

# In the Mountains – Going up?

Jill  
Sutcliffe



*Holidaying in high places such as the Andes or Himalayas is becoming increasingly popular. Jill Sutcliffe describes the dangers that await the unwary traveller and explains how, if we understand our bodies, we can avoid the worst problems of life at high altitudes.*

From time to time, mountain rescue groups are called out to take action to find someone and to rescue them when they've found themselves in difficulties. In the UK the highest mountain, Ben Nevis, is about 1500m high; it is exhilarating – with the right kind of preparation and equipment – to visit such areas. You need to take notice of the weather conditions and be prepared to decide *not* to go if the forecast is bad.

However, walking in places which are higher than Ben Nevis can start to have an effect on the body. Everyone knows that when you heat water at height it boils more quickly – the reduced atmospheric pressure lowers the boiling point of water. The body also starts to behave slightly differently as it tries to make up for the reduced oxygen level. So what is the difference about travelling at altitude?

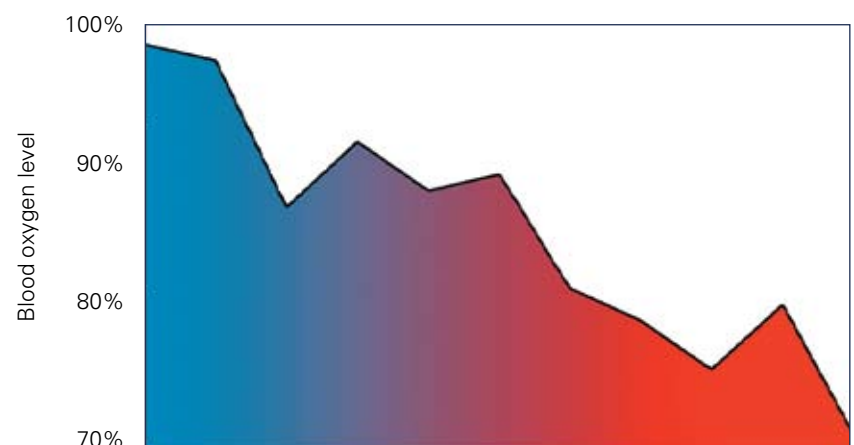
## Effects at altitude

The main difference is that as you go higher the air pressure gets lower (the air gets 'thinner'), and this means that for every breath you take there will be

less oxygen in it for your body. Oxygen is needed for respiration, the process which releases the energy to move and for your brain and digestive system to work. So as your body gets less oxygen it has to adapt. Initially you start to breathe faster and deeper and the body starts to make more red cells so that it can carry more oxygen in the blood.

In some unfortunate people, fluid starts to collect in the lungs. They suffer severe breathlessness even when at rest, and they cough up frothy, bloodstained spit. This is 'high altitude pulmonary oedema' and the sufferer may need to be given oxygen quickly and must descend straight away.

**Key words**  
respiration  
human health  
atmospheric  
pressure

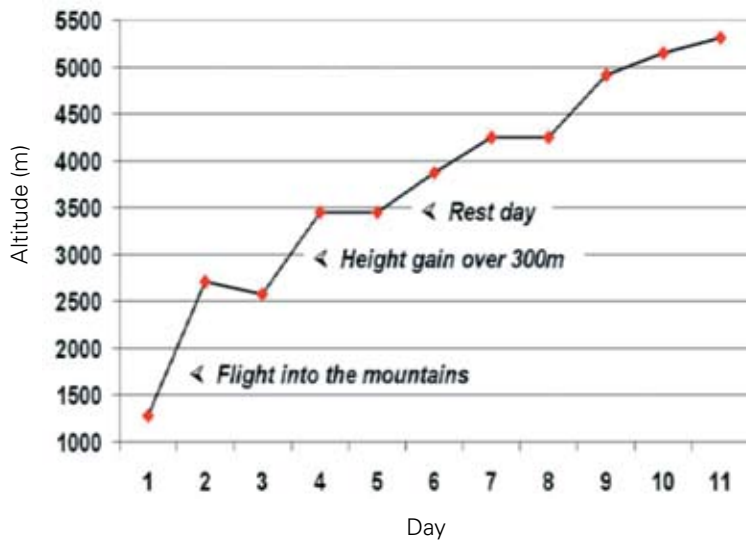


Altitude increasing from sea-level to 5300 m

Measurements of an individual's blood oxygen saturation during a climb.



At high altitudes, snow can be very cold and dry.



Gaining height: how one walker's altitude increased during a trek in Nepal.

Such changes take time to happen. If you go up slowly you should be OK and stay healthy. However, if you go up too fast you risk suffering from altitude-related illness. At heights above 3000 m the best advice is *not* to go up more than 300 m in any one day. If the route means going up more than 300 m you will need to come down to a level so that you've only changed your altitude by 300 m. One danger arises when people fly in and land at a high altitude and then only have a short time for their holiday and try to rush things. You need to build in some time to acclimatise and for your body to get used to the change.

Most people going up high feel altitude-related symptoms. If the illness is dealt with correctly, it is unlikely to be a major problem but if it is not recognised and understood, that can spell disaster.



Camping during a blizzard: snow is an excellent insulating material so the climbers stay warm in their tents.

## Top score:

### how footballers do better at high altitude

*In South America, several countries have capitals which are high up in the Andes. The highest, La Paz in Bolivia, is at 3700 m above sea-level. What problems does this pose for footballers?*



Source: BMJ

There are two answers to this. Local footballers who live and train at altitude are well-adapted to the low atmospheric pressure. Their circulatory systems have a high concentration of the red blood cells which carry oxygen around the body.

For visiting teams from lower altitudes, it's a different story. They can suffer symptoms of altitude sickness (as described in the main article), and this affects their performance.

Teams from lower altitudes spend several days acclimatising to high altitudes. In May 2007, football's governing body FIFA banned international matches at altitudes greater than 2500 m, citing concerns about players' health and possible distortion of competition.

However, even after acclimatisation, it seems that the footballers from high altitude have an advantage. This finding emerged from a study by Dr Patrick McSharry of the Department of Engineering Science at Oxford University. He looked at the results of 1460 matches between football teams of 10 different countries S America. Some have home grounds close to sea-level; others regularly play high up in the Andes mountain range.

## Possible illnesses

It is important to find out before you leave for your trip about what can happen and what to look for. Some very strange things can happen to your body when you go high! Things such as headaches, being out of breath, feeling or being sick, sleeping badly and not feeling hungry. These are symptoms of Acute Mountain Sickness. One of the main impacts is not being able to think straight so it helps if someone else is keeping an eye on you.

The brain is affected by altitude because it needs a good supply of oxygen. With less oxygen available the brain may swell causing pressure. You need to look out for headaches, becoming dizzy and experience mood changes. It is a good idea to keep a log so that you can monitor your own condition. One young traveller wrote:

*I set off at the back with a sore head, coughing. My cough and head got worse. A 'drag' feeling began in my mouth. When I met the others I plucked up the courage to ask if my speech was slurred. The shock hit me. I heard myself mumble incoherently. They looked horrified as my words just dribbled out. I couldn't use my left arm, no power, my left hand tingled, the left of my face was paralysed and my head sore. I was done for!!! Expert medical care and a descent to a much lower altitude as quickly and safely as possible saved my life.*

## Help

A British doctor was the medic employed on an expedition in the mountains in 1991. One of the group developed Acute Mountain Sickness and died. The doctor hadn't known what to do. When he got back to England he talked with others and set up a group – Medical Expeditions – to find out more and, importantly, to train other people about the effects of high altitude. The group runs annual courses, organise expeditions to mountainous areas and undertake research on the participants so that they can learn more about what happens to the body at high altitude. They have just published a short, easy to carry manual, *Travel at High Altitude*. Regular articles about health and travel are published in *Wanderlust* magazine by Dr Jane Wilson-Howarth who is also the author of *Bugs, Bites and Bowels*, a guide to keeping healthy when travelling. The latter deals with more than just altitude and includes a section on the beasts, large and small, to avoid.

*Jill Sutcliffe is an environmental scientist and a keen (but careful) traveller. Excerpts with permission from Medex.*

### Look here!

Download a copy of the Medical Expeditions guide *Travel at High Altitude* from:  
[www.medex.org.uk](http://www.medex.org.uk)

Dr McSharry's statistical analysis, published in the *British Medical Journal*, showed that teams such as Argentina, Brazil and Uruguay, with low-level home grounds, were much less likely to win when they played teams such as Colombia, Ecuador or Bolivia, all over 2500 m up.

What's more, he was able to show that teams from high up still had an advantage when they played lower down – there is evidence that the players' increased blood supply can help their running performance.

The outcome is that the Bolivian team effectively has a 1.5 goal advantage in matches where they play teams whose base is at sea-level. To put it another way, that's a 0.5 goal advantage for every 1000 m difference in altitude.

Dr McSharry emphasises that adaptation to altitude may be only one of several factors which affect the results. The ball behaves differently at high altitude where the air is thinner – it spins less, and moves faster and further. Or it might be that these teams are simply better-trained and managed. Perhaps you'll think twice before accepting a challenge from some mountain athletes.

