

Effects of Hypothermia in Outdoor Conditions

Adapted from: Wilderness Search and Rescue by T. Setnicka, AMC-Boston, 1980 by SKSA-Ltd.

Exposure Hypothermia:

Hypothermia resulting from moderate exposure may proceed slowly. It is easy to miss the early symptoms unless you know to be on the lookout. Hypothermia is easier to prevent than to treat. The first stage may be treated with dry clothes, warm fluids, food and exercise. Stage two requires active re-warming in a heated shelter or direct body contact under insulation before proceeding to stage-I treatment. Recovery from stage-III is problematic without hospital support due to the risk of shock and subsequent cardiac effects - the patient should be littered as quickly and gently as possible to professional aid. This is only a guideline for those practiced in first aid.

Stages and Effects of Hypothermia*			
Stage	Core Temp °F (°C)	Observed Symptoms	Patient's Experience
I	98 - 95 (37 - 33)	<ul style="list-style-type: none"> - Uncontrolled shivering - Clumsiness - Cold skin 	<ul style="list-style-type: none"> - Chills - Fatigue - Impaired dexterity
II	95 - 90 (35 - 32)	<ul style="list-style-type: none"> - Impaired speech, apathy - Disorientation, amnesia - Gross in-coordination - Shivering may stop 	<ul style="list-style-type: none"> - Numb fingers - Numb toes - Rigid muscles
III	90 - 82 (32 - 28)	<ul style="list-style-type: none"> - Severe in-coordination - Blue waxy skin - Slow respiration - Weak pulse - Pupil dilation - Cardiac Arrhythmia 	<ul style="list-style-type: none"> - Semi-conscious - Irrationality
IV	82 - 78 (28 - 20)	<ul style="list-style-type: none"> - Cardiac arrest 	<ul style="list-style-type: none"> - Unconscious
* These effects may proceed differently in different patients and more rapidly in patients with impaired health.			

Immersion Hypothermia:

Heat can be conducted away from the body very quickly by contact with water especially if colder than 50 °F (10 °C). Sudden immersion leads to gasping, especially while swimming in rapids or waves, and the likelihood of swallowing water increases greatly, aggravated by panic. The rapid deterioration of a swimmer's mobility in cold water has been documented and is summarized below. Consider that in 40 °F moderate waves you have about 2 minutes to rescue an overturned paddler. Rescues should be practiced, coordinated and executed efficiently.

Degradation of Swimmer's Ability in Cold Water			
From A. F. Davidson, American Whitewater 12, No. 1, 1966			
Water Temperature		Useful Work*	Unconscious*
70 °F	20 °C	45 min	3 hr
60 °F	15 °C	30 min	2 hr
50 °F	10 °C	15 min	60 min
40 °F	4.5 °C	7.5 min	30 min
32.5 °F	0.3 °C	<5 min	<15 min
* Expected results for a healthy adult individual. Youth, age, weight, use of drugs or alcohol and other medical factors as well as whitewater or wave conditions will act to shorten these times.			