



REDEFINING MISSION READINESS

A closer look at an Army Alaska soldier's cold weather isolation training paints a more complete picture of factors impacting recovery and preparedness.

Commanders know that mission readiness can make the difference between life and death on the battlefield. And in serving their country, they have a duty to be acutely attuned to the physical and mental health of their soldiers. Phil Ranck, Army Alaska's Chief Warrant Officer, paints a powerful summary of this great responsibility: "When we look at our commanders and try to understand what they have to do on a daily basis, they really have two root primary functions: identify risk and mitigate it as much as possible, and understand the return on investment for the decisions that they make."¹

But all too often, commanders are relying on an incomplete picture to make decisions, emphasizing physical exertion and underestimating the toll that training in harsh environments takes on a soldier's health, wellbeing, and - ultimately - tactical readiness. One female soldier's journey in completing the Denali Isolation Course demonstrates how stress and

recovery impact the performance of those who serve - highlighting, in this case, that four days in cold weather isolation at altitude reduced sleep quality and recovery, exposing this soldier to a heightened risk of injury and illness in the weeks that followed her mission.

This soldier's journey is not unique: in the U.S. Military, soldiers regularly engage in training and combat missions where they take on high stress in extreme conditions. The lesson to military leaders is not necessarily to modify the intensity of the missions, but rather to fully understand the impact of psychological and physical demands, applying lessons learned under realistic training simulations to make more informed decisions that optimize their troops' health and performance - ensuring combat readiness for real-world missions.

TESTING THE LIMITS OF PERFORMANCE IN COLD WEATHER ISOLATION

As a part of her tactical readiness, Amy,* a female soldier stationed in Anchorage, Alaska, embarked on a cold weather isolation course in the Denali Mountain Range. The course was rigid, the temperatures were subarctic, and the conditions were unbearable. In the month of January, when Amy completed the course, the temperature typically reaches a high of 5 degrees fahrenheit and a low of negative 13 degrees fahrenheit. But it is not uncommon to see sub 20 degree temperatures. Furthermore, Anchorage, home of the 425th Airborne Army unit, sits at an elevation of 106 feet above sea level, compared to Denali at 20,000 feet. Acclimating to this higher altitude, oxygen levels decrease, so individuals often need to take more breaths to get the same amount of oxygen. These were far from typical conditions for Amy.

Unsurprisingly, operating under these harsh conditions heightens a soldier's stress response. In such an extreme environment, individuals often experience distress, or "negative" stress - which taxes their body and mind and can impair functioning - rather than eustress², which is "positive, helpful, and motivating." And cold stress - the sustained decrease in internal body temperature that Amy experienced on the Denali course - has a significant impact on the motor and cardiovascular system. As low temperatures restrict blood flow and oxygen to the heart, the heart must pump harder to circulate blood, causing elevated blood pressure and heart rate. Muscle tension and shivering are the physical manifestation of this hard work, and these behaviors are correlated with impaired motor function and changes to respiratory rate.

Wearing WHOOP on the Denali course enabled Amy and her command to view her stress, adaptation, and recovery in an entirely new light. With its non-invasive design, 24/7 wearability on the wrist or arm, and the ability to disable bluetooth, GPS, and wifi for high security and remote environments, WHOOP tracked Amy's critical metrics around sleep, strain, and recovery without distracting her from the mission at hand. On the isolation course, Amy was stripped of technology, connectivity, and wifi. Upon her return, she was able to view a holistic picture of how her body coped with the conditions and demands her body endured.

Amy's WHOOP data shows the effect of her rigorous training environment. As her body worked harder, her resting heart rate (RHR) increased from a baseline of 48 bpm to 54 bpm during the arctic course.

But RHR data was just scratching the surface in understanding Amy's fitness and readiness. Analyzing heart rate variability (HRV) and sleep quality told a much richer story about the true stress and impact of the training course.

HRV is a critical metric to gauge readiness: higher variability indicates that the body is more prepared to execute at a high level. Due to the stress in her environment, as Amy's time in isolation increased, her HRV decreased. Amy's HRV declined 15% after 3 days of the course, hinting at a stress response accumulation. This increased stress adversely impacts sleep quality by inhibiting the body's ability to reach slow wave sleep (SWS) - also known as deep sleep - and REM, which provide the body and brain with the most restorative benefits, allowing for physical and mental recovery.

One of the most telling results in Amy's data was seeing that the course drastically reduced her ability to sustain quality sleep. While total hours of sleep bounced back somewhat readily, even after 2 weeks following the completion of the course, her SWS and REM were still dramatically reduced as compared to baseline measures.

IMPACT OF ISOLATION COURSE

AMY'S DATA CHANGES FROM BASELINE



RHR

Increase from
48 bpm to 54 bpm



HRV

Decrease of **15%**
in **3 days**

TOTAL RESTORATIVE SLEEP DURING AND FOLLOWING THE COURSE WERE LESS THAN 60% OF BASELINE.

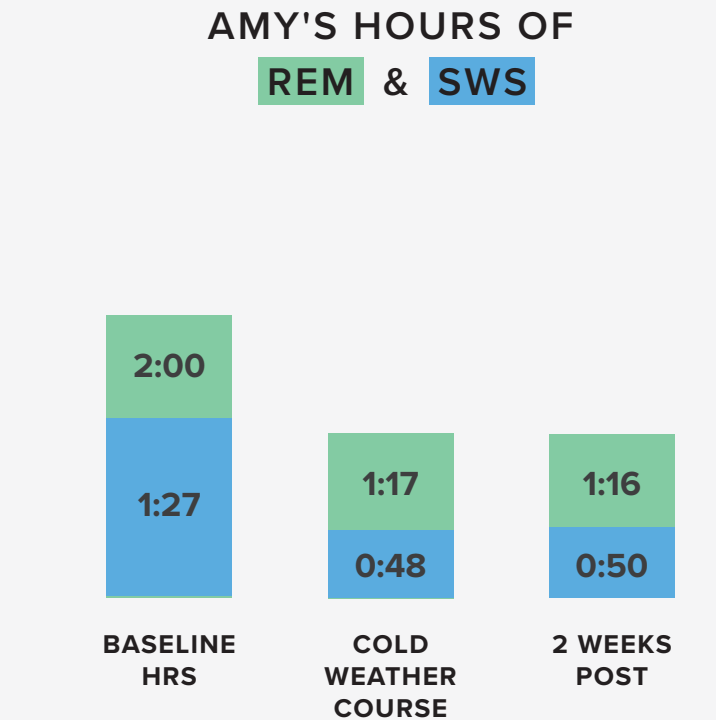
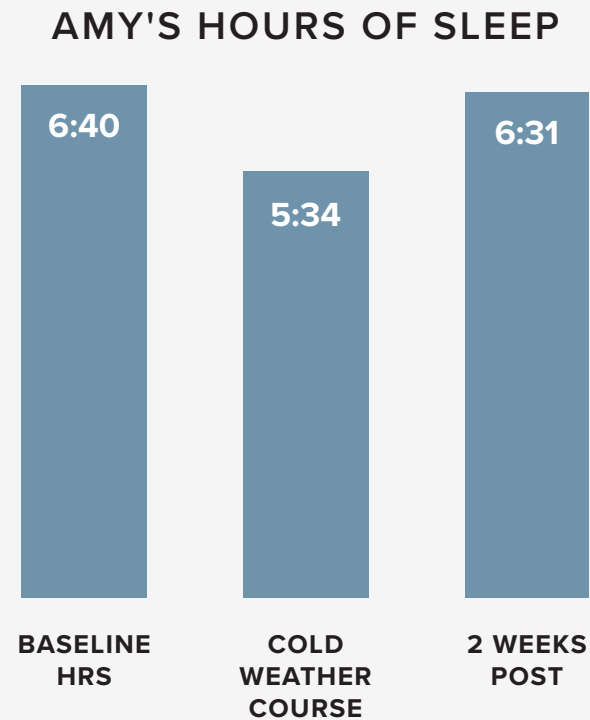
The punchline? Amy was not primed to take on high levels of stress and physical exertion even 2 weeks following her mission and was at higher risk of illness and injury due to the vast decline in the quality of her restorative sleep and recovery.

Pushing an individual’s physical and mental limits in tactical courses, paired with an adequate time to recover and return to baseline health measures, creates better leaders, soldiers, and NCOs who are more adaptable to and ready for increased stress. Equipping soldiers and commanders with this data and education on performance will pay dividends in improving the physical and mental health and tactical readiness for individuals and troops on the front lines.

In the words of Phil Ranck, **“WHEN OUR SOLDIERS ARE OUT THERE AND WE’RE DOING THINGS, WE HAVE A TENDENCY TO MASK CAPABILITY WITH WILLPOWER AND DETERMINATION. THAT IS THE SOLDIER WAY. WE WILL ATTEMPT TO POWER THROUGH AS BEST WE CAN AT PERSONAL RISK TO OUR OWN HEALTH AND WE DON’T REALLY UNDERSTAND WHY BECAUSE WE DON’T RECEIVE EDUCATION LIKE THIS ON A DAILY BASIS.**

SO COMMANDERS, IF YOU LOOK AT IT, ARE USING DIRTY DATA TO MAKE THE DECISIONS, NOT BECAUSE THEY WANT TO BUT BECAUSE THEY DON’T HAVE THE RIGHT INFORMATION AT HAND. WHOOP [IS] HELPING US SEE THINGS IN A DIFFERENT LIGHT AND UNDERSTAND RISK MITIGATION.”³

Understanding the toll of critical but taxing missions like Amy’s is a wake up call to military leaders around the world - prompting them to take a data-driven, holistic view of their soldiers’ stress and recovery to facilitate greater performance on and off the battlefield.



1 Quote from Phil Ranck, WHOOP podcast #112, <https://www.whoop.com/thelocker/podcast-112-us-army-study-alaska-hrv/>
2 "Positive & Negative Types of Stress" <https://www.choosingtherapy.com/eustress-vs-distress/>
3 Quote from Phil Ranck, WHOOP podcast #112, <https://www.whoop.com/thelocker/podcast-112-us-army-study-alaska-hrv/>
* Name has been changed to protect the identity of the active duty service member