ICAR MEDCOM MRA Report

Dr. Alison Sheets and Dr. Christopher Van Tilburg

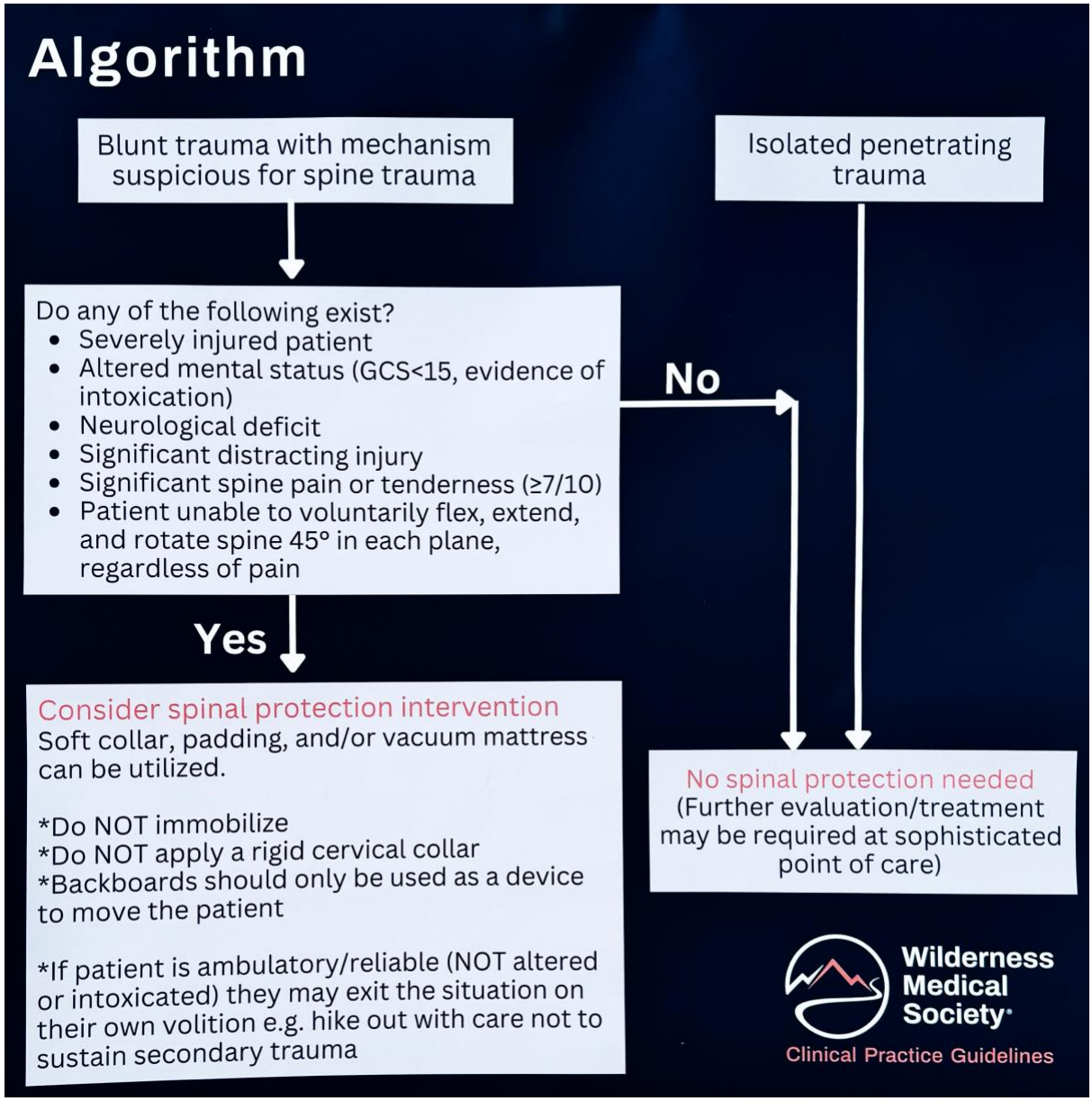
November 2025

Dr. Sheets and Dr. Van Tilburg represented the MRA at the International Commission for Alpine Rescue Congress at Jackson, Wyoming, October 8-1, 2025. About 650 Mountain Rescuers from all over the world, attended. Wednesday was the practical day at Jackson Hole Mountain Resort held high on the slopes on a gorgeous fall day. Thursday and Friday were work sessions for the four commissions- mountain emergency medicine (MEDCOM), avalanche (AVCOM), terrestrial (TERCOM) and aviation (AIRCOM). The Dog Handlers sub-commission also met. Saturday morning began with plenary sessions, with mainly human factors discussed, followed by the Assembly of Delegates. Vendors included companies with uniforms/clothing, avalanche, high angle, industrial, and medical equipment as well as other technology. Friday evening was "heritage night" which had a small rodeo and first nations ceremony. Saturday evening was the "Gala Banquet" which was held at the top of the gondola at Snow King ski resort under a stormy snow-filled sky.

Practical Day- The MEDCOM put on a day of workshops beginning with a tabletop session on "Rescue at Very High Altitude". Dr. Jenn Dow, Medical Director for Denali National Park (among other leadership positions) and Chrissie Oken, Denali National Park climbing ranger did an excellent job with challenging the audience to address a "typical" rescue near the summit of Denali. Small groups with widely different backgrounds came together to solve the complex problems in this type of rescue. Dr. Dow and Ms. Oken prepared large photographs of the terrain, explained the regulations and nuances of working with the National Park Service in Alaska, and, critically, they brought many years of experience in the terrain to the conversation. We heard incredibly positive feedback about this session throughout the remainder of the conference.

The afternoon had three consecutive workshops on the "A,B,C,D's - Best practices, new techniques and technologies**"** of mountain emergency medicine. The goal of these workshops was to review the basics of patient care and showcase the techniques and equipment appropriate for austere environments. The first, Airway and Breathing, was presented by Dr. Natalie Hotzle, Germany, and Dr. Naomi Dodds

(Scotland). They had a great variety of airway adjuncts, techniques, and pro-tips and the mannequins to try them out on. The second, Circulation, was a joint presentation with Dr. Drew Harrel, University of New Mexico, and Dr. Volker Litchke, German Red Cross. Dr. Harrel ran everyone through an entertaining review of the MARCH (anachronism for Massive Hemorrhage, Airway, Respirations, Circulation and Hypothermia/Head Injury) algorithm, shock, CPR, intravenous and intraosseous access, blood product in the field, tranexamic acid, and tourniquets among other aspects of critical care. The third and final workshop was Disability, with Dr. Seth Hawkins, Wilderness Medical Society, and Jason Williams EMT-P, University of New Mexico, discussing the updated Wilderness Medical Society Clinical Practice Guidelines on Spinal Cord Protection. Although this change in pre-hospital practice has been going on for some time, many agencies both in the USA and elsewhere, still think in terms of "spinal immobilization" instead of "spinal motion restriction". See below and visit https://journals.sagepub.com/doi/10.1177/10806032241227232 for full article.



A medically related presentation by the Avalanche commission was “Intermittent CPR”. Participants used one of three litters to practice patient packaging, then intermittent CPR, while trying to move the patient in the litter. Litter systems included two-handled toboggan (akja), vinyl rollup litter with vacuum mattress, and improvised litters with rope, sleeping pad, and a tarp. Some key lessons: It's difficult to start CPR with the patient lying in the position they are found. A patient needs to be rolled onto their back and moved to flat ground. Attempts at CPR in flexible or improvised litters are much more difficult than in rigid litter. Intermittent CPR is currently indicated for hypothermic cardiac arrest. It is unknown whether it is helpful, or indicated, for other types of cardiac arrest. The current literature suggests continuous 20 to 30 minutes of CPR prior to any transport. Then stop CPR while moving for 5-10 minutes. Then resume CPR 5-10 minutes, transport, repeat as able.

Working conference sessions- In this report we will focus on the most relevant information for the Mountain Rescue Association and it’s members. Much of the MEDCOM work is under development and these presentations will not be included. Final recommendations, published research, case reports and other interesting works are as follows.

Thursday October 9th- Occupational Medical Examinations of Mountain Rescue Team Members, Dr. Volker Lischke, German Red Cross. Dr. Lischke presented the results of an internal ICAR survey about Medical screening or examination for fitness to SAR work. Of the 141 ICAR organizations querried, 54 (38.3%) responded. Of the responding agencies 66% were volunteers and most non-governement. Sixty-one percent had no medical exam requirement to become a rescuer, 39% do require an exam with most of those also requiring ongoing medical exams depending on scope of work. Air rescue agencies were the most likely to require on-going fitness evaluations.

Interestingly, this study was looking at ways to reduce illness and injury in rescue workers. While falls and trauma are the most common mishaps for rescuers, cardiac health seemed to be the aim of pre-screening medical exams. Not all injuries or illnesses can be avoided by medical screening, maybe none. Nevertheless, Dr. Lischke recommends medical exams for alpine rescues. While logistically difficult depending on your jurisdiction and medicolegal climate, Dr. Lischke feels it should be driven by the SAR organizations and their medical leadership before external agencies become involved.

Case report - respiratory infection potentially increasing the risk of high-altitude pulmonary edema (HAPE) and high-altitude cerebral edema (HACE). Dr. Jon Fleming and Dr. Aaron Reilly, UNM-IMMC, USA, presented the case of a 19 year old male who was healthy and had no previous altitude experience. He was part of a study of 78 soldiers taken to 3600 meters to see if active ascent to altitude makes a difference for the development of acute mountain sickness (AMS). The subject was part of the active group and developed acute mountain sickness and hypoxia the first night at altitude. The next night he deteriorated with hypoxemia to 55%, heartrate 132 bpm, dyspnea, nausea, fever to 38.3 C, headache and ataxia. He was taken to a hospital at lower elevation and tested positive for parainfluenza virus and was admitted overnight. Although the relationship with upper respiratory infections and susceptibility to altitude illnesses has been noted in prior studies, the pathophysiology is not well understood. Inflammatory changes in the lung are believed to cause a subtle hypoxia that may increase susceptibility to viral pathogens. Alternatively, inflammation may be from increased oxygen use from the exertion, or the mobilization of blood from a splenic response to exercise. One key conclusion: it’s best to avoid exertion at altitude if you are sick. Case reports are interesting and generate hypotheses but rarely provide answers for complex clinical questions.

Effects of harness attachment point on pulmonary function- Dr. Roger Mortimer, National Cave Rescue Council, USA and Dr. Sarah Davis, USA. They performed a randomized cross over study using a CMC

Atom Global full body harness attachment in 4 configurations: ventral, sternal, combined, dorsal. The checked pulmonary functions in the 4 configurations and compared it to the subjects' baseline (no harness or suspension). They found no difference between attachment points. All pulmonary functions tested decreased compared to baseline, although none were clinically significant.

Drone-delivery of an Automated External Defibrillator in Mountainous Areas Dr. Giacomo Strapazzon CNSAS, EURAC Research, Italy. Dr. Strapazzon discussed case reports on drone delivery of medical equipment, including an AED. This technology exists and is functional. Drones are limited by weather, payload and other parameters. But in a test against a snowmobile, the drone was able to deliver an AED much faster going up a mountain. The drone used for this study can operate for 30 minutes, carries a payload of 12 pounds, and has a range of about 3 miles from the operator.

Development Session: Very High-Altitude Rescue, Medical management of casualty- Steve Roy, ISMM. What UNIQUE considerations occur during rescue at VHA- altitude, temperature, UV effects? What are the medical problems specific to altitude? How does altitude effect the evaluation, treatment, decision making, and/or equipment used when confronted with a patient in these environments?

The MEDCOM has been working on a large project concerning mountain rescue at very high altitudes. They present pharmacologic prophylaxis when going quickly to altitude as well as when to use supplemental oxygen among other things. Recently published ICAR specific recommendations are here:

https://www.alpine-rescue.org/system/production/article/documents/file/005/262/ccbc3cb01b3ea836ba2df17deccb55d3d8b4ac606955db0299bf568dd50a97ef/2025%20ICAR%20recommendation%20Pharmacological%20Prophylax.pdf?1761586517

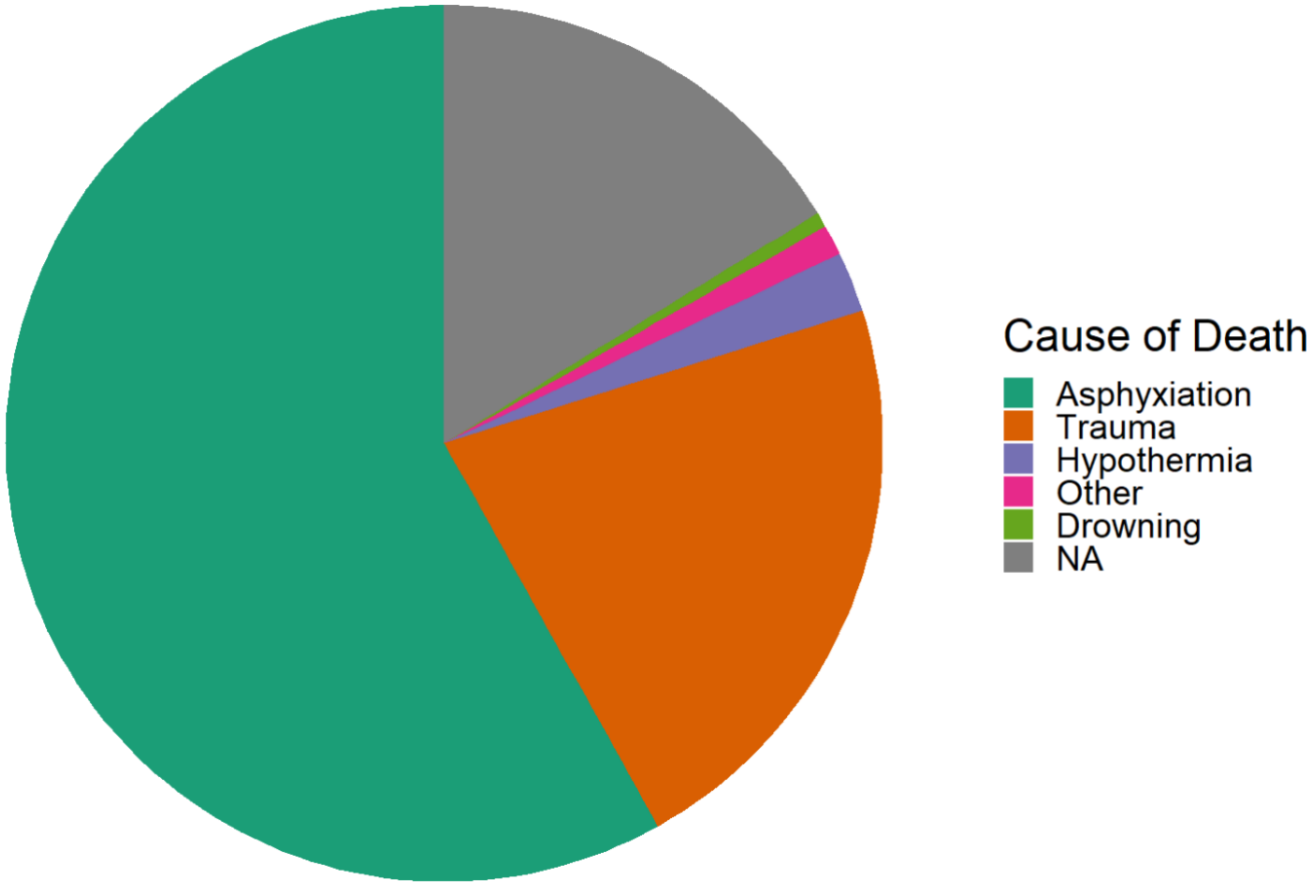
The peer reviewed paper here: https://www.liebertpub.com/doi/pdf/10.1177/15578682251365931

And the Helicopter Rescue at VHA, which has a recommended survival kit for crew and pilots, among other things, can be found here: https://www.liebertpub.com/doi/10.1177/15578682251375408

Friday October 10th

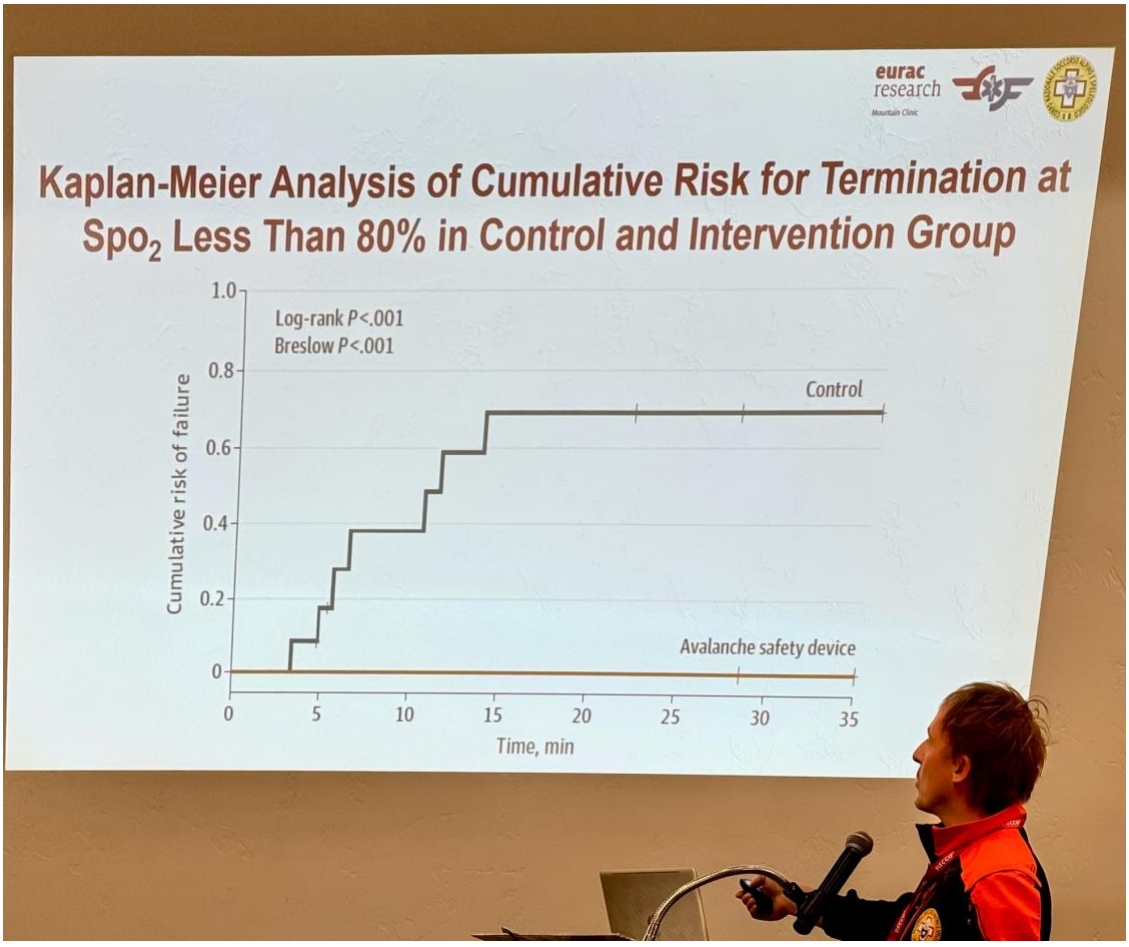
A review of airway management in helicopter EMS (HEMS) hoist and short-haul operations- Dr. Scott McIntosh, University of Utah, WBR, Dr. AJ Wheeler, TCSAR, USA. Supraglottic (I gel) airways are most common HEMS airway adjunct used with endotracheal tubes rare. Overall, there are few intubations in pre-helicopter human external cargo (short haul or hoist). A study evaluating Manual vs Automated ventilation with iGel during short haul helicopter operations, was presented by Wade Quilter MS2. Airway mannequins were used in actual helicopter iterations. Not unexpectedly, manual use of a bag valve mask, when compared to an automated ventilator, showed more movement of the iGel and poorer performance in multiple metrics: minute ventilation, ease of use, physical difficulty, etc. When intubation is performed in preparation for HEMS HEC operations, automated ventilators, of which several small, litter compatible models exist, should be used.

Cause of Death in Colorado Avalanche Fatalities, Dr. Alison Sheets, MRA, CAIC, USA. Dr. Sheets presented an update on previous work published in 2018 in Wilderness and Environmental Medicine. Asphyxia remains the leading cause of death (in all studies) at 58%, trauma 22%, hypothermia 2%, drowning/other 1.6% and undetermined in 16%. Mode of travel, aspect, elevation are not determinants of cause of death. Coroners' determinations of cause are generally correct but some education to this group is recommended and was performed by Colorado Avalanche Information Center in fall of 2025.



Avalanche Fatalities- Colorado 1995-2025

Efficacy and Pathophysiological Implications of a New Asphyxiation Delaying Device – SAFEBACK, Dr.Giacomo Strapazzon, CNSAS/EURAC, Italy. Dr. Strapazzon presented data on the novel air supplier made by Safeback. The device has a fan located at the top of a backpack and mouthpiece similar to an air diverter (aka artificial airway device or Avalung). When activated in an avalanche, it supplies fresh air to the subject through the chest strap. By dilution of the CO2 with fresher air from the snowpack behind the subject the hope is longer survival in critical burials. The data suggests that the device works to prevent asphyxia in a simulated avalanche. The research was typical of EURAC's excellent work and was recently published in JAMA. The device website is Safeback | Avalanche Survival Gear.



SAFEBACK study

Saturday Plenary sessions-

Ultra Trail du Haut-Fiffre turns into nightmare, Dr. Sonia Popoff/ENSM and Col. Bertrand Host/PGHM. They described an ultramarathon race in which one runner died and several more needed air or ground evacuation due to predicted storm. The lesson: race organizers being empowered to cancel or delay a race in bad weather.

Risk Management Responsibility to Halt the Rescue Operations. Gregor Dolinar / GRZS. This described several missions in Slovenia in dangerous conditions and remote areas including a climber who fell over 100meters into a vertical cave in the snow. Discussed rescuers and incident command's need to delay or temporarily hold rescue. Key lesson: slow down during missions to prevent errors.

The Good, Bad & Ugly of Rescue Team Cultures. Dave Weber EMT-P; Mountain Rescue Collective (USA) This talk discussed team culture. The main lessons include 1. Take ownership of problems you have with

your team or team members. 2. Check your ego. 3. Keep rescue systems and procedures simple. 4. Stay focused. 5. Empower your team.

Competition vs. Collaboration: Shaping Safer Cultures in Alpine Rescue. Janna Allen, Dana Kent. Solitude Ski Patrol (USA). This talk discussed women in mountain rescue, especially focusing on challenges in this male dominated field. One key recommendation was to focus on collaboration and strengths, instead of a culture of competition among team members.

Efficiency Saves Lives: Unifying Norwegian SAR with a Common Digital Platform. Norway has a multi-disciplinary SAR system, and they found that the prior mapping apps (like CalTopo) did not serve the needs of SAR, police, fire and other agencies. So, they created their own cell-phone GPS-enabled mapping app.

How Many Funerals Does It Take? Terry Miyauchi; Arizona Dept. of Public Safety (ret.), Bell Helicopters (USA). This talk, from a former public safety officer, discussed several cases of helicopter fatalities. The underlying message was, 1. Lose your ego. 2. Promote excellence. 3. Recognize bad days. 4. Manage up or out (keep your team members making progress and don't be afraid of getting rid of people who are no longer productive to the team). Additionally, he felt that if you see something, say something, and regretted the times he did not say anything related to the fatalities reviewed.

Near Miss: How Unifying Operational Language Accelerates Cultural Cohesion and Reduces Risk. Laura McGladrey NP; University of Colorado, Stress Trauma Adversity, Research and Treatment Center (USA) and Clayton Horney CW3; Colorado Army National Guard (USA). These two presenters discussed stress reactions among rescuers including an overview of the stress continuum and the 3-3-3 system (check in in 3 days, 3 weeks, and 3 months). Mr. Horney implemented the system for the CoANG.

Teton County SAR