



IMPROVING CARE FOR MEDICALLY COMPLEX INFANTS:

ACCOMPLISHMENTS AND FUTURE DIRECTION OF THE CHNC COLLABORATIVE INITIATIVES FOR QUALITY Improvement

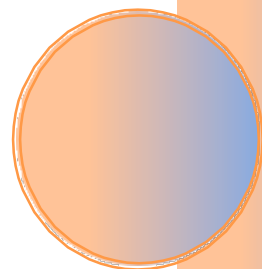
May 2017

Prepared by the CIQI Steering Committee:

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Much of the work of the CHNC has been made possible through the support of our children's hospitals

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The Children's Hospitals Neonatal Consortium (CHNC Collaborative Initiatives for Quality Improvement (CIQI) in 2009. The CHNC CIQI was developed for participating hospitals in the Children's Hospitals Neonatal Database (CHND) to provide structure for **quality improvement collaborative** work in children's hospitals neonatal intensive care units (NICUs) and **impact the health care outcomes** of the patients cared for in these hospitals.

The aim of this group is to enable the completion of meaningful quality improvement projects by achieving outcome **targets established by benchmarking, literature review and outcome variation** data driven by CHND.

MISSION: The CHNC CIQI seeks an interdisciplinary team approach to support a scientific foundation for clinical decision-making and to identify clinical practices that when standardized across NICUs improve outcomes.

VISION: The CHNC CIQI will be nationally recognized as a leader in quality improvement and evidence-based practice with a shared vision to improve health, quality of care, and resource utilization.

IMPORTANCE:

A **collaborative approach** to improve healthcare is imperative in order to successfully achieve and sustain improvements at the patient level. Landmark reports including "To Err is Human" and "Crossing the Quality Chasm" (*National Academies press 2000, 2001*) highlight the ongoing risk to patient quality and safety. Significant gaps in healthcare quality and outcomes exist. Therefore, leveraging data across multiple organizations is needed to establish objective outcomes and to successfully improve the quality of care. The CHND has the foundation for obtaining the data for children's hospitals NICU settings. The CHNC CIQI steering committee team recognizes the importance of **novel collaborative approaches** to **minimize variation, improve outcomes and ultimately cost/resource utilization** while engaging the frontline care providers and families to develop projects directed specifically at the children's hospital NICU microsystem. The structure and components of the CHNC CIQI neonatal quality improvement collaborative have demonstrated **effective improvement** in outcomes for patients treated in the children's hospital NICU setting.

ACCOMPLISHMENTS:

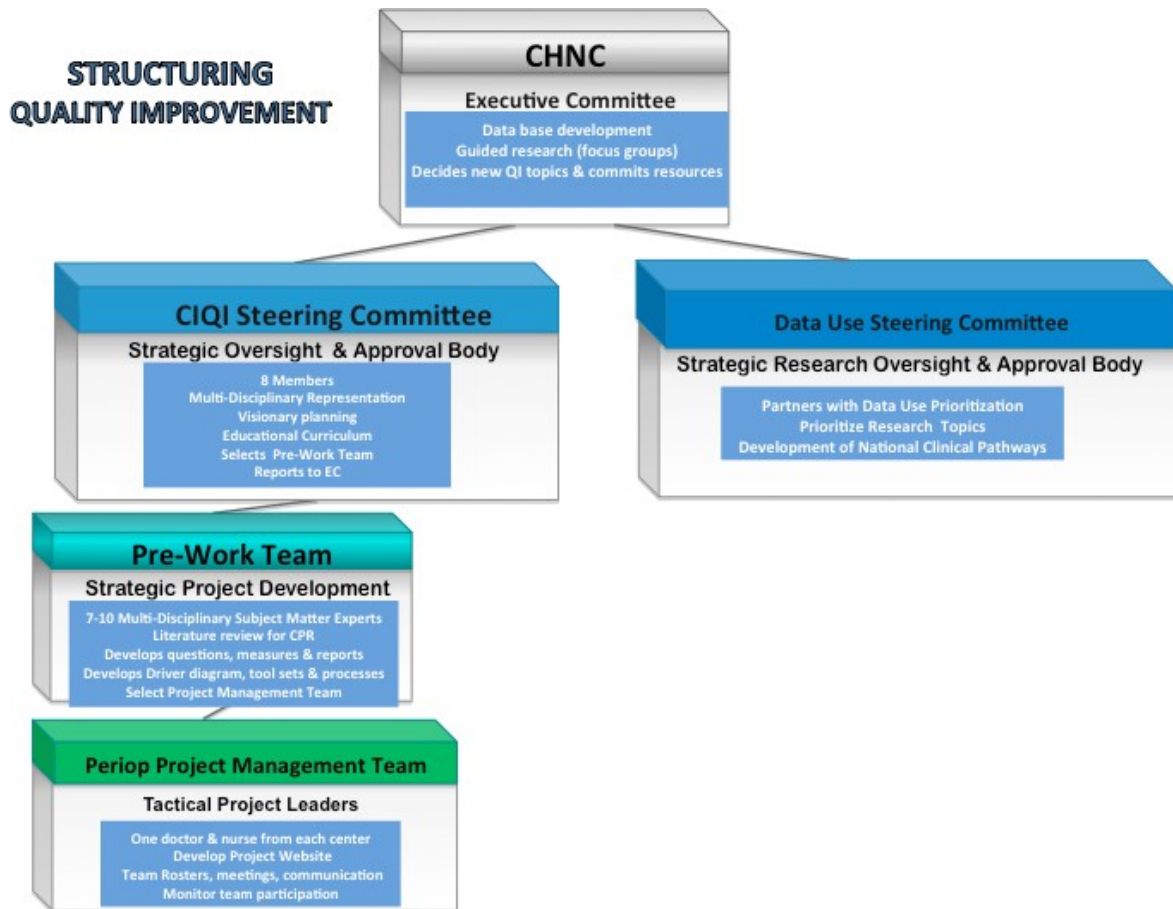
- **SLUG Bug Collaborative (Standardizing Line Care Under Guideline Recommendations):** 17/24 (71%) CHNC hospitals participated in a collaborative to lower central line associated blood stream infections (CLABSI). The collaborative exceeded the project aim of lowering CLABSI by 15 % by demonstrating a 20% reduction in CLABSI rates across centers.
 - An estimated 35 CLABSI events were prevented, up to seven lives were saved with an attributable cost savings of \$69,000 per CLABSI averted (2.4 million dollars over the 12-month study period)
 - Over 80% of centers achieved improvement as noted by the Institute for Healthcare Improvement (IHI) team assessment score and a decrease in CLABSI rates
 - Centers continued to **sustain low rates 18 month** after the collaborative period
 - This collaborative was one of the **first to utilize orchestrated testing** to identify specific components of care bundles that contributed to outcome improvement
 - **Hub scrub compliance monitoring, when used in combination with sterile tubing change, decreased CLABSI rates by 1.25 per 1000 line days**
 - Four centers continued to lower CLABSI rates with implementation of sterile tubing change
- **STEPP IN Collaborative (Safe Transitions & Euthermia in the Perioperative Period in Infants and Neonates):** 24/28 (85%) CHNC hospitals participated in the collaborative to improve postoperative hypothermia and/or improve peri-operative handoff.
 - There was a **48% decrease in post-operative hypothermia**
 - There was a **decrease in communication care failures by 57%** and **respiratory care failures by 64%**
 - 100% of teams have implemented change and 86% demonstrated improvement as noted by the IHI team assessment score
 - Strategies associated with decreased post-operative hypothermia included:
 - Compliance with maintenance of euthermia at select time points throughout the peri-operative period specifically on arrival to and departure from the operating room
 - Reporting a practice of pre-warming the operating room ambient temperature to > 74°F
 - Assessment of resource utilization and risks post-operative for hypothermia is in process
- **STEPP IN next STEPPs:** 27 centers have joined this new collaborative that began in April 2017. The purpose of the STEPP IN next STEPPs is to build on the gains from the STEPP IN project. The SMART aim is **achieve a Post-Operative Management Score (POMS) in the target range in ≥ 85% of surgical timeframes within 18 months beginning in December 2018 and sustained for 12 months.** This collaborative focuses on all aspects of peri-operative handoff communication (before, during and after surgery) in order to
 - Optimize patient physiologic parameters as measured by the POMS including post-op pH, PCO₂, glucose, temperature and unintended respiratory events
 - Optimize pain management to decrease consecutive pain scores suggesting moderate pain

- **Spreading Improvement Competency**
 - A comprehensive educational program was offered to spread quality improvement principles across centers.
 - These educational offerings were integrated within the collaborative meeting structure at no additional cost to participants
 - Pretest / post test scores showed an average improvement in knowledge of 29% (range 18-42%) for participants
- **Value added**
 - **Maintenance of certification** for quality improvement was granted for over 500 (SLUG Bug and STEPP IN) physicians across neonatology, surgery and anesthesia at no additional cost to participants
 - Data from CHND demonstrates that a center's participation in a quality collaborative improves outcome measures faster compared to non-participating centers
- Recognized as **international experts for multicenter quality improvement success and methodology**
 - Consultants to the Ohio Perinatal Quality Collaborative during program development on neonatal abstinence with use of orchestrated testing
 - 2015 Vermont Oxford Annual Quality Congress Workshop
 - Optimizing Perioperative Care for Neonates
 - IHI Improvement Advisor Program invited lecture
 - "Applications of Orchestrated Testing in the Clinical Setting"
 - 2016 Annual Pediatric Academic Society Meeting Workshop
 - Helping your Team with Handoff: Using Quality Improvement Methodology to Optimize Patient Safety and Team Communication
- **Collaborative structure**—Engaging Team members across Institutions
 - Participation promotes relationships
 - STEPP IN project(s) engaged individuals across disciplines (surgery, anesthesia and neonatology)
 - Listserv provides opportunities to query practices across centers beyond the collaborative
 - The collaborative provides opportunities for interdisciplinary team engagement both locally and at the planning level
 - **Transparency** promotes in depth benchmarking and learning across institutions

SUMMARY

CHNC CIQI is improving care for children's hospitals NICU patients through an interdisciplinary effort driven by CHND with a focus on practice standardization to improve outcomes and resource utilization.

APPENDIX I: CIQI STRUCTURE



APPENDIX II: Scientific Work

PEER REVIEWED PAPERS

1. Piazza A, Brozanski B, Provost L, Grover T, Chuo J, Smith J, Mingrone T, Moran S, Morelli L, Zaniletti I, Pallotto EK. SLUG Bug: Quality improvement with orchestrated testing leads to NICU CLABSI reduction. *Pediatrics*. 2016 Jan; 137(1):1-12. 23. doi: 10.1542/peds.2014-3642. Epub 2015 Dec 23. PMID: 26702032
2. Pallotto EK, Chuo J, Piazza A, Provost L, Grover T, Smith J, Mingrone T, Moran S, Morelli L, Zaniletti I, Brozanski B. Orchestrated Testing: An Innovative Approach to a Multicenter Improvement Collaborative. *Am J Med Qual*. 2015 Oct 19. pii: 1062860615609994. [Epub ahead of print] PMID: 26483566
3. Grover TR, Pallotto EK, Brozanski B, Piazza AJ, Moran S, McClead R, Mingrone T, Morelli L, Smith JR. "Interdisciplinary teamwork and the power of a quality improvement collaborative in tertiary neonatal intensive care units." *J Perinat Neonatal Nurs*. 2015 Apr-Jun;29(2):179-86. doi: 10.1097/JPN.000000000000102. PMID: 25919608

PAS Presentations 2016

1. Piazza AJ, Brozanski B, McClead R, Smith JR, Richardson T, Grover T, Mingrone T, Holston M, Chuo J, Moran S, Bellflower B, Rao R, Hulbert C, Rintoul N, Pallotto EK. STEPP-IN: A Multi-Center Collaborative Decreases Care Failure by Implementing Standard Communication Process for Post-operative Handoff. Poster presentation
2. Pallotto EK, Brozanski B, Piazza AJ, Mingrone T, Smith JR. *Helping your Team with Handoff: Using Quality Improvement Methodology to Optimize Patient Safety and Team Communication*. Workshop.
3. Pallotto EK, Piazza AJ, McClead R, Smith JR, Richardson T, Grover T, Mingrone T, Holston M, Chuo J, Moran S, Bellflower B, Rao R, Hulbert C, Rintoul N, Brozanski B. STEPP-IN: A Multi-Center Collaborative Reduces Post-Operative Hypothermia and Identifies Key Strategies for Success. Presentation
4. Piazza AJ, Brozanski B, McClead R, Smith JR, Richardson T, Grover T, Mingrone T, Holston M, Chuo J, Moran S, Bellflower B, Rao R, Hulbert C, Rintoul N, Pallotto EK. STEPP-IN: A Multi-Center Collaborative Decreases Care Failure by Implementing Standard Communication Process for Post-operative Handoff.

PAS Presentations 2015

1. Pallotto EK, Piazza A, Grover TR, Smith J, Moran S, Mingrone T, Bellflower B, Holston M, Chuo J, Morelli L, Richardson T, Hulbert C, Rintoul N, Rao R, Soliman D, McClead R, Brozanski BS. STEPP IN: A Multi-center Quality Collaborative Reducing Post-Operative Hypothermia in Neonates. Poster Symposium
2. Piazza AJ, Pallotto EK, Richardson T, Provost L, Chuo, J, Grover T, Smith JR, Mingrone T, Moran S, Morelli L, McClead R, Brozanski B. *The Benefits of Participation in a CLABSI Reduction Collaborative*. Poster Symposium.

PAS Presentations 2014

1. Brozanski B, Piazza A, Chuo J, Provost L, Grover T, Smith J, Mingrone T, Moran S, Holston M, Morelli L, Zaniletti I, Pallotto E. *Multi-Center Collaborative To Prevent Central Line-Associated Bloodstream Infections (CLABSI) Utilized Results from Orchestrated Testing to Impact Further CLABSI Reduction*. Poster Symposium.

PAS Presentations 2014

1. A Piazza, MD, B Brozanski, MD, J Chuo, MD, MS, L Provost, MS, T Grover, MD, J Smith, PhD(c), NNP-BC, S Moran, DNP, NNP-BC, T Mingrone, MSN, T O'Connor, RN, L Morelli, RN, LNCC and E Pallotto, MD. MSCE. "In an Orchestrated Design Paradigm A Children's Hospital NICU Quality Improvement Collaborative Decreased CLABSI Rates." Poster Session

PAS Presentations 2013

1. Pallotto EK, Piazza AJ, Brozanski BS, Grover T, Smith JR, Distler A, Holston M, Moran S, O'Connor T, Chuo J. *"Improving the health of neonates: establishing a collaborative QI process for Level 3C children's hospitals NICUs"* Poster Session.
2. Pallotto EK, Chuo J, Piazza AJ, Smith JR, Grover T, Distler A, Holston M, O'Connor T, Moran S, Murthy K, Brozanski B. *"Using a multi-center collaborative model to derive testable recommendations for reducing CLABSI in Level 3C children's hospital NICUs."* Poster Session.

Additional Scientific Abstracts and Presentations

Pallotto EK, Brozanski B, Piazza AJ, Mingrone T, Smith JR Children's Hospital Neonatal Consortium: Optimizing Perioperative Care for Neonates. Invited workshop. Vermont Oxford Network NICQ Symposium and 2015 Annual Quality Congress. November 2015. Chicago, Illinois

Brozanski BS for the CHNC CIQI Steering Committee. *"Children's Hospital Neonatal Consortium (CHNC) Promotes Continuous Initiatives for Quality Improvement (CIQI)"* Invited Presentation. Children's Hospital Association Quality and Safety leaders Forum, Orlando, Florida, March 2014.

S Moran, DNP, NNP-BC; J Chuo, MD; MS, B Brozanski, MD; T Grover, MD; A Piazza, MD; L Morelli, RN, LNCC; E Pallotto, MD, MSCE; J Smith, PhD(c), NNP-BC. *"Nursing Contributions in a Multi-Institutional and Multidisciplinary Collaborative Reduces CLABSI Rates."* Presentation. The Council of International Neonatal Nurses: 8th International Neonatal Nursing Conference. September 5-8, 2013. Belfast, Ireland.

E Pallotto MD MSCE, A Piazza MD, J Chuo MD, L Provost MS, T Grover MD, J Smith PhD(c) NNP-BC, L Morelli RN LNCC, T Mingrone MSN, T O'Connor BSN, B Brozanski MD. *"Children's Hospitals NICUs Lower CLABSI Rates through Planned Experimentation"* Poster Session. CHA-NACRI Creating Connections, March 18- 19, 2013.

J Chuo MD MS, B Brozanski MD, T Grover MD, A Piazza MD, J Smith PhD(c) NNP- BC, L Morelli RN LNCC, S Moran DNP NNP-BC, E Pallotto MD MSCE. *"Building a collaborative quality improvement infrastructure for Children's Hospital Neonatal Intensive Care Units (NICUs)"* Poster Session. CHA-NACRI Creating Connections, March 18-19, 2013.

Appendix III:

The Children's Hospital Neonatal Database

2017 Membership

1. Alfred I. duPont Hospital for Children, Wilmington
2. All Children's Hospital Johns Hopkins Medicine, St. Petersburg
3. American Family Hospital, Madison
4. Ann & Robert H. Lurie Children's Hospital of Chicago
5. Arkansas Children's Hospital, Little Rock
6. Boston Children's Hospital
7. Cincinnati Children's Hospital
8. Children's Healthcare of Atlanta at Egleston
9. Children's Healthcare of Atlanta at Scottish Rite
10. Children's Hospital and Medical Center, Omaha
11. Children's Hospital Colorado, Denver
12. Children's Hospital of Orange County
13. Children's Hospital of Pittsburgh of UPMC
14. Children's Hospital of Wisconsin, Milwaukee
15. Children's Medical Center Dallas
16. Children's Mercy Hospitals and Clinics, Kansas City
17. Children's National Medical Center, Washington, DC
18. Children's of Alabama, Birmingham
19. Children's Hospital Los Angeles
20. Children's Hospital of Michigan, Detroit
21. Cook Children's Medical Center, Fort Worth
22. Florida Hospital for Children, Orlando
23. Hospital for Sick Children, Toronto, Ontario
24. Le Bonheur Children's Hospital, Memphis
25. Nationwide Children's Hospital, Columbus
26. Primary Children's Hospital, Salt Lake City
27. Rady Children's Hospital, San Diego
28. Riley Children's, Indianapolis
29. Seattle Children's Hospital
30. St Christopher's Hospital for Children, Philadelphia
31. St. Louis Children's Hospital
32. Texas Children's Hospital, Houston
33. The Children's Hospital of Philadelphia
34. UCSF Benioff Children's Hospital Oakland

Appendix III:

The Children's Hospital Neonatal Consortium CIQI Steering Committee Members 2017

Beverly Brozanski, MD, IA Co-Chair

Medical Director, Neonatal Intensive Care Unit, Children's Hospital of Pittsburgh of UPMC
Professor Dept of Pediatrics, University of Pittsburgh School of Medicine. Pittsburgh, PA

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Medical Director Intensive Care Nursery Neonatal, ECMO Medical Director Children's
Children's Mercy Kansas City
Professor of Pediatrics University Missouri School of Medicine Kansas City, MO

Anthony Piazza, MD Vice-Chair

Medical Director Intensive Care Nursery and Neonatal ECMO Medical Director Children's
Healthcare of Atlanta at Egleston Hospital
Associate Professor of Pediatrics Emory University School of Medicine Atlanta, GA

Tom Bartman, MD, PhD

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Associate Medical Director of Quality for Nationwide Children's Hospital
Associate Professor Division of Neonatology Nationwide Children's Hospital, Columbus OH

John Chuo, MD, MSBI, IA

Medical director of Telemedicine and Neonatal Quality officer at Children's Hospital of
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Associate Professor of Pediatrics at the Perelman School of Medicine at the University of
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Theresa Grover, MD

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Associate Professor of Pediatrics University of Colorado School of Medicine

Judy Hawes, CNS-NP

Clinical Nurse Specialist-Neonatal Nurse Practitioner,
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Quality for Intermountain Healthcare
Associate Professor, Dept of Pediatrics, University of Utah

Joan Smith, PhD, NNP-BC

Director of Quality, Safety and Practice Excellence
St Louis Children's Hospital, St Louis, MO

Rick McClead, MD, MHA

Medical Director of Quality Improvement Services at Nationwide Children's Hospital
Professor and Vice Chairman for Quality in the Department of Pediatrics, The Ohio State
University College of Medicine, Columbus, OH

Former Members

Susan Moran, DNP, MS, NNP-BC (2010-2015)

Children's Hospital Colorado, Aurora, CO