

## Altitude Sickness

### What is altitude sickness?

Altitude sickness is a number of symptoms that can occur from ascending to high altitudes more quickly than the body can adjust. The reduced atmospheric pressure means that 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 overall health.

### What are the symptoms?

Mild symptoms can occur between 1,200 to 1,800 metres (4,000 to 6,000 feet) but serious symptoms are rarely seen below 2,700 to 3,000 metres (9,000 to 10,000 feet).

The illness is generally divided into:

1. Initial symptoms: Before serious illness occurs, a person may develop swelling of the face, hands, and feet. This illness almost always has a gradual onset and gets worse slowly over several hours. Although these initial symptoms are not a problem of great concern, on their own, they are a warning that more severe symptoms may occur if the person continues to ascend.
2. Acute Mountain Sickness (AMS): Symptoms can include headache that may progress from mild to excruciating, loss of appetite which may include nausea and vomiting, and fatigue that may progress to complete apathy.
3. High Altitude Cerebral Edema (HACE): This syndrome occurs when symptoms of AMS become severe enough to cause swelling of the brain. The symptoms include changes in consciousness, staggering, and loss of balance. This illness can progress rapidly to coma and death.
4. High Altitude Pulmonary Edema (HAPE): The symptoms of AMS may progress to congestion in the lungs with or without brain involvement. This illness may start as shortness of breath and progress to severe breathlessness even at rest.

### Who is at risk?

People are exposed to high altitudes in different ways. When skiing, hiking, or sightseeing, a person may go to high altitudes during the day and descend to sleep at a more comfortable altitude a night. This activity generally does not create problems. Others may fly into high altitudes directly such as La Paz, Bolivia; Lhasa, Tibet; Quito, Ecuador; or Cuzco, Peru. This passive transportation seems less likely to cause altitude sickness because very little personal exertion is required. Those at greatest risk are those who hike 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 some form of altitude illness. Death from complications occurs in two to three trekkers in Nepal every year.

... 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

## How can I protect myself?

- Ascend gradually, if possible. Try not to go directly from low altitude to more than 2,750 m (9,000 ft) sleeping altitude in one day. Once above 2,750 m (9,000 ft), move sleeping altitude no higher than 1,600 ft (500 m) per day, and plan an extra day for acclimatization every 1,000 m (3,300 ft).
- Consider using acetazolamide to speed acclimatization, if abrupt ascent is unavoidable.
- Avoid alcohol for the first 48 hours.
- Participate in only mild exercise for the first 48 hours.
- Having a high-altitude exposure at more than 9,000 ft (2,750 m) for 2 nights or more, within 30 days before the trip, is useful.
- Be prepared to stop ascending if symptoms of altitude illness 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. 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 and numbness in fingers and toes,
- changes in taste (carbonated beverages taste flat),
- rarely, nausea.

## Other treatments:

Descent is the most important 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 always begin as the person is ascending. Diarrhoea 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 clear completely. Aggressive hospital-based care, however, 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 level of reasonable fitness should be assessed before descent is attempted. Cardiac stress tests before 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 assessed carefully and counselled before attempting trekking. Pregnancy does not appear to be a direct cause of altitude sickness but the effects of lower oxygen levels on the foetus have not been researched. Children trekking should be old enough to report symptoms. Oral contraceptives may affect a woman's susceptibility to blood clots at high altitudes but this possibility has not been proven.