Army Develops App to Determine Body's Water Needs

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http://www.army.mil/article/136391/Army_develops_app_to_determine_body_s_water_needs/
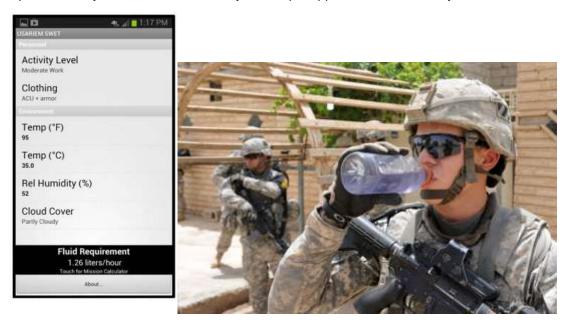

Photo Credit: U.S. Army graphic
*Pictured here is the **Soldier Water Estimation Tool** app main screen. This Android-based smartphone application is a decision aid that translates a complex sweat prediction model into simple user inputs. The user need only estimate the anticipated intensity of the activity (low, medium, high, including example activities), choose from among three categories of military clothing ensemble and input weather conditions (air temperature, relative humidity and cloud cover) to estimate the fluid intake required to maintain optimal hydration.*

NATICK, Mass. (Oct. 24, 2014) -- Clean, potable water is one thing the world universally cannot live without. It hydrates. It cleans. It keeps us alive and well. No doubt, water is very valuable to Soldiers.

However, as many mission planners know, water planning can be a nightmare. Too much water can strain already heavy combat loads, perhaps forcing some Soldiers to pack too little in favor of a lighter pack. When Soldiers don't have enough water, dehydration could set in, decreasing performance and increasing the risk of serious heat illnesses.

"Water is a huge logistical problem for training and field missions," said Dr. Nisha Charkoudian, a research physiologist from the U.S. Army Research Institute of Environmental Medicine, known as USARIEM, Thermal and Mountain Medicine Division. "Obviously, planners do not want too much, but having too little can lead to serious problems. Dehydration exacerbates symptoms caused by heat and altitude exposure, and makes a lot of things worse, including the ability to perform physical tasks in hot and high-altitude environments."

Massachusetts Institute of Technology Lincoln Laboratory -- Dr. Anthony Lapadula, Dr. Albert Swiston and Mr. Tajesh Patel -- to develop an app that will help unit leaders accurately predict water needs with the goal of minimizing the burden of water transport and sustaining hydration.

"Research into heat stress has been going on for over 50 years at USARIEM," Charkoudian said. "We have been providing guidance to the Department of Defense about sweat loss and hydration, and refining it for many years through TB MED 507. Paper doctrine provides generalized look-up tables generated from complicated equations. The app meets requests from the increasingly digital battlefield for paperless guidance that is simple, accurate, mission-specific and available in real time."

Called the **Soldier Water Estimation Tool, or SWET**, this Android-based smartphone app is a decision aid that translates a complicated biophysical and physiological sweat prediction model into simple user inputs regarding the anticipated intensity of activity (low, medium, high, including example activities), three category choices of military clothing ensemble and weather conditions (air temperature, relative humidity and cloud cover).

The SWET app has user-friendly inputs and provides the user with the amount of water required for the specified conditions in liters per hour. A separate "Mission Calculator" tab further simplifies planning by providing total amounts of water required for a given unit (number of people) for a given mission duration (total time, in hours). Total water amounts are provided in liters, one-quart canteens, two-quart canteens and gallons.

Charkoudian said this app was designed for unit leaders to determine group water needs. The average amount of water needed per person does not reflect individual differences, but the model error for individuals is estimated to be small. Soldiers should expect to see this app within the year on the Army's Nett Warrior platform.

"This will be one of the first apps rolled out in the Nett Warrior platform," Charkoudian said. "I am so excited to be doing stuff that is directly helping Soldiers in the field. I think that's just so cool."

In the meantime, Charkoudian said that the app has already undergone limited user testing with the Army Mountain Warfare School in Jericho, Vermont, where Soldiers gave very positive feedback. She is looking forward to more feedback once the app goes live, to make updates and possibly explore its uses in the commercial world.

"There is the potential here for future versions of SWET for sports and sports drink companies, for team sports, as well as for humanitarian and disaster-relief organizations," Charkoudian said. "People want apps; that's what they are excited about. It's something everyone can relate to."

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