

Abnormal Thermal Patterns in Very Preterm Infants Associated with Infection and Maternal Smoking

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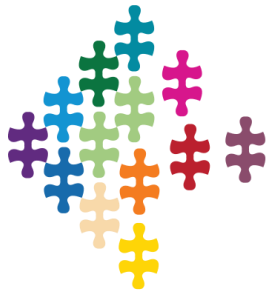


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No Conflicts of Interest to Declare

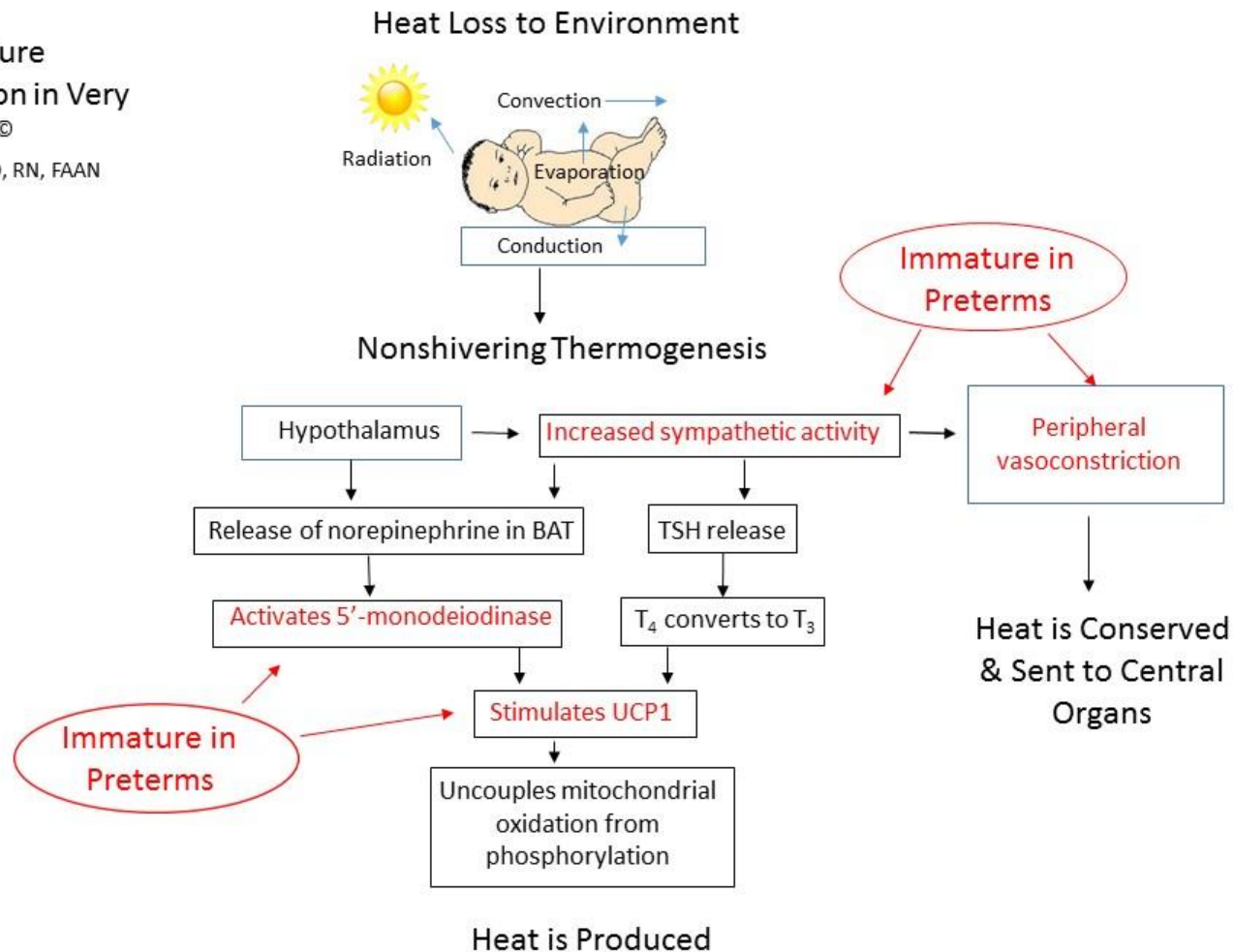
Very Preterm Infants



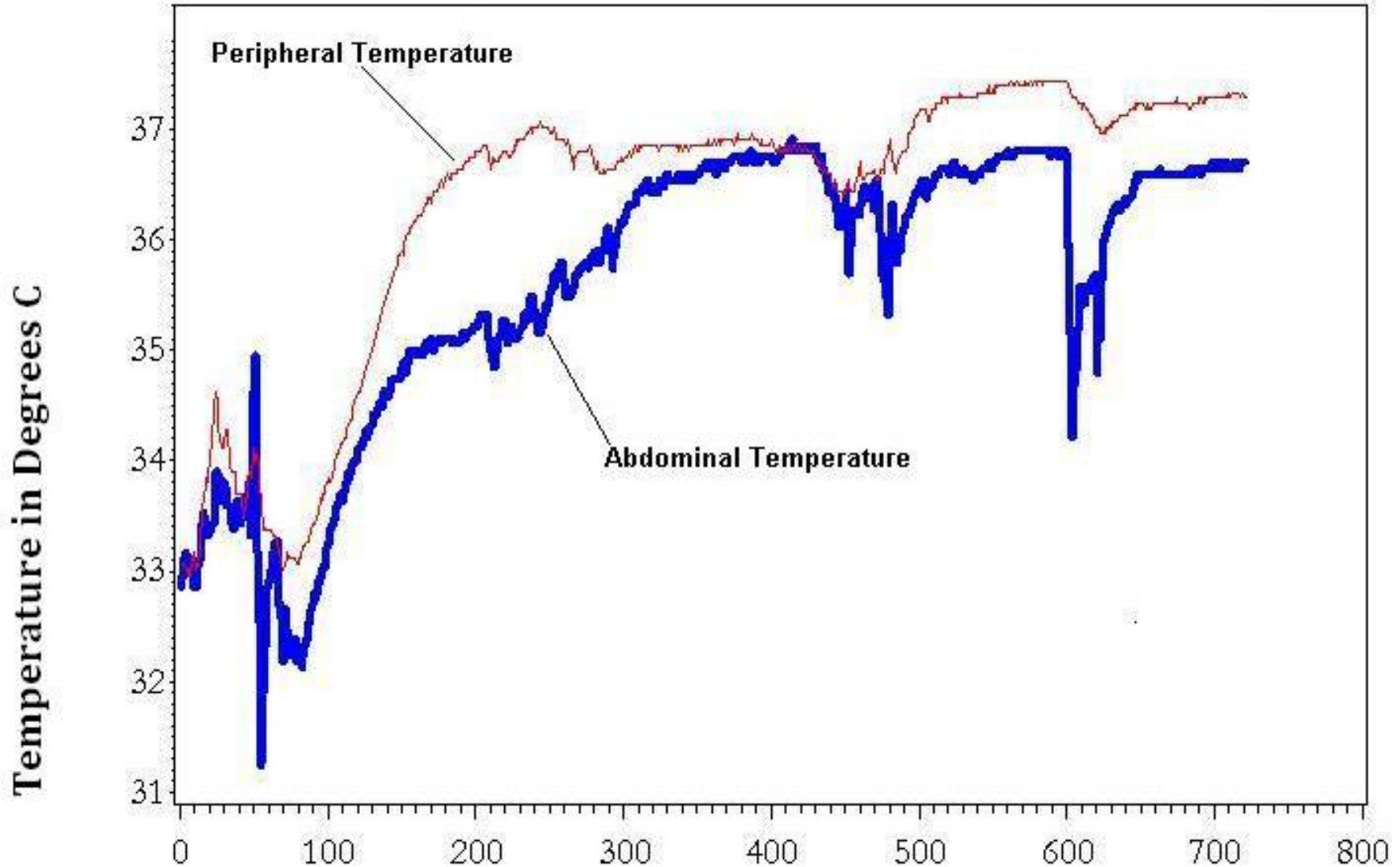
Thermoregulation in Very Preterm Infants

Model of Immature Thermoregulation in Very Preterm Infants ©

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Plot of Foot Temperature > Abdominal Temperature for First 12 Hours of Life



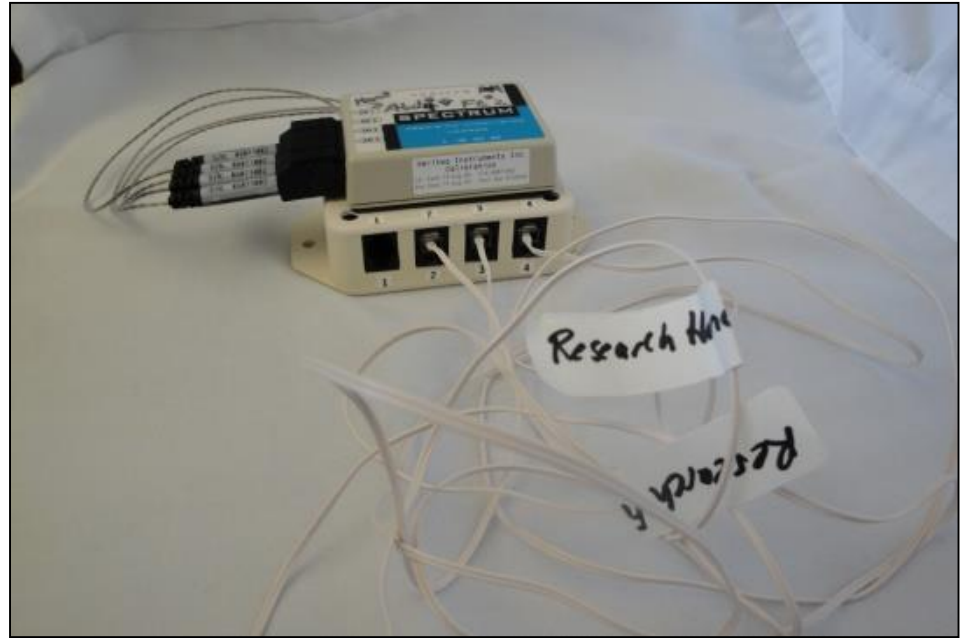
Purpose:

To examine Abdominal (Central) and Foot (Peripheral) temperature in 30 very preterm infants over their first 2 weeks of life in relationship to morbidity and mortality using an exploratory, case study approach.

- IRB Approval at Duke University Health System
- < 29 Weeks GA
- 500-1200 grams at birth
- Enrolled by 6 hours of age
- Within subject and between subject analysis



- Abdominal, Foot and Inside Incubator Temperature every minute X 2 weeks (20,000 measures)
- Calculated Central-Peripheral Temperature Difference
- Medical Record Data



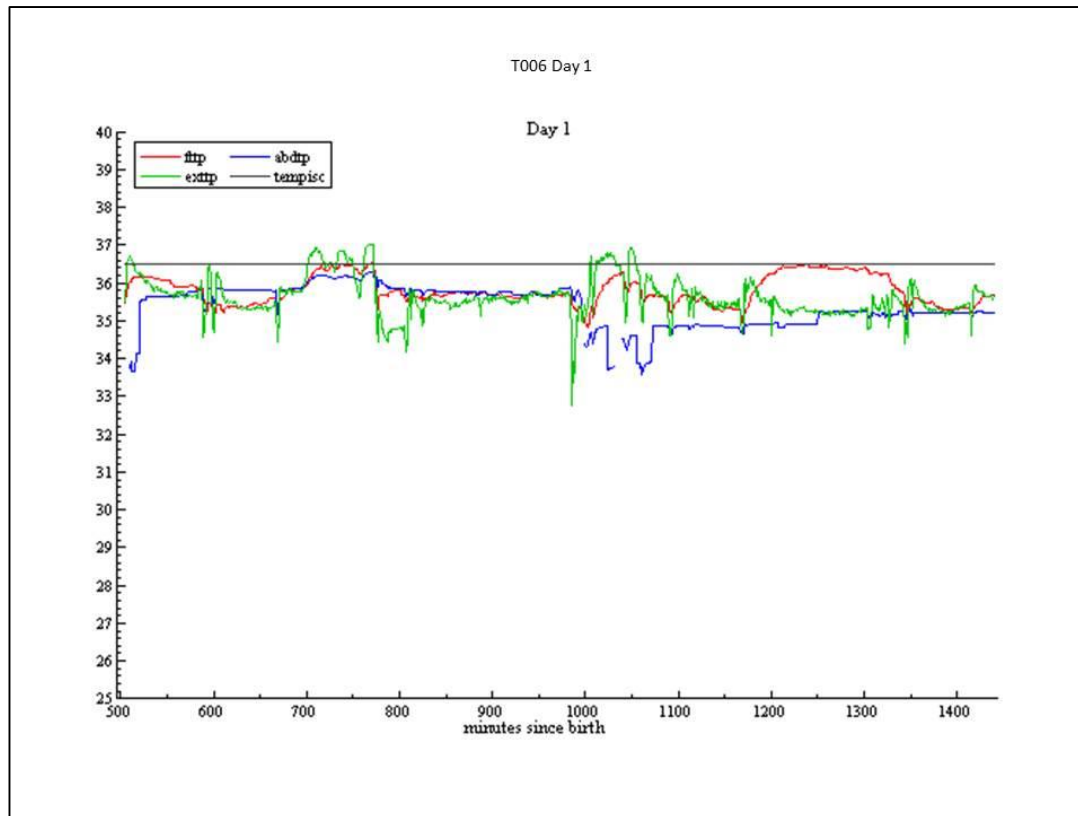
Veriteq Data Loggers (Vaisala)

Results: Demographics

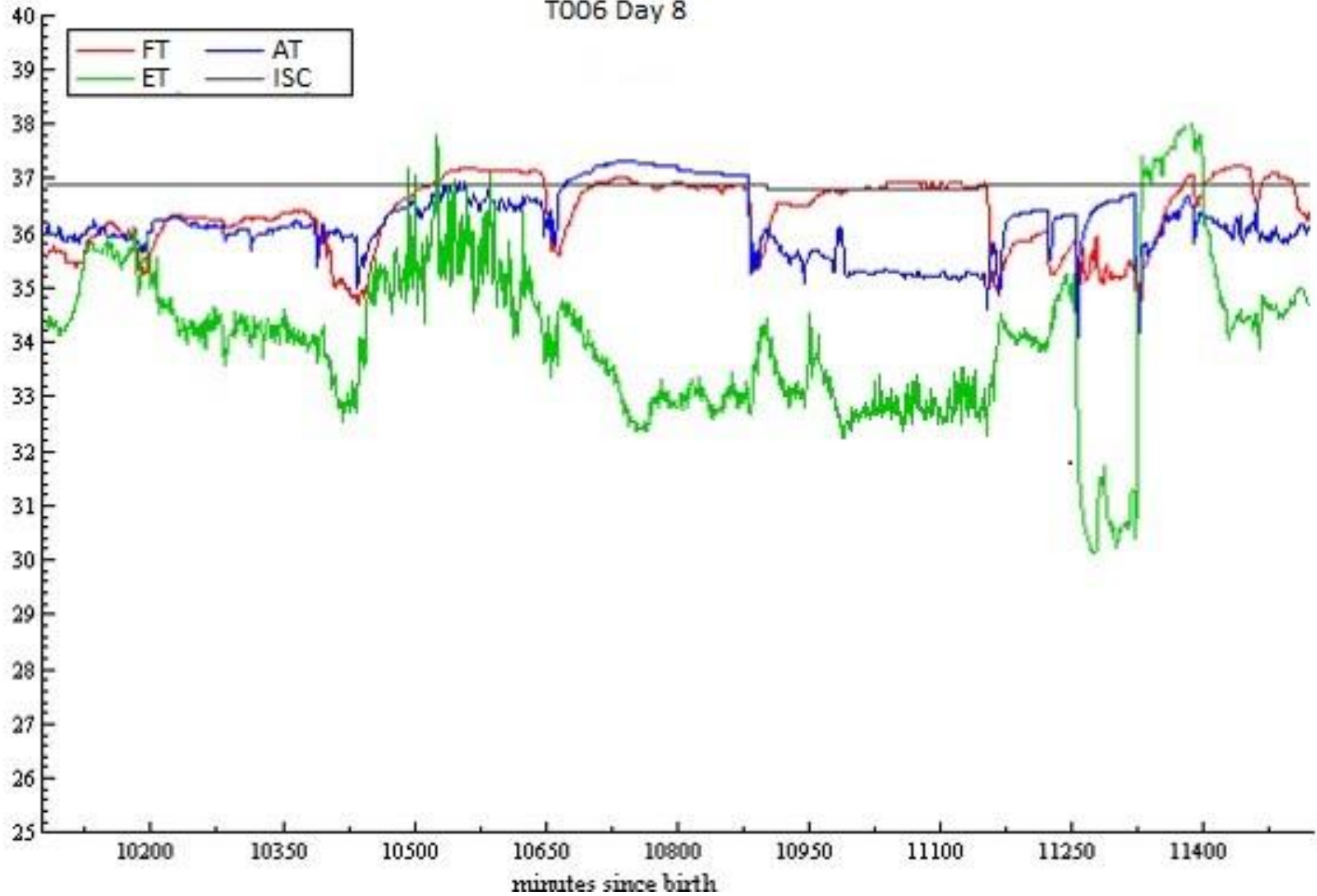
- 22 Infants
- Mean BW 860 grams (± 135)
- Mean GA 26 weeks (± 1.2)
- 68% Female (15)
- 68% African American (15)
- 27% White (6)
- 5% Hispanic (1)

Skin Temperature

- Abdomen: Mean $36.53^{\circ} \pm 0.19^{\circ}\text{C}$ (36.09-36.81)
- Foot: Mean $35.91^{\circ} \pm 0.28^{\circ}\text{C}$ (35.10-36.40)



T006 Day 8



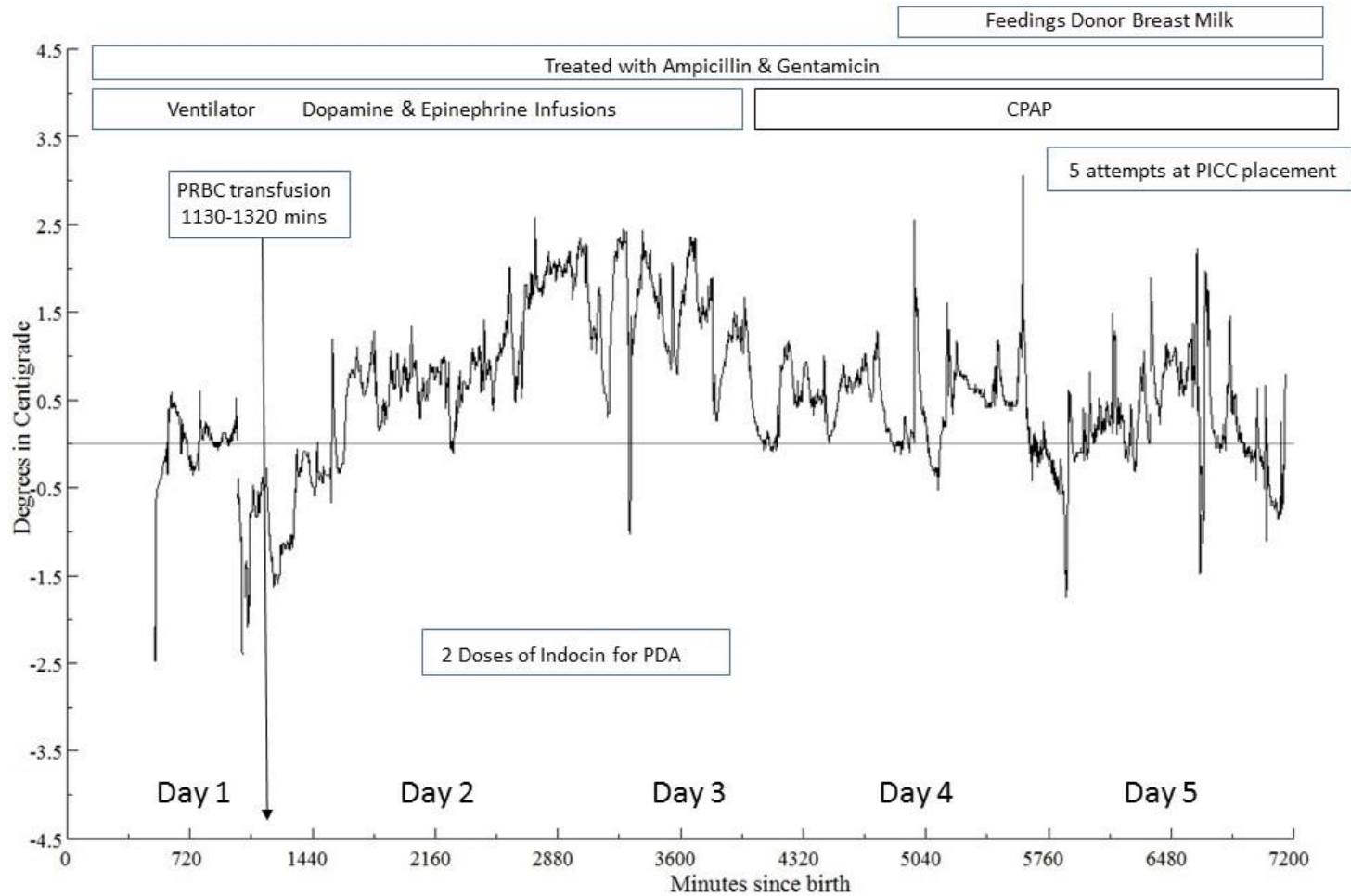
Evaluating Central-Peripheral Temperature Difference

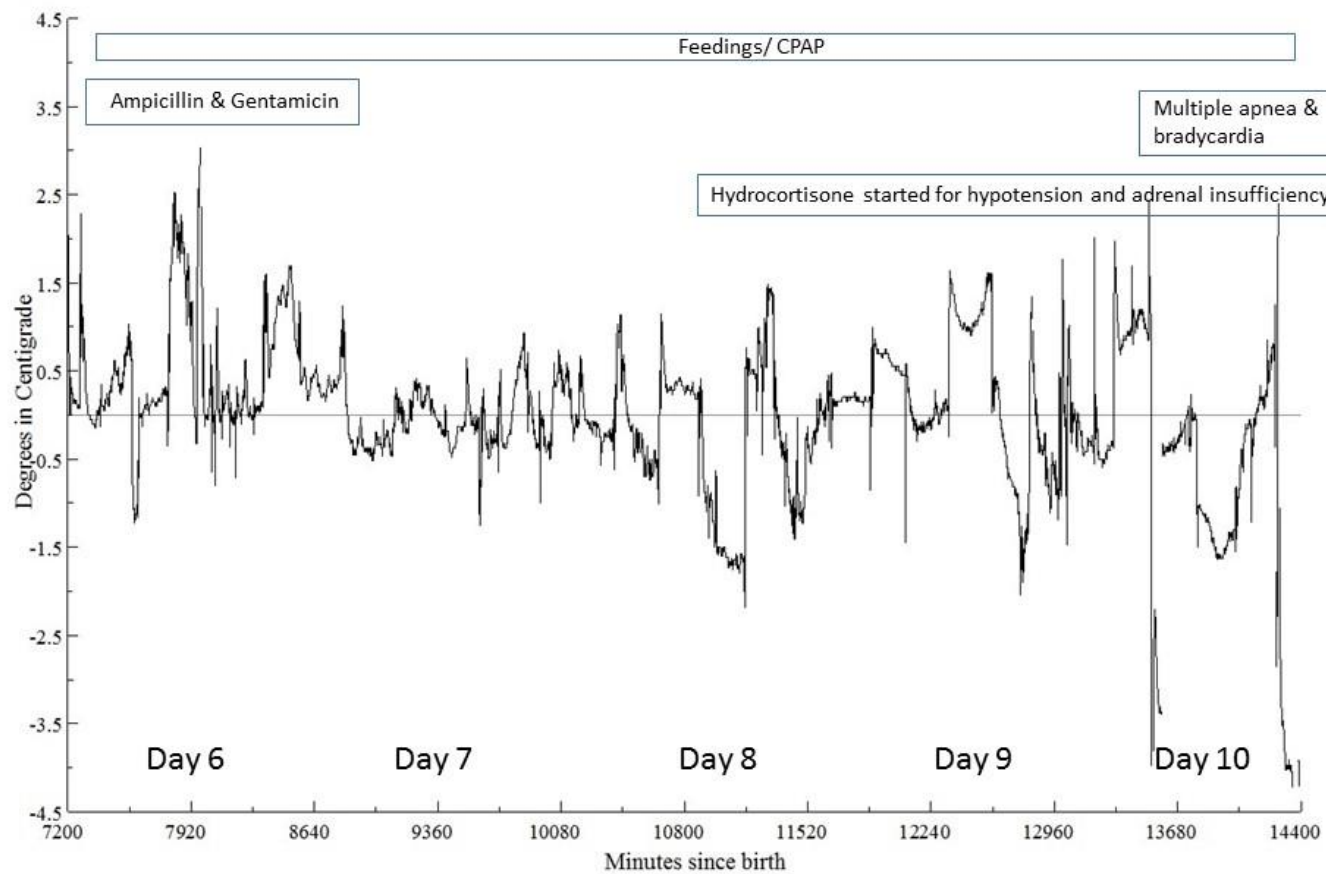
- Range: 0-70.7%
- 2 Week mean over all infants ranged
7.32%-38.51%

Infant ID	GA	BW	Sex	Race/ Ethnicity	NEC	Infection	Maternal Smoking	Maternal Chorio	Total % NTD
T006	27	880	F	AA	X	X	X	X	38.51
T033	23 3/7	890	F	AA		X		X	32.66
T008	25 3/7	950	M	AA			X	X	27.25
T017	27 4/7	1050	F	AA					25.29
T029	25 6/7	850	M	AA	X		X		24.25
T002	26	850	M	AA		X			22.33
T022	27 5/7	850	F	AA					19.27
T010	27 1/7	900	F	AA					18.20
T031	27 1/7	640	F	W					17.94
T025	28 1/7	950	F	W				X	17.89
T012	27 4/7	820	F	AA	X			X	17.88
T023	27 3/7	730	M	W		X			17.61
T021	27 4/7	1090	F	AA					16.37
T001	27	820	F	AA			X		16.32
T009	26 1/7	660	F	His					15.55
T018	27 3/7	590	F	W					14.67
T026	25 6/7	880	M	AA					12.80
T015	27	1040	F	W					11.61
T007	27 6/7	740	F	AA					11.57
T014	27	940	F	W					11.49
T011	27 3/7	1040	M	AA				X	10.21
T020	26 2/7	760	M	AA					7.32

T006: 38.51%

- 880 grams, 27 weeks, Female, AA infant
- Maternal Smoking during pregnancy
- History of PROM
- Very unstable
- NEC at 33 days of age (CONS)





Results

	Yes	No	Wilcoxon
Infection	27.78%, sd 9.52 (4)	16.44%, sd 5.34 (18)	p<0.05*
Maternal chorioamnionitis	24.07%, sd 10.59	16.41%, sd 4.9	P <.13
Maternal Smoking	26.6%, sd 25.75	16.7%, sd 16.99	p<0.06
Race/ethnicity Being AA race	20.02%, sd 8.54	15.25%, sd 2.82	P< 0.07

Conclusions

- Infants <1500 grams have varied amounts of time with foot warmer than core throughout their first 2 weeks of life.
- Monitoring central and peripheral temperatures and their difference appears to be an important biomarker that can be used in clinical care

Larger Study

- Sample of 200 infants in 3 NICUs
- Longitudinal body temperature until discharge
- Risk Factors
 - Race/ethnicity
 - Smoking History
 - Maternal Infection
- Acute morbidity
 - Infection
 - NEC
- Chronic Morbidity
 - Development
 - Brain/Gut pathology



Biomarker

CP Temp Difference
↑ % of minutes
FT > AT = "marker"

Mechanism

Dysregulated or Immature ANS

Indicators:

- * CP Temp Diff Temperature
- * HRV ECG

Maternal Smoking

Increased % minutes
with FT > AT

Predicts ANS
dysregulation

ANS dysfunction brain
& gut

- SIDS
- Neuro
- Autism
- ADHD
- GI: IBS, Crohns
- Immunosuppression

Increased morbidity

- Infection
- NEC

Questions?



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