

## References

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## Disasters and therapeutic or prophylactic interventions

War, political uprising, famine, civil war, and natural disasters such as earthquakes, floods, or cyclones involve considerable disability, mortality, and economic loss for the masses. Apart from emergency operations involving search and rescue for survivors, health care personnel are obliged to tackle infections, psychological disorders, and other emergency situations besides those afflicted by disasters. Survivors need an uninterrupted supply of medications for different medical disorders. Prophylactic substance usage is an integral component of the strategies directed to prevent disease outbreaks among large

congregations of survivors. Rescue team members responsible for immediate and routine interventions have to be well immunized and receive adequate prophylactic or therapeutic agents as well.<sup>1</sup> Predisaster plans and preparedness by international and allied organizations to combat future calamities would not be comprehensive unless they address issues relating to adequacy of therapeutics, prophylactics, and diagnostics for usage in the adverse environment created by disasters. Survivors can face great temperature extremes, from subzero to 45-50°C, during the aftermath of disasters.

Disasters disrupt the infrastructure of routine health care. Apart from negligible residual services available in different establishments, earthquakes or aerial bombings disrupt local power generation plants.<sup>2</sup> Disruption of electricity supplies to pharmacy and nonpharmacy locations affects the supply and quality of therapeutics and prophylactics. The storage requirements of therapeutic agents against common disorders encountered among disaster-afflicted individuals stipulate constant storage at temperatures ranging from 2-8°C<sup>3</sup>: they are not to be frozen. The quality of labile therapeutics like insulin, thrombolytic agents, antibiotics, interferon, and uterine stimulants (Table 1) would not be expected to be optimal when these agents are stored outside the recommended temperatures. An inadvertent exposure in a disaster-devastated site to higher or lower temperatures might be associated with a poor therapeutic response to such agents. This could adversely affect patients with injuries, communicable diseases, cardiovascular disease, and psychological sequelae of the disaster. Furthermore, the storage requirements for vaccines and immunoglobulins used for prevention of certain diseases are stringent: storage is either at subzero temperature or between 2 and 8°C. The liquid or lyophilized vaccines protecting against varicella and polio must be kept frozen. Mass immunizations with roughly handled vaccines, which are found at refugee camps for those afflicted by disasters, might be less effective in preventing outbreaks of vaccine-preventable diseases.

Future plans to combat disasters should incorporate research efforts to produce therapeutic and prophylactic formulations that could withstand adverse environments, including changes in temperature, humidity and atmospheric pressure during wars, earthquakes, and similar catastrophes. Stabilization of labile vaccines with trehalose, pirodavir, or deuterium oxide has been encouraging.<sup>4</sup> Such stabilized formulations would interest armed forces globally.

One would expect appropriate research input to tackle the issues of inadvertent therapeutic or prophylactic fail-

Therapeutic agents requiring constant storage between 2 and 8°C

Category	Representative
Hormones	insulin chorionic gonadotrophin*
Enzymes	thrombolytic agents: alteplase, streptokinase, pepsin*
Anti-infective	antibiotics: cephalosporins, penicillinase resistant penicillin anti-HIV agents: ritonavir*
Antineoplastics	alkylating agents: thiopeta antimetabolites: pentostatin vinca alkaloids: cyclophosphamide*
Miscellaneous	uterine stimulants: ergometerine maleate, oxytocin interferon proxymetacaine eye drops*

\* And others.

ures among those subjected to a strenuous life after a disaster.

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### If you don't feel well at altitude...

To the Editor:

In an exchange of letters in the last edition of *Wilderness and Environmental Medicine*, Dr Litch and colleagues perhaps inadvertently misquoted and misinterpreted a valuable aphorism in regard to diagnosing altitude illness. The quotation was, "If you are not feeling well at altitude, it's altitude illness until proven otherwise."<sup>1</sup> Dr Litch and colleagues have since changed this to "illness at altitude is altitude illness until proven otherwise." They also pointed out the dangers of adhering too tightly to this diagnostic approach. I am afraid that Dr Litch's misquotation and his subsequent interpretation may lead to abandonment of a valid approach to the diagnosis of altitude illness.

The original statement, a quote I had made that first appeared in Stephen Bezruchka's *A Guide to Trekking in Nepal* in 1985,<sup>2</sup> was aimed at trekkers, not as a diagnosis guide for doctors. At that time, altitude illness was not as commonly appreciated among trekkers, and there was a tendency, that I had observed first hand, to want to attribute symptoms that occurred at altitude to anything but altitude illness (too much sun, dehydration, hitting one's head on a low doorway, etc). Also, I had discovered that acute mountain sickness (AMS) can present symptoms in many different ways, and it was difficult for trekkers to memorize a long list of them (headache, nausea, loss of appetite, lassitude, insomnia) to try to determine if they actually had AMS.

The aphorism has three benefits: 1) it suggests that one can use a global approach for diagnosing AMS. If one simply was performing badly at altitude compared to one's peers, it would be good to ask the question, "Could this be altitude illness?" 2) It puts altitude illness appropriately at the forefront of one's investigation of symptoms. It was not meant to suggest that all "illness at altitude is altitude illness," as Dr Litch implies. However, it is important to remember that the vast majority of symptoms that resemble AMS at altitude is AMS. 3) The clause, "until proven otherwise" was there to make sure that people did consider other possibilities, and that not all illness at altitude is caused by altitude alone. During my 15 years at the Canadian International Water and Energy Consultants Clinic, I became inter-

ested in documenting the "proven otherwise," aspect of altitude illness to establish a more realistic and tested differential diagnosis of illness at altitude. We documented and published case reports of suddenly symptomatic brain tumors at altitude,<sup>3</sup> pulmonary embolism presenting as high-altitude pulmonary edema,<sup>4</sup> and Guillain-Barre syndrome misdiagnosed as high-altitude cerebral edema.<sup>5</sup>

There is a separate body of case reports that document other illnesses occurring at altitude, which, for the most part, were not originally considered to be AMS. These would include the heart attacks, seizures, and cerebral hemorrhages that have rarely been reported to occur at altitude.

Therefore, we should remember the original aphorism, and its intent. If someone becomes ill while trekking or climbing at high altitude, the first question should always be, "Could this be altitude illness?" The second question should be, "Could this not be altitude illness?" Dr Litch and colleagues appeared to be concerned that some people had focused too much on the first part of the phrase, and not enough on the phrase "until proven otherwise." Although it is often possible to rule out altitude illness at altitude by experienced personnel, if there is any remaining doubt and the person is seriously ill, then descent is mandatory. In these cases, the "proven otherwise" part is something that happens after the person is evacuated to a lower altitude. I agree with Dr Litch and colleagues that altitude is usually associated with remoteness and lack of access to medical care, and evacuation is appropriate for any seriously ill person.

The case that prompted the exchanges in *Wilderness and Environmental Medicine*<sup>6</sup> was a classic example of medical abandonment while trekking, something that Dr Basnyat appropriately pointed out in his case report. Regardless of the final diagnosis, no one can claim that leaving this unfortunate man alone in a teahouse for four days with someone who did not speak his language constitutes appropriate care for a trekking client. Whether or not we understand why he ultimately died, we can use this case to reaffirm our commitment to getting sick people out of the mountains, or keep them continuously under the care of someone who can make adequate decisions regarding evacuation, until the situation is resolved.

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