

Mayo Clinic studies climbers on Everest to help heart patients at home

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It's a natural laboratory for studying heart disease, lung problems, muscle loss, sleeping disorders and new medical technologies. It's also the highest mountain in the world. Mount Everest's extreme altitude puts climbers under the same conditions experienced by patients suffering from heart disease, obesity or advanced age. To take advantage of that, Mayo Clinic researchers are joining an expedition to Everest with National Geographic, The North Face and Montana State University. The Mayo group will monitor up to nine climbers from base camp for the duration of the climb, which will run from mid-April to mid-May.

"We can simulate some conditions in oxygen tents and hyperbaric chambers, but only for short periods," says Bruce Johnson, Ph.D., Mayo Clinic physiologist and leader of the scientific expedition. "We're studying the effects of extreme altitude on healthy, active individuals as well as these extreme athletes because what they experience mimics aspects of [heart disease](#)."

Dr. Johnson, who has conducted research at the South Pole and other mountain ranges, will be joined by three other Mayo investigators: physician-researcher Doug Summerfield, M.D., and scientists Bryan Taylor, Ph.D., and Amine Issa, Ph.D. Mayo Clinic also will send its own reporter to cover the [research expedition](#). Joel Streed of the Mayo Clinic News Network will blog and shoot video from base camp. The coverage can be followed at www.MayoCliniconEverest.com, and on Twitter at #MayoClinic #onEverest.

The expedition and other [research initiatives](#) are part of Mayo's work to transform medical care. The data generated by the expedition is expected to provide new insights into aging patients and heart disease, and help Mayo develop high-quality, affordable options for patients who need cardiac monitoring.

The Projects

Sleep Physiology

It's hard to get a good night's sleep in a cold tent, especially at 18,000 feet. Sleep apnea is common, and such starts and stops in breathing also trouble many overweight patients or those with chronic heart failure. [Sleep apnea](#) can decrease oxygen in the blood, a serious condition at sea level and at high altitude. Poor sleep quality occurs due to restricted space, high wind, hard surfaces; even clothing or equipment may play a role. Researchers will study oxygen during sleep and sleep quality as it relates to other high altitude problems.

Muscle Loss at High Altitude

Previous studies show that climbers lose weight rapidly at high altitude -- primarily muscle, not fat -- and extra food intake has negligible impact. Muscle wasting is a common problem with many chronic diseases, including heart disease. The hypothesis is that weight loss is related to more severe hypoxia, especially at night. The team will track calories, sleep quality, sleep hypoxia and body composition.

Lung Fluid Regulation

Pulmonary edema, fluid in the lungs common in heart patients, remains a mystery on mountains. Some think it's caused by an uneven

constriction of blood vessels in the lungs, a response to the lower inspired gas pressures. Yet it doesn't happen to everyone who climbs, so there may be other factors, such as genetic susceptibility. Researchers will look at pressures in the lungs, gas transfer across the lungs and other factors.

Remote Monitoring Testing

Remote monitoring and recording devices will be tested, some for the first time under such extreme conditions. Ensuring they are rugged enough for Mount [Everest](#) and function under extreme cold and pressure changes will be valuable for future climbs and sea-level use. One monitor developed by Mayo researchers will get its first field test. If reliable data capture works on Mount Everest, quality should be assured in monitoring heart patients remotely in their homes, providing a tip-off when medication needs to be adjusted or a visit to the doctor is needed.

Provided by Mayo Clinic

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