CONDITION

# High altitude illness

High altitude illness is a group of conditions caused by reduced oxygen after ascending to high elevations

**WHAT IT IS**
Illness caused by low oxygen after ascent to high altitude

**BODY SYSTEM**
Brain, lungs, heart and circulation

**MAIN SYMPTOMS**
Headache, nausea, dizziness, breathlessness

**WHAT CAUSES IT**
Low oxygen after ascending faster than the body acclimatizes

**HOW IT IS DIAGNOSED**
Clinical assessment, oxygen reading, and sometimes chest imaging

**MAIN TREATMENT**
Stopping ascent, descent, oxygen, and altitude medicines

**CAN IT BE CURED?**
Yes - descent and treatment usually resolve it

**IS IT AN EMERGENCY?**
Sometimes - confusion, breathlessness at rest, or trouble walking

**LONG-TERM OUTLOOK**
Most recover fully after prompt descent and care

## Overview

High altitude illness is a group of conditions that can develop when you travel to high elevations too quickly. Air pressure falls with altitude, so each breath delivers less oxygen to your body.

The body can adjust to lower oxygen through a process called acclimatization. Breathing becomes faster, and other changes help oxygen reach your tissues. This takes time. Symptoms may appear when ascent is faster than your body can manage.

High altitude illness becomes more likely above about 2,500 metres, or 8,200 feet. It can sometimes occur lower, especially after a rapid ascent. There is no exact altitude at which everyone becomes unwell.

The main forms are:

AMS can often be managed by stopping the ascent and allowing time to recover. HACE and HAPE are medical emergencies. They require immediate action, including descent when possible.

- Acute mountain sickness (AMS): the common, usually milder form
- High altitude cerebral oedema (HACE): swelling of the brain caused by altitude
- High altitude pulmonary oedema (HAPE): fluid collecting in the lungs

## Symptoms

Symptoms usually begin within hours of reaching a higher sleeping altitude. They may start overnight or the next morning.

AMS typically causes a headache after a recent ascent, along with one or more of the following:

A mild headache by itself is not always altitude illness. Dehydration, missed meals, alcohol, migraine, heat, cold, and exhaustion can cause similar symptoms. However, a new headache with other symptoms after ascent should be taken seriously.

HACE may develop when AMS becomes severe, although it can occasionally appear without clear earlier symptoms. Warning signs include confusion, unusual behaviour, marked drowsiness, and difficulty walking in a straight line. A person may stumble or be unable to stand without support.

HAPE affects the lungs. Early signs include an unusual loss of exercise ability, breathlessness that is greater than expected, and a dry cough. As it worsens, breathlessness may occur while resting. The cough may become wet, and the person may have chest tightness, blue or grey lips, severe weakness, or bubbling sounds when breathing.

A racing heart and faster breathing are common at altitude, even without illness. The pattern of symptoms, whether they are worsening, and the recent ascent are more useful than any one sign.

- Nausea, loss of appetite, or vomiting
- Dizziness or light-headedness
- Unusual tiredness or weakness
- Poor-quality sleep

## Causes and risk factors

High altitude illness is caused by reduced oxygen pressure at altitude. It is not caused by infection and does not spread between people.

The main risk is ascending rapidly, especially when the sleeping altitude rises quickly. Sleeping high matters because the body spends many hours at that elevation. A daytime trip to a higher point followed by sleep at a lower level is usually less demanding.

Other factors that increase risk include:

Physical fitness does not protect against altitude illness. Very fit people may be at risk if they climb quickly or push through early symptoms.

Age and general health do not reliably predict who will become ill. Some people are naturally more vulnerable than others. A previous trouble-free trip also does not guarantee that a future ascent will be safe because the route, speed, sleeping altitude, and level of exertion may differ.

Heart or lung conditions can make low oxygen harder to tolerate. Pregnancy may also affect travel planning. These situations do not automatically rule out altitude travel, but they warrant medical advice before the trip.

- A previous episode of altitude illness
- Living near sea level and travelling directly to altitude
- Heavy exercise soon after arrival
- Continuing to climb despite symptoms
- Sleeping at a much higher elevation than the previous night

## Diagnosis

There is no single blood test that confirms high altitude illness. Diagnosis is mainly based on your symptoms, recent increase in altitude, and physical examination.

A clinician may measure oxygen saturation using a finger sensor called a pulse oximeter. Oxygen readings are normally lower at altitude, so the number must be interpreted in context. Consumer devices may also be inaccurate when fingers are cold, circulation is poor, or the person is moving.

If HACE is suspected, the examination focuses on alertness, behaviour, coordination, and walking. Difficulty walking heel-to-toe is an important warning sign.

If HAPE is suspected, a clinician will assess breathing, listen to the lungs, and measure oxygen

levels. A chest X-ray or ultrasound may show fluid in the lungs, but treatment should not be delayed when the symptoms and situation strongly suggest HAPE.

Other conditions can resemble altitude illness. These include dehydration, low blood sugar, migraine, infection, asthma, carbon monoxide poisoning, blood clots in the lungs, stroke, and head injury. The setting and full pattern of symptoms help distinguish them.

## Treatment and management

The first step for possible AMS is to stop ascending. Do not go higher while symptoms are present.

Mild symptoms may improve with rest at the same altitude. Fluids can correct dehydration, and simple pain relief or anti-nausea treatment may help symptoms. Drinking excessive water does not treat altitude illness and can be harmful.

If symptoms worsen or do not improve, descent is the most reliable treatment. Even a moderate reduction in altitude can help. You should not resume ascent until symptoms have fully resolved.

HACE and HAPE require urgent descent whenever it can be done safely. A person who is confused, very breathless, or unable to walk steadily should not descend alone. Exertion should be kept as low as possible, particularly with HAPE.

Supplemental oxygen can improve oxygen levels while evacuation or descent is arranged. A portable pressure bag can temporarily simulate a lower altitude when descent is delayed, but it does not replace evacuation.

Medicines may be used under medical guidance:

These medicines do not make it safe to continue climbing with worsening symptoms. Their suitability depends on your health, other medicines, previous reactions, and the type of altitude illness.

- Acetazolamide helps the body acclimatize and can assist recovery from AMS
- Dexamethasone , a steroid, can reduce symptoms of severe AMS or HACE but does not produce acclimatization
- Nifedipine may be used for HAPE in selected situations, especially when oxygen or descent is delayed

## Complications

Most mild AMS settles without lasting effects when ascent stops and symptoms are respected.

Untreated AMS can progress to HACE. Increasing brain swelling can cause loss of coordination, reduced consciousness, coma, and death if descent and treatment are delayed.

HAPE prevents oxygen from moving normally from the lungs into the blood. It can worsen quickly, especially if the person keeps exercising or stays at the same altitude. Severe oxygen shortage can affect the brain and other organs.

HACE and HAPE can occur together. Cold, difficult terrain, poor visibility, or a remote location may also make evacuation harder and increase the risk of falls or other injuries.

Prompt recognition, oxygen when available, and descent greatly improve the chance of recovery.

## Prevention

High altitude illness cannot always be prevented. Some people develop symptoms even after a careful ascent.

Gradual ascent is the most useful preventive step. Allow time at an intermediate elevation before going higher. Once at high altitude, increase sleeping elevation slowly and include rest or acclimatization days. Avoid making a large jump to a much higher sleeping altitude when possible.

During the first days at altitude:

Extra water does not prevent altitude illness. Fitness training before a trip may help with the physical demands, but it does not prevent AMS, HACE, or HAPE.

Preventive acetazolamide may be considered when a gradual ascent is not possible or when someone has a history of altitude illness. Other medicines are reserved for particular risks. A clinician familiar with altitude medicine can discuss whether medication is appropriate before travel.

- Keep exercise lighter than usual
- Eat normally and drink according to thirst
- Limit alcohol, which can worsen sleep and judgement
- Notice early symptoms rather than pushing through them
- Do not climb higher with symptoms of AMS

## Living with it and what to expect

High altitude illness is usually a short-term condition rather than an ongoing disease.

Mild AMS often improves over one to three days if you remain at the same altitude and do not exert yourself heavily. This improvement reflects acclimatization. If symptoms become worse instead, descent is needed.

After descent, headache, nausea, and dizziness often improve within hours, although tiredness may last longer. Recovery from HACE or HAPE can take days or weeks, depending on severity and how quickly treatment began. Medical follow-up may be needed after a severe episode.

Most people recover fully and have no lasting restrictions at lower altitude. A previous episode does mean you may be more likely to have altitude illness again, particularly with a similar or faster ascent.

Future altitude travel may still be possible. A slower plan, lower sleeping elevations, early recognition of symptoms, and sometimes preventive medicine can reduce risk. After HACE or HAPE, obtain medical advice before returning to altitude.

## When to get medical help

Stop ascending if you develop a new headache with nausea, dizziness, unusual fatigue, or poor coordination after gaining altitude. Rest at the same level and monitor symptoms closely. Descend if they worsen or fail to improve.

Get emergency help and begin a safe descent if you or someone with you has:

Call local emergency or mountain rescue services when available. Do not leave a confused, unsteady, or severely breathless person alone. If immediate descent is unsafe, use oxygen or a portable pressure bag if available while arranging evacuation.

Arrange routine medical follow-up after HACE or HAPE, if symptoms continue after returning to a lower altitude, or before another high-altitude trip after a severe episode.

- Breathlessness while resting
- Confusion, unusual behaviour, or difficulty staying awake
- Trouble walking straight, repeated stumbling, or inability to stand
- A wet cough, chest tightness, or blue or grey lips
- Rapid worsening after earlier mild altitude symptoms

## Common questions

What altitude causes altitude sickness?

It is most common above about 2,500 metres, or 8,200 feet, but there is no fixed cutoff. How quickly you ascend and how high you sleep are more important than reaching one exact number.

Can fit people get altitude sickness?

Yes. Fitness does not prevent altitude illness. Fit people may climb faster or exercise harder, which can increase their exposure before acclimatization occurs.

How long does altitude sickness last?

Mild AMS often improves within one to three days if you stop ascending. Descent may bring faster improvement. HACE and HAPE need urgent treatment, and recovery can take longer.

Can I keep climbing with a mild headache?

Do not climb higher if the headache may be AMS, especially when it comes with nausea, dizziness, fatigue, or poor sleep. Wait until symptoms have fully resolved. Descend if they worsen.

Does drinking water prevent altitude sickness?

No. Normal hydration is important, but extra water does not prevent altitude illness. Drink according to thirst and avoid becoming either dehydrated or overhydrated.

Can children get altitude sickness?

Yes. Children can develop the same conditions as adults. Younger children may show irritability, poor feeding, vomiting, reduced play, or unusual sleepiness rather than clearly describing a headache.

## Sources

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