

the course. At the end of course, reviews from the participants were discussed.

**Discussion:** The participants suggested that the course should be repeated every six months. It was decided that there should be more time for the practical portion of the course. It was determined that the course would be integrated into the Afghan health system.

**Conclusion:** Post-graduate courses are important components of the modern health care system. In many developed countries, these courses have become compulsory and are conducted regularly. However, standardized and regularly performed courses should be supported in developing countries.

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### (P1-69) Joint Military and NGO Vaccination Campaign in Remote Areas in Haiti

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**Introduction:** The January 12 2010 7.0-magnitude earthquake's epicenter hit just 10 miles west of Port-au-Prince and its 2 million inhabitants at 4:53 pm.

**Problem:** Although assistance arrived to major ports and cities from all corners of the globe, access from rural and remote areas to centralized hospitals remained difficult. Many of the injured were without access to transportation even a month after the earthquake. Earthquake victims in remote areas have less access to wound care and running water, and therefore more prone to infection and tetanus.

**Response:** Our group was comprised of a civilian mobile medical team able to negotiate difficult terrain by foot with vehicle support provided by the 82nd Airborne military. The military support supplied vehicles and experience needed to tackle the difficult terrain. Because the vaccines are temperature sensitive, delivery of them to remote areas with long travel times in hot climates is logistically difficult and requires coordination. In order to assure vaccines would not be wasted, they were picked up from the WHO the morning of deployment and stored in coolers without direct contact with ice. An advance team would arrive to the target site first to coordinate with local community leaders and gather patients with tetanus prone wounds in a central area. A second team would transport the amount of vaccine needed as estimated by the advance team.

**Result:** Our group vaccinated approximately 300 people without access to the centralized hospitals per day using this system, with no vials of vaccine wasted or spoiled.

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### (P1-70) Enduring Impacts of Explosive Remnants of War

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More than 175 million landmines have been deployed since the end of World War II, including > 65 million since 1980. They differ from other weapons by remaining active in the ground long after hostilities have ended. They lie in fields and

woodlands, alongside roads and footpaths, and in villages, creating a humanitarian problem with social, economic, and environmental dimensions. In addition to the threat from landmines, many areas of former conflict are contaminated by sub-munitions, unexploded ordnance, discarded weapons, improvised explosive devices (IEDs) and other hazardous debris of war. The victims of landmines and unexploded ordnance inevitably are the poorest and most vulnerable members of societies. It is the subsistence farmer, nomads and their herds, and fleeing refugees who are most affected. Economic necessity forces people to enter known mined areas in search of food and water, to graze livestock, or to gather thatch for their homes. Because landmines are designed to maim, their victims often require extensive treatment for long periods of time. The first aid administered to victims often is rudimentary; in some cases, inappropriately applied tourniquets result in amputations that otherwise might not have been necessary. Much has been achieved since the international community first was made aware of the threat from landmines in countries emerging from conflict in the 1990s. Over the past 20 years, the work of a few non-governmental organizations (NGOs) operating independently in Afghanistan, Angola, and Cambodia has developed into an international program involving the United Nations, the national authorities of 78 mine-affected countries, donor governments, and < 100 NGOs and demining companies. However, more must be done to develop sustainable national capacities. It is particularly necessary for the international community to assist national authorities develop effective and affordable local medical and rehabilitation capabilities.

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### (P1-71) Can a Thick Snow Layer be Protective in Mine Injuries: Case Report

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Despite their low mortality rate, mine injuries have high rate of morbidity. Depending on the severity, different levels of amputation may be required for the affected extremities. A mine injury composed of an atypical condition because of thick layer of snow is described in this presentation. A 21-year-old man was taken to the emergency department because of a mine injury. He had severe pain on his right heel. He was injured in an explosion in a rural state that had 50–60 cm of snow on the ground. Vascular access was provided and cast immobilization was applied to the right foot. The patient then was carried by ambulance helicopter. Vital signs were normal. Right ankle movements were limited and painful, and there were minimal edema and hematoma on both sides of the patient's heel in physical examination. Neither motor sensorial nor vascular deficit was determined. Comminuted calcaneus fractures were observed in x-ray and in the computerized tomography. A short leg circular cast was applied during follow-up. The cast was taken off at the end of the second month, and rehabilitation began. The follow-up was complete at the end of the sixth month with complete recovery. Mine injuries are special military injuries the sometimes affect civilians. In these injuries, lower extremities often are affected and amputation may be

required. This case is similar to high-falling calcaneus fractures. This may have occurred as a result of an upwards blast impact that may have been weakened because of the thickness the layer of snow. Thick layers of snow may help protect civilians from mine injuries. This potential protective affect may be useful for researchers aiming to decrease mine injuries.

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### (P1-72) Advanced Surgical Cooling Garment to Combat Heat Stress in CBW Ppe and Hot Surgical Environments J. Mcisaac

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**Introduction:** Heat stress is an occupational hazard for all personnel requiring Personal Protective Equipment (PPE). Even “breathable PPE” increases measurable heat stress in active troops and surgical personnel. A novel negative-pressure, semi-permeable surgical cooling vests for use in the operating theater was jointly developed by Mountain Laurel Biomedical, Hamilton Sundstrand, and Hartford Hospital.

**Materials and Methods:** Surgical personnel alternated between wearing cooling garment vs no cooling under their surgical gowns (PPE) during surgical procedures lasting up to several hours. Tympanic temperatures were monitored for safety. A questionnaire was completed after the conclusion of surgery to assess perception of comfort. Trials began at ~18 deg C, but ambient temperature was increased to 24 deg C (40–50% RH) for the third series of trials. Results: The study was terminated prematurely. After wearing the cooling vest, surgeons refused to complete additional control trials due to the heat. They demanded to use the cooling device for all surgery, even outside the protocol! Vest wearers remained dry and reported a statistically significant ( $p < 0.0001$ ) greater level of comfort compared to control subjects. The weight, fit, and mobility restriction of the vest was not clinically significant.

**Conclusion:** Active cooling and drying using a negative pressure cooling vest improves subjective thermal comfort with minimal perceived impact on mobility during surgical procedures. This technology may have utility in other fields that utilize PPE. The Chemical Biological Warfare (CBW) ensemble, in particular, is a promising candidate. Heat stress from PPE ensemble even if “breathable” –Cooling at ~100 watts with 18 deg C water –Semipermeable membrane allows condensation removal. Wearer stays cool and dry. –Negative pressure prevents coolant loss if punctured –Minimal perceived restriction of shoulder, neck, and waist range of motion – Light weight ~1.5 lbs. (0.68 kg) – Quick disconnects allow options for cooling source.

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### (P1-73) Medical CBRN Training for Military Health Staff and Its Benefits

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**Objective:** The increasing threat of the use of chemical, biological, radiological, and nuclear (CBRN) agents requires significant

military medical preparedness and response, including training. The initiatives for CBRN training by Gulhane Military Medical Academy, which is under the Health Command of the Turkish Armed Forces, will be discussed, and the training program and educational model for medical CBRN defense will be highlighted.

**Method:** The training is given to military hospital staff once or twice a year. Hospital staff is trained over a period of five days, with practical issues regarding medical CBRN defense covered during the last two days. A questionnaire is given to trainees at the beginning and at the end to ascertain the adequacy of the course.

**Results:** So far, this medical CBRN training has been given to 150 military health staff including physicians, nurses, and medical non-commissioned officers. According to the survey, they benefited greatly from this training, and there was a statistically significant increase in CBRN knowledge when the initial and final scores of the survey were compared ( $\chi^2 = 3.089$ ;  $p = 0.002$ ).

**Conclusion:** Through this planned trainings, staff are trying to become well-trained in detection, personal protection, decontamination, and the organization aspects of CBRN defense to apply the proper prophylactic measures, diagnosis, and treatment. Feedback suggests this program also helped “train the trainers”, providing extensive information to other staff working in military hospitals.

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### (P1-74) Introduction of the Portable Decontamination Unit of Gulhane Military Medical Academy

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**Introduction:** Chemical, biological, radiological and nuclear (CBRN) cases are seen as an increasing risk because of the increasing threat of international terrorism. Decontamination is one of the basic components of the intervention for CBRN exposure. The introduction portable decontamination unit in the hospital setting is described in this presentation.

**Method:** The general properties, facilities, and capabilities of the portable decontamination unit, which is present in the GATA CBRN Department of the Turkish Armed Force’s Health Command, were evaluated.

**Results:** The portable decontamination unit in the hospital has a metal frame that is 54 m<sup>2</sup> wide. It is composed of two tents that weigh about 300 kg. The metal frame, metal legs, and tent cloth are stored in carrying bags. Four people can construct the tents in 10 minutes. An educated squad of four people can prepare the decontamination system and instructions in 25–30 minutes. The unit consists of two lines: one for outpatients and another for inpatient decontamination, which includes a rail system. Each decontamination line contains an undressing, shower, and dressing section.