# HIGH-ALTITUDE ILLNESS FACT SHEET

**This fact sheet provides information on high-altitude illnesses, including acute mountain sickness (AMS), high-altitude cerebral edema (HACE), and high-altitude pulmonary edema (HAPE). Those traveling to high altitudes should be aware of the symptoms and treatments for high-altitude illnesses.**

## ACUTE MOUNTAIN SICKNESS (AMS)

AMS is characterized by a group of symptoms that can occur when an individual ascends elevation too quickly. The occurrence of AMS is common at high altitudes (75 percent of people will have mild symptoms at altitudes over 10,000 feet [3,048 m]). The severity of AMS depends on change in altitude, rate of ascent, physical exertion, and individual variability. It is important to note that AMS symptoms at altitudes below 6,500 feet (1,981 m), may be the result of other conditions, such as heat illness or dehydration.

## SYMPTOMS OF AMS

Symptoms of AMS may include mild headache, loss of appetite, nausea, dizziness, insomnia, and fatigue. These symptoms will decrease over time as the body acclimates to the altitude. Acclimation usually takes between two and four days. If symptoms get worse while resting at the same altitude, the person should descend immediately to a lower altitude and receive proper medical treatment.

## WHAT TO DO IF A PERSON IS EXHIBITING SYMPTOMS OF AMS

Although AMS is not life-threatening and the symptoms are often mild and manageable, it can develop into HACE or HAPE, which can be life-threatening if not immediately treated. It may be necessary for a person experiencing AMS symptoms to descend to a lower altitude or to simply stop at the current altitude to wait for improvement before going higher. If conditions worsen, the person should immediately descend at least 1,000 to 2,000 feet (305 to 610 m) to a lower altitude. Aspirin or acetaminophen can be taken for headache pains. If the person has prescribed medication, this can be self-administered, and symptoms will usually diminish after 12 to 24 hours.

## HIGH-ALTITUDE CEREBRAL EDEMA (HACE)

HACE is characterized by the swelling of brain tissue caused by fluid buildup at high altitudes. Little is known about the exact physiological processes that lead to the fluid buildup in the brain.

## SYMPTOMS OF HACE

Symptoms of HACE can include extreme fatigue, loss of coordination, severe headache, unusual changes in personality (such as violence or laziness), nausea, confusion, and breathing abnormalities causing moderate to severe sleep disturbances. More severe symptoms may include seizures, coma, and stroke. HACE can be fatal if not treated promptly after symptoms are observed.

## HIGH-ALTITUDE PULMONARY EDEMA (HAPE)

HAPE is the result of fluid buildup in the lungs. Fluid from the body leaks into the lungs because of the lower air pressure at higher altitudes and because of physiological changes in the body that are not completely understood. The fluid builds up in the alveolar regions of the lung, where oxygen from the air enters the bloodstream. Because the presence of this fluid inhibits the exchange of oxygen, and because the air at higher altitudes has less oxygen available, the amount of oxygen in the blood decreases significantly. As this condition becomes more severe, it can cause a wide variety of problems, including impaired brain function and even death. HAPE may occur in people who rapidly ascend to altitudes higher than 8,000 feet (2,438 m), especially when they are exerting themselves.

## SYMPTOMS OF HAPE

Symptoms of HAPE can include extreme fatigue, breathlessness (even at rest), shallow and fast breathing, coughing, chest tightness, visual impairment, lethargy, and blue or gray lips or fingernails. The person may also be confused or act irrationally because of the lack of oxygen reaching the brain.

## WHAT TO DO IF A PERSON IS EXHIBITING SYMPTOMS OF HACE OR HAPE

Early detection is essential for effective treatment. A person exhibiting symptoms of HACE or HAPE should immediately descend between 2,000 and 4,000 feet (610 to 1,219 m) to a lower altitude. Once at a lower altitude, the individual should be taken to a medical facility to receive proper treatment.

## THOSE AT RISK FOR HIGH-ALTITUDE ILLNESS

Anyone traveling to high altitudes is at risk for AMS, HACE, and HAPE. An increased level of physical fitness does not provide protection. It is not the altitude itself but the change in altitude that accounts for most of the symptoms. The rate of ascent is also a risk factor for developing high-altitude illness—the more rapid the ascent, the higher the risk. Biological, genetic, and cardiac irregularities, pulmonary problems, and lifestyle variations can also play a role in the severity and onset of high-altitude illness. Any person who has experienced high-altitude illness in the past should avoid traveling to high altitudes.

## GENERAL PREVENTION MEASURES

A slow, gradual ascent that allows the body to acclimate in stages over a few days will minimize the risk of developing high-altitude illness. Avoiding overexertion, decreasing salt intake, and increasing dietary carbohydrate intake may also reduce the risk. The prescription medication acetazolamide may also be used as a preventive treatment for AMS. Avoid going directly from low altitude to a sleeping altitude higher than 9,000 feet (2,743 m) in one day. Once above 9,000 feet, move sleeping altitude no higher than 1,600 feet (488 m) per day, and plan an extra day for acclimation for every 3,300 feet (1,006 m) of altitude gained. Reduce risk by taking a day trip to a higher altitude and return to a lower altitude to sleep.

Those with certain preexisting medical conditions may need to refrain from traveling to or spending long amounts of time at high altitudes. Before planning a trip to a high-altitude location, consult a doctor if you have a heart or lung disease, you have diabetes, or you are pregnant.

## REFERENCES


Peter H. Hackett and David R. Shlim, "Altitude Illness," in *CDC Yellow Book* (2020): https://wwwnc.cdc.gov/travel/yellowbook/2020/noninfectious-health-risks/high-altitude-travel-and-altitude-illness (accessed December 29, 2021)

*Travel at High Altitude* (2008): https://www.medex.org.uk/the-medex-book/ (accessed Sept. 6, 2017)


**For more information about this topic, call the Risk Management Division:**

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