

## Altitude Sickness

### What is altitude sickness?

Altitude sickness refers to a number of symptoms that occur as a result of ascending to high altitudes more rapidly than the body can adjust. The reduced atmospheric pressure means the air is less rich with oxygen and therefore less oxygen is available for body cells to use. The severity of the symptoms depends on the altitude reached, the rate of ascent, the time spent at the high altitude, and the person's general health.

### What are the symptoms?

Mild symptoms may occur between 4,000 to 6,000 feet (1,200 to 1,800 meters) but serious symptoms are rarely seen below 9,000 to 10,000 feet (2,700 to 3,000 meters). The illness is generally divided into three syndromes.

1. Acute Mountain Sickness (AMS): Headache (that may progress from mild to excruciating), loss of appetite (may include nausea and vomiting) and fatigue (that may progress to complete apathy).
2. High Altitude Cerebral Edema (HACE): The symptoms of AMS have become severe enough to cause swelling of the brain. The symptoms include changes in consciousness, staggering and loss of balance. This can progress rapidly to coma and death.
3. High Altitude Pulmonary Edema (HAPE): The symptoms of AMS may progress to congestion in the lungs with or without cerebral involvement. This may start as shortness of breath and progress to severe breathlessness even at rest. If pink frothy sputum results, the prognosis is very poor.

Before any of these symptoms occur, the individual may observe swelling of the face, hands, and feet. This illness almost always has a gradual onset and gets worse slowly over several hours. Although not a problem of great concern, these symptoms are a warning that more severe symptoms may occur if the person continues to ascend.

### Who is at risk?

People are exposed to high altitudes in different ways. When skiing, hiking, or sight-seeing, a person may go to high altitudes during the day and descend to sleep at a more comfortable altitude a night. This generally does not create problems. Others may fly into high altitudes directly such as La Paz, Bolivia; Lhasa, Tibet; or Cuzco, Peru. This passive transport seems less likely to cause altitude sickness because very little personal exertion is required. Those at greatest risk are those who hike

... over

**Kingston**  
221 Portsmouth Avenue  
Kingston, ON K7M 1V5  
Tel: 613-549-1232  
1-800-267-7875  
Fax: 613-549-7896

**Cloyne**  
P.O. Box 59  
14209 Highway 41  
Cloyne, ON K0H 1K0  
Tel: 613-336-8989  
Fax: 613-336-0522

**Napanee**  
41 Dundas Street  
Napanee, ON  
K7R 1Z5  
Tel: 613-354-3357  
Fax: 354-6267

**Sharbot Lake**  
P.O. Box 149  
1130 Elizabeth Street  
Sharbot Lake, ON K0H 2P0  
Tel: 613-279-2151  
Fax: 613-279-3997

vigorously and move up several thousand feet in a day with no opportunity to return to a lower level at night. The Himalayas represent the biggest risk where 50 percent or more of trekkers on popular high altitude routes suffer altitude illness effects. Death from complications occurs in two to three trekkers in Nepal annually.

### **How can I protect myself?**

- Have a sensible itinerary including gradual ascents
- Be prepared to stop ascending if altitude symptoms occur (headache, fatigue, nausea)
- Never ascend to sleep at a higher altitude if symptoms are present
- Descend if symptoms persist

Death has usually occurred because the person continued to ascend with symptoms that should have been recognized as altitude sickness.

### **Drug therapy:**

Acetazolamide (Diamox) - When used to prevent AMS, Diamox should be taken one day before the ascent, the day of the ascent and one day after the ascent. A dose of 125 mg twice a day appears to be sufficient.<sup>1</sup> When used for treatment of AMS, 250 mg. twice daily appears preferable. Do not take Diamox if you are allergic to sulpha drugs.

### **Side effects of this drug include:**

- increased urination,
- tingling/numbness in fingers and toes,
- carbonated beverages taste flat, and
- rarely causes nausea.

### **Other treatments:**

Descent is the number one treatment. Bottled oxygen and pressurized bags that mimic descent help as well.

It is important to differentiate from other illnesses and altitude sickness should be assumed unless proven otherwise. The symptoms must begin as the person is ascending. Diarrhea is never a symptom of altitude sickness and fever rarely is.

All symptoms can improve rapidly and dramatically with descent although they may take 48 to 72 hours to completely clear. However, aggressive hospital-based care may be necessary for cerebral or pulmonary complications. With treatment, even the most severe symptoms show improvement in 24 to 48 hours.

### **Other factors affecting altitude safety**

A general level of fitness must be present. Pre-trip stress tests do not appear to be of value and there is no correlation between altitude and heart disease. The correlation is between heart disease and current level of activity. A sedentary person who suddenly decides to trek at high altitudes is at increased risk. All individuals with pulmonary disease, a history of seizure activity, blood disorders or diabetes should be carefully assessed and counseled before attempting trekking. Pregnancy does not appear to be a direct deterrent but the affects of lower oxygen levels on the fetus have not been researched. Children trekking should be old enough to report symptoms. Oral contraceptives may affect the person's susceptibility to blood clots at high altitudes but this has not been proven.