



National Optical Astronomy Observatory

Kitt Peak National Observatory • Cerro Tololo Inter-American Observatory • NOAO Gemini Science Center

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WORKING AT ALTITUDE AWARENESS POLICY

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REVISION HISTORY

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1.0 INTRODUCTION

High Altitude Health Information:

Whether you are an experienced trekker, a visitor or an observer, altitude does not discriminate. Altitude affects the young and old, fit or feeble. High altitude is defined as 5,000 -11,500 ft. in elevation.

Altitude Sickness or acute mountain sickness (AMS) is the most common unhealthy response to altitude: it's a collection of signs that your body is becoming ill and has not adapted successfully to a higher altitude.

2.0 SIGNS/SYMPTOMS OF AMS

For your own safety, assume any illness at altitude is AMS. The most common reasons that people fail to descend as soon as they should are bad assumptions. They assume that having AMS is a sign of weakness; that their level of fitness means they can't have AMS; or mistake their symptoms for the flu or another illness. Assume AMS first: it happens to healthy strong people, and if it turns out you are indeed sick with something else, descending to a lower altitude will make it easier for your body to heal anyway.

In particular, if you've recently ascended, and you have a headache and any other symptom, you probably have AMS. The other signs of AMS vary for different people, but include:

- fatigue
- dizziness
- loss of appetite
- nausea or vomiting
- confusion
- difficulty walking (called *gait ataxia*)
- rattling breath
- feeling generally extremely ill

The last three signs in particular are signs that you are becoming quite ill, but you should not wait for the onset of these symptoms before acknowledging you have AMS.

You and your group should keep an eye on each other for signs of AMS. If you have AMS, monitor your symptoms to ensure they do not worsen. Very sick people can become confused and not realize how ill they are. Loss of appetite is a particularly good sign: anyone who has been walking or climbing at altitude for a day should be hungry for a good meal in the evening.

If you have symptoms of AMS, do not ascend further. Consider descending. Contact the Kitt Peak EMT or Wilderness First Responder for assistance. On Kitt Peak you can call 8777, or

dial 8721 for a Radio Patch and state you have an emergency and your location or use your radio on channel 1 and ask for assistance.

3.0 DEFINITIONS

AMS-Acute Mountain Sickness

4.0 PREVENTION

4.1 Keep Hydrated - Remember to drink adequately - around one liter extra of clear fluids per day. Pushing large volumes of water does not protect against AMS, and can give the same symptoms (headaches, nausea, vomiting and more) as severe AMS from electrolyte imbalance.

Minimize the consumption of caffeine while working at high altitudes, as it is a diuretic and can prevent adequate hydration.

4.2 Acclimatize to Altitude gradually-Acclimatization is the process of getting your body to adapt to the lower oxygen levels by ascending slowly into higher altitudes, spending some time at each one to adapt.

5.0 RESPONSIBILITIES

NOAO employees, visitors, observers and contractors all have the responsibility of making themselves aware of the symptoms of AMS in this policy and knowing their own limitations while working on Kitt Peak.

5.1 It is important to remember that just because you are young and healthy, and haven't experienced altitude sickness in the past doesn't mean you are immune to it on future climbs. Physical fitness is not necessarily a good indicator, and neither are strength or good health. You may react badly to altitude despite being fit, young and healthy. In fact, the fit, young and healthy have a hidden risk: their general physical capacity leads them to believe that they should handle altitude just fine, which is not always true.

5.2 Bad health, on the other hand, is a risk factor: particularly cardiac or respiratory problems. Healthy hearts and lungs have a hard enough time getting oxygen to your tissues at high altitudes. Naturally, if you have physical problems that make exertion difficult for you, you have reason to think carefully about exertion at high altitude, where it is much harder!

6.0 PROCEDURES

6.1 For all stages of altitude sickness, the main treatment is to go down to a lower altitude as quickly and safely as possible. For mild altitude sickness, over-the-counter medicines should relieve headache. Other symptoms will go away quickly at a lower altitude.

- 6.2 Drinking plenty of water is the number one way to help your body adjust easily to the higher altitude. The low humidity keeps the air dry, like the desert, so you need about twice as much water here as you would drink at sea level.
- 6.3 The effects of exercise are more intense at altitude. Walking up to elevated telescope locations may be more strenuous than anticipated. Take your time when walking to these location.
- 6.4 With less water vapor in the air at this altitude, there's less protection from the sun, so sunscreen is a must. Bring sunglasses, sunscreen, lip balm... even in winter.
- 6.5 Dress in Layers - check the weather and use this information to dress appropriately. Because the sun is especially powerful, it can feel much warmer than the actual temperature during the daytime, but then become very chilly after sundown, particularly in the Spring, Fall and Winter. It is best to layer your clothing.

7.0 REFERENCES

Daniel K. Inouye Solar (DKIST) Telescope, Maui, HI – Altitude safety
Lowell Observatory, Flagstaff, AZ – visitor safety
Mt. Graham International Observatory (MGIO), Safford, AZ – visitor safety