

A Multi Center Approach to Managing High-Order Multiple Births

April 5, 2013

Kim Firestone BS, RRT
Neonatal Respiratory Outreach
Clinical Liaison
Akron Children's Hospital

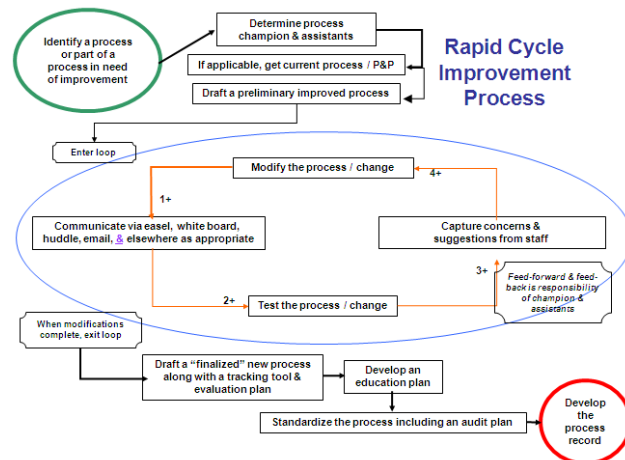
Amy Knupp MSN, RN
Director, Nursing Quality Improvement & Patient Safety
Wexner Medical Center @ The Ohio State University

Objectives

- Describe the use of the Vermont Oxford Network Collaborative's Potentially Better Practices for the delivery of high-risk neonatal patients
- Discuss one center's experience with using these Potentially Better Practices in the delivery and care of a high-risk, high-order multiple births.
- Discuss the use of another center's adaptation of this initial model of care.

The Improvement Story

- Vermont Oxford Network
 - NIC/Q, NICQ 2000 ...
 - YIN
 - iNICQ's
- 4 key habits for improvement
 - habit of change
 - habit for evidence-based practice
 - habit for systems thinking
 - habit for collaborative learning



Improvement Story

- Multidisciplinary Leadership Groups
 - MDPLT
- Multidisciplinary Working Groups
 - Face to face
 - Conference calls
 - Email list servs
 - Trained facilitators
 - Expert faculty

Focus Groups

- Specific improvement topics
 - Critical appraisal of published literature
 - Detailed process analysis
 - Benchmarking
 - Social process
 - Site visits

Potentially Better Practices

- Resource kits
 - Tested and implemented
 - Rapid cycle improvement
 - 106 PBP's available (at that time)
 - Reduce nosocomial infections
 - Reduce chronic lung disease
 - Reduce radiograph use
 - Reducing LOS
 - Reduce blood gases
 - Promote nutrition
 - Reduce IVH

Quality Improvement Collaboratives

- 9 years of quality improvement collaboratives
- Long term outcomes
- Sustained implementation of respiratory practices
- Increased survival
- Reduced nosocomial infections

Payne et al, Pediatrics, 2010

High Order Multiples

- January 2004
 - Anticipated birth of sextuplets
 - Best possible organization
 - Best possible operational
 - Best possible clinical outcomes
- Affected two hospitals
 - Maternal side
 - Neonatal side

Plan for the Delivery

- Resuscitation date plan with family
 - Documentation for both teams
 - Wee Deliver
- PBP decision
- Extensive media coverage
- planning meeting

Personnel

- Two multi-disciplinary teams
 - Nursing
 - Neonatal nurse practitioners
 - Neonatologists
 - Respiratory care
 - Radiology
 - Security
 - Volunteers
 - Risk management public relations
 - Transport services
 - Administration
 - telecommunications
 - Audiovisual personnel

Coordinated Plan

- Investigate problems and solutions for potential logistic issues
- Benchmarking via e-mail and phone
- Ideas generated
- Staff plan created with call system
- PBP's reviewed
 - Patient safety issues
 - Set of practices formed

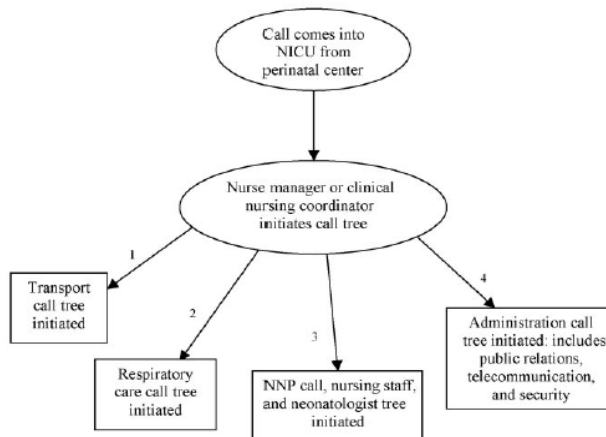
Coordinated Plan

- Equipment coordination
 - Extra equipment rented
 - Stored in a closed room
 - Color coded
- Assignment of team
 - Two nurses
 - Neonatologist
 - One respiratory therapist
- Security involvement
 - Police escort

Admission to level III NICU

- Designated area
 - Birth order
- Maintained space
- 1 to 1 nursing care
 - First 24 hours
- Media exposure
 - No external sources until fifth day of life
 - Audiovisual department extensive involvement

SEXTUPLET CALL TREE



Outcomes and Results

- Process measures evaluated
- Focus on:
 - Reducing nosocomial infection- 33 PBP's
 - Reducing chronic lung disease - 16 PBP's
 - Reducing LOS – 9 PBP's
 - Reducing Blood Gas Usage – 7 PBP's
 - Reducing IVH – 12 PBP's
 - Enriching Family-Centered Care – 7 PBP's

Outcomes and Results

- Aimed to use 97 PBP's
 - 96 used
 - H2 blocker exception
- Surfactant within 15 minutes of life
- Enteral feeds on day of life 1
 - Enteral prime feeds after 24 hours when breast milk was available

Outcomes and Results

- Measure included:
 - Mortality, Morbidity, LOS, Hospital Charges
 - Resource use
 - Days on ventilator
 - Total number of labs drawn
 - Hyperalimentation days
 - Intralipid days
 - Time for surfactant
 - Radiographs
 - Antenatal steroids
 - Days of central line placement

Outcomes and Results

- Compared with infants cared for with same weight/gestation in 2002-2003 at ACH
- VON comparison bw 750- 1250 g
 - Antenatal steroids
 - Birth weight
 - Cost-to- charge ratio
 - Mortality/morbidity
 - No severe IVH, CLD, Pneumo, PVL, or late infection

Outcomes and Results

- No reported errors
- LOS same
- Outcomes of resources
 - Fewer blood gases
 - No difference in radiographs
 - No difference in hyperalimentation days
 - No difference intralipid days
 - Fewer total labs, total labs per day no significance difference

Measure	Sextuplets (N = 6)	Controls (N = 26)	P
Average birth weight, g	1052.0 ± 180.0	999.0 ± 130.0	.2541 ^a
LOS, d	63.0 ± 7.8	64.0 ± 27.0	.267 ^b
CPAP days	4.2 ± 1.3	11.0 ± 9.0	<.01 ^a
CPAP days per days hospitalized	0.07 ± 0.03	0.16 ± 0.12	<.01 ^a
Ventilator days	2.3 ± 1.9	9.8 ± 15.0	<.01 ^a
Ventilator days per days hospitalized	0.04 ± 0.02	0.12 ± 0.11	<.01 ^a
Time to surfactant, min	13.5 ± 5.9	101.0 ± 151.0	<.01 ^c
Total No. of gases	2.0 ± 0.6	9.8 ± 14.7	<.01 ^c
No. of gases per day hospitalized	0.032 ± 0.012	0.13 ± 0.12	<.01 ^c
No. of radiographs	5.0 ± 3.9	9.9 ± 16.0	.79 ^b
No. of radiographs per days hospitalized	0.08 ± 0.05	0.13 ± 0.13	.72 ^b
Day of life at which started on enteral feeds	2	3.7	
Hyperalimentation days	17.0 ± 6.5	16.0 ± 16.0	.21 ^b
Hyperalimentation days per days hospitalized	0.26 ± 0.1	0.23 ± 0.12	.31 ^b
Intralipid days	9.0 ± 4.0	9.0 ± 14.0	.6 ^b
Intralipid days per days hospitalized	0.14 ± 0.065	0.12 ± 0.12	.43 ^b
Central line days	12.7 ± 10.4	11.4 ± 18.1	.22 ^c
Central line days per day hospitalized	0.21 ± 0.17	0.16 ± 0.25	.45 ^c
Total No. blood draws	19.0 ± 7.9	35.6 ± 31.8	<.01 ^c
Total No. blood draws per days hospitalized	0.3 ± 0.1	0.50 ± 0.19	.16 ^c

Data are means ± SD.
^a Unpaired t test with Welch's correction.
^b Mann-Whitney test.
^c t test.

Kantak et al, Pediatrics 2006;118:S159

Ohio State Improvement Story

- Anticipated delivery June 2010
- Habit for collaborative learning
 - *Kantak A, Grow J, Ohlinger J. et al. Management of High-Order Multiple Births: application of lessons learned because of participation in Vermont Oxford network collaboratives. Pediatrics. 2006;118:S159. Available at: www.pediatrics.aappublications.org/content/118/Supplement_2/S159.full.html*
- Cooperative blueprint
- Long term outcomes

The next high order deliveries

- Subsequent triplets, quadruplets
- August 2010
 - 24 week Quintuplets
 - The blue print needs to be utilized
 - Day of delivery- one hour notice
 - Plan
 - Outcomes

Results

- Multidisciplinary collaboration and coordination
- Cooperative blueprint
- Avoiding dissatisfaction
- Cost-effective
- No errors
- Contributing factors of collaboration reducing variation and errors

Bibliography

- Horbar JD, Plsek PE, Leahy K, Ford P. The Vermont Oxford Network: improving quality and safety through multidisciplinary collaboration. *Neoreviews*. 2004;5:e42-49
- Harbar JD, Plsek PE, Leahy K. NICU/Q 2000: establishing habits for improvement in neonatal intensive care units. *Pediatrics*. 2003;111(4). Available at: www.pediatrics.org/cgi/content/full/111/4/SE1/e397
- Ohlinger J, Kantak A, Lavin J. et al. Evaluation and development of potentially better practices for perinatal and neonatal communication and collaboration. *Pediatrics*. 200; 118(5). Available at: www.pediatrics.org/cgi/content/full/118/5/S2/S147
- Kantak A, Grow J, Ohlinger J. et al. Management of High-Order Multiple Births: application of lessons learned because of participation in vermont oxford network collaboratives. *Pediatrics*. 2006;118;S159. Available at: www.pediatrics.aappublications.org/content/118/Supplement_2/S159.full.html
- Payne N, Finkelstein, MS, Kaempf, J. NICU Practices and Outcomes Associated With 9 Years of Quality Improvement Collaboratives. *Pediatrics*. 2010;125 (3)437-446.