

Altitude illness

Altitude illness describes a number of conditions that may occur in individuals ascending rapidly to high altitude, usually above 2,500m

Altitude illness includes a number of conditions that may occur in individuals travelling to high altitude, usually above 2,500 metres (8,200 feet). Most trips to altitude can be enjoyed safely if sensible precautions are taken. High altitude is defined as an elevation above 1,500m and can be divided into the following categories: high altitude 1,500 to 3,500m, very high altitude 3,500 to 5,500m and extreme altitude above 5,500m.

If an individual ascends gradually to high altitude, their body is usually able to adjust to the reduced oxygen levels. This process is known as acclimatisation. If ascent is too swift, then acclimatisation may not occur rapidly enough and altitude illness may follow.

Altitude illness includes: acute mountain sickness (AMS), high altitude cerebral oedema (HACE) and high altitude pulmonary oedema (HAPE). Severe AMS, HACE and HAPE are life-threatening conditions that need urgent attention.

Symptoms include:

- **AMS** – headache, loss of appetite, nausea, vomiting, dizziness, sleep disturbance, fatigue and weakness.
- **HACE** – confusion, altered consciousness and incoordination.
- **HAPE** – Increasing breathlessness, breathlessness lying flat, cough (initially dry then wet), chest tightness and blood tinged sputum.

Prevention

The key to preventing high altitude illness is gradual ascent with regular rest days. Medications may be used to help prevent altitude illness in certain individuals. People with pre-existing medical conditions should consult with their healthcare provider prior to travel.

General advice

- Awareness of the symptoms of altitude illness is crucial. Symptoms at altitude are caused by altitude illness until proven otherwise.
- Never ascend to sleep at a higher altitude in the presence of symptoms of altitude illness.
- Always attempt to descend if symptoms of altitude illness worsen at a given altitude or if symptoms are severe.
- Never leave an individual with altitude illness alone.
- Always trek with an experienced guide.
- Travel insurance should adequately cover the itinerary and activities planned. The maximum altitude should be disclosed and emergency evacuation by helicopter included within the policy.
- Where possible travel from altitudes less than 1,200m to altitudes greater than 3,500m in a single day should be avoided.

- Above 3,000m avoid increasing sleeping elevation by more than 500m a day and ensure a rest day (at the same altitude) every three or four days.
- It is recognised that travellers flying or driving directly to high altitude locations may be unable to ascend gradually. In such cases, rest days should be strongly considered before or after such large gains in elevation and elsewhere in the itinerary to ensure that the overall ascent rate averaged over the entire trip (e.g, total elevation gain divided by the number of days of ascent during the trip) falls below the 500m/day threshold.

Medication

- Preventative medications are not necessary for low risk situations (see below) and individuals should rely on gradual ascent.
- Preventative medications may be considered in addition to gradual ascent in moderate or high risk situations (see below).
- Preventative medications are not a substitute for gradual ascent.
- Acetazolamide (Diamox®) is the preferred drug (unlicensed). The recommended dose is 125mg twice daily to be commenced one day prior to ascent to high altitude and then continued for at least two days after reaching the highest altitude (see altitude illness factsheet link below for children).
- For individuals ascending to a high point and then descending toward the base (eg, descending from the summit of a mountain), in the absence of symptoms, preventive medications should be stopped when descent is initiated.
- A trial dose of Diamox® for one or two days should be taken prior to travel to check for side effects which include: increased urine production (diuresis), pins and needles (paraesthesia), nausea, vomiting, headache and taste disturbance.
- Diamox® is contraindicated in pregnant women particularly in the first trimester and those with severe allergy to sulfa-based drugs (such as history of anaphylaxis or Stevens-Johnson syndrome). However, those with less severe allergy to sulfonamide medications can consider a supervised trial of acetazolamide before the trip, particularly if planning travel to a location remote from medical resources.

Wilderness Medicine Society Risk categories for Acute Mountain Sickness

Risk category	Description
Low	• Individuals with no prior history of altitude illness and ascending to $\leq 2,800\text{m}$. • Individuals taking ≥ 2 days to arrive at 2,500–3,000m with subsequent increases in sleeping elevation $< 500\text{m}$ per day and an extra day for acclimatisation every 1,000m.
Moderate	• Individuals with a history of AMS ascending to 2,500–2,800m in one day. • Individuals with no history of AMS ascending to $> 2,800\text{m}$ in one day. • All individuals ascending $> 500\text{m/day}$ (in sleeping elevation) at altitudes above 3,000m but with an extra day for acclimatisation every 1,000m.
High	• Individuals with a history of AMS ascending to $> 2,800\text{m}$ in one day. • All individuals with a history of HACE or HAPE.

	• All individuals ascending to >3,500m in one day. • All individuals ascending >500 m/day (in sleeping elevation) above 3,000m without extra days for acclimatisation. • Very rapid ascents (e.g. <7 day ascents of Mt. Kilimanjaro).
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Note:

- Altitudes listed in the table refer to the altitude at which the person sleeps.
- Altitude is assumed to start from elevations <1,200m.
- The risk categories described above pertain to unacclimatised individuals.

Resources

- [Altitude illness factsheet](#)
- [The International Climbing and Mountaineering Federation \(UIAA\): Mountain medicine advice and recommendations](#)
- [Medex: Travel at high altitude](#)