Emergency Nursing Resource: Non-invasive Temperature Measurement in the Emergency Department

Executive Summary

December 2011

Overview: Emergency Nursing Resources (ENRs) are evidence-based documents that facilitate the application of current evidence into everyday emergency nursing practice. ENRs contain recommendations based on a systematic review and critical analysis of the literature about a clinical question.

ENRs are created following the rigorous process described in ENA's Guidelines for the Development of Evidence-Based Emergency Nursing Resources.

ENA believes that ENRs will have a positive impact on patient care and emergency nursing practice by bridging the gap between practice and currently available evidence.

Clinical Question: What method of non-invasive body temperature measurement is the most accurate and precise for use in patients (newborn to adult) in the emergency department?

Problem: A patient's temperature is a critical vital sign that may be used by Emergency Department (ED) clinicians to determine the degree of illness and the need for further assessment and intervention. Accurate body temperature measurement in the ED setting is necessary for the timely detection and management of fever or hypothermia; as well as evaluating treatment effectiveness (Crawford, Hicks, & Thompson, 2006; Sund-Levander & Grodzinsky, 2009). Pulmonary artery (PA) temperature is considered the "gold" standard for measuring core body temperature (Fulbrook, 1993), as mixed venous blood temperature reflects thermoregulation by the hypothalamus. Other invasive methods include esophageal, rectal and bladder measurements. Rectal temperature is considered the least invasive among these invasive temperature measures, and often is assumed to approximate core temperature (Fulbrook, 1993). Noninvasive temperature measurement methods include oral, temporal artery (TA), axillary and aural [tympanic membrane (TM)] measurements (Bridges & Thomas, 2009). All types of temperature measurements have advantages and limitations related to accuracy and precision, as well as practicality and feasibility in the ED setting (Craig, Lancaster, Taylor, Williamson, & Smyth, 2002; Fadzil, Choon, & Arumugam, 2010; Farnell, Maxwell, Tan, Rhodes, & Philips, 2005; Hooper & Andrews, 2006; Lawson et al., 2007; Lawson et al., 2007).

Description of Decision Options /Interventions and the Level of Recommendation

Level A (High) Recommendation: Based on consistent and good quality of evidence; has relevance and applicability to emergency nursing practice.
Level B (Moderate) Recommendation: There are some minor inconsistencies in quality evidence; has relevance and applicability to emergency nursing practice.
Level C (Weak) Recommendation: There is limited or low-quality patient-oriented evidence; has relevance and applicability to emergency nursing practice.
N/R: Not recommended based upon current evidence.
I/E: Insufficient evidence upon which to make a recommendation.
N/E: No evidence upon which to make a recommendation.

Temperature Measurement Device	Adult	Adult Febrile	Adult Hypo-Thermic	Adult Critically Ill /Intubated	Pediatrics 0-3 Months	Pediatrics 3 Months – 3 Years	Pediatric 3 Years – 18 Years	Pediatric Febrile	Pediatric Hypo-Thermic	Pediatric Critically Ill /Intubated
Oral	A	A	A	A	N/R	A	A	A	N/E	N/R
Tympanic	I/E	N/R	N/E	I/E	N/R	I/E	N/R	N/R	N/E	I/E
Temporal Artery	A	N/R	N/E	I/E	N/R	I/E	A	A*	N/E	I/E
Chemical Dot	I/E	I/E	N/E	I/E	N/R	N/E	N/R	N/R	N/E	N/E
Axillary	B	N/R	N/E	I/E	N/R	I/E	B	N/R	N/E	I/E

Access the complete ENR on Non-invasive Temperature Measurement in the Emergency Department

* Temporal artery temperature greater than 37.3°C indicates rectal temperature of 38.3°C or greater in subjects 3-24 months (Schuh, 2004).

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