



Travel at altitude

Traveling to high altitude creates extra demands on the body due to lower oxygen levels, cold, and increased UV radiation.

These can result in serious illness, especially if someone ascends rapidly to high altitudes or ignores early symptoms of altitude illness. Those with certain medical conditions should seek medical advice and take appropriate precautions before traveling to high altitude.

Travel to high altitude may be a chosen part of your travel itinerary when trekking or climbing for example, but it can come as more of a surprise when driving over high passes or flying into towns and cities which are situated at a high altitude.

High altitude is defined as an elevation above 1500 meters. Altitude illness includes a number of conditions that may occur typically above 2500 meters. At higher altitudes, the air pressure reduces, which results in less oxygen intake for every breath. The body then starts to behave slightly differently as it tries to make up for the change in oxygen levels. For example, more red blood cells are created to carry oxygen through the bloodstream, as well as increases in heart rate, breathing and urination. The best way to avoid altitude illness is to ascend gradually. However this is not always possible, for example if you are due to fly in to an area of high altitude.



Destinations at high altitude

Examples of places at high altitude are as follows:

High altitude (2400-3658m): Cochabamba, Bolivia (2550m), Bogota, Colombia (2645m), Quito, Ecuador (2879m), Cuzco, Peru (3225m)

Very high altitude (3658-5500m): La Paz, Bolivia (3658m), Lhasa, Tibet (3685m), Everest Base Camp (5500m)

Extreme altitude (5500-8848): Mount Everest summit (8850m), Mount Kilimanjaro (5895m)

Pre-existing medical conditions

Travelers with certain medical conditions should seek medical advice before travel to high altitudes. This includes people with heart or lung diseases, including sleep apnea, as their condition may be particularly affected by the reduced oxygen levels. People with diabetes need to be aware that many physiologic processes, including glucose metabolism, energy expenditure and insulin requirements differ at altitude compared with sea level.

Travelers with epilepsy and sickle cell disease should ensure their condition is stable and will not be worsened by altitude.

In pregnancy, travel to altitudes up to 2500m is considered safe. There is not thought to be an increase in risk of altitude sickness in pregnancy, but it can cause reduced oxygen levels in the placenta if it occurs. This may then be dangerous to the fetus. The World Health Organization advises avoiding sleeping at altitudes over 3000m during pregnancy.

Altitude illness

Altitude illness includes the following conditions:

- Acute Mountain Sickness (headache, nausea, vomiting, loss of appetite, dizziness, sleep disturbance, weakness)
- High altitude cerebral oedema (confusion, altered consciousness and incoordination)
- High altitude pulmonary oedema (increasing breathlessness, breathlessness lying flat, cough, chest tightness and coughing up blood or pink phlegm)

The latter two conditions and severe forms of high altitude mountain sickness are all life-threatening conditions requiring urgent medical attention.

Prevention of altitude illness

Gradual ascent with regular rest days is the key to preventing altitude illness. The human body can adapt significantly to the stresses of altitude, but it requires time to do so.

Any individual's pre-disposition to altitude illness appears to be genetically determined. Being more physically fit does not protect you from suffering from its effects.

Travel from altitudes less than 1200m to altitudes greater than 3500m in a single day should be avoided where possible.

Above 3000m you should avoid sleeping at elevation more than 500m higher than the previous night, and ensure a rest day at the same altitude every three to four days.

You should never ascend to sleep at a higher altitude when you have symptoms of altitude illness. Wherever possible, descend to a lower altitude if symptoms of altitude illness worsen or if symptoms are severe.

Prevention medications may be considered in moderate and high-risk situations, which should be discussed with a medical professional. These medications should be in addition to, and not instead of, gradual ascent.

Acetazolamide (Diamox®) is the preferred drug for preventing and treating altitude illness. A trial dose should be taken for one or two days prior to travel to check for side effects. These include increased production of urine, pins and needles, nausea,

vomiting, headache, and taste disturbance. This medication should not be used in pregnant women and in those with a severe allergy to sulfa-based drugs.

There are several other medications that have also been shown to be effective at preventing or treating altitude illness, including steroids and Nifedipine.

Climate

There is increased exposure to UV radiation at higher altitude. It is important to use a sunscreen that protects against UVA, UVB and UVC with a high sun protection factor (at least SPF30). Lips, ears, and nose should also be protected. Sunglasses should be worn that filter out UV light.

High altitude environments tend to be cold, especially at night. Ensure you have appropriate clothing and equipment to keep you warm.

Always call the Everbridge Assistance line if help is required with medications or any medical issues during travel.

References

CDC: The Yellow Book: Chapter 3: High Altitude and Altitude Illness: <https://wwwnc.cdc.gov/travel/yellowbook/2020/noninfectious-health-risks/high-altitude-travel-and-altitude-illness#:~:text=Acute%20Mountain%20Sickness,-AMS%20is%20the&text=Symptoms%20are%20similar%20to%20those,or%20after%20the%20first%20night.>

Fit for Travel: Altitude and Travel. Available at: <https://www.fitfortravel.nhs.uk/advice/general-travel-health-advice/altitude-and-travel>

NaTHNaC: Altitude Illness. Available at: <https://travelhealthpro.org.uk/disease/12/altitude-illness>

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