Patient Hold Goes Cold

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Warfighting in the Arctic poses several logistical challenges that force medical personnel to consider different modalities of medical treatment. Taking part in extreme cold weather training events creates significant environmental challenges and provides valuable learning opportunities that will help shape the future of Army nursing care in the Arctic.

One such major exercise, Arctic Warrior 21, involved more than 1,300 Soldiers and incorporated airborne operations, situational training exercises, and live-fire exercises in the Donnelly Training Area near Delta Junction, AK. The two-week cold weather training event kicked off with a joint forcible entry operation (JFEO) when more than 100 paratroopers from what was then the 4th Infantry Brigade Combat Team (Airborne), 25th Infantry Division safely jumped from C-17 and C-130 aircraft. Ambient temperatures during the exercise ranged from -11 to -40 degrees Fahrenheit, with wind chill temperatures dropping below -64. This training exercise posed a significant environmental challenge and provided a multitude of lessons learned that will ultimately enhance medical capabilities in the Arctic climate.

During the JFEO, the 3rd Battalion, 509th Parachute Infantry Regiment established Role I immediately near the drop zone, while the 725th Brigade Support Battalion provided Role II support, including patient hold services, seven miles from the airfield. A supporting element from 1st Stryker Brigade Combat Team (SBCT), 25th Infantry Division established Role I in buildings with access to running water and stable heat.

The first medical care a Soldier receives is provided at Role I, also referred to as unit-level medical care. This role of care includes immediate lifesaving measures and treatment provided by designated combat medics or treatment squads. Major emphasis is placed on those measures necessary for the patients to return to duty or to stabilize them and allow for their evacuation to the next level of care. These measures include maintaining the airway, stopping bleeding, preventing shock, protecting wounds, immobilizing fractures, and performing other emergency measures as indicated.

The Role II military treatment facility (MTF) provides a greater capability to resuscitate trauma patients than what is available at Role 1. Those patients who can return to duty within 72 hours are held for treatment. Role II care provides medical evacuation (MEDEVAC) from Role 1 MTFs and provides Role 1 medical treatment on an area-support basis for units without organic Role 1 resources. The Role 2 MTF has the capability to provide packed red

Medics with 3rd Battalion, 509th Parachute Infantry Regiment check the vitals of a patient during Arctic Warrior 21 at Donnelly Training Area, AK, on 12 February 2021. (Photo by SSG Alex Skripnichuk)

blood cells (liquid), limited x-ray, clinical laboratory, operational dental support, combat and operational stress control, operational public health, patient hold services, and when augmented, physical therapy and optometry services.

In preparation for the JFEO, the Role II utilized Light Medium Tactical Vehicles to ground transport medical equipment sets in issued hard cases. The convoy to the drop zone area lasted nearly 24 hours, and prolonged exposure to arctic temperatures led to freezing of liquid medications and intravenous fluids. The command surgeon mandated lactated Ringer's solutions be disposed after freezing but authorized the use of thawed normal saline, if used with a fluid warmer. Several medications lacked specific data if safe for human use after freezing, proving it is crucial to prevent freezing during transport by keeping them in a temperature-controlled vehicle.

In snow-packed areas, deployment of tent structures also proved challenging, taking more than four hours to set up. Commanders mandated use of gloves to decrease risk of contact frostbite, but this limited hand dexterity. Once heated, the snow beneath the tent floor melted into an ice sheet, creating a slick environment when transporting notional casualties. Soldiers and medics donned ice cleats and springs to prevent falls, but those could increase premature tent floor damage.

Standard-issue tent heaters were insufficient in effectively heating medical or trauma patients, even with on-site commercial technician troubleshooting. At sub-zero temperatures, the tents never exceeded 51 degrees. Generators often failed daily, which further dropped average temperatures inside the Role II. Leaders tested industrial heaters to augment, but we could not safely utilize them without effective ventilation.

Our Role II's standard equipment package only included Hypothermia Management and Prevention Kits and wool blankets. However, simulated patients remained uncomfortably cold with these measures so we recommended the use of their personal sleep systems. In later field training exercises, we ordered and tested Bair Huggers, which improved patient comfort.

Regarding frostbite, our unit provided water buffalo heaters that maintained water in a warmed liquid state. However, in cases of chilblains or superficial frostbite, we had no device that would effectively circulate water between 102 and 108 degrees F. Our Role II providers later discovered commercial sous vide cooking devices in emesis basins could maintain this temperature without excess water waste.

In summary, effective medical care and patient hold within standard-issue Role II sets proved incredibly challenging in sub-zero temperatures. Warfighting in the Arctic environment poses several logistical challenges and forced us to consider different modalities of medical treatment. With the potential for large-scale combat operations, the Arctic poses a unique threat where both air and ground evacuation may be unavailable, which may prolong patient hold times. Ultimately, the Arctic Warrior 21 exercise provided valuable learning opportunities that will help shape the future of Army nursing care in the Arctic. Through equipment enhancements and modified table of organization and equipment changes to accommodate Arctic specific needs, Army Medicine will be better prepared for an Arctic conflict.

Author's Note: *The former Arctic Warrior exercise is now the Joint Pacific Multinational Readiness Center-Alaska (JPMRC-AK), a regional Combat Training Center (CTC) rotation enabled by JPMRC and the Joint Readiness Training Center. Rotation 23-02 will advance the readiness of Arctic-capable forces for future employment within the U.S. Army Pacific Command area of responsibility and beyond. It will also advances the objectives of the U.S. Army Arctic Strategy.*

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