

Health Maintenance at Sea

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MedSail 2014

The “Fearsome Five” are health issues that must be addressed in order to maintain the health and safety of the crew, and their optimal physical and mental performance: food (calorie depletion), fluid (dehydration), fahrenheit (hypothermia), fatigue (sleep deprivation), and fitness (injury, illness, infection).

FOOD. Keep the crew well fed, and prepare high calorie and simple carbohydrate meals for the beginning of the trip. Avoid spending time in the galley following departure in order to prevent seasickness. Have snacks readily accessible.

FLUID. Fluid loss at rest in a thermoneutral environment (82 to 86°F and 50% relative humidity) occurs via the skin, lungs and kidneys. Each organ has an obligate daily loss of approximately 500 mL. Minimal daily body water loss is therefore 1500 mL. Headache, nausea, lethargy, apathy, lightheadedness, and lower BP can develop with a deficit of 1 to 2 L (3 to 5% of total body water); these symptoms mimic seasickness and heat exhaustion. Exposure to sunny, hot, breezy, and dry conditions promotes increased fluid loss from skin and lungs, increasing “insensible loss.” Boaters are more susceptible to dehydration during this “ideal boating weather.” Sailors tend to drink inadequate amounts of fluid for multiple reasons. The ship’s water tank may not contain fresh-tasting potable water. Boat motion constantly churns up the tank, and tanks easily become contaminated when filled from unclean sources. In rough weather, it is often difficult for crew to go below to use the head, and it becomes especially problematic if they need to remove foul weather gear while below. Under these conditions, self-imposed water restriction is sometimes practiced in order to reduce the need to urinate. Men suffering from prostatic hypertrophy may voluntarily restrict fluids in order to urinate less frequently. Some of the drugs for seasickness accentuate urinary retention in men with BPH, compounding the problem. Seasickness accompanied by nausea and vomiting frequently causes dehydration. Everyone must take measures to prevent dehydration. The crew must monitor fluid their intake and schedule a brief change of course in rough seas, so that the boat is more stable and it is safe to go below decks. It is essential to store plenty of clean fresh water in the ship’s tanks and if necessary, store commercial bottled water. Some

crew favor using their own refillable water bottles to monitor fluid intake. It is prudent to hydrate in the absence of thirst and to monitor urine volume and color, which should be copious and light tan. Darker tan color signifies concentrated urine and dehydration.

FARENHEIT. Hypothermia may develop acutely when someone is suddenly immersed in cold water, or over a period of hours to days during prolonged exposure to the elements (cool and wet conditions and wet clothing). Mild hypothermia, defined as a core temperature above 90° F, is the only level that can be treated aboard a boat. Deeper levels require evacuation to a medical facility for treatment and rewarming. Sustained uncontrollable shivering is the most reliable and earliest sign of a drop in core temperature. Shivering is the body's protective mechanisms to maintain a normal core temperature. It is the best clinical sign of impending hypothermia. Thermal sensors in the skin trigger reflex shivering as the shell cools; shivering is the body's way of producing heat by increasing metabolic activity (up to 5 times) through involuntary exercise. Shivering intensity is maximal at core temperatures of 89.6° F (32° C) to 91.6° F (33° C) (mild hypothermia). Other early clues are alterations in motor skills and changes in mental status. As blood is diverted from the muscles and nerves, there is loss of manual dexterity, large muscle coordination, and strength. Clumsiness while performing simple tasks, such as adjusting binoculars or using navigational instruments, is apparent. Walking safely on deck and working with lines and gear becomes hazardous. Subtle changes in mental status cause impaired judgment, confusion, and disorientation. There are changes in personality and frequent errors in judgment. Initial treatment of a fully conscious and shivering mildly hypothermic person with a core temperature above 90°F is to prevent further cooling and heat loss. The person is still capable of rewarming himself and does not require evacuation. Shelter the victim from wind and water. Replace wet clothing with multiple layers of dry insulating garments after the skin is completely dried. If dry clothing is not available, provide an extra vapor barrier with added foul weather gear. A windproof layer minimizes convective and evaporative heat loss. When practical, wrap the victim like a burrito in blankets, sleeping bag, sails, or sail bags. Provide calories with simple carbohydrate foods and sweet liquid drinks, and allow vigorous shivering to continue in order to generate rewarming heat. Shivering thermogenesis has been shown to produce rewarming rates of as much as 3° to 4° C/hour. Warm liquids are psychologically beneficial but will not influence rewarming rates.

Warming the skin directly inhibits shivering and should be avoided. Warm showers will not be sufficient to warm the core; they may cause vasodilation and severe hypotension. Hot showers should not be used to treat chronic (exposure) hypothermia or acute (immersion) hypothermia. Many downed airmen and navy personal were rescued at sea during WW II, and sent to the showers for rewarming, only to suffer “circumrescue collapse.” Victims of hypothermia from immersion in cold water for a long period of time are especially susceptible because of dehydration from the cold water and hydrostatic induced diuresis.

FATIGUE. Sleep Deprivation and fatigue lead to cognitive errors, poor judgment, mood changes and sometimes hallucinations. Sailors often have irregular sleep schedules, prolonged watches, and difficult sleeping conditions. The challenge is to improve sleep efficiency. Sleep cycles have light and deep stages of rest. A one-hour nap can quickly bring about the deeper restorative sleep stage. Regular watch and sleep schedules, and napping to reduce fatigue, are recommended. Many medications for seasickness cause drowsiness, which disrupts the regular sleep schedule.

FITNESS. Soft tissue extremity injuries, usually caused by trips and falls during sailing maneuvers, are common, especially in heavy weather. Being caught in lines or struck by objects are frequent factors. The usual injuries are contusions, lacerations (especially of hands), sprains, and strains. Severe injuries, such as fractures, concussions, and dislocations, are not common. Most injuries occur in the cockpit or on the foredeck. Sheets, blocks, lines, and deck hardware contribute to most injuries. A companionway ladder or external steps can be slippery and dangerous if one is not holding the handrails. Steps should have “non-skid” material. Hand injury is especially common if an inexperienced crew member is asked to handle and secure lines under tension. Capstans, winches and cleats all require different skill and experience. Handling the anchor chain and lines on the anchor windless requires instruction and well-practiced coordination between the bowman and boat operator. Gloves are sometimes protective and can prevent lines slipping and rope burns. The fore deck is a toe and foot trap for any crewmember in bare feet, especially at night, or in rough weather. Shrouds, cleats, stanchions, fairleads, cars and other deck hardware can easily trip an unwary crewmember walking on deck. Falling overboard is always a risk. Seasickness, sunburn, galley burns, engine burns, and dehydration are the most frequent illnesses, and together with marine related infections (usually cellulitis), comprise the most common illnesses for cruising sailors.

All crew and onboard personnel should have screening medical and dental examinations to identify acute and chronic medical and dental conditions. The designated medical officer should have and review the medical history for each crew member, including allergies and prior surgery, and a list of all prescription and OTC medications currently taken. A medical briefing with the crew weeks prior to departure should include environmental issues they may encounter, required vaccinations and prophylactic medications, the need for an adequate supply of personal medications, and the requirements for personal hygiene to prevent commonly transmitted infectious diseases in the restricted boat environment (eg, gastroenteritis). Include a discussion of alcohol use while at sea and in port.