

Army Builds Tool to Save Lives at High Altitude

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Mountain climbing is risky business. When unacclimatized individuals rapidly ascend to altitudes greater than 8,000 feet, they put themselves at risk for suffering from high-altitude illnesses. The addition of hard physical exercise, typical of a military mission, increases this level of risk. Detecting these illnesses prior to occurrence has the potential to save lives.

U.S. Army Research Institute of Environmental Medicine (USARIEM) researchers recently returned from Taos Ski Valley, NM, where they completed their data collection for a tool that will predict Acute Mountain Sickness (AMS) in individuals prior to occurrence. Thirty-eight warfighters from the 3rd Armored Brigade Combat Team, 1st Armored Division at Fort Bliss, TX, volunteered to participate in this research this past summer.

“This tool (the AMS_alert algorithm) has the potential to save lives at high altitude and identify high-risk individuals before a casualty occurs,” said Dr. Beth Beidleman, research physiologist with USARIEM’s Military Performance Division. “AMS can progress into life-threatening high-altitude pulmonary edema [HAPE] or high-altitude cerebral edema [HACE] which both require evacuation. Both of these illnesses involve fluid either in the lungs or brain and can result in death within 24 hours.”

One Soldier in last summer’s study experienced all three high-altitude illnesses — AMS, HAPE, and HACE. “Fortunately, we were able to evacuate this volunteer to the nearest emergency room and there were no untoward or lasting effects, but this option is not always available when warfighters are on a mission in remote mountainous regions,” said Beidleman. “Having a hypoxia monitoring system on board can be the difference between life and death.”

Roughly 50 to 90 percent of unacclimatized warfighters will experience AMS symptoms when rapidly ascending to high altitudes greater than 8,000 feet, depending on the altitude. AMS can impact every aspect of a warfighter’s physical and mental performance.

“If we can alert commanders and non-commissioned officers on the field in real time that someone is in trouble prior to occurrence of AMS, HAPE, or HACE, they can begin treatment early, adjust the mission, and plan evacuations safely.”

Unlike other environments, the dismounted warfighter is the primary weapon platform at altitude, and the impact of hard physical exercise during ascent is understudied. One aim of this research study was to answer whether hard exercise during altitude ascent impacts the timing and severity of high-altitude illnesses. In addition, most warfighters live below 12,000 feet when deployed to altitude, and the majority of altitude research occurs at altitudes above 14,000 feet.

Warfighters operate in every terrain, elevation, climate and in any-and-all conditions. The AMS_alert algorithm provides a technological breakthrough in physiologic and genomic monitoring not only for the U.S. Army but also for civilian health-care providers, mountaineers, recreational athletes, and search and rescue teams. Read more about the study and AMS tool at https://www.army.mil/article/260429/army_builds_tool_to_save_lives_at_high_altitude.