

Regional collaborative efforts to implement best practice guidelines improve newborn admission temperatures in multi-level NICUs and mother baby units (MBUs) in North Texas

Phyllis Wan-Huen, Jonathan NedreLOW, Darryl Miao, Amanda Truelove, Michelle S. Charless, Christina Gist, Hendrik J. Antonisse and Rashmin C. Savani

For the Perinatal Committee of the
North Central Texas Trauma Regional Advisory Council Perinatal

Objective

- To use state-mandated regionalization of care to establish best practice guidelines to decrease hypothermia on admission to NICUs and MBUs by 20% ***without*** increasing hyperthermia over a 3-year period.
- The Perinatal Committee of NCTTRAC aim to standardize the collection of admission temperatures in all newborns.

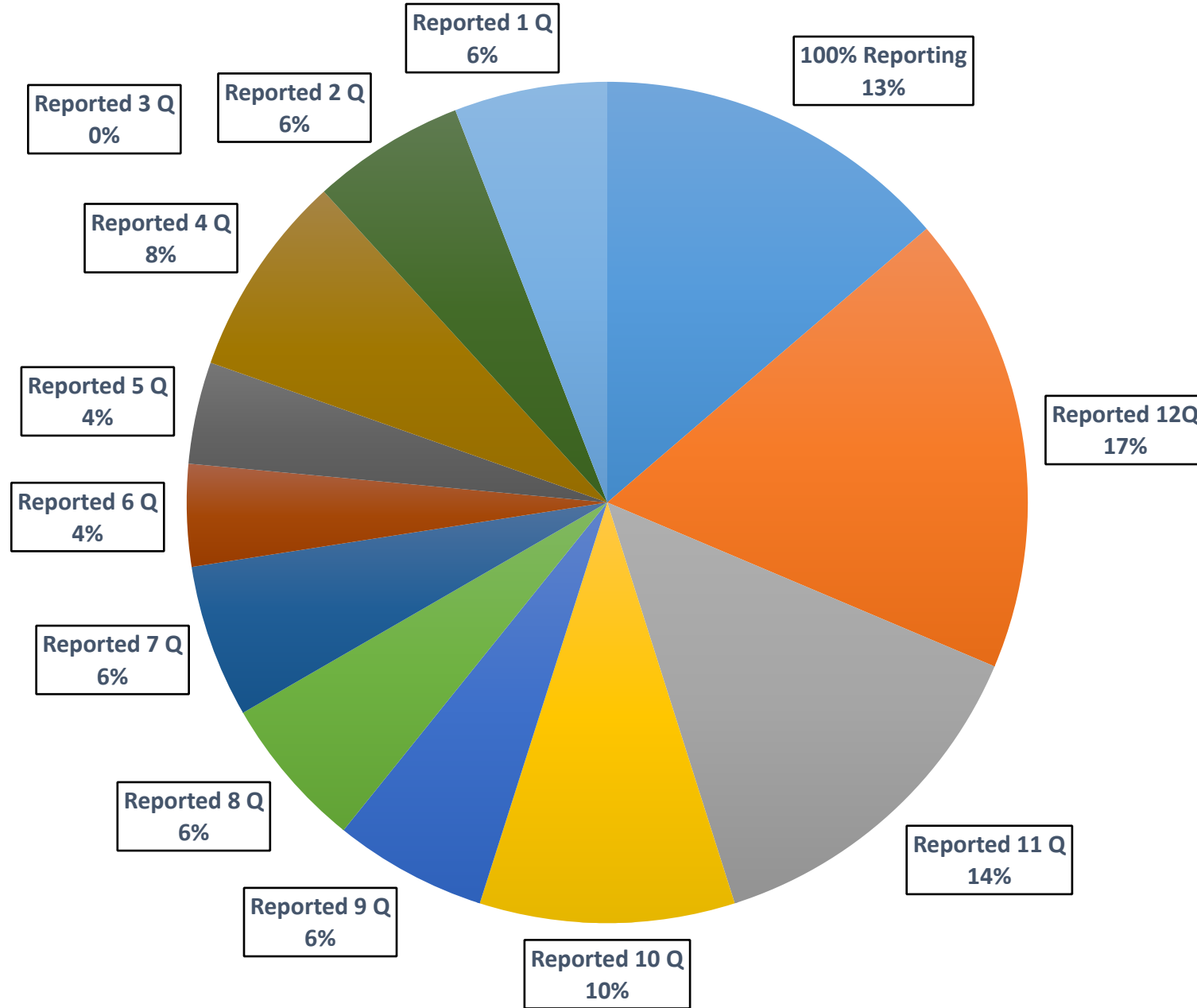
Methods

- Hypothermia ($< 36.0^{\circ}\text{C}$) and Hyperthermia ($>37.5^{\circ}\text{C}$) were defined using WHO criteria and a buffer for cold stress.
- The Perinatal Committee of NCTTRAC held monthly meetings to share best practices.
- Temperature was recorded on admission to NICU and within 20-60 min of life in MBU.
- Quarterly surveys (survey monkey) sent via the regional listserv were used to obtain de-identified data on number of admissions to NICU/MBU, number of infants with hypo/hyperthermia on admission, method for obtaining temperature, and institutional changes in temperature guidelines.
- Control charts were used to determine rate changes in hypo- and hyperthermia

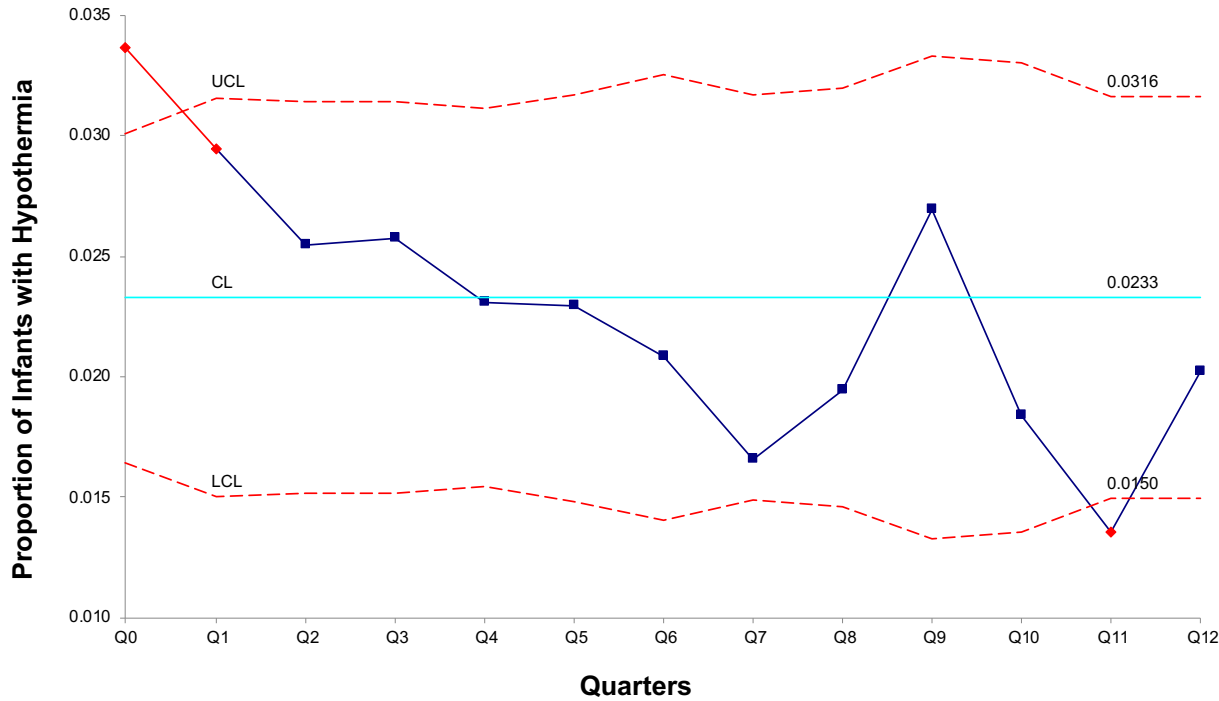
Hypothermia and Hyperthermia Rates in NICU and MBU

- A total of 37,968 infants were included over a 3 year period in the NICU
- Baseline hypothermia was 3.37% and hyperthermia was 8.39%
- A total of 237,800 infants were included over a 3 year period in MBU
- Baseline hypothermia was 1.26% and hyperthermia was 7.77%

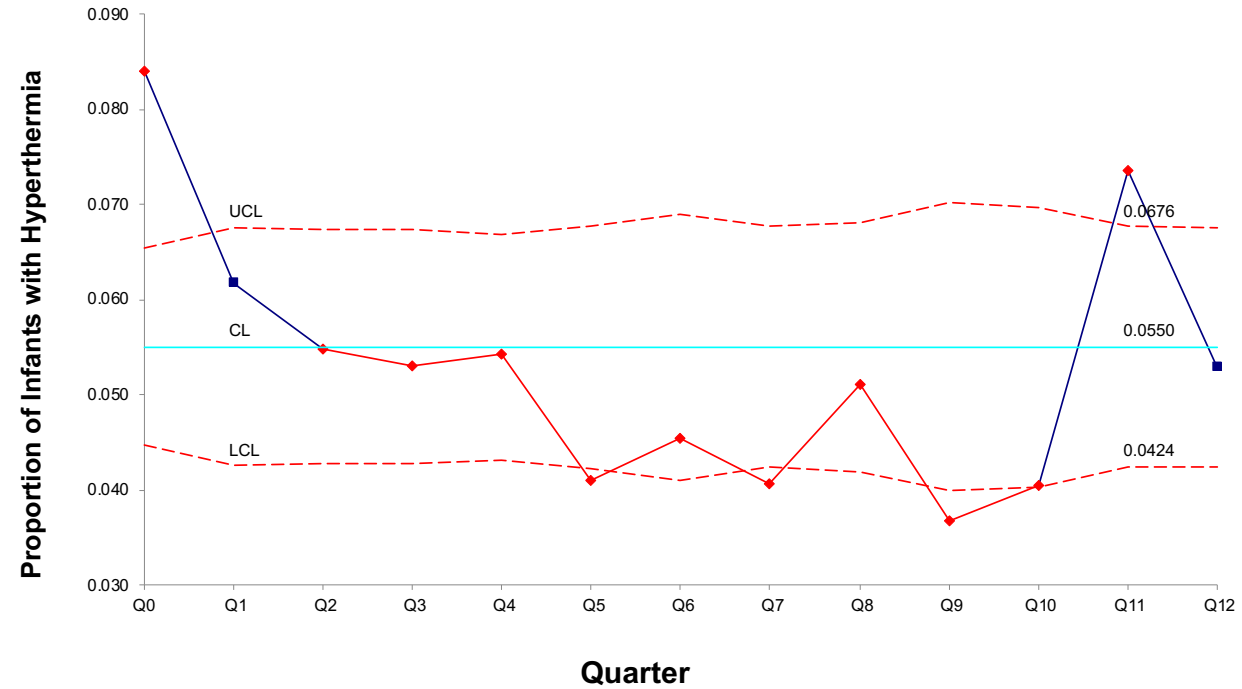
CONSISTENCY OF DATA REPORTING



NICU Hypothermia p Chart

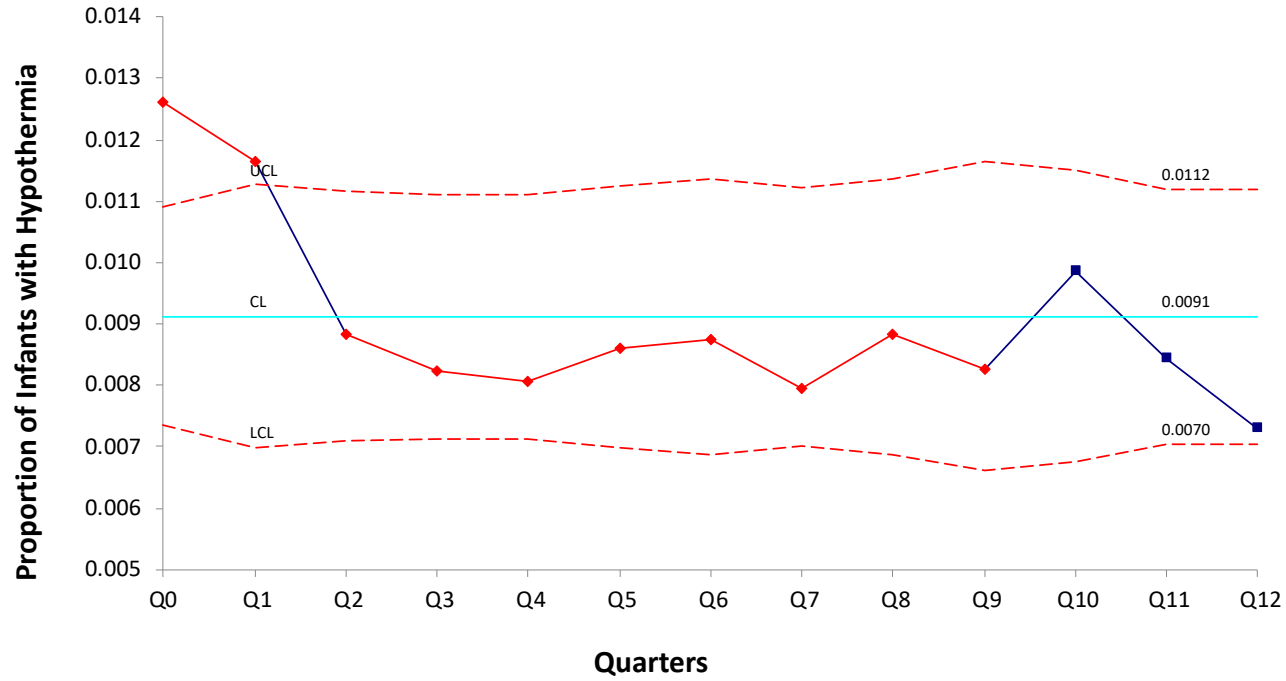


NICU Hyperthermia p Chart

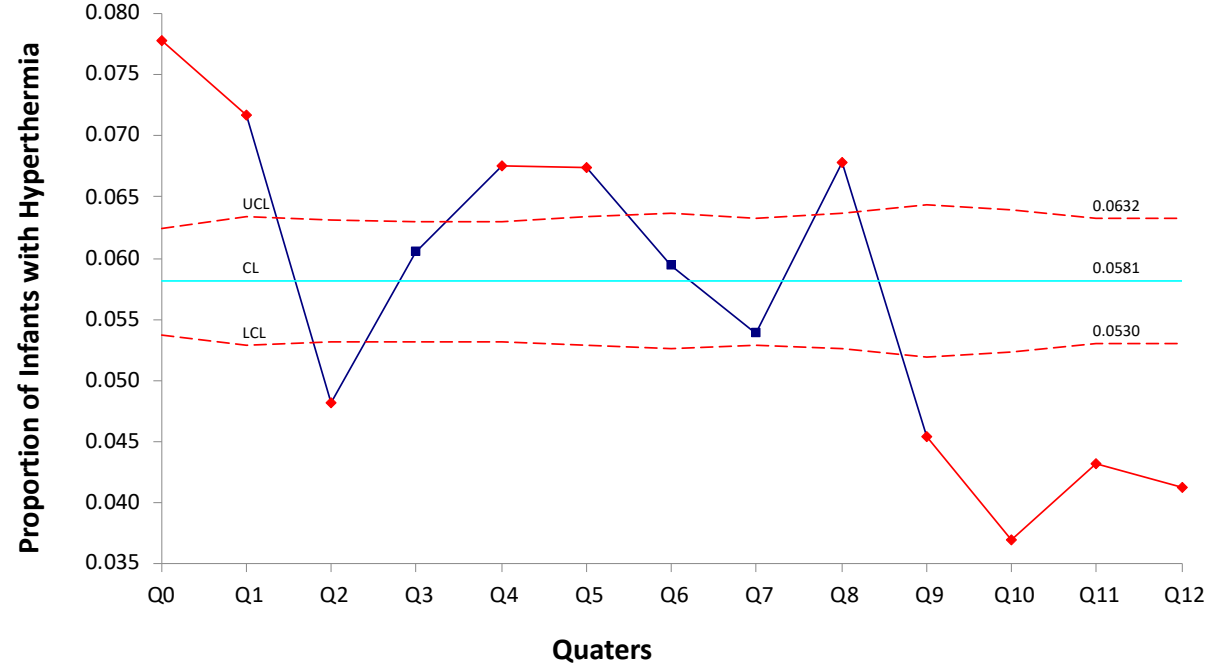


For both hypothermia and hyperthermia in the NICU, the linear trend analysis P-value was < 0.01 .

MBU Hypothermia p Chart



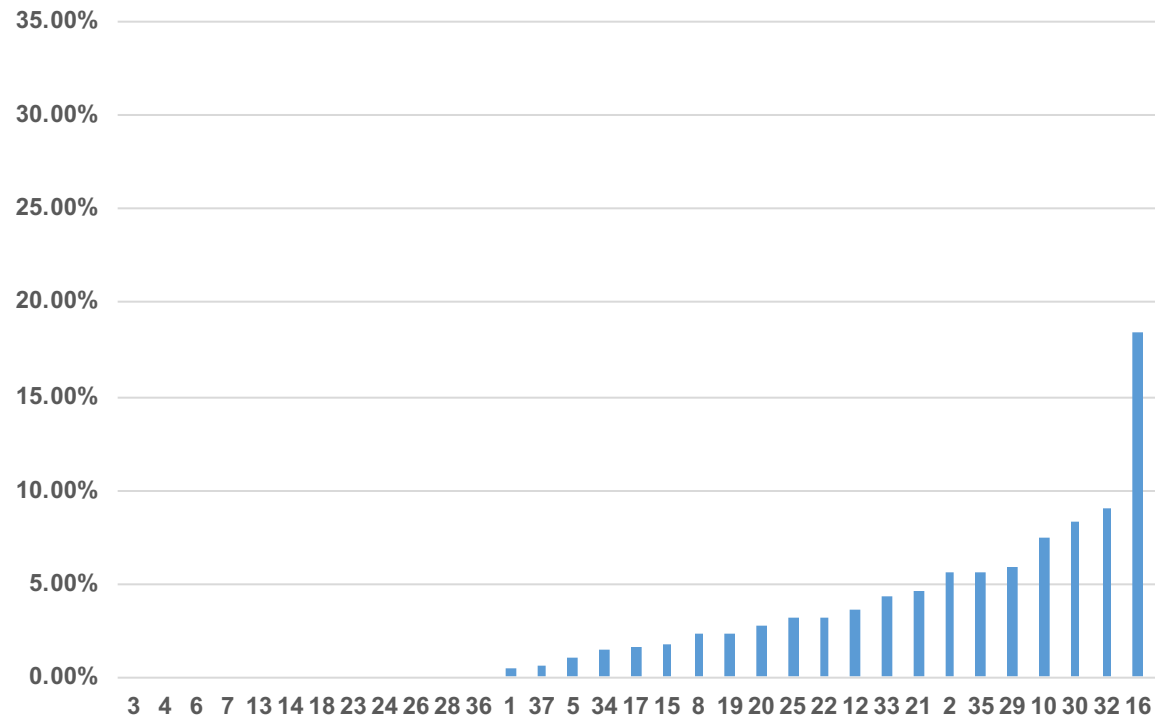
MBU Hyperthermia p Chart



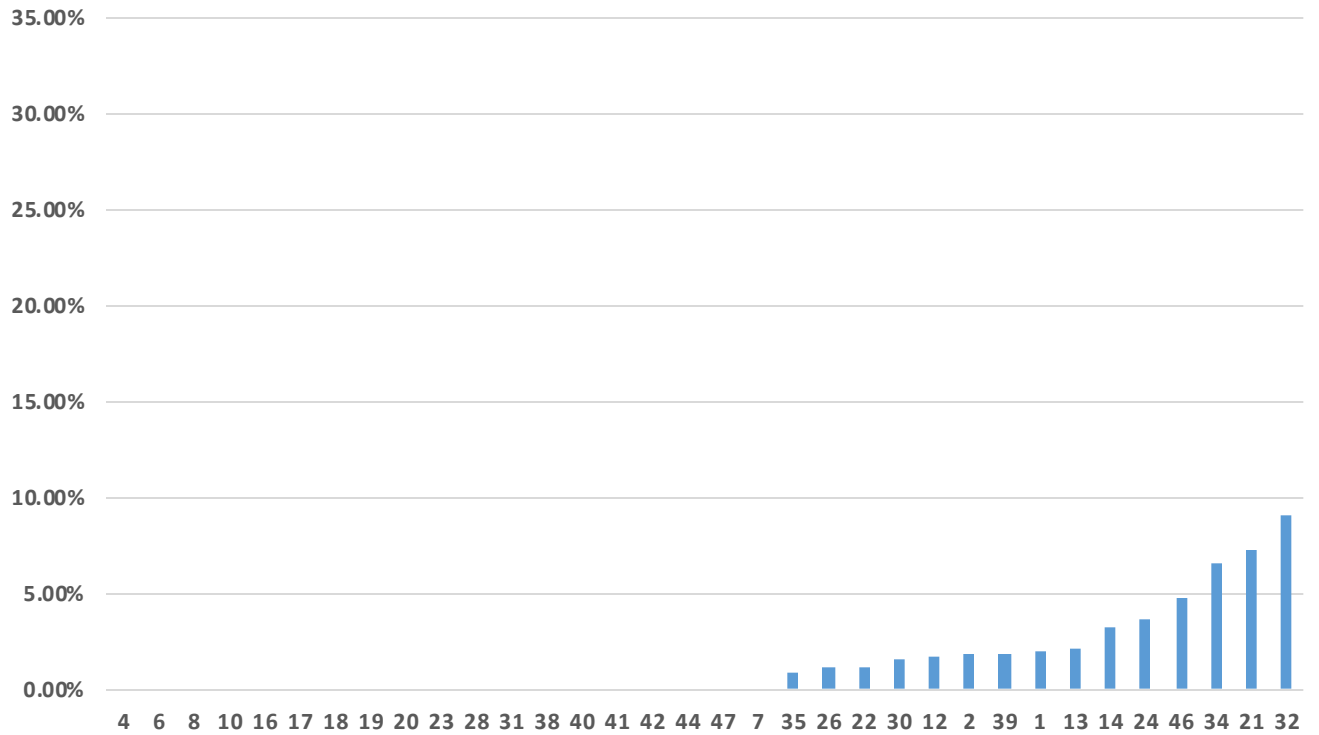
Both hypothermia and hyperthermia linear trend analysis p-value was < 0.01 in mother baby units

Interhospital Variability – NICU Hypothermia

NICU Percent Hypothermia (N=33)
Baseline Data Q0 9/16-12/16

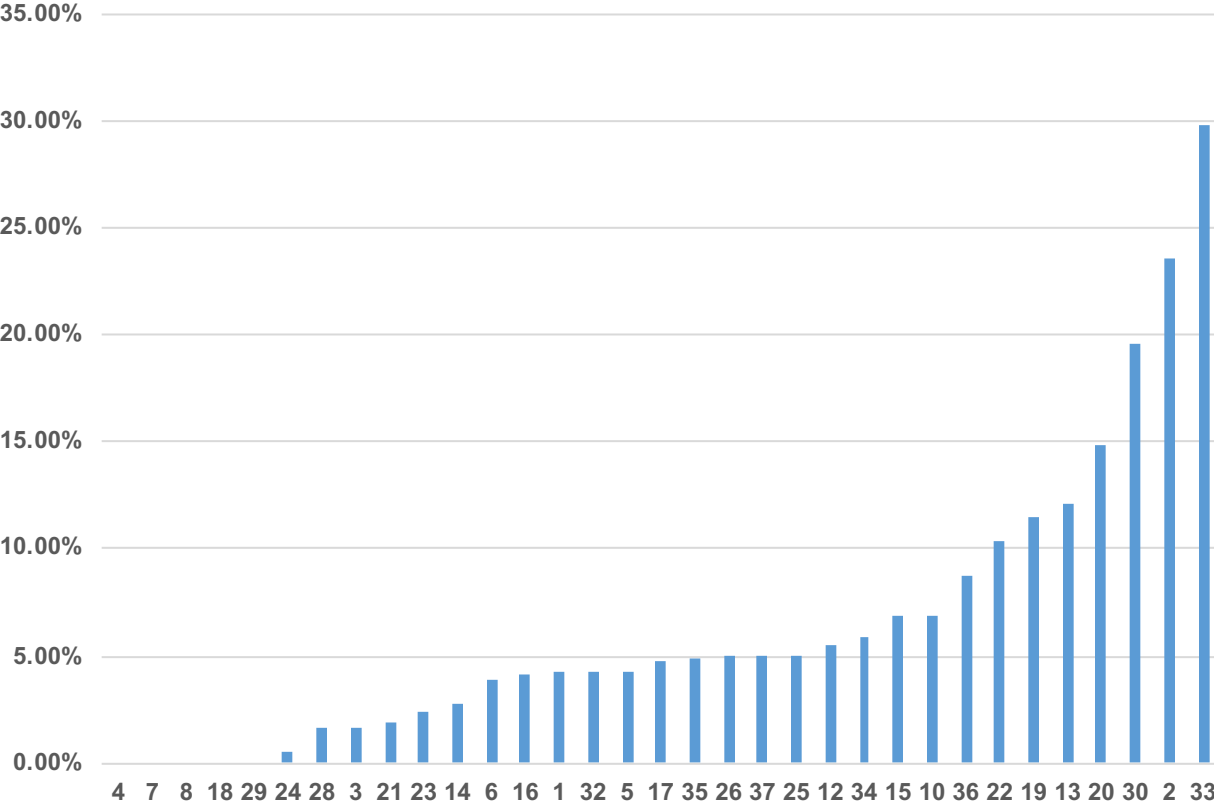


NICU Percent Hypothermia (N=34)
Q12: 10/1/19 - 12/31/19

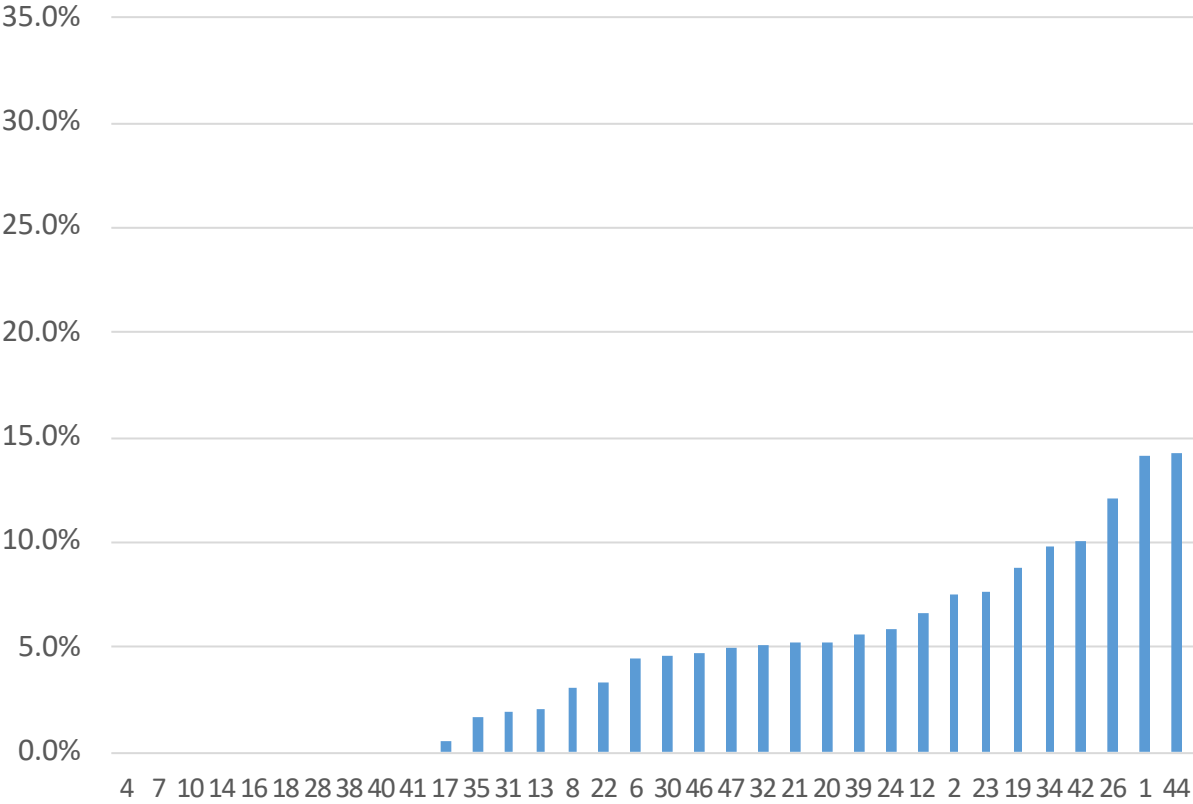


Interhospital Variability – NICU Hyperthermia

NICU Percent Hyperthermia (N=33)
Q0: 9/1/16-12/31/16

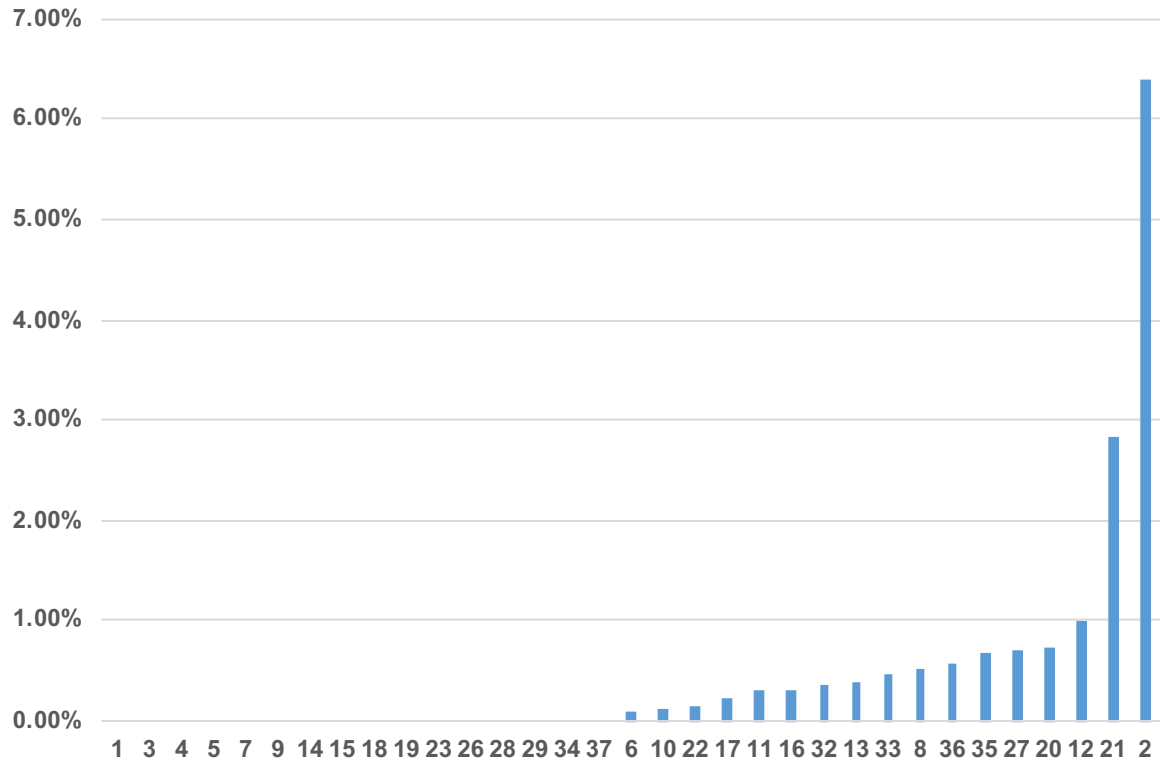


NICU Percent Hyperthermia (N=34)
Q12: 10/1/19 - 12/31/19

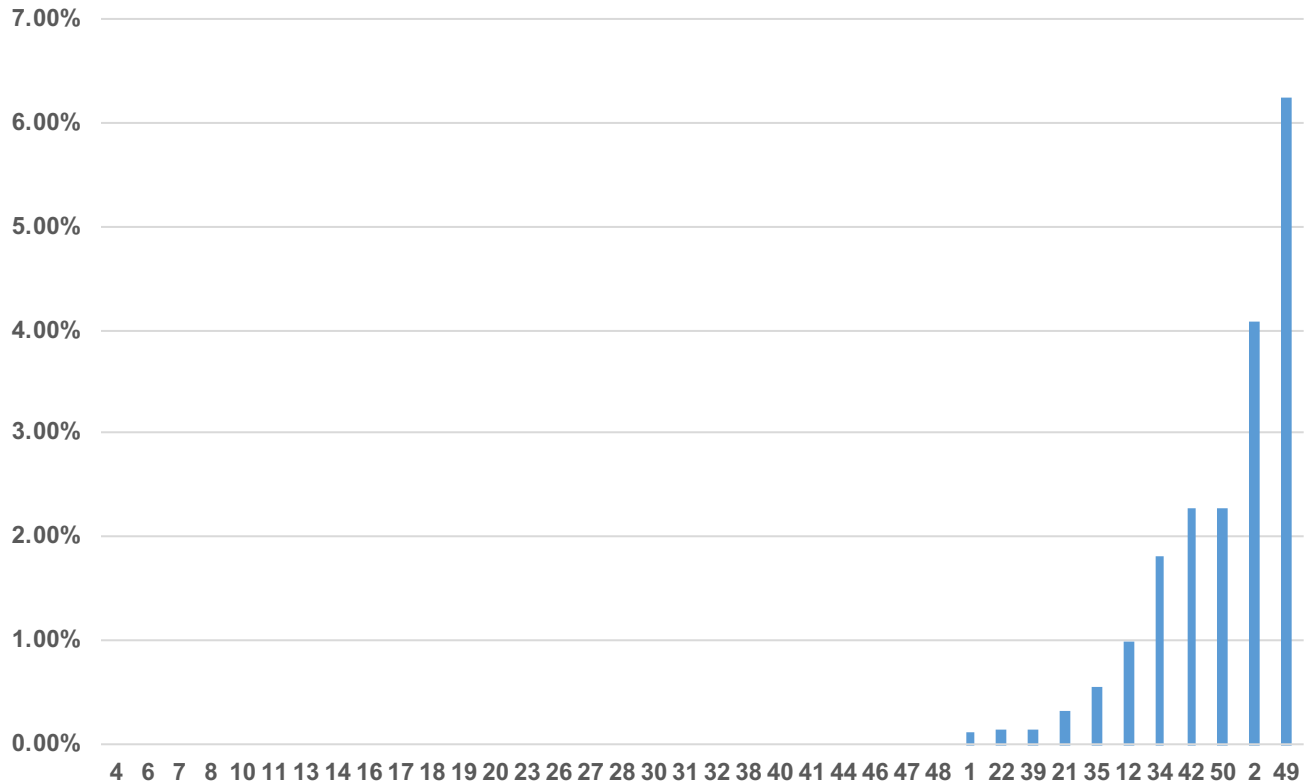


Interhospital Variability – MBU Hypothermia

MBU Percent Hypothermia (N=33)
Q0: 9/1/16 - 12/31/16

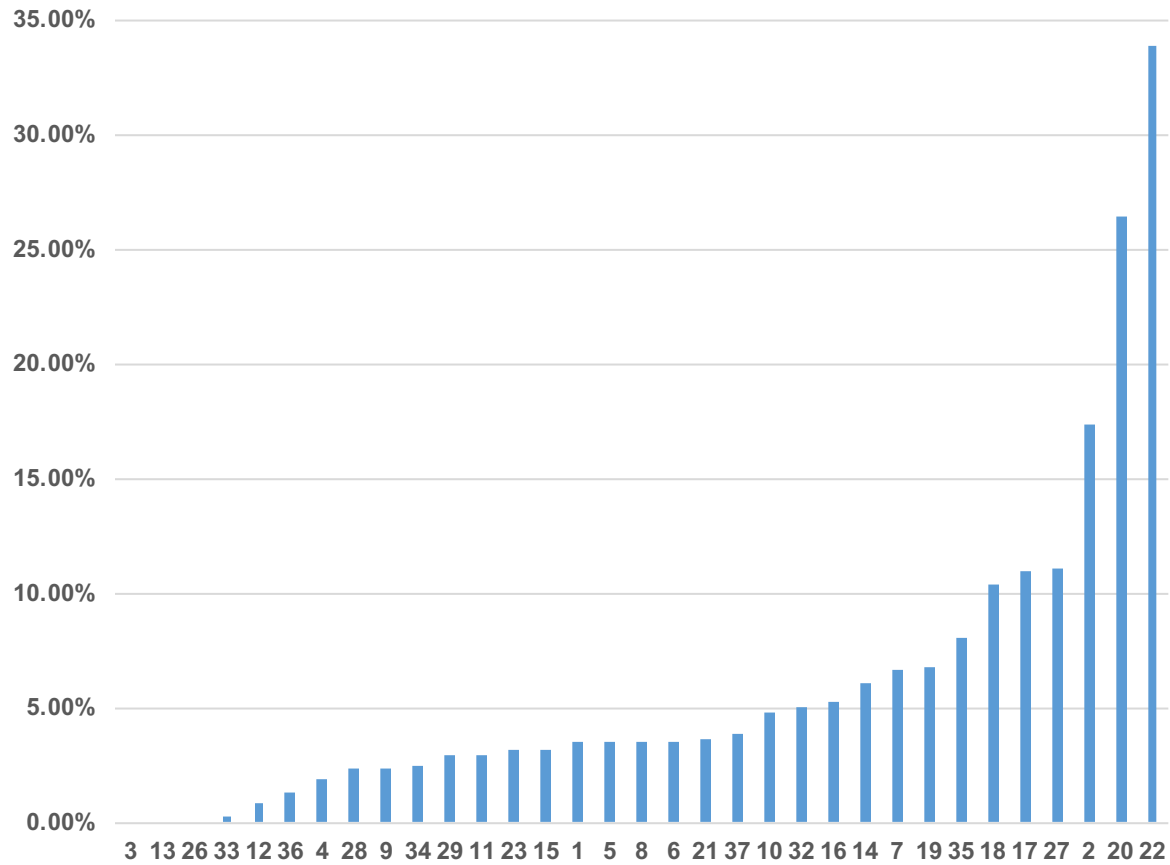


MBU Percent Hypothermia (N= 38)
Q12: 10/1/19 - 12/31/19

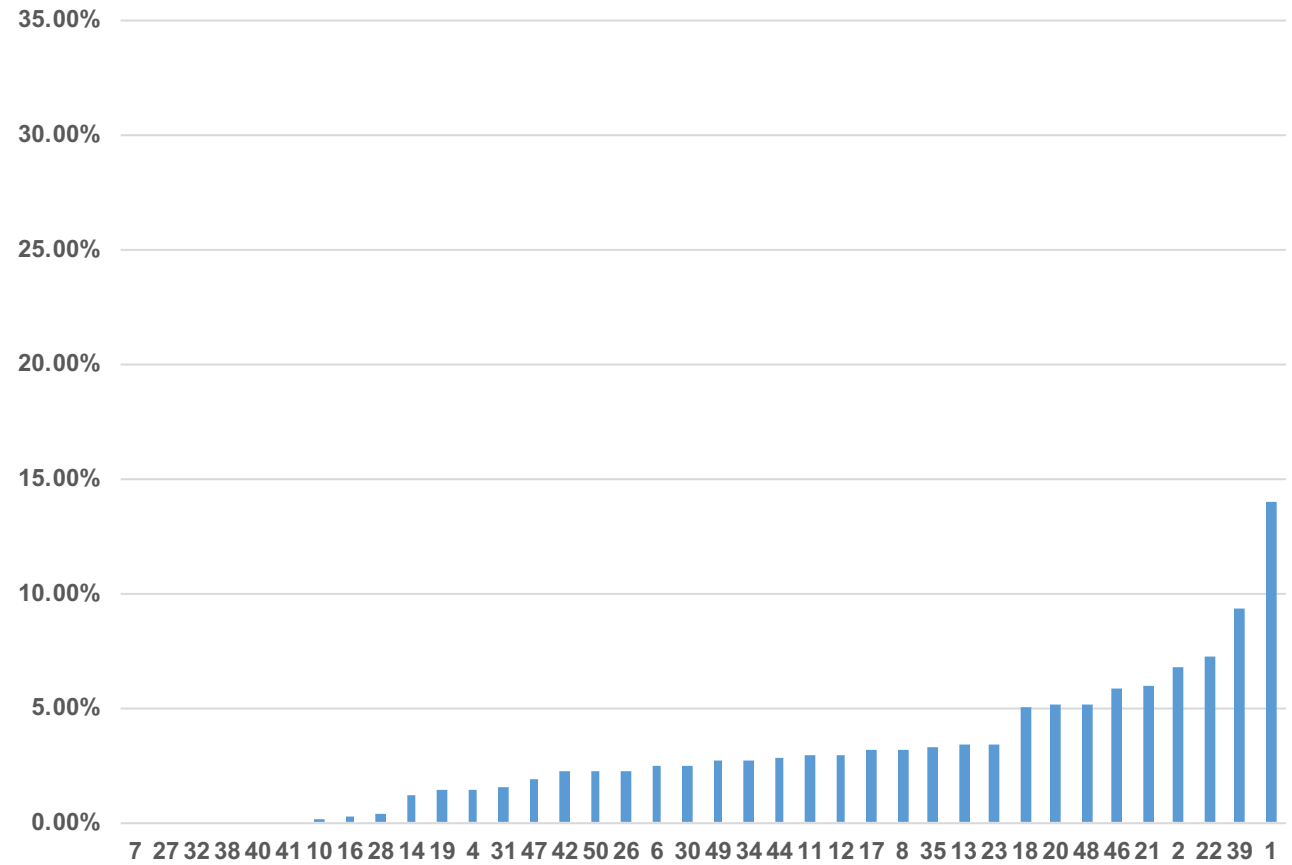


Interhospital Variability – MBU Hyperthermia

MBU Percent Hyperthermia (N=33)
Q0: 9/1/16 - 12/31/16



MBU Percent Hyperthermia (N= 38)
Q12: 10/1/19 - 12/31/19



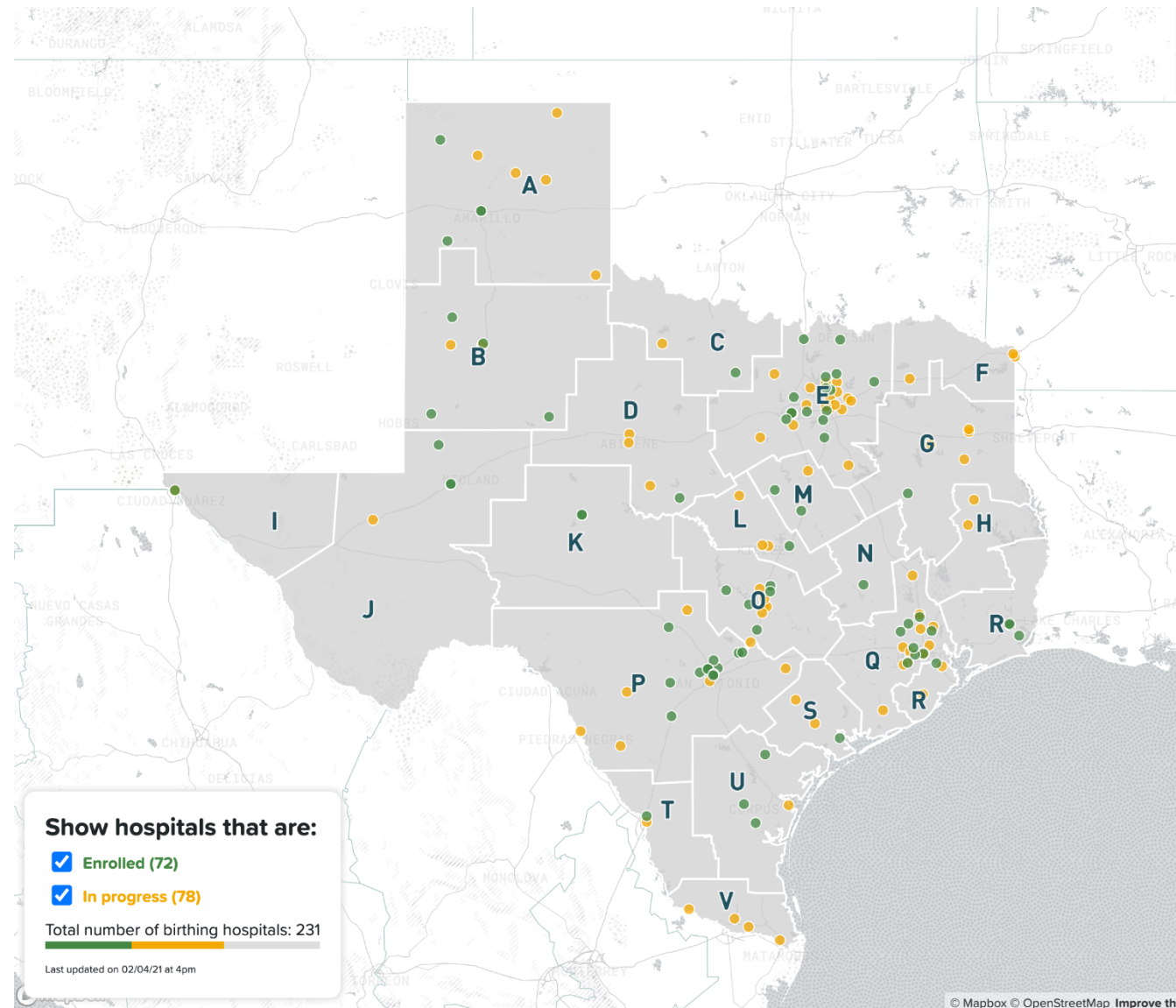
Summary

- One of the benefits of a regionalized QI study is the large population size. In total, **37,968** of NICU and **237,800** of MBU admissions were tracked in this study.
- Each quarter, the response rate was ~60% of all 54 hospitals.
- Control charts showed significant decrease in rates of hypothermia on admission to both NICU ($P<0.01$) and MBU ($P<0.01$).
- Importantly, as a balancing measure, there was no increase in hyperthermia on admission to NICU or MBU.
- Inter-hospital variability also improved with time.

Conclusion

- Large scale QI projects are feasible and results in substantial gains in quality
- The Perinatal Care Region structure, implemented by state regulations, can successfully facilitate multi-hospital QI projects
- This initiative is now being expanded to all 22 perinatal regions in Texas.
- Establishment of a state-wide granular patient level database will facilitate further QI projects.

TCHMB Newborn Admission Temperature: Hospital Enrollment Map



Thank You

Temperature committee of NCTTRAC

Jonathan NedreLOW, MD

Cook Children's Medical Center, Fort Worth, TX, United States

Daryl Miao, MD

Texas Health Harris Methodist Hospital Southwest Fort Worth, Fort Worth, TX, United States

Amanda Truelove, MSN, RNC-OB, NE-BC

University of Texas Southwestern Medical Center, Dallas, TX, United States

Michele S. Charless, RN, BSN, MBA, CPN

Medical City Dallas Children's Hospital, Dallas, TX, United States

Christina Gist, RN, BSN

Texas Health Harris Methodist Alliance, Fort Worth, TX, United States

Hendrik J. Antonisse

North Central Texas Trauma Regional Advisory Council, Arlington, TX, United States

Rashmin C. Savani, MBCChB

University of Texas Southwestern Medical Center, Dallas, TX, United States

The authors would like to acknowledge the members of the Perinatal Committee of the North Central Texas Trauma Regional Advisory Council for their participation in this project

Hypothermia and Hyperthermia Rates in the NICU (N=37,968)

	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Total	4397	2986	3101	3111	3337	2880	2400	2900	2725	2043	2171	2950	2967
Total Hypothermia	148	88	79	80	77	66	50	48	53	55	40	40	60
Total Normothermia	3880	2447	2852	2868	3249	2696	2241	2739	2559	1913	2043	2693	2750
Total Hyperthermia	369	184	170	165	181	118	109	118	139	75	88	217	157
# of NICUs reporting (%)	33	33	36	35	32	31	31	33	29	24	29	30	34
% Hypothermia	3.37%	2.95%	2.55%	2.57%	2.31%	2.29%	2.08%	1.66%	1.94%	2.69%	1.84%	1.36%	2.02%
% Hyperthermia	8.39%	6.16%	5.48%	5.30%	5.42%	4.10%	4.54%	4.07%	5.10%	3.67%	4.05%	7.36%	5.29%

Hypothermia and Hyperthermia Rates in MBUs (N=237,800)

	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Total	25750	17710	19585	20612	20489	17872	16220	18499	16189	12816	14426	18836	18796
Total Hypothermia	325	206	173	170	165	154	142	147	143	106	142	159	137
Total Normothermia	22581	15852	18467	19194	18939	16512	15114	17356	14947	12129	13761	17862	17882
Total Hyperthermia	2002	1269	945	1248	1385	1206	964	996	1099	582	533	815	777
# of NICUs reporting	34	33	37	36	33	32	33	35	30	27	30	33	38
% Hypothermia	1.26%	1.16%	0.88%	0.82%	0.81%	0.86%	0.88%	0.79%	0.88%	0.83%	0.98%	0.84%	0.73%
% Hyperthermia	7.77%	7.17%	4.83%	6.05%	6.76%	6.75%	5.94%	5.38%	6.79%	4.54%	3.69%	4.33%	4.13%

Limitations

- While regional collaboration can increase the patient pool being studied, it also has limitations.
- Information is limited to the proposed survey and relies on individual hospital to input data consistently.
- Information on demographics of the patient population and other cofounding factors are limited.