



University of Colorado **Anschutz Medical Campus**

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Study shows nitrous oxide decreases pain for women in labor at any altitude

CU College of Nursing study is first to evaluate pain relief gas at sea level and high altitudes

AURORA, Colo. (October 6, 2021) – A notable study compared nitrous oxide use for pain relief during labor at institutions located at sea level versus high altitude. To date, no other publication has evaluated the impact of altitude when administering nitrous oxide for pain relief during labor. The [study](#) published in *Anesthesia & Analgesia*, with obstetric anesthesiologist, Cristina Wood, MD as lead author, found the gas is safe to use for pain and relaxation for women in labor whether they live in Florida or Colorado.

“We have known that nitrous oxide can be used to relieve the pain of labor for many patients. We just don’t know if altitude plays a role in how effective it is, or the types of side effects incurred. So, this is a first of its kind study,” said Principal Investigator Priscilla Nodine, CNM, PhD, and associate professor with the University of Colorado College of Nursing.

Epidurals are still the most used pain-relieving option for labor in the U.S. In many other countries, such as Australia, nitrous oxide is the predominant analgesia used during labor, but it’s still rare in the United States. A U.S. survey in 2011 found only 6% of people used it during labor. “Nitrous is a great labor support tool for patients in labor. Individuals are able to change positions, walk, and use other modalities like birth balls while using nitrous,” said co-author and CU Nursing Associate Professor Jessica Anderson, DNP, CNM

However, the partial pressure of all gases decreases with elevation. “Given what we know about the property of gases at altitude, it was wonderful to find that using nitrous oxide at altitude was just as effective as using nitrous oxide at sea level for our laboring patients. We want moms to have as many options as possible for pain management during labor,” said Wood.

While the gas levels are decreased at higher altitudes, it was not significant enough for the laboring patients to ask for different pain management more often than those at sea level, according to the study. There were also no significant differences in neonatal outcomes. The mothers in the higher elevations experienced significantly fewer side effects than those delivering at sea level.

The multicenter retrospective study included four institutions (University of Colorado Hospital, Mount Sinai West, University of North Carolina, and Vanderbilt Medical Center) over a three-year period. It showed that nitrous oxide (50% N₂O and 50% O₂ administered through inhalation) appears to be effective at both high and low altitude and that patients were not more likely to convert to another form of pain relief at high altitude. The research team included *anesthesiologists, obstetricians, family medicine physicians and nurse-midwives*.

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