the findings from Baxter State Park that an older demographic would be at higher risk of requiring rescue.

Regarding direction of travel, Welter et al¹ state that “the role of hiking phase (ascending or descending a mountain) is not discussed in currently available wilderness medicine literature.” In the Denali study we noted that of all SAR events, 44.8% “occurred while the subject was descending.” Perhaps more interestingly, we specified that of “falls recorded as the primary reason for SAR...77% occurred on descent.” (Further, in 2008 McIntosh et al³ found that 61% of fatalities on Denali occurred on descent, a large percentage of which were falls.) In Baxter State Park, although only 30% of SAR cases documented a direction of travel, 86% of those indicated the subject was descending. Thus, published data from Denali would support the discussion point of Welter et al¹ that injuries leading to SAR, perhaps as a combination of exposure, descent ergonomics, or fatigue, may be more likely to occur on descent. Both the Denali and the Baxter State Park data appear to support the concept that safety on descent is important.

In addition to Denali data, a study of Mount Everest climbers further documents the risk of older age and descent direction.⁴ In 2007, Huey et al⁴ reviewed Mount Everest climber data from 1990 to 2005 and found that “those older than 60 years have increased odds of dying, especially when descending from the summit.” More specifically, Huey et al⁴ state that there was an increase in “death rate for climbers older than 59 years” ($P = .037$), and that the “death rate of climbers descending from the summit was nearly twice that of those who did not summit” ($P = .048$). These Mount Everest results regarding older age and descent risks are comparable to the findings from both Baxter State Park and Denali.

The stated primary objective of the Baxter State Park study is to describe SAR epidemiology to facilitate training and preparation within their park. To that end, we put forth the consideration of studies from both Denali and Mount Everest, and how they relate to the Baxter State Park data. Although differences exist between the wilderness experience on these higher peaks when compared with the Mount Katahdin vicinity, there appear to be some comparable risks. These reported similarities may serve to enhance local educational objectives and preparation for rescue services in each region.

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In Reply to Brillhart et al

To the Editor:

We appreciate the interest of Drs. Brillhart, McIntosh, Dow, and Grissom¹ in the article “Epidemiology of search and rescue in Baxter State Park: dangers of descent and fatigue.”² We apologize for erroneously citing an absence of preceding research regarding fatigue, age, and ascent vs descent as they correlate with need for search and rescue (SAR) events, which are indeed directly and well addressed in the Denali^{3,4} and Everest⁵ articles.

Of note, we believe the Baxter data provide increased external validity regarding increased risk of age in outdoor recreation. While Denali and Everest represent high-altitude, highly technical environments drawing experienced mountaineers, Baxter is a low-altitude state park that draws a diverse demographic from experienced hikers to young families and weekend enthusiasts, many with no intention of summiting the 5270 foot peak. Moreover, Baxter represents a region with far less inclement weather than Everest or Denali, with a majority of SAR events occurring in seasons without any snow, glaciers, or major winds. It appears age as a general risk factor and descent as a risk factor for trauma transcend a variety of regions, terrains, and demographics.

Regarding fatigue as a major cause of SAR events, the Denali data did find fatigue to encompass 28.3% of all

medical cases (13 of 261 total cases) “exclud[ing] altitude and cold-related injury.”² However, although these cases excluded the explicitly altitude-dependent primary complaints of frostbite, high altitude pulmonary edema, high altitude cerebral edema, acute mountain sickness, and hypothermia, it may be hard to delineate exclusive fatigue from the confounding factor of altitude hypoxia. As the authors state, “Denali is known for high altitude and extreme cold, and the majority of causes of medical cases reflected these features.” In contrast, the Baxter data are exclusively from below 5270 feet, confirming the role of fatigue in inciting SAR events regardless of altitude.

Once again, we appreciate your comments and collaboration, and acknowledge the preceding research in age, fatigue, and direction of travel. We are interested to see largely similar findings across a breadth of terrain and demographics, and hope these unified findings may serve accident prevention and SAR response preparation.

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