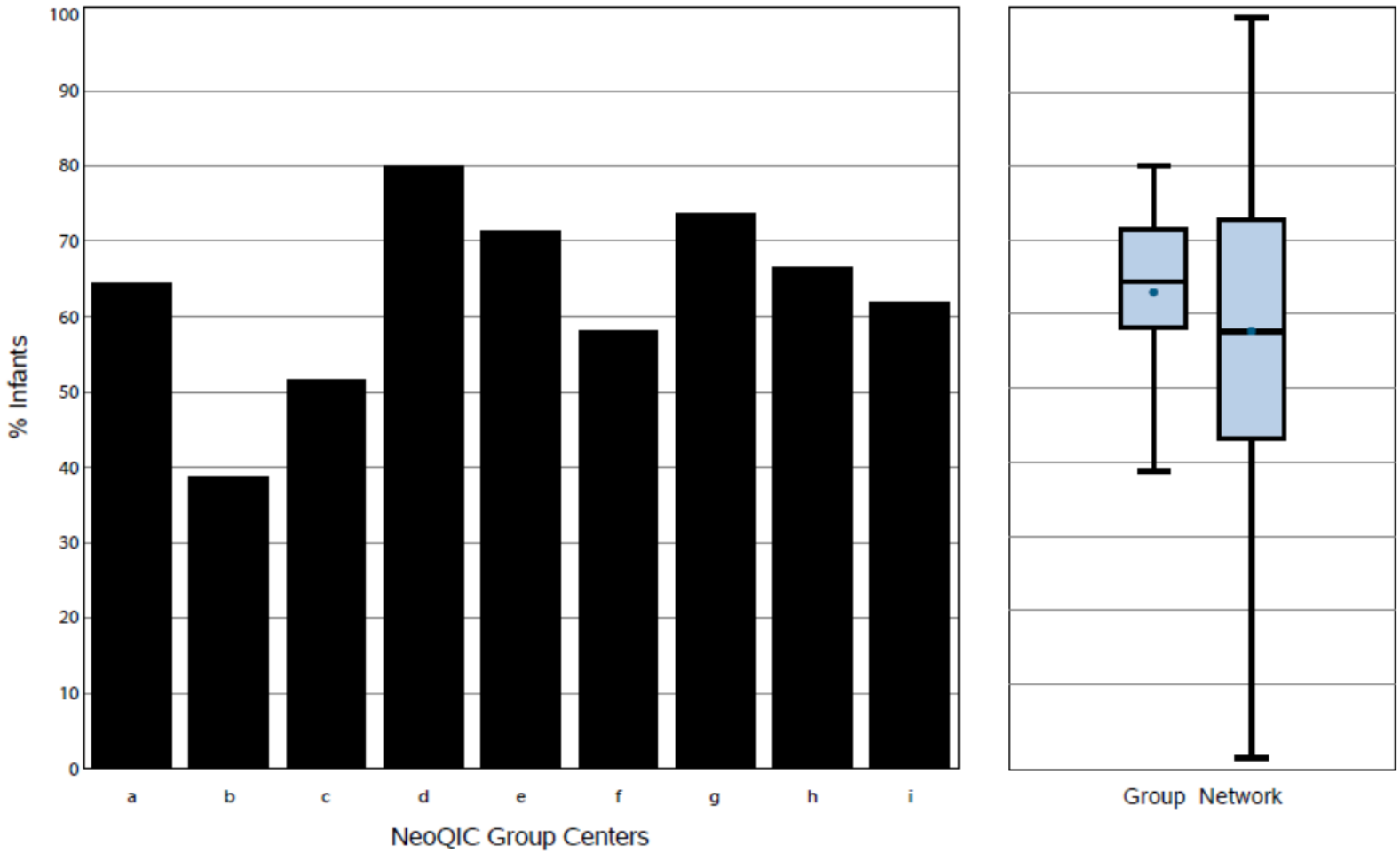
Benchmarking

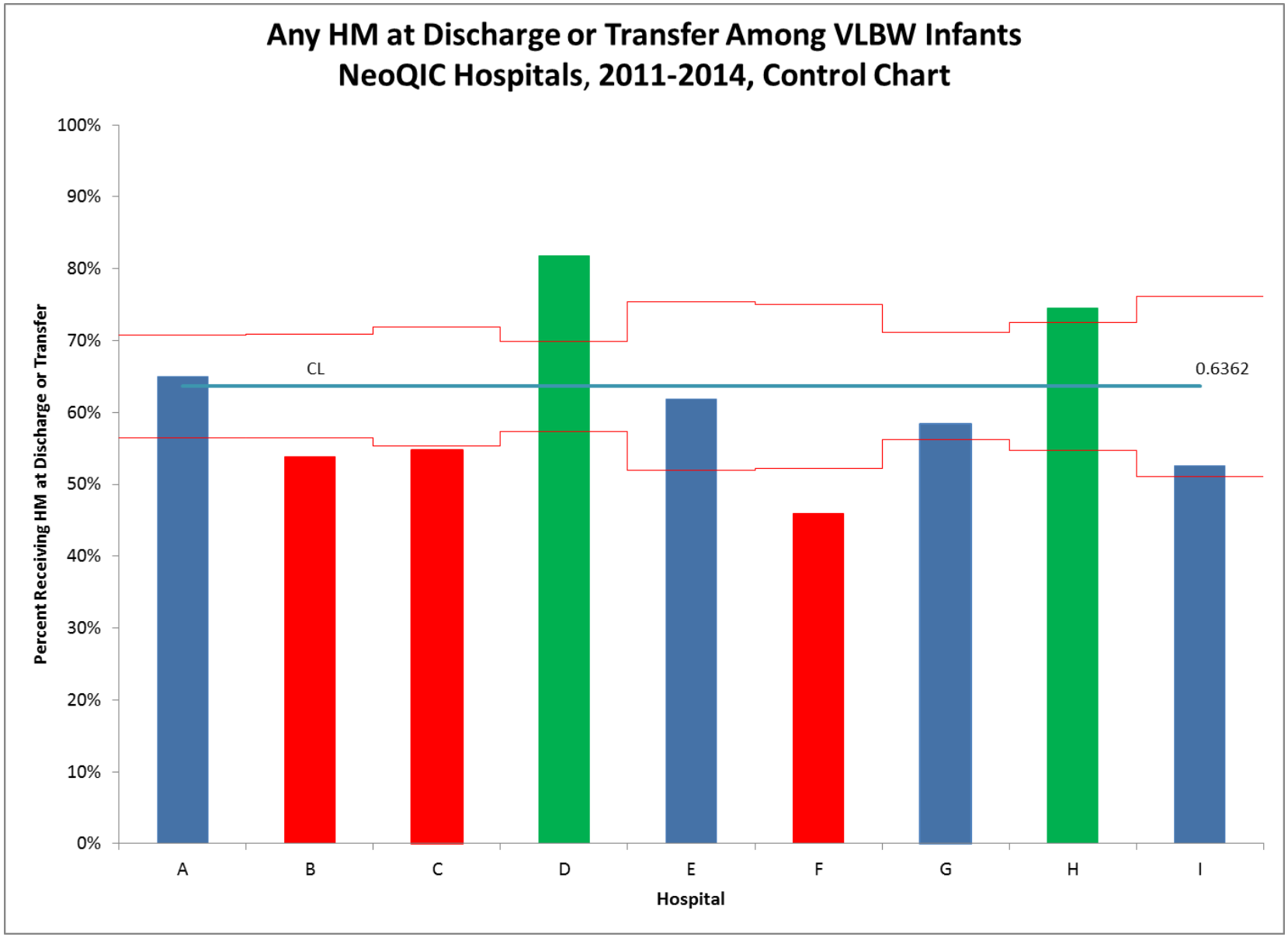
- Comparing performance to others
- Typically done with data and measures
- Can also be done with practice surveys (structural measures)
- Vermont-Oxford Network may be largest benchmarking platform in medicine

Any HM at Discharge or Transfer, VLBW Infants Center Compared to VON Network



Infants 501 to 1500 Grams Born in 2013: Any Breast Milk at Discharge Home




Any HM at Discharge or Transfer Among VLBW Infants
NeoQIC Hospitals, 2011-2014, Control Chart
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent Receiving HM at Discharge or Transfer
CL
0.6362
A
B
C
D
E
F
G
H
I
Hospital

Side Note on Transparency

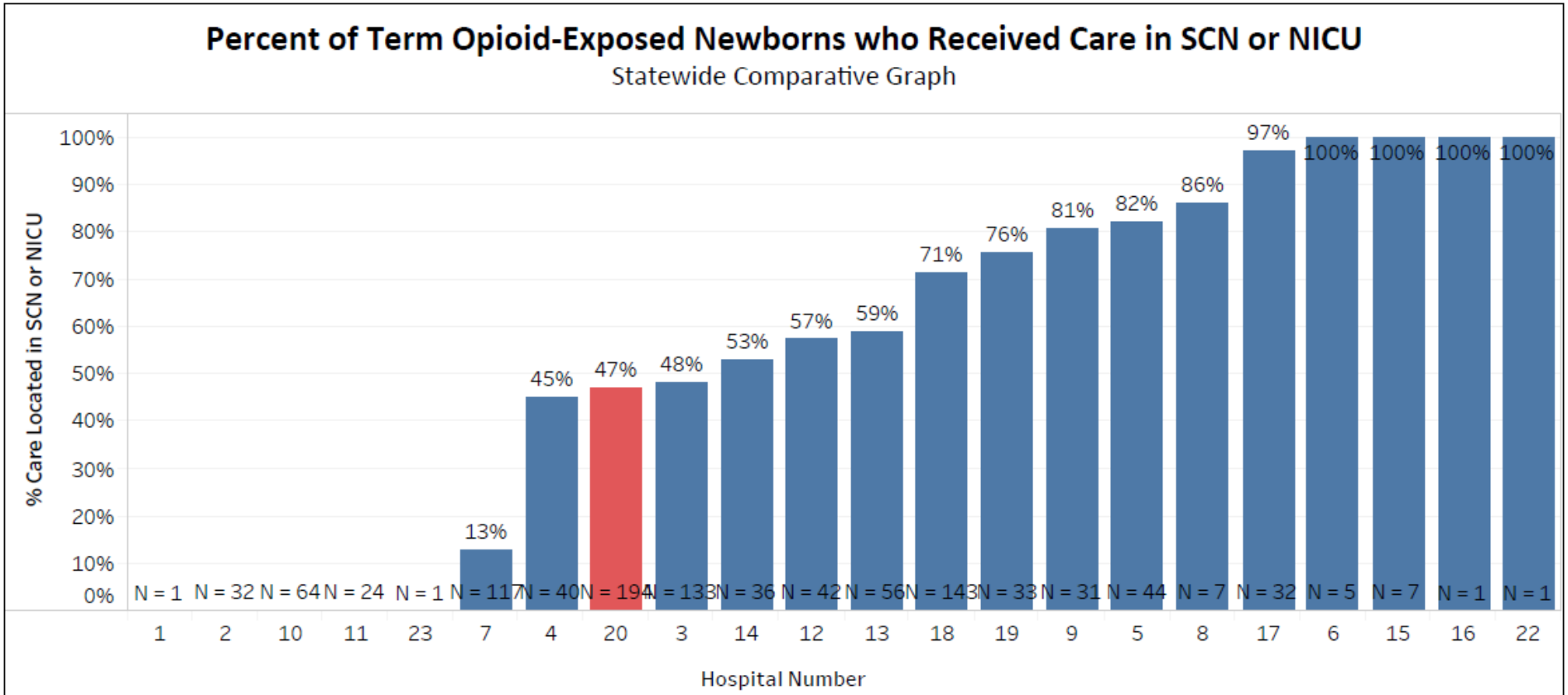
Transparency

- Share hospital IDs – know who's who
- Share sample sizes – statistical comparisons
- Share practices – who's doing what?

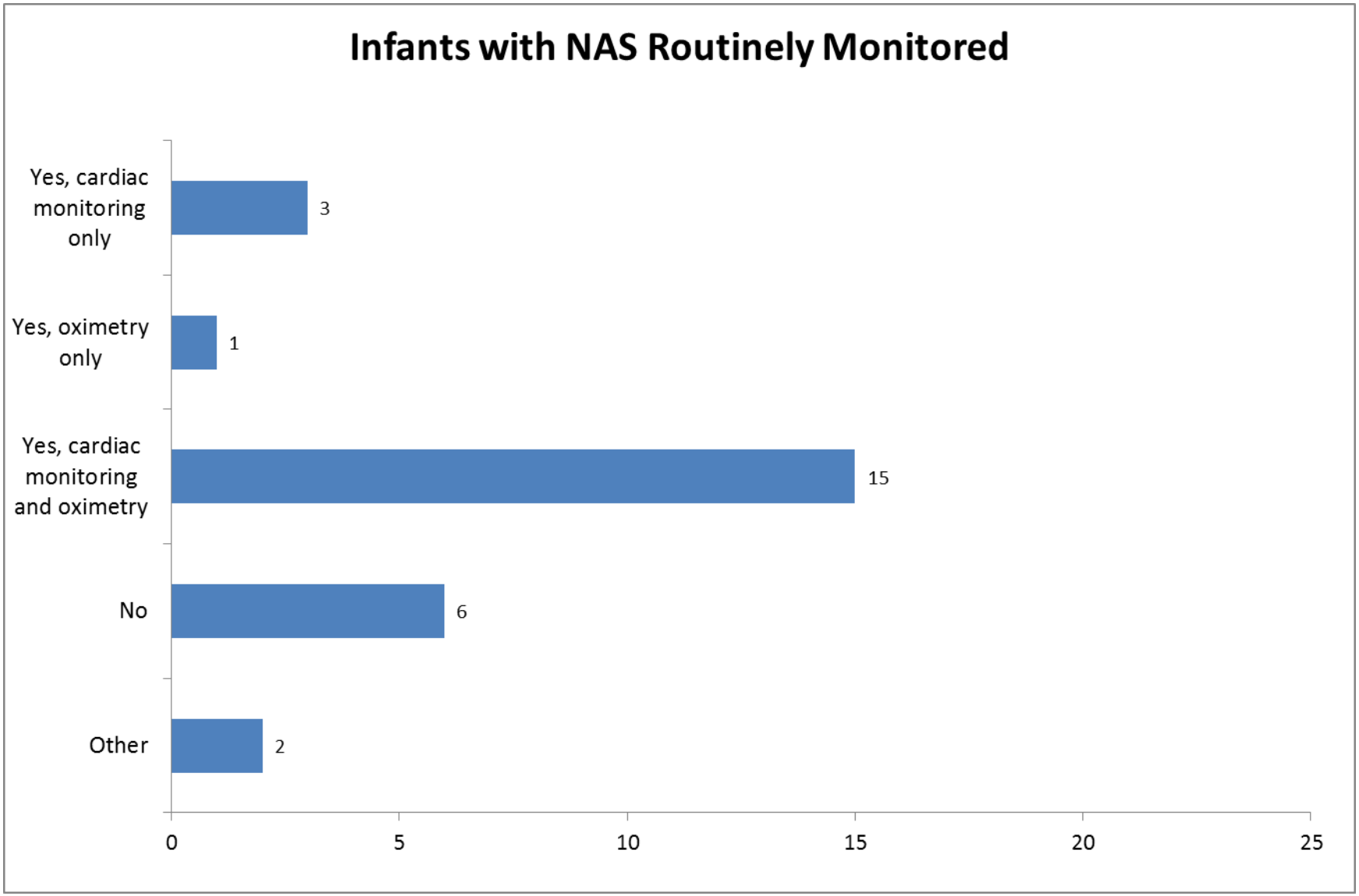
Transparency has been a core principle for NeoQIC.

"Whoa, let's not go crazy. How about we just make our accounting translucent?"

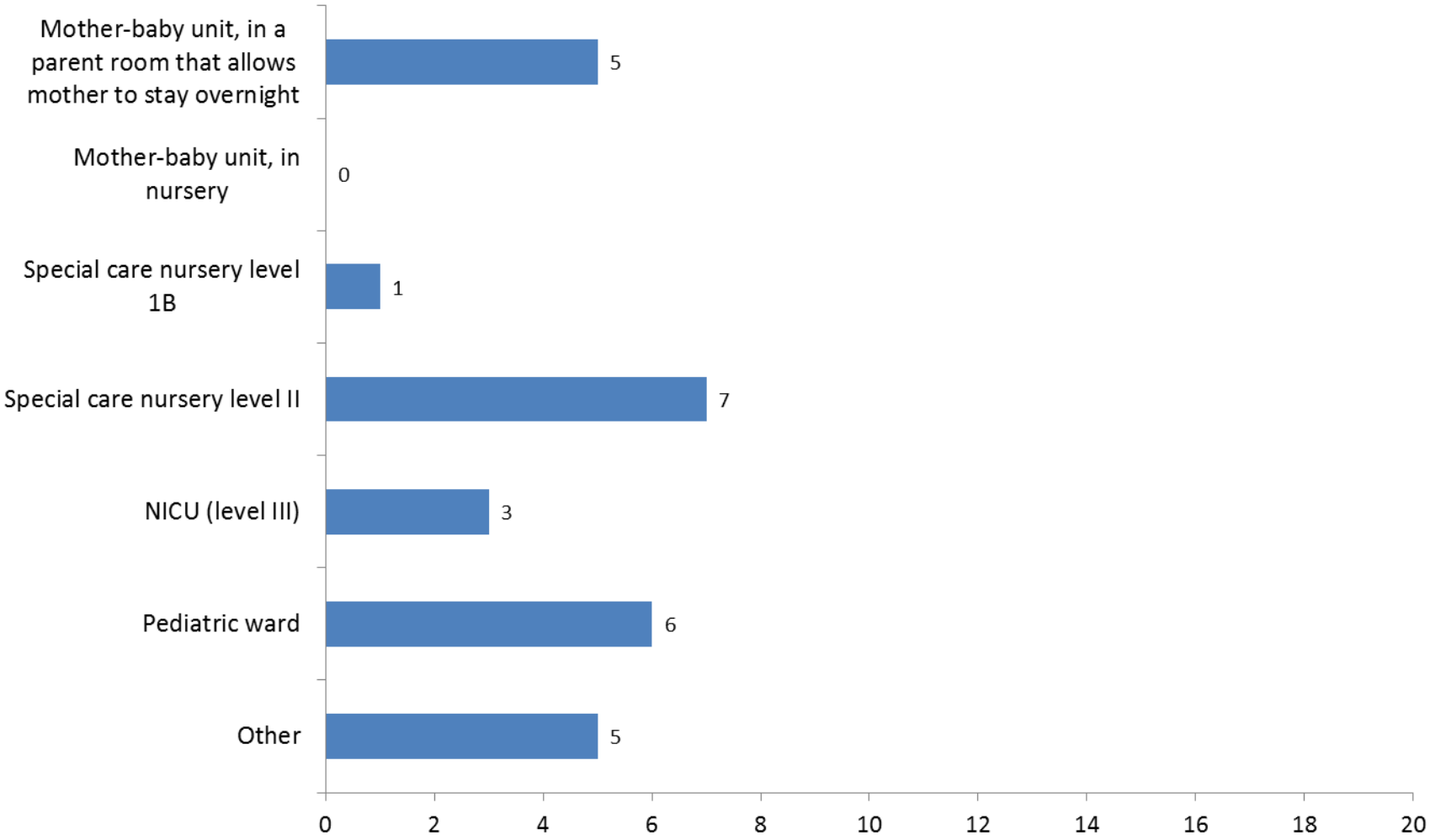
Benchmarking



Graph shows overall performance for this measure from Jan 2017 to Sept 2018, for all hospitals participating in statewide collaborative.
Your hospital is indicated in red.


Infants with NAS Routinely Monitored
Yes, cardiac monitoring only
3
Yes, oximetry only
1
Yes, cardiac monitoring and oximetry
15
No
6
Other
2
0
5
10
15
20
25

Location of Care: Pharmacologic Therapy, Begun Weaning



Benchmarking – My Opinion

- Comparing yourself to national benchmarks is a great start, and important.
- Comparing yourself to your state peers is **much** more compelling.
- Transparency dials benchmarking up to **11.**

What do state-based PQCs do?

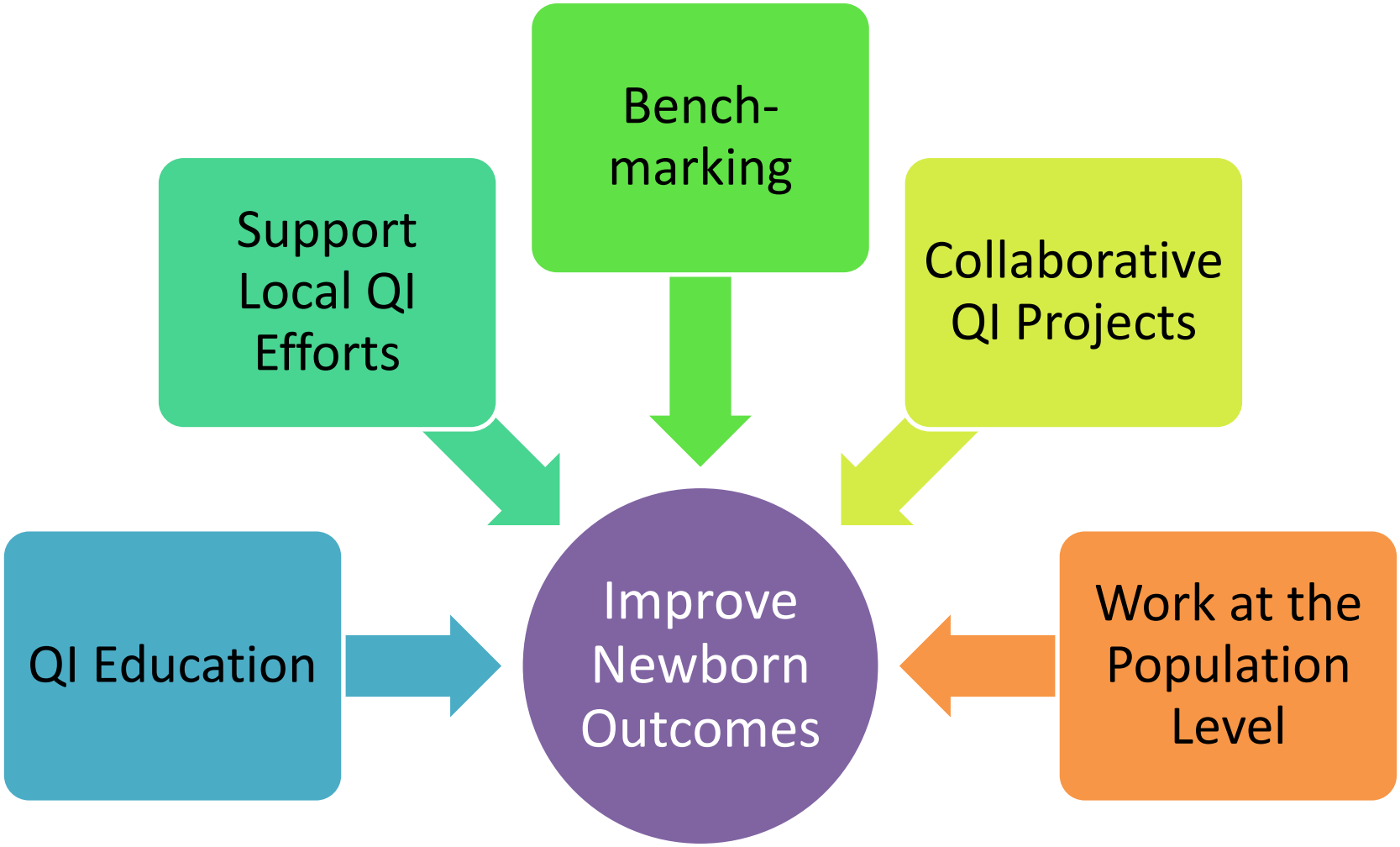


Table 1
Examples of quality improvement initiatives by state collaboratives

	CA	CO	FL	GA	IL	MA	MI	MS	NE	NH/ ME/VT	NY	NC	OH	OK	TN	TX	UT	WV	WI
Antenatal steroids	✓	—	✓	—	—	—	—	—	—	—	✓	—	✓	—	✓	—	—	—	—
Antimicrobial stewardship	✓	✓	—	—	—	—	—	—	—	—	—	✓	—	✓	✓	—	—	—	—
Vital statistics and birth certificate accuracy	—	—	✓	—	✓	—	—	—	—	✓	—	—	✓	—	—	—	—	—	—
Nosocomial and central-line associated bloodstream infections	✓	—	—	—	—	—	✓	—	—	—	✓	✓	✓	—	✓	—	—	—	—
Congenital heart disease screening	—	—	✓	✓	—	—	—	—	—	—	✓	✓	—	✓	✓	—	—	—	—
Delivery room management	✓	—	—	—	—	—	—	✓	—	—	—	—	—	—	✓	—	—	—	—
Reducing early- elective deliveries/ primary C-sections	✓	—	✓	—	✓	✓	—	—	✓	—	✓	✓	✓	—	✓	✓	—	✓	—
Hospital duration of stay	✓	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Human milk/ breastfeeding promotion/ nutrition	✓	—	✓	—	—	✓	—	✓	✓	—	✓	✓	✓	✓	✓	✓	—	✓	✓
Neonatal abstinence syndrome	—	—	✓	—	—	✓	✓	—	—	✓	—	✓	✓	—	—	—	✓	—	—

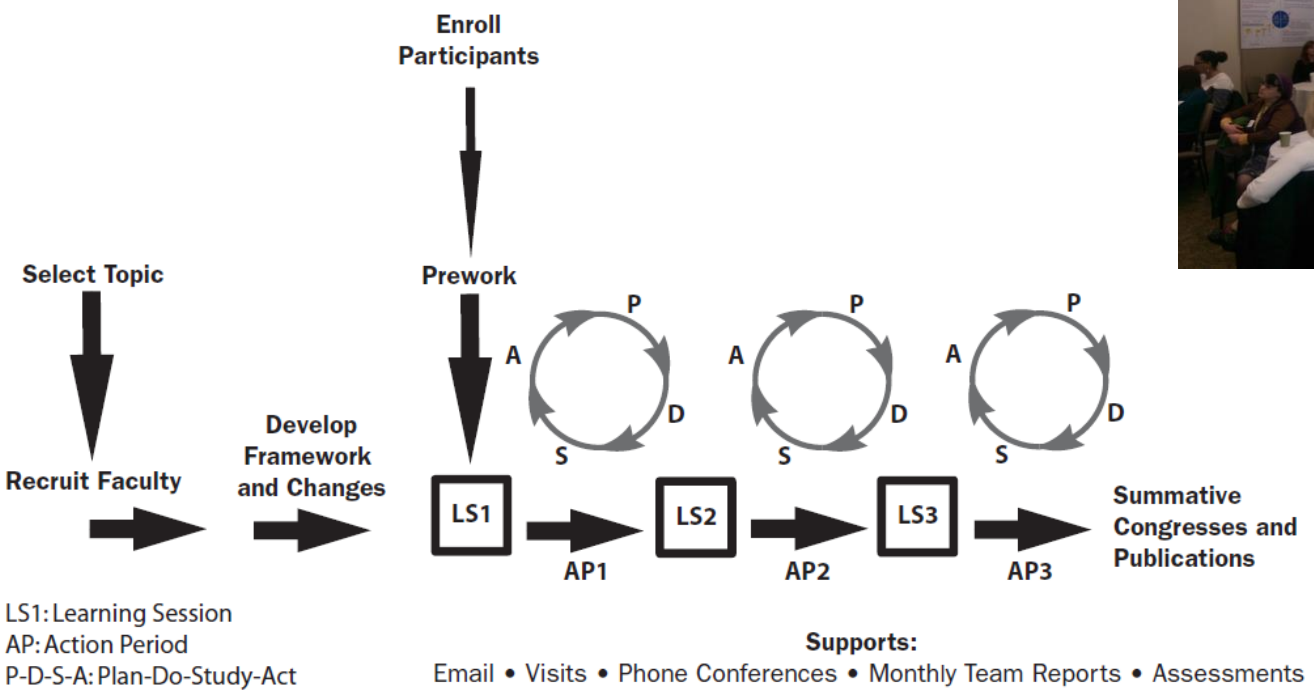
Information from CDC website

Not a complete list

Pai, Lee, and Profit, Clinics in Perinatology, June 2018

QI Methods for Collaborative QI

Figure 2. Breakthrough Series Model



IHI Breakthrough Series

QI Methods for Collaborative QI

1. Common Aims
2. Common Measures
3. Common(ish) Changes
4. Use Data to Drive Improvement!

Addressing Substance Use Across the Perinatal Period

	Pregnancy	Newborn	Infancy
Goal	Improve care of pregnant women with opioid use disorder by increased screening and enrollment in MAT	Improve care of the opioid exposed newborn by increasing family engagement during hospitalization	Improve follow-up and support of infants with NAS by increasing enrollment in Early Intervention

Area	Metric Name	Metric Definition	Numerator	Denominator	Data Source	Measure Type	Notes
Maternal Care	Medication-assisted therapy in mothers (MAT)	Among all births of infants at risk for NAS due to in-utero opioid exposure, percent of mothers on MAT during pregnancy	Of maternal-fetal exposures those births exposed to prescribed methadone or prescribed buprenorphine	All births at risk for NAS due to in-utero opioid exposure	REDCap NAS Form	Outcome	Numerator: Question 10 Denominator: All births in database
	Illicit drug use in mothers	Among all births of infants at risk for NAS due to in-utero opioid exposure, percent of mothers using illicit drugs	Of maternal-fetal exposures those births exposed to any non-prescribed or illicit substances	All births at risk for NAS due to in-utero opioid exposure	REDCap NAS Form	Outcome	Numerator: Questions 10&11 Denominator: All births in database
Newborn Care	Pharmacologic therapy for NAS	Among all infants at risk for NAS, percent requiring pharmacologic therapy for NAS	Those infants receiving pharmacologic agents for NAS	All births at risk for NAS due to in-utero opioid exposure	REDCap NAS Form	Outcome	Numerator: Question 15 Denominator: All births in database
	Non-pharmacologic therapy for NAS: skin-to-skin	Among all infants at risk for NAS, percent that received skin-to-skin contact any time during first 24 hours of life	Those infants receiving skin-to-skin contact	All births at risk for NAS due to in-utero opioid exposure	REDCap NAS Form	Process	Numerator: Question 16 Denominator: All births in database
	Non-pharmacologic therapy for NAS: rooming-in	Among all infants at risk for NAS, percent that “roomed-in” for at least 1 night prior to maternal discharge	Those infants who “roomed-in”	All births at risk for NAS due to in-utero opioid exposure	REDCap NAS Form	Process	Numerator: Question 17 Denominator: All births in database
	Eligibility for breastmilk in SENs	Among all infants at risk for NAS, percent that were eligible to receive his or her mother’s breastmilk per hospital guidelines	Those infants who were eligible to receive his or her mother’s breastmilk per hospital guidelines	All births at risk for NAS due to in-utero opioid exposure	REDCap NAS Form	Process	Numerator: Question 12 Denominator: All births in database

NeoQIC Neonatal Abstinence Syndrome Project

Primary Aims

Overall Project Goal

Improve the care and outcomes of newborns impacted by NAS

1. Improve the hospital-based care of infants at risk of NAS.
2. Improve childhood outcomes of infants born at risk for NAS.

Associated Measures
1) Percent of live births in MA where infants are at risk for NAS
2) Percent of live births in MA where infants have NAS

Primary Drivers

- Increase and improve participation of MA hospitals in improvement project
  - *Measure*: % of MA birth hospitals engaged in project
- Reduce post-natal exposure to opiates
  - *Outcome Measure:* % of newborns at risk for NAS needing pharmacologic Rx
  - *Outcome Measure:* total post-natal opiate exposure
- Increase family involvement in care
- Improve discharge process for infants with NAS
- Maximize ability to maintain safe and intact family structure
  - *Measure*: % of infants with NAS living with biologic or adoptive family at one year of age

Secondary Drivers

- Increase number of hospitals that have structured and effective NAS improvement projects in place
  - *Measure:* % of hospitals in project with active NAS QI project by end of 2015
  - *Measure:* % of hospitals in project reporting data to state database by end of 2015
- Improve non-pharmacologic care
  - *Process Measure:* % of newborns at risk for NAS receiving non-pharmacologic care
- Increase use of human milk
  - *Process Measure:* % of newborns at risk for NAS receiving any human milk by discharge
- Increase antenatal consults for families at risk for NAS
  - *Measure:* % of families at risk for NAS receiving antenatal consultation
- Increase rooming-in
- Improve referrals to Early Intervention (EI)
  - *Measure:* % of infants with NAS referred to EI by time of hospital discharge
- Improve coordination with DCF
- Increase support systems following discharge

Potential Change Concepts

1) Outreach to all MA hospitals
2) QI education and project facilitation
3) Database development including completion of Data Use Agreements

1) Development of local protocols
2) Staff education
3) Family education

Process Measure: % of participating hospitals with appropriate local policies or guidelines

1) Development of local protocols
2) Staff education

1) Consider innovative approaches to rooming-in in context of physical space limitations

1) Real-time EI referral rate reports to hospitals

1) Improve case-load of DCF case workers

1) Develop system of community-based care coordinators
2) Maximize use of existing community-based support programs

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Neonatal Quality Improvement Collaborative of Massachusetts

Tools: PDSA Form

PDSA FORM

Hospital		Date	
Team Members		PDSA #	
PDSA TITLE:			
PDSA STATUS:	☐ Planned, not initiated ☐ Planned and in progress ☐ Complete		

Part 1

"Aim" and "Plan" should be completed prior to initiating test, and can be updated during test as needed.

AIM

1. Which primary driver does this PDSA address?
Primary drivers for project are: (1) parental education; (2) initiation; (3) continuation; and (4) transition to home breastfeeding.

2. What is your AIM statement for your work on this key driver, including this PDSA cycle?
Use a "SMART" aim: specific, measurable, achievable, relevant, time-bound. Improve [what], from [baseline] to [goal], by [when].

PLAN

3. What is the change you are planning to test?
For new interventions, focus initially on small tests of change, rather than immediate broad implementation of new processes.

4. How will you test this change? Be specific.
How big (or small) will the test be? How long will it last? Where will it be done?

5. How will you know if this change is an improvement? What measures will you use for this test?
Note that PDSA cycles often use short-term measures collected for a particular test, in addition to overall project measures.

neoQIC Neonatal Quality Improvement Collaborative of Massachusetts

HSyE Northeastern University Healthcare Systems Engineering Institute

6. What are the tasks necessary to prepare for and then conduct this test?
Include who will be responsible for each task, and when it will be completed.

7. What do you predict will happen? What is your hypothesis for this test?
Be specific, and refer to the measures you defined in question 5: how much do you predict your measure will change, and by when.

Part 2

Complete "Do", "Study", and "Act" as soon after test is completed as possible.

DO

8. What happened as you conducted the test? Was the test completed as planned? What problems or unexpected observations were encountered?

STUDY

9. What were the results of the test, using the measures identified above?
Include measures before and after the test. Include (or attach) a run chart showing your results.

ACT

10. What are your next steps?
ADAPT: improve the change and continue testing using PDSA cycles – what will be your next PDSA?
ADOPT: test changes on larger scale or develop plan for implementation and sustainability – how will you expand?
ABANDON: discard change idea and try different approach using a new PDSA cycle – what will be your next change idea?

neoQIC Neonatal Quality Improvement Collaborative of Massachusetts

HSyE Northeastern University Healthcare Systems Engineering Institute

Tools: Hospital Progress Reports

Improving the Care of Mothers, Infants and Families Impacted by Perinatal Opioid Use: A Massachusetts Statewide Initiative

Beth Isreal Deaconess Medical Center Key Metric Report
January 2017 – December 2018
Preliminary Data

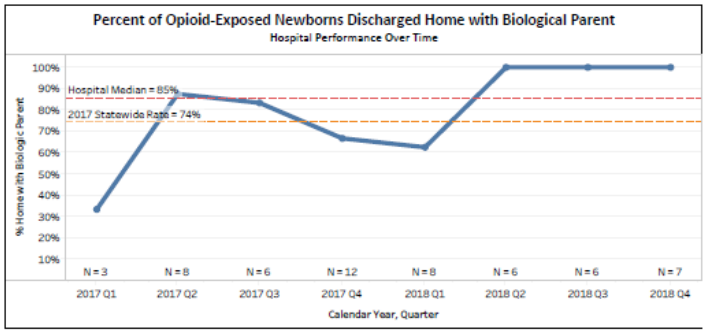
Please do not share

1

Post-Discharge Care Metrics (Continued)

Discharge Home with Biologic Parent

Numerator: Number of infants who were discharged home with their biologic parent
Denominator: All newborns at risk for NAS due to in-utero opioid exposure
Goal: In general, higher is better



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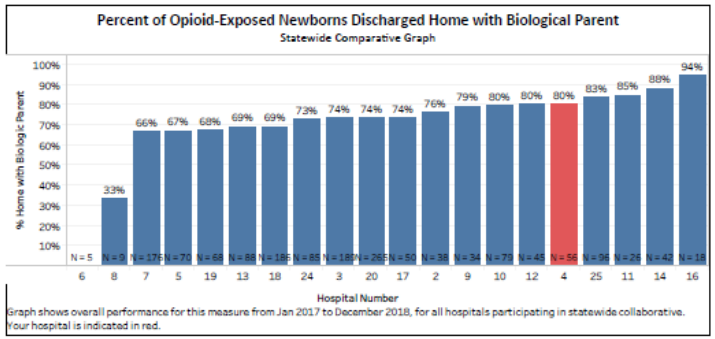
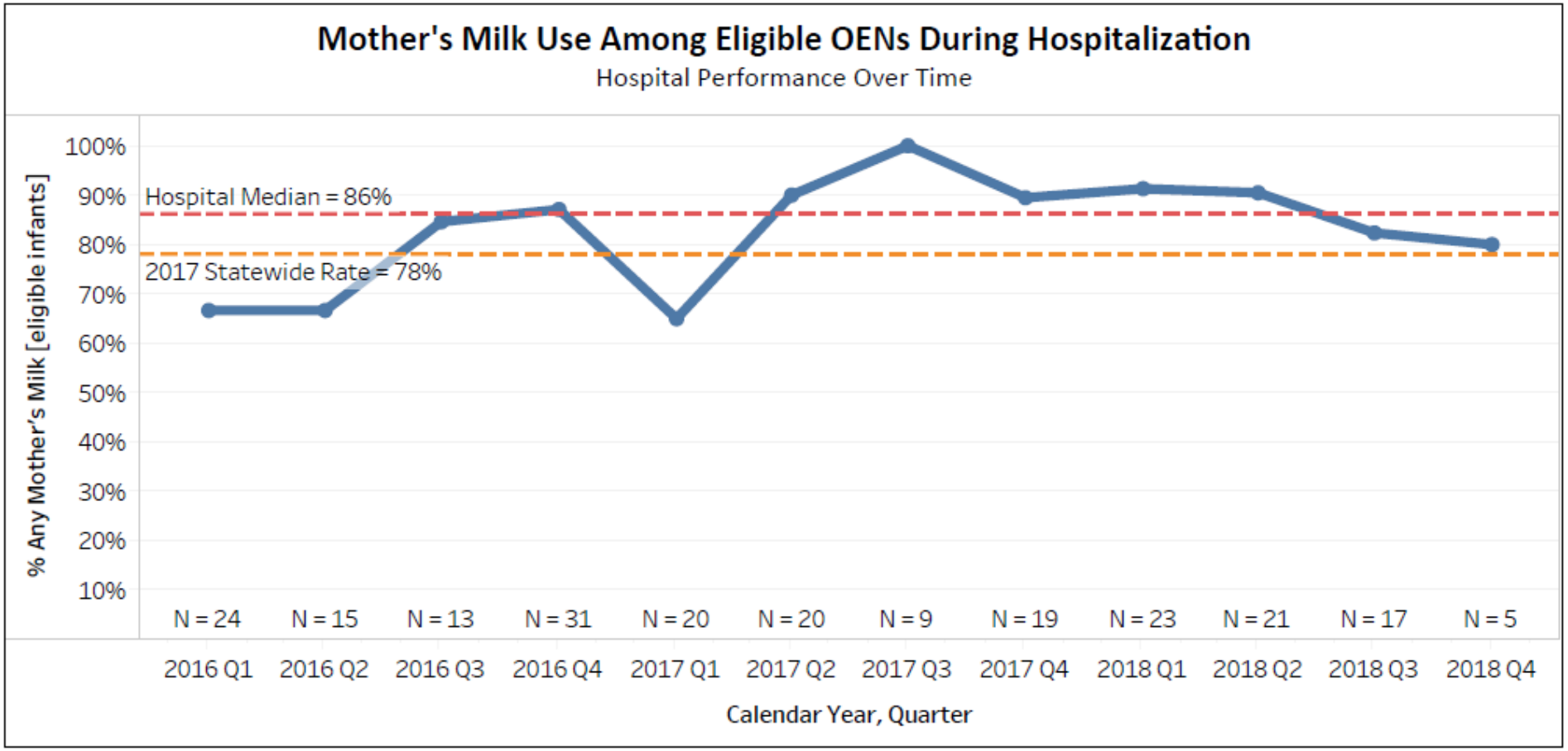


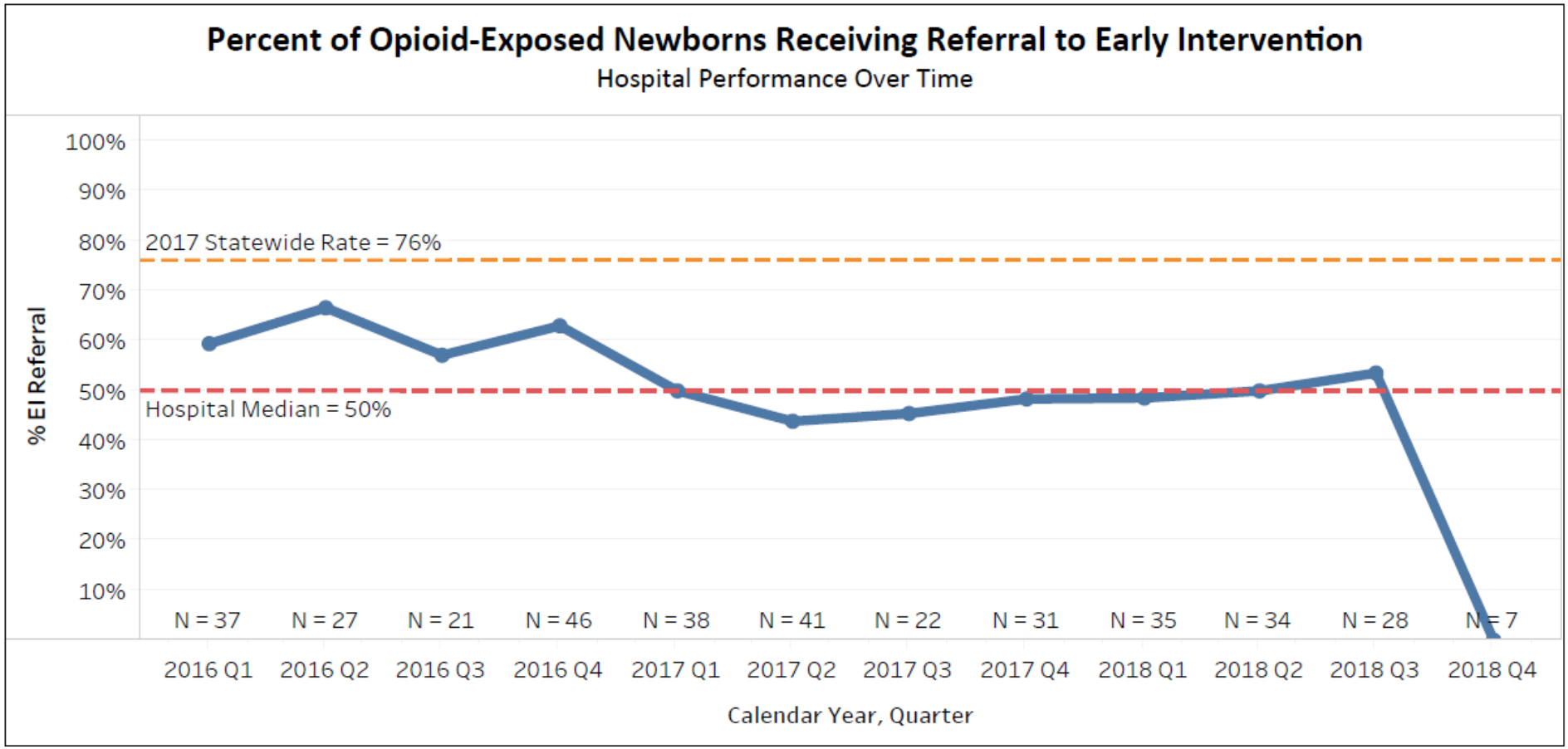
Graph shows overall performance for this measure from Jan 2017 to December 2018, for all hospitals participating in statewide collaborative. Your hospital is indicated in red.

20

Tools: Hospital Progress Reports



Tools: Hospital Progress Reports



Collaborative QI with PQCs

1. Common Aims
2. Common Measures
3. Common(ish) Changes
4. Use Data to Drive Improvement!

Add collaboration, sharing, teamwork.

So…. does collaborative QI work?

Success Stories - NNPQC

CDC

Success Stories

The success stories below detail perinatal quality improvement work from state-based PQCs supported by CDC's Division of Reproductive Health.

- The Perinatal Quality Collaborative of North Carolina (PQCNC) Success Story [PDF – 235 KB] outlines PQCNC's activities, results, and lessons learned in leading a national project to reduce infections in neonatal intensive care units.
- The Perinatal-Neonatal Quality Improvement Network of Massachusetts (PNQIN) Success Story shares PNQIN's actions, results, and insights related to improving breast milk use in neonatal intensive care units.
- The Illinois Perinatal Quality Collaborative (ILPQC) Success Story [PDF – 171KB] share related to improving the accuracy of birth certificate data, an important source of inform
- The Ohio Perinatal Quality Collaborative (OPQC) Success Story [PDF – 187KB] discuss learned in improving birth registry data, prematurity outcomes, and the number of babie
- The New York State Perinatal Quality Collaborative (NYSPQC) Success Story [PDF – 8 lessons learned in reducing scheduled cesarean sections (C-sections) and labor induction pregnancy.
- The California Maternal Quality Care Collaborative (CMQCC) Success Story [PDF – 6 accomplishments, and lessons learned in building a data center, which helped hospitals to

NICHQ

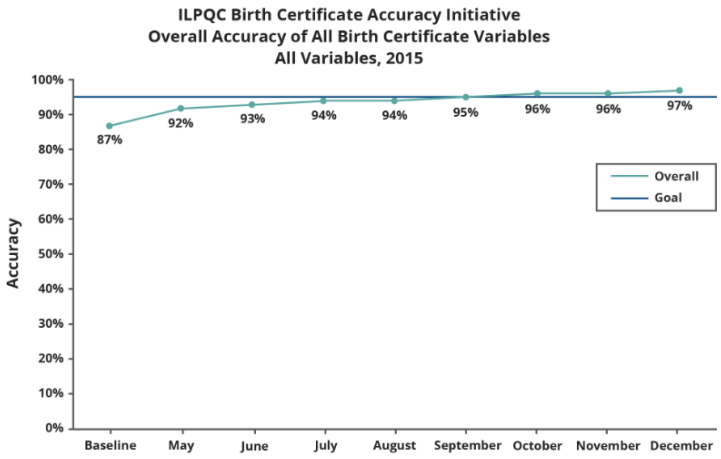
Success Stories

There are many PQCs that have tackled some complex challenges. Here are a few state examples to provide inspiration that improvement and change is not only possible, but attainable. Full case studies can be found on the CDC website using the links below.

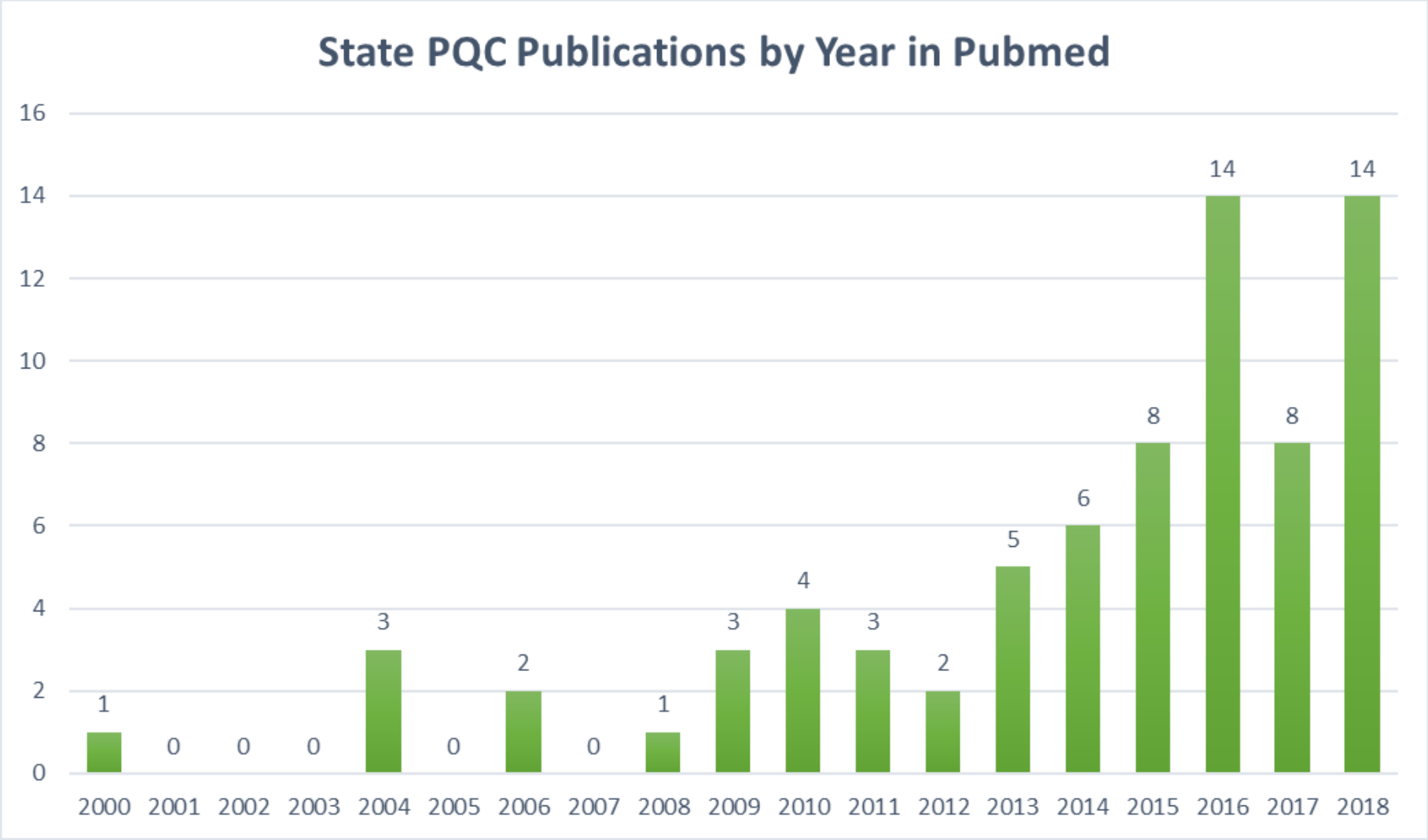
- California
- Illinois
- Massachusetts 1
- Massachusetts 2
- New York
- North Carolina

Illinois

Led an initiative to improve the accuracy of birth certificate data. It resulted in improved accuracy on all birth certificate variables from 87 percent at baseline to 97 percent at completion. **Read the full case study.**

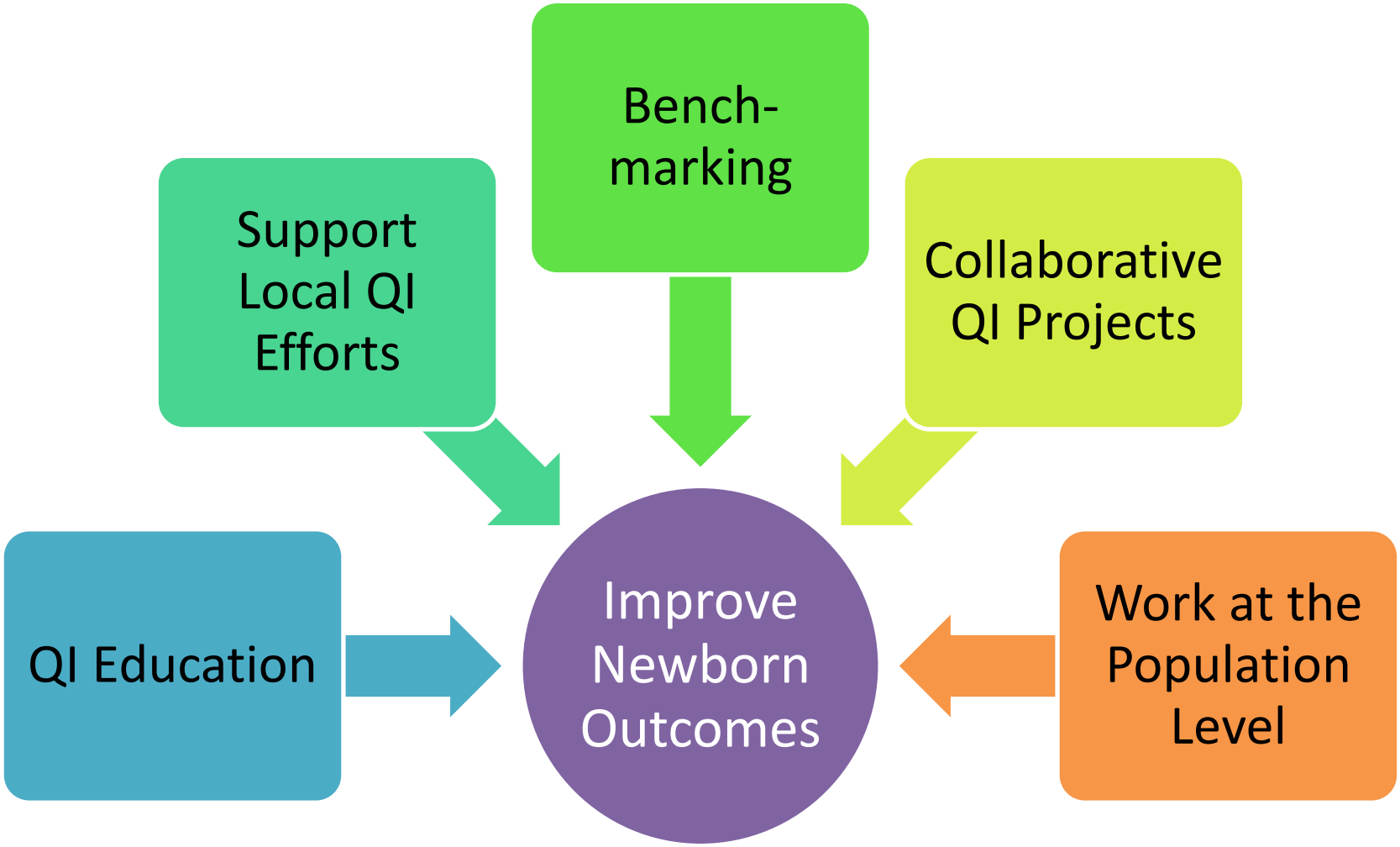


https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pqc.htm
https://www.nichq.org/project/national-network-perinatal-quality-collaboratives#success-stories



(based on fairly rough Pubmed keyword search)

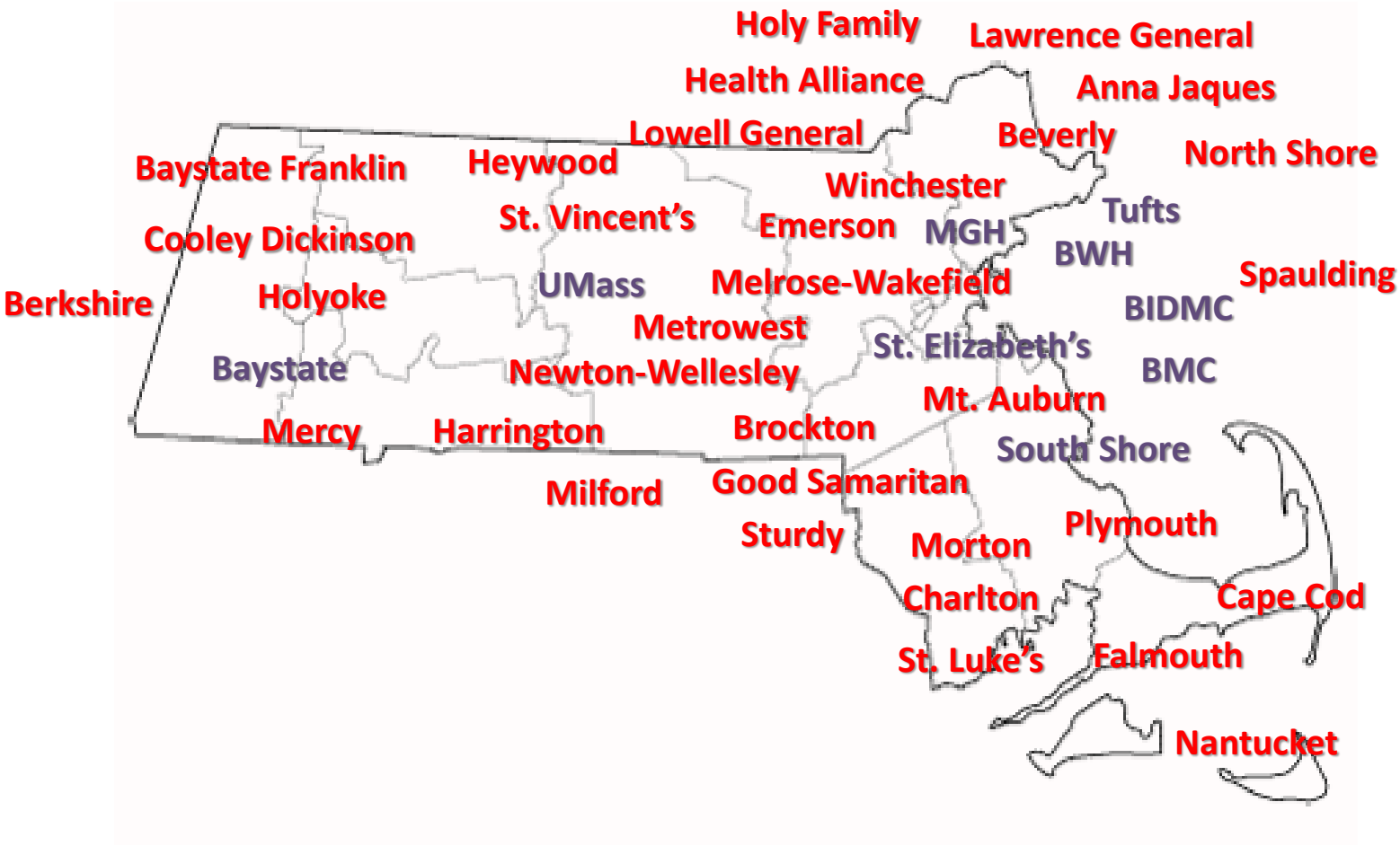
What do state-based PQCs do?



Targeting Population-Level QI

At the end of the day, by definition, improving perinatal outcomes across the population should be the goal of all state-based PQCs.

NeoQIC NAS: Participating Centers



PQCs and Population Health

- Think about aims and measures
- Target population-level improvement
- Address equity and disparities

Aims/Measures for NAS: Hospital

- Increase % of pregnant women screened for opioid use
- Increase % of pregnant women with opioid use disorder receiving antenatal counselling on NAS
- Increase use of breast milk in infants with NAS
- Increase % of infants at risk for NAS rooming-in with their mothers
- Reduce length of stay for infants at risk for NAS

Aims/Measures for NAS: Population

- Reduce wait time to treatment for women with opioid use disorder
- Increase % of pregnant women with opioid use disorder receiving medication-assisted therapy
- Increase # of buprenorphine-waivered providers
- Increase % of infants with NAS living with biologic families
- Increase % of infants with NAS enrolled in Early Intervention

Administrative Data for Population QI

- Already being collected
- Measures entire population
- Reliability uncertain (can be improved)
- Need to think about measure definitions
- Timeliness critical
- Pretty successful already on OB projects

Population-Level Dashboards

Neonatal Abstinence Syndrome

https://www.mass.gov/guides/neonatal-abstinence-syndrome-dashboard#resources

OFFERED BY Department of Public Health

GUIDE

Neonatal Abstinence Syndrome Dashboard

This page provides an overview of neonatal abstinence syndrome (NAS) in Massachusetts.

TABLE OF CONTENTS

Feedback

Massachusetts NAS Dashboard
https://www.mass.gov/guides/neonatal-abstinence-syndrome-dashboard

NEONATAL ABSTINENCE SYNDROME DASHBOARD

Overview | Pregnancy (Prenatal) | Birth (Neonatal) | Infancy (Post Discharge) | About these data

What indicator do you want to see?

Percent of women delivering a live birth with evidence of opioid use disorder during pregnancy

How would you like to view the data? Grouped by:

◉ Overall ○ Insurance Type ○ Race / Ethnicity ○ Mother's Age ○ Mother's Education ○ EOHHS Regions

Percent of women delivering a live birth with evidence of opioid use disorder during pregnancy

Opioid use disorder describes the recurrent use of opioid painkillers causing clinically and functionally significant impairment, such as health problems, disability, and failure to meet major responsibilities at work, school, or home. For this measure, individuals with opioid use disorder were identified using diagnosis codes in hospital discharge records. A complete list of the codes used can be found by clicking the "About these data" button above.

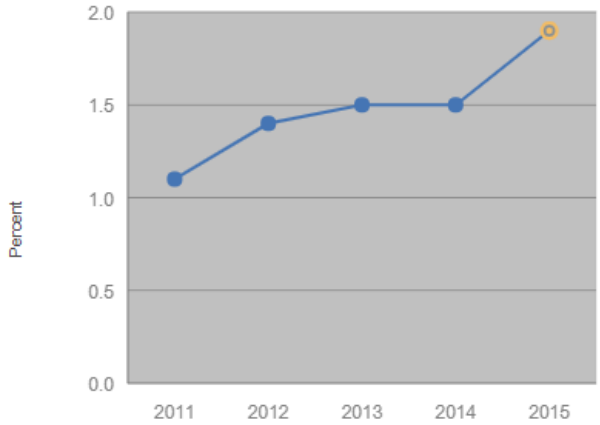
2011 2012 2013 2014 2015

Slide or click to change year

1.9

Percent

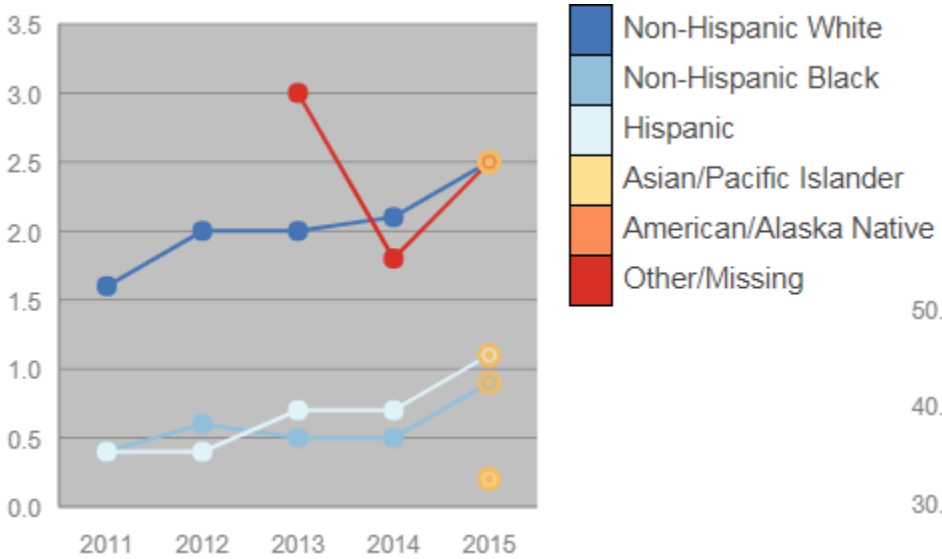
in 2015



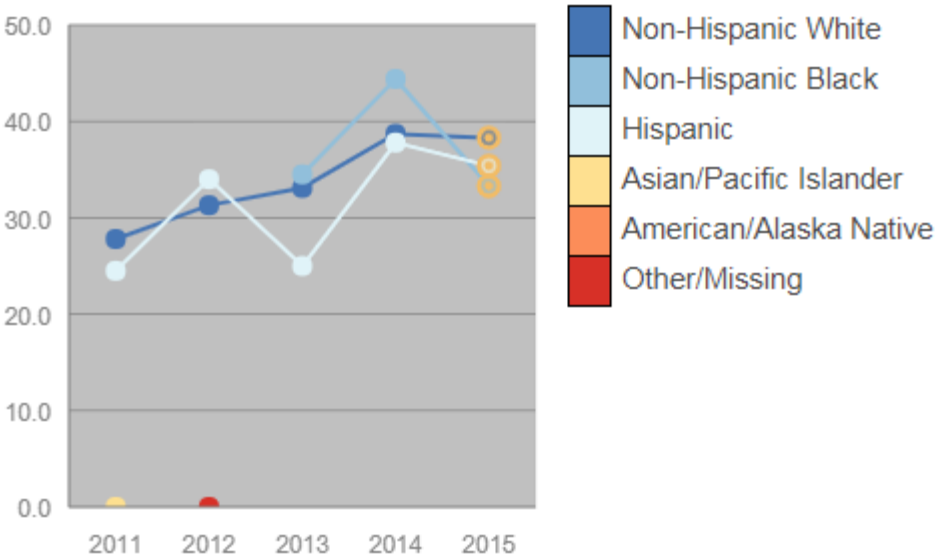
Massachusetts NAS Dashboard
https://www.mass.gov/guides/neonatal-abstinence-syndrome-dashboard

Can Identify Disparities

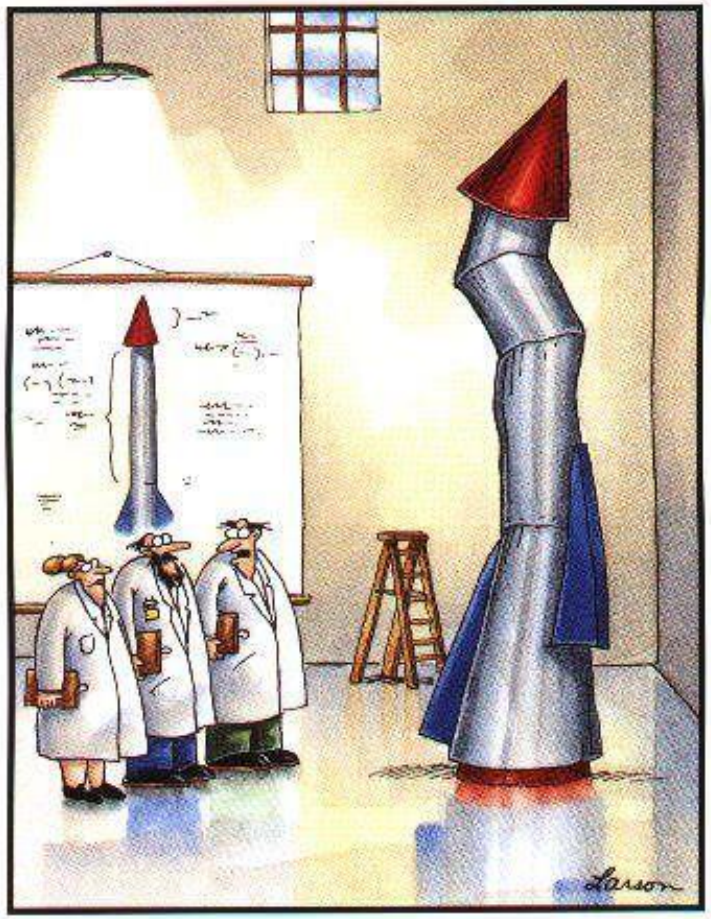
Opioid Use Disorder in Pregnancy



Enrollment in EI for Infants with NAS

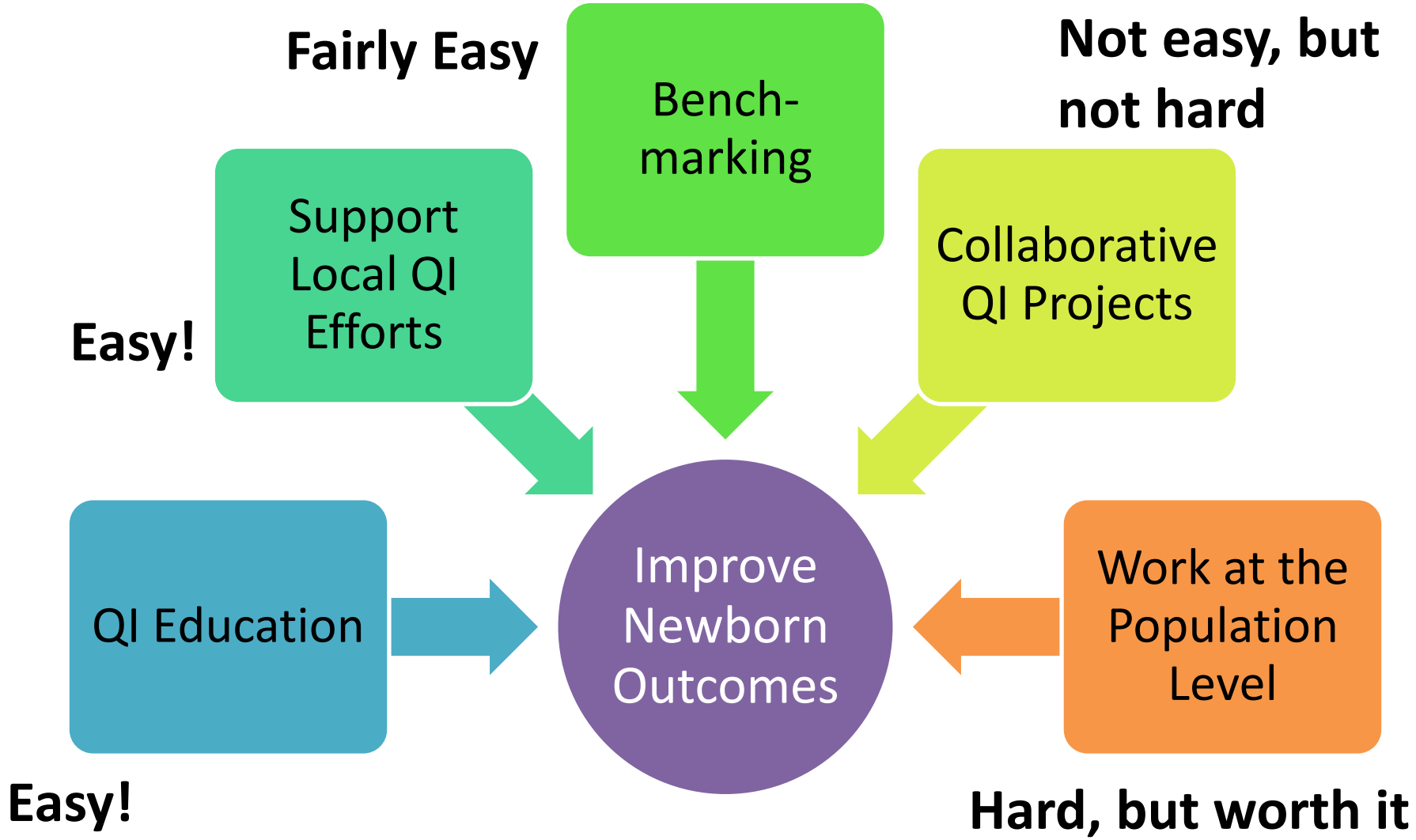


What do state-based PQCs do? A lot!



"It's time we face reality, my friends. ...
We're not exactly rocket scientists."

What do state-based PQCs do? A lot!



4. Improving NAS care through a collaborative

neoQIC PN QIN

How do we improve outcomes?

AMERICA'S OPIOID CRISIS: THE UNSEEN IMPACT ON GEORGIA CHILDREN

AS GEORGIA FAMILIES STRUGGLE WITH ADDICTION, CHILDREN ARE CAUGHT IN THE FRAY.

A GROWING CRISIS

28% MORE opioid-related deaths nationwide since 2015.

86.7% of people in Georgia suffering from drug dependence or abuse go untreated.

8.7 MILLION CHILDREN nationwide have a parent who suffers from a substance use disorder.

A NEED FOR FAMILY-CENTERED POLICIES

KEEPING FAMILIES TOGETHER IMPROVES OUTCOMES AND LOWERS COSTS

MORE THAN HALF of children placed in foster care go home to their families. Keeping families together from the start helps prevent further trauma and improves outcomes.

MEDICAID PAID 81% OF THE $1.5 BILLION that hospitals billed for treating babies suffering from opioid withdrawal in 2012.

A DEVASTATING TOLL ON CHILDREN

FOSTER CARE PLACEMENTS ON THE RISE

8,546 GEORGIA CHILDREN were placed in foster care in 2016.

17% WERE INFANTS.

In 37% of these placements, parental substance use was a factor.

MORE BABIES BORN EXPOSED TO OPIOIDS

Every **25 minutes** in America, a baby is born suffering from opioid withdrawal, which can mean:

1. LOWER BIRTHWEIGHTS
2. RESPIRATORY CONDITIONS
3. FEEDING DIFFICULTIES
4. SEIZURES
5. LONGER HOSPITAL STAYS

A LIFELONG IMPACT

Children dealing with traumatic experiences can face social, emotional, physical, and mental health challenges that last into adulthood.

Left unaddressed, early childhood adversity can lead to **school failure**, risky behaviors like **alcohol and drug use**, and increased chance of health conditions like **obesity and heart disease**.

WHAT YOU CAN DO

RETHINK OUR APPROACH: SUPPORT CHILDREN AND FAMILIES IN HEALING TOGETHER

- **Create policies that prioritize prevention** and allow children to remain safely with their families during treatment.
- **Give providers tools** to recognize, treat, and support children and their parents affected by trauma to lessen the lifelong impact and promote healthy families.
- **Ensure families have real and timely access to services** through Medicaid and other prevention and treatment programs.

Sources for this document are available at www.aap.org/OpioidFactsheets.

casey family programs

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN™

neoQIC

PN QIN

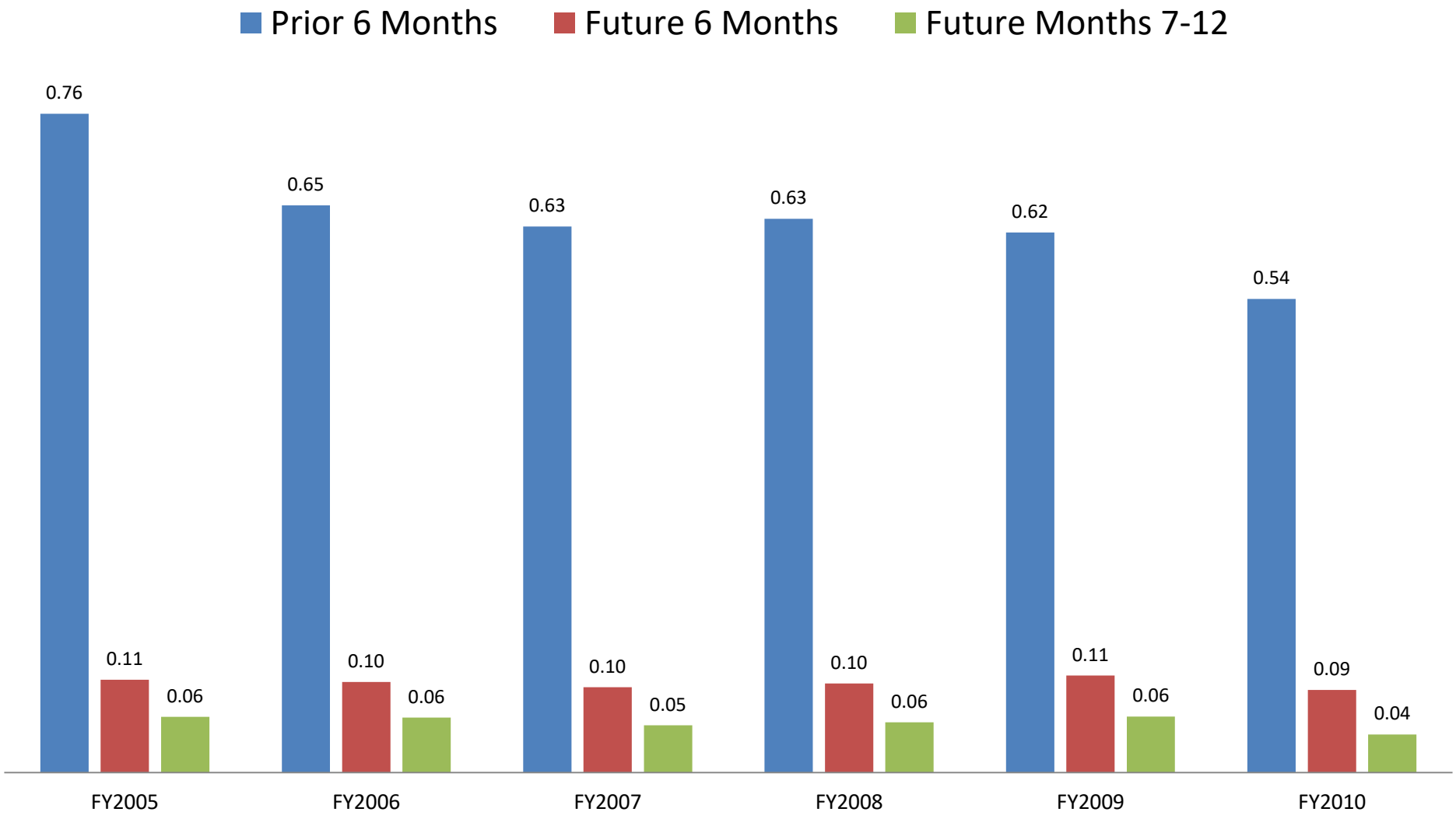
https://www.aap.org/en-us/advocacy-and-policy/federal-advocacy/Documents/Opioid-StateFactsheets/opioid_fs_georgia.pdf

Fairly important and perhaps not-so-obvious take-home point #1 (restated):

Outcomes for families and infants impacted by perinatal opioid use are far, far better when mothers are enrolled and engaged in a treatment program.

We therefore want to see the number of infants with NAS **increase.**

Average Detox Admissions Per Methadone Enrollment, MA BSAS



Slide courtesy of: Hilary Jacobs, Director, Massachusetts Bureau of Substance Abuse Services, June 2013

ACOG COMMITTEE OPINION

Number 711 • August 2017

(Replaces Committee Opinion Number 524, May 2012)

Committee on Obstetric Practice
American Society of Addiction Medicine

The Society of Maternal–Fetal Medicine endorses this document. This Committee Opinion was developed by the American College of Obstetricians and Gynecologists' Committee on Obstetric Practice in collaboration with committee members Maria A. Mascola, MD, MPH; Ann E. Borders, MD, MSc, MPH; and the American Society of Addiction Medicine member Mishka Terplan, MD, MPH.

Opioid Use and Opioid Use Disorder in Pregnancy

For pregnant women with an opioid use disorder, opioid agonist pharmacotherapy is the recommended therapy and is preferable to medically supervised withdrawal because withdrawal is associated with high relapse rates, which lead to worse outcomes.

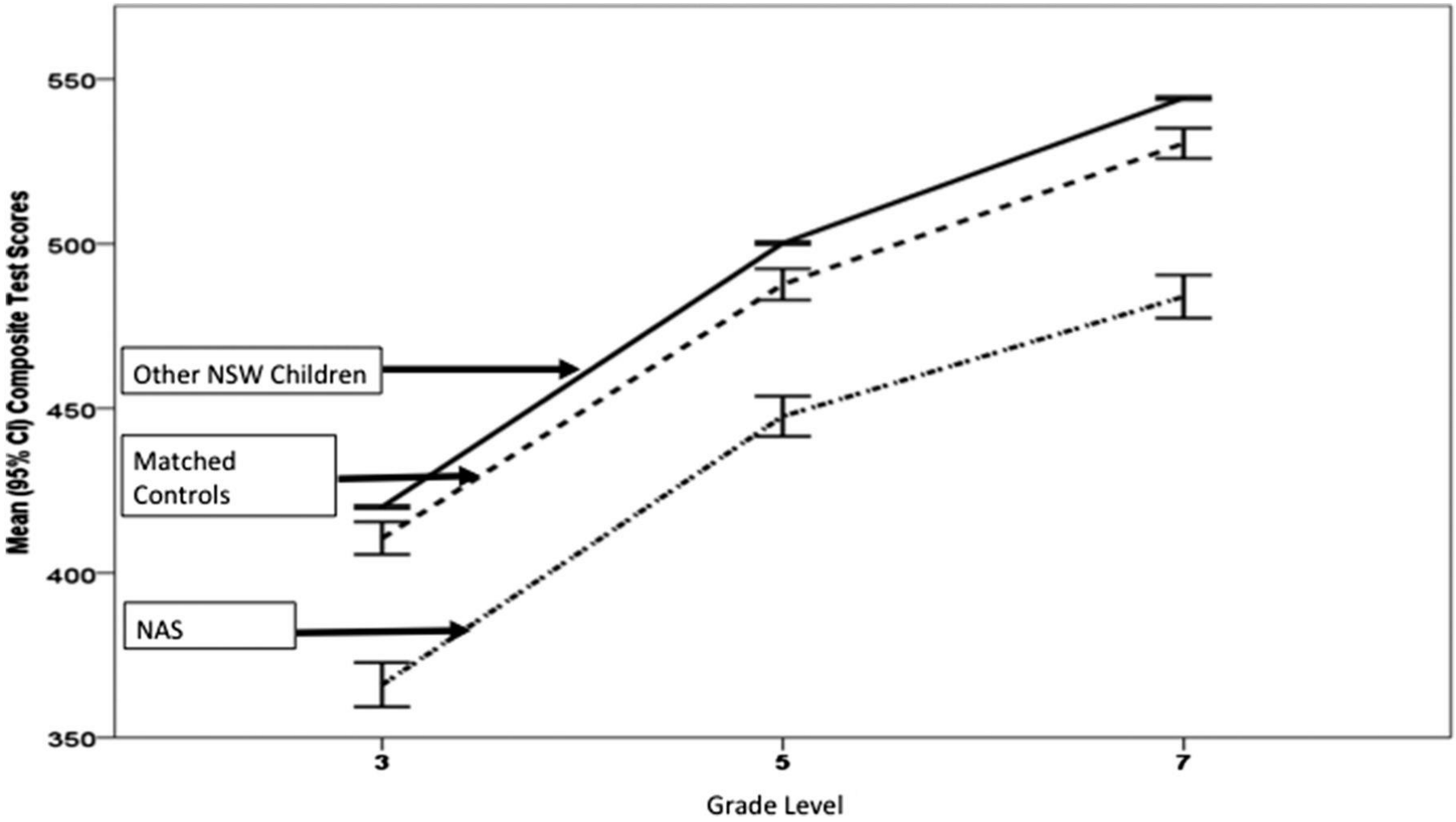
But if we do a better job of screening and identifying mothers with OUD, and getting them into treatment, won't that lead to more NAS?

And isn't NAS bad for babies?

A relatively big problem: we don't know much about **long-term outcomes** of NAS.

Overall, what we do know suggests impact of in-utero opioid exposure and post-natal NAS symptoms on long-term outcomes is minimal, and that social environment and other factors play a far greater role in determining growth and development.

NAS and School Performance, New South Wales, Australia



Ju Lee Oei et al. Pediatrics 2017;139:e20162651

Retrospective review of neurodevelopmental outcomes in infants treated for neonatal abstinence syndrome

Stephanie L. Merhar[1] · Jennifer M. McAllister[1] · Kathryn E. Wedig-Stevie[1] · Amy C. Klein[2] · Jareen Meinzen-Derr[3] · Brenda B. Poindexter[1]

Journal of Perinatology, 2018

87 infants, evaluated at 2 years

Table 2 Bayley scores

	Median (range)	Mean (SD)	Score < 85	Score < 70
Cognitive	95 (65–115)	96.5 (10.6)	9	3
Language	94 (62–132)	93.8 (13.3)	17	5
Motor	94 (70–112)	94.0 (9.4)	11	0

We conclude that children with NAS are at risk for lower developmental scores than the test normative population at 2 years of age.

Full length article

Prenatal exposure to methadone or buprenorphine: Early childhood developmental outcomes

Karol Kaltenbach[a], Kevin E. O'Grady[b], Sarah H. Heil[c], Amy L. Salisbury[d,e,f], Mara G. Coyle[e], Gabriele Fischer[g], Peter R Martin[h], Susan Stine[i], Hendrée E. Jones[j,k,*]

Drug and Alcohol Dependence, 2018

96 infants, through 3 years
Multiple assessments

Bayley scores: 94-98 at 12 months
92-99 at 24 months
98-102 at 36 months

Overall, this study found that from 3 months through 36 months of age, children prenatally exposed to buprenorphine or methadone were well within the range of normal development in physical growth measures, cognitive development and language development. Also, mothers maintained on buprenorphine or methadone did not differ on any of the measures, other than the ASI legal section.

Reconsidering retrospective review of neurodevelopmental outcomes in infants treated for neonatal abstinence syndrome

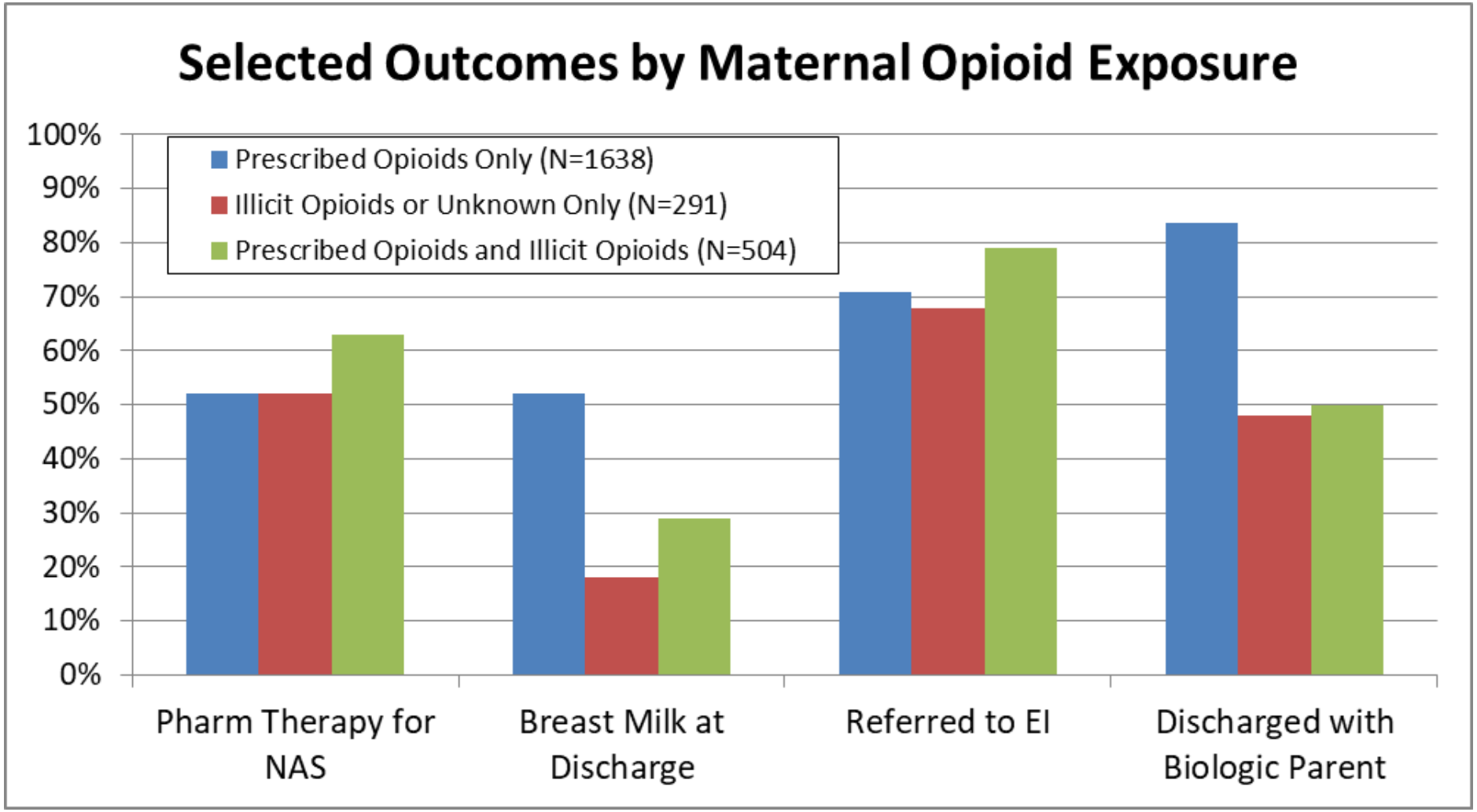
Hendrée E. Jones[1,2] · Kevin E. O'Grady[3] · Karol Kaltenbach[4]

Journal of Perinatology, 2018

This well-meaning causal explication is likely errorful. Children who experience developmental problems do so for a variety of reasons. Moreover, those reasons may or may not be related to maternal opioid use. Controlled data strongly suggest that most children who have experienced NAS will function during their first 3 years of life within normal developmental limits on a broad variety of measures of cognitive and social functioning [5]. Finally, to the extent there are developmental differences between children who were diagnosed with NAS and a normative sample of children who were not, such differences are likely due to multiple prenatal and postnatal causes.

We THINK (but don’t know) that in-utero opioid exposure in and of itself is ok with regards to long-term neurodevelopment.

How about exposure to MAT versus illicit opioids?


Selected Outcomes by Maternal Opioid Exposure
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Prescribed Opioids Only (N=1638)
Illicit Opioids or Unknown Only (N=291)
Prescribed Opioids and Illicit Opioids (N=504)
Pharm Therapy for NAS
Breast Milk at Discharge
Referred to EI
Discharged with Biologic Parent

COMMENT & RESPONSE

Treatment of Opioid Use Disorder During Pregnancy and Cases of Neonatal Abstinence Syndrome

Davida M. Schiff, MD
Stephen W. Patrick, MD, MPH, MS

JAMA Pediatrics Published online May 1, 2017

Efforts to expand treatment options, including opioid agonist therapy for pregnant women with opioid use disorder with methadone and buprenorphine, may in fact increase the number of cases of NAS, but this should still be considered a treatment success.

shots HEALTH NEWS FROM NPR

4:40

+ QUEUE

DOWNLOAD

PUBLIC HEALTH

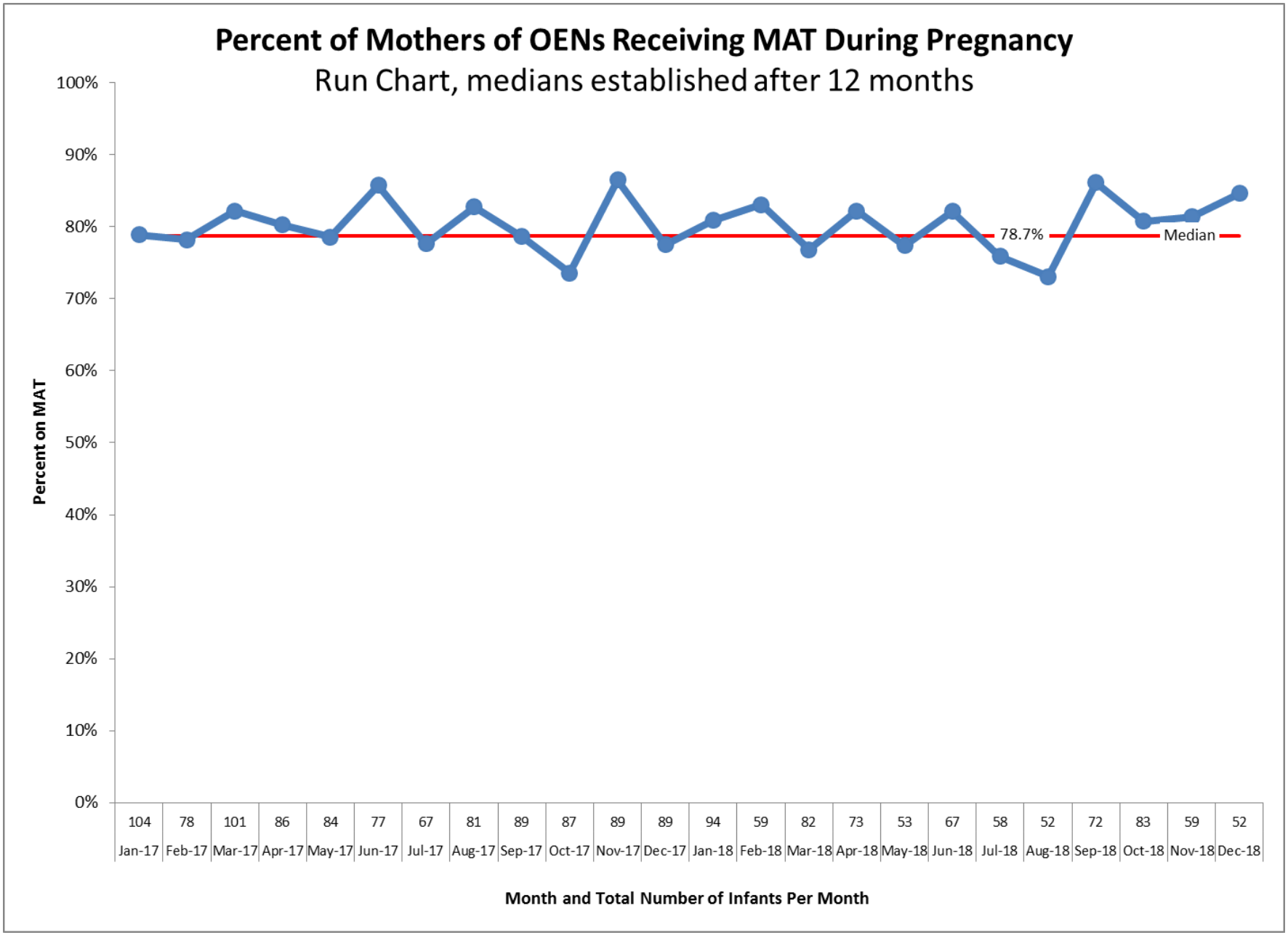
For Babies Of The Opioid Crisis, Best Care May Be Mom's Recovery

May 8, 2018 · 4:30 PM ET

Heard on All Things Considered

https://www.npr.org/sections/health-shots/2018/05/08/605358266/for-babies-of-the-opioid-crisis-best-care-may-be-moms-recovery

And how are we doing in this area?


Percent of Mothers of OENs Receiving MAT During Pregnancy
Run Chart, medians established after 12 months
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent on MAT
78.7%
Median
104 Jan-17
78 Feb-17
101 Mar-17
86 Apr-17
84 May-17
77 Jun-17
67 Jul-17
81 Aug-17
89 Sep-17
87 Oct-17
89 Nov-17
89 Dec-17
94 Jan-18
59 Feb-18
82 Mar-18
73 Apr-18
53 May-18
67 Jun-18
58 Jul-18
52 Aug-18
72 Sep-18
83 Oct-18
59 Nov-18
52 Dec-18
Month and Total Number of Infants Per Month

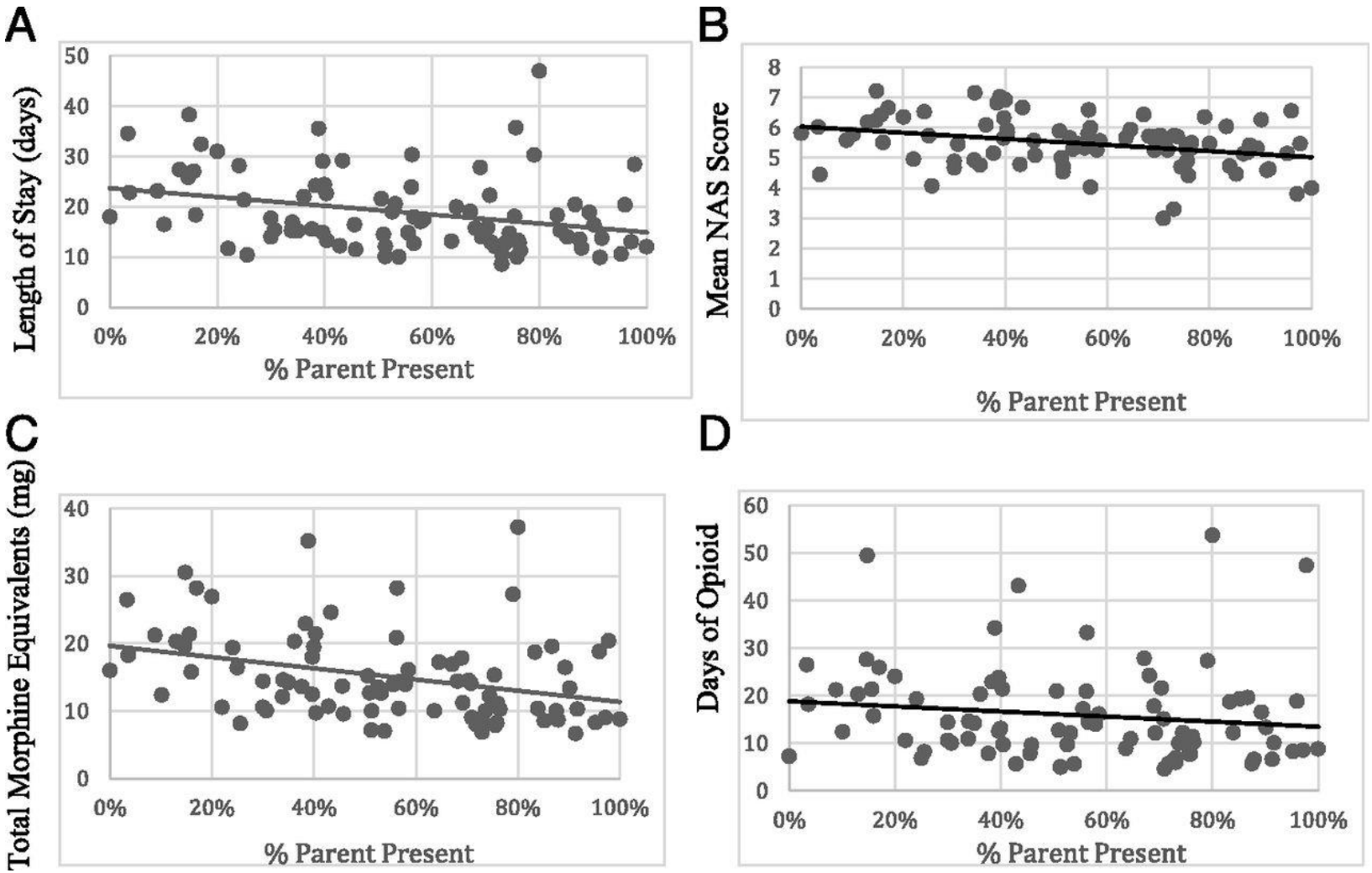
Take-Home Points 1: Pregnancy

- Getting more moms with OUD engaged and on treatment may be the most important goal of all of this work.
- This will likely INCREASE the number of newborns with NAS, but that's ok.
- Newborn outcomes are largely dependent on maternal outcomes.

Fairly important and reasonably obvious take-home point #2:

Increasing engagement and partnership with families during the care of opioid-exposed newborns will improve outcomes.

Correlation of parental presence and NAS outcomes.



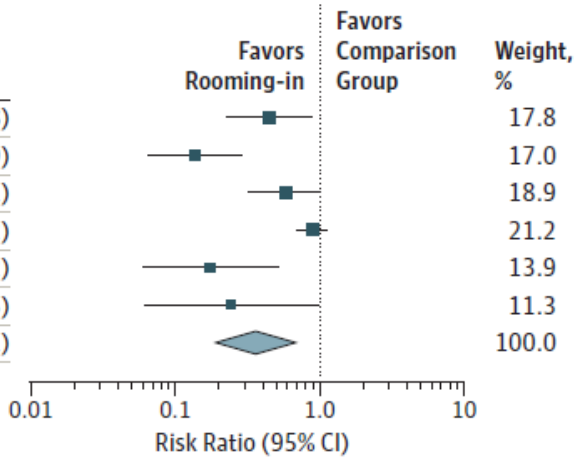
Mary Beth Howard et al. Hospital Pediatrics 2017;7:63-69

Figure 2. Rooming-in vs Usual Care on the Need for Pharmacotherapy

A Meta-analysis

Source	Rooming-in No. of Events	Rooming-in Total No.	Comparison Group No. of Events	Comparison Group Total No.	Risk Ratio (95% CI)	Weight, %
Abrahams et al,[7] 2007	8	32	21	38	0.45 (0.23-0.88)	17.8
Grossman et al,[19] 2017	6	44	54	55	0.14 (0.07-0.29)	17.0
Holmes et al,[18] 2016	13	48	25	54	0.58 (0.34-1.01)	18.9
Hûnseler et al,[24] 2013	19	24	47	53	0.89 (0.71-1.12)	21.2
McKnight et al,[22] 2016	3	20	20	24	0.18 (0.06-0.52)	13.9
Saiki et al,[23] 2010	2	18	19	42	0.25 (0.06-0.95)	11.3
Total (95% CI)	51	186	186	266	0.37 (0.19-0.71)	100.0

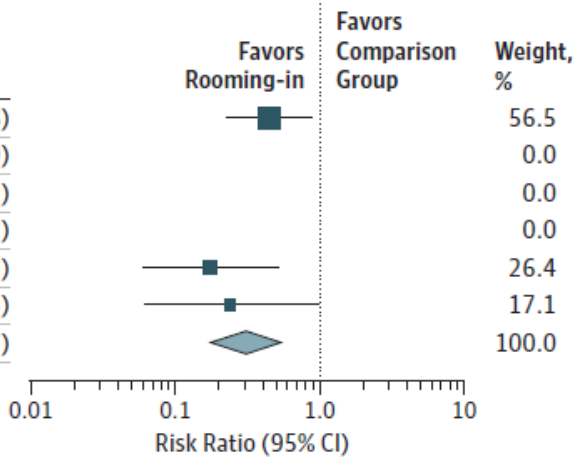
Heterogeneity: $\tau^2 = 0.51$; $I^2 = 85\%$
Test for overall effect $z = 2.99$; $P = .003$



B Sensitivity analysis

Source	Rooming-in No. of Events	Rooming-in Total No.	Comparison Group No. of Events	Comparison Group Total No.	Risk Ratio (95% CI)	Weight, %
Abrahams et al,[7] 2007	8	32	21	38	0.45 (0.23-0.88)	56.5
Grossman et al,[19] 2017	6	44	54	55	0.14 (0.07-0.29)	0.0
Holmes et al,[18] 2016	13	48	25	54	0.58 (0.34-1.01)	0.0
Hûnseler et al,[24] 2013	19	24	47	53	0.89 (0.71-1.12)	0.0
McKnight et al,[22] 2016	3	20	20	24	0.18 (0.06-0.52)	26.4
Saiki et al,[23] 2010	2	18	19	42	0.25 (0.06-0.95)	17.1
Total (95% CI)	13	70	60	104	0.32 (0.18-0.57)	100.0

Heterogeneity: $\tau^2 = 0.04$; $I^2 = 13\%$
Test for overall effect $z = 3.86$; $P < .001$



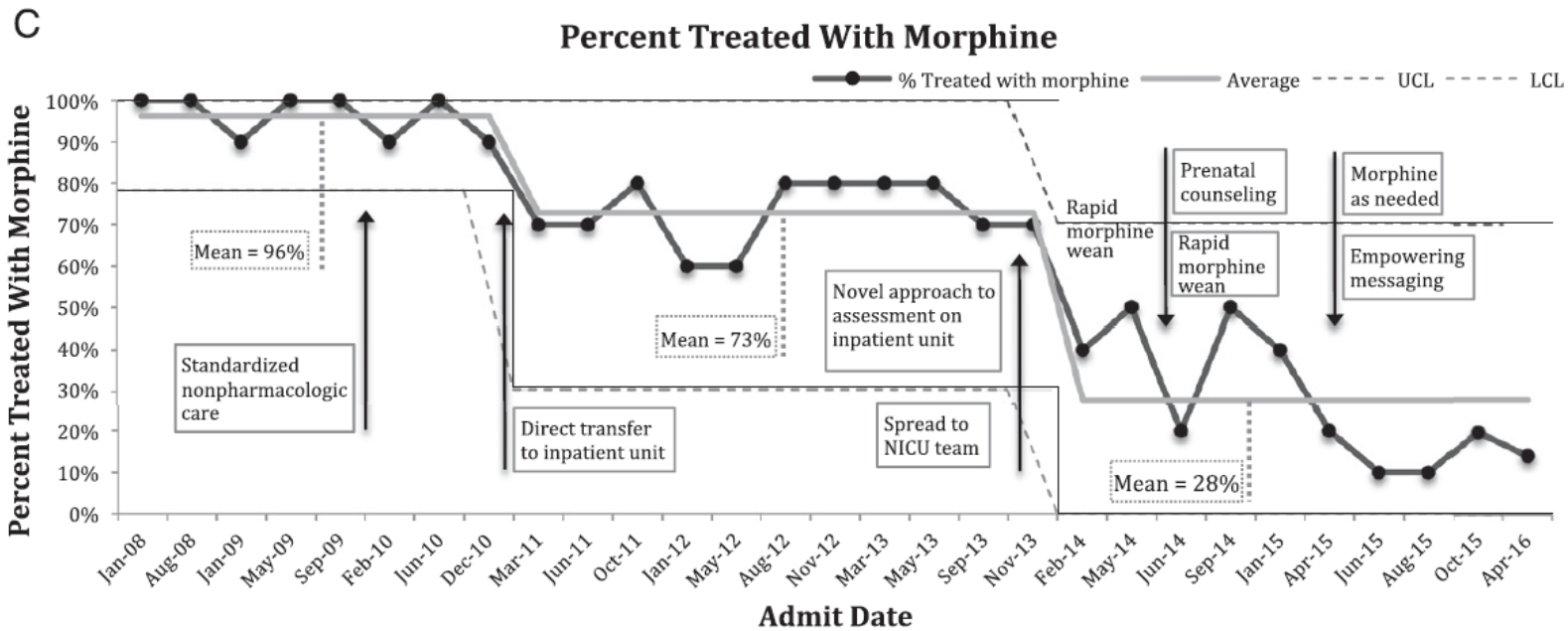
An Initiative to Improve the Quality of Care of Infants With Neonatal Abstinence Syndrome

Matthew R. Grossman, MD,[a] Adam K. Berkwitt, 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]

PEDIATRICS Volume 139, number 6, June 2017:e20163360

TABLE 1 Summary of Interventions

Interventions	Completion Date
Standardized nonpharmacologic care on the inpatient unit	February 2010
Transfer from WBN to the inpatient unit	February 2011
Development of a novel approach to assessment	January 2014
Spread of change concepts to NICU	January 2014
Rapid morphine weans	June 2014
Prenatal counseling of parents	June 2014
Morphine given as needed	May 2015
Empowering messaging to parents	May 2015

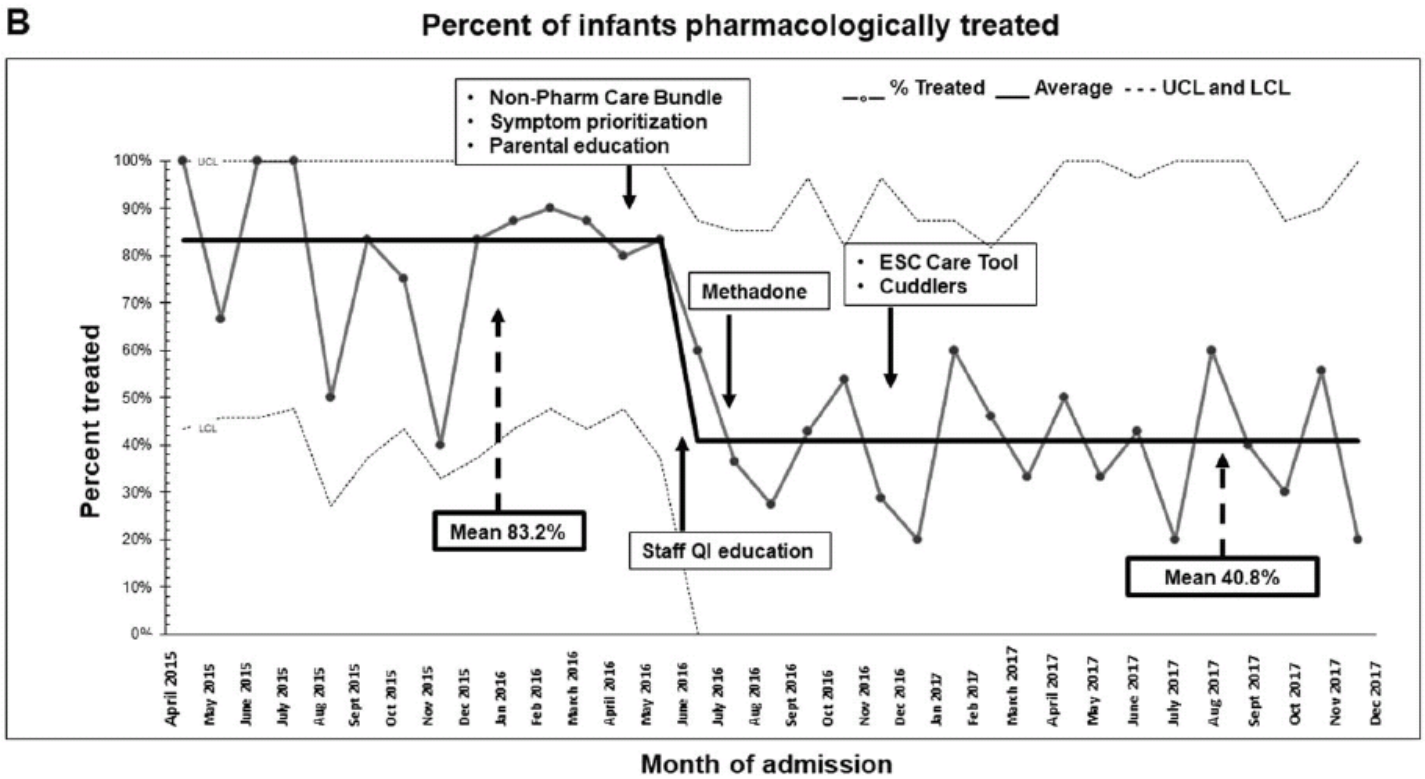


"Eat, sleep, console"

Grossman et al, Pediatrics, 2017

Quality improvement initiative to improve inpatient outcomes for Neonatal Abstinence Syndrome

Elisha M. Wachman[1] · Matthew Grossman[2] · Davida M. Schiff[1,3] · Barbara L. Philipp[1] · Susan Minear[1] · Elizabeth Hutton[1] · Kelley Saia[4] · FNU Nikita[5] · Ahmad Khattab[6] · Angela Nolin[6] · Crystal Alvarez[5] · Karan Barry[1] · Ginny Combs[1] · Donna Stickney[1] · Jennifer Driscoll[1] · Robin Humphreys[1] · Judith Burke[1] · Camilla Farrell[7] · Hira Shrestha[1] · Bonny L. Whalen[8]



Wachman et al, J Perinatology 2018

The Eat, Sleep, Console NAS Care Tool Training Page

This page is for all hospitals participating in the systematic roll-out of the ESC care tool. Click the arrows below to access the various resources for ESC education and implementation.

>> To update your hospital implementation status or to check on your hospital's status click here.

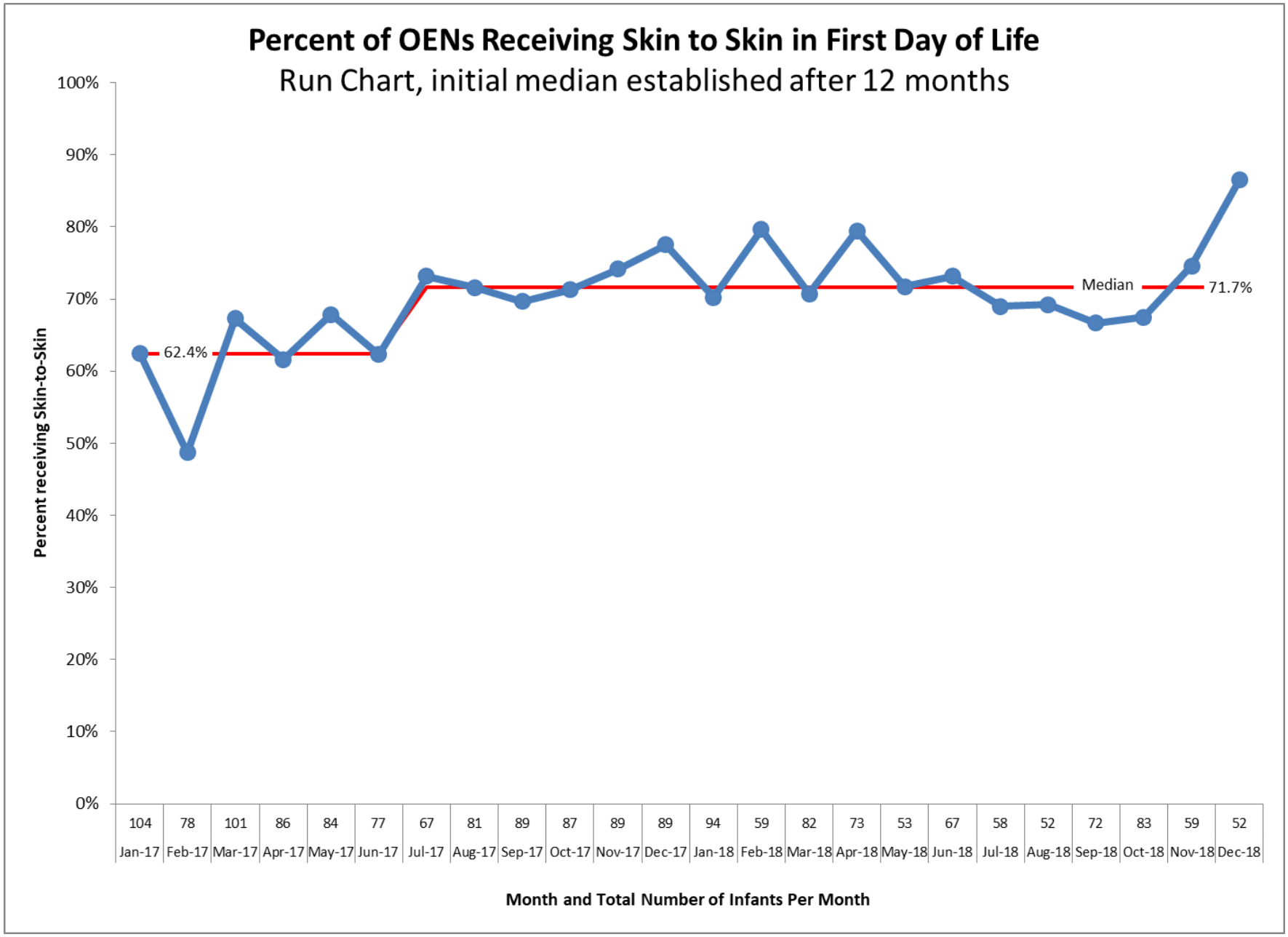
- Webinars and Workshops
- General NAS Resources
- Team Development Resources
- ESC Educational Materials
- ESC Training Resources
- ESC Implementation Resources
- Finnegan Symptom Prioritization
- Montinoring Impact

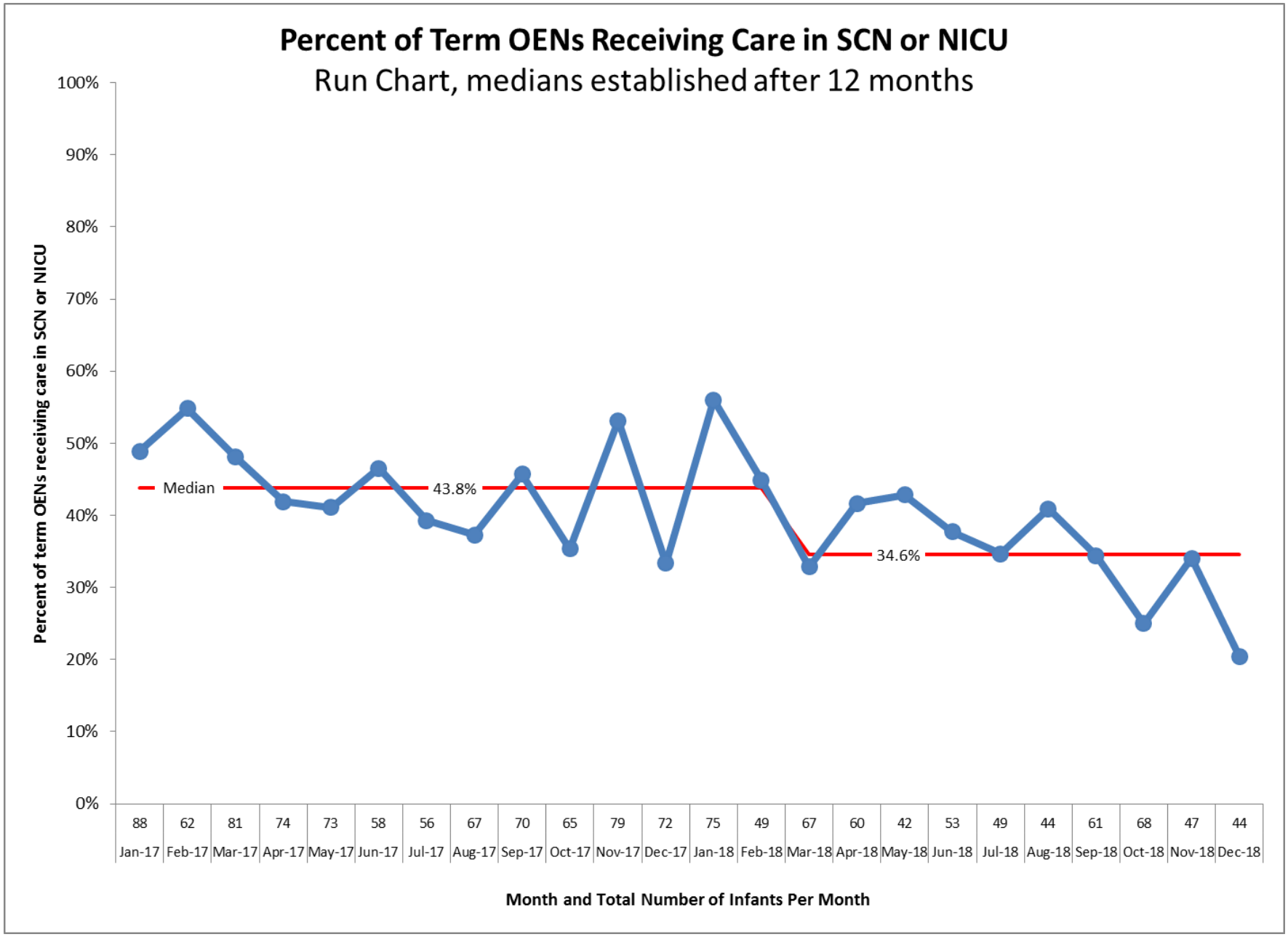
“Eat Sleep Console”

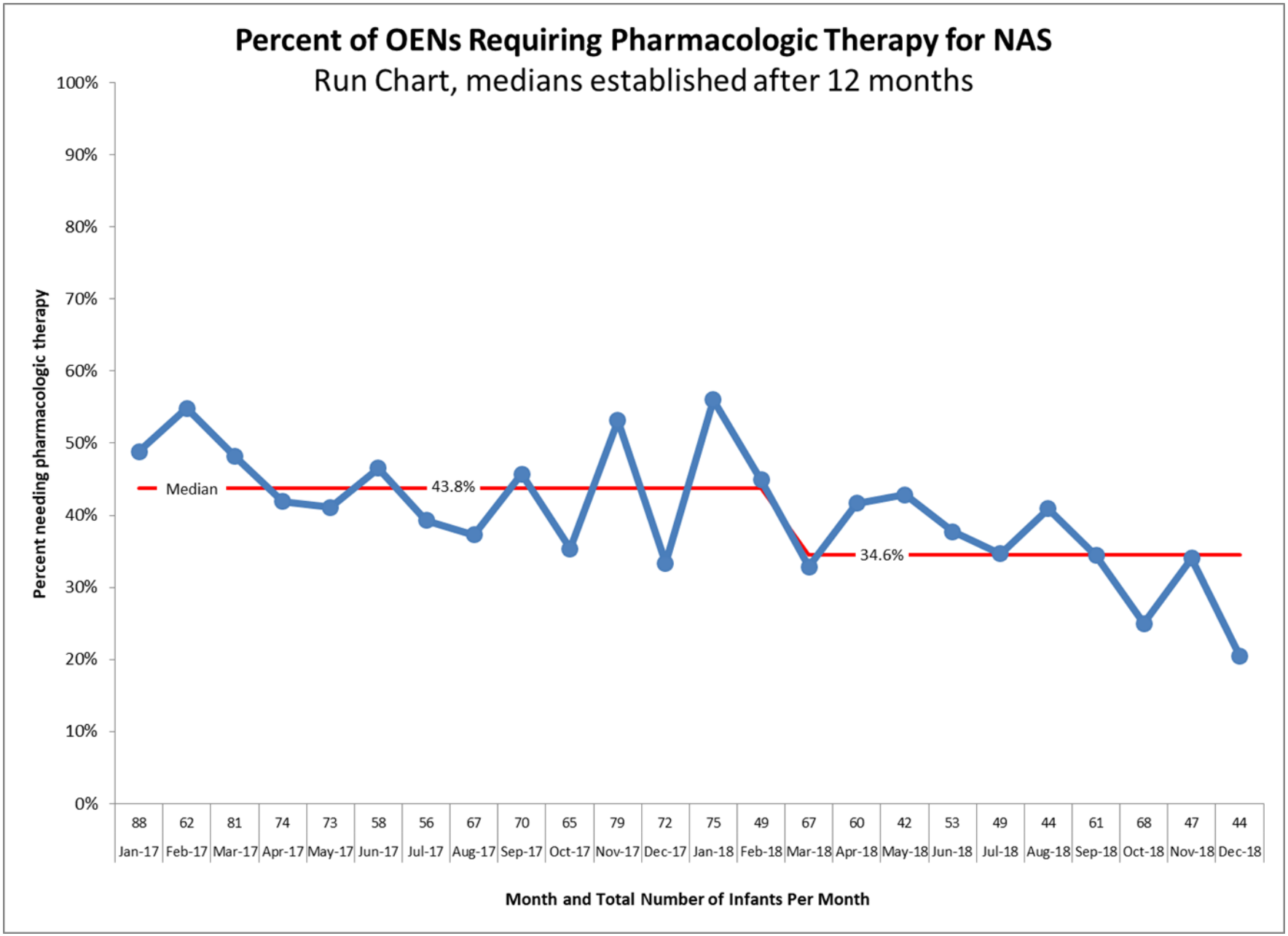
To date, about 6 Massachusetts hospitals have implemented ESC.

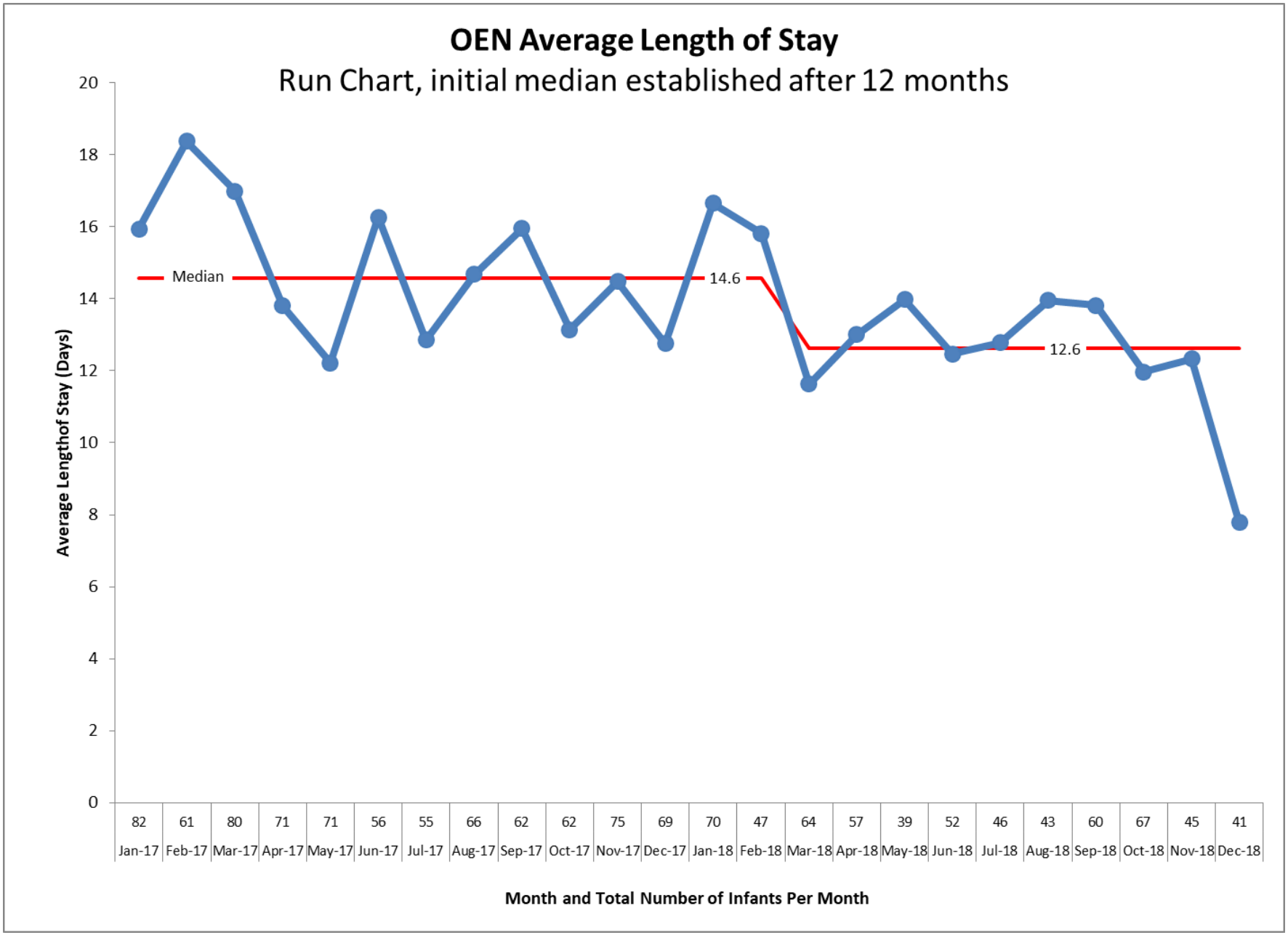
Far more have greatly improved non-pharm care practices, which may be even more important.

And how are we doing in this area?


Percent of OENs Receiving Skin to Skin in First Day of Life
Run Chart, initial median established after 12 months
Percent receiving Skin-to-Skin
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
62.4%
Median
71.7%
104 Jan-17
78 Feb-17
101 Mar-17
86 Apr-17
84 May-17
77 Jun-17
67 Jul-17
81 Aug-17
89 Sep-17
87 Oct-17
89 Nov-17
89 Dec-17
94 Jan-18
59 Feb-18
82 Mar-18
73 Apr-18
53 May-18
67 Jun-18
58 Jul-18
52 Aug-18
72 Sep-18
83 Oct-18
59 Nov-18
52 Dec-18
Month and Total Number of Infants Per Month


Percent of Term OENs Receiving Care in SCN or NICU
Run Chart, medians established after 12 months
Percent of term OENs receiving care in SCN or NICU
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Median
43.8%
34.6%
88 Jan-17
62 Feb-17
81 Mar-17
74 Apr-17
73 May-17
58 Jun-17
56 Jul-17
67 Aug-17
70 Sep-17
65 Oct-17
79 Nov-17
72 Dec-17
75 Jan-18
49 Feb-18
67 Mar-18
60 Apr-18
42 May-18
53 Jun-18
49 Jul-18
44 Aug-18
61 Sep-18
68 Oct-18
47 Nov-18
44 Dec-18
Month and Total Number of Infants Per Month


Percent of OENs Requiring Pharmacologic Therapy for NAS
Run Chart, medians established after 12 months
Percent needing pharmacologic therapy
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Median
43.8%
34.6%
88 Jan-17
62 Feb-17
81 Mar-17
74 Apr-17
73 May-17
58 Jun-17
56 Jul-17
67 Aug-17
70 Sep-17
65 Oct-17
79 Nov-17
72 Dec-17
75 Jan-18
49 Feb-18
67 Mar-18
60 Apr-18
42 May-18
53 Jun-18
49 Jul-18
44 Aug-18
61 Sep-18
68 Oct-18
47 Nov-18
44 Dec-18
Month and Total Number of Infants Per Month


OEN Average Length of Stay
Run Chart, initial median established after 12 months
Average Lengthof Stay (Days)
20
18
16
14
12
10
8
6
4
2
0
Median
14.6
12.6
82 Jan-17
61 Feb-17
80 Mar-17
71 Apr-17
71 May-17
56 Jun-17
55 Jul-17
66 Aug-17
62 Sep-17
62 Oct-17
75 Nov-17
69 Dec-17
70 Jan-18
47 Feb-18
64 Mar-18
57 Apr-18
39 May-18
52 Jun-18
46 Jul-18
43 Aug-18
60 Sep-18
67 Oct-18
45 Nov-18
41 Dec-18
Month and Total Number of Infants Per Month

Take-Home Points 2: Newborn

- Increasing engagement with families in the care of the opioid-exposed newborn after birth will improve outcomes.
- Non-pharmacologic therapy really works!
- Of note, this makes the definition of NAS messy.

Fairly important and reasonably obvious take-home point #3:

We should get as many infants with in-utero opioid exposure or NAS enrolled in Early Intervention as possible.

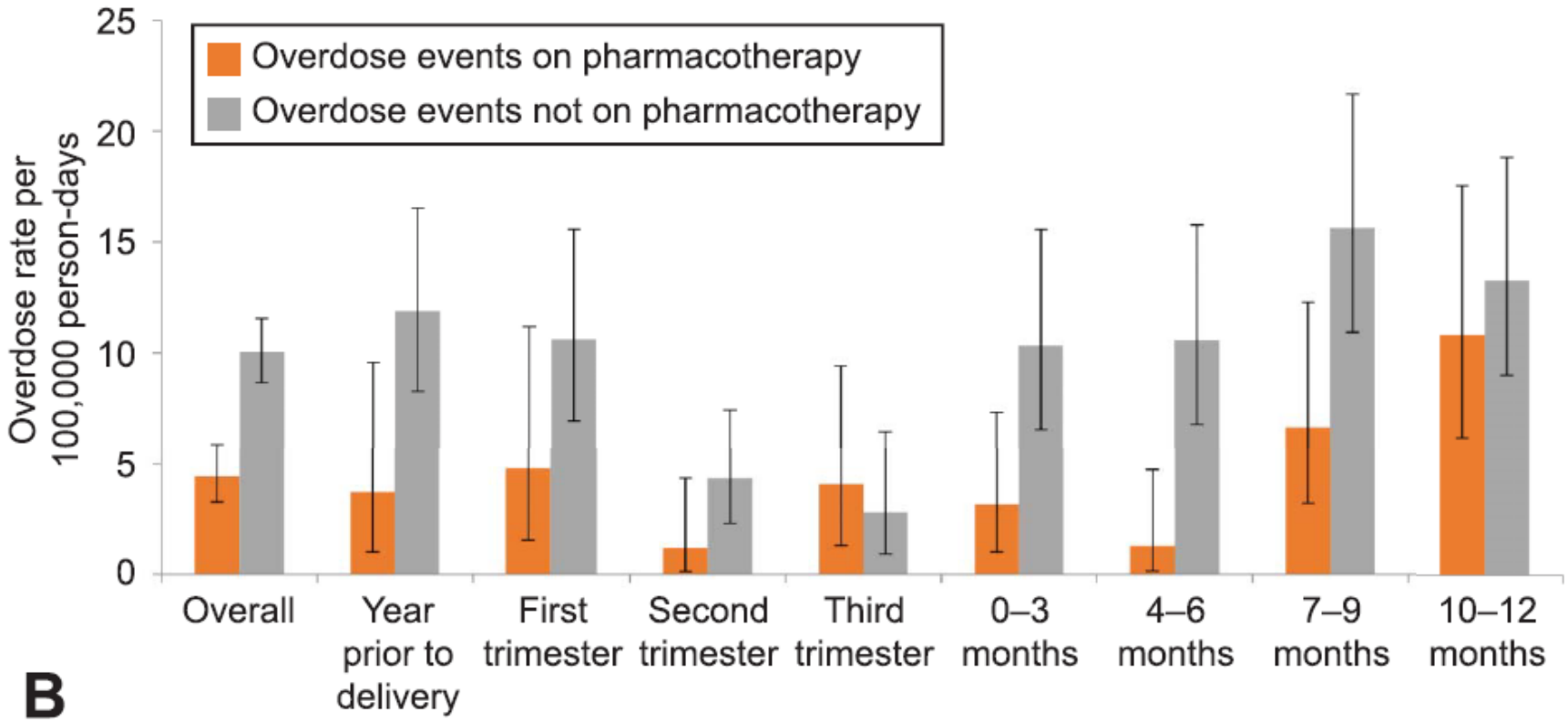
Another relatively big problem: we don't know much about **short-term outcomes** of NAS, in terms of what happens to these infants after they leave the hospital.

Fatal and Nonfatal Overdose Among Pregnant and Postpartum Women in Massachusetts

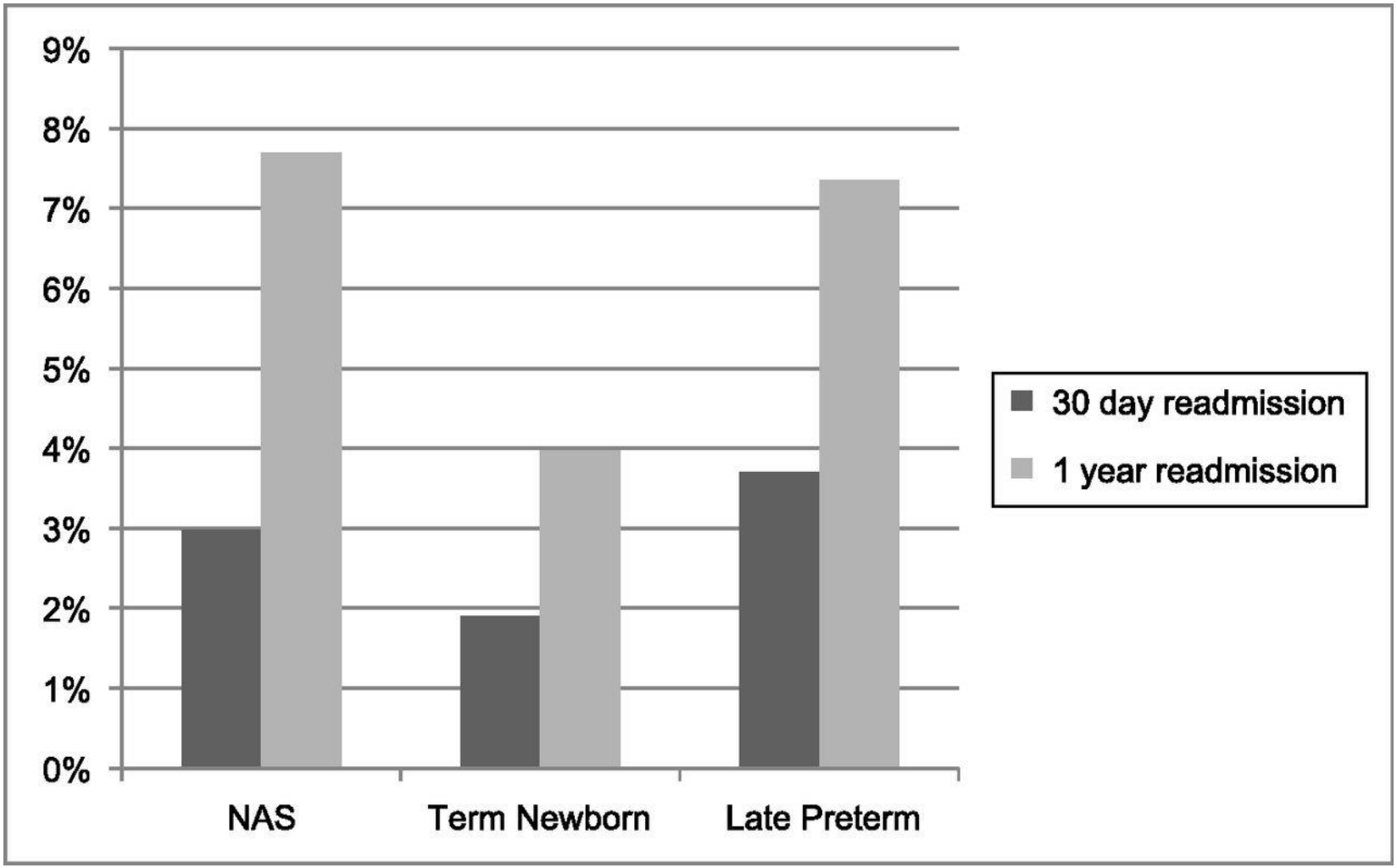
OBSTETRICS & GYNECOLOGY

VOL. 132, NO. 2, AUGUST 2018

Davida M. Schiff, MD, MSc, Timothy Nielsen, MPH, Mishka Terplan, MD, MPH, Malena Hood, MPH, Dana Bernson, MPH, Hafsatou Diop, MD, MPH, Monica Bharel, MD, MPH, Timothy E. Wilens, MD, Marc LaRochelle, MD, MPH, Alexander Y. Walley, MD, MSc, and Thomas Land, PhD

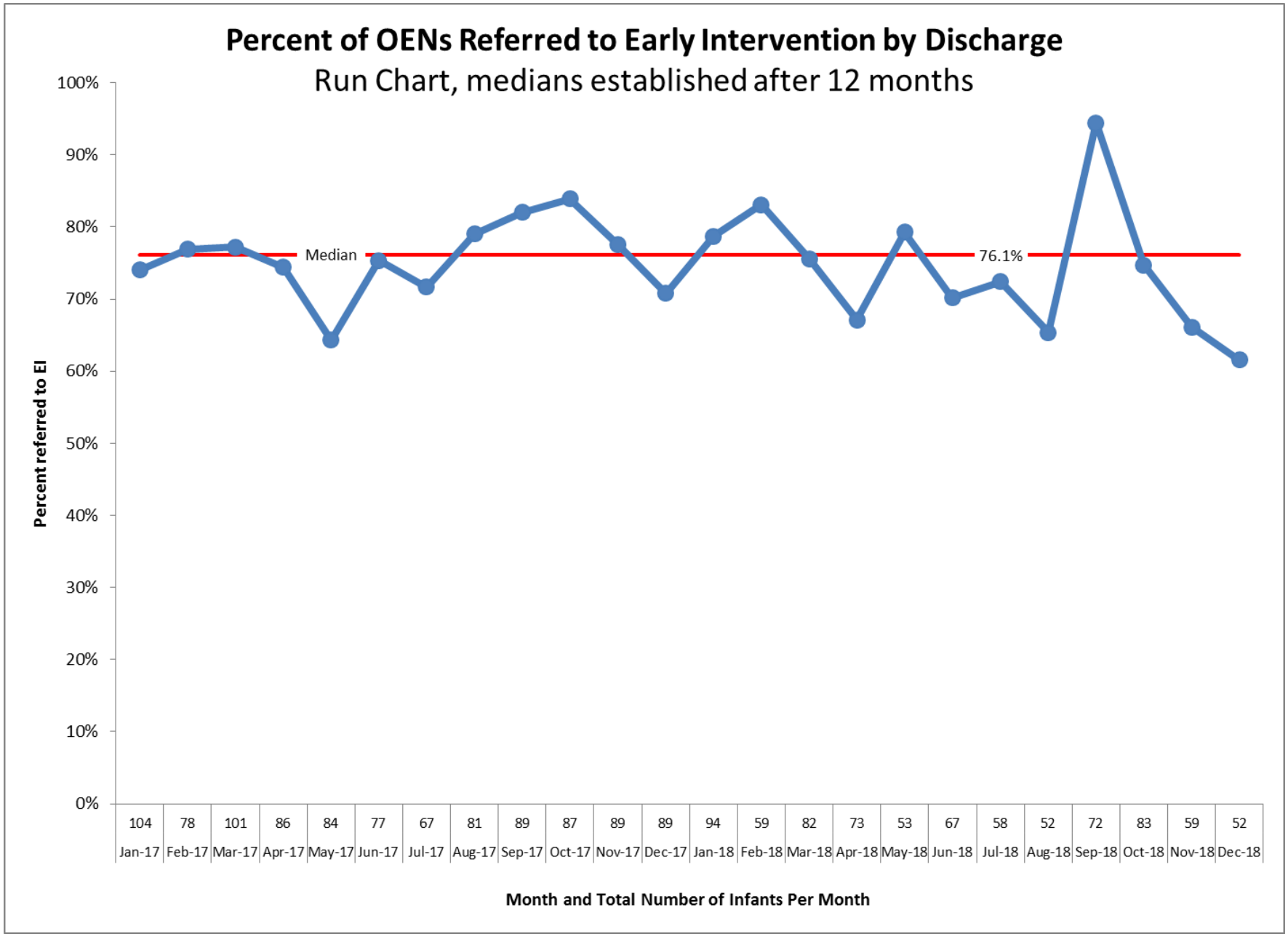


Thirty-day and 1-year hospital readmission rates, infants with NAS, New York, 2006–2009



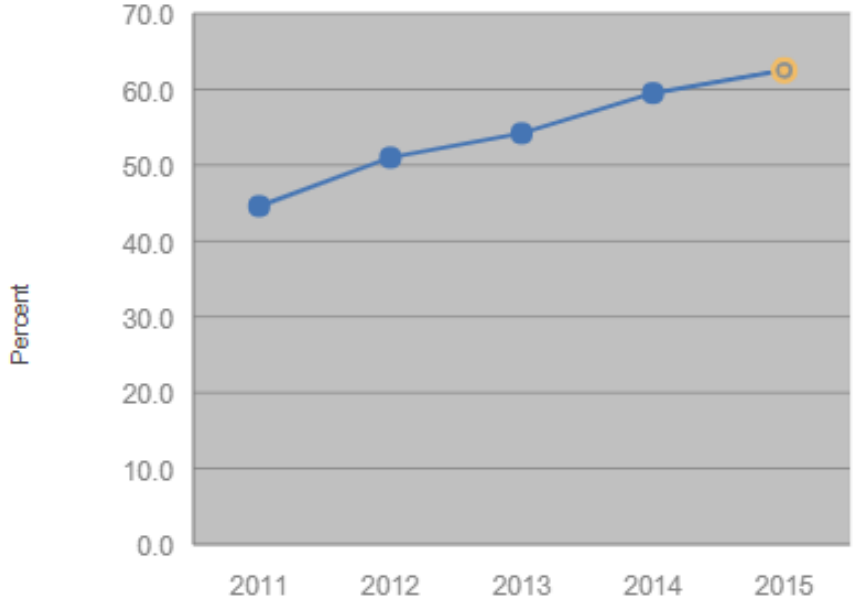
Patrick et al. Hospital Pediatrics 2015;5:513-519

And how are we doing in this area?

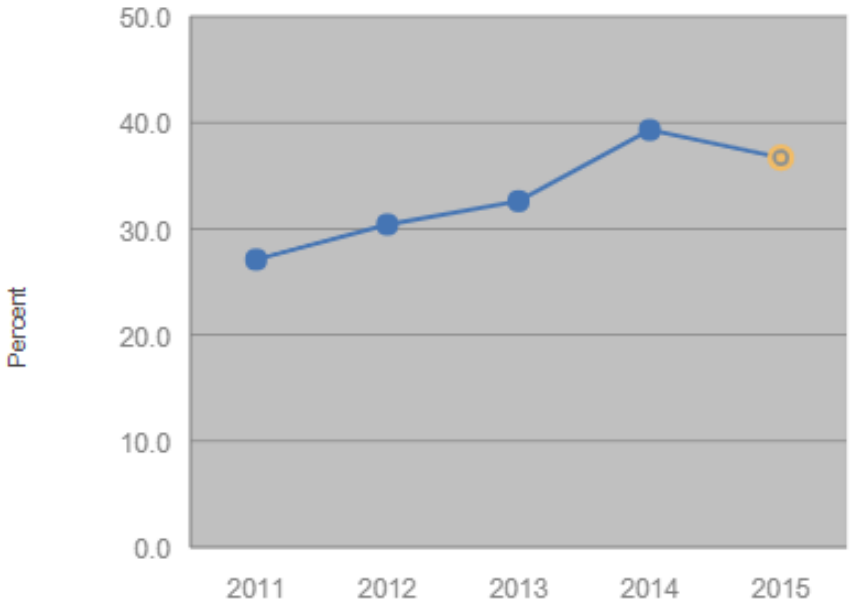

Percent of OENs Referred to Early Intervention by Discharge
Run Chart, medians established after 12 months
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent referred to EI
Median
76.1%
104 Jan-17
78 Feb-17
101 Mar-17
86 Apr-17
84 May-17
77 Jun-17
67 Jul-17
81 Aug-17
89 Sep-17
87 Oct-17
89 Nov-17
89 Dec-17
94 Jan-18
59 Feb-18
82 Mar-18
73 Apr-18
53 May-18
67 Jun-18
58 Jul-18
52 Aug-18
72 Sep-18
83 Oct-18
59 Nov-18
52 Dec-18
Month and Total Number of Infants Per Month

NAS and Early Intervention (EI)

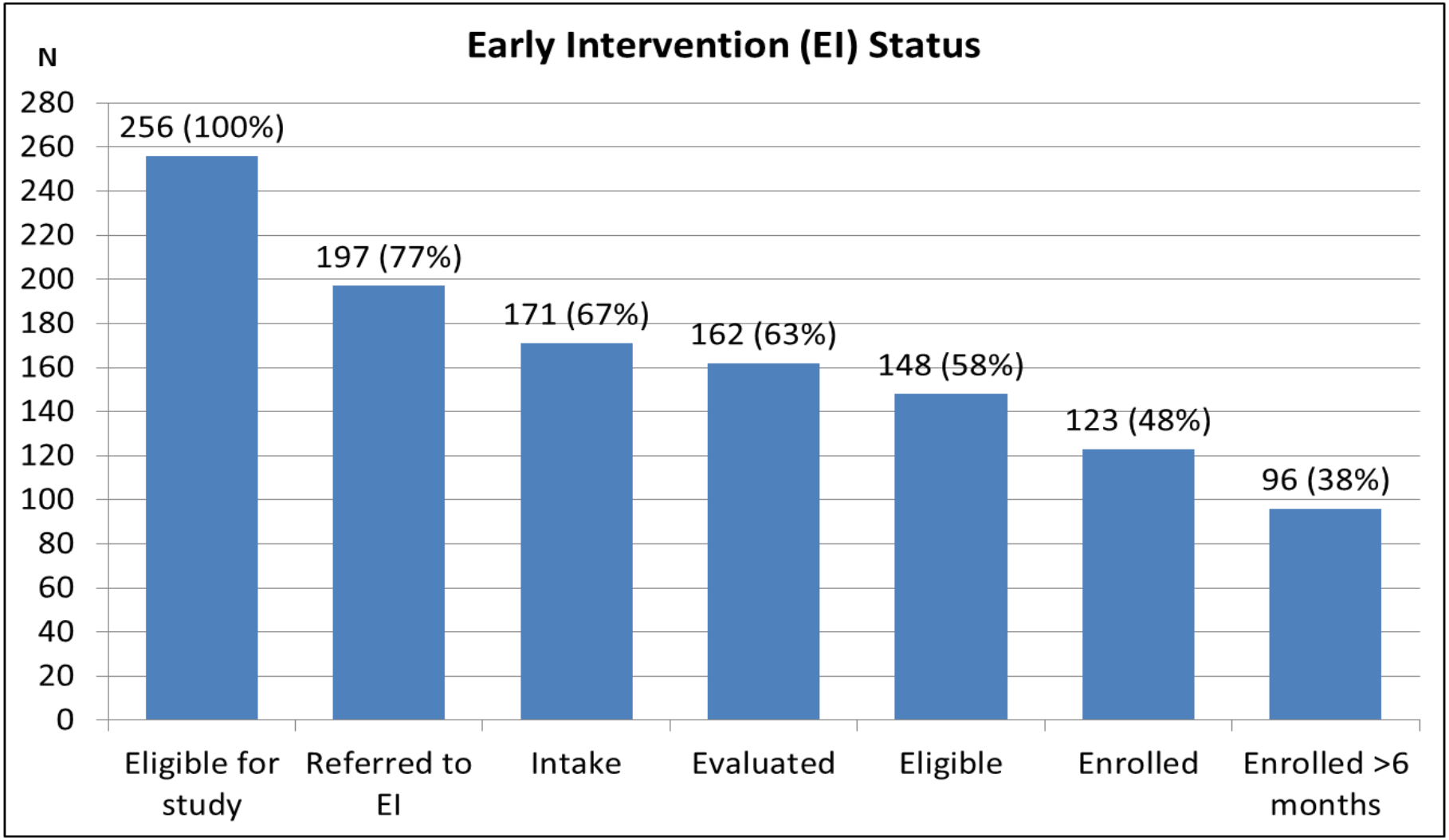
Infants with NAS REFERRED to EI within 6 months of birth



Infants with NAS ENROLLED in EI within 1 year of birth



EI Referral to Enrollment, 1 hospital



Head Start and NAS?

The *President's Commission on Combating Addiction and the Opioid Crisis* and the Bipartisan Policy Center have written that comprehensive family-centered approaches are likely to have the best outcomes for both children and parents given that more parents will have access to drug screening and treatment, allowing more children to remain with their parents and out of the child welfare system.

The federal Head Start program has provided millions of children and their parents exactly these kinds of holistic, family-centered approaches to early childhood education for more than 50 years.

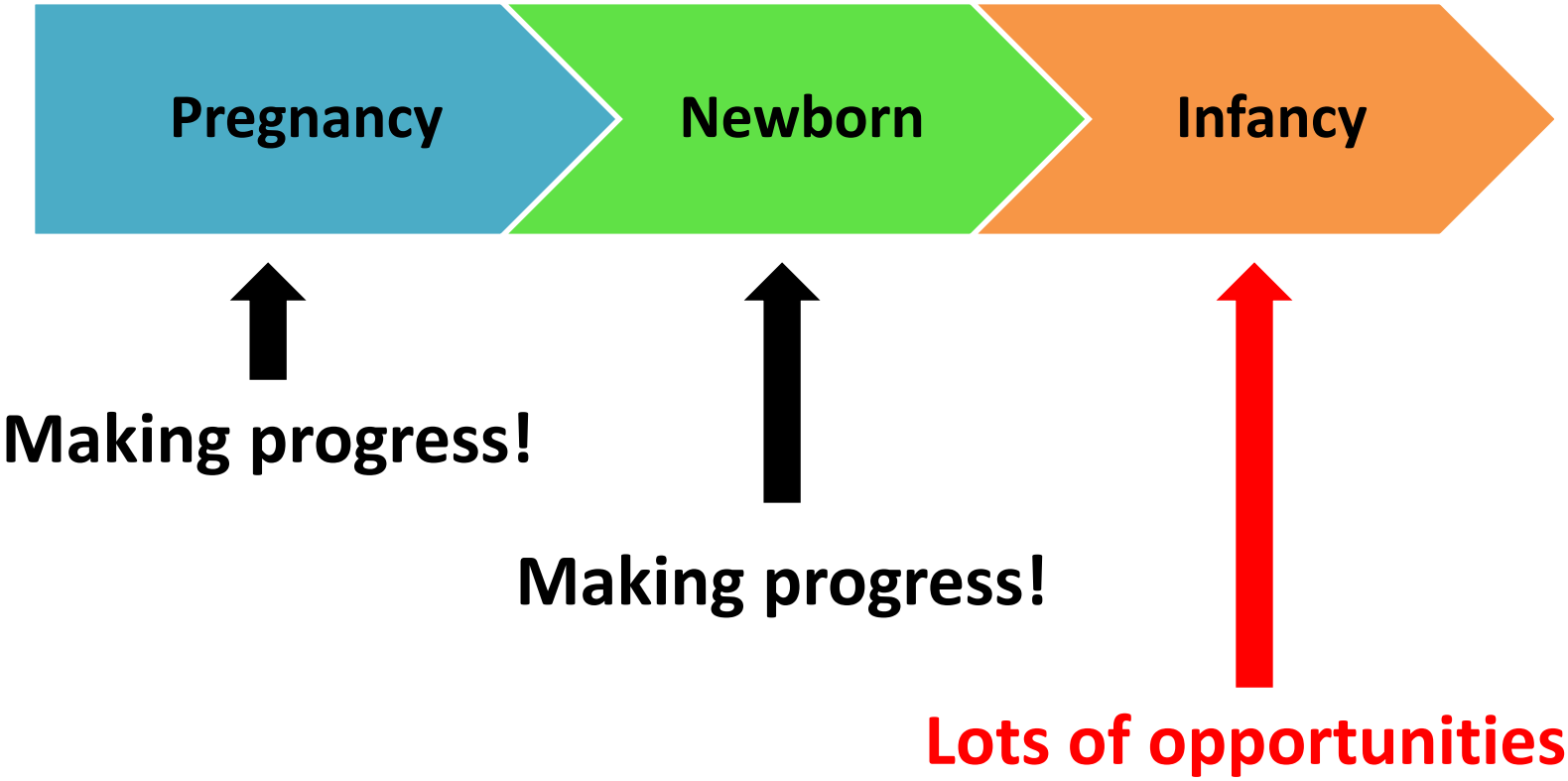
Take-Home Points 3: Infancy

- While we don't know much about what happens to these infants after discharge, we know the post-partum period is particularly high-risk for moms and babies.
- Discharge planning should include good follow-up and referrals to programs such as Early Intervention and Early Head Start.
- We need to do more work in this area!!

Improving NAS Care: Summary?

- Getting more mothers with OUD into treatment, including MAT, may be the most important improvement we can make.
- Family-centered, non-pharmacologic care after birth works, is doable, and is good for baby and family.
- We really need to think about opportunities to improve follow-up after discharge.

Addressing Substance Use Across the Perinatal Period



Final Take Home Points (really)

- State PQCs can do a LOT of different things, some easy and some not so easy, but all that add quite a bit to hospital-level and population-level improvement.
- There are real opportunities to improve the care of women with opioid use disorder and infants at risk for NAS, some which aren't that hard (and some that are).

Why Should You Participate?

Perinatal-Neonatal Quality Improvement Network of Massachusetts

Spring 2019 Summit

Improving the Care of Mothers, Infants and Families Impacted by Perinatal Opioid Use: A Massachusetts Statewide Initiative

SAVE THE DATE!

June 11th, 2019 | 8:30am to 4:30pm

Four Points by Sheraton 1125
Boston-Providence Turnpike, Norwood, MA

Keynote Address

"Optimizing Long-Term Outcomes for Opioid-Exposed Newborns: What We Know, What We Don't Know, and What We Should Do"

Hendrée E Jones, PhD
Executive Director
UNC Horizons, University of North Carolina

POSTER FAIR!!

We encourage all teams to share their work by presenting at the poster fair — this will be a highlight of the day!

Awards will be given to top posters.

For more information on abstract/poster submission, please click here.

Other Highlights: Family Experience | Hospital Presentations | Updates from the State Breakout Sessions | Data Updates | Non-pharmacologic Care | More!

Register HERE. CMEs and CEUs will be provided.

Thank you to all of our hospitals, partners, and families.

Join us on June 11th!
www.neoqicma.org