

## NEWS RELEASE FOR IMMEDIATE RELEASE

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### **Study shows promising results in using the sun's ultraviolet rays to decontaminate water at high altitudes**

*Solar water disinfection could improve access to safe drinking water across the world in high altitude remote areas, reports Wilderness & Environmental Medicine*

**Philadelphia, March 1, 2023** – Research shows that solar water disinfection (SODIS) may be just as effective at decontaminating *Escherichia coli* (*E coli*) infected water at high altitudes as it is at low altitudes. The results of a [new study](#) appearing in the Wilderness Medical Society's official journal [Wilderness & Environmental Medicine](#), published by Elsevier, show promise for improving global access to safe drinking water.

Water can be successfully disinfected through several methods: heat, filtration, chemical treatment, and ultraviolet (UV) light. The use of natural sunlight for solar disinfection of contaminated water effectively inactivates many microorganisms, including bacteria, viruses, protozoa, and fungi.

A team of researchers at the University of Colorado Anschutz Medical Campus conducted an experimental study to determine the effect of SODIS on water purification at high altitude (defined as above 2,500 meters) compared to low altitude (below 2,500 meters) among different types of water containers.

"No other published research examining the effectiveness of SODIS at high altitude is available to our knowledge. Adequate access to water, sanitation, and hygiene is a crucial component of human health during emergency situations such as natural disasters and extreme weather events, which are becoming prevalent with climate change," according to lead investigator William Mundo, MD, MPH, School of Medicine and School of Public Health, University of Colorado Anschutz Medical Campus, Aurora, CO, USA.

A study design previously described in the literature was modified, most notably to evaluate the concentration of *E coli* colony forming units (CFUs) at multiple time points throughout the required six hours of direct sunlight, as recommended by the World Health Organization. Compared to control containers with no sunlight exposure, the researchers found that all bacteria were inactivated by six hours. At two hours, bacterial inactivation at high altitude was 1.7-fold greater than at lower altitude, however, at the end of six hours, there were no significant differences between high and low altitude samples.



Caption: Experimental set up with Nalgene bottles, plastic water bottles, and a plastic bag placed on a reflective tarp exposed to the sunlight during a lower-altitude trial (Credit: Kylie Van Hoesen, MD).

The study also found that compared with Nalgene bottles, plastic bottles had a 1.4-fold greater decrease in CFUs. No statistical difference in bacterial inactivation was found between plastic bottles and plastic bags.

Co-lead investigator, Kylie Van Hoesen, MD, School of Medicine, University of Colorado Anschutz Medical Campus, Aurora, CO, USA, commented, “This project highlights how health equity, global health, and wilderness medicine can intersect in the development of research around improving access to safe drinking water across the world in high altitude remote areas.”

While the study highlights some early evidence that SODIS may be used at high altitude to create access to clean and safe drinking water, more research is required to investigate if SODIS is effective at disinfecting other organisms at high altitude before studies involving human subjects are developed.

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#### **Notes for editors**

The article is “Evaluation of *Escherichia coli* Inactivation at High Altitudes Using Solar Water Disinfection,” by Kylie Van Hoesen, MD; William Mundo, MD, MPH; Savannah Mierau, BA; Camille J. Hochheimer, PhD; Lucas Eggers, BS; Steven Shaw, MS; Brian C. Russo, PhD; and Elaine Reno, MD (<https://doi.org/10.1016/j.wem.2022.10.005>). It appears online ahead of *Wilderness & Environmental Medicine*, volume 34, issue 1 (March 2023), published by [Elsevier](#).

The article is openly available at [https://www.wemjournal.org/article/S1080-6032\(22\)00197-1/fulltext](https://www.wemjournal.org/article/S1080-6032(22)00197-1/fulltext).

Full text of the article is also available to credentialed journalists upon request. Contact Theresa Monturano at +1 215 239 3711 or [hmsmedia@elsevier.com](mailto:hmsmedia@elsevier.com) to obtain copies. Journalists wishing to interview the authors should contact William Mundo, MD, MPH, at [william.mundo@cuanschutz.edu](mailto:william.mundo@cuanschutz.edu).

This study received funding from the Wilderness Medical Society Charles S. Houston grant, supported by the Academy of Wilderness Medicine®, and the Pilot Grant Award from the Center for Innovative Design and Analysis at the Colorado School of Public Health.

#### **About *Wilderness & Environmental Medicine***

*Wilderness & Environmental Medicine* (WEM), the official journal of the Wilderness Medical Society, is a peer-reviewed international journal for physicians practicing medicine in austere environments. It is devoted to original scientific and technical contributions on the practice of medicine defined by isolation, extreme natural environments, and limited access to medical help and equipment. Examples

of topics covered include high altitude and climbing; hypothermia and cold-induced injuries; drowning and near-drowning; hazardous plants, reptiles, insects, and marine animals; animal attacks; search and rescue. [www.wemjournal.org](http://www.wemjournal.org)

### **About the Wilderness Medical Society**

Founded in 1983, the Wilderness Medical Society (WMS) is the world's leading organization devoted to wilderness medical challenges. Wilderness medicine topics include expedition and disaster medicine, dive medicine, search and rescue, altitude illness, cold- and heat-related illness, wilderness trauma, and wild animal attacks. WMS explores health risks and safety issues in extreme situations such as mountains, jungles, deserts, caves, marine environments, and space. For more information on the WMS, please visit us at [www.wms.org](http://www.wms.org).

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