



DEPARTMENT OF VETERANS AFFAIRS
Veterans Health Administration
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UNDER SECRETARY FOR HEALTH'S INFORMATION LETTER

LONG-TERM EFFECTS OF HEAT-RELATED ILLNESSES

NOTE: A number of United States personnel serving in Southwest Asia including those participating in Operation Iraqi Freedom (OIF) have been diagnosed with heat-related illnesses.

1. Purpose. This Information Letter is intended to provide basic information about these disorders so that Department of Veterans Affairs (VA) staff will be better prepared to care for veterans who may have experienced heat-related problems while on active duty.

2. Background

a. Heat-related illnesses include a continuum of multisystem disorders. Various terms are used to describe illnesses along this spectrum (including heat cramps, heat stress, heat injury, heat exhaustion, etc.) while the most serious form is termed heat stroke. The basic mechanisms of heat illnesses are failure of the body's thermoregulatory system and heat accumulation more rapidly than it can be dissipated by the body.

b. Heat stroke can be subdivided into "classical," which tends to affect the elderly and debilitated, and "exertional," which typically affects military personnel, and may be complicated by muscle damage and associated renal failure.

c. Heat stroke is a catastrophic medical emergency characterized by an elevated body temperature of greater than 104 degrees Fahrenheit (40 degrees Celsius) and central nervous system dysfunction (including delirium, convulsions, and coma). Systems principally damaged by heat stroke include the: brain, liver, kidneys, muscle, and blood coagulation. In light of unexplained pneumonia reported among personnel serving in OIF, it should be noted that pneumonitis may occur with heat stroke, but is not a common finding.

d. Rapid cooling is the cornerstone for treatment of serious heat illnesses. Treatment of associated problems and complications, including fluid and electrolyte abnormalities, renal failure, seizures, and breathing difficulties, also may be necessary.

e. About 15-20 percent of patients with heat stroke may die of the acute illness. Most heat stroke survivors will make a full recovery but perhaps 10-15 percent will have prolonged and/or

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permanent medical problems, including neurological, cognitive, and behavioral deficits from small strokes in the brain, liver abnormalities, and heat intolerance.

f. A study from Singapore published in 2003 of soldiers who had experienced heat exhaustion found increased neurasthenia, poorer short-term memory, slower reaction time, and poorer postural stability 2 weeks after the acute episode, but no significant differences 6 1/2 months after the episode indicating a good prognosis.

g. In a study published in 2001, United States (U.S.) military recruits experiencing a heat illness during recruit training (about 10 percent of which were severe enough to require hospitalization) were found to have slightly lower military retention rates, and higher subsequent military hospitalization rates, including for further exertional heat illnesses.

h. Only a small fraction of individuals experiencing heat related illnesses have heat stroke and most of those with milder forms of heat related illness should recover sufficient thermoregulation to hold almost all jobs.

3. Recommendations

a. There are no specific modalities for treatment of long-term sequelae of heat-related illness.

b. It is recommended that veterans with neurocognitive deficits or behavioral problems be referred for rehabilitative and/or mental health services as appropriate.

c. It is also recommended that veterans with disabilities possibly related to heat injuries in service contact the Veterans Benefit Administration so that a compensation claim may be submitted. Veterans may reach the VA Regional Office serving their area by calling toll-free 800-827-1000.

d. Heat intolerance may be documented by specialized testing (see subpar.4a), but such tests probably would not be useful in most clinical situations.

4. References

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c. Gardner J. and Kark, J., "Medical Aspects of Human Environments," Clinical Diagnosis, Management and Surveillance of Exertional Heat Illnesses. Vol 1. Ch. 7. Department of the Army, 2001 Available at: <http://www.bordeninstitute.army.mil> .

d. Headquarters, Department of the Army and Air Force, Technical Bulletin TB MED 507/AFPAM 48-152 (I) "Heat Stress Control and Heat Casualty Management," March 7, 2003. Available at: <http://www.usariem.army.mil> .

e. Phinney, L. et al., Long-term Follow-up after Exertional Heat Illness During Recruit Training," Medicine and Science in Sports and Exercise. Vol. 33, No. 9: pp. 1443-1448: 2001.

f. Romero, J. et al. "Neuropsychological Sequelae of Heat Stroke: Report of Three Cases and Discussion," Military Medicine. Vol. 165, No. 6; pp. 500-503: 2000.

g. Tucker, L. et al. "Classical Heatstroke: Clinical and Laboratory Assessment," Southern Medical Journal. Vol. 78, No. 1:pp. 20-25;1985.

h. U.S. Army Research Institute of Environmental Medicine, Heat Stroke, see at: <http://www.usariem.army.mil/heatill/htstroke.htm> .

i. Weinmann, M., Hot on the Inside, Emergency Med Services, Vol. 32, Number 7: p. 34: July 2003.

5. Additional Information. Questions may be referred to the Office of Public Health and Environmental Hazards at 202-273-8575.

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