

# Paramedic – Evidence Based Medicine (P-EBP) Program

## Paramedic CAT (Critically Appraised Topic) Worksheet

**Title:** Prehospital Moderate Hypothermia Management with Simple Invasive Active Internal Rewarming

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### Clinical Scenario:

Paramedics arrive on scene to find an unresponsive patient who has been exposed to cold environmental temperatures for an unknown duration of time with no evidence of trauma, and is obviously hypothermic. In efforts to restore the patient to a normothermic temperature, the paramedics remove the patient from the environment, to the warm ambulance, and remove cold/wet clothing. After a rapid patient assessment and confirming hypothermia, the paramedics begin passive and active external rewarming techniques with blankets and chemical hot packs. They then begin simple invasive active internal rewarming via warmed intravenous saline during the prolonged transport time to a medical facility.

### PICO (Population – Intervention – Comparison – Outcome) Question:

In moderately hypothermic patients, does active internal rewarming in addition to active external rewarming compared to standard care of active external rewarming improve a patients return to normothermia rate or promote cardiovascular instability.

### Search Strategy:

(prehospital OR out – of – hospital) AND (accidental hypothermia) AND (comparison of warming techniques OR active internal rewarming)

### Search Outcome:

Research provided numerous results with few focusing on the stated topic. Many of the results found focused on in hospital ED treatment of patients, perioperative patients, induced hypothermia patient trials in physiology

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labs, traumatic hypothermia, and rewarming trials with animals. Majority of the research found was not recent, rather aged.

## Relevant Papers:

AUTHOR, DATE	POPULATION: SAMPLE CHARACTERISTICS	DESIGN (LOE)	OUTCOMES	RESULTS	STRENGTHS/WEAKNESSES
D. Watts	134 traumatic hypothermic prehospital patients	Randomized Prospective  LOE 1	increase in body temp during transport	hot pack rewarming showed a mean increase in body temperature during transport (+1.36 degrees C)  no intervention, passive rewarming, reflective blankets, warmed IV fluids, warmed IV fluid plus reflective blanket showed a mean decrease in temperature during transport (-0.34 degrees C)	+ based pre hospital with ground/air ALS  -administered warmed IV fluid results grouped with various other results to obtain a mean outcome.  -based on trauma patients
C. Shields	16 patients who presented with accidental hypothermia with a core temperature of less than 32 C.	prospective	Rate of rewarming	patients had a mean rewarming rate of 1.16 degrees C/hr	- could have used a larger patient sample size - based on patients in Hospital -study completed >10 years ago.

## Comments:

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Rural/Northern EMS clinicians with higher probability of prolonged transport times and management of patients with cold environment exposure can possibly better manage moderately hypothermic patients instead of deferring internal active rewarming. Further studies, equipment (fluid warmers), and education in addition to standard care of passive and active external rewarming (exposing, blankets, chemical hot packs) could aid patient care and outcome.

Closely related studies in controlled situations (in hospital) show that optimal simple invasive internal rewarming raises patient internal temperature at a faster rate than active external rewarming alone, with low incidence of cold blood shunting to the core when initiated appropriately.

**Consider:** *Why would you NOT change practice, based on this article?*

Based on research findings within the referenced articles, further studies by prehospital clinicians are needed to determine efficient modes of warming IV fluids and management of moderate hypothermic patients with the warmed fluids. Further education for prehospital clinicians concerning safe rewarming rates, while maintaining cardiovascular stability and providing physiological support is also necessary. Due to the lack of relevant information found, current practice should remain to prevent inconsistent or harmful patient care.

## **Clinical Bottom Line:**

Currently prehospital hypothermia management is focused on preventing further heat loss and physiological cold stress, not on rewarming the patient.

Further study is needed to evaluate a prehospital process of warming with initiation of warmed IV saline in management of accidental moderate hypothermia. The out of hospital management benefits, hazards and patient outcome also requires further studies.

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## References:

Watts DD, Roche M, Tricarico R, Poole F, Brown JJ Jr, Colson GB, Trask AL, Fakhry SM., (1999) The utility of traditional prehospital interventions in maintaining thermostasis. *PEC*; 3(2):115-22

Shields CP, Sixsmith DM., (1990) Treatment of moderate-to-severe hypothermia in an urban setting. *Ann Emerg Med*; 10:1093-7