

high altitude health advice



Healthy people may travel rapidly to 11,480ft above sea level but can develop symptoms of acute mountain sickness after arrival (headache, nausea, breathing difficulty, mental confusion). Those with respiratory cardiac problems may experience symptoms on arrival at even lower levels.

Impact of high altitude on the human body and brain

- As altitude increases, barometric pressure (measure of the *weight* of the air) reduces
- At 19,000ft barometric pressure is half of that at sea level
- As a direct result of this fall in pressure, oxygenation decreases
- In July/August atmospheric pressure is universally higher than at other times of the year
- It is therefore better to be climbing at the equator in midsummer
- Hypoxia (the reduction of oxygen content) may lead to:

1. AMS (Acute Mountain Sickness)

AMS normally develops about 6-12 hours after critical altitude is reached. Serious effects of altitude have been documented as low as 3,000ft; but in most cases problems will materialise around 12,000ft. Virtually all climbers will experience some of the symptoms of AMS listed below. In a sense AMS can be thought of as a relatively benign condition that could lead to the more serious developments of HAPE and HACE. AMS symptoms are some or all of the following and likely to be found in the following percentage of cases: headache (96%), disturbed sleep (70%), loss of appetite (38%), nausea (35%), dizziness and lassitude (27%), vomiting (14%). It follows that AMS will increasingly affect the ability of the climber to make sound decisions.

Prevention and reduction of AMS: climb slowly, discuss with your doctor a drug regime such as Diamox, and be very fit. Fit climbers are 17% likely to suffer, whereas unfit climbers are 43% likely to suffer. AMS need not lead to the abandonment of a climb. If the symptoms are mild, a rest day at the same or a lower altitude may be sufficient. However if the symptoms persist the climber must descend. Otherwise there is the real risk that the illness will develop into the more serious and life-threatening HAPE or HACE.

2. HAPE (High Altitude Pulmonary Oedema)

HAPE symptoms (some similar to AMS) demand immediate descent or death may result. They include: breathlessness on exertion and at rest, cough, gurgling in the chest, blood in sputum. One of the first symptoms is more than average breathlessness on climbing, followed by breathlessness at rest, often accompanied by a cough. But a dry cough is also common at altitude and in most cases is not due to HAPE. Immediate descent required, and if possible drug regime of Nifedipine.

Prevention and reduction of HAPE: To avoid these conditions you need to acclimatise to the increasing altitude by climbing slowly. It is also possible to use a regime of drugs such as Diamox, and Nifedipine to deter HAPE.

3. HACE (High Altitude Cerebral Oedema)

HACE usually occurs only above 12,000ft and after rapid ascent. Symptoms generally but not always seem like those of AMS but the headache is severe and not relieved by analgesics. Further symptoms may include: vertigo, ataxia - unsteady movements and balance - and hallucinations. As ataxia is one of the first symptoms usually to appear, it is worth doing a heel to toe walking test.

Prevention and reduction of HACE: Treatment is descent and more descent. Drug regime of Dexamethasone may help.

further conditions associated with high altitude

- Retinal haemorrhages are common and, if they appear to enlarge, descent is advised.
- Snow blindness is caused by UV light damaging the cornea.
- Sleep may deteriorate with hypoxia (lowering of oxygen content). You should remember that an 8-hour sleepless night lying at rest is the equivalent of 6-hours sleep, so do not become distressed about lack of sleep.
- The Gastro-Intestinal System is affected and weight loss is to be expected. On a 3-6 week expedition to altitudes over 12,000ft climbers can expect to lose 12-17lbs. Climbers lose most weight during the first few days at altitude. You consume more energy at altitude and the fall in temperature demands an increase in diet. Furthermore your basal metabolic rate increases in spite of the good clothing and protective gear. Overall expect to need about 450kcal/day extra. A diet high in carbohydrates (65%) and low in fat is recommended during ascent and periods of maximum exertion. Hygiene is super-important and hands should be thoroughly washed and scrubbed for around 3 minutes before eating, after the toilet etc. in order to reduce the risk of debilitating gastroenteritis.
- Dehydration is possible and liquid intake should be kept up. But there is no evidence that lots of liquid prevents AMS. Hypoxia stimulates a urine flow. AMS usually leads to a reduced urine output. The conclusion seems to be: drink more than usual, but not to the point of nausea.

- The skin at altitude is at risk from the increased UV, the cold and the wind. Symptoms include; ageing, sunburn, cold sores, prickly heat, and UV conjunctivitis. Your kit should contain high factor suncream and lipsalve with sunblock.
- Peripheral Oedema or the swelling of hands and feet is sometimes noted at altitude. The symptoms usually diminish after a few days, and they do not necessarily herald HACE or HAPE.
- Mild Hypothermia arises when the body core temperature is caused to drop to between 32-35°C. Symptoms include shivering, stumbling and poor co-ordination. Treatment includes: warm dry clothes, warm packs, and plenty to drink - preferably warm liquids. Below 32°C is considered to be severe hypothermia and when the core temp falls below 30°C shivering will cease. The patient must be disturbed as little as possible, insulated with warm items such as a sleeping bag; and very gently taken to a lower altitude. This is a very serious condition requiring skilled medical attention.
- Heat Exhaustion and Heat Stroke can arise in mountain terrain as well as lowland hot zones. Temperatures at altitudes of over 20,000ft (6,000m) can reach 30°C in the sun. Heat Exhaustion is the result of salt and water loss through sweating accompanied by low oral intake of fluids. Symptoms are profuse sweating, dizziness, and fatigue. Treatment consists of removing the patient from the sun, fanning or cool sponging, and oral re-hydration. Heat Stroke is a potentially fatal condition and differs from heat exhaustion in that the body temperature rises above 40°C, sweating may cease, the body will be very hot to touch, headache is likely, and mental disturbance. Urgent treatment to remove the patient from the sun, surface cool the body with cool liquid, even snow or ice, followed by evacuation to hospital.

diamox

Our itineraries are designed to acclimatise you to altitude without the need for Diamox. However Diamox can help speed up the process of acclimatisation and, subject to the essential approval from your doctor, it is a personal decision as to whether to take the drug or not. NB: Acetazolamide is a sulfonamide medication, and persons allergic to sulfa medicines should not take it. We do recommend Diamox in the following cases:

- Treatment of persons with AMS
- Treatment of persons bothered by periodic breathing at night
- Prophylactically for persons on rapid forced ascents (such as flying into Lhasa, Tibet)
- Prophylactically for those persons who have repeatedly had AMS in the past

Diamox, a drug often used in the treatment of the eye condition glaucoma, is also useful in the prevention of AMS. AMS occurs commonly during visits to 3000-4500m and may cause a severe headache, exhaustion and general feelings of illness. In rare cases (but sometimes even at these altitudes), the condition progresses to cause more serious problems that are potentially fatal - HAPE & HACE. Diamox reduces the headache of AMS and helps the body acclimatise to the lack of oxygen - it also probably reduces the incidence of the complications of AMS mentioned above - HAPE & HACE. Whether or not one takes Diamox is obviously a matter of personal choice - travel to high altitudes is quite possible without it.

how to take diamox

If you decide to use the drug, we suggest 125mg (half of one tablet) is taken twice daily as a trial at sea level for two days several weeks before a visit to altitude. Assuming no unpleasant side effects are experienced, take the drug in the same dose for three days before staying at 3500m and thereafter for two or three days until you feel acclimatised, for about five days in all.

side effects

Like all drugs, Diamox may have unwanted side effects. Tingling of the fingers, face and feet is the commonest, but this is not a reason for stopping the drug unless the symptoms are intolerable. Dizziness, vomiting, drowsiness, confusion, rashes and more serious allergic reactions have all been reported but are unusual. In exceptional cases, the drug has caused more serious problems with blood formation and /or the kidneys. Those who are allergic to the sulphonamide antibiotics may also be allergic to Diamox. More commonly, the drug makes many people feel a little off colour, fizzy drinks can also taste strange when you are taking Diamox.

These notes were compiled with the help of information from: the Institute of Mountain Medicine; and The High Altitude Medicine Guide. Bibliography for Mountain Health: "Expedition Medicine" published by the Royal Geographical Society & "High Altitude Medicine Handbook" by Andrew Pollard and David Murdoch. Published by Radcliffe Medical Press.