Selected Abstracts from the Wilderness Medical Society's 2015 Summer Scientific Conference

Reliance on Technology Among Climbers on Mount Rainier

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Objective.—Thousands of people set out daily to climb the world's highest mountains in hopes of summiting. Although many 3000-m summits are accessible in favorable weather, conditions may turn calamitous quickly, requiring practiced navigation or rescue. Owing to the portability and low cost of many technological devices, many climbers have eschewed map and compass navigation. We sought to evaluate climbers' reliance on technologic devices, as well as their effectiveness and reliability for rescue.

Methods.—This survey study evaluated a convenience sample of climbers and hikers who arrived at Camp Muir, Mount Rainier (10,188 feet). Investigators ascended on 6 separate dates to the study site to collect data. The primary outcome evaluated was the percentage of climbers relying on a technologic device for rescue.

Results.—Two hundred forty-four of 308 climbers (79%) brought some technologic means for rescue. However, only 133 (43%) had a nontechnological backup plan in event of device failure. Therefore, 57% relied solely on the functioning of their devices in a rescue situation. Of the 102 climbers who relied solely on a cell phone as their means of rescue, 49 (48%) had service at the time of the survey. Thirty-three of 308 (11%) reported that they had required a technologic means of rescue in the past, most commonly an avalanche beacon ($n = 13$). For the 24 rescue devices that failed, the most common reasons were dead batteries in global positioning satellite equipment and lack of cell phone service.

Conclusions.—Reliance on technological devices is becoming commonplace among climbers on Mount Rainier and largely replacing map and compass orienteering. The lack of reliable service for these devices as well as their failures among climbers who have had to use a rescue device in the past is, however, alarming.

Altitude Illness on Mt. Rainier—Incidence and Climbers' Cognizance

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Objective.—Thousands of people set out daily to climb the world's highest mountains in hopes of summiting. However, altitude illness accounts for many aborted or failed summit attempts. Annually, more than 10,000 climbers attempt to summit Mount Rainier, although many develop signs and symptoms of altitude illness, thus hindering their climbs. Acute mountain sickness (AMS) is largely preventable; therefore, we evaluated prevalence of AMS among climbers as well as their understanding of the signs and treatment of AMS.

Methods.—This survey study evaluated a convenience sample of climbers and hikers who arrived at Camp Muir, Mount Rainier (10,188 feet). The study was conducted between August 2010 and August 2012. Investigators ascended on 6 separate dates to the study site to collect data. The primary outcome was incidence of AMS according to Lake Louise criteria. Climbers also were evaluated on the percentage of correct answers on a 3-question multiple-choice test regarding the signs, symptoms, and treatment of AMS, high altitude cerebral edema, and high altitude pulmonary edema.

Results.—Three hundred eight climbers participated in the study, of whom 32 did not indicate presence or absence of headache and thus were excluded from evaluation of AMS. Sixty-eight (25%) of the remaining climbers met the criteria for AMS. Forty-eight multiple question tests were incomplete and therefore not analyzed. Of the remaining 260 tests, 112 people (43%) correctly answered the 3

questions. Seventy-eight climbers (36%) could not report a single correct treatment option for AMS.

Conclusions.—Since data were first recorded in 1853, the number of climbers visiting Mount Rainier has steadily increased. However, the understanding of altitude illnesses is lacking, despite a high prevalence of AMS. A greater understanding of AMS, its identification and management, and preventive measures would benefit this population.

Civilian Helicopter Search and Rescue Accidents in the United States: 1980 Through 2013

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Objective.—Helicopters are commonly used in search and rescue operations, and accidents have occurred during helicopter search and rescue (HSAR) missions. The purpose of this study is to determine whether the civilian (ie, neither Department of Defense nor Department of Homeland Security) HSAR accident rate in the United States can be established and if any common contributing factors can be identified.

Methods.—Searches of the National Transportation Safety Board aviation accident database, the records of major search and rescue and air medical organizations, and the medical and professional literature for reports of HSAR accidents were conducted.

Results.—A total of 47 civilian HSAR accidents were identified during the study period. Of these, 43% (20 of 47) involved fatal injuries, compared with 19% (1390 of 7221) for US general helicopter aviation accidents, and 40% (105 of 260) for US helicopter emergency medical services accidents during the same period. Accidents occurring at night had a higher percentage of fatalities, 67% (8 of 12), than did those occurring during daylight, 33% (12 of 35). The majority of accidents occurred under visual meteorological conditions, but all 3 accidents occurring under instrument meteorological conditions resulted in fatal injuries. The total number of HSAR missions conducted annually could not be established.

Conclusions.—Although the overall number of HSAR accidents in the United States is small, the percentage of fatal outcomes from HSAR accidents is more than twice that for general helicopter aviation accidents, and is comparable to that seen in helicopter emergency medical services operations. Accidents occurring during darkness or under instrument meteorological conditions had a higher percentage of fatalities. A limitation of this study is that the total number of HSAR missions conducted annually in the United States could not be established, so an overall accident rate cannot be calculated. Further study could help to improve the safety of flight in the HSAR environment.

Impact of Previous Concussion on Helmet Use and Risk Compensation

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Objective.—Previous studies have evaluated helmet use and risk compensation in alpine skiing and snowboarding. The impact of previous concussion (PC) related to skiing/snowboarding injuries and subsequent helmet usage or subjective risk compensation behavior has not been explicitly studied. There is evidence that helmet use reduces head injury risk, but the effect on concussion risk is inconclusive. The purpose of this study is to determine whether risk compensation while skiing/snowboarding is correlated with a history of concussion and whether risk compensation with helmet use could be contributing to more concussions in skiers and snowboarders.

Methods.—This was a descriptive cross-sectional survey of persons aged 18 to 65 years who were interviewed on the mountain during their ski/snowboarding day at Park City Mountain Resort (2014–2015 season).