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## CRITICAL CARE MEDICINE BOARD REVIEW MANUAL

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## Environmental Hazards

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# HOSPITAL PHYSICIAN®

## CRITICAL CARE MEDICINE BOARD REVIEW MANUAL

### Environmental Hazards Chapter 1—Case Studies in Hyperthermia

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#### I. INTRODUCTION

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Heat stroke, malignant hyperthermia, and neuroleptic malignant syndrome are disorders related to a disruption of normal thermal homeostasis and may result in a fatal outcome. Failure to recognize these illnesses and offer early therapy may contribute to increased patient morbidity.

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#### II. HEAT STROKE

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Heat stroke is the most serious manifestation of the heat stress illness and is a medical emergency. Heat stroke is a syndrome characterized by a body temperature equal to or higher than 40.6 °C (105 °F) possibly with anhidrosis and changed mental status. When body temperatures reach a level in excess of 41 to 42 °C (106.8–107.6 °F), denaturation of enzymes and other proteins begins and cellular lipid membrane dissolution occurs.

The incidence, morbidity, and mortality of heat stroke are difficult to quantify because of misidentification of patients with other clinical disorders.

Although the typical history seems self-evident, usually **little or no clinical warning presages the onset of classical heat stroke**. As thermoregulatory mechanisms

fail, body temperature climbs rapidly and a patient can quickly lapse from apparent baseline health status to obtundation or coma with a high core temperature.

The following case describes a common presentation of heat stroke.

#### CASE PATIENT I Presentation

Case patient 1 is an 82-year-old man who is brought to the emergency department after being found unresponsive lying in bed at his high-rise apartment. The patient is known to have hypertension, taking  $\beta$ -blockers regularly. He lives alone and was last seen by his visiting nurse 3 days prior to admission and was doing well with the exception of appearing more irritated and confused than normally. Because of the unusual weather circumstances of high humidity and temperatures reaching 102 °F, one of the patient's grandsons decided to check on him; he had only an old fan at home and no air conditioning.

Upon the patient's arrival at the emergency department, a check of his vital signs reveals a temperature of 106.1 °F, blood pressure of 80/40 mm Hg, heart rate of 80 beats per minute (bpm), and respiratory rate of 8 breaths/min. He is unresponsive and is intubated for airway protection. Prompt cooling is initiated and the patient is transferred to the intensive care unit.