

E1

COLD RELATED

EMS personnel must ensure they provide careful thorough assessment and gentle handling to patients who have suffered cold exposure. Tissue damage and cardiac complications could result from aggressive assessment, treatment, and transport of these patients.

GENERAL

- scene assessment for mechanism of injury
- personal protective equipment should be utilized as appropriate
- body substance isolation techniques and equipment should be utilized as appropriate
- primary survey
- consider load and go
 - particularly if there is evidence of moderate to severe hypothermia, cardiorespiratory or cerebral compromise
- carefully move patient to a warm environment, if possible
- do not allow the patient to exert him/herself - e.g. walking, standing unassisted to transfer to the stretcher, etc.
- initiate transport
 - on scene times should be kept to a minimum
 - treat other life-threatening conditions en route
- transport the patient to the nearest appropriate health care facility
 - notify the receiving health care facility of the patient's status as soon as possible
 - transport patient in a position of comfort, injuries permitting
 - monitor and treat the patient en route
 - additional surveys and treatments should be conducted en route
- report all findings to the receiving facility staff, and document on the patient care report

Frostbite

- provide dry dressings and passive warmth to affected areas
 - handle injured parts gently
 - keep the affected areas at rest
 - if the lower limbs are involved do not allow the patient to walk
- remove all coverings from the injured part(s)
- protect injured areas from pressure, trauma, and friction
- do not rub affected areas
- do not break blisters

- do not allow the limb to thaw if there is a chance that the limb may refreeze before evacuation is complete or while en route
- use only passive rewarming
- maintain the patient's core temperature and prevent further heat loss
 - place the patient in a warm ambulance
 - wrap the patient with blankets
- warm fluids may be administered to a fully conscious and oriented patient

Hypothermia

- defined as a core body temperature below 35° Celsius
- a thirty to sixty second assessment may be needed to determine if a pulse or respirations are present
- maintain high concentration oxygen delivery to the patient
 - assist ventilations if required
 - oxygen should be warmed and humidified, if possible
- consider load and go, particularly when there is evidence of cardiorespiratory or cerebral compromise
- move patient to a warm environment, if possible
- provide dry dressings and passive warmth to affected areas
- to prevent further deterioration in the patient's condition
 - remove wet clothing from the patient
 - maintain the patient in a warm, draft free environment
- maintain the patient's core temperature and prevent further heat loss
 - place the patient in a warm ambulance
 - wrap the patient with blankets

NOTE

- core temperature can only be assessed by a rectal thermometer or suitable alternative method
 - an oral or tympanic thermometer is not suitable to determine core temperature in the hypothermic patient
- active rewarming for patients with cold emergencies should be left until arrival at the health care facility
- patient should be wrapped in blankets to prevent further cooling and to allow for passive rewarming
 - do not use electric blankets
- assessment of vital signs in hypothermic patients should be done for a longer time because heart rate and respirations may be slowed
 - it may also be more difficult to detect pulses or chest movement if the tissues are cold or rigid
- when assessing the patient to determine whether they meet the criteria for the determination of death, a hypothermic patient should be assessed carefully
 - do not withhold resuscitative efforts unless there are reasons (other than hypothermia) to withhold resuscitation
 - if there is any doubt whether these patients meet the criteria, full resuscitative measures should be initiated
 - in general, patients are not determined to be dead unless they are "warm and dead" because severe hypothermia may mask all signs of life
- the absence of a pulse in a hypothermic patient is not a reliable indication of cardiac activity
- to avoid the possibility of inducing ventricular fibrillation to a cold but functioning heart, handle hypothermic patients with care

- functional cardiac activity is considered to be absent if
 - the patient with a palpable pulse loses a palpable pulse during evacuation
or
 - no clinical signs of life are present
 - no spontaneous ventilation
 - no response to assisted ventilation
 - no spontaneous movements or sounds
 - no organized rhythm on a cardiac monitor
 - no audible heart sounds on auscultation
- always consider the possibility of hypothermia in an elderly patient with an altered level of consciousness
 - hypothermia may develop in elderly patients in an environment which is "cool" and not necessarily "cold"
 - signs and symptoms of hypothermia in the elderly may include
 - irregular or slow heart rate
 - shallow, irregular, or slow respirations
 - low blood pressure
 - absence of shivering, but skin feels cold to the touch
 - facial bloating
 - pale and waxy skin color
 - slurred speech
 - altered level of consciousness
- shivering usually occurs between 36.6° to 32° Celsius, but not usually below this temperature
 - presence or absence of shivering is a fair indicator of the severity of hypothermia in a patient
- moderate to severe hypothermic patients in cardiac arrest should be managed based on current treatment guidelines and protocols
 - some exceptions do exist with the hypothermic patients
 - if the core temperature is less than or equal to 30° Celsius
 - defibrillate (ETG G22) once if shock advised
 - further defibrillation attempts can be made if core temperature rises above 30° Celsius
 - withhold intravenous cardiac arrest medications (lidocaine, etc.)
 - if the core temperature is greater than 30° Celsius
 - repeat defibrillation as indicated
 - if EMS personnel are trained and certified intravenous cardiac arrest medications can be used
- in rescue situations, EMS personnel should be prepared to treat rescue personnel for hypothermia
 - additional resources should be requested during the initial scene assessment if they might be required

Table 1 – Core Body Temperature and Resultant Physiologic Changes

°F	°C	Physiologic Changes and Responses Due to Decreasing Core Body Temperature
99.6	37.6	“Normal” rectal temperature.
98.6	37	“Normal” oral temperature.
96.8	36	Increased metabolic rate in attempt to balance heat loss.
95.0	35	Shivering maximum at this temperature.
93.2	34	Patients usually responsive and normal blood pressure.
91.4	33	Decreasing levels of consciousness may be noted.
89.6	32	Decreased level of consciousness; pupils dilated; shivering ceases.
78.8	31	Blood pressure difficult to obtain.
86.0	30	Progressive loss of consciousness, increased muscular rigidity. Severe hypothermia below this temperature.
85.2	29	Slow pulse and respirations; cardiac arrhythmia develops.
82.4	28	Ventricular fibrillation may develop if the heart is irritated.
80.6	27	Voluntary motion lost along with pupillary light reflex, deep tendon and skin reflexes – appearance of death.
78.8	26	Victims seldom conscious.
77.0	25	Ventricular fibrillation may appear spontaneously.
75.2	24	Pulmonary edema develops.
73.4	23	
71.6	22	Maximum risk of fibrillation.
69.8	21	
68.0	20	Heart standstill.
66.2	19	
64.4	18	Lowest accidental hypothermic patient with recovery in Manitoba.
51.2	14	Lowest accidental hypothermic patient with recovery (in Saskatchewan, 1994).

NOTES :