

Evidence-Based Clinical Pathway: Accidental Hypothermia – Temperature assessment & staging

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Primary Sources: 1) Brown DJA *et al.* Accidental hypothermia. *NEJM* 2012;367: 1930-1938; 2) Danzl D. Accidental hypothermia, Chapter 138 in *Rosen's Emergency Medicine* 7th edition 2009; 3) Bessen HA, *et al.* Hypothermia. Chapter 203 in *Tintinalli's Emergency Medicine*, 7th edition 2011.

Pathway applicability: Patients with unintended (nontherapeutic) hypothermia

This pathway is intended as a complement to the clinical pathways:

"Accidental Hypothermia – Rewarming treatment" & "Accidental Hypothermia – Diagnostic & therapeutic considerations"

Provide clinical care as per other hypothermia clinical pathways

Concurrent with clinical care, assess temperature:

Intubated patient: Thermistor probe in distal third of esophagus

- Proximally placed thermistors give false-high readings if using heated-air inhalation

Nonintubated patient or intubated patient: Thermistor probe in bladder

- Bladder thermistors give false-high readings during warmed-fluid peritoneal lavage

Less-preferred options for temperature assessment:

- Rectal thermometry (need to insert probe 15 cm into rectum; temps may lag behind core temperatures during rewarming)

- For rectal or oral assessments, low-reading thermometers must be used if there is any chance of hypothermia

- If these approaches are used they should only be temporizing measures until thermistors can be placed in esophagus or bladder.

Temperature assessment options to be avoided in hypothermic patients:

- Axillary or skin/temporal thermometry

- Indirect infrared tympanic membrane thermometry

Expected physiology at various temperature levels

°F	°C
122	50
113	45
104	40
99	37
95	35
93	34
91	33
90	32
86	30
82	28
75	24
72	22
66	19
57	14
41	5

°F	°C
122	50
113	45
104	40
99	37
95	35
93	34
91	33
90	32
86	30
82	28
75	24
72	22
66	19
57	14
41	5

Treatment implications at various temperature levels (airway/fluids)

Risk of rewarming atogenesis (airway/fluids)

Target temp: heated gases/fluids

Insulin not reliably effective below this temp

Active rewarming indicated; terminate resuscitation if no ROS

Defibrillation rarely successful below this temp

Threshold for ECMO/CPB activation

Shivering reduced; atrial dysrhythmia common; cardiac arrest risk increases; core/periphery temp diff

Shivering absent; humans essentially poikilothermic

HR down by 50%; Marked increase in risk of spontaneous nonperfusing ventricular rhythm

Body's mechanisms for heat preservation cease to function

Temp at which fixed/dilated pupils can be attributed to hypothermia

Coagulopathy develops

Normal body temp

Mild hypothermia: 95°/35° down to 90°/32°

Severe hypothermia: below 90°/32°

Intact survival after 66 mins' cold-water immersion

Lowest accidental hypothermia, intact survival

Resuscitation unlikely warranted

The J wave, seen at the QRS-ST junction, results from transmural voltage gradient during early ventricular repolarization. J waves are suggestive of hypothermia but may also be seen in other conditions (e.g., Brugada syndrome, hypercalcemia).

