

Joint Theater Trauma System Clinical Practice Guideline

HYPOTHERMIA PREVENTION, MONITORING, AND MANAGEMENT

Original Release/Approval	2 Oct 2006	Note: This CPG requires an annual review.	
Reviewed:	Sep 2012	Approved:	18 Sep 2012
Supersedes:	Hypothermia Prevention, Monitoring and Management, 30 Jun 2010		
<input type="checkbox"/> Minor Changes (or)	<input type="checkbox"/> <i>Changes are substantial and require a thorough reading of this CPG (or)</i>		
<input checked="" type="checkbox"/> Significant Changes	PI monitoring plan added.		

1. **Goal.** To establish guidance for prevention and management of hypothermia in the combat casualty.
2. **Background.**
 - a. Hypothermia, acidosis, and coagulopathy constitute the “triad of death” in trauma patients. The association of hypothermic coagulopathy with increased mortality has been well described. As many as 66% of trauma patients arrive in emergency departments manifesting some degree of hypothermia (temperature < 96.8°F or 36°C). Over 80% of non-surviving patients have had a body temperature of less than 34°C. This degree of hypothermia causes dysfunction of coagulation proteins, thus exacerbating hemorrhage. The mortality in combat casualties with hypothermia is double that of normothermic casualties with similar injuries.
 - b. Prevention of hypothermia **must** be emphasized in combat operations and casualty management at all levels of care. Hypothermia occurs regardless of the ambient temperature; hypothermia can, and does, occur in both hot and cold climates. Because of the difficulty, time, and energy required to actively re-warm casualties, significant attention **must** be paid to preventing hypothermia from occurring in the first place. Prevention of hypothermia is much easier than treatment of hypothermia; therefore prevention of heat loss should start as soon as possible after the injury. This is optimally accomplished in a layered fashion with rugged, lightweight, durable products that are located as close as possible to the point of injury, and then utilized at all subsequent levels of care, including ground and air evacuation, through all levels of care.
 - c. Measurement and documentation of the patient’s temperature on standard forms are measures of compliance with hypothermia prevention and treatment guidelines. While core temperature is most accurate, obtaining it is not always necessary. Most casualties with relatively minor wounds can have adequate temperature measurement performed using an oral, tympanic, or axillary route (tympanic and axillary temps are very unreliable). The use of “Temp Dots” on the forehead of casualties, while not as accurate as other measurements, can identify trends in patient body temperature, as well as act as a constant reminder to maintain appropriate hypothermia preventive postures. In any casualty in which these measurements are outside of an expected range (< 97° F or > 100° F), a core temperature should be taken for best accuracy.
3. **Evaluation and Treatment.** The following measures will be used to prevent hypothermia:
 - a. Temp dots will be placed on the forehead of all immediate/urgent litter casualties at Level II and during CASEVAC to Level III.

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- b. Keep Emergency Treatment Area/OR temp > 85–90° F during casualty resuscitation and operative procedures.
- c. Use of warmed IV fluids and blankets is indicated, where available, as well as forced air warming devices (Bair Hugger) as applicable (see details below.)
- d. Mandatory documentation of patient temperature on arrival to, and discharge from, all Level II and III facilities. If non-core temperature (oral, axillary or tympanic) is outside of an expected range (< 97° F or > 100° F), use core temperature (rectal or esophageal) measurement for best accuracy.
- e. Mandatory use of Hypothermia Prevention/Management Kits (HPMK) for all rotary wing evac/ground evac for urgent litter or intubated or immediate triage category casualties (Level I to II and Level II to III.)
- f. See Addendum A for specific details on the management of hypothermia from the point of injury through the various levels of care.

4. Performance Improvement (PI) Monitoring.

- a. Intent (Expected Outcomes).
 - 1) Temperature and route of temperature will be taken and documented on all patients arriving at a Role 2 or 3 facility and upon discharge.
 - 2) Core temperatures (rectal or esophageal) is obtained on all patients with a temperature outside the range of < 97° F and > 100° F.
 - 3) Warming measures and sustainment of core temperature > 96° F is initiated on all patients.
- b. Performance/Adherence Measures.
 - 1) Temperature and route of temperature was taken and documented on all patients who arrived at a Role 2 or 3 facility and upon patient discharge.
 - 2) Core temperatures (rectal or esophageal) were obtained on all patients with a temperature outside the range of < 97° F and > 100° F.
 - 3) Warming measures and sustainment of core temperature > 96° F was initiated on all patients.
- c. Data Source.
 - 1) Patient Record
 - 2) Joint Theater Trauma Registry (JTTR)
- d. System Reporting & Frequency.

The above constitutes the minimum criteria for PI monitoring of this CPG. System reporting will be performed annually; additional PI monitoring and system reporting may be performed as needed.

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The system review and data analysis will be performed by the Joint Theater Trauma System (JTTS) Director, JTTS Program Manager, and the Joint Trauma System (JTS) Performance Improvement Branch.

5. Responsibilities.

- a. All Health Care Providers, Medics, and Corpsmen will be familiar with the guidelines for prevention, monitoring, and management of hypothermia, as listed and described in Addendum A.
- b. Additionally, all personnel involved in the care and evacuation of combat casualties will be familiar with alternative and field expedient hypothermia prevention, and treatment devices and methods described in Addendum A.
- c. It is the trauma team leader's responsibility to ensure familiarity, appropriate compliance and PI monitoring at the local level with this CPG.

6. References.

- ¹ DoD Directive 6000.12, "Health Services Operations and Readiness", 29 Apr 96.
- ² DoD Instruction 6430.2, "DoD Medical Standardization Board", 17 Mar 97.
- ³ HA Policy: 06-005, "Defense-wide Policy on Combat Trauma Casualty Hypothermia Prevention and Treatment", 16 Feb 06.
- ⁴ Marine Corps Center for Lessons Learned, "Hypothermia incidence in trauma patients and prevention/mitigation measures: Analysis of data and information from Operation Iraqi Freedom, September 2003 to November 2005," 5 Jan 06.

**Approved by CENTCOM JTTS Director,
JTS Director and CENTCOM SG**

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APPENDIX A

1. General Recommendations. The following outlines general recommendations on how to use specific products at the various levels of care found on the battlefield. A coherent hypothermia prevention and reversal strategy is required during stages of combat casualty care. A layered approach, taking into account weight, power requirements, clinical effectiveness and usability, should be utilized. All devices should be either disposable or PMI and utilized at all levels of care and available on all evacuation platform.

- a. Tactical Combat Casualty Care principles should be followed while preventing hypothermia:

Tactical Field Care. In this phase of care of the patient, all attention should be directed towards preventing heat loss. Stop bleeding and resuscitate appropriately. If available, warm fluids should be used. This will start generating internal heat that facilitates rewarming. Place the Thermo-Lite Hypothermia Prevention System Cap on the casualty's head, thereby decreasing heat loss from this exposed site. Place the patient on the Blizzard Rescue Blanket. Remove any wet or bloody clothing and replace with dry clothes, if possible. Place the Ready-Heat Blanket on the torso and back of the casualty with a layer of clothing or a sheet between the casualty's skin and the Ready-Heat Blanket: This is a self-heating blanket that requires no special activation. Once the ingredients are exposed to the air, they instantly start to heat up to a maximum temperature of 104°F (40°C) for 8 hours. Wrap the Rescue blanket around the casualty, effectively retaining the heat generated by the warming blanket next to the casualty. If you do not have a survival blanket of any kind, then find dry blankets, poncho liners, space blankets, a sleeping bag, or a body bag, or anything that will retain heat and keep the casualty dry. Place a temp dot on the forehead of the patient. This will assist in monitoring changes in the patients' response to treatment, and will serve as a visual "clue" to remind providers to monitor the patients' temperature throughout the evacuation process.

Figure 1, Blizzard Blanket



b. MEDEVAC considerations:

- 1) During MEDEVAC, the patient should remain wrapped in the Ready-Heat Blanket, Blizzard Rescue Blanket, and Hypothermia Cap.

Figure 2, Ready-Heat Blanket, Blizzard Rescue Blanket, and Thermo Cap



- 2) If these items were not available in the other phases of care, then check with the air crew to see if they have them or any other similar items that can be used to prevent heat loss and can re-warm the patient. This will require pre-mission planning and coordination with air crews.
- 3) Wrap the casualty in dry blankets and try to keep the wind from blowing through open doors and blowing over or under the casualty.
- 4) Utilize the Thermal Angel or other portable fluid warmer on all IV sites.

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- c. At Level I utilize:
- 1) Hypothermia Prevention and Management Kit™ (HPMK) North American Rescue Products Part Number: 80-0027 NSN: 6515-01-532-8056 **or**
 - 2) Blizzard Rescue Blanket NSN: 6532-01-524-6932 **and**
 - 3) TechTrade ‘Ready-Heat’ Blanket NSN: 6532-01-525-4063 **and**
 - 4) Thermo-Lite Hypothermia Prevention System Cap, manufactured by Encompass Techstyles (item # 5110-100)
- d. At Level IIa utilize:
- 1) Blizzard Rescue Blanket NSN: 6532-01-524-6932 **and**
 - 2) TechTrade ‘Ready-Heat’ Blanket NSN: 6532-01-525-4063 **and**
 - 3) Thermo-Lite Hypothermia Prevention System Cap, manufactured by Encompass Techstyles (item # 5110-100)
 - 4) Thermal Angel NSN:6515-01-500-3521 **and**
 - 5) Bair Hugger NSN: 6530-01-463-6823
 - 6) Temp Dots (100/box) NSN 579609404M

Figure 3, Bair Hugger and Thermal Angel



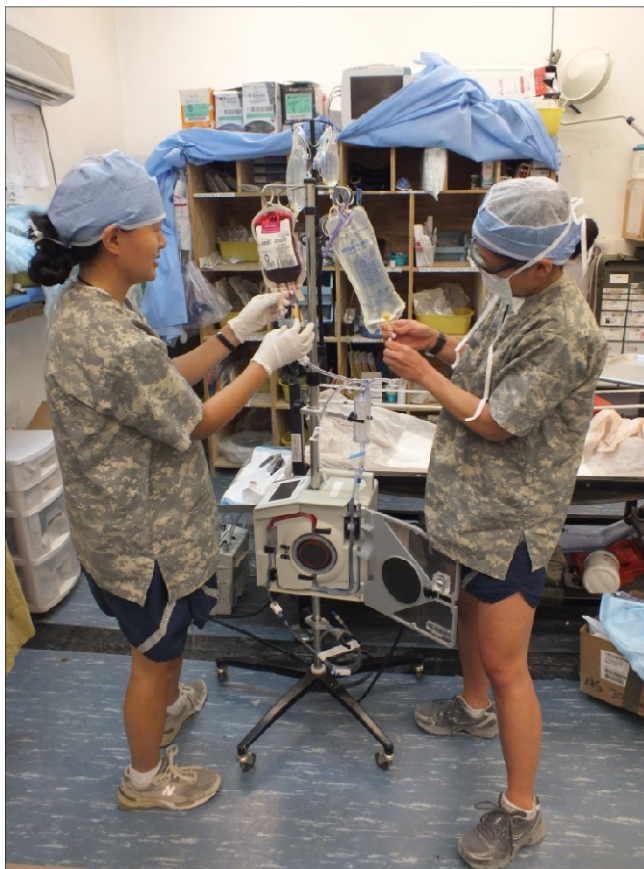
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- e. At Level IIb and III utilize:
- 1) Keep Emergency Treatment Area/OR temp > 85–90° F; use warmed IV fluids and blankets **and**
 - 2) TechTrade ‘Ready-Heat’ Blanket NSN: 6532-01-525-4063 **and**
 - 3) Thermo-Lite Hypothermia Prevention System Cap, manufactured by Encompass Techstyles (item # 5110-100)
 - 4) Bair Hugger NSN: 6530-01-463-6823 **and**
 - 5) Thermal Angel NSN:6515-01-500-3521 **or**
 - 6) Belmont FMS 2000 NSN: 6515-01-370-5019
 - 7) Blizzard Rescue Blanket NSN: 6532-01-524-6932
 - 8) Foley Temp Sensing Kit NSN: 603481080516
 - 9) Temp Dots (100/box) NSN 579609404M

Figure 4, Belmont FMS



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- f. On any evacuation platform utilize the:
- 1) Hypothermia Prevention and Management Kit™ (HPMK) North American Rescue Products Part Number: 80-0027 NSN: 6515-01-532- 8056 **or**
 - 2) Blizzard Rescue Blanket NSN: 6532-01-524-6932 **and**
 - 3) TechTrade 'Ready-Heat' Blanket NSN: 6532-01-525-4063 **and**
 - 4) Thermo-Lite Hypothermia Prevention System Cap, manufactured by Encompass Techstyles (item # 5110-100)
 - 5) Thermal Angel NSN:6515-01-500-3521
 - 6) Temp Dots (100/box) NSN 579609404M

Figure 5, Thermal Angel



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- g. Field Expedient ‘Tricks of the Trade’ when not all the equipment is available:
- 1) Warm IV fluids using two MRE heaters
 - 2) Transport ‘hot pocket’ using wool blanket, space blanket and body bag.

Figure 6, IV Warming Fluids, Hot Pocket, and HPMK™

Warming IV Fluids w/ MRE Heaters



*Hot Pocket
(wool blanket, space blanket and body bag)*



Hot Pocket (complete)



Ready for Transport in HPMK™



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- 2. Equipment and Supply Information.** The following equipment should be used in a layered fashion across the evacuation chain.
- Blizzard Rescue Blanket NSN: 6532-01-524-6932
 - TechTrade 'Ready-Heat' Blanket NSN: 6532-01-525-4063
 - Thermo-Lite Hypothermia Prevention System Cap, manufactured by Encompass Techstyles (item # 5110-100)
 - Space Blanket (Heavy duty)
 - Wool Blanket (green)
 - Hypothermia Prevention and Management Kit™ (HPMK) North American Rescue Products Part Number: 80-0027 NSN: 6515-01-532-8056 (comprised of 1-3 above)
 - Temp Dots (100/box) NSN 579609404M
 - Thermal Angel NSN:6515-01-500-3521
 - Belmont FMS 2000 NSN: 6515-01-370-5019
 - Bair Hugger NSN: 6530-01-463-6823
 - Foley Kit, Temp Sensing w/16FR Catheter (10/case) DeRoyal Industries Item # 81-080516 & NSN: 603481080516 (requires Interface Cable, YSI series 400, 12 foot Item # 81-101400 & NSN: 603481101400) <http://www.deroyal.com>

Items **a–g** do not require power; are used to prevent heat loss and should be used as far forward as possible. Items **h** and **i** are fluid warmers that require power, and consequently deliver heat to the casualty. They are used during transport and at surgical sites. The Belmont device is easy to use, requires little training and provides warmer fluids at higher rates than other fluid warmers. The combination of these devices will both prevent and treat hypothermia. They represent a progression of complexity and power requirements and can be utilized in a layered fashion. Ideally these devices will be utilized during initial treatment and through the evacuation process. These devices should be either disposable or PMI, exchanged upon transport. They should be used on any patient that has suffered hypotension (systolic blood pressure < 90 mmHg), is intubated, has received more than 1000cc of fluid, or has received a blood transfusion.

Figure 7, Vendor Packed "Ready-Heat" Blanket



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APPENDIX B

ADDITIONAL INFORMATION REGARDING OFF-LABEL USES IN CPGs

1. **Purpose.** The purpose of this Appendix is to ensure an understanding of DoD policy and practice regarding inclusion in CPGs of “off-label” uses of U.S. Food and Drug Administration (FDA)–approved products. This applies to off-label uses with patients who are armed forces members.
2. **Background.** Unapproved (i.e., “off-label”) uses of FDA-approved products are extremely common in American medicine and are usually not subject to any special regulations. However, under Federal law, in some circumstances, unapproved uses of approved drugs are subject to FDA regulations governing “investigational new drugs.” These circumstances include such uses as part of clinical trials, and in the military context, command required, unapproved uses. Some command requested unapproved uses may also be subject to special regulations.
3. **Additional Information Regarding Off-Label Uses in CPGs.** The inclusion in CPGs of off-label uses is not a clinical trial, nor is it a command request or requirement. Further, it does not imply that the Military Health System requires that use by DoD health care practitioners or considers it to be the “standard of care.” Rather, the inclusion in CPGs of off-label uses is to inform the clinical judgment of the responsible health care practitioner by providing information regarding potential risks and benefits of treatment alternatives. The decision is for the clinical judgment of the responsible health care practitioner within the practitioner-patient relationship.
4. **Additional Procedures.**
 - a. **Balanced Discussion.** Consistent with this purpose, CPG discussions of off-label uses specifically state that they are uses not approved by the FDA. Further, such discussions are balanced in the presentation of appropriate clinical study data, including any such data that suggest caution in the use of the product and specifically including any FDA-issued warnings.
 - b. **Quality Assurance Monitoring.** With respect to such off-label uses, DoD procedure is to maintain a regular system of quality assurance monitoring of outcomes and known potential adverse events. For this reason, the importance of accurate clinical records is underscored.
 - c. **Information to Patients.** Good clinical practice includes the provision of appropriate information to patients. Each CPG discussing an unusual off-label use will address the issue of information to patients. When practicable, consideration will be given to including in an appendix an appropriate information sheet for distribution to patients, whether before or after use of the product. Information to patients should address in plain language: a) that the use is not approved by the FDA; b) the reasons why a DoD health care practitioner would decide to use the product for this purpose; and c) the potential risks associated with such use.