CRITICAL CARE AND RESUSCITATION

Online Appendix

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Appendix to: Cutuli SL, Osawa EA, Eyeington CT, et al. Accuracy of non-invasive body temperature measurement methods in critically ill patients: a prospective, bicentric, observational study. *Crit Care Resusc* 2021; 23: 346-53. https://doi.org/10.51893/2021.3.OA12

eTable 1. Characteristics of body temperature measurement methods used.

Methods	Site	Commercial Name	Manufacturer	Description	Type of measure	Range	Accuracy
Invasive							
	Pulmonary Artery	Swan-Ganz Catheter	Edwards Lifesciences Corp. One Edwards Way Irvine, CA	Hemodynamic monitoring device based on a temperature-sensing catheter placed into the pulmonary artery for trans-cardiac thermodilution	Continuous	-	-
	Femoral Artery	PiCCO (Pulse Contour Cardiac Output)	PULSION Medical Systems, Germany	Hemodynamic monitoring device based on a temperature-sensing catheter placed into a central artery for trans-pulmonary thermodilution and pulse contour analysis.	Continuous	-	-
Non-Invasive							
	Axilla	NexTemp	Medical Indicators, Hamilton, NJ	Strip which display body temperature through colored dot	Intermittent	35.5-40.4 °C	± 0.1 °C within 37-39°C
	Forehead	TAT-5000	Exergen Corporation, Watertown, MA	Scanner sensing infrared waves emitted by the blood flowing into the temporal artery.	Intermittent	16.0-43.0 °C	± 0.1°C
	Ear canal	Genius^{TM}2	COVIDIEN, MA	Ear canal probe sensing infrared waves emitted by the tympanic membrane.	Intermittent	33.0-42.0 °C	± 0.2°C within 33-42°C

eTable 2. Overview of body temperature measurements by invasive and non-invasive methods, accounting for repeated measures.

Methods	Observations, N	Mean, °C	95% CI, °C (Lower, Upper)	Range, °C
Invasive[a]	375	37.08	37.0, 37.16	33.9 – 39.0
Non-Invasive				
Axillary chemical dot[b]	288	36.76	36.68, 36.84	35.2 - 38.5
Temporal scanner[c]	370	36.42	36.36, 36.48	35.0 - 38.3
Tympanic infrared	294	36.64	36.54, 36.74	34.2 - 38.7

[a] Pulmonary Artery Catheter was placed in 44 (88%) patients, PiCCO in 4 (8%) patients, temperature-sensing urinary catheter in 9 (18%) patients.
[b] 16 measurements were reported as "non-readable" by nurses.
[c] 1 measurement was 25.6 °C and was excluded from the analysis.

Abbreviation: CI, confidence interval

eTable 3. Predictors of body temperature accounting for repeated measures.

Explanatory variables	Univariable analysis			Multivariable analysis		
	Estimate	95% CI (Lower, Upper)	p	Estimate	95% CI (Lower, Upper)	p
Propofol mg/h	-0.004	-0.006, -0.002	<0.001	-0.002	-0.001, -0.003	<0.001
Active Warming	-1.00	-1.27, -0.73	<0.001	-0.73	-0.53, -0.93	<0.001
MV	-0.45	-0.59, -0.30	<0.001	0.09	0.01, 0.17	0.04
NBA	-0.63	-1.04, -0.22	0.003	-0.18	-0.01, -0.33	0.046
RRT	-0.59	-1.02, -0.15	0.009	-0.49	-0.34, -0.64	<0.001
Aortic Surgery	-0.51	-1.04, 0.03	0.06	-0.41	-0.11, -0.71	0.004
Enrolment time point	0.06	0.05, 0.08	<0.001	0.02	0.01, 0.03	0.007

Abbreviations: CI, confidence interval; MV, Mechanical Ventilation; NBA, Neuromuscular Blocking Agents; RRT: renal replacement therapy.

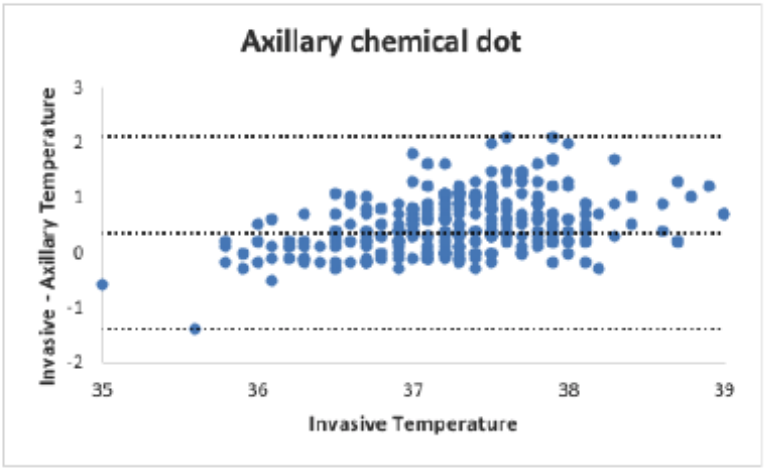
eTable 4. Overview of body temperature measurements by invasive and non-invasive methods, accounting for repeated measures and adjusted for significant covariates

Methods	Observations, N	Mean, °C	95% CI, °C (Lower, Upper)
Invasive	375	37.17	37.09, 37.25
Non-Invasive			
Axillary chemical dot	288	36.81	36.73, 36.89
Temporal Scanner	370	36.49	36.43, 36.55
Tympanic Infrared	294	36.71	36.61, 36.81
Abbreviation: CI, confidence interval			

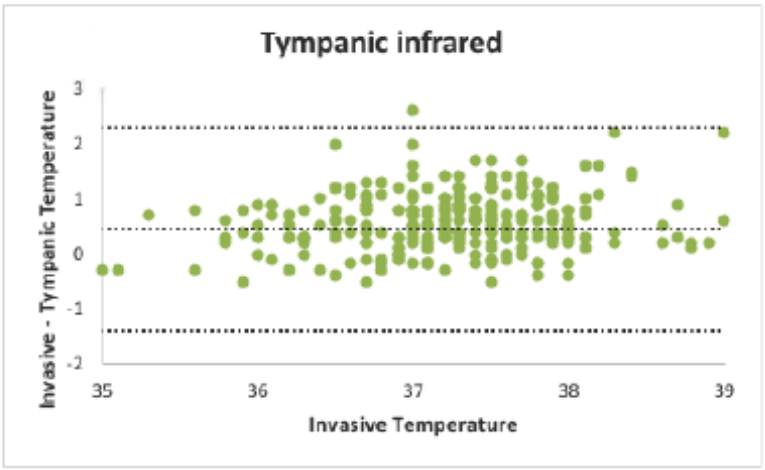
eTable 5. Accuracy of non-invasive body temperature methods, accounting for repeated measures and adjusted for explanatory variables

Methods	n	Mean Difference, °C (95%CI)	P-value	95% Limits of agreement, °C (Lower, Upper)
Invasive – Axillary chemical dot	279	0.36 (0.26-0.46)	<0.0001	-1.38, 2.11
Invasive – Temporal scanner	361	0.68 (0.59-0.77)	<0.0001	-0.94, 2.30
Invasive – Tympanic infrared	285	0.46 (0.35-0.56)	<0.0001	-1.39, 2.31
Axillary chemical dot –Temporal scanner	275	0.32 (0.23-0.41)	<0.0001	-1.24, 1.88
Axillary chemical dot –Tympanic infrared	279	0.10 (-0.01-0.20)	0.07	-1.70, 1.89
Tympanic infrared – Temporal scanner	290	0.22 (0.13-0.32)	<0.0001	-1.90, 1.45
Abbreviation: CI, confidence interval				

A.



B.



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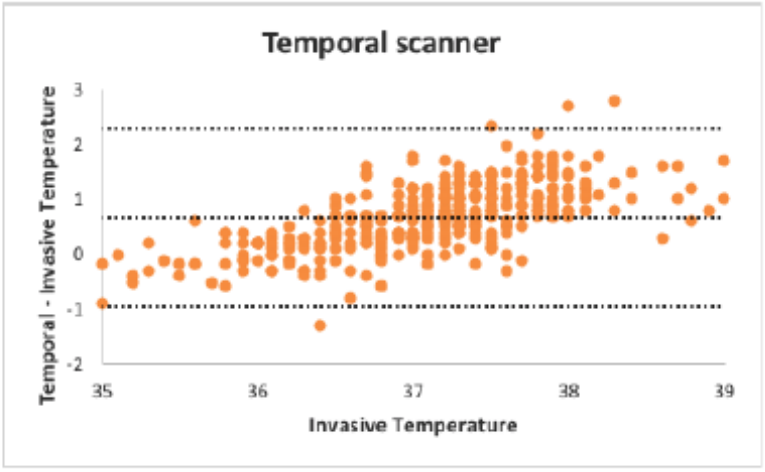

eFigure1. Bland-Altman plots of temperature measurements, accounting for repeated measures and adjusted for significant covariates. A. Invasive and Axillary chemical dot method; B. Invasive and Tympanic infrared method; C. Invasive and Temporal scanner method. Each colored dot corresponds to invasive temperature (*x-axis*) and differences (*y-axis*) of paired invasive (gold standard) and non-invasive (index methods) measurements. Among horizontal dotted lines, the inner represents the mean difference (bias) and the outers represent the 95 % Confidence Interval of differences (Limit of Agreement) of paired invasive (gold standard) and non-invasive (index methods) measurements.