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Contact: David Kelly

david.kelly@ucdenver.edu

303-315-6374

[University of Colorado Denver](http://www.ucdenver.edu)

Study shows living at high altitude reduces risk of dying from heart disease

Low oxygen may spur genes to create blood vessels

AURORA, Colo. (March 25, 2011) – In one of the most comprehensive studies of its kind, researchers at the University of Colorado School of Medicine in partnership with the Harvard School of Global Health have found that people living at higher altitudes have a lower chance of dying from ischemic heart disease and tend to live longer than others.

"If living in a lower oxygen environment such as in our Colorado mountains helps reduce the risk of dying from heart disease it could help us develop new clinical treatments for those conditions," said Benjamin Honigman, MD, professor of Emergency Medicine at the CU School of Medicine and director of the Altitude Medicine Clinic. "Lower oxygen levels turn on certain genes and we think those genes may change the way heart muscles function. They may also produce new blood vessels that create new highways for blood flow into the heart."

Another explanation, he said, could be that increased solar radiation at altitude helps the body better synthesize vitamin D which has also been shown to have beneficial effects on the heart and some kinds of cancer.

The study was recently published in the *Journal of Epidemiology and Community Health*.

At the same time, the research showed that altitudes above 4,900 feet were detrimental to those suffering from chronic obstructive pulmonary disease.

"Even modestly lower oxygen levels in people with already impaired breathing and gas exchange may exacerbate hypoxia and pulmonary hypertension [leading to death]," the study said.

Honigman, senior author of the study, along with researchers that included Robert Roach, PhD, director of the School of Medicine's Altitude Research Center, Deborah Thomas, PhD, a geographer at the University of Colorado Denver and Majid Ezzati of the Harvard School of Global Health, spent four

years analyzing death certificates from every county in the U.S. They examined cause-of-death, socio-economic factors and other issues in their research.

They found that of the top 20 counties with the highest life expectancy, eleven for men and five for women were located in Colorado and Utah. And each county was at a mean elevation of 5,967 feet above sea level. The men lived between 75.8 and 78.2 years, while women ranged from 80.5 to 82.5 years. Compared to those living near sea-level, the men lived 1.2 to 3.6 years longer and women 0.5 to 2.5 years more.

Despite these numbers, the study showed that when socio-economic factors, solar radiation, smoking and pulmonary disease were taken into account, the net effect of altitude on overall life expectancy was negligible.

Still, Honigman said, altitude seems to offer protection against heart disease deaths and may also play a role in cancer development.

Colorado, the highest state in the nation, is also the leanest state, the fittest state, has the fewest deaths from heart disease and a lower incidence of colon and lung cancer compared to others.

"We want to now look at these diseases in a more focused way so we can see the mechanisms behind hypoxia and why they affect the body the way they do," Honigman said. "This is a public health issue in Colorado and the mountain West. We have more than 700,000 people living at over 7,000 feet above sea level. Does living at altitude change the way a disease progresses? Does it have health effects that we should be investigating? Ultimately, we hope this research will help people lead healthier lives."

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Faculty at the University of Colorado School of Medicine work to advance science and improve care. These faculty members include physicians, educators and scientists at University of Colorado Hospital, The Children's Hospital, Denver Health, National Jewish Health, and the Denver Veterans Affairs Medical Center. Degrees offered by the UC Denver School of Medicine include doctor of medicine, doctor of physical therapy, and masters of physician assistant studies. The School is located on the University of Colorado's Anschutz Medical Campus, one of four campuses in the University of Colorado system. For additional news and information, please visit the UC Denver newsroom online.

