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Army tries to temper heat risks facing troops

By Joe Gould - Staff writer
Posted : Sunday Aug 14, 2011 17:29:26 EDT

Record heat across the United States in the past month has seen an 18-year-old cadet at the U.S. Military Academy die during an exercise and, days later, a paratrooper die after physical training at Fort Bragg, N.C.

In another incident, 10 soldiers doing a brigade run at Fort Bragg weeks earlier fell ill in the heat and sought medical treatment for heat injuries.

On June 6, more than 500 soldiers dropped out of a 10K run for the 3rd Brigade Combat Team at Fort Bragg. Of the 10 who went to the hospital, three were admitted, one to the intensive care unit, according to Lt. Col. Dave Connolly, a spokesman for the 82nd Airborne Division.

On July 21, Cadet Jacob Bower of Fairmont, W.Va., was found unresponsive during a land navigation exercise on a day when the local temperature at the academy in New York was in the 90s. His father told The Associated Press that a preliminary autopsy indicates his son died of heat-related causes.

Then on July 29 at Fort Bragg, Sgt. Joshua Mann was running with his unit, Company C, 1st Battalion, 504th Parachute Infantry Regiment, when he collapsed, apparently from a heat-related illness. The 22-year-old airborne infantry team leader from Winside, Neb., died the next day at a post hospital.

Days after Bower's death, Army headquarters sent an Army-wide memo emphasizing the importance of safety regulations and risk-management planning during land navigation exercises.

Across the Army, officials are looking for better ways to handle the heat and keep soldiers from succumbing to it.

SIGNS OF HEAT ILLNESS

The marks of heat exhaustion may include:

- Excessive sweating with pale, moist, cool skin
- Headaches
- Weakness
- Dizziness
- Cramping, nausea or vomiting

Serious symptoms:

Since mid-July, a dome of oppressive heat, accompanied by unusually high humidity, has covered much of the country, breaking longstanding temperature records, according to Susan Buchanan of the National Weather Service. Above-average heat is expected to continue, at least in the Southeast, deep into August.

It is "the worst summer that we've had in a long time," said Dr. Francis O'Donnell, a senior medical



SGT. WATSON JOSEPH / ARMY

Above, a soldier cools off with water from a well while in Katalai village, Khowst province, Afghanistan, in June. Across the Army, officials are looking for better ways to handle the heat and keep soldiers from succumbing to it.

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- Confusion
- Seizures
- Rapid, weak breathing and pulse
- Reduced blood flow can lead to life-threatening organ damage, heat stroke and organ failure.
- Blood-starved intestinal walls are thought to become permeable, exposing cells to harmful bacteria.
- The central nervous system and organs may also be damaged.

consultant at the Armed Forces Health Surveillance Center, predicting higher-than-normal numbers of heat-related injuries despite the services' required precautions.

"One would hope that all of the preventative measures the services employ remain constant and the trainers and supervisors are as vigilant as ever, but despite our best efforts, we still have cases," said O'Donnell, a former Army doctor.

In April, the heads of Medical Command and Training and Doctrine Command distributed their

annual memorandums calling attention to their bible of heat casualty prevention and treatment, Technical Bulletin Medical 507. It mandates comprehensive risk-reduction procedures for use across the Army.

Army Surgeon General Lt. Gen. Eric Schoomaker reminded the force this year that an average of two to three soldiers die annually from heat illnesses, most of them during physical testing or training. In 2010, more than 200 soldiers suffered from heat stroke and more than 1,700 received medical treatment for less-severe heat injuries. Numbers were not available for heat illnesses so far this year.

"Most heat illnesses are preventable, and none need to be fatal," Schoomaker wrote.

The Army's efforts to reduce and treat heat-related injuries have most recently yielded a device that's being tested at the Airborne School, Fort Benning, Ga. It's a low-tech solution: a portable trough full of ice water in which soldiers can soak their arms to cool off.

Whether the device makes sense for the Army is up for a decision from TRADOC, the Army Research Institute of Environmental Medicine in Natick, Mass., and the Natick Soldier Center.

"The idea is something out in the field that's low-technology, that is very effective in cooling the body," said Dr. Michael Sawka, chief of the Thermal and Mountain Medicine Division at USARIEM. "It allows better-quality training in the heat; it can lower body temperature, lower skin temperature and reduce cardiovascular strain."

TRADOC has increasingly embraced ideas like using ice water-soaked sheets to rapidly cool overheated soldiers. When there's a risk of heat injuries, TRADOC requires that there be eight ice sheets on hand per platoon.

VULNERABLE SOLDIERS

Installations in the Southeast are generally the hardest hit by heat-related injuries. Fort Bragg leads the Army, followed by Fort Benning; Fort Polk, La.; and Fort Jackson, S.C., Defense Department statistics show.

The region's heat and humidity are what typically fell soldiers, said Col. (Dr.) Karen O'Brien, a former command surgeon at both TRADOC and Fort Benning, now at Madigan Army Medical Center, Wash.

"Benning and Jackson struggle with heat injuries because there is a very high humidity level," she said. "The primary way you dissipate heat is by sweating, but when the humidity is high, the sweating is unable to effectively cool you."

New soldiers attending basic and advanced combat training at bases in the Southeast are particularly prone to injury from intense heat; soldiers in their first 18 to 24 months of active duty have significantly higher rates of heat-related injuries. In early training, they are often less physically fit or acclimated to the Southern heat.

"You get people from Alaska and cadets coming in from West Point who aren't acclimated, and it takes two weeks to acclimate," O'Brien said. "When you show up for a school like Ranger School or Airborne School,

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you start training the next day, and you're not acclimated."

Minor illnesses and skin problems like a sunburn or poison ivy can contribute to the risk. Many substances such as illegal drugs, alcohol, diuretics, anti-epileptic medications, antihistamines and antidepressants can all leave users more prone to heat illnesses.

Experts say it's not only the sick, overweight, under-acclimatized soldier who's worth watching, but the star who is so motivated that he pushes his body even as it breaks down.

A 2005 Army study found that women are more prone to heat injuries than men, whites are more prone than other races, soldiers from Northern states are more prone than Southerners, and infantrymen and gun crew soldiers are more susceptible than other types of soldiers.

WHEN HEAT MEANS TROUBLE

Classic heat stroke, which tends to strike the elderly, the sick and the very young, is not what usually gets soldiers. What the Army sees most are heat exertion illnesses, said Sawka, of the USARIEM.

Exercise strains the body's cardiovascular system, and heat strains it further as the body pumps blood to the skin to cool it down. Heat also makes the blood vessels slacken, forcing the heart to work even harder to circulate blood.

Though military researchers do not completely understand these illnesses, they are making strides, Sawka said. They have learned, for example, that early intervention is vital to saving lives and that viral infection leaves otherwise healthy people more vulnerable.

"The Army is leading the way in trying to understand this problem and work with it," Sawka said. "It's predominantly a DoD problem to study."

While it's fairly well-known that heat-stroke victims are more prone to new heat injuries, Army researchers at USARIEM are trying to figure out why and how to treat them.

Dr. Lisa Leon, a researcher with the USARIEM who studies organ and tissue damage in victims, said organs sustain damage at different rates, which makes it hard for doctors to know for sure when a person is truly fit for duty.

"[Doctors are] basically measuring enzymes to tell when those are normal, but many times those are not accurately reflecting the injury that is still evident at the tissue level," Leon said. "You can have residual organ damage that they can't easily detect."

Another mystery is why some soldiers have different tolerances to heat. Researchers hope to learn the answer and develop procedures and training to better acclimatize soldiers.

RISK-ASSESSMENT PROGRAMS

Even without all the answers, the Army has developed regulations and planning tools to better prevent and treat heat-related illnesses.

TRADOC requires every training event to have a risk-mitigation plan. Leaders have options such as modifying the uniform or the event, or conducting it at a cooler time of day, and they are more apt to spot warning signs.

If the training plan includes a moderate amount of risk, a lieutenant colonel must sign off on it.

"A lot of people, when you go out and look, they just weren't right up to 72 hours before, and then they go out in the morning and started to do something like a road march or a run, and they just dropped dead," O'Brien said. "It was because they had suffered the effects of the cumulative heat from the day before."

It's common to track soldiers' water consumption using short, nylon "Ogden cords" affixed to their uniforms. Soldiers move a bead down the cord for each quart of water they drink. The beads can be color-coded to indicate whether a soldier had a previous heat injury or is otherwise at risk.

Heat-illness prevention is part of TRADOC's fitness plan for soldiers, included with how they eat and sleep, and whether the training is safe.

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"When we see units having more heat strokes than heat exhaustion, getting treated at medical facilities, we get very concerned," O'Brien said. "That shows they aren't ... sending people for early evaluation, stopping and assessing things."

Leadership is crucial in taking care of soldiers, she said.

"I tend to see fatalities happening every other year," O'Brien said. "When you have good leaders who are aware of the risks, you see effective prevention of heat injuries. Then you get a year where there's a changeover and people just don't understand how dangerous it is there, and you'll get a fatality. It's a constant battle to keep leadership really understanding how dangerous it is."

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