programs have told us about being taught to develop relationships with licensed physicians as a source of prescription medications. Such practices not only put the “first responder” and his or her patient at risk, they also constitute clear violations of most state medical practice acts, placing the prescribing physician in a nearly indefensible position.

The enormous expense of many Wilderness First Responder courses today, including tuition, travel, and time away from other pursuits, is rightly a concern for volunteer organizations. It is difficult to see the “value added” from these expenses. Mr Moss also is quite correct in highlighting the absurdity of much that is occurring in this field currently. Automated external defibrillators (AEDs) in the backcountry are but one example of such silliness. Finally, he is right to stress the correct definitions of terms such as “first aid.” We are amused at the number of programs advertising that they teach wilderness “medicine.”

Mr Nicolazzo, the director of a commercial wilderness first aid training program, provides more of an unreferenced essay or advertisement than a direct response to our article. His letter is useful, however, as an illustration of the types of problems with which this unregulated industry is replete.

Mr Nicolazzo makes a number of statements, which, while frequently heard in the context of wilderness first responder programs, do not hold up to careful scrutiny. The call for a “firm foundation in normal anatomy and physiology” is a simple example. Setting aside the complete implausibility of a layperson achieving anything approaching a “firm foundation” in these topics in a few hours, there is no evidence-basis for the statement. Ankle sprains constitute one of the most common causes of backcountry evacuations for injury. One could spend hours instructing laypersons on the multiple articulations in the ankle mortise, but the likelihood that this would make them better able to provide field treatment is nil. References to the “rather high level of quality” in wilderness first responder courses and the role of competition in producing “increasingly better curriculum, materials, and delivery methods” are completely unsubstantiated anecdote. These and similar assumptions in his letter are precisely the sorts of statements that are overdue for careful, rigorous analysis.

The letter includes suggestions reflecting either hubris or naiveté. An example of this is the suggestion that the “WMS board” undertake “lobbying . . . to legalize effective treatments that are currently illegal” such as “epinephrine use.” Helping a client who is carrying epinephrine that has been validly prescribed to administer the drug as ordered is not illegal in any jurisdiction and requires little if any training. Making a diagnosis of

anaphylaxis in an individual without a prior history, and providing a specific dose and route of epinephrine constitutes the practice of medicine. The idea that state medical licensing authorities would endorse this practice by nonprofessionals without oversight after a brief unstandardized course is ludicrous. Even if regulatory bodies were open to such a drastic change in practice, there is absolutely no risk-benefit analysis to justify it.

The entire wilderness “medicine” education industry is overdue for very thorough scrutiny. A multitude of unregulated providers are offering education of uncertain quality in the use of techniques that have not been subject to any real evidence-based analysis to students who are unlikely to retain them in order to treat conditions with which they probably will never come into contact. This is being done at an incalculable cost to outdoor programs, which often subsist on a shoestring, but which are told that such training is essential for their safe operation. It is about time to rethink this entire boondoggle, beginning with the type of careful epidemiologic analysis called for by Ms Pope, Mr Moss, and Dr Forgey.

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Trekker Behavior as One Indicator of AMS Knowledge

To the Editor:

We read with interest the letter “Trekking Awareness of Acute Mountain Sickness and Acetazolamide”¹ in the Winter 2008 issue of the Journal. The authors found that among trekkers in the Everest region of Nepal, there was a poor understanding of acute mountain sickness (AMS) and acetazolamide. This finding is similar to that of other studies in high altitude regions^{2,3} where trekkers were asked directly about their knowledge. Another approach to attempt to evaluate what a population knows or believes about a topic may be to examine behaviors related to that topic. This is what we attempted to do in 2003 at Manang in the Nepal Himalaya (3469 m). We surveyed a convenience sample of 307 of the 1316 trekkers who attended the Himalayan Rescue Association lectures (Table 1) to determine whether they took steps to prevent or treat AMS, including using acetazolamide where appropriate. We were interested in looking at the pattern of usage of acetazolamide, particularly in those at increased

Table 1. Characteristics of trekkers surveyed

<i>Characteristics</i>	<i>No. of trekkers</i>
Gender	
M	187
F	120
Age (years)	
<20	5
20–40	266
40+	31
Country of origin	
United Kingdom and Western Europe	118
Israel	98
North America	34
Australia and New Zealand	30
Other	27
Previous experience at altitude	
AMS	10
No AMS	99
Rate of ascent	
≤4 days	8
5+ days	299
Other medications taken	
Medications other than oral contraceptives	56
Women taking oral contraceptives	42

risk for AMS. The increased risk group included trekkers who had had a previous episode of AMS when at altitudes above 2500 m and those who came up to Manang at an accelerated rate (4 days or fewer from below 1000 m). The following details were queried:

- Yes or no response to a history of symptoms consistent with AMS on this trek. (Lake Louise Consensus definition was used, that is, headache plus 1 of the following: anorexia, nausea, or vomiting; fatigue or weakness; dizziness or lightheadedness; or difficulty sleeping. Severity of illness was not stratified.)
- Prior exposure to high altitude (over 2500 m) and whether or not they had suffered from AMS on those occasions.
- Rate of ascent (from less than 1000 m to Manang at 3469 m).
- Yes or no response to use of acetazolamide, as well as whether acetazolamide was being used for prevention or for treatment of AMS, and the dosage being used.
- Other medications being taken.

This questionnaire examined the behavior and experiences of trekkers in relation to altitude illness and use of acetazolamide without attempting to directly assess their knowledge of these issues. We found that 35% of the trekkers we surveyed had a symptom complex consistent with AMS at some point on the way up to or after arrival

at Manang (3469 m). The incidence of AMS in a population varies depending on the altitude reached, the speed of ascent, and individual variation. Our finding was consistent with the literature⁴ and so we believe it reflected the true incidence within our group.

Thirty trekkers (approximately 10% of those surveyed) used acetazolamide at some point in their journey, 13 for prevention, 10 for treatment, and in 7 cases the reason for use was unclear. None of those who used acetazolamide for prevention of AMS developed altitude illness on the current trip.

In examining the subgroups of interest, we found that of the 8 trekkers who completed the trip in 4 days or less, 5 had suffered a symptom complex consistent with AMS. Of this group of 8, none had taken acetazolamide for treatment. Only 1 had taken it for prevention and was symptom free.

Ten of the 109 people who had been to high elevations (over 2300 m) at least once before admitted to having had altitude illness on previous trips. Of these, only 1 took acetazolamide for secondary prevention. Four of the remaining 9 complained of symptoms suggestive of AMS at some time during the current trip. Of these 4, only 2 were taking acetazolamide for treatment (Table 2).

No consistent dosing of acetazolamide was used by trekkers, with amounts ranging from 125 mg daily to 250 mg twice daily, whether for prevention or treatment.

Although we did not expect all trekkers who might benefit from the use of acetazolamide to take it, we were surprised at the very low number that did. One possible reason for this might be lack of knowledge regarding the use of acetazolamide, but another might be a preference to avoid using medication in general. To see if this latter situation was the case, we also enquired regarding what other medications trekkers were using. One third of the female trekkers were taking oral contraceptives (OCs), and 56 trekkers were taking other medications, both prescription and over the counter, for a variety of reasons. This suggests that trekkers were not averse to the idea of taking medication, even if alternative manage-

Table 2. Acetazolamide use among high-risk trekkers

<i>Risk factors</i>	<i>Acetazolamide use</i>	<i>Sx</i>	<i>Non-Sx</i>
Rapid ascent (Total: 8)	Actz for Rx	0	0
	Actz for Prev	0	1
	Actz not used	5	2
AMS on previous trips (Total: 10)	Actz for Rx	2	0
	Actz for Prev	0	1
	Actz not used	2	5

Actz, acetazolamide; Rx, used for treatment of AMS; Prev, used for prevention of AMS; Sx, symptomatic of AMS.

ment options (such as in the case of contraception) existed.

Our findings upon studying trekker behavior could represent a gap in knowledge regarding AMS, its prevention and management. This is consistent with studies involving more direct inquiries of "knowledge," including the letter by Subedi et al. Our findings also provide information about the use of acetazolamide among trekkers for AMS prevention, something that Subedi et al found lacking in the literature.¹

We agree with the authors that there is a "wealth of information" available regarding AMS and acetazolamide, but is all this information good? Trekkers may access this information via the Internet, guidebooks, or their physicians when planning travel to high altitude areas. Neither randomly accessed Web sites nor all guidebooks carry consistently reliable and verifiable information. Physicians are often consulted before travel in order to provide prescriptions and immunizations required when visiting many of the countries where trekking occurs. Thus they may compose the ideal group to focus on for knowledge assessment, education, and dissemination of information. There is an ever-increasing population involved in adventure travel⁵ and, in turn, an increasing population at risk for AMS. Though we did not attempt to directly measure trekkers' understanding of AMS, our findings suggest that there may be a knowledge deficit in this group on the topic. Given that when such illness does occur, it is frequently in a remote setting, the importance of determining and implementing steps to improve trekkers' knowledge and preparation should not be underestimated.

Acknowledgments

We would like to acknowledge the contributions of Lorraine Woolford, MA, MD, FRCSC, MSc, and Alexandra Bell, BSc, in the analysis of the data and editing of the manuscript. We would also like to acknowledge the support of the Himalayan Rescue Association who, by running nonprofit high altitude clinics in Nepal, have dramatically improved the health and safety of those traveling through the highest mountains in the world.

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In Reply to Trekker Behavior as One Indicator of AMS Knowledge

To the Editor:

In their letter to the editor, the authors of *Trekker Behavior as One Indicator of AMS Knowledge*¹ referred to the Lake Louise Consensus definition of acute mountain sickness (AMS) but omitted to mention the minimum score of 3 that we cite in our article.² This could have lowered the threshold for diagnosis of AMS. However, they did say that the incidence of AMS in their study was "consistent with the literature."

Acetazolamide was clearly beneficial but underused. Only 1 of the 10 trekkers who had previously experienced AMS took prophylactic acetazolamide. Ignorance about AMS and the benefits of acetazolamide persists despite available information.

We agree that physicians who are usually contacted for vaccinations and prescription of medication have the opportunity to advise on AMS prevention. But is this information easily available to the doctors? Are the Mountain Medicine organizations exploring this possibility?

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