Thermal Fragility Among Preterm Infants at Birth

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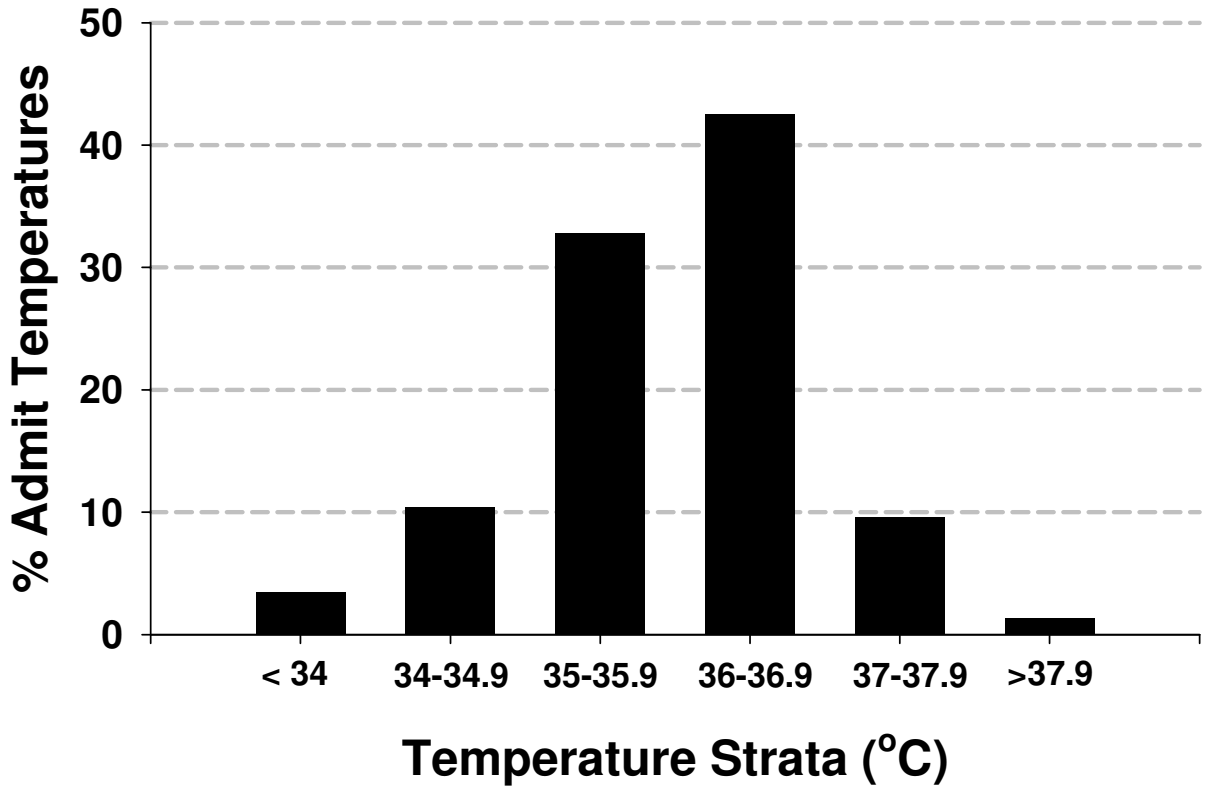
Disclosure

- I have no disclosures of conflicts of interest.
- This presentation will not involve discussion of unapproved or off-label, experimental or investigational use of a drug

Distribution of Admission Temperatures Among 5277 LBW Infants: 2002-2003



- In-born, 401-1499gm BW at 15 NICHD Neonatal Research Network (NRN) centers
- Direct admissions to the NICU, mean age at admit temperature 23±14 minutes
- BW (x±sd): 1032±288g, GA 28.0±2.8 wks
- Mean admit temperature: 35.9±1.0°C
- Admit temperatures: 46.9% < 36°C, 1.3% > 38°C

Laptook et al, Pediatrics 2007; 119: e643-e649

Admission Temperature for Infants ≤ 28 Weeks' Gestation

Gestational Age, wk	*n*	Birth Weight, mean ± SD, g	Admission Temperature, %	
			<35°C	<36°C
28	643	1088 ± 201	9.6	38.3
27	609	977 ± 182	10.7	41.5
26	539	840 ± 163	13.2	44.2
25	468	751 ± 130	20.5	57.1
24	397	655 ± 100	33.8	64.2
<24	187	598 ± 118	43.9	71.1

- With decreasing GA and BW, the frequency of admission temperatures < 35°C and < 36°C increase

Laptook et al, Pediatrics 2007; 119: e643-e649

Interventions to Reduce Hypothermia at Birth Among Preterm Infants: RCT

- In addition to use of preheated radiant warmer
  - Plastic wrap without drying (J Pediatr 2004;145:750-753)
  - Exothermic mattress (J Perinatology 2011;31:780-784)
  - Polyethylene cap (J Pediatr 2010;156:914-917)
  - Forced air warming of the mother (Anesth Analg 2002;94:409-414)
  - Heated, humidified gas for respiratory support (J Pediatr 2015;166:245-250)
  - Increased room temperature (Am J ObGyn 2016;505;e1-e7)

Association between Admission Temperature and Mortality Among Preterm Infants

- NRN data: For every 1°C decrease in admit temp, the adjusted odds of mortality increased (OR 1.28, 95% CI 1.16-1.41) Pediatrics 2007;119:e643-e649
- Other reports: similar associations
  - Epicure, Pediatrics 2000;106:659-671
  - California, J Perinatol 2011;Suppl 1:S49-56
  - Brazilian network, J Pediatr 2014;164:271-5
  - Canadian network, JAMA Pediatr 2015;169;e150277
- RCT of occlusive wraps to reduce mortality (J Pediatr 2015;166:262-268)
  - Occlusive wraps: higher admit temp (36.3 vs 35.7°C) but no difference in mortality
- NRN data in preparation: adjusted odds of mortality decreased for each 1°C increase in admit temp (OR .81, 95% CI .71-.91)

Conclusion: Thermal Management at Birth

- Develop a clinical bundle
  - Specific elements of the bundle need to match the needs of the clinical service
- Intermittent audits of admission temperature
  - Thresholds to trigger assessments of drifts in practice
- Association between admit temp and mortality:
  - Marker of mortality or causal is not clear