

PQCNC in Review

Making North Carolina the best place to give
birth and be born!

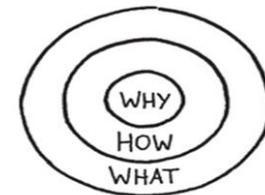


Martin J McCaffrey, MD, CAPT USN (Ret)
Director Perinatal Quality Collaborative of North Carolina (PQCNC)
For the Perinatal Quality Collaborative of North Carolina
martin_mccaffrey@med.unc.edu
984 974-7852

Improving Perinatal Care in NC Hospitals Since 2007

- What?
 - Create value through improvement science via state-wide perinatal initiatives
- How?
 - Partnership with patients and families
 - Spread best practice
 - Resource optimization
- Why?
 - Every perinatal patient deserves the same care we would want for our family member
 - We will make NC the best place to give birth and be born

THE GOLDEN CIRCLE.



Hospitals (65) Participating in PQCNC Initiatives

- Cape Fear Valley
- Carolinas Medical Center
- CMC-Pineville
- Columbus
- Cleveland
- Duke
- Granville
- New Hanover
- Novant Forsyth
- Novant Huntersville
- Novant Presbyterian
- Rex
- UNC
- Vidant (ECU) Greenville
- Womack
- WakeMed
- Caromont
- Catawba Valley
- Central Carolina
- CMC-NorthEast
- FirstHealth - Moore
- Grace
- McDowell
- Mission
- Onslow
- Transylvania
- Women's - Cone Health Greensboro
- Durham Regional
- Pardee Women & Children's Center
- Harris
- Albemarle Women's Center
- Granville Medical Birthing Center
- Halifax Regional Medical Center
- Maria Parham Medical Center Maternity Services
- Nash Health Care Special Care Nursery
- Nash Health Care Women's Center
- Wilson Medical Center
- Carteret General Hospital Brady Birthing Center and Nursery
- Outer Banks Hospital
- Bladen County Hospital Birth Center
- Johnston Health Women's Pavilion
- Wake Med Cary
- Southeastern Regional Women's Healthcare
- Vidant Edgecombe
- Alamance Regional Medical Center
- Brenner Children's Hospital
- Davis Regional
- Morehead Memorial Hospital
- Randolph Hospital
- CMC – Lincoln
- Grace Hospital
- High Point Regional Culp Women's Center
- Iredell Memorial Hospital
- Novant-Matthews
- Rowan Regional Medical Center
- Stanly Regional Medical Center
- Lenoir Memorial Hospital
- Watauga Medical Center
- Wilkes Regional Medical Center
- Angel Hospital
- Blue Ridge Regional Hospital
- NH Camp Lejeune
- Lake Norman Regional

PQCNC Initiatives to Date 2009-2015

- Reduction of Early Elective Deliveries (<39 Weeks) (2009)
- Reduction of First Birth Cesarean Delivery Rate (Support for Intended Vaginal Birth SIVB) (2010-2012)
- Reducing Central Line Associated Blood Stream Infections in NICUs (CLABSI) (2009, 2010-2011)
- Increasing Breastfeeding Rates in Well Nurseries (2010-2013)
- Increasing Maternal Milk Use in NICUs (2010-2013)
- Conservative Management of Preeclampsia (2014-2016)
- NICU Parent and Staff Support (2013-2016)
- Neonatal Abstinence Syndrome (2014-2016)
- CCHD Web Reporting System (2014-Present)
- Birth Certificate Accuracy (2015-Present)

2017 PQCNC Initiatives

- Phase 2 (Post-Pilot): Conservative Management of Preeclampsia (CMOP) (includes 23 Hospitals)
- Antibiotic Stewardship Newborn Sepsis (ASNS)
- Prevention and Treatment of Obstetrical Hemorrhage
 - AIM (Alliance for Innovation on Maternal Health)
 - HRSA....multiple collaborator organizations including ACOG
 - PQCNC lead organization for the NC Partnership for Patient Safety
 - DPH, NC ACOG, NC OB GYN Society, NC AWHONN, NCHA/NCQC, Midwives, FP
 - Four Bundles
 - Maternal VTE Prevention
 - Obstetric Care for Women with Opioid Use Disorder
 - Obstetric Hemorrhage
 - Reduction of Peripartum Racial/Ethnic Disparities
 - Safe Reduction of Primary Cesarean Birth
 - Severe Hypertension in Pregnancy
 - Severe Maternal Morbidity Review
- Birth Certificate Accuracy...With Vital Records and NC SCHS
- CCHD Reporting

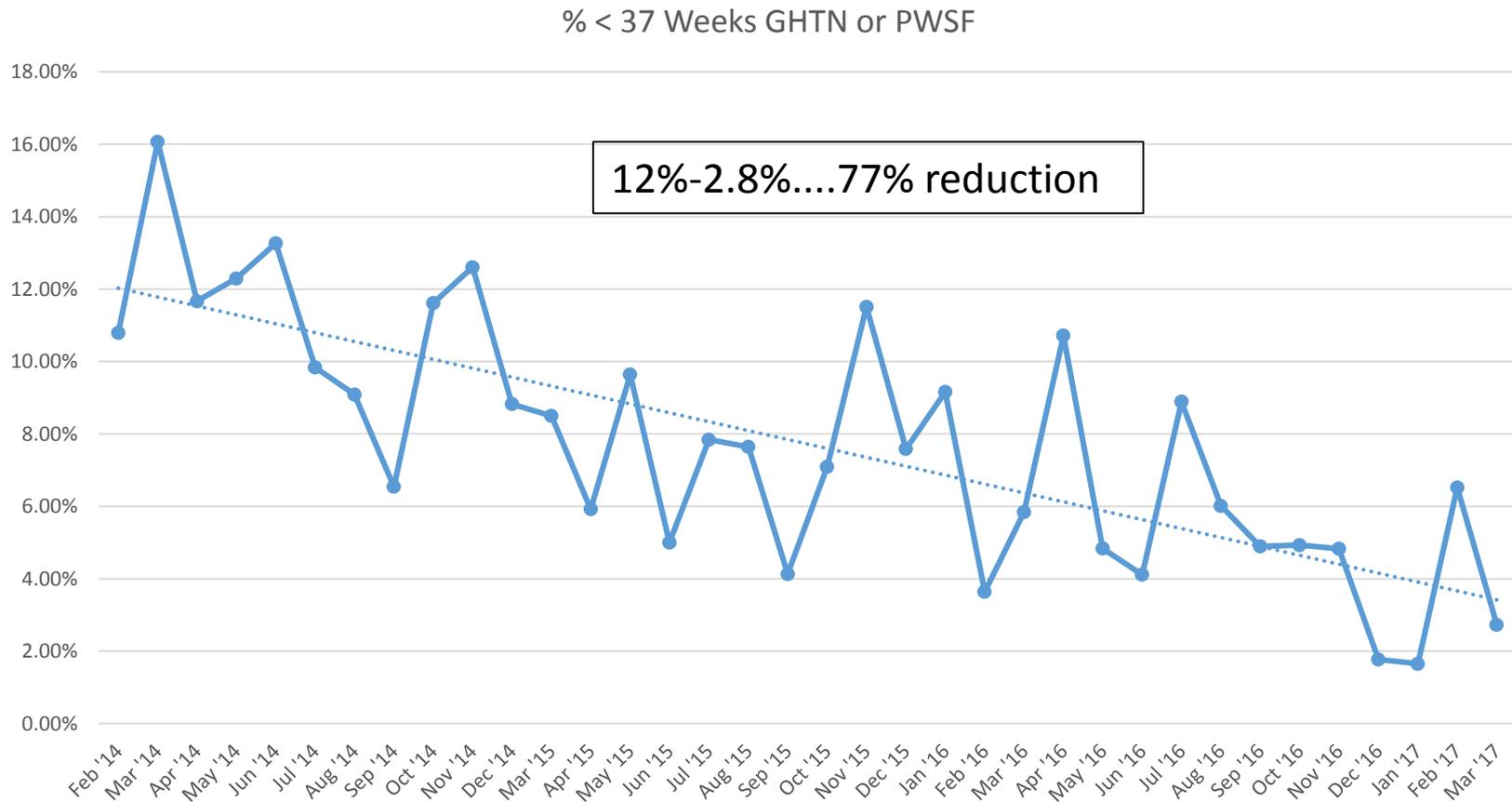
Conservative Management of Preeclampsia (CMOP)

- HTN disorders of pregnancy significant source of morbidity and mortality
- HTN disorders of pregnancy a significant factor in preterm birth
- New ACOG & CCNC guidelines related to HTNsive disorders
 - If only GHTN or PWSF, delivery at 37 weeks or >
- CMQCC toolkit for hypertensive disorders of pregnancy
 - Key metric of time to treatment
- Interest from patients and payers
- Likely consideration by JC of HTN measures for Perinatal Core Set
- Aims
 - 1) Eliminate deliveries < 37 weeks for GHTN & Preeclampsia Without Severe Features
 - 2) Increase Time to Treatment or BP Control < 1 hour to 90%
 - 3) Increase antenatal steroid rates to 90% (2 doses of ANS, not 1)

Conservative Management of Preeclampsia CMOP

- 114,789 total deliveries
- 14.1% HTN rate
- 40% Cesarean Section rate with any HTN diagnosis
- 3958 delivered < 37 weeks with any HTN diagnosis
- **3.4% of all preterm deliveries (NC preterm birth rate 10.4%)**
- 1495 delivered < 34 weeks with any HTN diagnosis
- 1.3% of all deliveries

Conservative Management of Preeclampsia % < 37 Week Deliveries PWSF or GHTN



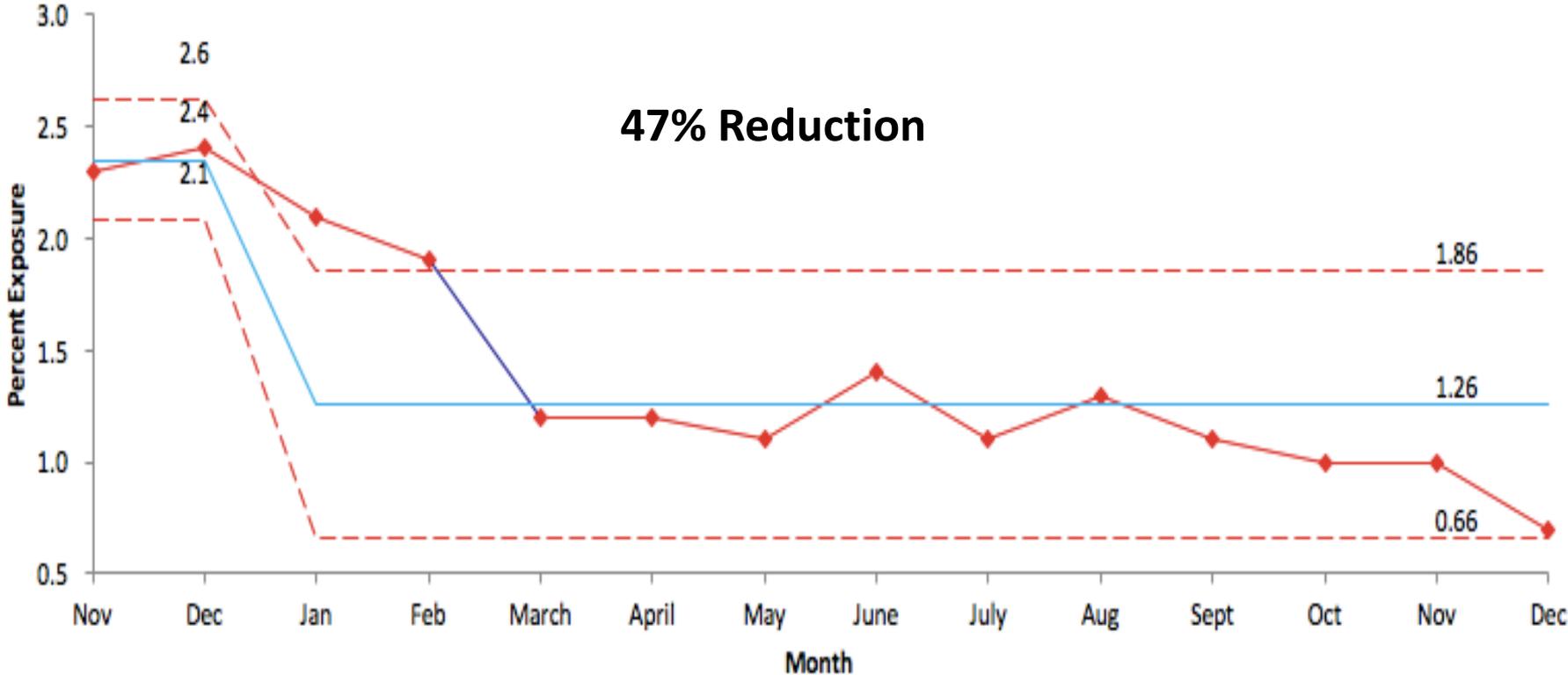
Conservative Management of Preeclampsia (CMOP)

- Stable ANS administration rates
- Increase in Time To Treatment or Control of HTN
- No increase in NICU admits for > 37 weeks
- Reduction in < 37 week non-indicated deliveries
 - Estimated 144 < 37 week deliveries avoided annually
 - **Estimated hospital cost savings using Tricare Calculator of \$2.52M for infants**

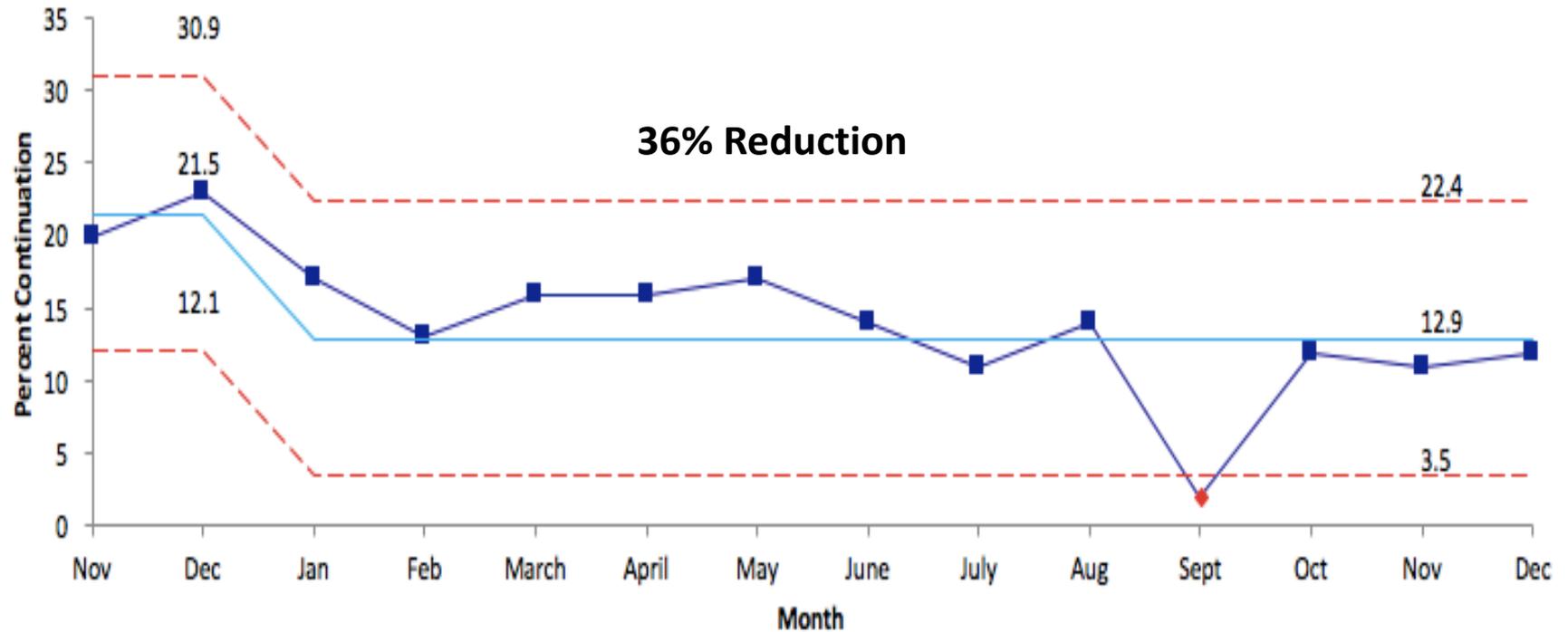
Antibiotic Stewardship Newborn Sepsis (ASNS) Demographics

- 49 Total teams in 43 hospitals
- Total of 46,480 deliveries in these hospitals over the collaborative period (38% of all live births in NC in 2017)
- Total of 13,526 NICU admissions (Jan-Dec)
- 681 infants in NBN treated with antibiotics (Jan-Dec)
- 3791 infants in NICUs treated with antibiotics (Jan-Dec)

NC NBN Percent Exposure



NC NICU Percent Continuation after 48 hours with a negative blood culture



What Have We Done?

- Eliminated antibiotic exposure for 792 NBN babies annually
 - Keep 792 moms and babies together, support breastfeeding
 - Eliminate transfer of 396 babies (50% of centers transfer to NICU)
 - Eliminate 792 NICU days
- Reduced continuation of antibiotics after 48 hours of negative cultures for 110 NBN babies
 - Eliminates separation for an additional 110 babies from moms with variable courses of antibiotics from 3-7 days
 - At least 50% of these NICU days
 - Estimate 4 days mean, avoids an additional 220 hospital days, 110 being NICU
- Cost avoided in NICU days alone: \$1.8M
- Value of supporting breastfeeding...priceless

What Have We Done?

- Reduced NICU antibiotic days by 22%, 442 days a month or 5,304 annually
- Ended antibiotic exposure after negative cultures at 48 hours for 27 NICU infants per month, 324 annually.
- Reduced antibiotics after 48 hours in 22-31 week infants by 36%...72 infants < 31 week infants per year.
- With a NNTH of 22 for severe NEC/death with antibiotic course > 5 days in ELBW infants, we estimate spared 3 infants from those complications.
 - If all NEC, cost avoidance of \$630K
- Total cost avoidance for ASNS: \$2.4M

PQCNC Value in 2017

- Cost: \$875,000
- Savings: \$4,900,000 (does not include pro fees)
- ROI: 560%
- If professional fees at 25%....
- ROI: 700%

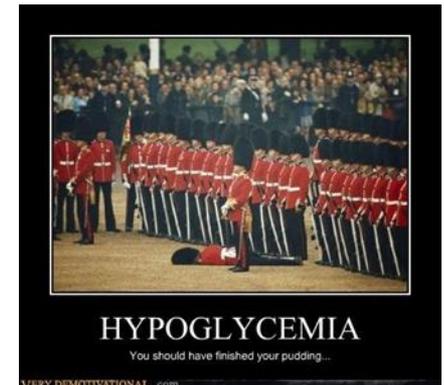
PQCNC Maternal Initiatives 2018 (AIM)

- **Obstetrical Hemorrhage**
 - Readiness, risk assessment, recognition, prevention
 - 65 hospitals
 - Reduction in the Severe Maternal Morbidity/Mortality Index (SMMI) for hemorrhage by 25%
 - Reduction in blood transfusion rates by 35%
- **Safely Reduce the Primary (NTSV) CS Rate**
 - Goal is recruit all 78 delivery facilities
 - **Reduction in the state primary cesarean section rate from 24% to 19%, a 20% reduction.**
 - **Potential avoidance of 1509 Cesarean Sections in low-risk primigravida mothers.**
 - Balancing factor NICU admissions
 - Reduce rate of future CS for primary CS avoided
 - **Potential cost avoidance of \$7.5M annually.**
 - **Does not account for future pregnancies in women avoiding a future Cesarean or future invasive placentation (accreta, percreta etc).**



2018: Newborn Hypoglycemia

- Offers PQCNC teams, collaborating together, a tremendous opportunity to standardize care within hospitals
- Bring hospital Newborn and NICU teams together...AGAIN!
- Reduce separation of mom and baby
- Support breastfeeding and skin to skin care
- Explore newer therapies like glucose gel
- Limit hospital days in the NICU.
- If we recruit all hospitals in NC we can potentially impact the care of 12,000 babies and mothers statewide.
- If 10% of these infants require IVF and NICU/SCN transfer, we can potentially avoid 50% of these transfers (500 infants and 1000 NICU days)
- This project screams PQCNC....spreading best practices, partnering with patients and families, and optimizing resources.



Why PQCNC Is Here Today?

The PQCNC Bundle

- CCHD Screening
- Birth Certificate Accuracy Initiative

CCHD Screening (SB 98)

- Screening for Critical Congenital Heart Disease mandated in 2013
- PQCNC established a web-based data collection system for reporting of CCHD screening results
- PQCNC has funded and maintained this site since 2013
- We are advised that BDMP will have systems in place by August 1, 2018 to support this data collection
- We are withdrawing this element of our request for bundle funding as BDMP will take over all aspects of data collection by 1 August

Improving the Accuracy of Birth Certificate Data

What Birth Certificate Data Is Used For

- Vital Statistics Data
 - Health research and epidemiology
 - Identifying important health issues and targeting problem areas
 - Planning and evaluating new types of health services
 - Making funding decisions and prioritizing the allocation of resources
 - Supporting and passing new legislation
 - Obtaining government grants and funding from private foundations
 - Reducing fraud in pension and benefit programs

Why The Birth Certificate Data Matters

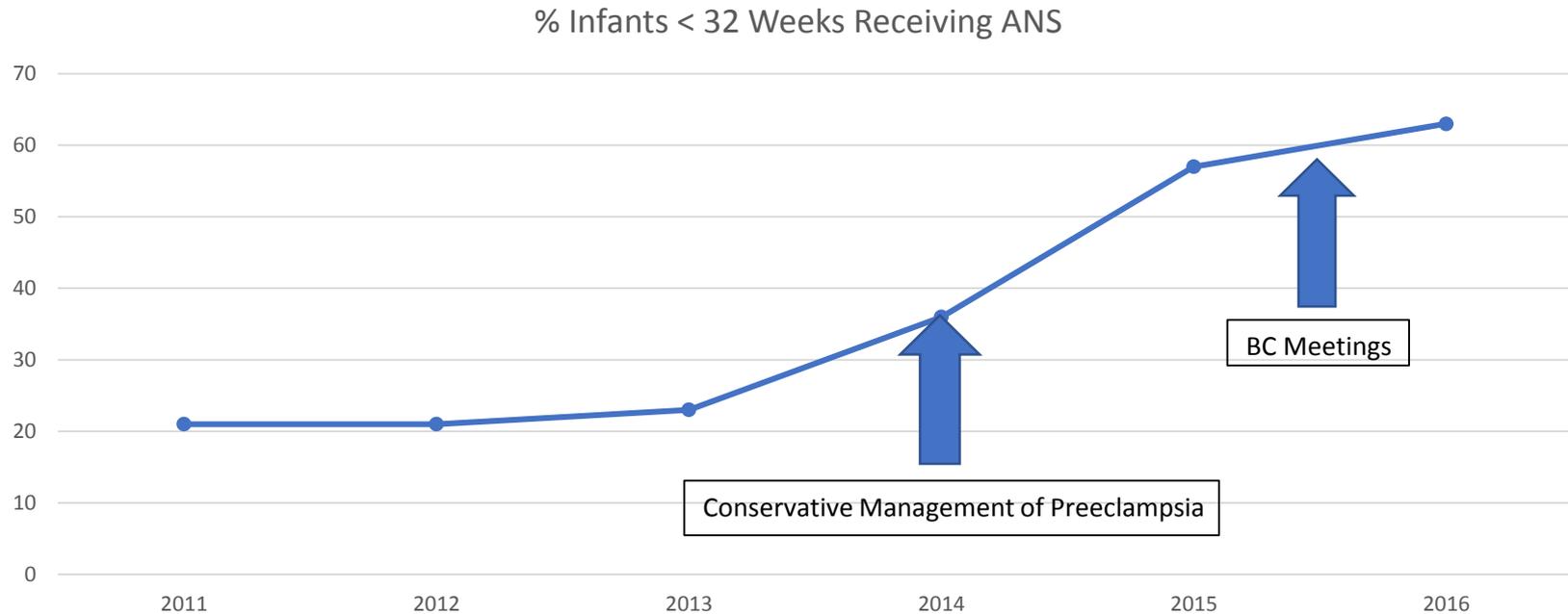
What Birth Certificate Data Is Used For

- Public Health Data
 - Evaluating prenatal care
 - Immunizing children
 - Caring for children with congenital anomalies
 - Monitoring risk factors causing poor pregnancy outcomes
 - Evaluating the need for health facilities
 - Estimating school enrollment and planning new schools
 - Planning and evaluating effectiveness of family planning programs

Electronic Birth Certificate

- 58 fields with multiple sub-fields
- Clinical elements:
 - Date first prenatal care, last prenatal care
 - Payer
 - Smoking including number of cigarettes and trimester
 - Cerclage, tocolysis, version
 - Onset of labor, characteristics of labor
 - Induction, augmentation, steroids, antibiotics during labor, chorio, meconium
 - Infections during pregnancy
 - Apgar scores
 - Obstetric estimate GA
 - Abnormal newborn condition (ventilation, NICU admit, surfactant, antibiotics to newborn, seizures, birth injury)
 - Congenital anomalies (anencephaly, cyanotic heart disease, CDH, cleft palate...)
 - Breastfeeding at discharge?
- Data often collected by registrars with no clinical training
- Began work on this in partnership **with Vital Records and SCHS** in 2015-2016

Challenges in BC Reporting: Administration of Antenatal Steroids



Birth Certificate Activities to Date: VR, SCHS and PQCNC

Birth Certificate Initiative

- First meeting – May 18, 2016
 - Participants included
 - 10 hospital birth certificate registrars
 - NC Vital Statistics and State Center for Health Statistics staff
 - Ten birth certificate elements were identified as potential areas of focus
 - Antenatal steroid administration
 - First trimester prenatal care visit
 - Antibiotics for newborn sepsis
 - Diagnosis of maternal hypertension
 - Prior preterm deliveries
 - Hepatitis B administration
 - Number of prenatal visits
 - Breastfeeding at discharge
 - Previous c/section
 - Diagnosis of maternal diabetes

Birth Certificate Activities to Date: VR, SCHS and PQCNC

Birth Certificate Initiative

- Second Meeting – October 5, 2016
 - 26 hospitals participated
 - Keynote speaker from CDC
 - Provided hospital-level data to each participant to help identify opportunities to improve
 - Identified low-hanging fruit
 - Not entering “unknown”
 - Looking for “weird data anomalies”
 - Extreme LBW births with no death certificates
 - Looking for sudden change in data trends at a hospital

A Snapshot of Birth Certificate Data

	2016 PQCNC data			2016 Vital Stats data			2017 PQCNC data		2017 Vital Stats Data
Labor and Delivery Units	# of moms admitted with HTN	# of infants who received ANS		# of moms admitted with HTN	# of infants who received ANS	Units with NICU and NBN	# of infants received antibiotics		# of infants received antibiotics
Hospital A	780	37		586	0	Hospital A-Missing data	289		4
Hospital B- Missing data	199	4		148	23	Hospital B- Missing data	64		4
Hospital C	306	39		751	136	Hospital C-Missing data	33		0
Hospital D-Missing Data	637	23		384	0	Hospital D-Missing Data	284		331
Hospital E	485	55		628	133	Hospital E	74		4
Hospital F	546	46		328	39	Hospital F	259		1
Hospital G	848	174		198	54	Hospital G	318		1

Birth Certificate Initiative - Pilot

- Select 7 interested hospitals (approximately 10% of delivery hospitals) from those in PQCNC Initiatives (diversity regarding demographics, geographic location, size, and academic/community setting)
- PQCNC staff will work with 7 hospitals:
 - Evaluate current effectiveness of reporting
 - Build a BC Perinatal Quality Improvement Team (PQIT) that includes a registrar
 - Create a process map of the birth certificate data collection
 - Use process map to identify opportunities for improvement locally
 - Identify system issues that may be barriers to accurate collection/reporting
 - Educate staff on WHY accurate birth certificate reporting is so important
 - Create specific action plan supplemented with specific individualized interventions outlined to achieve goals
 - Develop measurement and metrics for each site to track progress
 - Provide direct support to each site utilizing QI methods for improvement
 - Work 1:1 with registrars at each site providing individualized training
 - Develop a sustainable, solid reporting plan at the unit level
 - Ongoing mandatory training
 - Regular internal using a facility specific Birth Certificate Dashboard developed by initiative end

PQCNC Dashboard Tool

Birth Certificate Audit Sheet

Audit Item	Did the information match between the facility worksheet and the patient chart?	
Antenatal steroids	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Hepatitis B given in hospital	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Number of prenatal visits	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Prenatal care in first trimester	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Breastfeeding at discharge	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Antibiotics for newborn sepsis	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Previous c/section	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Diagnosis of maternal hypertension	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Prior preterm delivery	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Diagnosis of maternal diabetes	<input type="checkbox"/> Yes	<input type="checkbox"/> No

Birth Certificate Initiative Timeline

<u>Action</u>	<u>Duration</u>
Recruit 7 pilot sites month	1
• Baseline collection and systems issues identified <ul style="list-style-type: none">• 1:1 site visit to map process (flow diagram)• Monthly Virtual office hours via webex with vital statistics• Monthly support calls with registrar	4 months
• Initiative and intensive data collection begins <ul style="list-style-type: none">• Monthly audits comparing PQCNC data with registrar data• Continued site visit support• Continued monthly webex support• Each pilot site present sustainable reporting plan at final LS to all teams	12 months
• Development of action plan and training materials for statewide dissemination	1 month

Birth Certificate: Beyond the Pilot

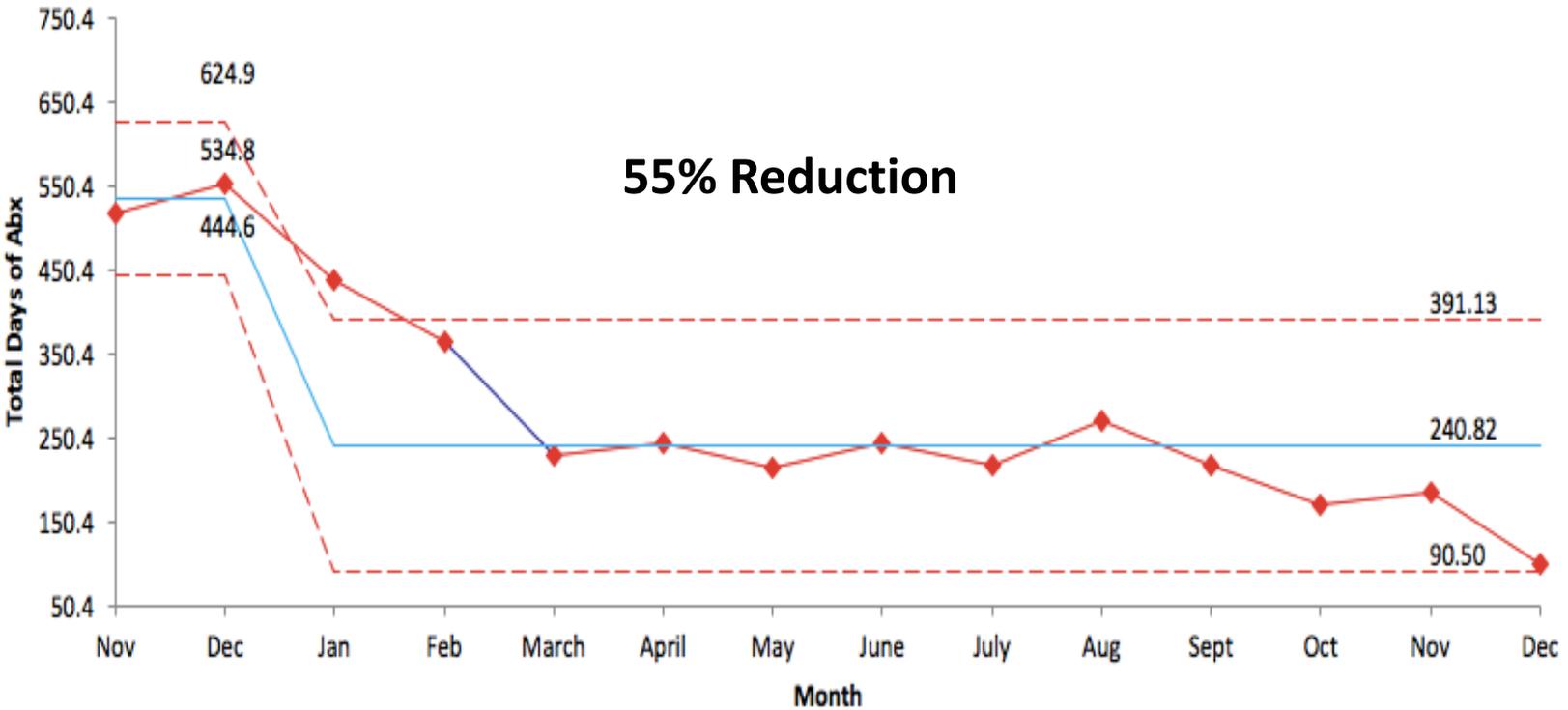
- After demonstrating success of the pilot we propose, contingent on the availability of funds, to spread leading practice across the state of North Carolina so that all delivery hospitals will achieve a reliably accurate Birth Certificate reporting process.
- Possibility that later work could expand lessons learned here to the Death Certificate

Cost of the Birth Certificate Initiative

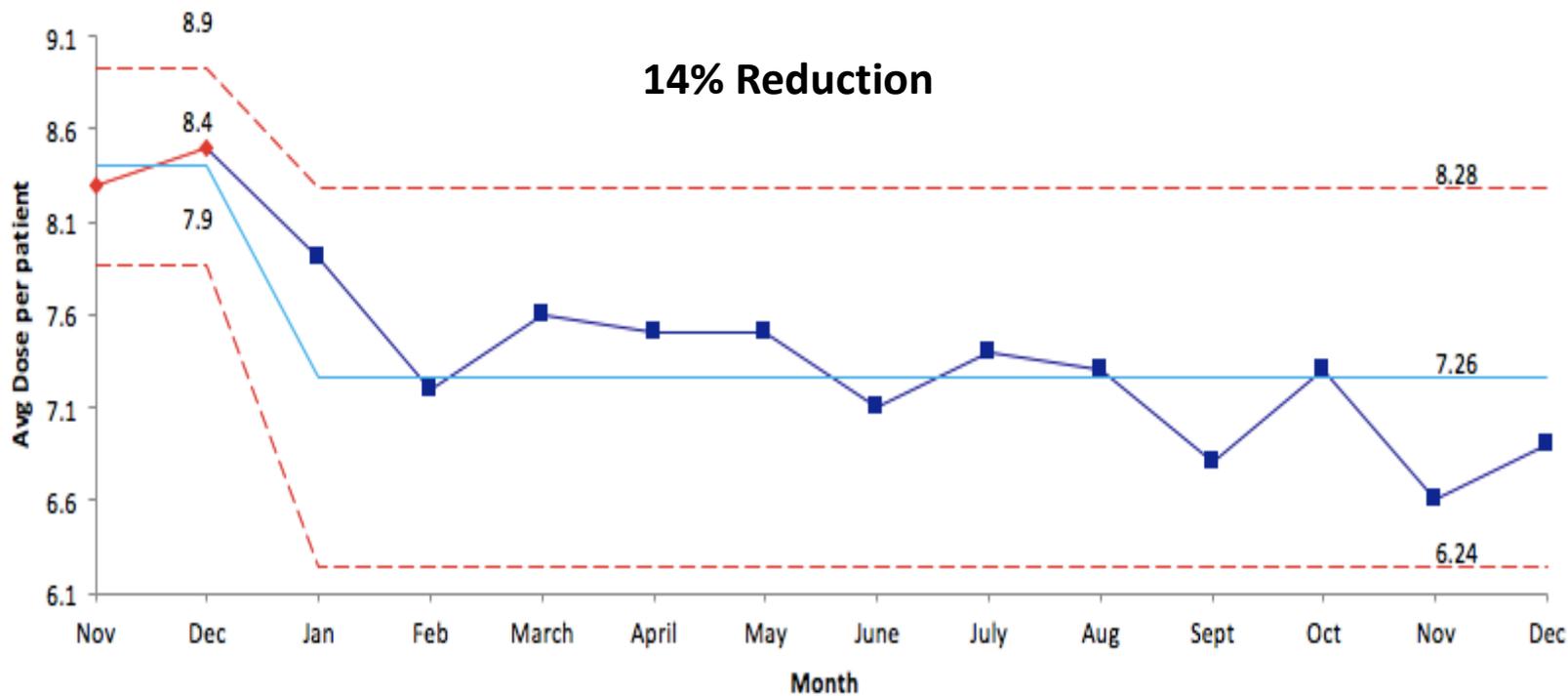
- Birth Certificate Initiative Expenses
 - Develop data systems to support initiative execution and development of a BC dashboard for hospitals: \$25,000
 - State meeting of key pilot stakeholders and registrars: \$5,000
 - Support regional training meetings: \$10,000
 - PQCNC Personnel to facilitate pilot hospital activity in the BC project
 - 0.75 FTE: \$60,000
- PQCNC Birth Certificate Initiative Request: \$100,000



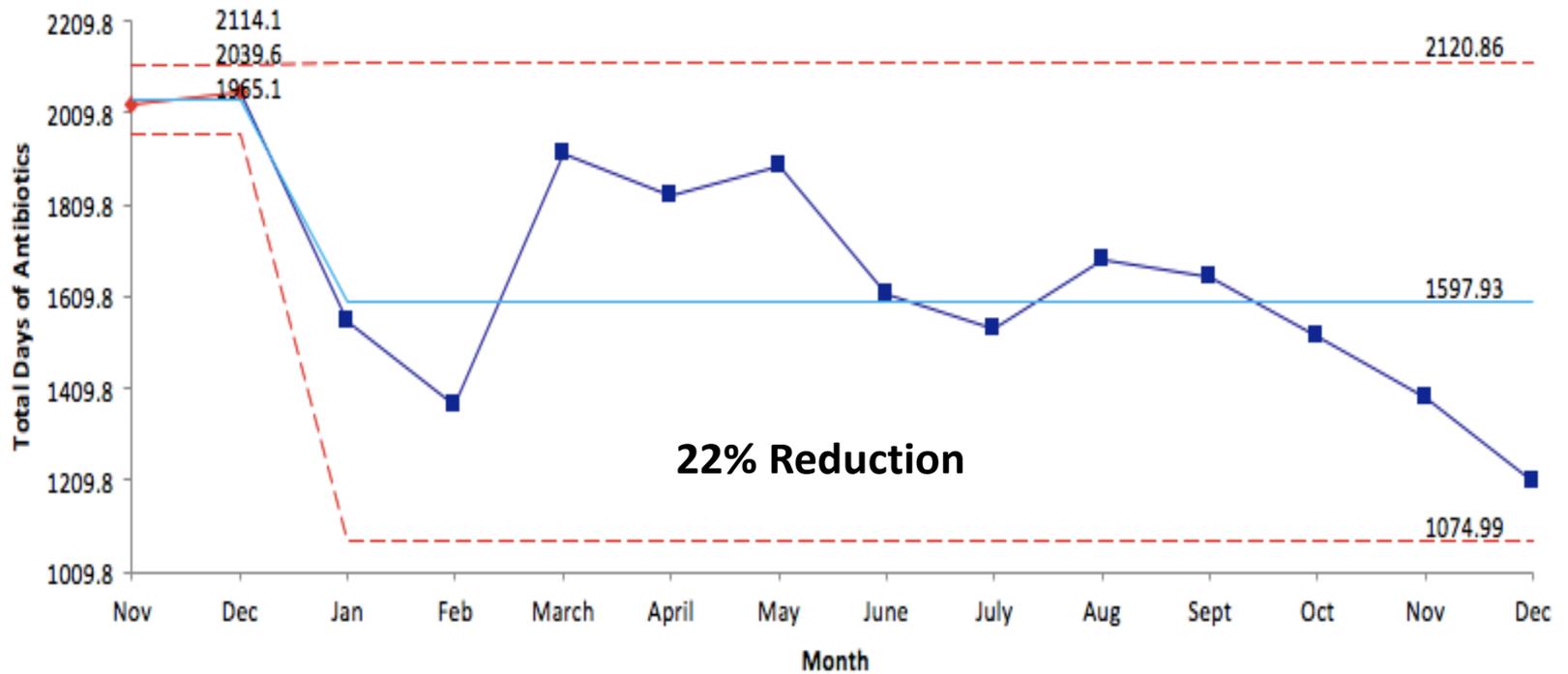
NC NBN Total Days of Abx



NC NICU Avg Dose per patient

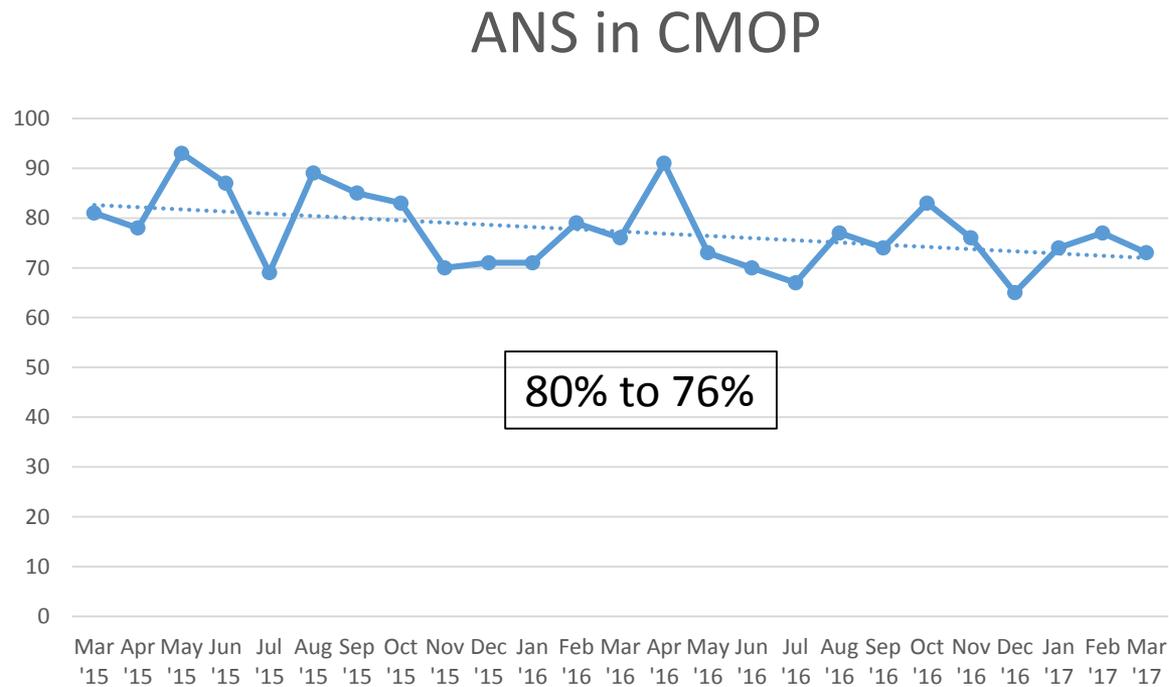


NC NICU Total Days of Antibiotics



Conservative Management of Preeclampsia

CMOP: ANS

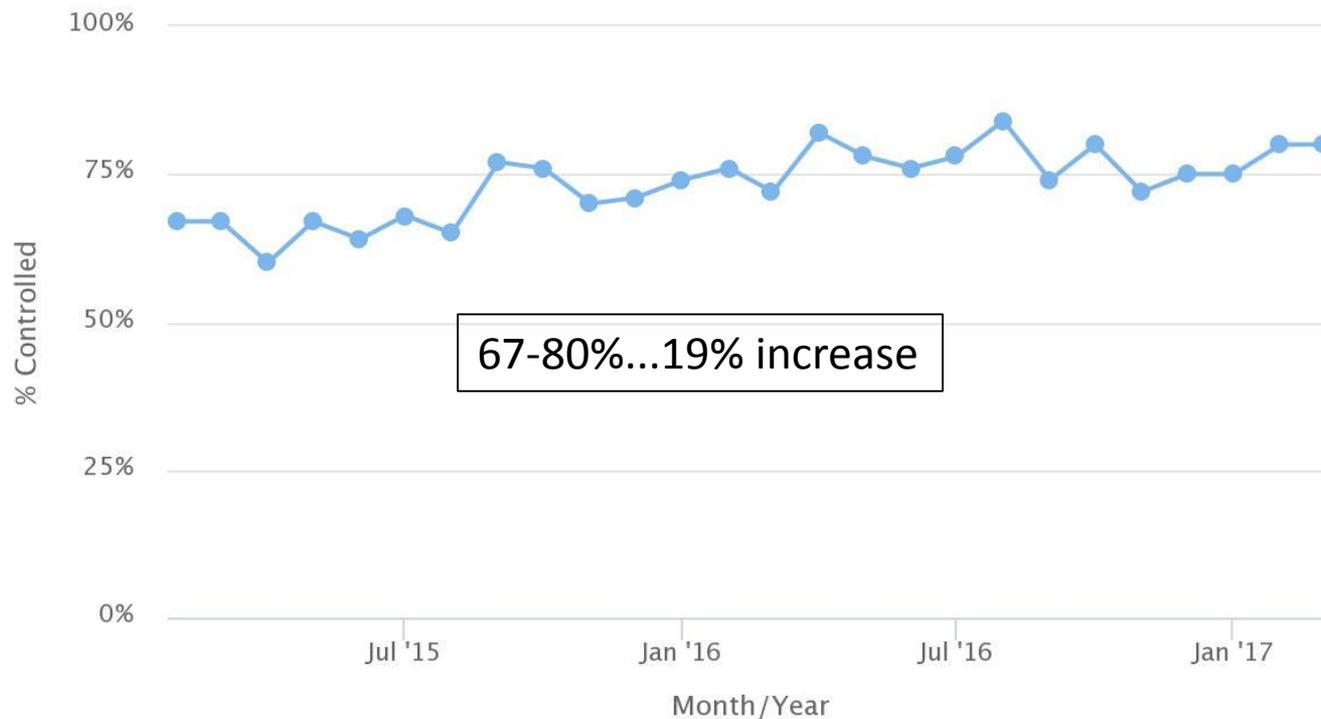


Conservative Management of Preeclampsia

CMOP: Time to Treatment

SBP > 160 or DBP > 110 Controlled Percentage

Ending: 2017-03-31; State: NC



Highcharts.com



PQCNC Value 2007-2017

Savings estimates (Tricare DRG calculator for hospital charges or hospital charge data from DMA)

- \$29,928,000 for SIVB/39 Weeks (sustained over 7 years based on CS reductions since work started)
- \$11,854,498 for newborn/NICU cost savings with reductions in 37-38 week deliveries
- \$3,600,000 for CMOP (avoiding preterm births and NICU stays)
- \$3,500,000 for NAS (avoiding NICU and overall hospital days)
- None of these savings include estimated 20% professional fees, added cost of \$9,336,499
- \$23,400,000 for CLABSI (sustained results over time since PQCNC CLABSI 2009)
- Total savings estimated = \$81,618,997

Cost

- CMS Transformation Grant (\$650K over 2010-2013)
- UNC Innovations Grant (\$600K over three years from 2009-2013)
- ORHCC/BCBSNC (\$1M) one-time support (2014)
- DPH Maternal Block Grant (\$250K x 3 years, \$350K x 2 years 2010-2014)
- NCGA (FY2015) \$465K
- NCGA (FY2016) \$635K
- CDC Grant (\$200K/year x 3 years)
- DMA Support 2017 (\$875,000)
- Total funding (2007-2017): \$6,275,000

ROI

- 1301% over the last eight years (2009-2017)

PQCNC Core Team

- Keith Cochran...Program Manager
- Susan Gutierrez...Clinical Initiative Manager
- Jodi DeJoseph...Clinical Initiative Manager
- Tara Bristol...Patient and Family Partnerships
- Arthur Ollendorff...Leader Maternal Initiatives
- Rachel Greenberg...Leader PQCNC Analytics

Total 4.8 FTEs



What Have We Done?

- Eliminated antibiotic exposure for 792 NBN babies annually
 - Keep 792 moms and babies together, support breastfeeding
 - Eliminate transfer of 396 babies (50% of centers transfer to NICU)
 - Eliminate 792 NICU days
- Reduced continuation of antibiotics after 48 hours of negative cultures for 110 NBN babies
 - Eliminates separation for an additional 110 babies from moms with variable courses of antibiotics from 3-7 days
 - At least 50% of these NICU days
 - Estimate 4 days mean, avoids an additional 220 hospital days, 110 being NICU
- Cost avoided in NICU days alone: \$1.8M
- Value of supporting breastfeeding...priceless

What Have We Done?

- Reduced NICU antibiotic days by 22%, 442 days a month or 5,304 annually
- Ended antibiotic exposure after negative cultures at 48 hours for an additional 27 NICU infants per month, 324 annually.
- Trend to reducing continuation of antibiotics after 48 hours in 22-31 week infants by 36%...avoided antibiotic continuation in 72 infants < 31 week infants per year.
- With a NNTH of 22 for severe NEC/death with antibiotic course > 5 days, we estimate spared 3 infants from those complications.
 - If all NEC, cost avoidance of \$630K
- Total cost avoidance for ASNS: \$2.4M