December 16, 2025

Eric Berg, Deputy Chief of Health
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Sent via email: eberg@dir.ca.gov and jlandaverde@dir.ca.gov

Re: Comments on Draft Changes to Title 8 Workplace Heat Illness Prevention Standards

Dear Mr. Berg and Ms. Landaverde,

On behalf of researchers at the Stanford University Climate and Energy Policy Program, we write to provide important new information relevant to the Division of Occupational Safety and Health ("Cal/OSHA") draft changes to the Title 8 Workplace Heat Illness Prevention Standards published on April 23, 2025. Our research, which will be available as a preprint in early 2026, suggests that as the temperature rises, the rate of Medi-Cal recipients hospitalized for a heat-related illness increases faster in cropland-dominant communities with majority farmworker populations than in majority built-up communities. This finding suggests that the current heat illness prevention standards inadequately protect outdoor agricultural workers and emphasizes the importance of expeditiously revising these standards to better "prevent[] heat illnesses and deaths of employees employed in California."[1]

A. As it gets hotter, heat-related claim rates increase more in majority cropland, outdoor worker dominant ZIP codes compared to majority built-up areas, illustrating the importance of expeditious § 3395 revision.

Of all weather events, heat caused the most fatalities in the United States in 2024.[2] From 1992-2006, CDC estimates that crop workers died from heat stroke 20 times more than the average worker.[3] Our analysis suggests that California's crop workers face similar disproportionate heat-vulnerability.

Using Med-Cal recipient home address ZIP codes from 2011- 2019 we see that "majority cropland" ZIP codes have heat-related claim rates increase 24.8 percent for every one degree celsius increase. Meanwhile, there is only a 20.5 percent increase for every one degree celsius in majority built-up ZIP codes.[4]

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[1] "Heat Illness Prevention Special Emphasis Program," Division of Occupational Safety and Health, Oct. 2022.
[2] "Weather Related Fatality and Injury Statistics," National Weather Service, 2024.
[3] "Heat-Related Deaths Among Crop Workers-United States, 1992-2006," JAMA, Sept. 3, 2008, doi:10.1001/jama.300.9.1017.
[4] The preprint uses the International Classification of Disease category "Effects of Heat and Light" which includes heatstroke, heat exhaustion, heat edema, and heat syncope. Notably, this may exclude other heat-triggered illnesses particularly for younger and older populations.

The upcoming preprint uses California Medi-Cal data (California's Medicaid system) which includes approximately 32 percent of the State's 2019 population. Using complete 2011-2019 Medi-Cal inpatient[5] and outpatient[6] billing code data, the study aggregated total heat-related claim counts by recipients' residential ZIP code, then calculated smoothed heat-related claim rates by ZIP code. We then compared heat-related claim counts and rates against land cover type, daily maximum temperature,[7] and socioeconomic variables derived from the U.S. American Community Survey data from 2015-2019. Notably, Medi-Cal billing data is not an official diagnosis. Rather, it is what a Medi-Cal is billed for, thus indicating how often providers are charging for heat-related illnesses and suggests an illness's relative risk.

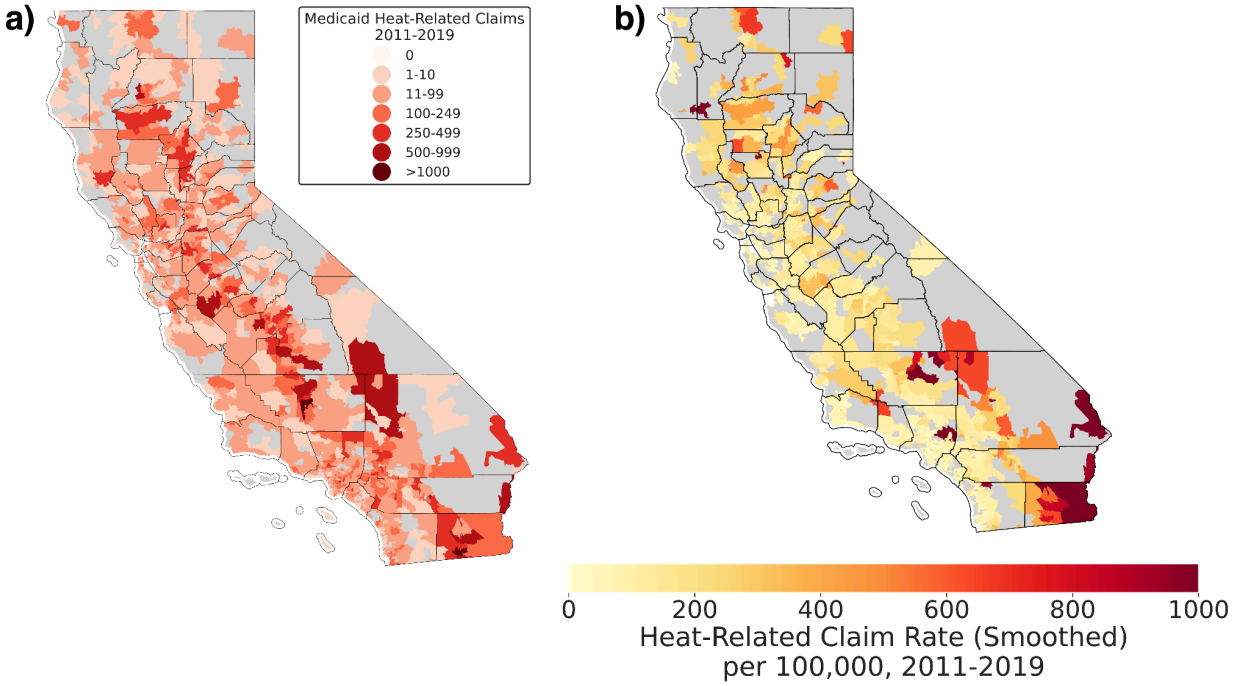

Figure 1. *Heat exposure and heat-related medical claims across California. a) The total inpatient and outpatient heat-related Medicaid claims by ZIP from 2011-2019 b) Population-adjusted annual heat-related claims per Medicaid eligible by ZIP code from 2011-2019.*

While the data does not include whether a heat-illness patient was hospitalized because of their outdoor work, there is a correlation between ZIP codes with high outdoor employment and heat-illness hospitalizations. Specifically, when ranking ZIP codes by percent of heat-related claims, the top 10 percent of zip codes had on average a 65 percent greater relative fraction of "agricultural, forestry, and fishing" workers in their workforce compared to the bottom 90 percent of ZIP codes (4.8 percent vs 2.9 percent). Similarly, an Office of Environmental Health Hazard Assessment's (OEHHA) report illustrates that the rate of heat related illnesses in California's workforce is trending upwards.[8]

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[5] Medicaid 100% [2011-2019] Inpatient Dataset Version 2.0, Stanford Center for Population Health Sciences, https://doi.org/10.57761/9mte-t021

[6] Medicaid 100% [2011-2019] Other Services Dataset Version 3.0, Stanford Center for Population Health Sciences, https://doi.org/10.57761/8hk4-0994

[7] The study focused on "built up," "cropland," and "tree cover" land types per ESA WorldCover 2020 Global, using Sentinel-1 and 2 satellites.

[8] "Occupational Heat-Related Illnesses," Office of Environmental Health Hazard Assessment, Oct. 24, 2025.

The OEHHA report emphasizes that some of the most heat-vulnerable are outdoor workers, farmworkers, and those of lower income. Referencing § 3395, the report explains that heat-illness medical data "can help assess the effectiveness of the current regulation to help inform action and policy."[9] We agree. Current Health Illness Prevention standards fall short of protecting outdoor essential workers. We urge Cal/OSHA not to delay updating and enforcing more effective standards.

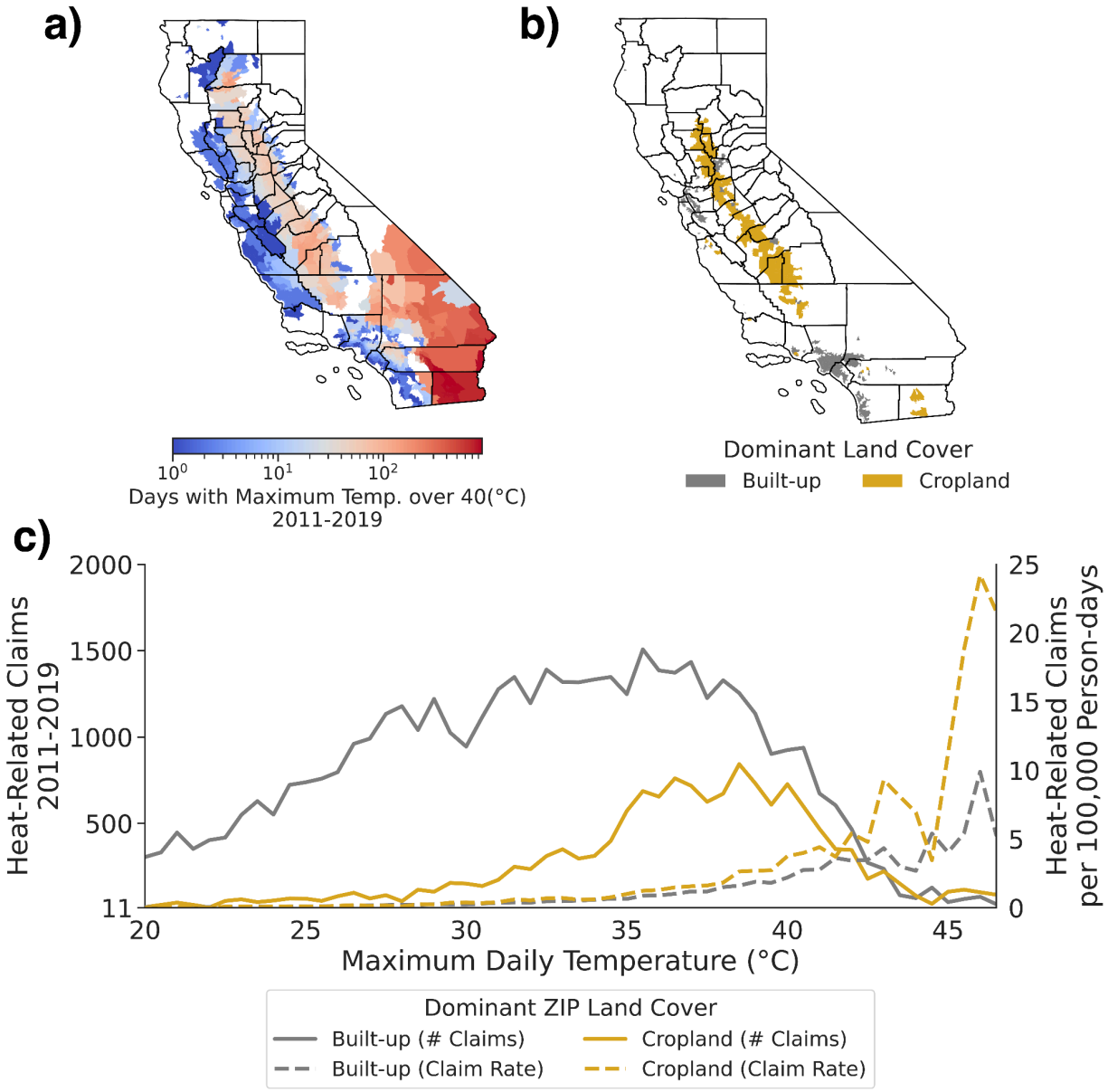

Figure 2. *A comparison of heat-related Medicaid claims in ZIP codes with majority built-up and majority cropland land cover based on normalized heat exposure. A) The number of days with a maximum temperature over 40°C. B) ZIP codes included in the analysis had either built-up or cropland as their majority land cover. C) Daily temperature in each ZIP was rounded to the nearest 0.5°C, then the total number of days and claims per dominant land cover type were aggregated into these 0.5°C buckets. The total number of claims per dominant land cover were then normalized by the total person-days of exposure for Medicaid eligibles to calculate heat-related claims per 100,000 person-days of exposure by maximum daily temperature and dominant land cover class.*

[9] *Id.*

B. Require links to real-time multi-factoral heat-risk indicators in heat illness prevention plans.

The analysis found a weak-to-moderate positive relationship between ZIP code average maximum daily air temperature and a ZIP code's monthly rate of heat-related Medi-Cal claims. As is well documented, this finding indicates that ambient temperature alone is a poor measure of determining heat-illness risk.[10] Yet § 3395 relies on air temperature to trigger shade requirements, § 3395(d), high-heat procedures, § 3395(e), and acclimatization, § 3395(g). Rather than rely on ambient temperature, we suggest employers consider multi-factorial heat-illness indicators.

We suggest adding a § 3395(i)(5) provision that requires heat illness prevention plans to link to multi-factoral heat-risk indicators such as the National Weather Service Heat Risk Tool,[11] CalHeatScore,[12] or eventually, Syndromic Surveillance.[13] Compared to using only ambient temperature, including a multi-factoral, near real-time heat-risk index for informing on-farm prevention measures would provide a more accurate means of predicting when heat-illness risk is highest even below the § 3395 triggering temperatures.

C. Use heat-illness medical data to inform Cal/OSHA inspections.

California has a series of indices that estimate average heat-risk trends.[14] These indices include a range of vulnerability covariates including temperature, age, and occupation. However, none factor in ZIP code-level Medi-Cal heat-illness data.[15] Of tested indices, CDC's Heat Health Action Index has the closest correlation with ZIP code level Medi-Cal heat-illness claim rates, likely because it incorporates prior heat-related emergency department events. We suggest Cal/OSHA consider referencing heat-illness medical data when making outdoor workplace inspections.[16] Such data can help show where heat-illness rates are highest, helping fulfill Cal/OSHA's many heat related policies.[17] This information fills a critical

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[10] Activity level, humidity, shade access, age, cardiovascular health, and several other metrics play a critical role in an individual's likelihood of heat-illness hospitalization, *see e.g.,* Carina J. Gronlund, "Racial and Socioeconomic Disparities in Heat-Related Health Effects and Their Mechanisms: A Review," *Current Epidemiology Reports,* 2014, doi: 10.1007/s40471-014-0014-4.

[11] "NWS Heat Risk Tool," National Weather Service (while lacking socioeconomic factors, the tool incorporates humidity, ambient temperature, duration of high-temperature, difference between high and low temperature in a day, and temperature at night).

[12] "CalHeatScore," CalEPA Office of Environmental Health Hazard Assessment, 2025 (updated daily, it is designed to "provide awareness to local and regional extreme heat events in California," it includes both environmental and historical emergency-department data and has plans to include more heat-risk factors in the coming years).

[13] "California Syndromic Surveillance," CDPH, (while this real-time emergency room data is not yet publicly available, avenues for tracking live medical data should be explored and incorporated over time).

[14] Prominent indices include California Heat Assessment Tool's Heat Health Action Index (CHAT), CDC's Heat and Health Index, and, to a lesser degree, CalEnviroScreen.

[15] CHAT and CDC's Heat and Health Index do incorporate *emergency* department data but without ZIP code level specificity.

[16] While all payer claims data is difficult to obtain, Cal/OSHA could begin by using emergency department data like CDC's Heat and Health Index or Medi-Cal data as used in the attached preliminary study. While representing only about 32 percent of California's total population, Medicaid represents some of the most vulnerable (low-income individuals). Furthermore, counties with the highest enrollment rates - Tulare (64% enrolled in 2024), Imperial (56%), Fresno, Madera, Merced, and Kern (all at 54%) - have significant outdoor workforces. Laurel Lucia, Miranda Dietz, "Medi-Cal Enrollment and Spending by District and County 2024," *UC Berkeley Labor Center*, Feb. 3, 2025.

[17] "Heat Illness Prevention Special Emphasis Program," Division of Occupational Safety and Health, Oct. 2022 (using ambient temperature as a high-heat inspection trigger, the program could also incorporate a heat-vulnerability index or heat-illness

gap in funnelling limited resources toward optimally protecting and improving the health, safety, and economic well-being of California's outdoor workers.[18]

D. Include a provision to review and revise the appropriate triggering thresholds in light of the most available science at least once every five years.

Specific ambient temperatures are the current triggers for heat-illness prevention procedures. These temperature-based triggers were last updated in 2014 and were informed by a 2006 study.[19] Heat-illness vulnerability forecasting has come a long way since 2006 and continues to improve. At minimum, this analysis is grounds for including a §3395(j) that requires Cal/OSHA to review what triggers § 3395 prevention standards in light of the most available science at least once every five years.[20]

D. Conclusion

We realize AB 2243 requires the "standards board to review the proposed changes and consider adopting revised standards on or before December 31, 2025." We urge Cal/OSHA not to delay. Heat-illness disproportionately affects outdoor workers and current heat-illness prevention standards based only on ambient temperature have little correlation with heat-illness hospitalization claims. We recommend Cal/OSHA require reference to more than just ambient-temperature in heat illness prevention plans and use medical data to inform regulatory inspections. We also urge Cal/OSHA to have cyclical reviews and revisions of §3395 to incorporate the latest science.

Thank you for the opportunity to comment past the formal deadline and we look forward to participating in an advisory committee meeting when it is convened.

Sincerely,

Gina Hervey, JD, MS
Avery Bick, PhD

Researchers from the Environmental and Natural Resources Law & Policy Program, Stanford Law School Climate and Energy Policy Program, Stanford Woods Institute for the Environment

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medical data); "Field Sanitation and Agricultural Safety and Health," Division of Occupational Safety and Health Policy and Procedures Manual, Mar 1, 2002 (recognizing heat illness agricultural worker risks, but referencing only ambient temperature); "Programmed Inspections Targeting: High Hazard Industries," Division of Occupational Safety and Health Policy and Procedures Manual, Mar. 20, 2018 (listing heat illness as a hazard used to prioritize high hazard industries for inspection); "FFY 2025-2026 High Hazard Industry List," Division of Occupational Safety and Health, 2025 (including beef, poultry, and egg production as high hazard industries); California Labor Code § 6314.1.

[18] "Who We Are," California Department of Industrial Relations, 2025.

[19] Janice Prudhomme et. al., "Heat Illness Memo 2006," Letter to Cal/OSHA, Oct. 18, 2017.

[20] We suggest five years to parallel how often Cal/OSHA holds reported workplace safety violations, *see,* "The Guide to Cal/OSHA," Department of Industrial Relations Division of Occupational Safety and Health, Aug. 2023 at 6.