


Justice & Health

New Analysis Provides More Evidence That Heat Standards Save Lives

As the Trump administration is expected to finalize a standard to prevent heat-related injury and illness for workers by early next year, a new study shows that clear, comprehensive rules save lives.



By Liza Gross 
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A Los Angeles County crew member hydrates between repaving a road as temperatures reach 100 degrees and above in August 2023. Credit: Robert Gauthier/Los Angeles Times via Getty Images

Last year was the **hottest on record**, but global warming isn't just overheating the planet. It's killing workers.

Now a new analysis of the impact of state-implemented outdoor heat standards on worker deaths adds to the growing body of **scientific research** showing that requiring employers to take simple precautions to prevent heat stress can reduce the risk of injury, illness and death from exposure to high temperatures on the job.




Similar precautions are included in the **heat standard** the Biden administration proposed last year, which the U.S. Occupational Safety and Health Administration is expected




to finalize by early next year.

Under the **proposed federal rule**, employers must provide adequate water, rest and shade when the heat index—a measure of how humidity amplifies heat’s effects on the body—reaches 80 degrees Fahrenheit, and take additional measures, such as providing paid 15-minute breaks every two hours, once the index reaches 90 degrees.

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For nearly two decades, California was the only state to mandate such protections for outdoor workers. Over the past three years, Colorado, Maryland, Nevada, Oregon and Washington have passed similar rules.

In the [new study](#), published in the peer-reviewed journal Health Affairs, labor policy experts compared heat-related deaths among outdoor workers in California, which adopted the nation's first outdoor heat standard in 2005, with neighboring states that have similar climates but lacked a standard during the study period, from 1999 through 2020.

Critics argued that the 2005 standard was not actively enforced and its ambiguous wording allowed employers to

skirt requirements. In keeping with those critiques, the researchers saw a drop in worker deaths relative to the surrounding states only after 2010, when the state enhanced enforcement and subsequently strengthened requirements to ensure workers had access to water, shade, breaks and emergency services during hot days.

The California standard became increasingly effective over time, said study author Adam Dean, an associate professor of political science at George Washington University, while worker deaths in the neighboring states of Arizona, Nevada and Oregon increased.

“After 2010, we’re finding a statistically significant association between the heat standard and heat-related outdoor deaths,” said Dean, meaning that the effect seen was not due to chance.

And there was a significant drop in heat-related deaths after stronger enforcement was implemented, Dean said, calling the observed 33 percent reduction in deaths “a conservative estimate.”

California officials ramped up enforcement of the heat standard starting in 2010 by increasing workplace inspections, issuing more citations for violations and expanding educational outreach to both employers and workers.

“The study’s methods are sound and its results are of great importance, documenting the life-saving impact of a comprehensive workplace heat standard,” said epidemiologist David Michaels, a professor at George Washington University’s Milken Institute School of Public Health and a former top OSHA administrator who was not involved in the study.

... of ... in the study.

“The finding that the revised standard so successfully prevented worker heat deaths is evidence that a clear, comprehensive workplace standard is an effective tool for saving lives,” said Michaels.

Undercounting Heat Deaths

Far too many workers are getting sick and dying from preventable heat-related illnesses, former OSHA deputy assistant secretary Jordan Barab said in formal comments in October as the agency considered a heat standard more than 50 years after government scientists **first recommended** one.

“And because of severe undercounting,” Barab said, “far more are dying than we even know about.”

Heat-related deaths are routinely undercounted for various reasons, including a failure to recognize how high temperatures trigger fatal heart attacks, strokes and deadly accidents as well as inconsistent reporting by medical professionals and coroners. Heat exposure is extremely risky for workers with underlying heart or lung conditions, especially if they’re laboring in **polluted air**.

Because working in hot conditions can impair cognitive function and lead to accidental injury and death, Dean and his colleague Jamie McCallum, an expert on worker struggles at Middlebury College, included vehicular deaths related to equipment in agriculture, construction and transportation as potentially caused by heat stress.

Farmworkers wear protective clothing while working in a bell pepper field through a heat wave on July 3, 2024, in Camarillo, Calif. Credit: Etienne Laurent/AFP via Getty Images

While the study didn't attribute every vehicular fatality to heat, Dean said, if the heat standard is effective, they would have expected to see a decline in those types of deaths relative to other states after implementing the policy.

“What we're saying is that the fact that these kinds of deaths in California decreased relative to those deaths in the neighboring states after the heat standard was passed is evidence in favor of the heat standard having been effective.”

In all, the team identified more than 6,000 heat-related deaths among outdoor workers in 126 counties in Arizona, California, Nevada and Oregon, about 300 deaths a year on average, between 1999 and 2020. Arizona had the most deaths overall and holds the county with the highest number of deaths in a year, Maricopa County, which had 233 deaths in 2020.

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All the states had spikes in worker deaths until 2010, when a very rapid increase in deaths in Arizona, plus spikes in Oregon and Nevada, together accounted for the 33 percent drop in California deaths relative to the other states, Dean said.

Dean said the study makes no claim that California's 2010 enforcement campaign was "perfectly successful." In fact, he said, worker deaths in California have actually increased since 2010 on average, but the increase in the surrounding states that lack a standard is much more extreme.

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California still had about 100 heat deaths a year from 2010 to 2020. But applying the conservative estimate that worker deaths decreased by 33 percent after 2010, Dean said, suggests the stronger standard saved about 34 lives per year.

"Climate change and increasing extreme heat is increasing the risk of heat-related deaths among outdoor workers everywhere," Dean said. "Heat-standard precautions can mitigate the worst risk."

Officials with U.S. OSHA did not respond to questions from Inside Climate News about when they expect to finalize the proposed heat standard or whether they will require employers to ensure workers have adequate water, shade and rest periods during hot days.

“Chronic and Persistent Vacancies”

The finding that worker deaths decreased over time in California is notable given perpetual understaffing challenges at Cal/OSHA, the state occupational safety and health agency, as outlined in a recent [California State Audit report](#).

The study indicates that regulations on paper, especially those with loopholes, mean very little without effective enforcement by regulators, said Garrett Brown, a retired Cal/OSHA field inspector who now serves as an agency watchdog.

“California’s enforcement gains are currently being undermined by chronic and persistent vacancies among field inspectors,” Brown said, noting that Cal/OSHA is currently operating with 95 inspector vacancies, a third of the available positions, and a \$16 million cut in its enforcement budget, Brown said.

Still, just having a standard on the books can help save lives, said Michaels. Many agriculture employers learned about the stronger standard, heard about citations being issued by Cal/OSHA and decided to comply with the

standard by providing water, shade and rest breaks, he explained.

“More farmworkers are alive today than would be if the stronger standard were not in effect,” Michaels said. “And more lives will be saved if federal OSHA adopts a similar standard.”

As temperatures continue to rise with greenhouse gas emissions, enforcement will be ever more critical to protecting undocumented workers and others who fear retaliation for taking the precautions that save lives, Dean and other labor experts say.

“We hope the federal government will implement a federal heat standard,” Dean said. “We also worry that it will not be effective in protecting workers unless it’s matched by the kind of increased enforcement that we’ve seen in California since 2010.”

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