

Rising Temperatures Result in Rising Danger for Workers: Examining the Impact of Extreme Heat on Workers and Potential Legal Changes to Protect Them

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I. Introduction

The global temperature is rising, with 2021 being the sixth warmest year ever recorded and 2013 through 2021 all falling in the hottest ten years recorded.¹ North Carolina's climate mirrors these global trends, and the impacts of rising temperatures are felt for more hours of a day as North Carolina has seen a significant increase in "warm" (minimum of 70° F) and "very warm" (minimum of 75° F) nights, a trend that is expected to continue.² Cities such as Raleigh "are seeing increasing trends in all facets of heat waves: frequency, duration, intensity, and timing."³ These effects are most significantly felt by vulnerable populations including those who are lower income, communities of color, and the elderly.⁴

As climate change affects the environment, heat-related incidents in the workforces are coming more into focus as "[o]ccupational exposure to heat can result in injuries, disease, death, and reduced productivity."⁵ Agricultural and construction workers are at the highest risk of heat-related incidents, but the increasing temperature affects all workers in a variety of ways.⁶ Increased temperature exasperates preexisting issues such as asthma and heart disease.⁷ Heat can

¹ *Annual 2021 Global Climate Report*, NAT'L CTR. FOR ENV'T INFO. (Jan. 2022), <https://www.ncei.noaa.gov/access/monitoring/monthly-report/global/202113>.

² See Kenneth E. Kunkel et al., *North Carolina Climate Science Report*, N.C. INST. FOR CLIMATE STUD, 6. (May 2020), https://ncics.org/wp-content/uploads/2020/06/NC_Climate_Science_Report_FullReport_Final_revised_May2020.pdf.

³ *Id.* at 196.

⁴ *Id.*

⁵ See Brenda Jacklitsch et al., *Criteria for A Recommended Standard: Occupational Exposure to Heat and Hot Environments*, CTR. FOR DISEASE CONTROL AND PREVENTION (2016), <https://www.cdc.gov/niosh/docs/2016-106/pdfs/2016-106.pdf>.

⁶ *Heat Illness Prevention in Outdoor and Indoor Work Settings*, OFF. OF INFO. AND REGUL. AFF. (2022), <https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=202204&RIN=1218-AD39>.

⁷ *Id.*

also create hostile work environments as studies show that rising temperatures lead to a rise in hate speech and hostile behavior towards others.⁸

Despite the increasing danger to workers caused by global warming, there is currently no federal Occupational Safety and Health Administration (“OSHA”) standard regarding heat and its impact on workers’ health.⁹ Only three states—California, Minnesota, and Washington—have a permanent specific heat standard for the workplace.¹⁰ Some states, such as Oregon, have issued temporary standards.¹¹ This paper will explore the potential impacts of the Biden Administration’s proposed federal standard and advocate for a North Carolina specific heat standard using California’s Heat Illness Prevention in Outdoor Places of Employment standard as a model.

II. Background

In response to the seriousness of heat-related illnesses, the Biden Administration announced an Advance Notice of Proposed Rulemaking (“ANPRM”) that would be coordinated by OSHA in partnership with the Departments of Labor, Health and Human Services, Homeland Security, and Agriculture; the Environmental Protection Agency; and the National Oceanic and Atmospheric Administration.¹² A rule was proposed in October 2021, but is still in the notice and comment period, leaving the majority of workers in the United States without a national standard to protect them from increasing danger.¹³ The ANPRM revealed that “[h]eat stress killed 815

⁸ See Amudalat Ajasa, *Hotter Days Bring Out Hotter Tempers, Research Finds*, THE WASH. POST (Oct. 13, 2022, 3:37 PM), <https://www.washingtonpost.com/climate-environment/2022/10/13/heat-hate-speech-aggression-climate/>.

⁹ *Heat*, OCCUPATIONAL SAFETY AND HEALTH ADMIN., DEP’T OF LAB. (last visited Dec. 20, 2022), <https://www.osha.gov/heat-exposure/standards>.

¹⁰ *Id.*

¹¹ *Id.*

¹² *Fact Sheet: Biden Administration Mobilizes to Protect Workers and Communities from Extreme Heat*, THE WHITE HOUSE (Sept. 20, 2021), <https://www.whitehouse.gov/briefing-room/statements-releases/2021/09/20/fact-sheet-biden-administration-mobilizes-to-protect-workers-and-communities-from-extreme-heat/>.

¹³ *Id.*

U.S. workers and seriously injured more than 70,000 workers from 1992 through 2017... However, this is likely a vast under estimate [sic], given that injuries and illnesses are under reported in the U.S., especially in the sectors employing vulnerable and often undocumented workers.”¹⁴ As temperatures continue to rise, so will the danger to workers.¹⁵

Workers are impacted in both outdoor and indoor workplaces with eighty percent of heat-related fatalities occurring in outdoor work environment while sixty-one percent of non-fatal heat-related injuries occurred in indoor workplaces.¹⁶ Seventy-three percent of the fatal incidences occurred during the first week on the job, a high rate attributed to physiological factors tied to being a new employee alongside insufficient heat-related knowledge (such as where to access water and/or shade) and training.¹⁷

One such fatal heat-related incident was the death of Maria Isabel Vasquez Jimenez.¹⁸ Her death and the deaths of three other field workers led to the California law named in her honor.¹⁹ Vasquez Jimenez was seventeen years old, and two months pregnant, when she died on her second day of work, as a result of heat stroke and a lack of access to water.²⁰ Her death and the subsequent outrage and protests led to California’s Division of Occupational Safety and Health (“DOSH”) implementing § 3395 of the California Code of Regulations (the Heat Illness Prevention in Outdoor Places of Employment rule a.k.a. the Maria Isabel Vasquez Jimenez Heat

¹⁴ *Heat Illness Prevention in Outdoor and Indoor Work Settings*, *supra* note 4.

¹⁵ See *Fact Sheet: Biden Administration Mobilizes to Protect Workers and Communities from Extreme Heat*, *supra*, note 12.

¹⁶ See Aaron W. Tustin et al., *Risk Factors for Heat-Related Illness in U.S. Workers: An OSHA Case Series*, 60 J. OCCUPATIONAL ENV’T MED. 383, 387 (Aug. 2018).

¹⁷ *Id.*

¹⁸ Sasha Khokha, *Teen Farmworker’s Heat Death Sparks Outcry*, NPR (June 6, 2008, 11:50 AM), <https://www.npr.org/2008/06/06/91240378/teen-farmworkers-heat-death-sparks-outcry>.

¹⁹ *Id.*, CAL. CODE REGS. tit. 8 § 3395(a)(1) (2020).

²⁰ *Id.*

Illness Standard) which protects workers such as Vasquez Jimenez.²¹ The proposed OSHA rule is similar to California's, but would also pertain to workers who are affected by indoor heat-related illnesses.²²

North Carolina workers are significantly affected by increasing temperatures: the summer daily maximum heat in 2022 was on average ninety-two degrees Fahrenheit, with the hottest day of summer being 114°F.²³ From May 1, 2022, to September 30, 2022, over three thousand North Carolinians went to the emergency room for a heat-related illness.²⁴ The majority of work-related emergency department visits for heat-related illness in North Carolina are among nineteen to forty-four-year-old males in rural communities.²⁵ North Carolina currently has no regulations addressing heat-related incidents despite a great need: approximately thirty-six percent of adult North Carolina migrant farmworkers and nearly forty-eight percent of child workers experience heat-related illnesses.²⁶ Given these dangers and the large portion of workers affected, North Carolina's Department of Labor should create a regulation to govern heat illness prevention in the workplace akin to that of California and the proposed federal rule.

III. The California Model

A. Overview of California's Heat Illness Prevention in Outdoor Places of Employment

²¹ Maricela De La Cruz, *How Farm Workers' Rights Have Strengthened Since the 2008 Death of Pregnant 17-Year-Old María Isabel Vásquez Jiménez*, KCRA3 (Aug. 23, 2022, 10:16 PM), <https://www.kcra.com/article/farm-workers-rights-pregnant-17-year-old-death-2008-maria-isavel-vasquez-jimenez/40950637>.

²² *Fact Sheet: Biden Administration Mobilizes to Protect Workers and Communities from Extreme Heat*, *supra* note 12.

²³ See *North Carolina Heat Report*, N.C. DEP'T OF HEALTH AND HUM. SERV. (Oct. 24, 2022), <https://epi.dph.ncdhhs.gov/oec/climate/Heatreportsummary2022-May01-sep30.pdf>

²⁴ *Id.*

²⁵ See *Heat Emergency Response Plan*, N.C. DEP'T OF PUB. SAFETY, EMERGENCY MGMT. (Dec. 2021), https://files.nc.gov/ncdps/documents/files/Divisions/EM/EOP/NCEOP_2020_FINAL-Entire-Plan-488-Pages.pdf.

²⁶ Taylor J. Arnold et al., *Heat-Related Illness Among Latinx Child Farmworkers In North Carolina: A Mixed-Methods Study*, 30 NEW SOL.: J. ENV'T & OCCUPATIONAL HEALTH POL'Y 111, 120 (2020) (North Carolina allows children aged ten and older to be hired for nonhazardous farm work outside of school hours).

Codified in 2006, the California Heat Illness Prevention in Outdoor Places of Employment standard was the first state standard to explicitly address the impact of heat on workers and attempt to regulate employers' actions to prevent heat-related injuries and deaths in the workplace.²⁷ The standard addresses water, shade, rest periods, high heat provisions, acclimatization, employee and supervisor training, and heat illness prevention plans.²⁸ It provides clear direction for what actions should be taken at what temperatures, such as requiring shade when temperatures exceed eighty degrees Fahrenheit and implementing a "buddy system" in periods of heat above ninety-five degrees Fahrenheit for employees to monitor for symptoms of heat-related illness.²⁹ Shade also has to be available when temperatures exceed eighty degrees Fahrenheit, and it must be sufficiently large enough for a worker to rest comfortably for five minutes.³⁰ When temperatures exceed ninety-five degrees Fahrenheit "a minimum of ten-minute rest break in the shade every two hours must be enforced."³¹

Furthermore, it includes specific details such as water must be "[p]ure, cool, no-cost [and] located as close as practicable to work area" and requires that each worker is required to be given one quart of water per hour worked.³² Recognizing the significant correlation between untrained employees and the occurrence of heat-related illness, the standard requires, "[e]ffective training before an employee begins work, and seasonally for permanent employees, covering risks, signs, and symptoms of [heat-related illnesses] and emergency procedures"³³ Employers are then

²⁷ Ashley M. Gregor, *Toward A Legal Standard of Tolerable Heat*, 44 COLUM. J. ENV'T L. 479, 552 (2019); *Heat Safety and Wildfire Smoke Standards and Guidelines at the State and Federal Level*, THE NAT'L AGRIC. L. CTR. (last visited Dec. 27, 2022), <https://nationalaglawcenter.org/heat-safety-and-wildfire-smoke-standards-and-guidelines-at-the-state-and-federal-level/>.

²⁸ See Chelsea Eastman Langer et al., *Are Cal/OSHA Regulations Protecting Farmworkers In California From Heat-Related Illness?*, 63 J. OCCUPATIONAL & ENV'T MEDICINE 532, 535 (Mar. 19, 2021).

²⁹ *Id.* at 535.

³⁰ *Id.*

³¹ *Id.*

³² *Id.*

³³ *Id.*

required to closely supervise new employees for their first fourteen days to ensure their safety and compliance with training.³⁴ California also requires that employers “maintain a written plan at the worksite” which contains the procedures necessary to implement all the standards created by the rule and that onsite supervisors receive training as to the plan and workers’ rights.³⁵

B. Evaluating the Effectiveness of the California Model

California’s regulation has led to a significant number of investigations and employer citations, with the number of investigations, citations, and fines increasing every year since the standard was created.³⁶ The California Division of Safety and Occupational Health (DOSH) has proposed an addition to the rule that “applies to all indoor work areas where the temperature equals or exceeds 82 degrees Fahrenheit when employees are present.”³⁷

However, the regulation is not perfect.³⁸ DOSH’s heat and agriculture program coordinator reported that although an average of fifty heat-related illnesses a year are reported, that number is likely inaccurate due to significant under reporting as “estimates by the Bureau of Labor Statistics [are] of about 480 heat-related illnesses a year, and ... a study that looked at workers compensation data in California ... showed up to 1,000 heat-related illnesses” a year.³⁹

The standard, as currently written, also fails to recognize the impacts of heat on human interactions and how those may impact workers health.⁴⁰ “Aggressive behavior was the tamest between 54 to 70 degrees ... [and while] the ‘feel-good window’ varies based on climate zones,

³⁴ *Id.*

³⁵ *Id.*

³⁶ See Brian Edwards and Jacob Margolis, *Why California Workers Are Still Dying from Heat Despite Protections*, CAPRADIO (Aug. 25, 2021), <https://www.capradio.org/articles/2021/08/25/why-california-workers-are-still-dying-from-heat-despite-protections/>.

³⁷ See Gregor, *supra* note 27 at 499.

³⁸ See De La Cruz, *supra* note 21.

³⁹ *Id.*

⁴⁰ See Langer et al., *supra* note 28.

temperatures above 81 degrees were consistently linked to significant increases in ... hate across all climate zones.”⁴¹

The overall impact of the regulation has been positive, as it has led to California “conduct[ing] at least fifty times the number of inspections resulting in heat exposure violations than OSHA did nationwide between 2013 and 2017.”⁴² This disparity demonstrates the need for required inspections “as employers have a greater incentive to maintain safe heat levels if they know that inspectors are honed in on acceptable standards.”⁴³ California workers are still dying from heat-related illnesses, but having regulations protecting workers is the first, and very necessary step, in achieving zero worker deaths and California’s Heat Illness Prevention in Outdoor Places of Employment standard is serving as a model to other states and the federal government.⁴⁴

B. Other States Specific Heat Standards in Comparison to California’s

Notably, while California’s heat illness prevention standard is currently the most extensive, both Minnesota and Washington have implemented heat illness prevention standards.⁴⁵ The table below provides a summary of the protections granted by each state.

| Standard Requirements | California⁴⁶ | Minnesota⁴⁷ | Washington⁴⁸ |
|---|--|--|---|
| Worksite Coverage | Outdoor, year-round (Proposed indoor rule) | Indoor, year-round | Outdoor, May 1-Sept. 30 |
| Threshold Triggering Protection Requirements | At 80°F | Between 77 °F – 86 °F (WBGT) based on workload | 89 °F (ambient temp.); lower if wearing heavy clothing/PPE. |

⁴¹ See Ajasa, *supra*, note 8.

⁴² See Gregor, *supra*, note 27 at 549.

⁴³ *Id.*

⁴⁴ See Edwards and Margolis, *supra*, note 35.

⁴⁵ *Id.* at 498-99.

⁴⁶ CAL. CODE REGS. tit. 8 § 3395 (2020).

⁴⁷ MINN. R. 5205.0110 (2014).

⁴⁸ WASH. ADMIN. CODE § 296-62-09510 (2019).

| Additional High Heat Protections | At 95°F | No | At 100°F |
|---|--------------------------------------|----------|---|
| Water | 1 qt./hr./worker of pure, cool water | No | 1 qt./hr./worker of suitably cool water |
| Shade | Yes | No | Yes |
| Training | Yes | Yes | Yes |
| Breaks | Yes | Yes | Yes |
| Acclimatization Plan | Yes | No | No |
| Heat Illness Prevention Plan | Yes | No | Yes |
| Emergency Medical Response Plan | Yes | No | Yes |
| Medical Monitoring | Reactive, Proactive when above 95°F | Reactive | Reactive |
| Record Keeping Requirements | Yes | Yes | Yes |

IV. Federal Level Regulations of Heat-Related Incidents in the Workplace

A. The State of Federal Regulation

Currently, OSHA’s only method of addressing heat-related illnesses is through enforcement of the General Duty Clause of the OSH Act (U.S.C.A. § 654(a)(1)). That law states that employers have a general duty to furnish to each of their employees employment and a place of employment free from recognized hazards that cause or are likely to cause death or serious physical harm to employees.⁴⁹ “To prove a violation of the General Duty Clause, OSHA needs to establish—in each individual case—that: (1) The employer failed to keep the workplace free of a hazard to which its employees were exposed; (2) the hazard was recognized; (3) the hazard was causing or likely to cause death or serious injury; and (4) a feasible means to eliminate or materially reduce the hazard existed,” which is exceedingly hard to do.⁵⁰

⁴⁹ 29 U.S.C. § 654(a)(1) (2022).

⁵⁰ Heat Injury and Illness Prevention in Outdoor and Indoor Work Settings, 86 Fed. Reg. 59309 (proposed Oct. 27, 2021).

The leading federal advice to employers regarding recommended occupational safety standards regarding heat were developed by the National Institute for Occupational Safety and Health (“NIOSH”). “In 1972, NIOSH published its first heat-related criteria document (‘Criteria Document’) delineating heat exposure levels that are safe for various periods of employment, including but not limited to the exposures at which no worker will suffer diminished health, functional capacity, or life expectancy because of his or her work experience.”⁵¹ NIOSH revised the Criteria Document in 1986, and 2016 in response to the growing risk of heat-related workplace hazards.⁵² “NIOSH developed Recommended Exposure Limits, which are suggested heat stress exposure limits for acclimatized workers, and Recommended Alert Limits, which are suggested heat stress exposure limits for non-acclimatized workers.”⁵³ While the Criteria Document is extensive, and implementing it would save workers’ lives, it’s effectiveness is limited as compliance is not mandatory.⁵⁴

B. The Need for Change

A nationally enforceable standard is essential to ensure that employees across the United States receive the same level of protection from heat related illness. The United States Postal Service serves as an example of a federal employer operating nationally. A report from the Center for Public Integrity revealed OSHA “had cited the Postal Service for exposing about 900 employees across the country to the risks of heat-related illness and death” between 2012 and 2019.⁵⁵ When reviewing “800,000 Equal Employment Opportunity Commission charges filed by Postal Service employees between 2004 and 2019, the report found that incidents [of workplace

⁵¹ See Gregor, *supra* note 27, at 496.

⁵² See Jacklitsch et al., *supra* note 3.

⁵³ See Gregor, *supra*, note 27, at 497.

⁵⁴ See Jacklitsch et al., *supra*,note 5.

⁵⁵ See Ajasa, *supra* note 8.

harassment and discrimination from managers and supervisors] increased by roughly five percent on days over 90 degrees compared with days when temperatures were between 60 and 70 degrees.”⁵⁶ This demonstrates the need for a federal regulation addressing heat-related incidents in both indoor and outdoor places of employment to protect employees from not just the physical effects of the rising temperatures but also the mental, emotional, and reactionary effects of the rising temperatures.⁵⁷

The Biden Administration’s proposed rule draws heavily on California’s standard and if finalized, the rule will have a tremendous effect on employees impacted by heat.

IV. A Proposed North Carolina Rule to Address the State’s Outdoor and Indoor Workers in Danger of Heat Related Illness

The world, the United States, and the state of North Carolina must act quickly and with strength to implement regulations protecting workers from heat-related injuries. The North Carolina Climate Report found that “by the end of this century, annual average temperature increases relative to the recent climate (1996–2015) for North Carolina are projected to be on the order of 6°–10°F under a higher scenario and 2°–6°F under a lower scenario.”⁵⁸ There are four approaches to adapting to extreme heat in the workplace: modifying the type of work; modifying the working environment; modifying the actual worker through acclimatization; and modifying worker clothing and PPE.⁵⁹ North Carolina must pick at least one and create regulation to protect North Carolina’s workers.

⁵⁶ *Id.*

⁵⁷ *Id.*

⁵⁸ See Kunkel et. al., *supra* note 2.

⁵⁹ See Gregor, *supra* note 27, at 549.

As North Carolina continues to get hotter, North Carolina’s Department of Labor should create a regulation that incorporates California’s approach to heat illness prevention in outdoor places of employment, and also addresses indoor workplaces.⁶⁰ In a study of California’s citation and inspection data for heat-related illnesses from 2005 to 2021, researchers “found that workers in the Agriculture, Forestry, Fishing and Hunting industry classification made up the largest share (32 percent) of 502 fatal and catastrophic heat cases in California; of these cases, farmworkers accounted for 94 percent.”⁶¹ Similarly, North Carolina is an agricultural state, with nearly eighteen percent of workers (nearly a million jobs) in 2021 employed in agriculture.⁶² Both the number of agricultural workers and the temperature are expected to increase; therefore, North Carolina would benefit from adopting a heat illness prevention standard in the workplace.⁶³

Furthermore, North Carolina’s construction industry is growing, with 242,200 North Carolina residents employed in construction at the end of 2021.⁶⁴ While the growth in the industry is good for the economy, more than one-third of occupational heat-related deaths in the U.S., from 1992 to 2016, were construction workers, creating even greater need for North Carolina to implement regulations that cover heat-related illness prevention in outdoor places of employment.⁶⁵

⁶⁰ See Kunkel et. al., *supra* note 2.

⁶¹ See Teniope Adewumi-Gunn and Juanita Constible, *Feeling the Heat: How California’s Workplace Heat Standards Can Inform Stronger Protections Nationwide*, NAT. RES. DEF. COUNCIL (Aug. 2022), <https://www.nrdc.org/sites/default/files/feeling-heat-ca-workplace-heat-standards-report.pdf>.

⁶² *Working Together to Further N.C. Agriculture*, N.C. CHAMBER (Oct. 7, 2022), <https://ncchamber.com/2022/10/07/working-together-to-further-n-c-agriculture/#:~:text=In%202021%2C%2017.5%20percent%20of,cornerstone%20of%20our%20state%27s%20economy.>

⁶³ See *Id.*; Kunkel et al., *supra* note 2.

⁶⁴ See Mark Buckshon, *NC Construction Employment Increases By 4% In Most Communities; But There Are Exceptions*, N.C. CONSTR. NEWS (Dec. 29, 2021), <https://www.ncconstructionnews.com/nc-construction-employment-increases-by-4-in-most-communities-but-there-are-exceptions/>.

⁶⁵ See Cindy Bae, *Raleigh Workers Stay Cool as OSHA Works To Create New Heat-Related Work Standards*, ABC11 (July 22, 2022), <https://abc11.com/osha-heat-work-rules-ncdol-wave/12067712/>.

North Carolina workers facing risks from indoor heat related illness also need protection. Thus a rule combining California’s protections for outdoor worker with Minnesota’s protections for indoor workers would protect the state’s “460,000 manufacturing workers, the largest industry workforce in the Southeast.”⁶⁶ North Carolina must act quickly to implement safety protections from heat-related illnesses at work, with a special concern for those millions of North Carolina residents most in danger in the agricultural, construction, and manufacturing industries. California, Minnesota, and the NIOSH Criteria Document can all serve as models of what measures, regulations, investigation and citation practices work and could be included in a North Carolina regulation covering heat-related illness prevention in outdoor and indoor places of employment.

V. Conclusion

The world is getting hotter and increasingly threatening workplace safety both indoors and out.⁶⁷ Dr. Craig Anderson, who has studied the relationship between violence and heat for over four decades, believes “climate change will directly increase human aggression and violence” via the “heat effect.”⁶⁸ The heat effect “suggests that as people become uncomfortably hot, they become more irritable, think more aggressively, perceive other actions with hostility and behave more violently.”⁶⁹ Furthermore, on a global scale the International Labour Organization has estimated that increased heat stress could result in a productivity decline by the equivalent of 80 million full-time jobs by the year 2030.⁷⁰ As the world continues to get hotter, millions of North

⁶⁶ *Food Processing and Manufacturing*, N.C. DEP’T OF COM., (last visited Dec. 28, 2022), <https://www.commerce.nc.gov/business/key-industries-north-carolina/food-processing-manufacturing#Workforce-355>.

⁶⁷ See Ajasa, *supra* note 8.

⁶⁸ *Id.*

⁶⁹ *Id.*

⁷⁰ Lin Taylor, *Rising Heat Stress Could Cost 80 Million Jobs by 2030 - U.N.*, REUTERS (July 1, 2019, 11:51 AM), <https://www.reuters.com/article/us-global-climate-jobs/rising-heat-stress-could-cost-80-million-jobs-by-2030-u-n-idUSKCN1TW36W>.

Carolina workers are in increasing danger of experiencing heat-related illnesses, injuries, and fatalities in the work place.⁷¹ These workers have a right to be protected in the workplace and to do so, North Carolina, as well as the federal government, should create regulation covering heat illness prevention in outdoor and indoor places of employment sooner rather than later. Maria Isabel Vasquez Jimenez’s death pushed California to enact critical worker protections – North Carolina should act before more workers die from heat-related illnesses.⁷²

⁷¹ See Bae, *supra* note 64.

⁷² See Khokha, *supra* note 18.