Supplementary Appendix

This appendix has been provided by the authors to give readers additional information about their work.

Supplement to: Nelson DA, Deuster PA, Carter R III, Hill OT, Wolcott VL, Kurina LM. Sickle cell trait, rhabdomyolysis, and mortality among U.S. army soldiers. N Engl J Med 2016;375:435-42. DOI: 10.1056/NEJMoa1516257

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List of Investigators

D. Alan Nelson, Ph.D.; U.S. Army Office of the Surgeon General

Patricia A. Deuster, Ph.D.; Consortium for Health and Military Performance, A DoD Center of Excellence; Department of Military and Emergency Medicine; Uniformed Services University

Robert Carter III, Ph.D.; U.S. Army Research Institute of Surgical Research, Fort Sam Houston & Department of Emergency Medicine, University of Texas Health Science Center at San Antonio

O. Hill, Ph.D.; Extremity Trauma and Amputation Center of Excellence, Center for the Intrepid, Brooke Army Medical Center

Vickee L. Wolcott, Ph.D.; Army-Baylor University Graduate Program in Health and Business Administration

Lianne M. Kurina, Ph.D.; Department of Medicine, Division of Primary, Preventive, and Community Medicine, Stanford University School of Medicine; 450 Serra Mall, Bldg 20, Stanford, CA 94305-2160; (650) 725-7531; lkurina@stanford.edu (corresponding author)

Table S1. Methods employed by the US Army to prevent exertional collapse events during training, including heat injury and rhabdomyolysis.

Leader, clinician and individual prevention measures[1]

Identify and assess hazards
• Check the recent and anticipated environmental conditions and associated heat stress levels, and determine unique group and individual risk factors
• Use the "HEAT" acronym:
  o Heat levels and associated risk
  o Exertion levels planned
  o Acclimation level of those present for training
  o Time factors including duration of activity and recovery time

Develop and implement risk controls
• Plan training in advance and estimate the risk of collapse events
• Consider the environment and training event characteristics:
  o Training event characteristics
  o Uniform and equipment needed
  o Location and time of day of key activities
• Adjust activity distances, durations, pace, and loads and emplace work/rest cycles
  o Conduct high-intensity training in cooler morning hours
  o Ensure no consecutive days of high-intensity activity
• Ensure proper resources are at appropriate locations

○ Equipment for checking Wet Globe Bulb Temperatures ○ Water, snacks and electrolyte beverages ○ Medical resources and locations, and relevant communication capabilities • Establish standard operating procedures, and train and test soldiers on them • Identify how to monitor hydration & high risk personnel
Supervise and evaluate • Ensure implantation of all planned measures • Check junior leaders for knowledge of the prevention program • Check medical resources (e.g., equipment, communications) • Stop training if an injury occurs and re-assess the total unit status
Further clinician actions[2]
• Screen and defer individuals seeking entry to military service for histories of prior recurrent or severe exertional collapse • Emplace protective duty restrictions for individuals with such histories • Refer soldiers with such histories for review for possible discharge from service

References

1. U.S. Army Medical Department, Army Public Health Center. Heat illness prevention. 2016. (https://phc.amedd.army.mil/topics/discond/hipss/pages/heatinjuryprevention.aspx)

2. Department of the Army. Army Regulation 40-501: Standards of Medical Fitness. 2011 (http://armypubs.army.mil/epubs/pdf/r40_501.pdf)