



## DEPARTMENT OF EDUCATION

DEPARTMENT OF HOMELAND SECURITY  
UNITED STATES COAST GUARD AUXILIARY



# *PE SpeedGram*

May 2004

Number 2004-02

## HYPOTHERMIA – ARE WE FOCUSED ON THE WRONG THING?

In all boating safety education, including ours, the focus for many years has been on the dangers of hypothermia and what to do when in cold water and protect you from hypothermia. Very valid scientific research on individuals exposed to immersion in cold water shows that the first problem is surviving long enough to even worry about hypothermia!

Depending upon an individual's physiology the real risks of **COLD WATER IMMERSION** occur when falling into water below 15°C (59°F) and most generally for everyone exposed to water below 10°C (50°F).

The steps in the process of dying from cold water immersion include:

1. COLD SHOCK
2. SWIMMING FAILURE
3. HYPOTHERMIA
4. POST-RESCUE COLLAPSE

As you can see, hypothermia is the third problem encountered in cold water immersion and our teaching needs to focus on having a boater survive long enough for that to be a problem! Let's look at each of these elements in a bit more detail.

**COLD SHOCK** – When someone falls into cold water their first unconscious response is to take a large breath of air...if their face is in the water when that gasp occurs, then their chances of survival immediately diminish. If the immersed boater doesn't inhale water on that first gasp, the breathing rate increases dramatically, the ability to hold one's breath may diminish to as little as 10 seconds, the heart rate and blood pressure rise substantially and there's a gradual loss of the ability to move the hands and feet. "Gradual" as used here is most definitely relative when you realize that this phase of cold water immersion lasts only 3 to 5 minutes.

**SWIMMING FAILURE** – After one has been in cold water for 3-30 minutes there's a continued inability to hold one's breath, loss of coordination in the arms and legs results in a body-angle incompatible with swimming...this results in the use of excessive amounts of energy in an attempt to swim, there is reduced ability to match breathing with swimming efforts and as a result of uncoordinated swimming, it becomes more and more difficult to keep the head above water.

HYPOTHERMIA – Here is the subject on which we have historically focused and about which we are fairly familiar. It usually takes about 30 minutes in the water for real hypothermia effects to set in but they may include shunting of blood from the extremities to the core to retain heat, shivering (which eventually ceases as the body's systems begin to fail), loss of consciousness and heart failure or lethal heart rhythms.

POST-RESCUE COLLAPSE – The hypothermic boater is not out of the woods after rescue. Blood pressure can drop to a dangerously low level as the blood vessels in the extremities re-warm or when their ability to remain constricted fails, inhaled water can damage tissues in the lungs to the point that the boater is incapable of properly getting oxygen into the system or expelling CO<sub>2</sub>, heart problems may develop as colder blood from the extremities is released into the core of the body, other physiologic abnormalities can occur and bleeding may reach lethal levels from previously unrecognized traumatic injury.

So, what is the answer to all of this? The answer is to do everything possible to prevent early death from Cold Shock and Swimming Failure and then hope that rescue takes place before hypothermia becomes irreversible. **The key then is for anyone who is on board a boat when the water temperature is below 60°F has to be wearing a PFD at all times versus having it nearby...after hitting the water, even with the PFD in-hand, we now know that they might not be able to get it on.** Further, if they end up in the water and are wearing a PFD, they remain upright and their head is maintained in a position so that they don't inhale water during Cold Shock. In a PFD, even if they experience Swimming Failure, they will continue to remain upright and can be rescued.

We also need to teach boaters that if they're ever called on to rescue someone who has fallen into cold water that the individual in the water may not even be able to grab onto anything that is thrown to them and, as a result, the use of a boat hook to get the victim to the rescuer's boat is a real likelihood.

**The key to all of this is the wearing of a PFD and ideally an anti-exposure garment. It is pretty evident that if someone falls into very cold water they will drown from a combination of Cold Shock and Swimming Failure unless they are very, very lucky. No matter how fit they are, no matter how good they are at swimming, these things happen in anyone who goes into cold water and the life-saving device that will keep them alive long enough to be rescued is a PFD. If you teach recreational boating safety anywhere where water temperatures get below 60°F or to people who boat in such waters, it's critical that we hammer home the mandatory use of a PFD for everyone on board.**

DC-E