



# Cold Water Survival & Hypothermia— You May Not Know As Much As You Think

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Research in Canada sheds additional light on human casualties associated with cold-water immersion (below 15°C or 59°F) and hypothermia that is often misunderstood or overlooked by specialists in the field. People often do not die of actual hypothermia but from a variety of problems where mild hypothermia causes them to lose their physical and mental ability to survive. A typical case is a victim in the water not able to keep their back to waves, inhaling the next wave, and dying from drowning in spite of a life jacket. It is the early period of the accident that victims do not survive water immersions even though they fall in the “safe” boundaries established on hypothermia survival charts. The majority of deaths (over half) occur in the two stages before hypothermia actually develops. This period is often ignored but where preventative efforts should be focused -- protection against the short-term incapacitating effects and protection from drowning. The study provides a variety of people such as emergency responders, coroners, lifesaving equipment manufactures, people in the maritime industry, etc., a better perspective of the problems and better identifies solutions for them.

Four stages of cold-water immersion leading to incapacitation and death:

- Stage 1, Initial immersion responses or cold shock;
- Stage 2, Short-term immersion or swimming failure;
- Stage 3, Long-term immersion or **hypothermia**;
- Stage 4, Post-rescue collapse.

At stage 1, a cold shock response can occur at water temperatures below 77°F. The shock severity is proportional to temperature (colder temperature, higher shock) and peaks between 50 to 59°F. This partly explains many deaths that occur in water as high as 50°F, long before standard survival curves would predict. It is now thought that this is one of the greater threats. Even for a healthy person, cold-water immersion can cause shock including respiratory distress and then the inability to control breathing and hold their breath. However, this is highly dependent on individual's health and body type. On initial immersion there is a large inhalation gasp followed by a four-fold increase in pulmonary ventilation or severe hyperventilation. By itself this can cause small muscle spasms. It was found that the ability to hold your breath decreases and you may not be able to control breathing in the first three minutes of immersion (water inhalation) which can lead to drowning. There is also a massive increase in heart rate and blood pressure. This can then lead to cardiac responses leading to death.

Death at Stage 2 can occur between 3 and 30 minutes after immersion, typically for those attempting to swim. The act of swimming can increase the rate of body cooling by 30-40%. Death was thought to be due to the physiological responses in Stage 1 but an alternative theory points to the mammalian diving response where cold water in contact with the nose and mouth can cause breathing to stop (apnea), heart rate slowing (bradycardia) and even cardiac arrest (asystole). A contributing factor in these early stages is also the loss of manual dexterity whereby cold water renders limbs useless especially in the hands, limiting victims' self-rescue abilities.

Some of the report conclusions included the importance to abandon ship dry, particularly in waters below 59° F, and the need for crew to wear lifejackets at all times on deck. In the event of water immersion, having the proper PFD during the initial critical window can mean the difference between life and death.

**Excerpts from “Survival in Cold Waters: Staying Alive” by Dr. C. J. Brooks, Transport Canada Marine.  
Survival in Cold Waters: Staying Alive. can be found at: <http://www.tc.gc.ca/MarineSafety/tp/tp13822/menu.htm>**

# ABANDON SHIP

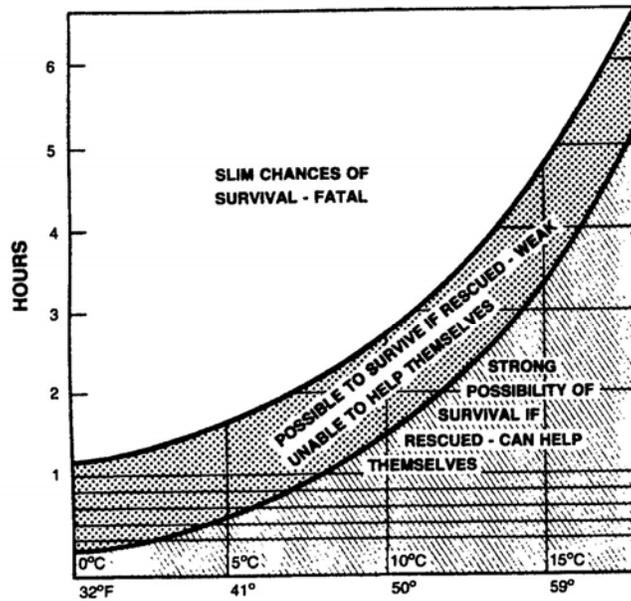
Remember! – Your vessel is the best survival craft. Don't unnecessarily and prematurely abandon ship.

1. Send a distress message / Turn on EPIRB.
2. Muster all persons on board.
3. Prepare persons to abandon ship.
  - PFDs/Immersion Suits
  - Prevent Panic
4. Prepare survival craft for launch. Deploy on leeward

## ACTIONS IN THE WATER

1. Minimize time in water.
2. Get to survival craft.
3. Keep body out of water as much as possible.
4. Do not swim aimlessly.
5. If you have no exposure suit, use the H.E.L.P.
6. Form a huddle with other survivors.

## COLD WATER SURVIVAL



SOURCE: "COLD WATER SURVIVAL" CANADIAN RED CROSS

## H.E.L.P.



**HELP** – the Heat Escape Lessening Position – protects the critical body areas and slows down the loss of heat. Get into this position if you are alone in the water.

## HUDDLE



If two or more people are in the water together, form a huddle so that the sides of your bodies are close together.