SAP

SOCIEDAD ARGENTINA DE PEDIATRÍA

The Keys to Collaborative Quality Improvement

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The Keys to Collaborative Quality Improvement

Disclosure

Dr. Soll is President of Vermont Oxford Network
And Coordinating Editor of Cochrane Neonatal

No other relevant financial issues to disclose.

The Keys to Collaborative Quality Improvement

- Understand how to use available data sources to evaluate your practice
- Understand how to choose measures
- Understand the value of benchmarking
- Understand what “potentially better practices” might lead to improvement
- Judge if your “change” has led to “improvement”

The Keys to Collaborative Quality Improvement

There has been a transition of neonatal networks from **research networks** to **“improvement” networks**.

Research networks have grown and evolved into networks dedicated to improvement of patient care at all member centers.

The primary mission of **neonatal quality improvement networks** is to improve care for infants, not necessarily to perform the traditional research activities of the large trials networks

Vermont Oxford Network

Infants Gestational Age 27 to 29 Weeks
Interquartile Ranges 2017

	Lowest Quartile	Highest Quartile
Antenatal Steroids	80%	97%
Cesarean Delivery	64%	84%
Delivery Room CPAP	22%	56%
DR Tracheal Intubation	65%	97%
DR Surfactant Administration	0%	36%

Over 22,000 Infants at NICUs in the Vermont Oxford Network

Vermont Oxford Network

Infants Gestational Age 27 to 29 Weeks
Interquartile Ranges 2017

	Lowest Quartile	Highest Quartile
Mortality	0%	11%
CLD @ 36 weeks PMA	7%	31%
Pneumothorax	0%	6%
Severe IVH	0%	7%

Over 22,000 Infants at NICUs in the Vermont Oxford Network

The Keys to Collaborative Quality Improvement

Variation in Outcome

- Case Mix
- Random Chance
- Unexplained
  - Effectiveness of Care?

The Keys to Collaborative Quality Improvement

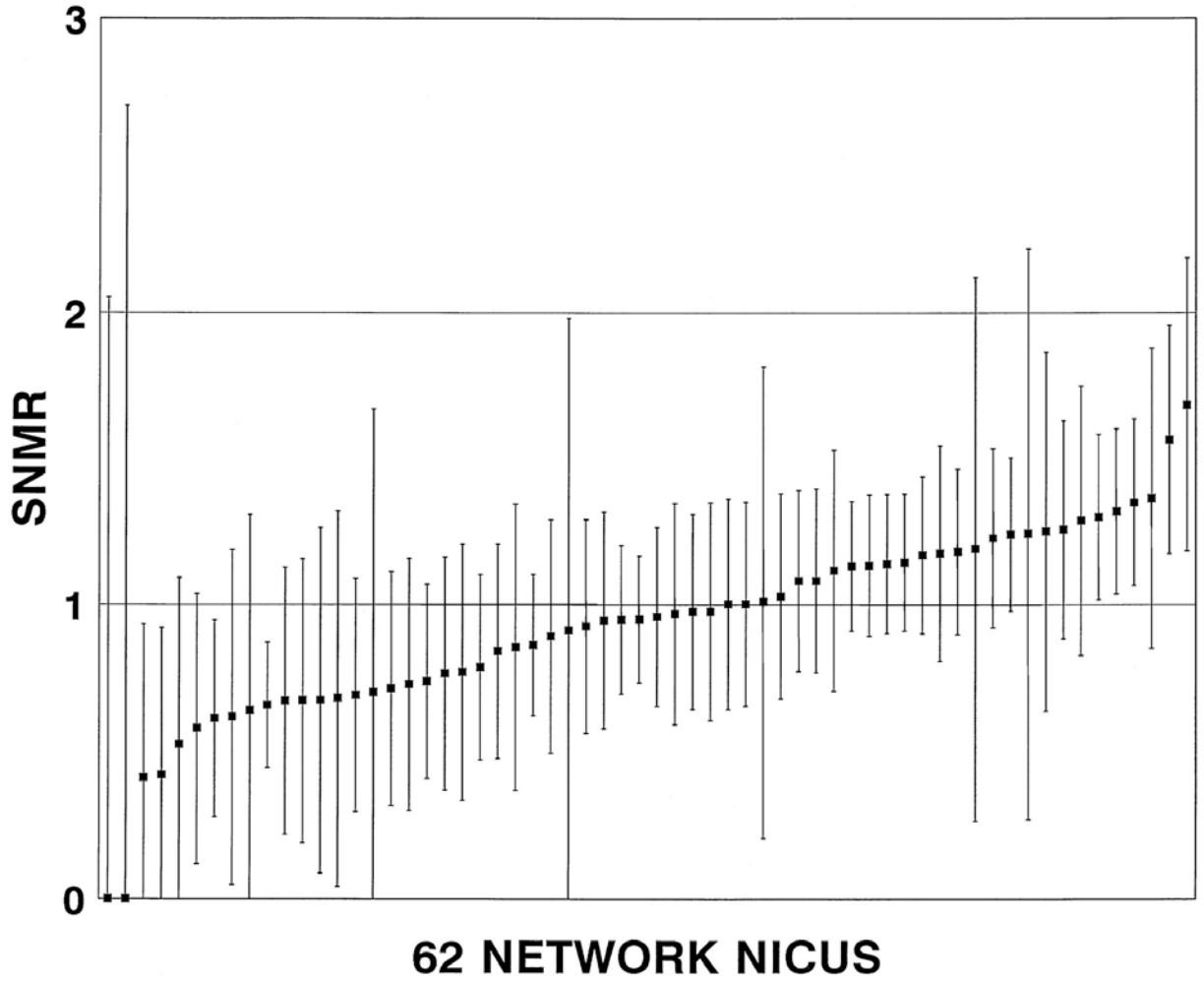
Sources of unexplained variation

- unmeasured risk
- practices
- processes
- people and staffing
- organizational structure and culture

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

Standardized neonatal mortality ratios (SNMRs) with 95% confidence intervals for 62 neonatal intensive care units (NICUs) in the Vermont Oxford Network, 1991–1992.



Horbar J D et al. Pediatrics 1997;99:149-156

Quality Measures and Benchmarking

1. Understand how to use available data sources to evaluate your practice

VERMONT OXFORD NETWORK

Nightingale

Where's my Center's Data?

You need reliable data....

The Keys to Collaborative Quality Improvement

- In order to identify opportunities for quality improvement, data are necessary to determine performance relative to current performance or peer-derived benchmarks.
- Once quality improvement is undertaken, data are used to track the effect of changes and interventions to assess the impact of quality improvement and to determine next steps.

Nightingale Tables and Charts

- Overview v
- Key Performance Measures
- Admissions and Discharges
- Infant Characteristics
- Initial Resuscitation
- Respiratory Care
- Respiratory Outcomes
- Infection
- Surgery
- PIH and PVL
- Retinopathy of Prematurity
- Feeding at Discharge
- Growth
- Length of Stay

proceed to view tables and charts on your center's data.

a

lightingale within 30 minutes of when VON receives a file. Each Nightingale page has a footnote that notifies data from your center.

ion

eading teams from around the world in Vermont Oxford Network's 2015 Quality Improvement Collaboratives.

uctory webinar to learn about Nightingale's features. If you are interested in participating, please email Erika ail with directions on how to connect.

• November 21 at 12:00 PM Eastern Time

Did you Know?

- Data management tools, recorded presentations and more are available in the Member's Area.
- Clicking on the question mark icon ? next to any measure opens the Data Definitions.
- From the Reporting drop-down menu, choose "Report Download" to download your center's annual and quarterly reports in PDF format.
- When you are in the "Nightingale Tables and Charts" section you can save what you're looking at by selecting "Add to Workspace" from the "Save Options" menu.

Category: Key Performance Measures | Population: All VLBW Infants | Location: All Infants | Comparison Group: Network

Measure: All | Group By: | Year: 2013

Center 999 and Network Values

Key Performance Measures - All VLBW Infants

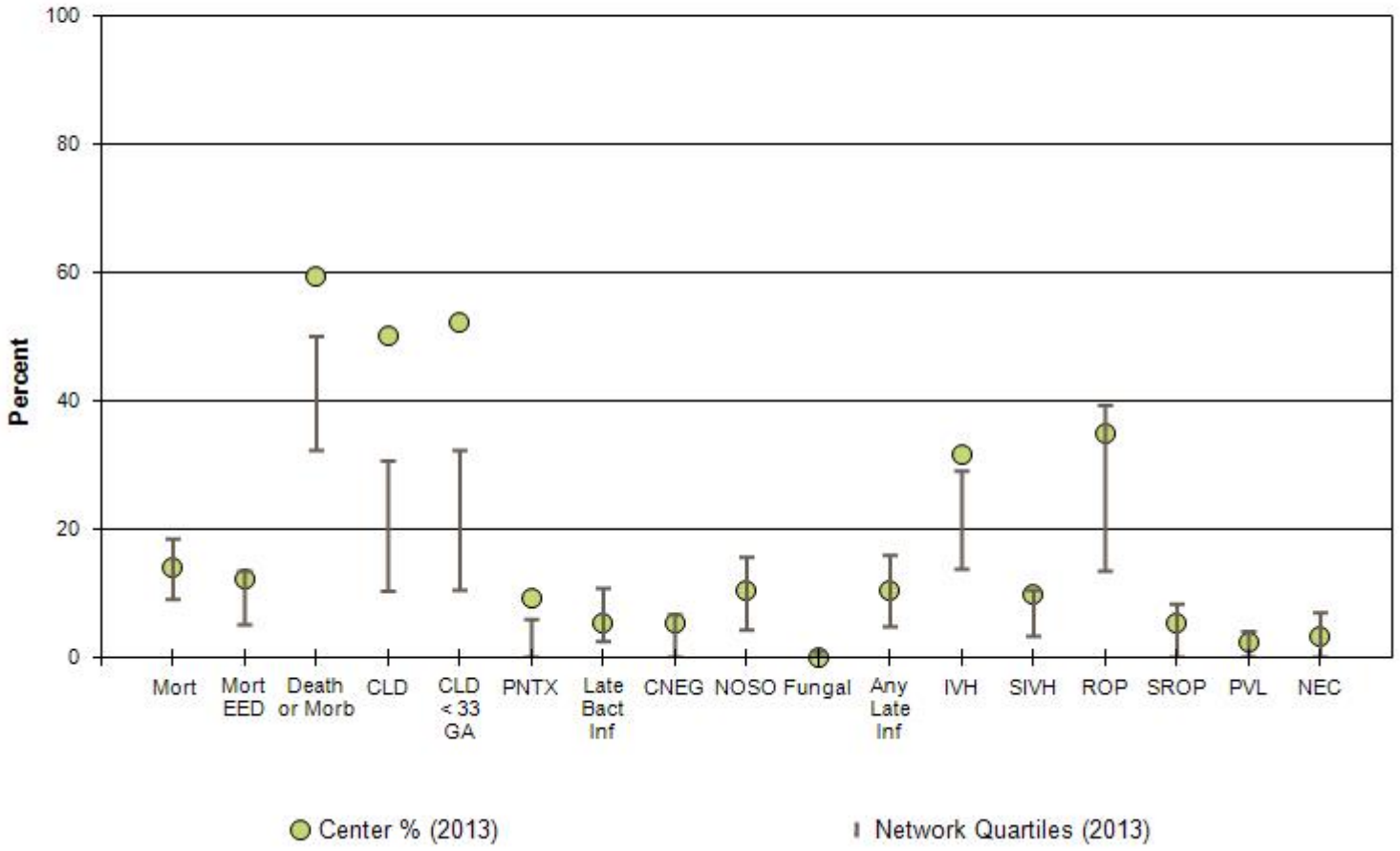
Measure	Center (2013) Cases	Center (2013) N	Center (2013) %	Network (2013) N	Network (2013) %	Network (2013) Q1	Network (2013) Q3
Mortality							
Mortality RA	14	101	13.9%	60,047	14.6%	9.1%	18.5%
Mortality Excluding Early Deaths RA	12	99	12.1%	57,034	10.1%	5.1%	13.5%
Death or Morbidity							
Death or Morbidity RA	60	101	59.4%	59,807	43.9%	32.3%	50.0%
Chronic Lung Disease							
Chronic Lung Disease RA	39	78	50.0%	51,167	24.4%	10.3%	30.6%
CLD: Infants < 33 Weeks RA	38	73	52.1%	46,942	26.0%	10.5%	32.3%
Pneumothorax							
Your Center RA	9	99	9.1%	58,516	4.0%	0.0%	5.7%
Any Location RA	9	99	9.1%	58,516	4.3%	0.0%	5.9%
Late Bacterial Infection							
Your Center RA	5	96	5.2%	55,985	7.9%	2.2%	10.3%
Any Location RA	5	96	5.2%	55,989	8.2%	2.5%	10.8%
Coagulase Negative Staph							
Your Center RA	5	96	5.2%	55,993	5.2%	0.0%	6.5%
Any Location RA	5	96	5.2%	55,994	5.3%	0.0%	6.7%
Nosocomial Infection							
Your Center RA	10	96	10.4%	55,987	11.5%	4.0%	14.8%
Any Location RA	10	96	10.4%	55,990	11.9%	4.3%	15.6%
Fungal Infection							
Your Center RA	0	96	0.0%	55,997	0.9%	0.0%	0.9%
Any Location RA	0	96	0.0%	55,998	1.0%	0.0%	0.9%
Any Late Infection							
Your Center RA	10	96	10.4%	55,987	11.9%	4.3%	15.3%
Any Location RA	10	96	10.4%	55,990	12.3%	4.8%	15.9%
Any IVH							
Your Center RA	28	92	30.4%	53,222	23.0%	12.5%	27.3%
Any Location RA	29	92	31.5%	53,280	24.4%	13.8%	29.1%
Severe IVH							
Any Location RA	9	92	9.8%	53,280	8.1%	3.3%	10.5%

Vermont Oxford Network: Center 999
Key Performance Measures

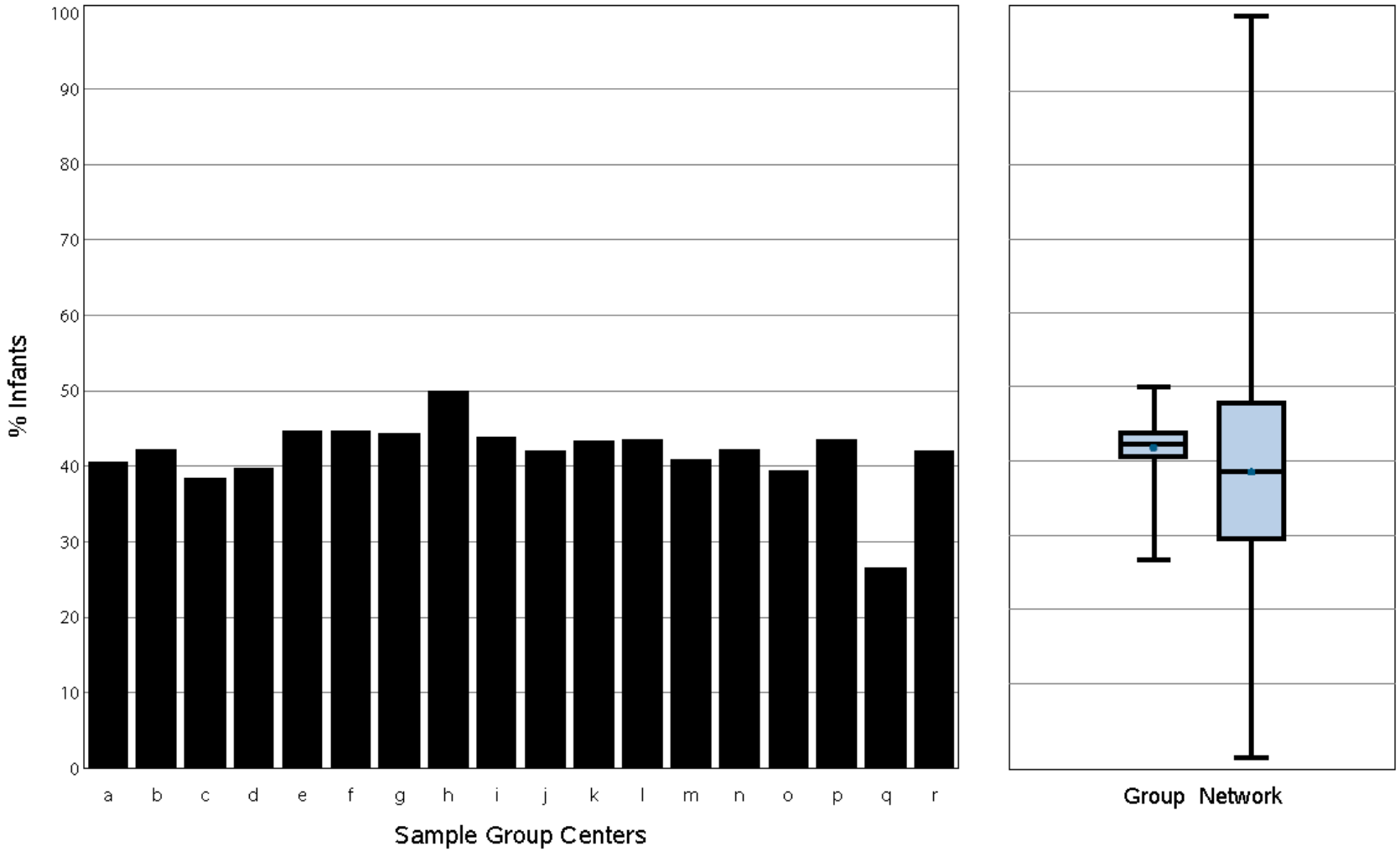
Center 999 and Network Values

Key Performance Measures - All VLBW Infants

Chart Type: Center and Group Quartiles Chart



Infants 501 to 1500 Grams Born in 2014: Death or Morbidity



Quality Measures and Benchmarking

2. Let’s discuss measures...

What might make you pick a measure?

Vermont Oxford NETWORK

Nightingale

Home | Save Options | Reporting | Tools | Log Out

Category: Key Performance Measures | **Population:** All VLBW Infants | **Location:** All Infants | **Comparison Group:** Network

Measure: All | **Group By:** | **Year:** 2013

Center 999 and Network Values

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Chronic Lung Disease: Center 999 52.1%; VON 26.0% (1st quartile 10.5%, 3rd quartile 32.3%)

Vermont Oxford Network: Center 999
Chronic Lung Disease in Infants < 33 weeks' gestation

Vermont Oxford NETWORK

Nightingale

Home | Save Options | Reporting | Tools | Log Out

Category: Respiratory Outcomes
Population: All VLBW Infants
Location: All Infants
Comparison Group: Network
Measure: -- CLD: Infants < 33 Weeks
Group By:
Year: 2013

Birth Wgt 5 Levels
Birth Wgt 10 Levels
GA Category
GA Weeks
Birth Location
Birth Year

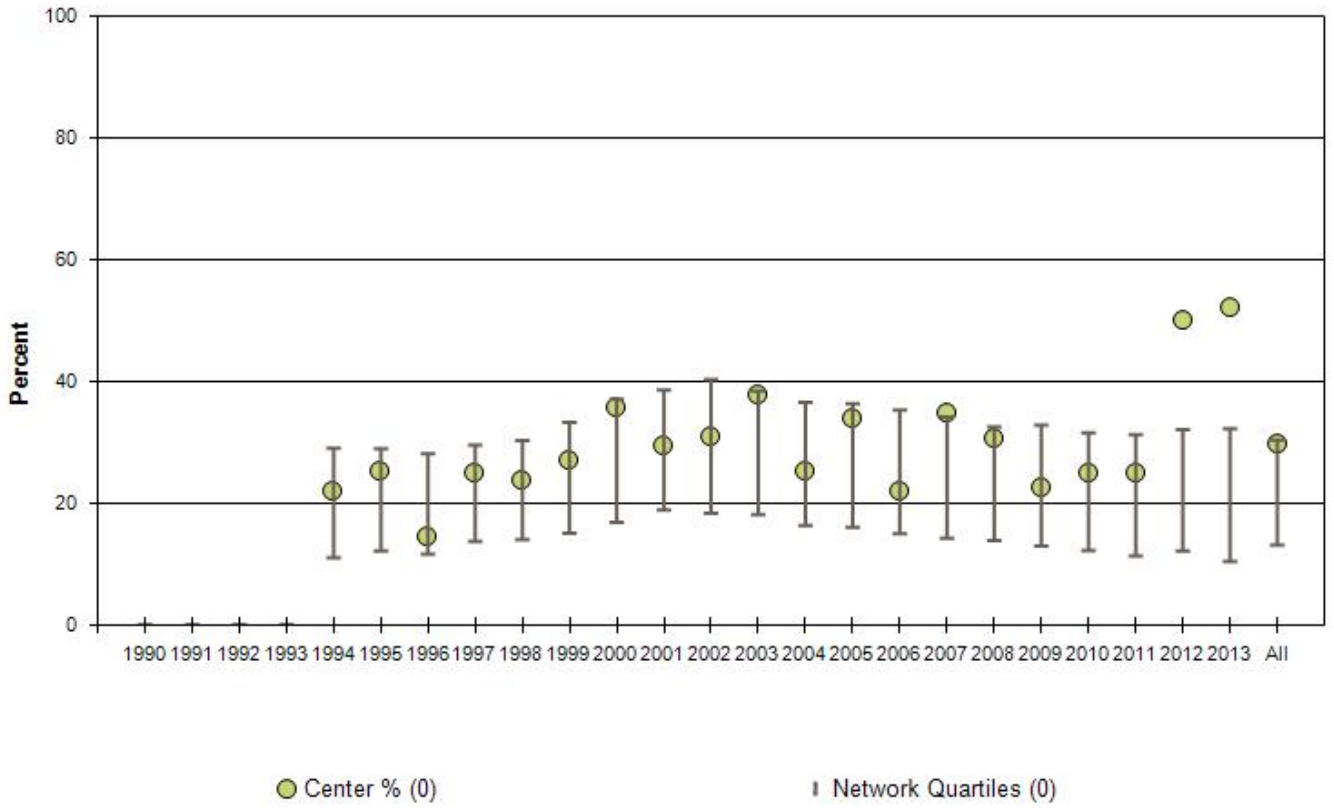
Center 999 and Network Values
espiratory Outcomes - All VLBW Infants
CLD: Infants < 33 Weeks
Birth Wgt 5 Levels

	Center (2013)			Network (2013)			
Birth Wgt 5 Levels	Cases	N	%	N	%	Q1	Q3
< 501	1	1	100.0%	612	77.5%	66.7%	100.0%
501-750	11	12	91.7%	6,413	63.4%	40.0%	84.2%
751-1000	11	19	57.9%	11,095	36.0%	12.6%	50.0%
1001-1250	9	20	45.0%	13,031	16.9%	0.0%	25.0%
> 1250	6	21	28.6%	15,791	9.1%	0.0%	12.5%
All	38	73	52.1%	46,942	26.0%	10.5%	32.3%

Vermont Oxford Network: Center 999
Chronic Lung Disease by Year

Center 999 and Network Values
Respiratory Outcomes - All VLBW Infants
CLD: Infants < 33 Weeks
Birth Year

Chart Type: Center and Group Quartiles Chart



Quality Measures and Benchmarking

More on measures....

Are these measures meaningful?

The differences between "research data" and "quality data"

	Measurement for improvement	Measurement for research
Purpose	implement current knowledge	discover new knowledge
Tests	sequential small observational tests	one tightly controlled test
Biases	attempt to stabilize bias from test to test	maximally controlled
Data	gather "just enough" to learn from	gather as much as possible
Duration	multiple short test cycles	months or years

Ellsbury DL, Ursprung R. A primer on quality improvement methodology in neonatology. Clin Perinatol. 2010 Mar;37(1):87-99.

JAMA Pediatrics

Revisiting the Definition of Bronchopulmonary Dysplasia: Effect of Changing Panoply of Respiratory Support for Preterm Neonates

Tetsuya Isayama, MD; Shoo K. Lee, MBBS, PhD; Junmin Yang, MSc; David Lee, MD; Sibasis Daspal, MD; Michael Dunn, MD; Prakesh S. Shah, MD, MSc; for the Canadian Neonatal Network and Canadian Neonatal Follow-Up Network Investigators

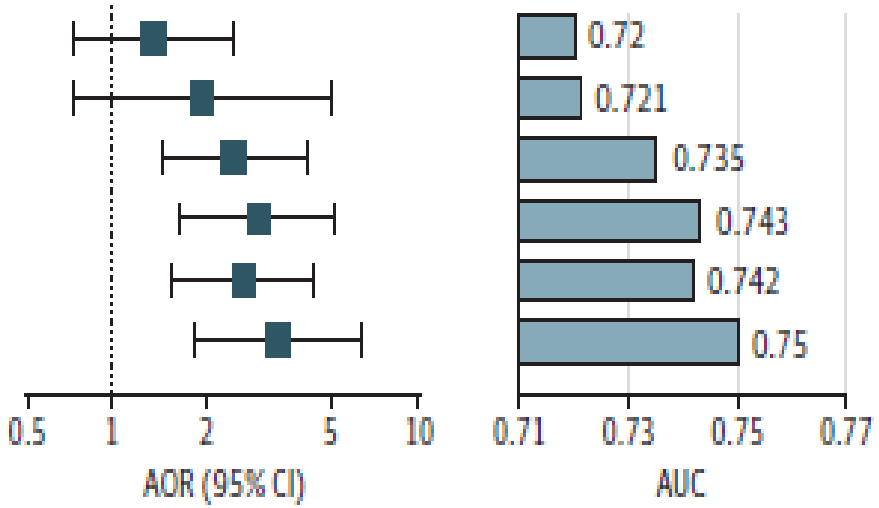
JAMA Pediatrics 2017 doi:10.1001/jamapediatrics.2016.4141

JAMA Pediatrics

Association of 6 Traditional Bronchopulmonary Dysplasia (BPD) Definitions With Adverse Outcomes at 18 to 21 Months of Age

A Serious respiratory morbidity

Traditional BPD Definitions	Adverse Outcome In BPD (+) Infants	Adverse Outcome In BPD (−) Infants	AOR (95% CI)[a]
Oxygen, 28 d	71/893 (8.0)	17/513 (3.3)	1.3 (0.7-2.4)
Oxygen/RS, 28 d	81/1123 (7.2)	7/283 (2.5)	1.9 (0.7-5.0)
Oxygen, 28 d and Oxygen/RS 36 wk PMA	62/579 (10.7)	26/827 (3.1)	2.4 (1.4-4.2)
Oxygen/RS, 28 d and 36 wk PMA	66/620 (10.7)	22/786 (2.8)	2.9 (1.6-5.2)
Oxygen, 36 wk PMA	61/548 (11.1)	27/858 (3.2)	2.6 (1.5-4.4)
Oxygen/RS 36 wk PMA	69/652 (10.6)	19/754 (2.5)	3.4 (1.8-6.3)



Definitions using oxygen requirement alone as the criterion at various postmenstrual ages were less predictive compared with those using the criterion of oxygen/respiratory support (RS) (receiving supplemental oxygen and/or positive-pressure RS)

Among those, oxygen/RS at 36 weeks had the highest AOR and area under the curve (AUC) for all outcomes.

Quality Measures and Benchmarking

More on measures....

What processes would you follow?
What “balancing” measures might exist?

Vermont Oxford Network: Center 999
Nasal CPAP

Getting Started

VON Vermont Oxford NETWORK

Nightingale

Home | Save Options | Reporting | Tools | Log Out

Category: Respiratory Care

Population: All VLBW Infants

Location: All Infants

Comparison Group: Network

Measure: -- Nasal CPAP

Group By:
- Birth Wgt 5 Levels V
- Birth Wgt 10 Levels
- GA Category
- GA Weeks
- Birth Location
- Birth Year

Year: 2013

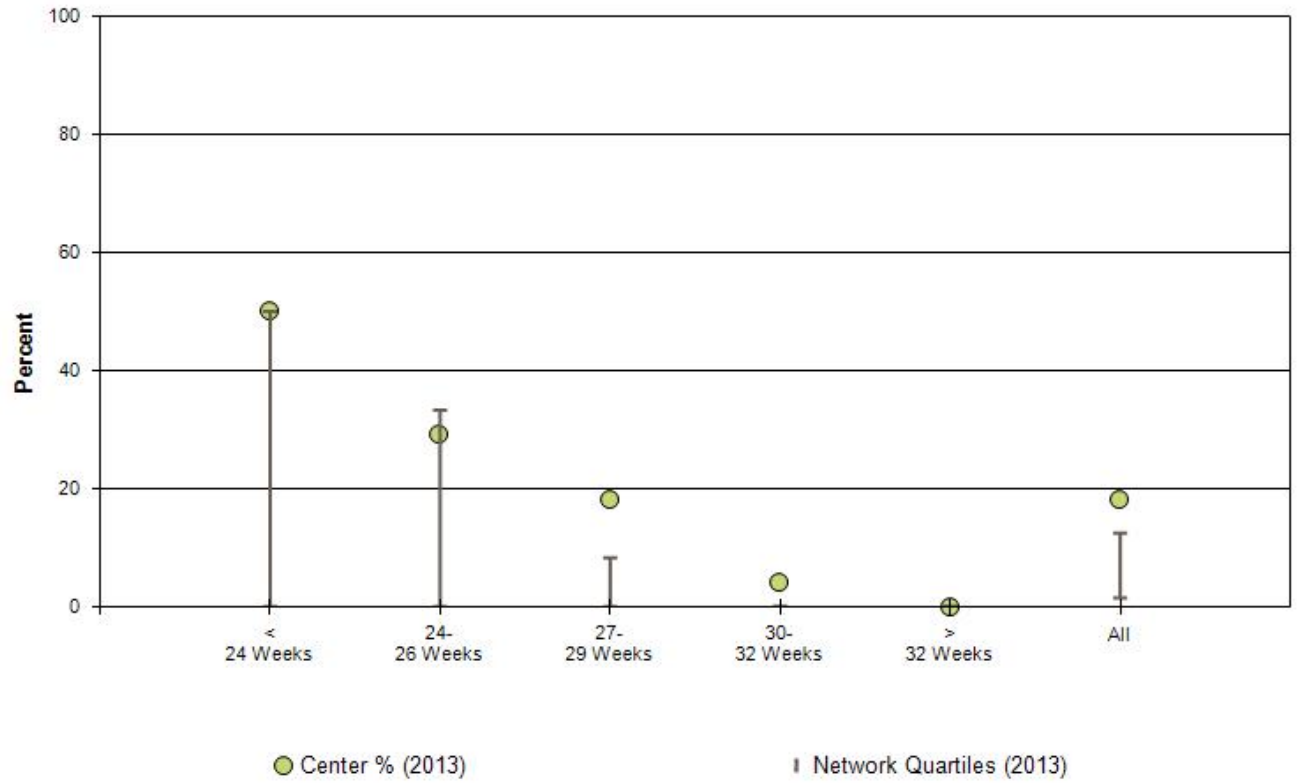
Center 999 and Network Values
espiratory Care - All VLBW Infants
Nasal CPAP
Birth Wgt 5 Levels

	Center (2013)			Network (2013)			
Birth Wgt 5 Levels	Cases	N	%	N	%	Q1	Q3
< 501	1	2	50.0%	1,391	47.2%	0.0%	100.0%
501-750	8	17	47.1%	9,458	70.4%	50.0%	84.2%
751-1000	13	24	54.2%	13,034	83.7%	68.8%	96.4%
1001-1250	14	26	53.8%	14,722	79.2%	66.7%	93.3%
> 1250	18	30	60.0%	19,885	66.1%	50.0%	81.8%
All	54	99	54.5%	58,490	73.5%	61.1%	83.3%

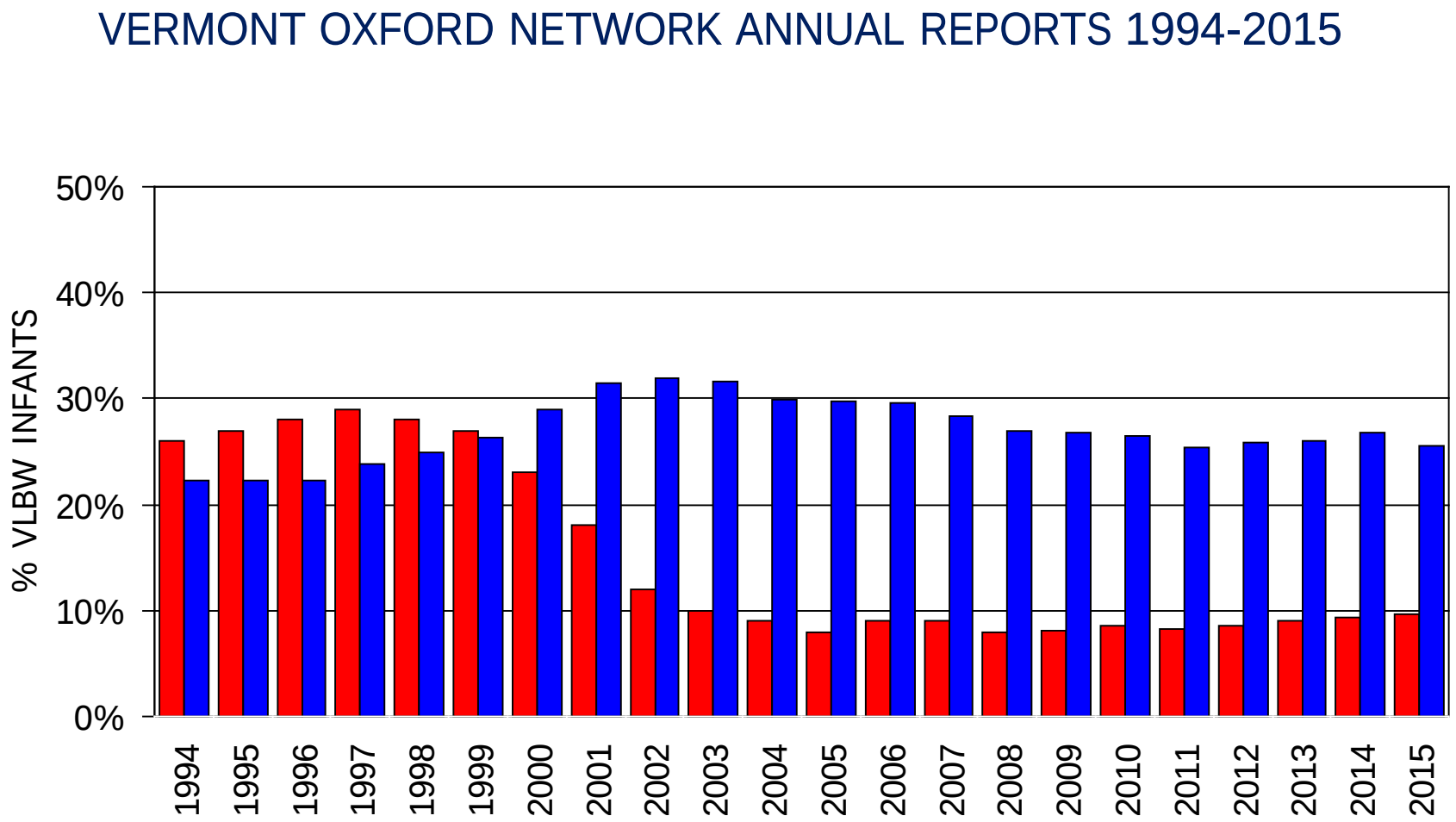
Vermont Oxford Network: Center 999
Steroids for Chronic Lung Disease

Center 999 and Network Values
Respiratory Care - All VLBW Infants
Steroids for CLD - Any Location
GA Category

Chart Type: Center and Group Quartiles Chart



Postnatal Corticosteroid Use and Chronic Lung Disease in VLBW Infants



Quality Measures and Benchmarking

3a. How not to do quality improvement

Reducing Nosocomial Infection

Ignaz Philipp Semmelweis

- Hungarian physician
- Puerperal fever
- Handwashing
- Mortality falls from 18.3 to 1.3%

Reducing Nosocomial Infection

QI Initiative

Outcome

Courtesy of R. Pfister

Quality Measures and Benchmarking

3b. How **to do** quality improvement:

Collaborative quality improvement and benchmarking

Data are NOT Enough!

- Data are necessary but not sufficient
- NICU teams need
  - Motivation
  - Training
  - Skills
  - Tools and Resources

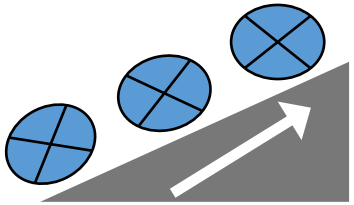
Vermont Oxford Network iNIC/Q Project

NICUs formed multidisciplinary teams that worked together under the direction of a trained facilitator over a 3-year period beginning in January 1995.

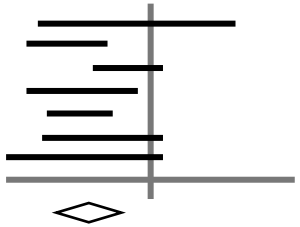
They received instruction in quality improvement, reviewed performance data, identified common improvement goals, and implemented "potentially better practices" developed through analysis of the processes of care, literature review, and site visits.

Four Key Habits

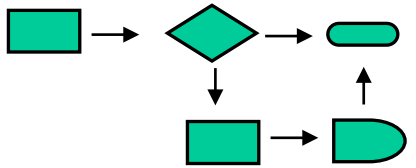
1. The habit for change



2. The habit for evidence-based practice



3. The habit for systems thinking



4. The habit for collaborative learning

Organizational Culture

What is a Team?

Individual Brilliant Physician/Nurse

vs.

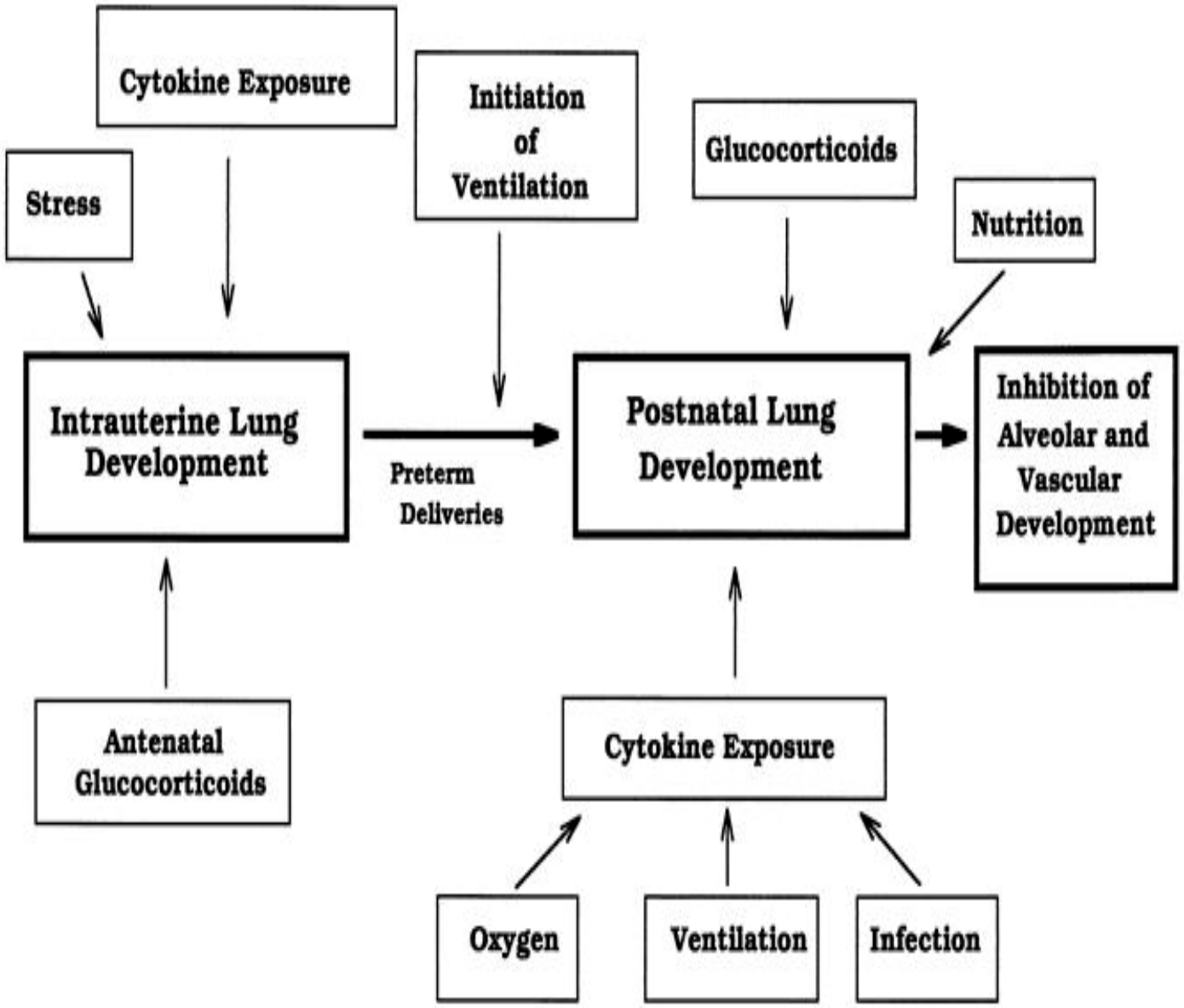
Highly Functional Team

What type of team are you on?

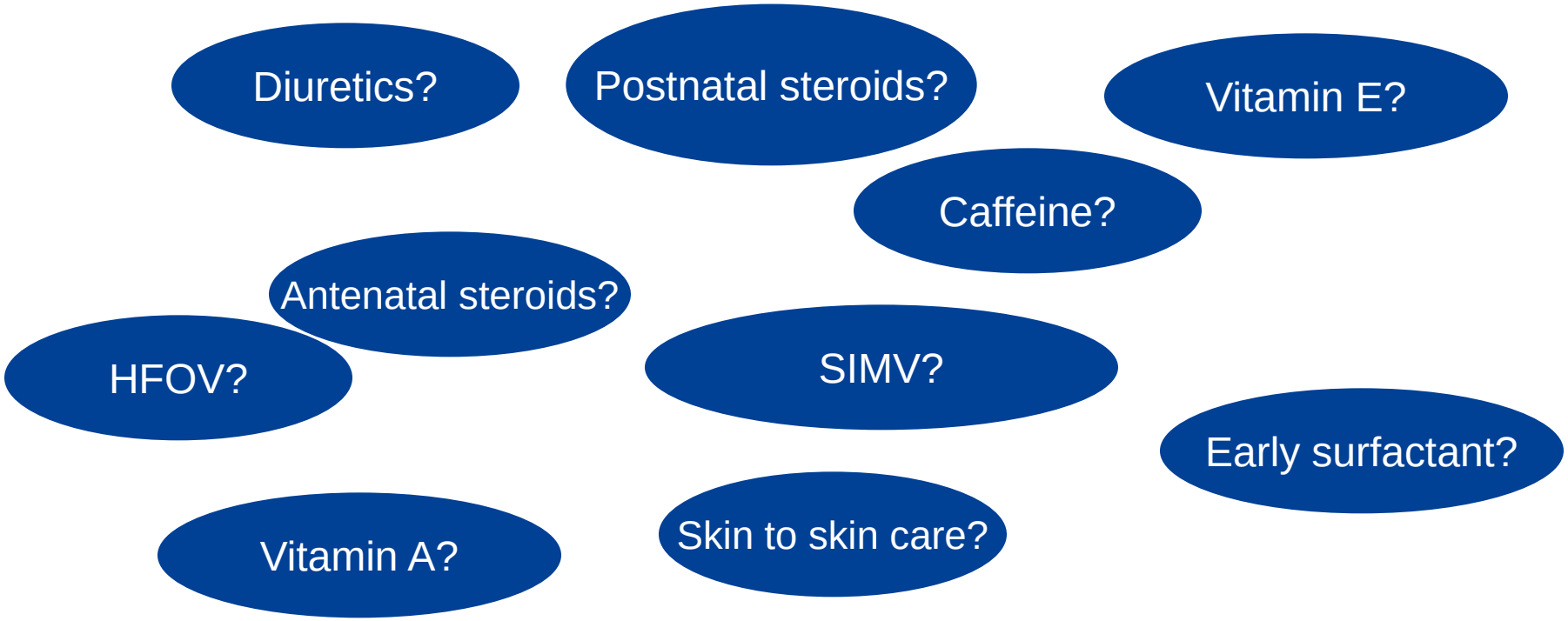
Quality Measures and Benchmarking

Where do change ideas come from?

Chronic Lung Disease



Evidence Based?



Improvement Formula

Do What?
Evidence Based Medicine

Do How?
Evidence Based Practice

Batalden, PB, Davidoff F. Qual Saf Health Care 2007;16:2-3

QSHC ONLINE

Difficulty of Translating Evidence to Practice

Efficacy: The benefit of using an intervention for a particular problem under ideal conditions, for example, in a laboratory setting, with in the protocol of a carefully managed randomized controlled trial, or at a "center of excellence."

Effectiveness: The extent to which a specific intervention, procedure, regimen of service ... does what it is intended to do for a defined population.

Efficiency: The extent to which objectives are achieved by minimizing the use of resources.

Difficulty of Translating Evidence to Practice

Efficacy: Pulmonary surfactant decreases the risk of pneumothorax and mortality in premature infants with RDS

Effectiveness and Efficiency:

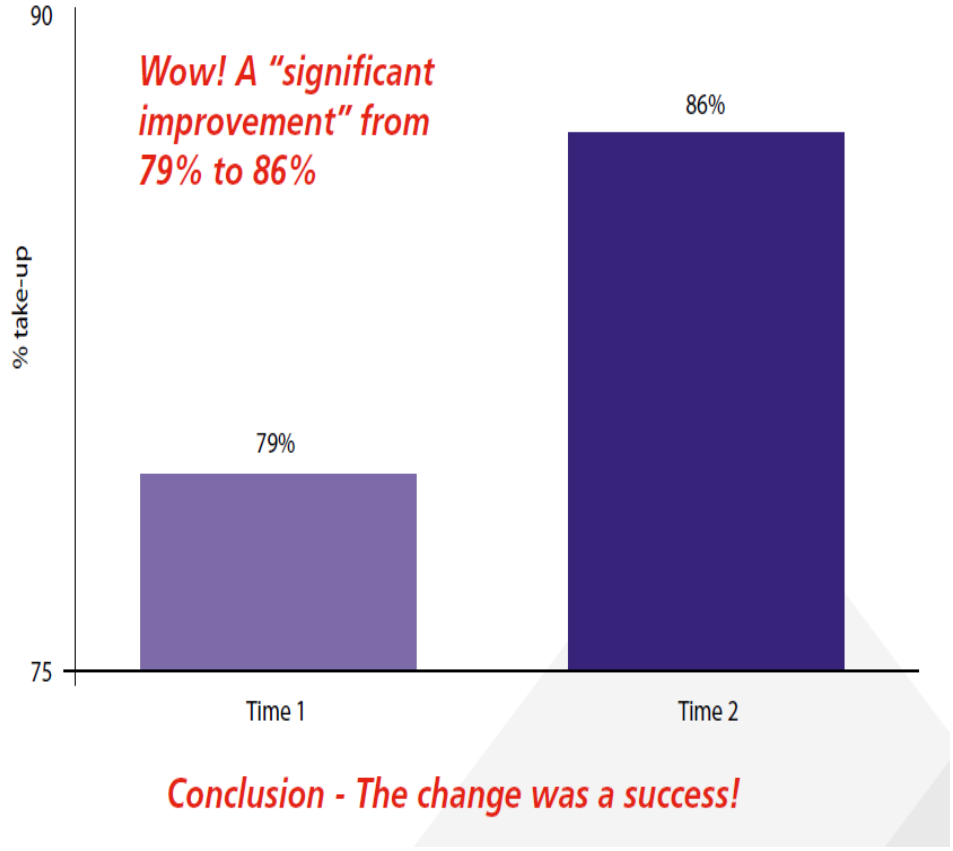
- Which patients?
- Which dose?
- Which product?
- Who should administer treatment?
- At what time?
- Do I need to retreat?

Quality Measures and Benchmarking

4. How will I know I made an improvement?

Improving use of NCPAP in the Delivery Room

Before and after introduction of a new policy



This example shows yearly figures for use of NCPAP in the delivery room before and after introduction of a new policy.

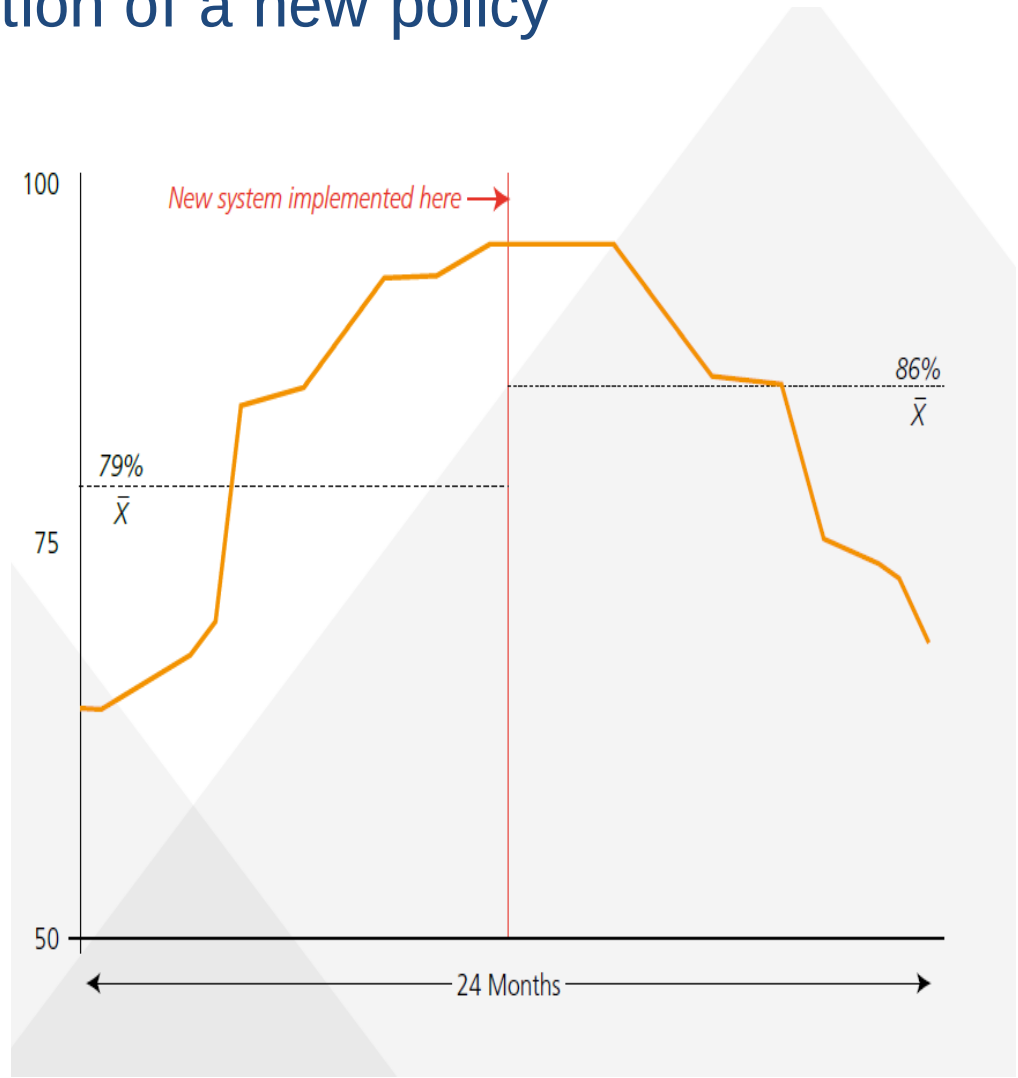
The aggregated data seems to indicate that the change was a success!

Improving use of NCPAP in the Delivery Room

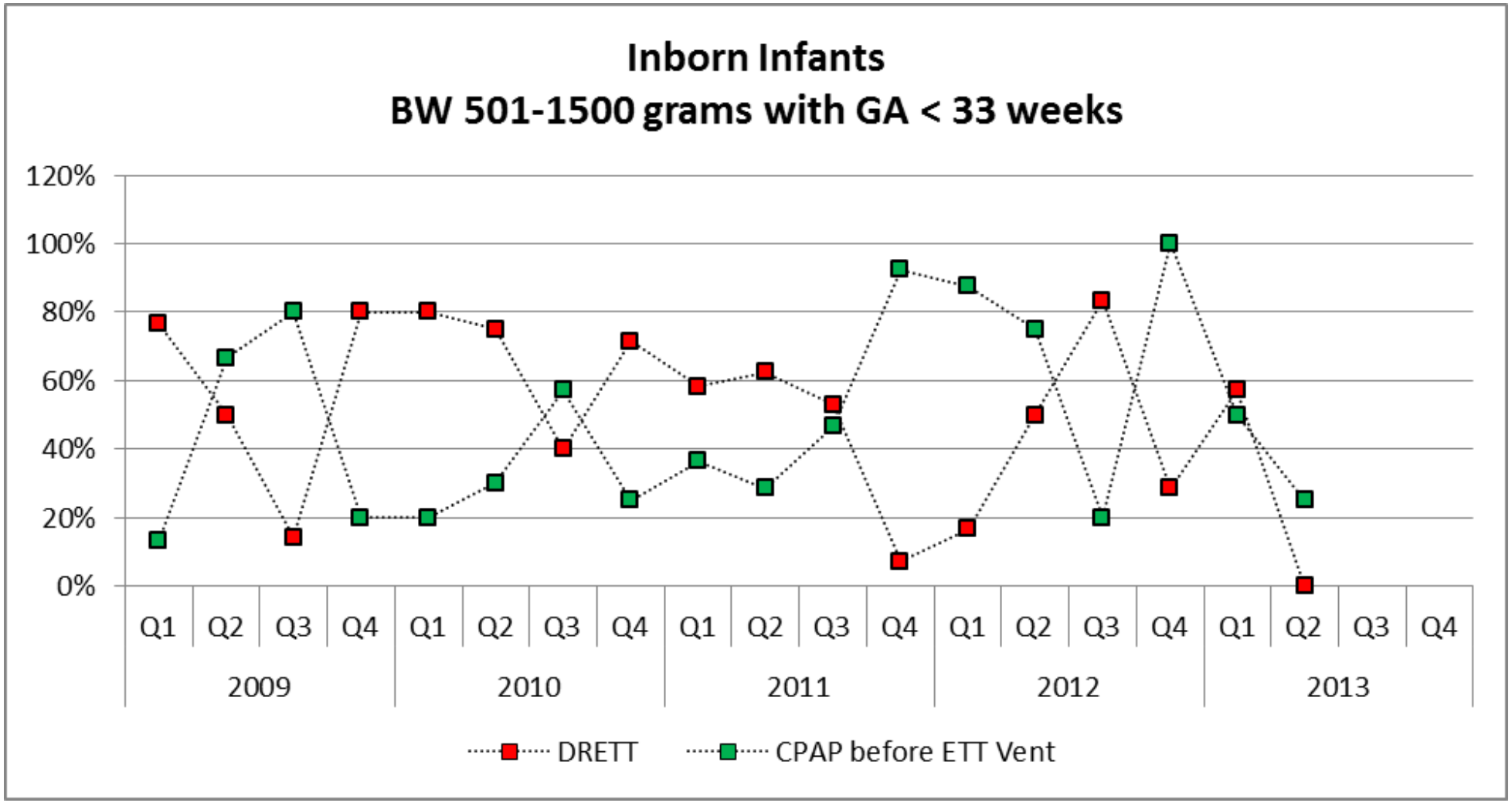
Before and after introduction of a new policy

Viewing how rates have changed within the two periods tells a very different story.

Rates were actually improving before the new policy was implemented, and after introduction, things might have actually gotten worse!



Follow processes of interest



American Academy of Pediatrics

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Collaborative quality improvement for neonatal intensive care. NIC/Q Project Investigators of the Vermont Oxford Network.

Setting: Ten self-selected neonatal intensive care units (NICUs) received the intervention. They formed 2 subgroups (6 NICUs working on infection, 4 NICUs working on chronic lung disease). **Sixty-six other NICUs served as a contemporaneous comparison group.**

Patients: Infants with birth weight 501 to 1500 g born at or admitted within 28 days of birth between 1994 and 1997 to the 6 study NICUs in the infection group (n = 3063) and the 66 comparison NICUs (n = 21 509); infants with birth weight 501 to 1000 g at the 4 study NICUs in the chronic lung disease group (n = 738).

Horbar and colleagues. Pediatrics. 2001 Jan;107(1):14-22.

American Academy of Pediatrics

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Collaborative quality improvement for neonatal intensive care.

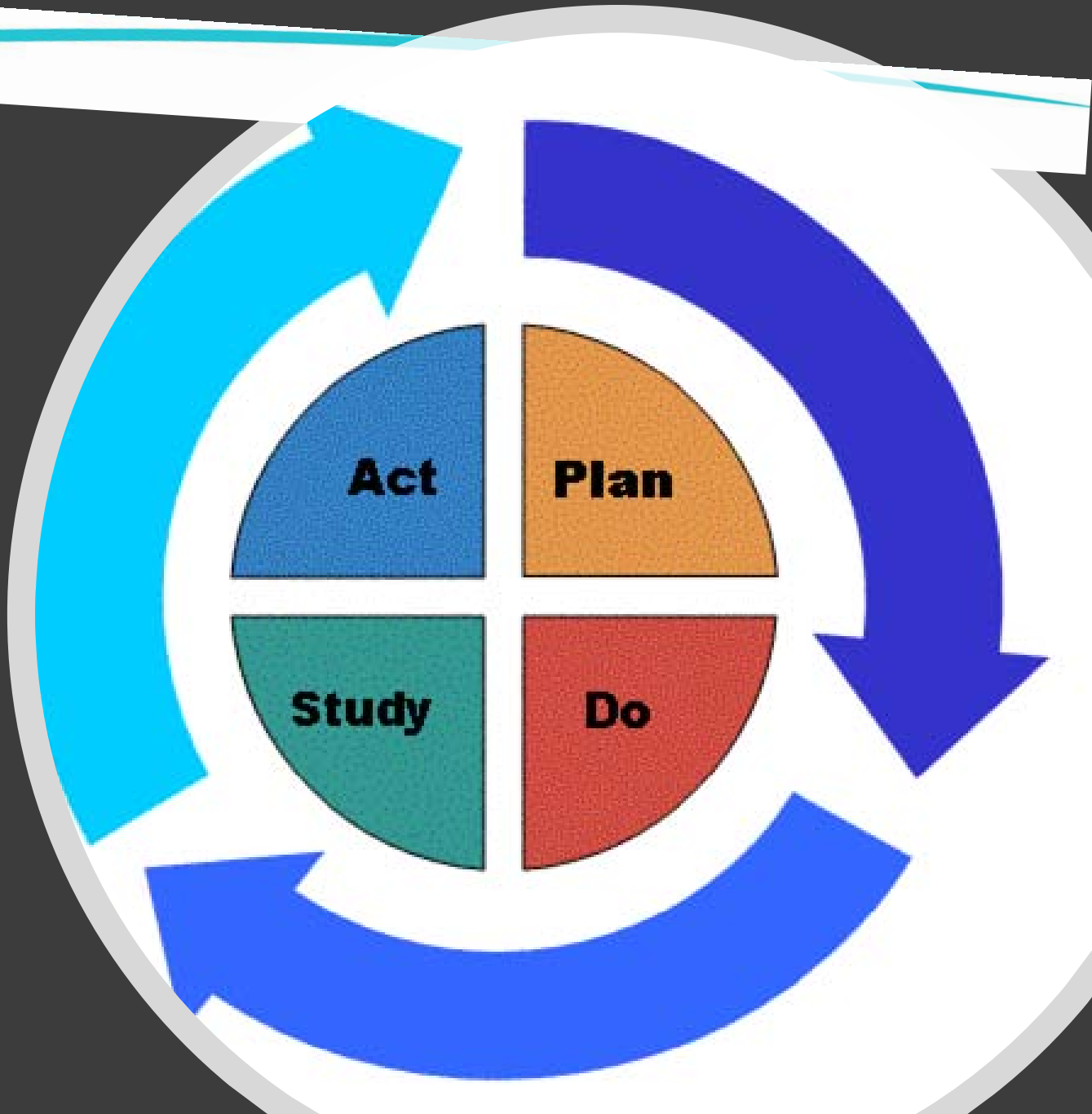
Best Practices?

Nosocomial Infection: Handwashing (and handwashing, and handwashing), guidelines for central line placement and care, skin care, blood culture techniques, “unit culture”

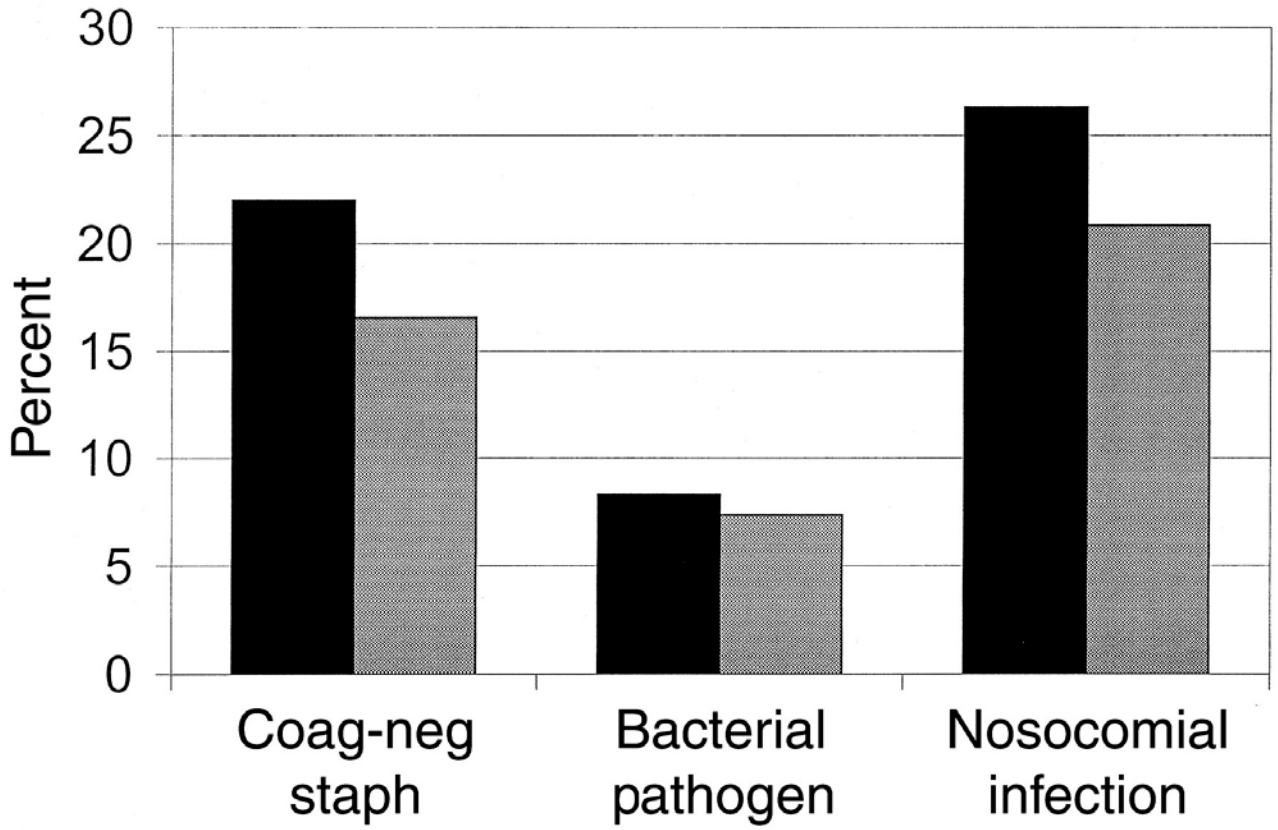
Chronic Lung Disease: Increased use of antenatal steroids, policies and guidelines for surfactant use, less invasive respiratory support, appropriate use of postnatal steroids, improved nutrition, vitamin A

Horbar and colleagues. Pediatrics. 2001 Jan;107(1):14-22.

PDSA Cycle

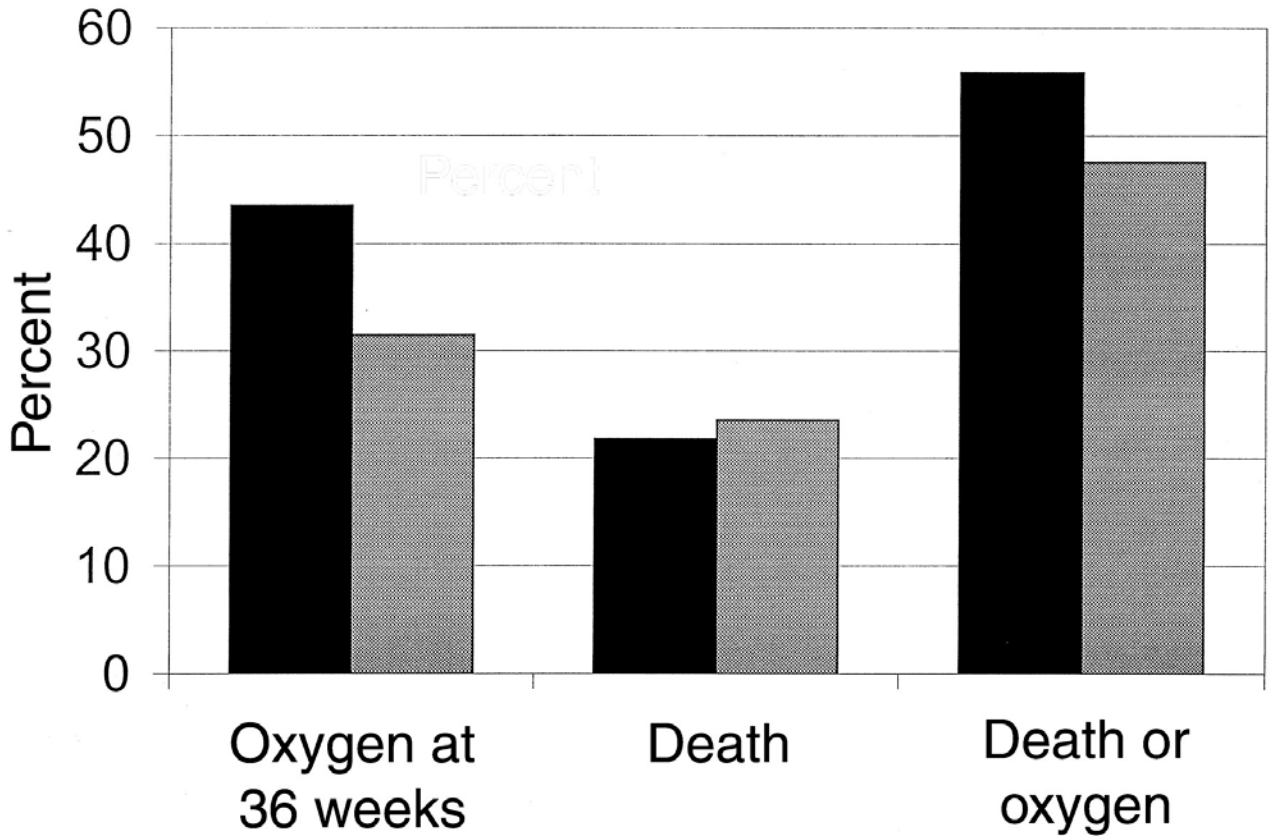


The rates of coagulase-negative staphylococcal infection, infection with other bacterial pathogens, and any nosocomial bacterial infection in 1994 (black bars) and 1996 (gray bars) for infants 501 to 1500 g hospitalized >3 days



Horbar J D et al. Pediatrics 2001;107:14-22

The rates of supplemental oxygen at 36 weeks' adjusted gestational age (oxygen at 36 weeks), death at 36 weeks' adjusted gestational age (death), and either supplemental oxygen or death at 36 weeks' adjusted gestational age (death or oxygen) in 1994 (black bars) and 1996 (gray bars)



American Academy of Pediatrics
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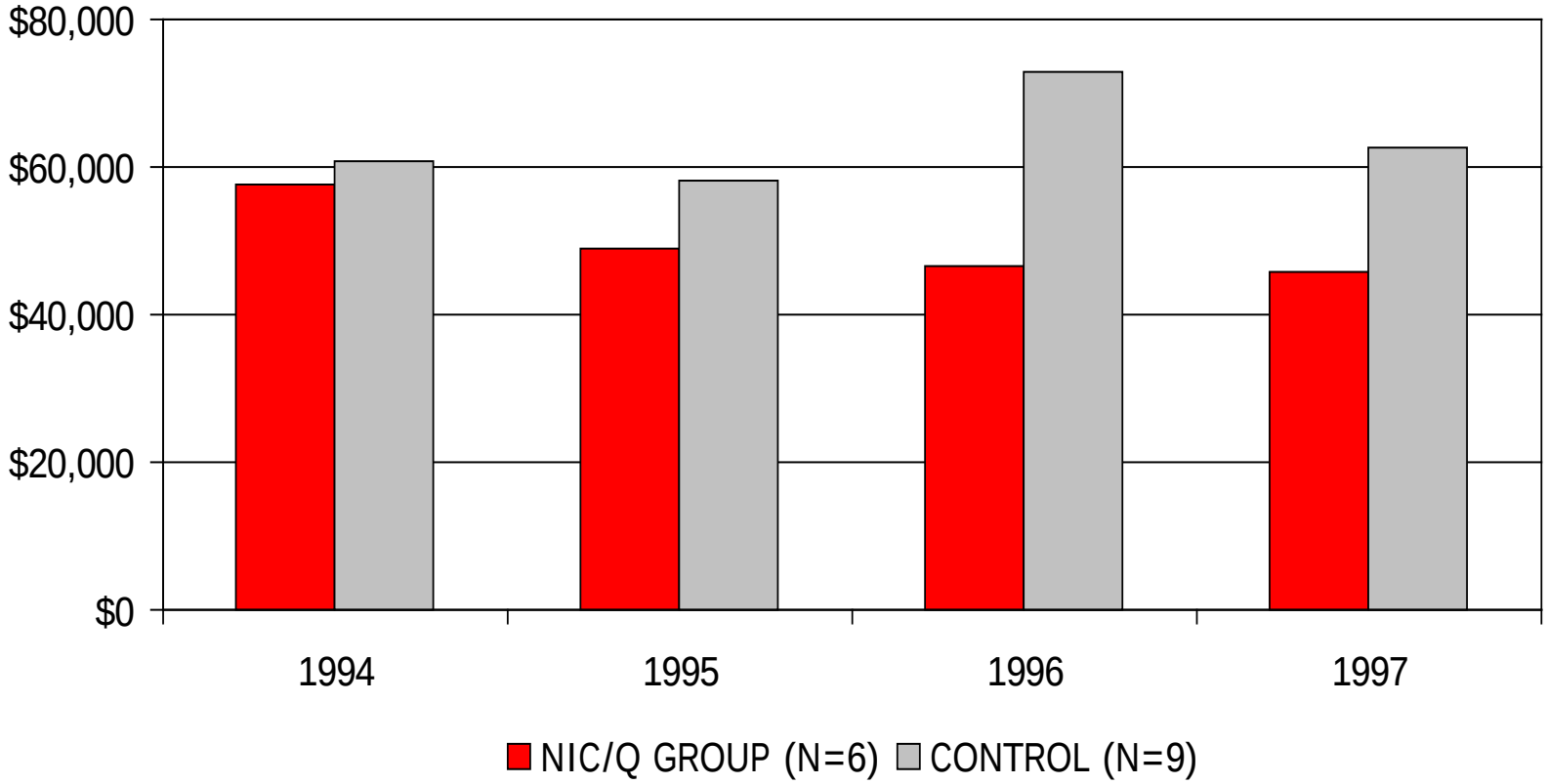
Economic implications of neonatal intensive care unit collaborative quality improvement.

Rogowski JA, Horbar JD, Plsek PE, Baker LS, Deterding J, Edwards WH, Hocker J, Kantak AD, Lewallen P, Lewis W, Lewit E, McCarroll CJ, Mujsce D, Payne NR, Shiono P, Soll RF, Leahy K.

Pediatrics. 2001 Jan;107(1):23-9.

NICQ Project: Infection Costs

Treatment costs/infant



The average savings per hospital in patient care costs for very low birth weight infants in the infection group was $2.3 million in the post-intervention year.

ROGOWSKI ET AL. Economic Implications of NICU Collaborative Quality Improvement. Pediatrics, January 2001.

JAMA Pediatrics

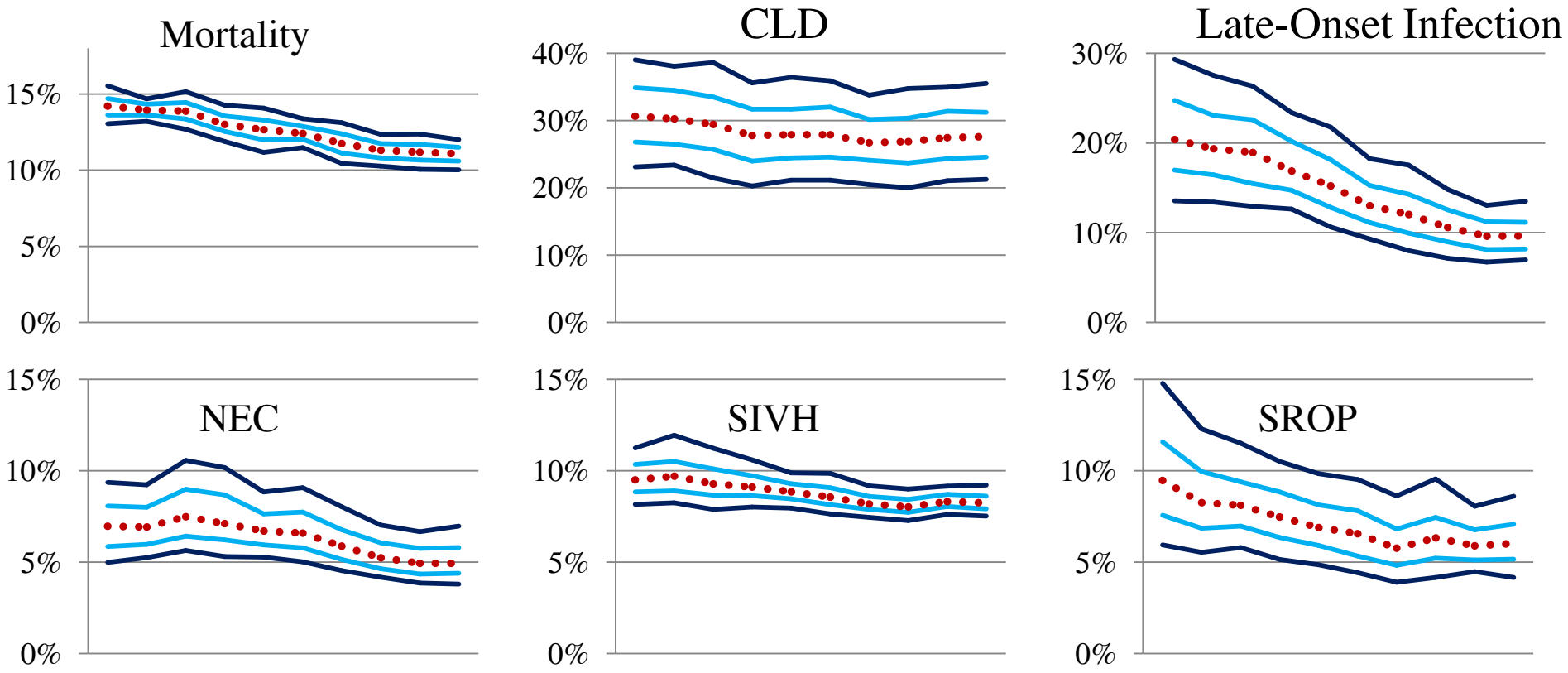
Variation in Performance of NICUs in the United States

Horbar JD, Edwards EM, Greenberg LT, et al. Variation in performance of neonatal intensive care units in the United States.

JAMA Pediatr. Published online January 9, 2017. doi:10.1001/ jamapediatrics.2016.4396

JAMA Pediatrics

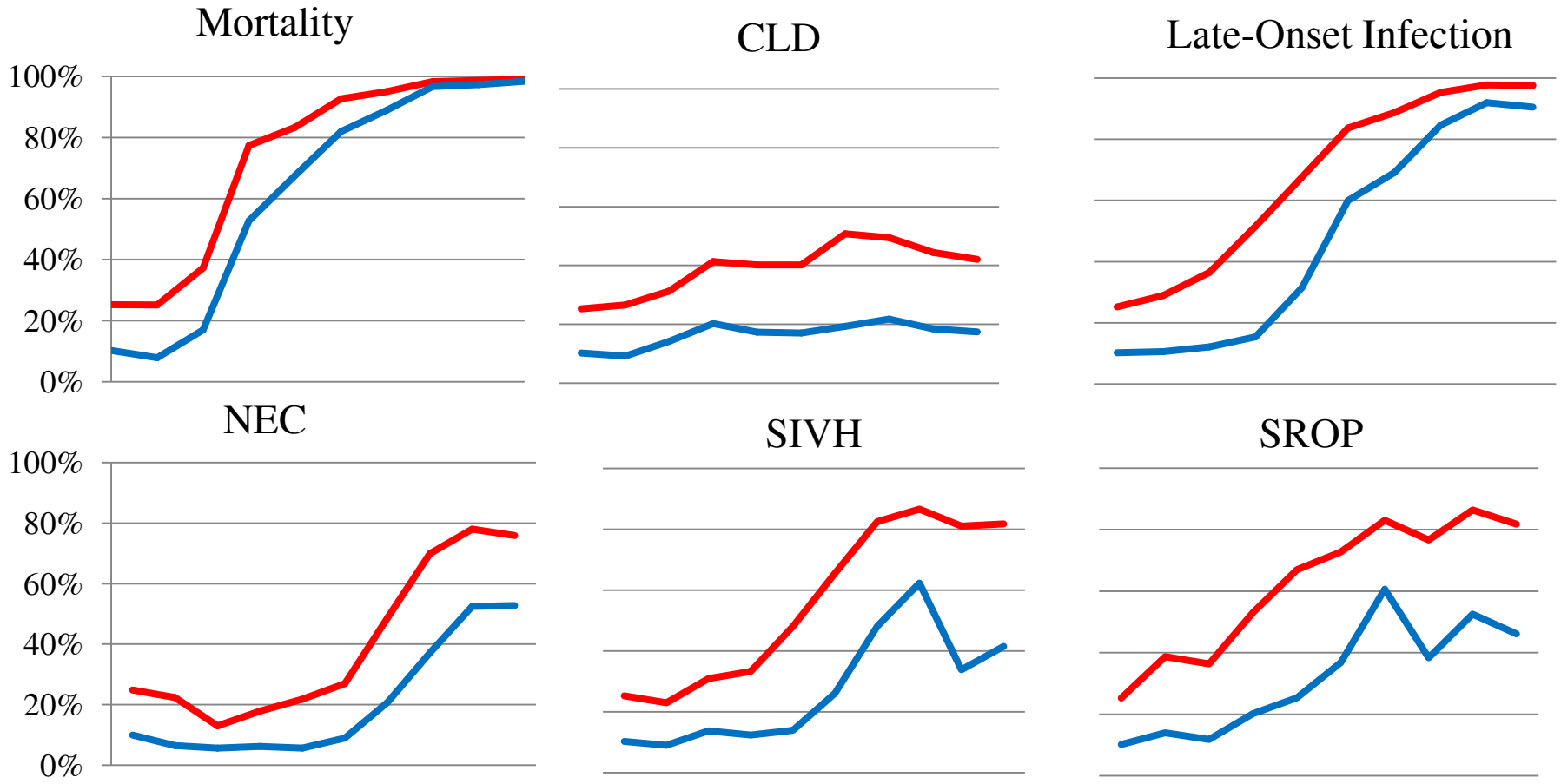
Risk-Adjusted Rates of Outcomes in the NICU at the 10th, 25th, 50th, 75th, and 90th Percentiles, 2005-2014, With the Dark Blue, Light Blue, and Dotted Red Curves Indicating 10th/90th, 25th/75th, and 50th Percentiles, Respectively



Horbar JD, Edwards EM, Greenberg LT, et al. Variation in performance of neonatal intensive care units in the United States. JAMA Pediatr. Published online January 9, 2017. doi:10.1001/ jamapediatrics.2016.4396

JAMA Pediatrics

Percentage of NICUs Reaching the 10th (Red Curve) and 25th (Blue Curve) Percentile Rates for 6 Outcomes From 2005



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By 2014, more than 75% of NICUs in the United States had learned to perform as well or better than the best 25% of NICUs performed in 2005 for major morbidities other than CLD.

The increased adoption of evidence-based practices and their implementation using quality improvement methods may have contributed to these gains.

These findings provide a novel way to quantify the magnitude and pace of improvement in neonatology.

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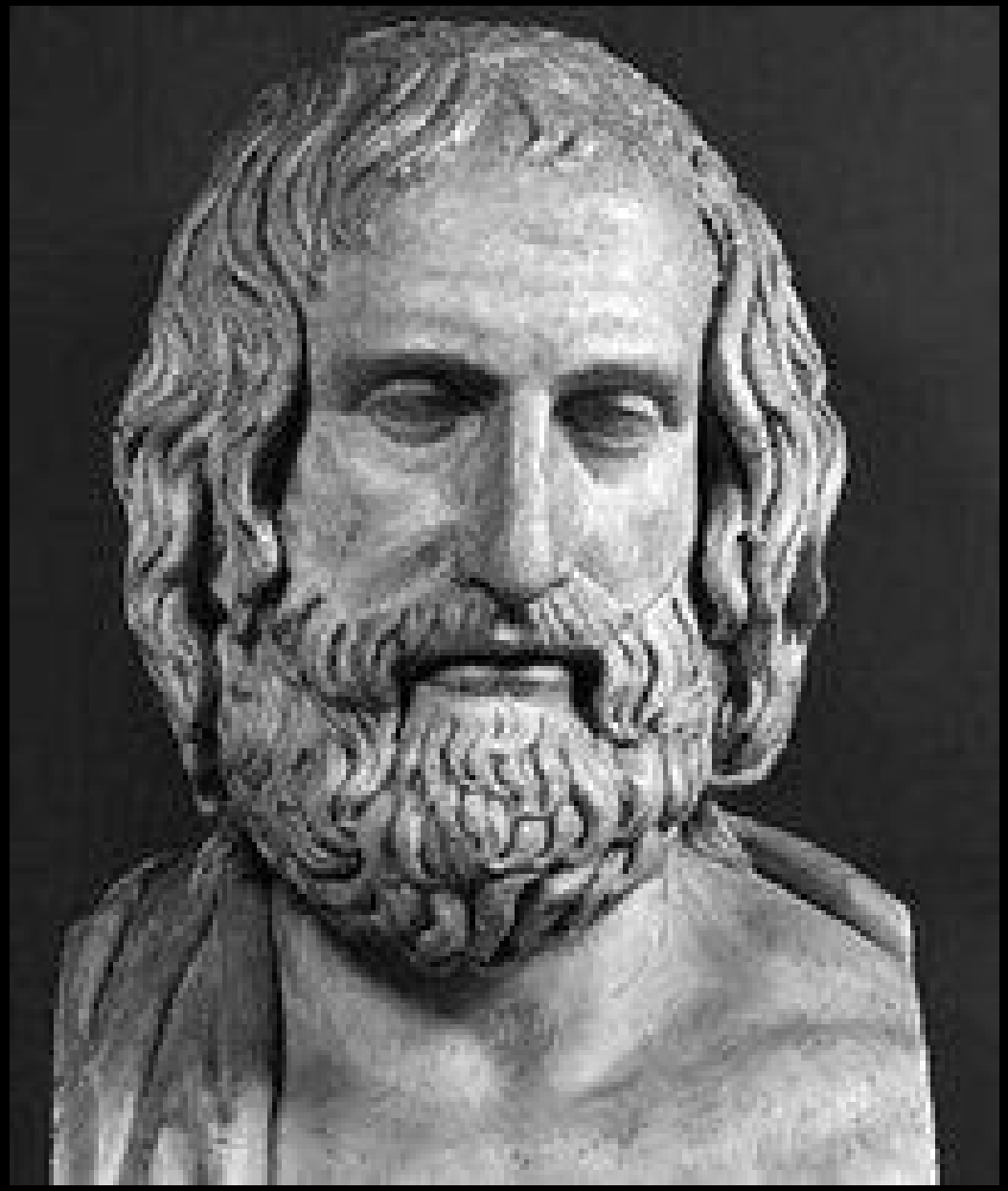
JAMA Pediatr. Published online January 9, 2017. doi:10.1001/ jamapediatrics.2016.4396

The Keys to Collaborative Quality Improvement

Collaborative improvement is a core activity of improvement networks.

Evidence is accumulating that these initiatives are quite successful.



“Man is the measure of all things”.

Protagoras of Abdera,
Ancient Greek philosopher