



Altitude sickness research prepares Soldiers in the field

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Looming in the distant skyline of Colorado Springs, Co., Pike's Peak is one of the nation's most popular tourist destinations, hosting hundreds of thousands of visitors on its 14,110 foot summit each year. What most vacationers don't know as they peer across the serene landscape is that just a few hundred feet away researchers from the U.S. Army Research Institute of Environmental Medicine are sharing the summit to advance military medicine.

For years research physiologists from the U.S. Army Medical Research and Materiel Command's USARIEM and research volunteers have spent their summers above the tree line to study ways of improving service members' capabilities in high altitude environments at the Maher Memorial Altitude Laboratory.

"The Army is very interested in any means to accelerate acclimatization," said USARIEM research physiologist Dr. Allen Cymerman. "We're obligated to have our troops knowledgeable and experienced in how to handle their environments."

Although the lab has been home to physiological research since it was placed on the Peak in late 1960s, the altitude sickness studies became even more relevant when troops were deployed to the mountains in Afghanistan after the Sept. 11 attacks. But, the mobility of the U.S. Army was sometimes faster than the Soldiers' bodies could keep up. Most people need time to acclimate to the lower levels of oxygen in the air the higher they go or they run the risk of developing Acute Mountain Sickness or even more severe health issues, said USARIEM research physiologist Dr. Steve Muza, who has spent the last few summers on the Peak.

"We scoop them up on helicopters, drop them off in the mountains, and they can become susceptible to problems," said Muza. "Our goal is to understand how the lack of oxygen affects Soldiers biologically and physiologically, and then take the information to mitigate or reduce them getting sick."

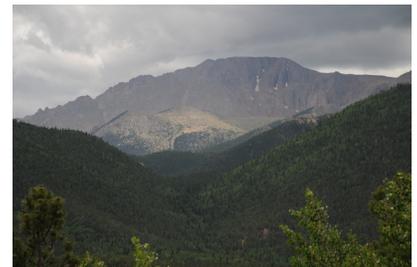
The effects of AMS run from minor annoyances of light light-headedness and a treatable headache to severe nausea. According to Cymerman, about 75 percent of people who venture above 8,000 feet without taking a few days to let their bodies adjust along the way will get some form of AMS. Less than 10 percent of people will react even stronger with life-threatening illnesses.

"Everyone has the same basic physiology," said Cymerman. "But some people can just adapt faster for unknown reasons."

Some of the medical breakthroughs from previous research on the Peak have led to the FDA's only approved altitude sickness prevention medicine, understanding nutrition and hydration affects, as well as other usable information for Soldiers in the field.



Pvt. Derek Adcock, a USAREIM research study volunteer in the Pike's Peak laboratory, is evaluated for his body's response to the altitude.



Pikes Peak is one of the most visited mountains in the world, second only to Japan's Mount Fuji. Its 14,110 foot summit gets hundreds of thousands of visitors a year and also has hosted the USARIEM Maher Memorial Altitude Laboratory since the 1960s.

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A USARIEM researcher analyses blood that was drawn to check the volunteers' biological response to the altitude while some perform a seven-mile endurance test in the background.

“For instance we demonstrated that we can improve performance by 25 percent by eating more carbohydrates,” said Muza. “We’re now in the process of developing carbohydrates supplement packages.”

This year’s research focused on determining the effects of hypoxic chambers in preparing for the Peak’s altitude. The low-oxygen chambers are being used by world-class athletes to help condition their bodies to perform better, and 20 Soldiers and three civilians volunteered to sleep in them for seven days at USARIEM headquarters in Natick, Mass.

They were then flown up to Colorado for a five-day stay on the Peak to see if the chambers, which gave them the equivalent of 8,000 feet acclimatization, actually improved their performance and adjustment to the altitude.

Adapting faster may have been on the mind of Pvt. Scott Caine, a Soldier who had a choice of studies where he could participate. Obviously not feeling well on his second day at the Peak with a pale, greenish hue to his skin, he explained why he volunteered for something he was warned would make him sick, if only for a short time.

“This is one of the main studies I wanted to do,” said Caine. “I’m heading to the 10th Mountain Division, which is deployed right now. If they can alleviate some of these problems before I get there, it would be great.”

Caine and the other volunteers were tested both at Natick and on the Peak for how sick they became, what kind of physical work performance they had, their mental performance, as well as their physiological response to the altitude. Under the watchful eye of a doctor, researchers and other medical professionals, the volunteers usually adapted to the environment after a few days.



Research volunteer Sarai Cavallo completes one of two seven-mile physical endurance tests at the Pikes Peak laboratory while researcher Eric Lammi monitors and documents her distance, heart rate and hydration.



The U.S. Army Research Institute of Environmental Medicine Maher Memorial Altitude Laboratory is one of only two buildings on the summit of the 14,110 foot Pikes Peak. Brought to the Peak in the late 1960s, it provides a day room/kitchen, dormitory, offices and research equipment areas.

With peoples’ health involved, the researchers can’t take their responsibility to the volunteers lightly, said Cymerman. Every year the scientists have to get the projected research signed off by an Institutional Review Board and an approving official, which can be a three-month review process, to ensure the volunteers are at a minimal health risk.

“Although we are in a natural environment, it’s not normal to take a Soldier and very rapidly place him at more than 14,000 feet,” he said. “If (someone) wants out of the study, we take him out. We make sure volunteers are protected.”

While the USARIEM researchers were protecting their volunteers, Caine said he was thinking about how his participation with the project was going to protect other Soldiers.

“This is great to be a part of,” he said in between one of his physical endurance tests. “A little bit of discomfort is OK because the help we’re giving to the Soldiers outweighs anything I’m feeling right now.”

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