



EDITOR'S NOTE

The Evolution to Prospective Research in Wilderness Medicine

The draw to wilderness medicine frequently stems from a personal connection to the outdoor environment. This creates a great diversity in the community, where a spectrum of professional focus is brought together by what can be a satisfying and potentially challenging common ground. It is natural for enthusiasts to look for ways to combine their vocational and avocational worlds, and the product of such efforts provides a substantial portion of the wilderness medicine literature.

Health professionals may be drawn to wilderness or other extreme environments for personal reasons or to support events organized by others. Insights or experiences gained during such activities can lead to opportunities to bring their worlds a little closer together: Incidents can arise that are worth reporting to the broader community, or a chance to collect data to provide novel or confirmatory evidence addressing questions of interest may develop.

Real-time experiences drive many of the case reports submitted for publication. Existing datasets, ranging from the informal to the rigorously developed, prompt many of the retrospective reports that are submitted. Prospective studies are more limited for very practical reasons. For example, if convenience sampling is considered as part of an expedition, the research obligations will usually have to be modest in terms of time, effort, and equipment required to avoid unnecessary disruption of what is likely already a fully engaging schedule. In addition, the available funding is typically limited.

Reporting on case experiences or analyzing existing records can be time consuming, but personal motivation and effort are often enough to drive the work. Prospective studies are much more complicated. Even the simplest prospective project requires careful planning and rigorous attention to detail for meaningful data collection. It is difficult to maintain experimental control and rigorous data collection protocols when research is tacked onto existing activities. The demands are frequently irreconcilable.

The nature of convenience prospective studies, particularly those conducted under field conditions, makes the concept of adequacy a challenging and often moving target. More flexibility may be required to distinguish

between acceptable and unacceptable shortcomings. Minor confounding can be addressed through cautious data interpretation and a clear description of the limitations of the work. Major deficiencies, however, might represent fatal flaws that make meaningful interpretation impossible.

The most robust prospective research studies provide sufficient control to allow the impact of one or a small number of variables to be confidently assessed. Such control is normally associated with laboratories, wherein simulations can be managed more easily, if imperfectly. The increasing sophistication and miniaturization of many research tools, though, can make laboratories portable enough to take into the field. In such cases the simulations can encompass additional aspects of the real world.

The chief burdens of prospective research studies, particularly those conducted in extreme environments, are high operating costs, staffing limitations, extensive planning requirements, and subject compliance. The wilderness medicine literature contains examples of highly controlled prospective research studies, but more are needed. In the absence of unlimited research funding, which will almost certainly remain a reality, additional creativity is required.

The first step to promote creativity is to encourage all investigators to strive for a higher standard. Where a case study could suffice, developing a case series should be considered. Retrospective dataset analysis should be developed beyond cursory reviews, augmented by additional resources and effort. Where prospective convenience sampling is a possibility, efforts to strengthen the research focus should be investigated. And at the top of the list, the option of developing dedicated prospective studies should be considered.

Prospective studies that are not feasible for one or a small number of investigators may become possible with larger research groups. Developmental efforts can be strengthened by collaboration with true subject matter experts. Although proximity is desirable, collaborations and mentorship can work over distance. Most importantly, well-designed collaborative research projects can be more attractive for funding, both intramural and extramural.

Research efforts will evolve with a change in expectations. Although a place will remain for case reports, retrospective reports, and convenience sampling, an increased focus on prospective studies is needed for maturation of the field. Critical consideration of the benefits of collaborative efforts to improve rigor is needed. Efforts to train new investigators and create research networks can accelerate progress. Individually, the goal should be to find collaborators or mentors to complement one's interests and capabilities, building strengths and creating opportunities.

Senior investigators should play a critical role in evolving scientific endeavors in the community. This can be achieved through informal availability to help guide research concepts and to connect the right people. More formal efforts should be facilitated by organizations dedicated to the field. The Wilderness Medical Society cur-

rently offers a series of research grants to members. Although the option for independent research concepts should remain viable, a focus on more powerful collective efforts could be promoted through the creation of research priority lists and discussion forums focusing on concept development and collaboration. Of course, additional funding would further drive interest.

Wilderness medicine is at a point at which both interest and practice are well established. Active promotion of more rigorous research norms and initiatives could help address unresolved complex questions and create new opportunities in the field.

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