



Public Health Division
Climate and Health Program

Climate and Health in Oregon

2024 Report



The Oregon Health Authority (OHA) developed this annual report in response to Governor’s Executive Order (EO) 20-04. That order directed OHA to provide annual reports on the public health impacts of climate change in Oregon to the Governor, the Oregon Climate Action Commission (formerly the Oregon Global Warming Commission) and the state Environmental Justice Council.

A note about the timing of this 2024 report: OHA strives to publish the annual report by midsummer the following year, which accommodates a lag in the availability of health data for the previous year. This year the report publication has been delayed due to staffing constraints and uncertainties affecting the public health system.

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Executive summary

Accelerating climate change is directly affecting the health of Oregonians in many ways, and those impacts are not felt equally. Increasing instances of extreme heat, wildfire smoke, water insecurity, and winter hazards worsen public health across the state, while exacerbating existing health inequities.

Globally, 2024 was the hottest year on record. In Oregon, it was warmer than average with some areas experiencing record-breaking temperatures. Large-scale wildfires burned over 1.7 million acres across the state, the most acreage burned in a single year in Oregon's history. Counties in eastern and southern Oregon experienced more days at higher temperatures than the year before, further compounding the impact of wildfires. About 1.2 million Oregonians experienced more than 28 days of combined exposure to both extreme heat and smoke. Climate projections indicate freezing rain and ice accumulation, similar to the conditions experienced in much of western Oregon in January 2024, may more frequently accompany winter storms in parts of the northern Willamette Basin.



Inequities in climate and health impacts

Advancing health equity is at the core of OHA's mission. While we are all vulnerable to the health impacts of climate change, some communities of color, Tribal communities, lower income, unhoused, and rural communities are disproportionately impacted. Data from 2024 are helping us better understand which populations to prioritize in our public health strategies. In 2024 in Oregon:

- There were 21 heat-related deaths, most of whom were older adults and men. People who identified as American Indian or Alaska Native accounted for a higher proportion of heat-related illness emergency and urgent care center visits than their proportion of the population. Increases in weekly non-fatal drownings and submersions coincided with periods of extreme heat, especially among out-of-state visitors.
- Black and African American individuals experienced a disproportionate impact from air-quality related respiratory illnesses, in part due to wildfire smoke and pollution.
- Ten counties, mostly rural, experienced more than 40 days with extreme heat and poor air quality occurring at the same time. This was six more counties than 2023.

Public health system climate and health actions

The Governor and Oregon legislature continued investment in climate resilience through Oregon’s public health system, growing a robust infrastructure to help Oregonians adapt to climate change hazards. The Oregon Health Authority (OHA), health departments of Federally Recognized Tribes, local (county) public health authorities (LPHAs) and community-based organizations (CBOs) form Oregon’s public health system, implementing policies and programs that strengthen climate adaptation statewide. New and continuing actions in 2024 include:

- **Climate resilience as an OHA strategic priority.** Climate resilience is prominent in [OHA’s 2024–27 Strategic Plan](#), underscoring the agency’s commitment to end environmental health inequities. This priority elevated its organizational importance beyond OHA Public Health Division and spotlights climate adaptation strategies across Equity and Inclusion, Medicaid, and Health Policy and Analytics divisions.
- **Public health modernization seeding climate resilience across public health system partners.** Oregon is modernizing its public health system to be equitable, prevention-focused and prepared to protect Oregonians from current and emerging health hazards, including those from climate change. In the 2023–2025 biennium, the Oregon Legislature allocated an additional \$50 million for public health modernization funding in the Governor’s budget, adding onto the \$60 million investment appropriated in previous legislative sessions. OHA, LPHAs, 76 CBOs and eight Federally Recognized Tribes of Oregon received resources to support a healthy, climate-ready Oregon. Climate and health adaptation plans, data system modernization, staffing, community engagement, and climate adaptation projects are all part of this cross-system public health effort.
- **Tracking collective climate and health progress.** In 2024, OHA’s Public Health Division adopted [Public Health Accountability Metrics](#) to set climate and health goals and measure progress towards achieving them by 2030. Accountability measures include requirements for LPHAs to develop climate and health adaptation plans and actions. OHA is accountable to provide technical assistance, publish guidance, recommend policy change, and steward health data to support partner work. OHA adopted specific metrics tied to two major climate impacts on health in Oregon: respiratory illness due to wildfire smoke and heat-related illnesses. OHA will publish progress through [annual reports](#) and will develop metrics that measure progress toward reducing drinking water insecurity and mental health impacts of climate change.

- **Medicaid climate supports for people in transition.** Starting in March 2024, the Oregon Health Plan (Oregon’s program for delivering Medicaid benefits) began offering first-in-the-nation protections from extreme temperatures and smoke to some of our most vulnerable neighbors – people going through major life transitions such as being at risk of homelessness or transitioning out of foster care or incarceration. These Oregon Health Plan Climate Supports provide housing, climate and nutrition support for these populations. From March to May 2024, OHA also distributed nearly 1,000 portable air conditioners and air filters to people in Oregon who are socially and medically vulnerable to smoke and heat impacts. These life-saving devices were in place in advance of the July 2024 heat wave.
- **Healthy Homes Grants.** In 2024, OHA issued nearly \$20.4 million to 34 organizations across the state for [Healthy Homes Grant Program](#) (HHGP) grants to repair and rehabilitate homes of low-income residents. OHA also set aside \$3 million in HHGP funds for the Nine Federally Recognized Tribes in Oregon. Grantee organizations help residents repair and rehabilitate dwellings to help them stay housed and safe from climate and environmental hazards.
- **Climate hazards information and outreach for the public and partners.** OHA experts collaborate with agency and community partners to produce environmental health advisories and health guidance, analyze data, support public communications, and mobilize public health interventions in response to climate hazards. For example, in 2024 OHA co-facilitated 26 Interagency Smoke Coordination Calls among partners responding to wildfires across the state, informing issuance of air quality advisories, developing public safety messaging, distributing public health risk communication toolkits, and providing near-real-time data about people arriving at emergency departments with smoke-related respiratory concerns.

Notable climate and health collaborations with state and federal partners

In 2024, OHA continued to collaborate with state and federal agency partners on climate adaptation and mitigation programs and policies. OHA provided data, information and expertise on incorporating health equity principles and strategies into shared work, helping fellow agencies prioritize communities that experience disproportionate risks from environmental and climate hazards.

- **Environmental Justice Mapping Tool.** OHA continued to work closely with the Department of Environmental Quality (DEQ) and other state agency partners in support of the [Environmental Justice Council](#)-led initiative to develop an Oregon-specific environmental justice mapping tool. This tool will provide policy makers, the public, and state and local agencies with geospatial information about communities disproportionately affected by environmental stressors and inform state policies, programs, and investment decisions.

- **Smoke Management and Prescribed Fire.** In 2024, the regional directors of the US Environmental Protection Agency (EPA), the US Forest Service, and directors of state health, environmental, and forestry agencies of Oregon and Washington signed a [joint regional agreement](#) to increase the pace and scale of prescribed fire in the Pacific Northwest while centering protection of public health. Prescribed fire or burning is a land management practice that reduces the risk of wildfires through controlled burns in high-risk areas. In Spring 2024, the interagency group designated and carried out the [West Bend Prescribed Fire Pilot Project](#) under this agreement. The pilot included intensive outreach and education to the public and succeeded in treating seven times more acres of forest than in past years. This effort complements Oregon’s long-standing Smoke Management Program implemented by the Oregon Department of Forestry (ODF) in collaboration with DEQ and OHA.
- **Oregon Climate Action Commission.** The [Oregon Climate Action Commission](#) (OCAC) tracks trends in greenhouse gas emissions, recommends ways to coordinate state and local efforts to reduce emissions, and works to prepare communities for the effects of climate change. In 2023, the Oregon Legislature passed a bill that modernized the previous Oregon Global Warming Commission and renamed it the Oregon Climate Action Commission as of January 2024. Changes included adding the OHA director as a named ex-officio (non-voting) OCAC commissioner. OHA participates regularly and helps inform OCAC deliberations and reports with climate and health information, including OCAC’s biennial report to the Oregon Legislature.

Letter from the OHA Public Health Director

2024 was the warmest year on the planet since global temperatures have been tracked, breaking the 2023 record. Oregon also experienced above-average temperatures, and a record-breaking wildfire season, compounding health risks and continuing to drive climate change-related illness and death across communities. From devastating wildfires in Central and Eastern Oregon that burned nearly two million acres and drought in Southern Oregon, to a prolonged heatwave in the Willamette Valley, nearly every corner of Oregon experienced some impact from climate change in 2024.

A growing body of science, documented by the Oregon Climate Change Research Institute, predicts Oregon will continue to experience warmer temperatures year-round, particularly in summer, as well as drier summers with a higher risk of drought.

While climate change poses an existential threat to the health and well-being of all Oregonians, its effects are not felt equally. Oregon's public health data demonstrate that some communities of color, Tribal communities, lower income, unhoused, and rural communities are disproportionately impacted by climate-related illness and death. How and why is the burden higher in some communities and what actions are needed to reduce health risks? OHA is working with statewide partners toward a bold, comprehensive, equitable, and ambitious public health response to address these questions in our shared work. Since 2015, the Governor and Oregon Legislature have resourced the Oregon Health Authority through Public Health Modernization to mobilize the statewide public health system toward building long-term climate resilience, bringing together local and equity-centered partners doing this work across the state.

These investments in all local public health departments, community-based organizations, and health departments of the Federally Recognized Tribes of Oregon link climate resilience action across over a hundred organizations. In addition to describing these system-wide public health investments and collective action, *Climate and Health in Oregon 2024* documents the health effects of climate change in Oregon in 2024. The report also documents OHA's accountability actions and interagency work that seek to make every Oregon community resilient to climate change.

Climate change is an urgent public health threat and OHA remains steadfast in its foundational commitment to advancing health equity and eliminating health disparities. We are building a public health system that is equipped and resourced to respond to the magnitude of this threat, while working together to end health inequities.



Naomi Adeline-Biggs, MBBS, MPH
Public Health Director
Oregon Health Authority

Introduction: Accelerating climate threats demand a robust and responsive public health system



As documented in this and prior [Climate and Health in Oregon](#) reports, accelerating climate change is directly affecting the health of Oregonians in many ways, and those impacts are not felt equally. The overall trend of increasing episodes of extreme heat, wildfire smoke, water insecurity, and winter hazards is increasing health risks across the state, while exacerbating health inequities. This report also spotlights promising and effective interventions to help communities in Oregon adapt to this “new normal,” including through actions that simultaneously reduce greenhouse gas emissions and protect people from climate hazards.

Global climate trends in 2024

Globally, 2024 was the hottest year on record, with an average annual temperature 2.32°F above the 20th-century average. [1] This is not an outlier, but the continuation of a trend: the ten warmest years in the 175-year record have all occurred during the last decade (2015–2024). In its 2024 annual report, the National Oceanic and Atmospheric Administration (NOAA) cites at least 25 significant climate anomalies and events globally. [1] Underlying these anomalies are steadily increasing global surface and ocean temperatures; the 2024 Northern Hemisphere surface temperature was the warmest on record. Global ocean temperatures were also notable; each month from January through April exceeded the previous monthly records. The rapidly increasing heat on the land and the ocean are driving extreme temperatures and weather events that are negatively affecting the health of communities in Oregon and worldwide.

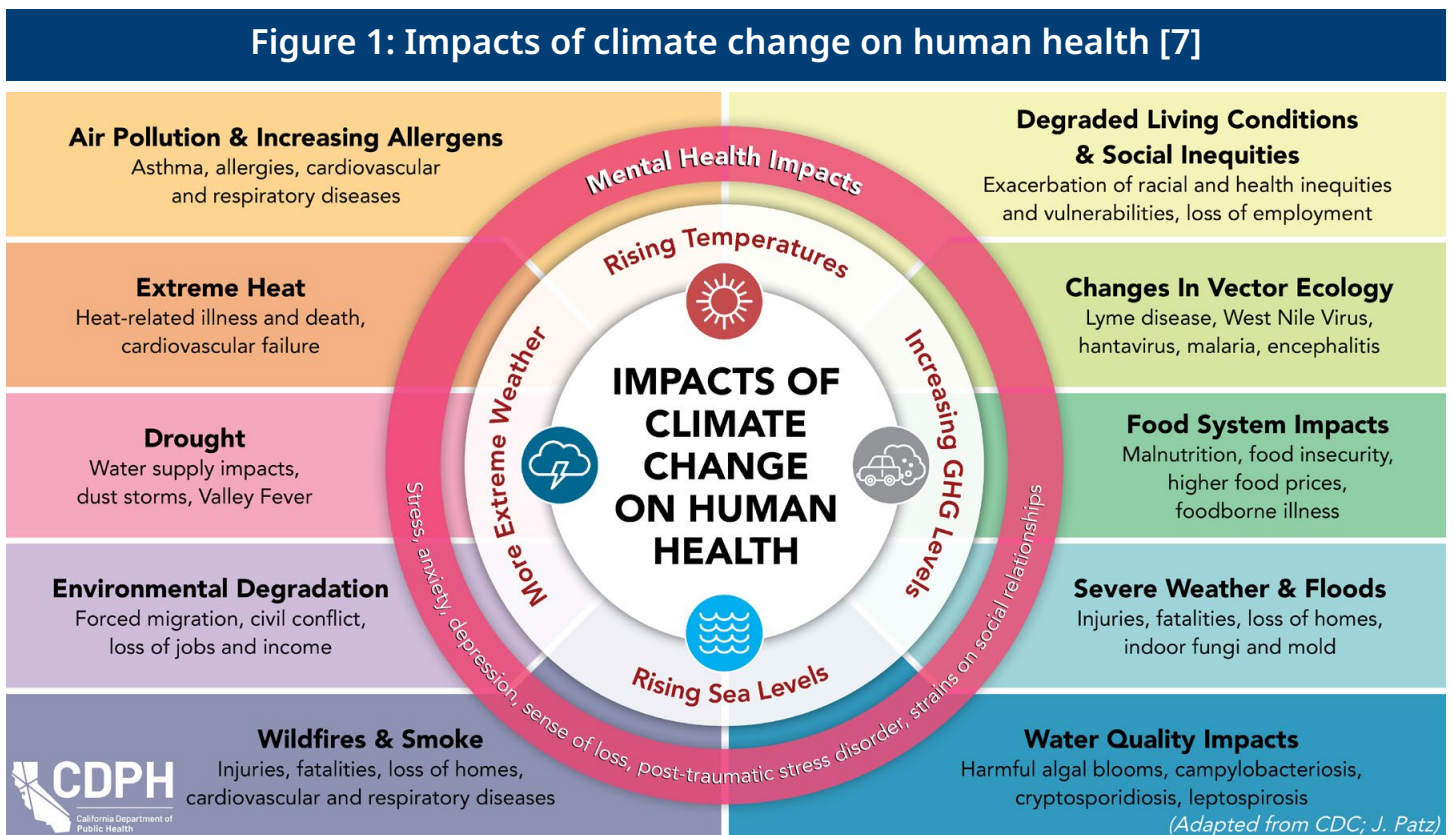
Oregon climate trends in 2024

In 2024, Oregon’s average temperature was 2.5°F above the 20th century norm—part of a persistent trend in the state. Nearly every year since 2000 has been warmer than historical averages, and many of Oregon’s hottest years on record have occurred in just the past two decades. [2] Much of the state experienced record-breaking summer temperatures in 2024, resulting in a statewide extreme heat emergency declaration on July 5th. [3,4] Sparked by this

early-season heatwave and several lightning storms, 2024 also saw a record-breaking wildfire season that burned more than 1.7 million acres. [5] The state experienced near normal levels of precipitation, with a monthly average of 33.59 inches of rain statewide, and moderate drought. [2,6] Fewer counties declared drought in 2024, decreasing from 13 in 2023 to 4 in 2024. [6] Several large storms disrupted communities, including a 2-day winter storm in January that resulted in rapidly developing cold temperatures, extensive power outages, and hazardous conditions.

Public health impacts of climate change

The health of Oregonians depends on complex and dynamic natural and social systems. As climate change disrupts these systems, cascading effects impact our physical, social, and mental well-being. [Figure 1](#) shows the myriad ways in which climate change affects our environment and human health. *Climate and Health in Oregon 2024* provides updates on how climate impacts affect the health of Oregonians and highlights state and local partner efforts to build climate resilience. OHA's working definition of climate and health resilience is the capacity of a community to successfully anticipate and adapt to climate stressors while promoting equity and well-being.



Public health accountability metrics

Oregon's Public Health Advisory Board (PHAB) advises OHA on policy matters related to public health programs, provides a review of statewide public health issues, and participates in public health policy development. PHAB establishes accountability metrics for OHA and tracks progress towards public health system goals of improving health, eliminating health inequities, and effectively using public funding.

PHAB selected "Increase community resilience for climate impacts on health" as one of three priority areas for public health accountability, setting metrics focused on extreme heat and wildfire smoke to assess Oregon's progress toward meeting OHA's public health goals. These metrics are consistent with the top priorities identified by OHA's Climate and Health program and LPHA and CBO public health system partners to prioritize preparedness, planning, and adaptation actions. PHAB also identified drinking water security and mental health effects of climate change as future metrics to develop and guide priorities.

Accordingly, in 2024 OHA adopted the following metrics that will inform its work and collaborations with partners within and outside of the public health system to reduce climate impacts on health. By 2030, OHA will seek to meet the following goals:

- Extreme heat
 - Reduce heat-related illness by 50%
 - Reduce heat-related hospitalizations by 60%
 - Reduce heat-related deaths by 70%
- Wildfire smoke
 - Reduce non-infectious respiratory emergency department and urgent care visits by 20%

In 2024 PHAB also set process measures for actions addressing extreme heat and wildfire smoke that OHA and LPHAs will report on annually and strive to complete by 2030.

OHA will be accountable to:

- Increase access to data about health outcomes associated with climate exposures, such as the number of people arriving to emergency departments with heat-related illness complaints
- Increase technical assistance to LPHAs that builds their capacity to assess and address the health impacts of climate change, such as using environmental health data to guide Community Health Improvement Plans and Climate and Health Adaptation Plans.

- Develop public health indicators and goals for water insecurity and mental health impacts of climate change.
- Identify policy changes needed to reduce health impacts of climate change on people in Oregon (beginning with extreme heat and wildfire smoke)

LPHAs will be accountable to:

- Collect and use data to identify population(s) experiencing disproportionate health impacts.
- Implement communications strategies, such as extreme heat awareness media campaigns.
- Demonstrate policy actions, such as providing data and subject matter expertise to inform policy development or implementation
- Establish community partnerships to support collective action, such as joint initiatives to increase awareness and access to cooling centers for populations at highest risk of heat-related illness.

Oregon Health Authority 2024–27 Strategic Plan

In June 2024 OHA adopted the [OHA 2024–27 Strategic Plan](#) to accelerate progress toward the agency’s ambitious strategic goal, set in 2019, to eliminate health inequities in Oregon by 2030. OHA identifies climate resilience as a key component to achieving the strategic plan goal pillar of “Fostering healthy families and environments.” OHA is operationalizing the plan through the agency’s [Oregon Health Forward](#) initiative.

“Fostering healthy families and environments” includes specific climate resilience strategies to:

- Increase identification and response to climate change-driven health risks.
- Increase equitable access to quality housing and climate adaptation resources.
- Improve the health of home environments.
- Support implementation of local climate adaptation plans.

Climate and health data

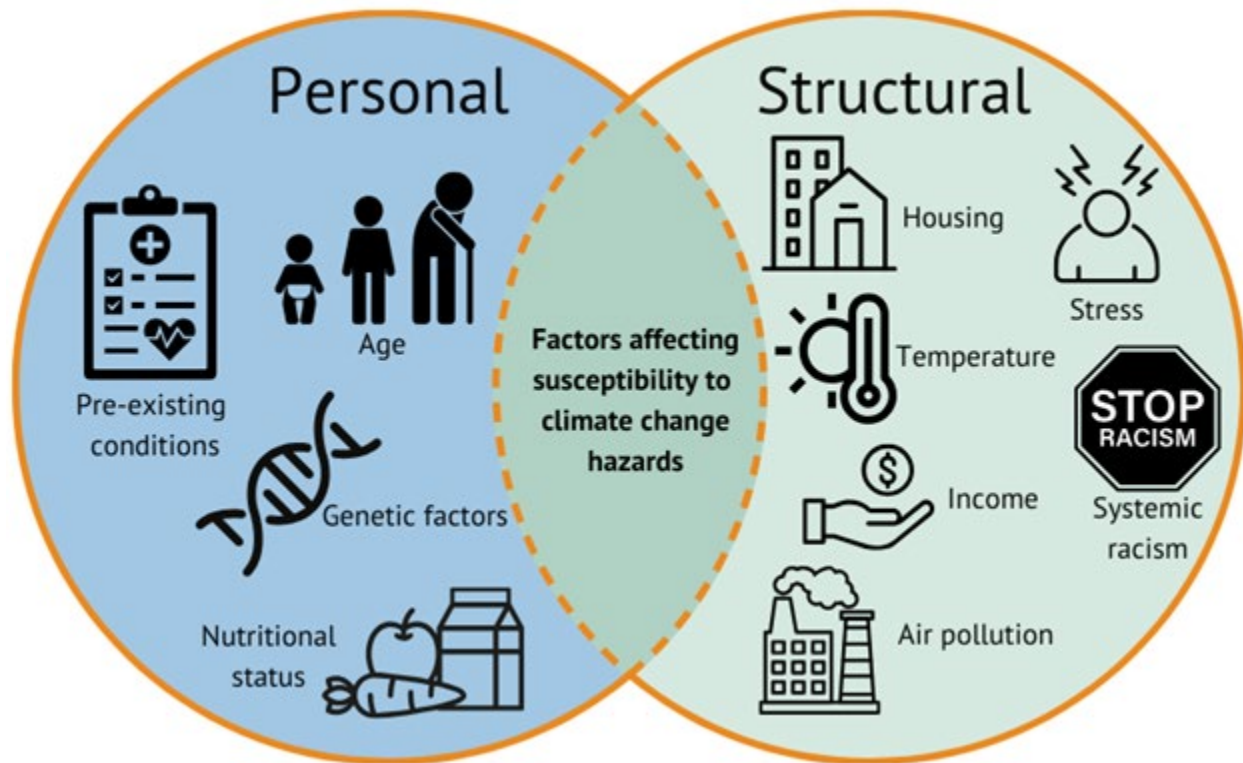
When preparing the annual *Climate and Health in Oregon* report, OHA reviews the previous year's data about environmental hazards known to be intensified by climate change – extreme heat, wildfire smoke, combined heat and smoke, water insecurity, winter hazards and vector borne diseases – and associated health risks or impacts to people in Oregon. Because [OHA has the strategic goal to eliminate health inequities in Oregon by 2030](#), this report highlights populations experiencing greater risks due to social determinants of health, to inform action needed to reduce those risks.



Climate change and health equity

The health effects of climate change are not experienced equally across regions, populations, and individuals. [8,9] A person's susceptibility to climate change-related health hazards depends not only on personal characteristics such as age, pre-existing conditions, and genetic factors, but also structural factors related to the social determinants of health such as housing, systemic racism, and income. These structural factors, among others, can drive disproportionate exposure to climate hazards and restrict individual and community access to protective resources and safety. The health impacts of climate change can exacerbate or create preventable and inequitable differences in health outcomes across different populations and communities. All health outcome disparities reported for Oregon populations in this section should be interpreted through both personal and structural lenses. [Figure 2](#) illustrates the interplay between the personal and structural factors driving increased health risk of different populations from climate change-related hazards.

Figure 2: Examples of factors affecting susceptibility to climate change-driven hazards



Note on population and health data in the following sections

Sociodemographic data

At the time of this report, the US Census Bureau's American Community Survey (ACS) had not released 2024 5-Year population estimates. OHA therefore used Portland State University (PSU) Population Research Center's Certified Mid-Year Population Estimates for 2024 statewide population, and preliminary certified estimates for race and ethnicity, age, and sex population estimates. The difference between ACS and Population Research Center estimates is negligible, so this report relies on PSU estimates to determine proportions and rates. This report uses OHA 2024 Vital Statistics heat deaths data that are preliminary and subject to change.

OHA recognizes that data systems have historically not captured the range and breadth of identities in Oregon and the U.S. In July of 2024, the Oregon Secretary of State approved the Oregon Administrative Rules establishing standards for race, ethnicity, language and disability (REALD), and sex, sexual orientation, and gender identity (SOGI) demographic data collection by OHA and contracted partners. These standards will support more accurate and complete representation of people in Oregon in state-level datasets, including expanded capacity to identify and address health inequities. These standards are in the implementation process and are not reflected in the data in this report. We, therefore, recognize the limitations in representation of REALD and SOGI identities in data analyses in this report and the subsequent limitations in identifying potential health inequities. We know that the true diversity of REALD and SOGI identities in Oregon is greater and look forward to providing more accurate and representative data in the future.

Health outcome data

OHA relies on three health outcome datasets to assess climate change-driven impacts to health and identify populations most at risk: Oregon ESSENCE, Vital Records, and Emergency Department Discharge data. Each dataset has strengths and limitations which inform dataset selection for specific climate-related hazards and outcomes. A summary of the health outcome datasets used in this report is included in the “Data sources” section of the [Appendix](#), and [Table A1](#) provides details of the data used for each health outcome figure in the report.

Extreme heat

During the summer of 2024, much of Oregon experienced record-breaking temperatures. In July 2024, several Oregon cities experienced record-breaking heat. Portland reached 104°F, while Salem and Eugene each reached 106°F. Both Salem and Eugene broke records for consecutive days above 100°F with five days of extreme heat, their longest such streaks on record. [10] On July 5, Governor Tina Kotek issued a statewide extreme heat emergency due to a prolonged heatwave of high daytime and nighttime temperatures. [4,11] Definitions of extreme heat vary by geography, time of year, other meteorological factors such as humidity, and duration of a heat event. For the purposes of this report, extreme heat conditions are defined as weather that is much hotter and sometimes more humid than average for a particular time and place. [12] The health impacts of heat also vary based on individual characteristics and social determinants of health. Oregonians can experience heat-related illnesses at a heat index as low as 80°F, which we use as a marker for extreme heat conditions.

Equity and heat-related health risks

Structural and social determinants strongly influence how communities experience extreme heat and related illnesses. Urban planning, housing policies, and public health infrastructure can increase heat vulnerability. The urban heat island effect, where cities are hotter than rural areas due to dense construction and limited green space, worsens heat impacts. [13] Inadequate housing policies and public health systems, like insufficient cooling resources and outreach, deepen disparities.

Social determinants such as income, housing quality, healthcare access, and social isolation also contribute to heat vulnerability. People at increased risk of heat-related illnesses include:

- Older adults, who may have reduced ability to regulate body temperature, underlying health conditions, or medications that worsen heat stress.
- Infants, young children and pregnant people, who are more physiologically sensitive to heat.
- People with chronic medical conditions, whose health can be worsened by heat.
- Outdoor workers and people who are unhoused, who face direct exposure.
- Socially isolated individuals and lower-income households, who may lack adequate cooling, safe housing, or timely healthcare access, including culturally and linguistically appropriate outreach. [14,15]

Addressing these factors, such as improving housing, expanding green spaces, and enhancing healthcare access, is crucial for reducing heat-related disparities in Oregon.

Factors that increase the risk of heat-related illness include:

- **Humidity:** High humidity makes it harder for the body to cool down through sweating, making heat feel more intense.
- **Lack of acclimatization:** People who are not used to hot conditions are at higher risk because the body needs time to adapt to extreme heat.
- **Consecutive hot days:** Several days of heat with little overnight cooling can make it harder for the body to recover and regulate temperature.

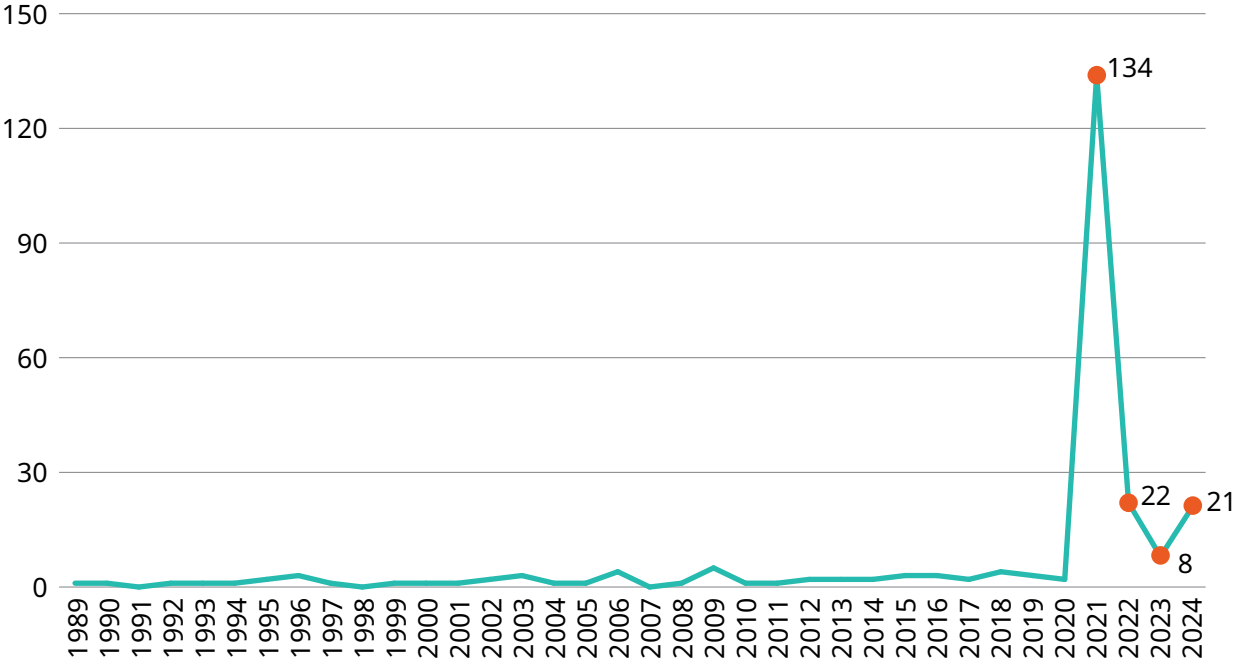
Extreme heat-related deaths

Undercounting of heat-related deaths can occur because heat worsens underlying conditions, making the primary cause harder to determine. Medical examiners frequently classify these deaths as strokes, heart attacks, or respiratory issues. Extreme heat can also have delayed effects. Health outcomes (e.g., heart attacks, strokes) can occur days after an extreme heat event, making it harder to directly link to heat.

Oregon lost 185 lives to extreme heat between 2021 and 2024.

In 2024, Oregon had 21 heat-related deaths. Before 2021, the number of annual heat-related deaths never exceeded five (Figure 3). Nearly half of heat-related deaths had multiple contributing causes. Cardiovascular disease contributed to 67%, diabetes to 38%, substance use to 14% and mental health conditions (unrelated to substance use) to 24% of heat-related deaths.

Figure 3: Statewide heat-related deaths, May 1–October 31, 1989–2024*^



* Data for 2024 are preliminary and subject to change.
^ Health outcome data details are included in [Table A1](#).

Adults aged 65 and older accounted for 71% of heat-related deaths in 2024, with most deaths occurring at home.

In 2024, deaths from extreme heat disproportionately affected adults aged 65 and older, who accounted for 71% of heat-related deaths, despite representing only 20% of the state's population ([Figure A1](#)). Thirteen of the 21 heat-related deaths (62%) occurred at the decedent's residence, and, of these deaths, most (77%) were adults aged 65 and older.

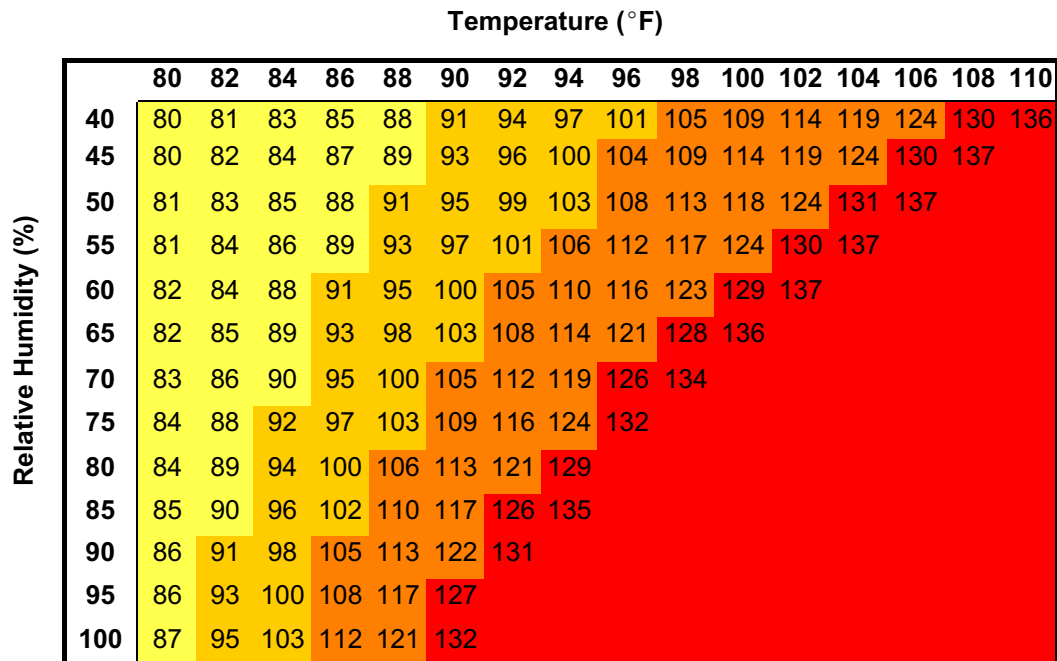
Males were at greater risk of heat-related deaths.

Extreme heat disproportionately affected males, who accounted for 67% of heat-related deaths, while representing 50% of the state's population ([Figure A2](#)). Current research shows a complex picture of how heat affects men and women differently, resulting from a combination of personal and structural factors. Evidence suggests that women may face lower physiological thresholds in coping with heat, while men are more likely to die from heat due to behavioral and social factors. Controlled research in hot, humid environments has found that women over age 60, especially post-menopausal women, are more physiologically vulnerable, meaning their bodies have a harder time cooling down. [16] However, U.S. surveillance data show that men make up most heat-related deaths, about 72% between 2004 and 2018. [17] One reason may be that men are more likely to have greater exposure to dangerous heat through outdoor work and strenuous activity, and older men are also more likely to be socially isolated, which increases risk during extreme heat events. [18,19] The role of hormones, chronic health conditions, and how biological sex, gender roles, and social factors work together to influence heat risk are not fully understood.

Oregonians experience heat-related illnesses at a heat index as low as 80°F

The heat index ([Figure 4](#)), which takes both temperature and humidity into account, is a more reliable indicator of the health hazard associated with heat exposure than temperature alone. [20] While the temperature measures the air's warmth, the heat index reflects how the body perceives that heat. On a 90°F day with high humidity, the heat index can make it feel like 100°F or higher, significantly increasing the risk of heat-related illnesses. In addition, while a single day of extreme heat can be dangerous, prolonged exposure to extreme heat over consecutive days increases the risk of more severe health outcomes due to cumulative stress on the body.

Figure 4: National Weather Service heat index chart



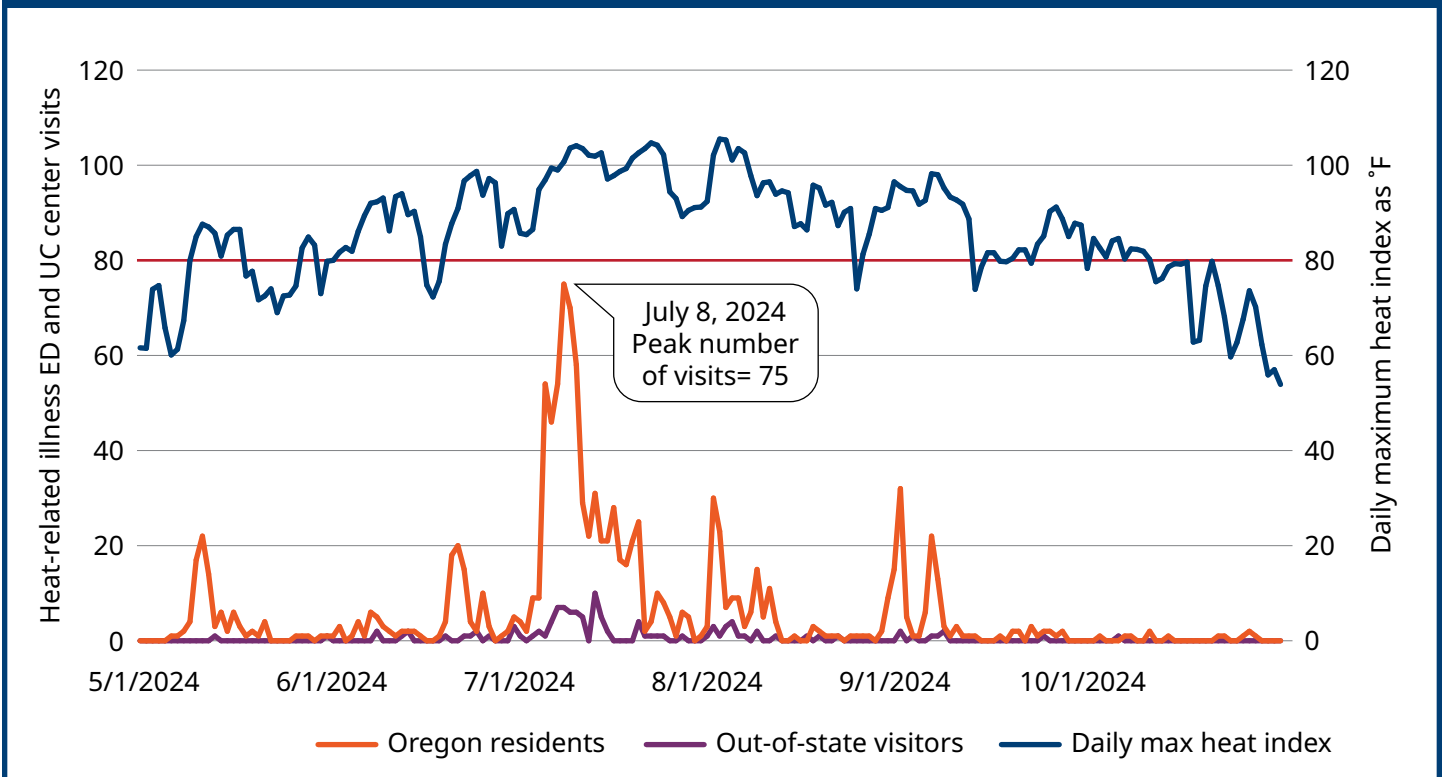
Likelihood of Heat Disorders with Prolonged Exposure and/or Strenuous Activity

■ Caution
 ■ Extreme Caution
 ■ Danger
 ■ Extreme Danger

Heat-related illness visits to emergency departments (ED) and urgent care (UC) centers

From May 1 through October 31, 2024, there were 1,149 statewide heat-related illness visits to EDs and UC centers among Oregon residents. The peak number of ED and UC center visits occurred on July 8, with 75 visits, coinciding with a prolonged stretch of extreme heat when daily maximum heat index values remained above 90°F and exceeded 100°F on consecutive days ([Figure 5](#)). Additional smaller increases in visits were observed in mid-July, early August and early September, aligning with subsequent periods of high heat. Consecutive heat index days between 80°F and 85°F increased early-season (May-June) heat-related illness visits to the ED and UC centers, particularly in the more densely populated Tri-County areas in Western Oregon (Multnomah, Washington, Clackamas) and Lane County. Out of state visitors were among those presenting with heat-related illness.

Figure 5: Daily heat-related illness ED and UC visits, May 1–October 31, 2024*^



* Health outcome data details are included in [Table A1](#).

^ The heat index data used in this report were obtained and archived by the Oregon Climate Service. [21]

Adults ages 18–44 accounted for the majority of heat-related illness visits

In contrast to heat-related deaths, heat-related illness disproportionately affected adults aged 18 to 44, who accounted for 41% of heat-related illness ED and UC center visits and 36% of the state’s population ([Figure A3](#)). Younger adults are more likely to engage in outdoor activities such as exercise, sports, or work in high-heat conditions. Younger adults may underestimate the risks of extreme heat or may not take the necessary steps to prevent heat-related illnesses, such as staying hydrated or wearing appropriate clothing. Heat-related illness also disproportionately affected adults aged 65 and older, who accounted for 26% of heat-related illness ED and UC center visits and 20% of the state’s population.

Men were more likely to experience heat-related illnesses

Heat-related illness also disproportionately affected men, who accounted for 62% of heat-related illness ED and UC Center visits, while representing 50% of the state’s population ([Figure A4](#)).

Heat-related illness and race and ethnicity

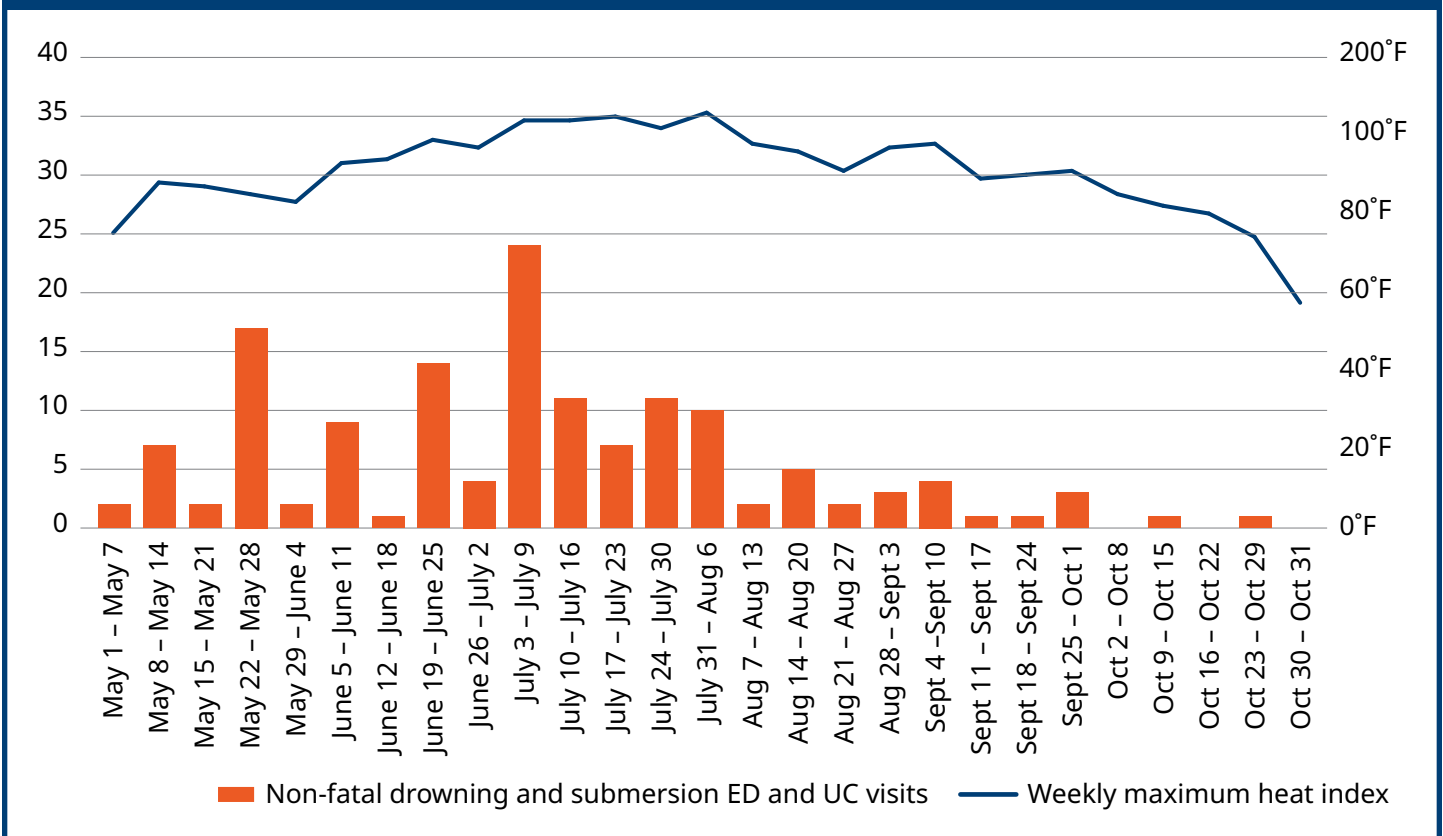
Extreme heat disproportionately affected certain racial and ethnic groups. People who are American Indian or Alaska Native accounted for 3% of heat-related illness ED and UC center visits while representing 2% of the population ([Figure A5](#)). Those

who are White accounted for 92% of heat-related illness ED and UC center visits and represented 86% of the state population. Extreme heat disproportionately affected people who are not Hispanic or Latino, accounting for 89% of visits, despite representing 85% of the state population ([Figure A6](#)).

Extreme heat contributes to the risk of drowning and submersion

During periods of extreme heat, people are more likely to engage in water-related activities to cool off, which can increase the risk of drowning incidents. During the week of May 22–28 (including Memorial Day), there was a spike in early-season non-fatal drowning and submersion ED and UC center visits, with out-of-state visitors accounting for 70% of ED and UC center visits. The peak number of visits occurred between July 3 and July 9, coinciding with the Fourth of July weekend, when the heat index reached nearly 104°F. The third highest week of visits coincided with Juneteenth ([Figure 6](#)). These patterns may reflect a combination of factors, including both high heat index values and increased recreational water use around federal holidays.

Figure 6: Statewide weekly non-fatal drowning and submersion ED and UC visits and maximum heat index, May 1–October 31, 2024*



* Health outcome data details are included in [Table A1](#).

Wildfire smoke

Fine particulates in wildfire smoke threaten health

Inhalable fine particles generated by combustion, including during wildfires, are harmful to health. These particles, also known as “particulate matter,” can travel deep into the lungs and into the bloodstream, causing damage to the lungs, heart and other organs. Many researchers study the effects of particulate matter 2.5 microns or smaller in size, referred to as “fine particles” or “PM2.5”, because these incredibly small particles can penetrate deeper into the lungs and cause more harm than larger particles. About thirty PM2.5 particles strung together measure the width of a human hair. Wildfire smoke is primarily known to influence human health by increasing PM2.5 in downwind communities. Wildfire smoke can travel hundreds or thousands of miles, meaning that Oregonians may be impacted by wildfires that occur in the state, in other states, or even in Canada. In this report, elevated PM2.5 levels are used as a proxy for the presence of smoke (from wildfire or prescribed fire) during the May–October months.

Many people have become familiar with the green, yellow, orange, red and purple color coding of the Air Quality Index (AQI) of the US Environmental Protection Agency’s (EPA) AirNow system, corresponding to “good,” “moderate,” “unhealthy for sensitive groups,” “unhealthy,” “very unhealthy” and “hazardous” air quality (Figure 7). In 2024, EPA revised the level of PM2.5 for a number of these categories to reflect increasing evidence of adverse health effects at lower levels of fine particulate matter pollution. [22]

Figure 7: EPA AQI categories for PM2.5

AQI Category (Index Value)	AQI Category Breakpoints for PM2.5 (µg/m ³)
Good (0–50)	0.0 to 9.0
Moderate (51–100)	9.1 to 35.4
Unhealthy for Sensitive Groups (101–150)	35.5 to 55.4
Unhealthy (151–200)	55.5 to 125.4
Very Unhealthy (201–300)	125.5 to 225.4
Hazardous (301+)	225.5+

Air quality trends in Oregon during summer of 2024

During the summer of 2024, Oregon experienced more days (50 days) at or above an AQI of Unhealthy for Sensitive Groups (USG) statewide than the summer prior (46 days). There were also more instances in which there were two or more consecutive days of an AQI at USG or above throughout the summer season than the season prior, with 9 multi-day events in summer of 2024 compared to 7 in summer of 2023. These multi-day events can further exacerbate chronic respiratory conditions, impact cerebrovascular systems, and contribute to premature death.

Non-infectious respiratory illness visits to EDs and UC centers

Respiratory illness that can be made worse by poor air quality, including asthma and chronic obstructive pulmonary disease (COPD), as well as symptoms like “wheezing” and “shortness of breath,” are collectively referred to as non-infectious respiratory illness. Healthcare visits for non-infectious respiratory illness are used to investigate the health impacts of wildfire smoke.

There are many factors and complex relationships that can impact visits to urgent care centers and emergency departments for non-infectious respiratory illnesses. These include but are not limited to seasonal variations in air quality, public risk perception of air quality events, protective health actions and the ability to take those actions, occupation, and seasonal allergies. Patterns in these visits can also be impacted by time-related factors such as seasonal travel, school calendars, holidays and prominent viral respiratory infections.

Non-infectious respiratory visits vary by age and sex.

From May 2024 to October 2024, there were 102,396 total visits for non-infectious respiratory conditions statewide. While only accounting for 20% of the state’s population, residents ages 65+ accounted for 41% of all emergency department and urgent care center visits for non-infectious respiratory illnesses during May–October 2024 ([Figure A7](#)).

Statewide, non-infectious respiratory visits were higher among the 0–4 and 5–17 age groups in the early season (May–June) and in the late season (September–October) compared to the mid-season (July–August). During the mid-season (July–August), visits in these age groups were lower than at other times, despite higher PM_{2.5} concentrations. Given these observed patterns among school-aged children, non-infectious respiratory visits may have been driven by school-related factors. These could include indoor air quality, which can vary based on ventilation systems, building materials, activity levels and outdoor air quality. [23] Additionally, schools provide more exposure to viral infections, and infectious and

non-infectious respiratory illnesses can impact one another. Viral infections can exacerbate chronic conditions that will result in non-infectious respiratory illnesses (e.g., asthma attacks), while underlying respiratory conditions can increase susceptibility to viral infections. [24]

Non-infectious respiratory illness visits were higher among females (56% of all visits) than males (44%) ([Figure A8](#)), which may be attributable to differences in the prevalence of chronic respiratory diseases and the presentation and severity of symptoms between females and males. [25] Anatomical, hormonal, and social/environmental factors can contribute to underlying differences in respiratory disease by sex.

Non-infectious respiratory illness and race and ethnicity

People who self-identify as Black or African American comprise 2% of the statewide population but account for 4% of non-infectious respiratory illness visits from May to October ([Figure A9](#)), while those identifying as White account for 86% of the population but 90% of visits. Similarly, individuals not identifying as Hispanic or Latino account for 85% of the statewide population but 90% of visits ([Figure A10](#)).

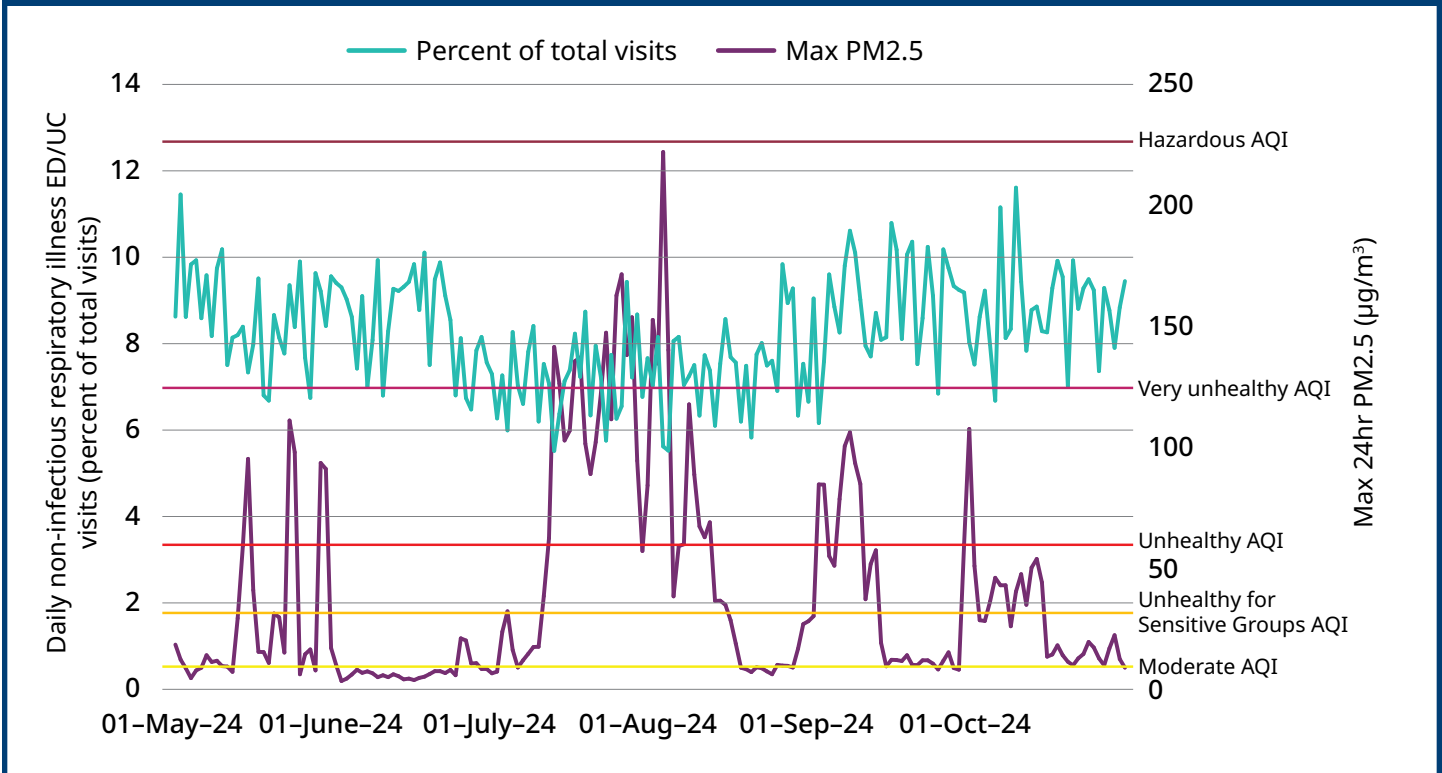
Assessing impacts to health during wildfire season

Wildfire smoke impacts, together with heat, are the two most concerning climate hazards affecting the health of Oregonians. As OHA draws on recent science about how smoke impacts health to investigate wildfire smoke events, we are identifying complex combinations of exposure, underlying health conditions and other factors that may help guide future actions to protect people in the state.

Six counties—Baker, Deschutes, Grant, Harney, Klamath, and Lane—experienced the most days at or above moderate AQI from May 1 to October 31, 2024. [Figure 8](#) shows the average maximum daily PM_{2.5} concentration and daily non-infectious respiratory illness visits (shown as percent of total visits) among these six counties. Three of these counties—Deschutes, Klamath and Lane—were also among the counties with the most days at or above moderate AQI in 2023. While some early-season and late-season wildfires increased daily maximum PM_{2.5}, these counties experienced the highest levels of PM_{2.5} during July and August. Daily non-infectious respiratory visits, as a percentage of total visits, were higher at the beginning and end of the season, and lower through the middle of the summer.

Research shows the relationship between acute (short-term) respiratory effects and PM_{2.5} concentrations are non-linear, with a higher rate of increase at lower levels of exposure to PM_{2.5} (10–30 µg/m³, in the “moderate” AQI range) compared to PM_{2.5} levels above 100 µg/m³ (“unhealthy” AQI and above). [26] By the end of the season, PM_{2.5} exposure throughout the prior months could compound and drive more non-infectious respiratory visits, despite PM_{2.5} concentrations being lower on a daily basis.

Figure 8: Non-infectious respiratory visits (as a percent of total visits) and PM2.5 in counties (Baker, Deschutes, Grant, Harney, Klamath, Lane) with the most days at or above moderate AQI, May–October 2024*



* Health outcome data details are included in [Table A1](#).

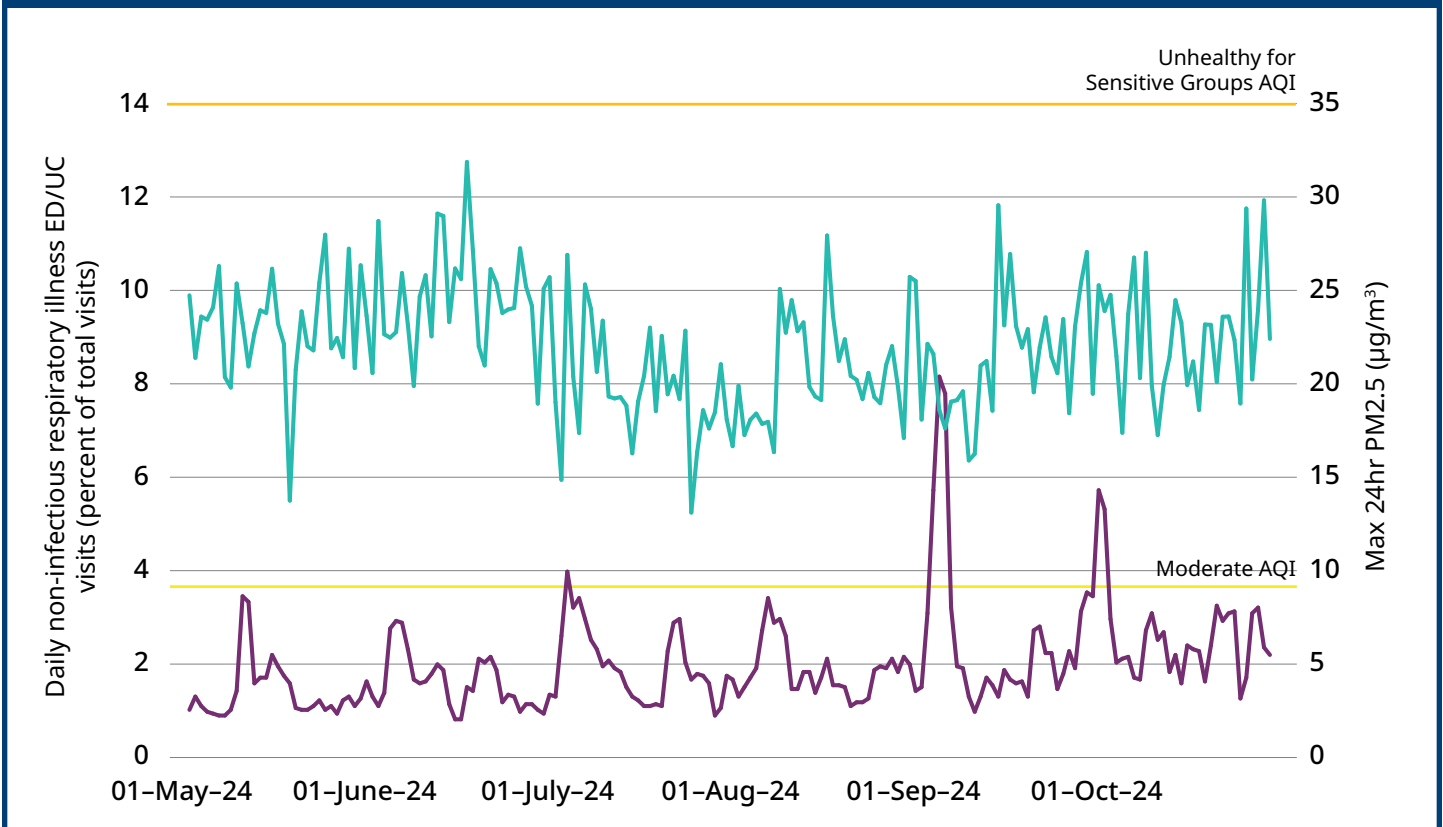
The six counties with the fewest days at or above moderate AQI from May 1–October 31, 2024 were Benton, Coos, Curry, Polk, Tillamook, and Yamhill ([Figure 9](#)). Three of these counties, Coos, Tillamook and Yamhill, were among the counties with the fewest days at or above moderate AQI in 2023. While there were some early-season and late-season events in 2024 which increased daily maximum PM2.5 among the above counties, they experienced the highest PM2.5 during September. Non-infectious respiratory illness visits increased as a percent of total visits in the days immediately following the September increase in PM2.5. Overall, the proportion of daily non-infectious respiratory visits was higher at the beginning and end of the season, and lower through the middle of the summer.

Despite having different patterns of air quality events, counties with the fewest days at or above moderate AQI during May 1–October 31 experienced similar trends in non-infectious respiratory visits as counties with the most days with compromised air quality, suggesting factors other than AQI may be driving non-infectious respiratory illness. Additionally, while these counties experienced vastly different PM2.5 throughout the season, non-infectious respiratory visits accounted for similar proportions of total visits to emergency departments and urgent care centers. This is another indication that there are more factors driving visits for non-infectious respiratory illnesses.

One possible factor is that counties that experience consistently high concentrations of wildfire smoke, and subsequently of PM2.5, during wildfire season may be more prepared to respond to them and protect against them. However, further investigation, such as qualitative research, is needed to determine if this is the case.

Pre-existing chronic health conditions and population age distribution may contribute to differences in observed respiratory health impacts of PM2.5. Coos County experienced more non-infectious respiratory illness visits in addition to having a higher prevalence of asthma, COPD and one or more chronic health conditions. In contrast, in Polk County, where the prevalence of asthma and COPD are lower than statewide rates, residents experienced fewer non-infectious respiratory illness visits. While these counties experienced some of the lowest concentrations of PM2.5 across the 2024 season, the prevalence of these chronic health conditions could increase sensitivity to air pollution, such as PM2.5, and thus be a factor in visits to emergency departments and urgent care centers for non-infectious respiratory visits.

Figure 9: Non-infectious respiratory visits (as a percent of total visits) and PM2.5 in counties (Benton, Coos, Curry, Polk, Tillamook, Yamhill) with the fewest days at or above moderate AQI, May–October, 2024*



* Health outcome data details are included in [Table A1](#).

Spotlight: Smoke Survey Post-West Bend Prescribed Fire Pilot

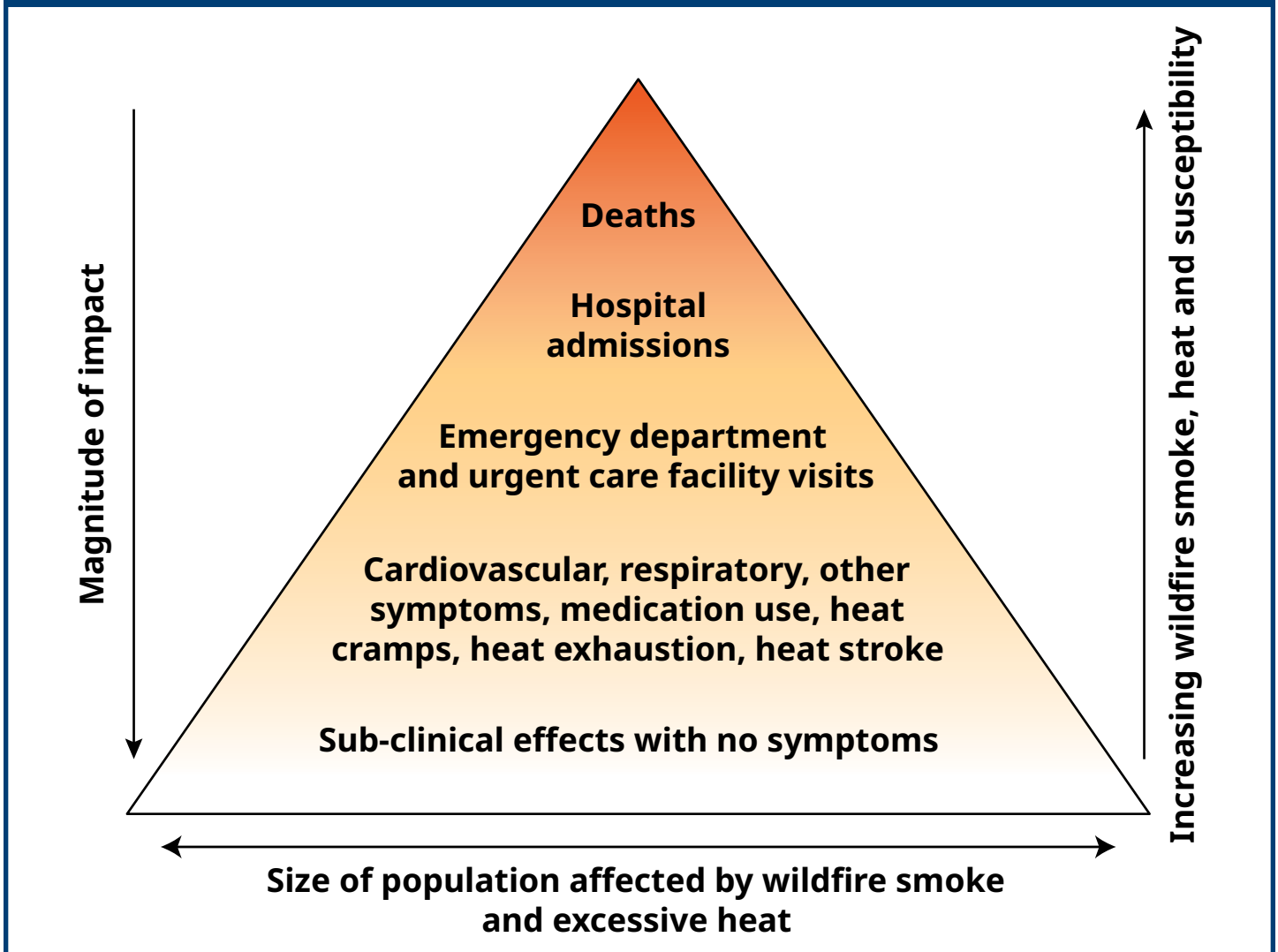
The West Bend Prescribed Fire Pilot Project took place in spring 2024. It was an effort to speed progress toward healthier forests by increasing the pace and scale of prescribed fire while protecting vulnerable people from prescribed fire smoke. [27,28] Prescribed fire is intentional, low-intensity burning in forested areas at times of low wildfire risk (usually in fall and spring) to reduce brush and debris that can fuel large wildfires. The new and essential aspect to this effort was a collaboration among county, state and federal agencies and research partners to ensure people in Deschutes County received information and tools to protect their health before and during the burning, and to learn lessons to inform future efforts. This unprecedented coordination and intensive outreach, together with favorable weather conditions, allowed the U.S. Forest Service to treat 1,864 acres in Deschutes National Forest, a seven-fold increase compared to previous years that averaged 225 acres of forest treated annually. [29] As part of an “after action review” of the pilot project, University of Oregon Center for Wildfire Smoke Research and Practice (UofO) conducted a survey to document attitudes toward prescribed burns, identify sources of information about the burns, understand behaviors adopted to reduce health risks and assess self-reported smoke exposure among Bend area residents. Of the 4,000 mailed surveys distributed to randomly selected households in the Bend area, UofO collected 508 responses. An additional 991 digital survey responses came from Central Oregon-focused websites and social media platforms. Seventy-nine percent of respondents think prescribed fire is suitable in at least certain areas of Deschutes County. Participants who reported encountering smoke in spring 2024 expressed lower support for prescribed fire use, as did respondents with household members with respiratory or cardiovascular disease or young children. Households with members who worked outdoors expressed fewer concerns about prescribed fire smoke than those without an outdoor worker. Potential communication strategies for future prescribed fires should acknowledge community concerns about smoke in advance, offer actionable steps residents can take to respond to smoke, tailor messaging to specific groups (e.g., outdoor workers), and increase messaging to strengthen community support for the frequency and scale of prescribed fire use.

Combined heat and smoke events

Elevated PM2.5 and extreme heat are individually associated with negative health impacts. These exposures often happen at the same time and may produce health impacts that are greater than the effects of individual exposures. [30]

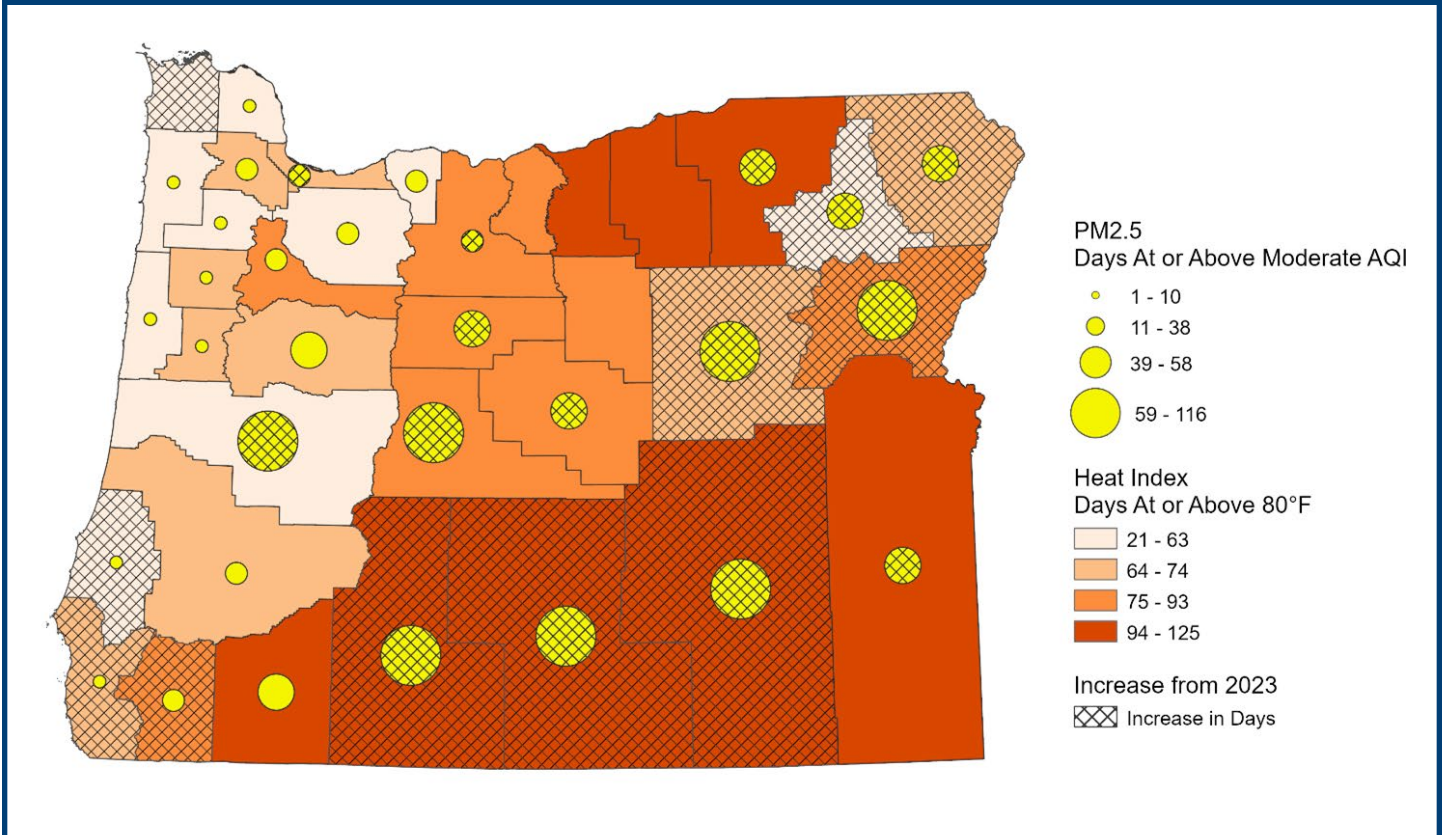
Figure 10 illustrates how exposure to wildfire smoke PM2.5 and heat can cause mild symptoms and increase to more severe symptoms, leading to emergency department visits, hospitalizations and even death. Illnesses and deaths from these environmental hazards can occur rapidly (same day) or have a lagged effect (days to weeks later). [30]

Figure 10: Pyramid of health effects from wildfire smoke and excessive heat [31]



This model is relevant for Oregon, where many counties experience numerous days of both elevated PM2.5 and high heat from May through October ([Figure 11](#)). In some areas of Oregon, the presence of ozone, another air pollutant increased by combustion, including wildfires and burning fossil fuels, may worsen health effects. [32]

Figure 11: Oregon counties showing days with a heat index at or above 80°F and at or above moderate air quality index levels, May–October 2024*



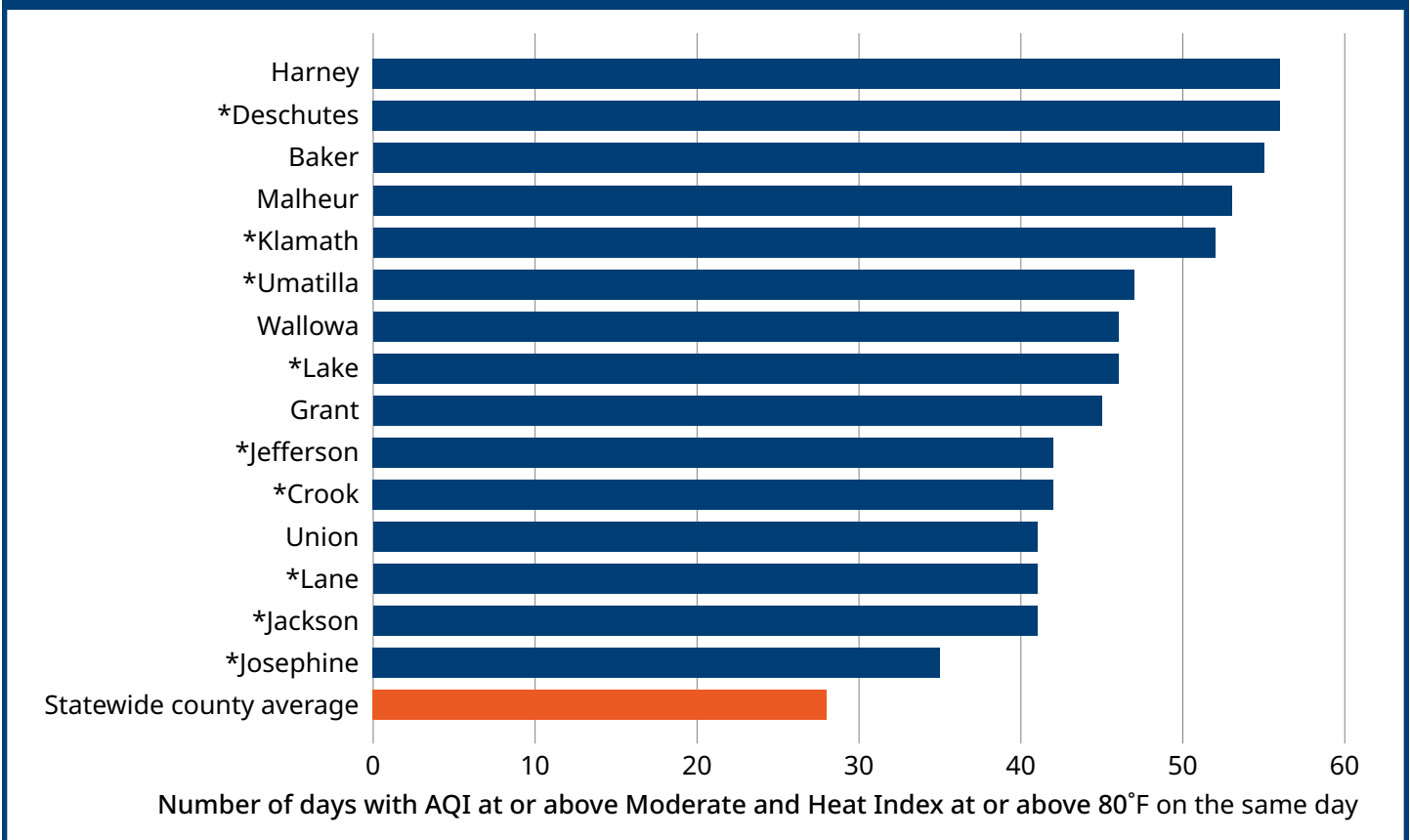
*Increases from 2023 are shown with crosshatching. Air pollution monitor data from permanent monitors are not available for Clatsop, Gilliam, Morrow, Sherman and Wheeler counties.

In 2024, the number of days with compromised air quality, defined as PM2.5 at or above Moderate AQI, ranged from 1 to 116 days across counties ([Figure 11](#)), a significant increase from the range of 2 to 61 days in 2023. Across Oregon, the county average for days with compromised air quality increased from 17 days in 2023 to 40 days in 2024. Fifteen counties had more days of compromised air quality during May 1 – October 31 in 2024 compared to the same period in 2023.

The number of days of extreme heat, defined as a heat index at or above 80°F, experienced by Oregon counties in 2024 ranged from 21 to 125, which was similar to the range in 2023 (17 to 125 days). Twelve counties had more days of extreme heat during May 1 – October 31 in 2024 compared to the same period in 2023.

Seven Oregon counties had increases in both the number of days of compromised air quality and the number of days of extreme heat during May 1 – October 31 in 2024 compared to 2023 (Figure 11). Counties experienced an average of 28 days with both extreme heat and compromised air quality during May–October 2024 (Figure 12). Nine of the fifteen counties with above average days of concurrent extreme heat and compromised air quality in 2024 experienced above average impacts in 2023 as well. Twelve of these counties are frontier (6) or rural (6). [33] Harney, Baker, Malheur, Wallowa, Grant and Union Counties are newly added to the list of counties with a higher-than-average number of concurrent impact days, reflecting the increased presence of wildfire smoke in eastern Oregon during 2024.

Figure 12: Days of concurrent extreme heat and compromised air quality among Oregon counties with above average exposure, May–October 2024*



* Counties with an asterisk (*) experienced high concurrent impacts in both 2023 and 2024

All of the counties with higher-than-average concurrent impact days are home to Oregonians who report a higher chronic disease burden than the state average. [34]

For example,

- 11 of the 15 counties are above the statewide average of 7.7% for adults ever diagnosed with coronary heart disease, heart attack or stroke.
- 10 of the 15 counties are above the statewide average of 6.2% for adults ever diagnosed with chronic obstructive pulmonary disease (COPD).
- 9 of the 15 counties are above the statewide average of 11.3% for adults with current asthma.

Thirteen of the 15 counties report a prevalence above the state average for two or more of the conditions above. Two counties, Deschutes and Wallowa are above the state average for one condition, COPD and asthma, respectively. Grant, Harney and Lake County estimates are based on small sample sizes and should be interpreted with caution. COPD data were not reported for Grant and Wallowa counties.

Spotlight: Pineros Y Campesinos Unidos del Noroeste (PCUN)

Pineros Y Campesinos Unidos del Noroeste, commonly referred to as PCUN, works to empower farmworkers and working Latinx families in Oregon. In response to the extreme heat and wildfire seasons, PCUN's rapid response campaign advocates for worker protections through safe workplace environments by conducting outreach to farmworkers. The campaign is entering its 4th year of a 10-week program where organizers work with farmers to host educational workshops during breaks and after shifts. In partnership with Oregon State University Extension Fire Program, PCUN co-created a wildfire guide that offers tips and resources about wildfire preparedness for community members who live in rented or temporary housing in Oregon, and who may work outdoors. Additional public messaging efforts around extreme heat and wildfire safety is broadcasted through Radio Poder, a Spanish language station that reaches the farm working communities in the Mid-Willamette Valley, and printed materials distributed to local partnerships such as the Oregon Childhood Development Coalition. PCUN's rapid response campaign demonstrates cultural and linguistically accessible programming and receives funding support from an OHA Public Health Equity grant.

Water insecurity

Changes to the climate are increasing the frequency and severity of droughts, floods, extreme precipitation, wildfires and other natural disasters, increasing the risk of water insecurity in Oregon. OHA defines water insecurity as inadequate and inequitable access to clean, safe and affordable water for drinking, food preparation, sanitation and hygiene, recreation, cultural and spiritual uses. Health risks from water insecurity include water-borne illness, exposure to harmful contaminants, dehydration and malnutrition, and poor mental health. [35]

Drought

Droughts are designated when an area experiences drier than normal conditions. They can have lingering impacts that persist despite the return of rain or snow. [36] In Oregon, the water year runs from October 1 to September 30, coinciding with the state's wet season beginning in autumn and ending after the following summer. Figures 13 and 14 show Oregon's ambient air temperature and water year precipitation anomalies from 1896 through 2023, measured against the 1901–2000 average, a standard baseline in climate science used to capture long-term variability. [37] Within this record, the most recent 24 years (1999–2023) were notably warmer than average and coincided with years of below average precipitation. Although drier than average years occur throughout the historical record, the trend of warmer than average temperatures combined with dry conditions may lead to more frequent and exacerbated drought. [3]

Figure 13: Average ambient air temperature anomaly in Oregon for each water year from 1896 through 2023 [37]

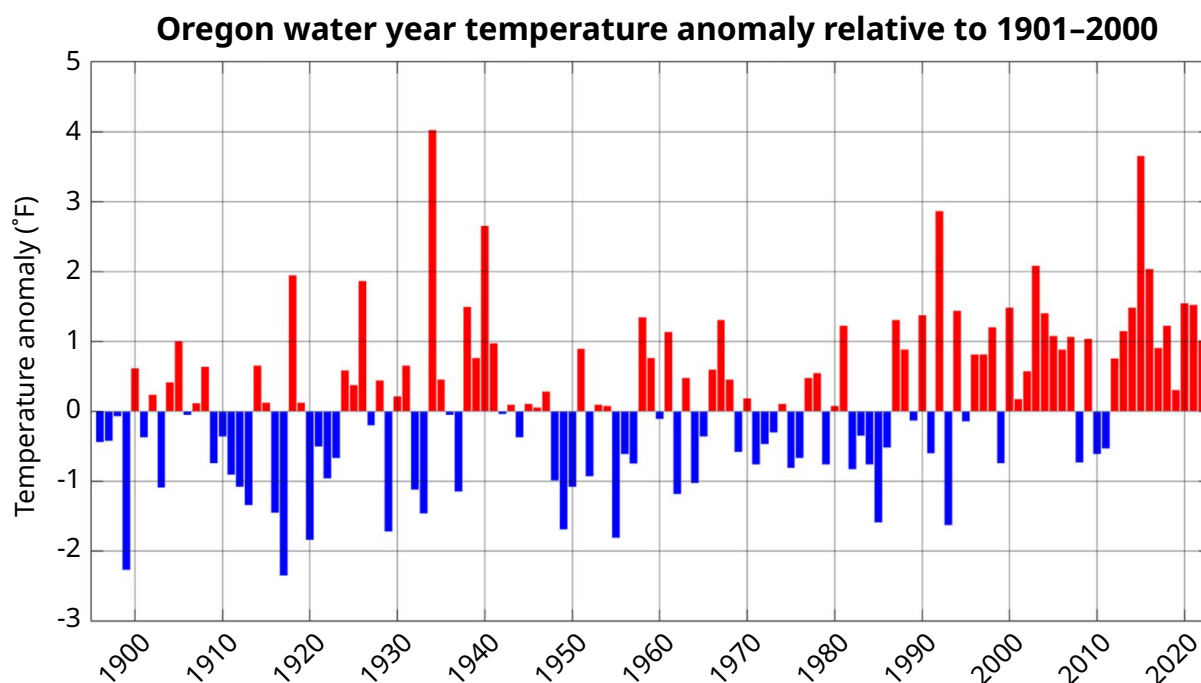
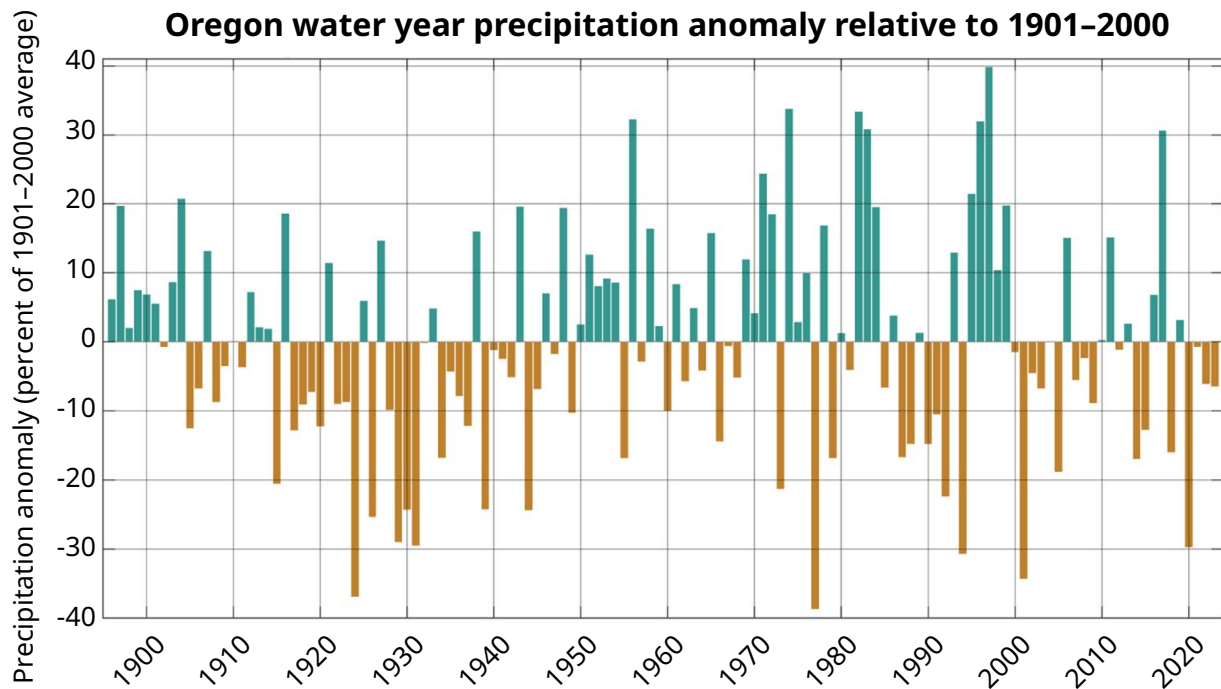


Figure 14: Total water year precipitation anomaly, expressed as percentage of the 1901–2000 average [37]



Drought conditions in Oregon in 2024 were generally mild to moderate as defined by the U.S. Drought Monitor ([Figure 15](#)). [38] In September 2024, 61% of Oregon’s land area experienced moderate drought while 2% experienced severe drought. Over the same time period in 2023, 56% of Oregon’s land area experienced moderate drought while 20% experienced severe drought. There were 4 counties with Governor drought declarations in 2024, compared to 13 counties in 2023, 26 counties in 2021 and 17 counties in 2022. [6]

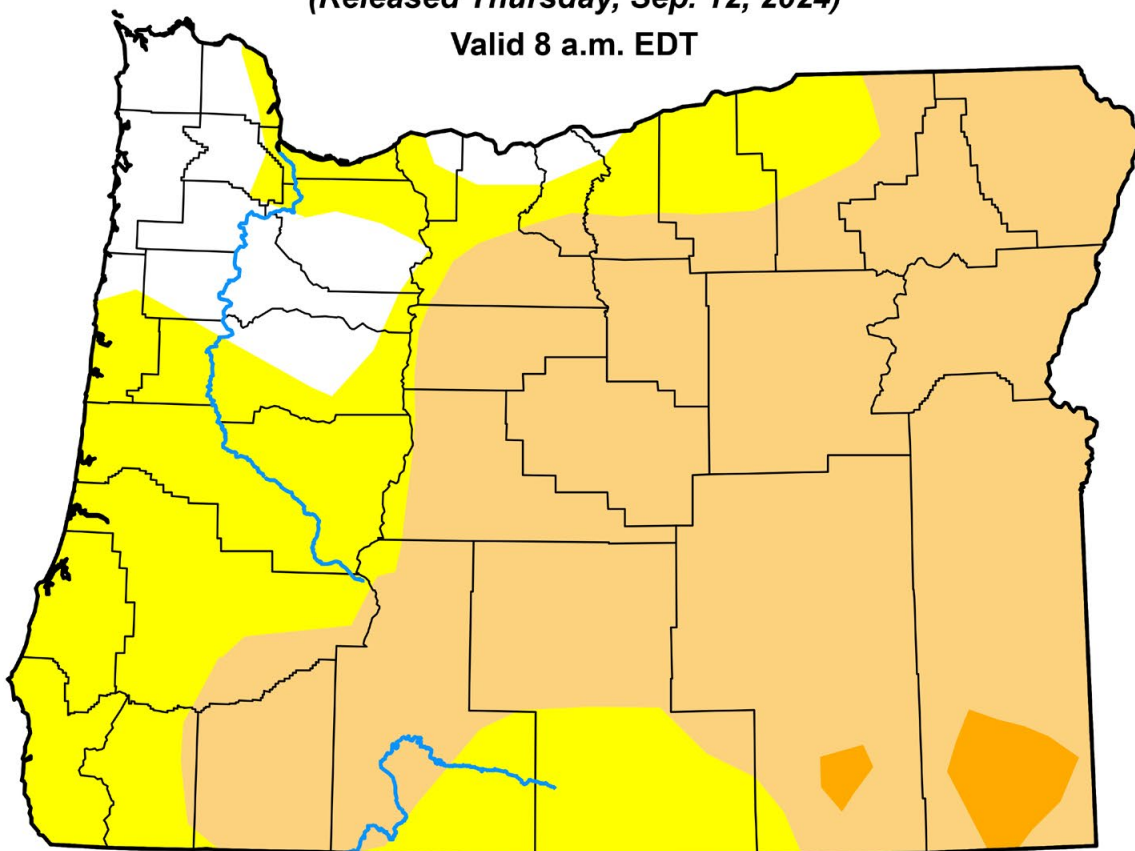
Figure 15: Oregon drought status on September 10, 2024 [38]

U.S. Drought Monitor

September 10, 2024

(Released Thursday, Sep. 12, 2024)

Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	8.98	91.02	60.84	1.80	0.00	0.00
Last Week <i>09-03-2024</i>	8.98	91.02	54.02	1.80	0.00	0.00
3 Months Ago <i>06-11-2024</i>	83.56	16.44	0.00	0.00	0.00	0.00
Start of Calendar Year <i>01-02-2024</i>	47.04	52.96	18.85	3.12	0.00	0.00
Start of Water Year <i>09-26-2023</i>	24.13	75.87	54.18	27.06	6.40	0.00
One Year Ago <i>09-12-2023</i>	24.13	75.87	56.11	19.63	0.00	0.00

Intensity:



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

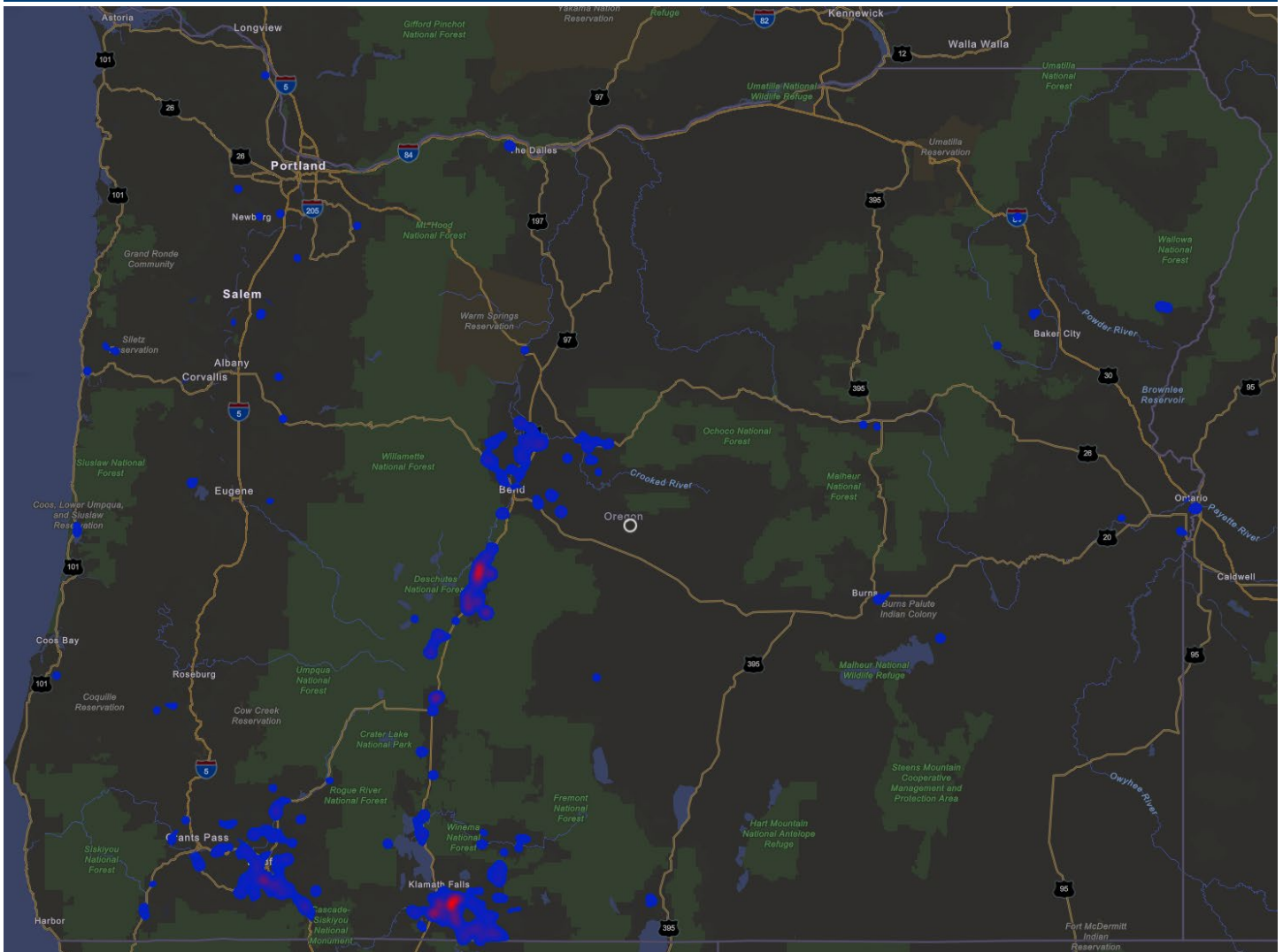
Lindsay Johnson
National Drought Mitigation Center



droughtmonitor.unl.edu

Reports of dry or slow to recharge wells is another measure of drought in Oregon. The Oregon Dry Wells Dashboard provides locations and counts of reports ([Figure 16](#)). [39] Reports are concentrated in the vicinity of Klamath Falls, La Pine and Medford, representing communities facing water insecurity due to lack of domestic water. In 2024, 68 reports were received compared with 171 in 2023, 737 in 2022 and 256 between June and December 2021.

Figure 16: Heat map of Oregon wells reported as dry or slow to recharge, 2021–2024 [39]



As climate patterns shift, Oregon is expected to experience increasing variability in precipitation, especially east of the Cascade Range. [37] However, precipitation trends in western Oregon remain uncertain, complicating water resource planning in the most densely populated parts of the state. Most critically, a shift in seasonal precipitation patterns is expected to increase summer drought risk statewide. Drier summers threaten water security for drinking water systems, agricultural production, and wildfire suppression – each of which has direct implications for public health. Drought-related water shortages can lead to increased contamination risks, reduced access to safe drinking water, and

heightened vulnerabilities for communities already facing environmental and health disparities. Rising temperatures will drive higher rates of evapotranspiration (evaporation of moisture from the land and plants), placing additional stress on water supplies. Projections suggest that drought conditions are likely to worsen along the western slopes of the Cascade Range and in the southern Coast Range, areas where many communities rely on surface and groundwater sources. In contrast, the Deschutes and John Day basins may see reduced drought risk, though overall conditions will remain variable.

These projections underscore the urgent need for proactive climate adaptation, water resource management, and public health preparedness strategies. Addressing these challenges now will be essential to protecting Oregon communities from the cascading effects of climate-driven water insecurity.

Harmful algal blooms

Harmful algal blooms (HABs) in waterbodies are exacerbated by climate change and pose a risk to human health. [40] In marine waters, rising ocean temperatures are boosting the conditions that promote the growth of certain algae that release toxins and contaminate shellfish, leading the Oregon Department of Agriculture to close recreational shellfish harvesting and impose restrictions on commercial crab harvests. [41] In June 2024, the entire Oregon coast was closed to bay clam, razor clam and mussel harvesting due to human illnesses from consumption of and presence of paralytic shellfish poisoning toxins in coastal shellfish. [42]

Certain freshwater bacteria known as cyanobacteria are also popularly referred to as HABs because they look similar to mats of algae that grow on underwater surfaces, float in or on the water, or create appearances similar to oil slicks or paint spills. Cyanobacteria that release toxins in rivers, lakes and reservoirs can cause serious illness or death in pets, livestock and wildlife. [43] People who swallow or inhale enough contaminated water can experience symptoms similar to food poisoning including headaches, cramps, diarrhea, nausea and vomiting, numbness, dizziness, and fever. In sensitive individuals, direct contact with a bloom can also cause a red, raised rash or skin, ear and eye irritation. Warm weather, nutrients and low water flow can cause these freshwater bacteria to multiply quickly.

In 2024, OHA's [Harmful Algae Bloom Surveillance program](#) issued 17 recreational use health advisories for rivers, lakes and reservoirs, in addition to a permanent advisory for South Umpqua River and mainstem Umpqua River. [44] Advisories are informed by regular monitoring of known HAB hotspots by Oregon Department of Environmental Quality and other partners, and information gathered in response to reports of HABs or HAB-related illnesses from members of the public and waterbody managers. Eight of those advisories were confirmed to have cyanotoxin concentrations above recreational use values of concern.

Winter hazards

Climate change commonly is associated with rising average temperatures and decreases in the proportion of precipitation falling as snow. Although these changes may seem positive for human health, climate change can also alter winter conditions in ways that exacerbate adverse health impacts. [45] Projections of how climate change will affect winter weather hazards such as cold air and freezing rain are complex and still emerging. Despite that scientific uncertainty, we include winter hazards in this report given the unusually cold temperatures and ice accumulation in many parts of Oregon in January 2024 and potential future increases in the likelihood of freezing rain. Although the January 2024 storm had substantial effects on public health, it was not historically cold.

Climate change and winter hazards in Oregon

Whether warming in the Arctic will contribute to severe winter weather in the northwestern United States is uncertain. [46] The amount of precipitation that falls in Oregon during winter storms may increase, and the ratio of rain to snow is likely to increase as well. [47] In the northern Willamette Basin, the future frequency of freezing rain is projected to increase in locations that currently are relatively cold and decrease in locations that currently are relatively warm. Projections suggest that easterly winds through the Columbia River Gorge may strengthen during winter, even as the Willamette Basin becomes warmer. Therefore, ice accretion (accumulation on solid surfaces) in the region may increase during freezing rain events. Generally, the occurrence of freezing rain is projected to decrease at lower elevations and increase at higher elevations. Strong easterly winds may be necessary for precipitation to fall as freezing rain. [46]

Hazards during winter storms including freezing rain, ice accumulation, and low elevation snow, pose human health risks through cold-related deaths and illnesses, winter weather related injuries, and indirect pathways such as loss of power. Winters in Oregon are now warmer than they were historically, with fewer extreme cold events. This trend is expected to continue through the twenty-first century. Even so, winter storms and other winter hazards are not expected to cease entirely but decrease in frequency, potentially leading residents to be less prepared for periodic extreme winter weather events. When winter storms do occur, Oregonians may be more at risk of related illnesses and injuries due to less recent and recurring experience with extreme winter weather.

Strategies to prevent negative health outcomes from extreme winter weather include:

- Home weatherization
- Energy assistance for low-income households
- Warming centers

- Protections for outdoor workers
- Improved public utilities, or underground utilities, to prevent winter storm damage [48]
- Maintenance of indoor air quality during storms by clearing outside vents to prevent the accumulation of indoor air pollutants, avoiding indoor use of fuel-powered generators, avoiding use of combustion appliances for heating, and having carbon monoxide and smoke monitors. [49]

January 2024 severe winter storm

In January 2024, Governor Tina Kotek declared a state of emergency across Oregon as the state experienced a 12-day winter storm. [50] Extremely cold temperatures relative to seasonal averages for locations around the state were accompanied by snow, sleet, freezing rain and windstorms, which resulted in power outages, plumbing pipe damage, snapped trees, landslides, and flooding. [51]

Windblown trees falling on homes were widely reported in the media, with two deaths resulting from collapses on a home and recreational vehicle, respectively. [51,54] Falling trees and branches brought down power lines in many locations, leading to widespread power outages and the loss of three lives after a downed powerline fell on a car in Portland. [51,53] The greatest number of power outages occurred in Benton, Clackamas, Clatsop, Hood River, Lane, Lincoln, Multnomah, Tillamook, and Washington counties. [51,] In total, 238,900 Oregonians lost power, and some had no power for 13 days. In addition to a loss of power, there were also disruptions to telecommunication services including cellular, broadband, and wireline. Transportation was greatly affected during the 2024 winter storm. Icy roads, fallen powerlines and landslides closed roads and freeways due to hazardous conditions. These impacts caused communities to lose communication services, electrical heating within homes and the ability to travel to safety or for everyday needs of living. Small businesses in Oregon reported losses of 165 million dollars, which includes lost wages and revenue. [51]

Populations at risk from winter hazards

Newborns, older adults and people with chronic health conditions are especially susceptible to cold-related injury, illness, and death. [55] Older populations are at greatest risk for cold-related morbidity (illness) and mortality (death). Cold-related mortality is highest in those ages 65 and older. [56,57]

Social determinants including income, housing quality, healthcare access, and social isolation contribute to cold and winter storm vulnerability. For example, barriers such as the cost of home heating and inadequate home insulation or ventilation impact lower-income households. Outdoor workers and people who are unhoused face social and systemic barriers to managing extreme cold and winter storm exposure and are at higher risk of negative effects. [55]

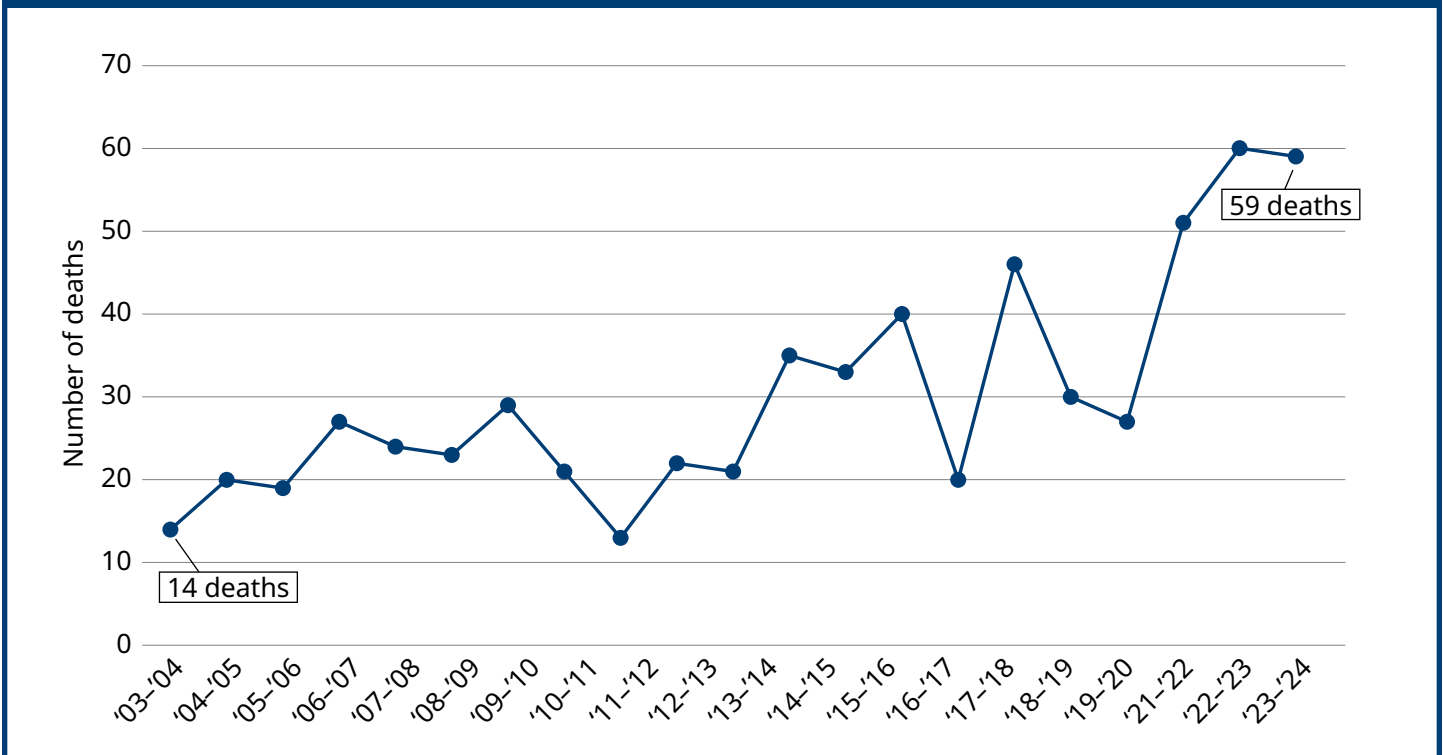
Racial and ethnic minorities are also more likely to be burdened by extreme winter weather due to home and heating deficiencies, a legacy of systemic discrimination and underinvestment. [58,59,60] A nationwide study on cold-related mortality found that American Indian or Alaska Native and Black or African American populations are more likely to die from effects of cold, likely a result of such inequities. [57]

Unhoused populations are also at increased risk for cold-related morbidity and mortality, as they often lack access to heat, shelter and protection from the elements. Oregon has the second highest rate of unsheltered homeless people in the U.S. [61,62]

Cold-related deaths in Oregon

Cold-related deaths have increased dramatically during the last three winters, with a peak of 60 deaths during the Winter 2022/23 season (Figure 17). Rising numbers of unhoused people, a population particularly vulnerable to cold exposure, may partially explain the observed increase in cold-related deaths during recent severe winter conditions. [62]

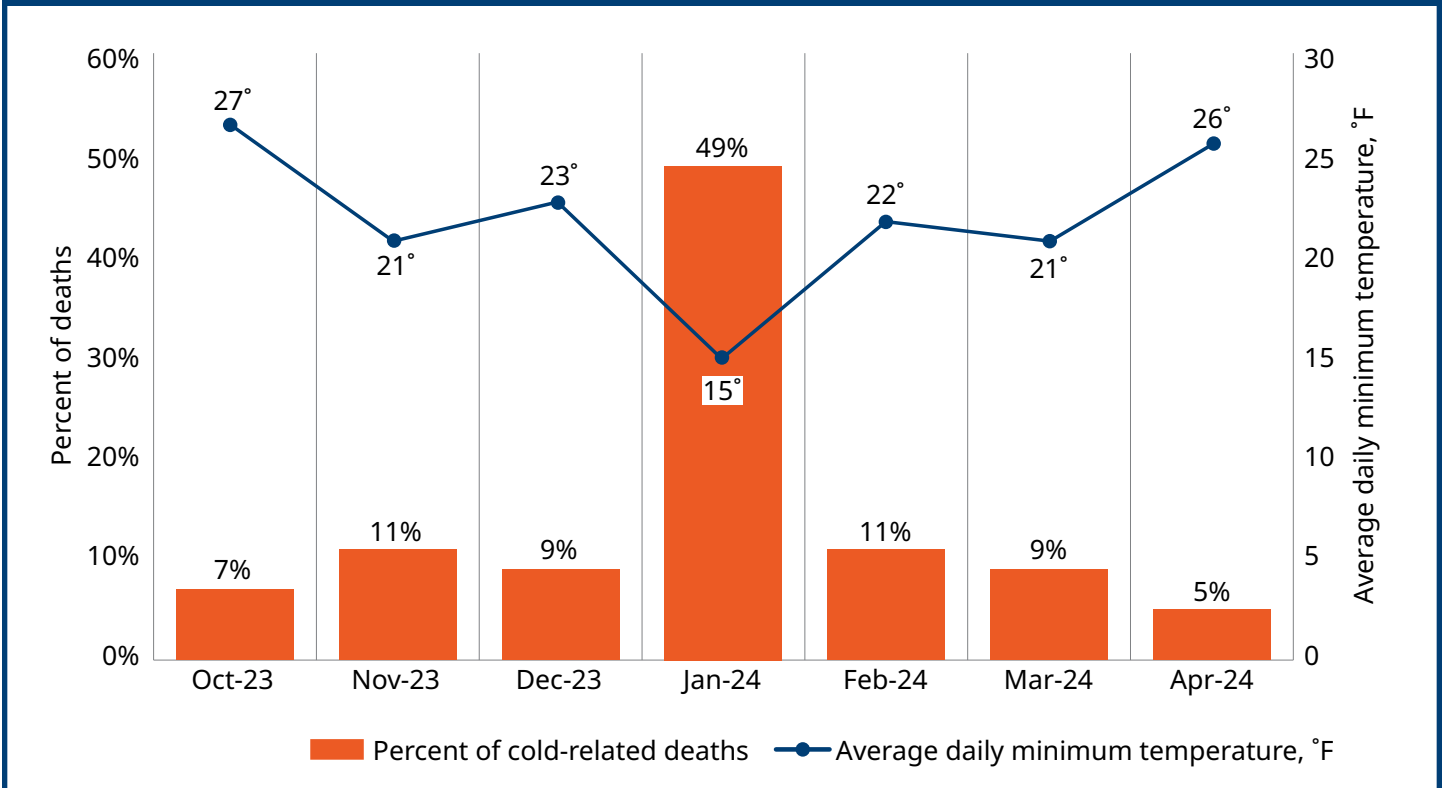
Figure 17: Cold-related deaths in Oregon, Winter 2003/2004 – Winter 2023/2024*



* Health outcome data details are included in [Table A1](#).

Typically, 20–25% of cold-related deaths each winter occur in January. However, 49% of deaths in the Winter 2023/2024 season occurred in January – nearly double the average monthly percentage (Figure 18). The average of the daily lowest temperature recorded anywhere in the state in January 2024 was 15°F. The severe winter weather that much of Oregon faced in January 2024 likely caused the increase in deaths. More than two thirds of the January deaths (19 of 28) occurred during the January 12–24 winter storm.

Figure 18: Cold-related deaths and average minimum temperature by month, Winter 2023/2024*^



* Health outcome data details are included in [Table A1](#).

^ The monthly temperature shown in this figure is the average of the lowest temperature recorded anywhere in the state each day of that month according to National Weather Service data available in Oregon ESSENCE

In Winter 2023/2024, there were no cold-related deaths among Oregonians aged 0–17, whereas those 45 and older had a disproportionate number of deaths ([Figure A11](#)). Those 65 and older accounted for 45% of cold-related deaths while only comprising 20% of the population. These data are consistent with national evidence that cold-related mortality is highest among older populations. [56, 58]

Those who died of cold-related illness were disproportionately male: 68% of deaths in Winter 2023/2024 were males although males comprise 50% of the population ([Figure A12](#)).

Cold-related deaths and race and ethnicity

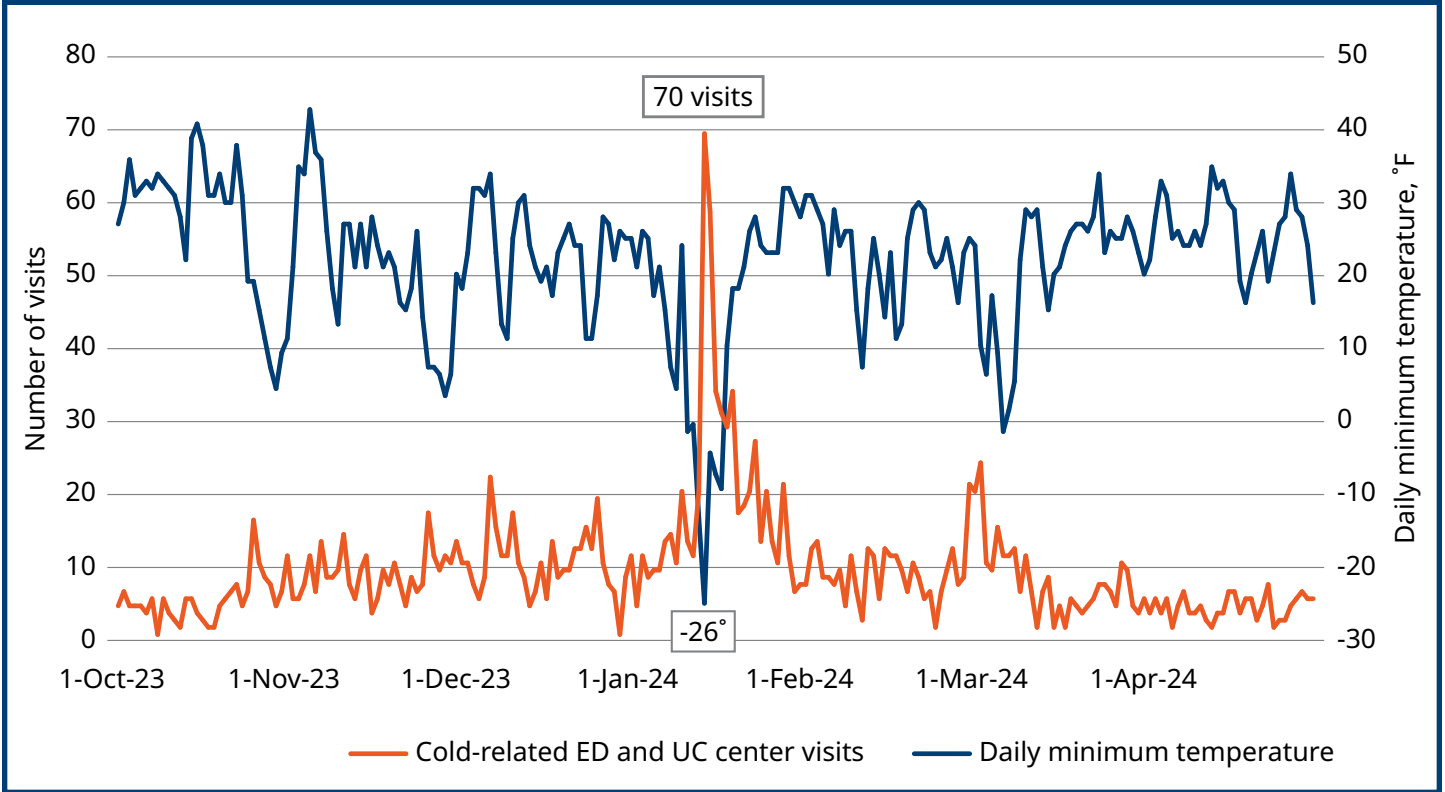
Cold-related deaths among people who identified as American Indian or Alaska Native and Black or African American populations appear disproportionately high compared to their share of the population ([Figure A13](#)). However, this difference between the statewide population and distribution of cold-related deaths among racial groups is not statistically significant due to the total number of individuals affected (59 cold-related deaths). American Indian or Alaska Natives are 1% of the population and accounted for 2% of cold-related deaths, and Black or African Americans are 2% of the population and accounted for 4% of cold-related deaths. These distributions are double the population distribution for these two groups, but in a year with 59 total cold-related deaths, 2% represents 1 case.

Differences were observed between the statewide population and the distribution of cold-related deaths among ethnic groups: 2% of cold-related deaths occurred among people who are Hispanic or Latino, but these ethnicities represent 15% of Oregon's population ([Figure A14](#)).

Cold-related illness visits to EDs and UC centers

Other health outcomes related to winter hazards include cold-related illnesses, such as hypothermia (dangerously low body temperature), frostbite, and falls on snow and ice. Visits for cold-related illness peaked during the January 2024 winter storm ([Figure 19](#)), as did falls due to snow or ice ([Figure 20](#)). During January 12 – January 25, there were 3,281 visits to emergency departments for falls due to snow and ice, which far exceeded the 119 visits that occurred over the two weeks prior to the storm and the 248 visits that occurred in the two weeks following. The number of ED and UC visits for cold-related illnesses in Winter 2023/2024 was 1,902, consistent with a generally increasing trend in cold-related illnesses since Winter 2020/2021 ([Table A2](#)).

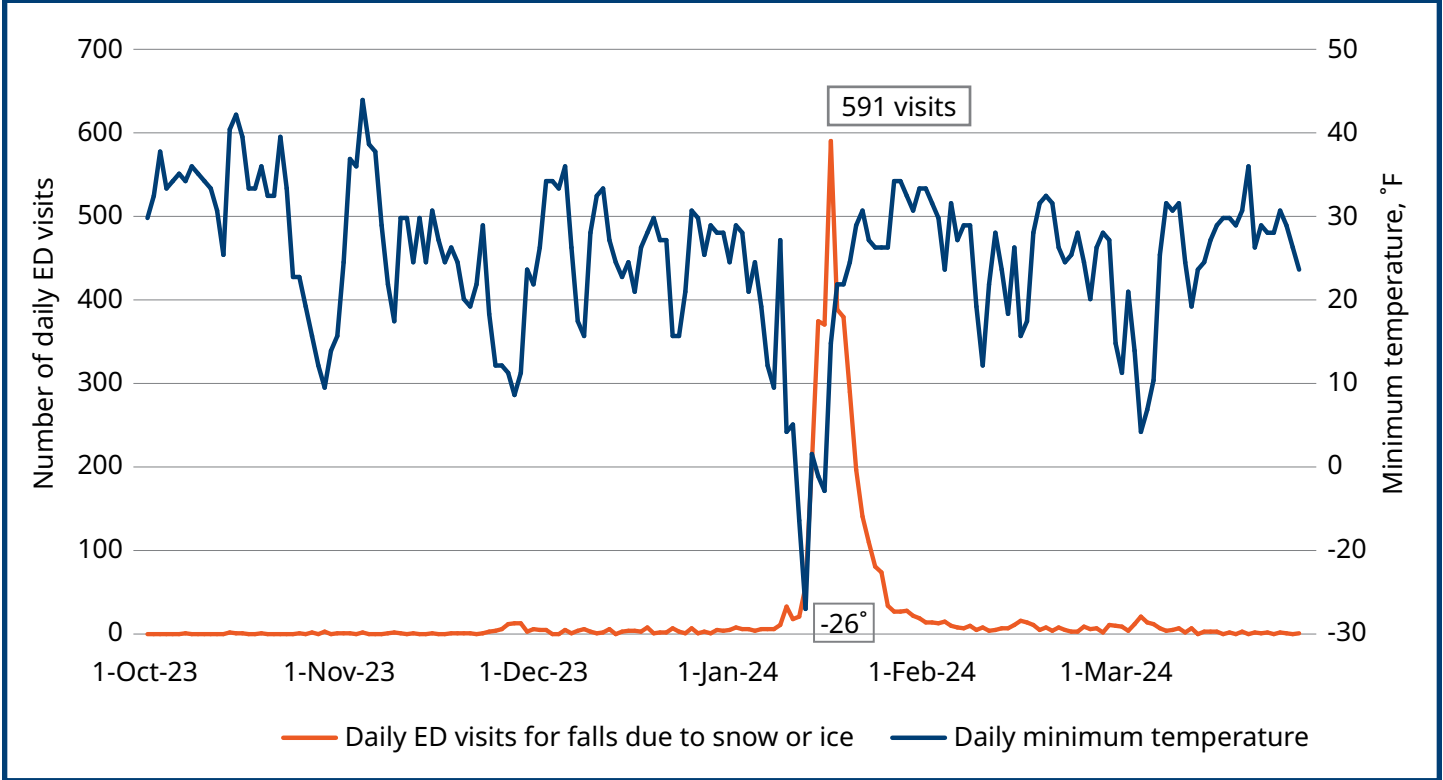
Figure 19: Cold-related illness ED and UC center visits and daily minimum temperature, Winter 2023/2024*[^]



* Health outcome data details are included in [Table A1](#).

[^] The daily minimum temperature shown in this figure is the lowest temperature recorded anywhere in the state on each day according to National Weather Service data available in Oregon ESSENCE.

Figure 20: Emergency department visits for falls due to snow or ice and daily minimum temperature, Winter 2023/2024*[^]



* Health outcome data details are included in [Table A1](#).

[^] The daily minimum temperature shown in this figure is the lowest temperature recorded anywhere in the state on each day according to National Weather Service data available in Oregon ESSENCE.

People 45 and older were disproportionately impacted by cold-related illnesses ([Figure A15](#)). Thirty-five percent of all visits were by people ages 45 to 64, although that age group represents 24% of the population, and 26% of visits were by people 65+, who represent 20% of the population.

Males were more likely to visit emergency departments and urgent care centers for cold-related illness ([Figure A16](#)). Males comprise 50% of the population yet represent 69% of visits. Black or African Americans were more likely to visit ED and UC centers for cold-related illness. Black or African Americans comprise 2% of the population and 8% of visits ([Figure A17](#)). American Indians or Alaska Natives represent 1% of the state's population and 3% of visits for cold-related illnesses. These outcomes may be driven by social and environmental determinants of health such as documented home and heating deficiencies among racial and ethnic minorities. [58, 59, 60] In comparison, Hispanic or Latino Oregonians were less likely to experience cold-related illness. Hispanic or Latino Oregonians comprise 15% of the population and 7% of visits ([Figure A18](#)). The rate of cold-related deaths and illnesses among Hispanic or Latino Oregonians may be lower than their representation in the population because a risk factor for cold-related illness is age; the median age of Hispanic or Latino Oregonians is 28 compared

to the median age of all Oregonians, which is 40. [63] Interactions among social, economic, and environmental factors may result in disproportionately negative or positive outcomes for different racial and ethnic groups in Oregon.

Spotlight: Severe Weather Collaborative

Lane County Human Services' Severe Weather Collaborative (SWC) is a network of providers, including non-profit and volunteer organizations, that coordinate responses to severe weather events that impact vulnerable, unhoused and unsheltered individuals. During a severe weather activation, frequent communications monitor the needs of and resources for community members. Response coordination includes activations of warming, cooling and smoke centers. During the January 2024 ice storm, members of the SWC operated shelter sites in multiple locations, going beyond their usual protocols, and provided more than 72 hours of continuous shelter for the unhoused and others who were affected by power failures. Combining valuable lessons learned from the 2024 ice storm with years of provider experience, the SWC carved a new path to expand severe weather programming at St. Vincent de Paul and the Egan Warming Centers during future events. This expansion also led to additional assistance for warming shelters in rural Lane County. The SWC received Oregon Health Authority's 2024 Public Health Emergency Preparedness Response Award in recognition of their many years of partnership with Lane County Public Health and their collaborative response efforts.

Vector-borne diseases

Changes in climate and weather factors such as temperature, precipitation and relative humidity can affect the survival and geographic distribution of disease vectors (e.g., mosquitos, ticks) and their ability to transmit pathogens (microorganisms that cause disease) to humans. [64] The environmental impacts of climate change also affect non-human species that serve as hosts (e.g., birds and horses). These interactions are complex and not always predictable. The reemergence of highly pathogenic avian influenza (HPAI) virus may be, in part, exacerbated by climate change. [65]

While the Pacific Northwest historically has had a lower incidence of vector-borne diseases compared to other areas of the U.S., the expansion and northward shift of these vectors increase the likelihood of impacts in Oregon and indicate a need for increased surveillance of the vectors and the diseases they carry. [65] Lyme disease, West Nile Virus and Zika virus infections are reportable vector-borne diseases in Oregon. OHA's [Acute and Communicable Disease Program](#) publishes weekly and monthly communicable disease reports that include vector-borne diseases.

Emergence of *Aedes aegypti* mosquitoes in Jackson County

Rising temperatures and altered precipitation patterns can influence the distribution and behavior of vector species like mosquitos. Historically, *Aedes aegypti*—a primary vector for diseases like dengue, Zika, and chikungunya—has been found predominantly in tropical and subtropical regions. However, the geographic range where this species of mosquito can survive is expanding due to changes in environmental conditions. Warmer temperatures, movement of people particularly in urban areas, and changes in water availability can create more favorable habitats for *Aedes aegypti* to breed and thrive.

In the summer of 2024, *Aedes aegypti* was discovered in Jackson County as part of routine mosquito surveillance. This is the first time this mosquito species was detected in Oregon. The presence of *Aedes aegypti* poses a significant public health concern for Oregon, although the species is not yet widespread.

Accurate identification of *Aedes aegypti* is critical for early detection and effective management in Oregon. This species can be differentiated from other mosquito species by several key characteristics: the presence of white markings on the legs and a lyre-shaped pattern on the back of the thorax. Additionally, *Aedes aegypti* tends to be a day-biting mosquito, active during early morning and late afternoon. Given the potential for climate change to alter local ecosystems, entomologists and vector control districts should continue to prioritize surveillance and community reporting to monitor any new occurrences of *Aedes aegypti* in Oregon. Early identification and control strategies are crucial to prevent the establishment of this species in the region and mitigate the risk of mosquito-borne diseases.

West Nile virus has been detected in Oregon for decades

West Nile virus was detected in mosquitoes in Baker, Jackson, Malheur, Morrow and Umatilla Counties during 2024. There were zero West Nile virus human cases reported among Oregon residents in 2024, compared to 17 the previous year (3 of which were acquired out of state) and 5 in 2022. [66]

Climate and health policy and investments

Significant health system investments in Oregon to advance community climate resilience and health equity



OHA Public Health Modernization Investments

For more than a decade the State of Oregon has been working to create a more equity-centered public health system that is able to address complex public health problems, including those driven by environmental health threats, with a priority on climate change-driven hazards. In 2024, funding requested by Governor Kotek and enacted by the 2023 Oregon Legislature continued to build a nimble, community-based and equity-centered public health system with climate and health resilience as a major focus. These investments helped OHA, Tribes, LPHAs and CBOs take actions to:

- respond to and prepare for more frequent wildfires, heat waves and other extreme weather events
- plan for chronic health stressors like poorer air quality and water insecurity
- address the factors that contribute to making certain communities more vulnerable to climate change
- promote healthy environments where people live, work and play

Below are updates about these various investments.

Community-based organizations (CBOs): With funding support from OHA's Public Health Equity Grant Program, CBOs continue to lead activities that promote community health and well-being. Of the 194 CBOs funded in the 2023–2025 biennium, 76 reported engagement in climate adaptation and health resilience work within the last year. CBOs identified environmental challenges within their communities such as extreme heat, water insecurity, industrial pollution, wildfire smoke, and access to parks. Examples of climate-related CBO program areas include policy and advocacy, education and outreach, and population-specific needs assessments or other data collection about the communities they serve. The range of these projects reflects the many types of climate impacts in communities across Oregon, as well as the diverse opportunities for local solutions.

Below are a few examples of grantee climate and health related projects that build climate resilience:

- Policy and advocacy: Educating and supporting community members to engage in governmental decision-making or planning processes related to climate change and health
- Education and outreach: Developing and delivering culturally-grounded climate and health education curricula for community health workers
- Population-specific data activities: Conducting surveys to document community health experiences related to climate change and environmental hazards to inform program development

Local Public Health Authorities (LPHAs): LPHAs (also known as county health departments) are protecting communities from environmental health threats through public health interventions that support equitable climate adaptation. By June 2025, each LPHA is required to develop a local or regional climate and health adaptation plan. These plans may be stand-alone or incorporated into a community health assessment and improvement plan and will be updated every five years. After completion, LPHAs will use funds from OHA to implement their respective plans.

OHA and LPHAs partner to convene a bi-monthly community of practice. Built as a support network among LPHAs working on climate and health planning, this community of practice encourages peer learning, problem-solving and collaboration.

Nine Federally Recognized Tribes of Oregon: Public health modernization continues to support the nine Federally Recognized Tribes, the Urban Indian Health Program, and the Northwest Portland Area Indian Health Board (NPAIHB) in serving Tribes and Native people in Oregon. In Spring 2024, OHA met with the NPAIHB to learn about climate-related impacts occurring in Tribal communities and began working with Tribes to identify climate priorities. Additionally, several Tribes are working with the NPAIHB to conduct environmental health assessments and develop climate adaptation plans to address climate change-driven health risks in their respective communities.

Oregon Health Authority: OHA's Environmental Public Health section continues to build its workforce capacity in climate and health, healthy homes and schools, healthy waters, land use and health, and epidemiology. This includes the establishment of a Healthy Waters Unit consolidating all water-related environmental health actions and strengthening OHA's capacity to evaluate and report on human health risks from exposure to environmental contaminants in domestic well and recreational water, fish consumption, beach water quality and

water reuse. Programs work to address climate change-related impacts, provide technical assistance to public health partners, and work across the agency and with other agencies to identify priorities and assess programming impacts.

OHA Medicaid Climate Supports

In 2022, Oregon was among the first states in the country to receive federal approval for a Medicaid waiver (an alternative state approach to using federal Medicaid funding) to cover climate change expenses for certain Medicaid-eligible patients in the state, primarily through the Oregon Health Plan. Starting in March 2024, OHA began distributing [OHP Climate Supports](#) to provide housing, climate and nutrition support for people in challenging situations, with eligibility criteria including those who are homeless or at risk of losing housing, leaving state or Tribal custody (carceral, foster care), transitioning from behavioral health treatment, and reaching the age of eligibility for both Medicare and Medicaid coverage. Climate supports include devices needed to help people stay safe during climate events, such as portable power supplies to operate medical devices like ventilators, during a power outage.

OHA Healthy Homes Grant Program

The Oregon Legislature established the Healthy Homes Grant Program (HHGP) in OHA in 2021. HHGP's goal is to improve housing conditions and health outcomes for low-income and environmental justice communities in Oregon. In the 2021, 2022 and 2024 legislative sessions, a total of \$30 million was appropriated for the program. Funding can be used to make homes more resilient to climate change and weather impacts and address a wide array of other health and safety-related hazards. In February 2024, HHGP launched the inaugural Request for Grant Applications. Thirty-four eligible entities from across the state were selected from a competitive pool and awarded a total of \$20.6 million in grant funds, with funding agreements expected to be completed by February 2025. OHA will also award \$3 million in non-competitive grants to Federally Recognized Tribes in Oregon. Current updates are available on the [Healthy Homes Grant Program website](#).

The Oregon Department of Environmental Quality (DEQ) incorporated funding for OHA's HHGP in Oregon's application to the Environmental Protection Agency for Priority Climate Action Plan and Implementation funding provided by the federal Inflation Reduction Act (IRA) to reduce greenhouse gas emissions. Recognizing that HHGP is designed to benefit low income Oregonians, DEQ is channeling \$1.8 million from federal IRA funds through the program to reduce greenhouse gasses while weatherizing residences and improving energy efficiency – interventions that also protect residents against health impacts from extreme heat, cold and wildfire smoke.

Interagency climate and health in all policies

Recognizing the broad-reaching and interrelated impacts of climate change, OHA seeks opportunities to support and partner with natural resource and transportation-focused agencies to inform their policies, programs, and investments to address health and equity impacts of climate change and other environmental hazards. OHA contributes strategies, resources, and data that can help other state agencies prioritize communities that experience disproportionate harm from environmental and climate hazards.

Environmental Justice Mapping Tool

[House Bill 4077](#) (enacted by the 2022 legislature) strengthened and expanded the membership and role of the [Environmental Justice Council](#) (EJ Council, formerly the Environmental Justice Task Force). The bill directed the EJ Council to oversee the creation of an environmental justice mapping tool that provides geospatial information about environmental justice impacts and provides guidance for state agencies when adopting rules and policies. In 2024, OHA continued to lead technical development of the tool, together with DEQ and other state agency and academic partners, to develop the Oregon-specific EJ mapping tool. This type of tool will provide information to the public and increase state agencies' capacity to prioritize populations that experience disproportionate risks of environmental exposures when developing and implementing policies, programs and investments.

OHA leads the Environmental Justice Mapping Tool Methodology Workgroup with participation from state and local agencies and academic partners. The Methodology Workgroup is tasked with providing recommendations to the EJ Council on the development of the mapping tool. In April 2024, the EJ Council voted to include a Climate Change Risk indicator domain in the Oregon Environmental Justice Mapping Tool, which will include climate hazard risks, environmental benefits, and community opportunities. In June 2024, the Environmental Justice Council voted to include indexes in the mapping tool for coastal, rural, remote, large city and small city communities because climate change risks differ in Oregon depending on proximity to the coast and economic composition of communities.

Oregon's Climate Pollution Reduction Grant

In July 2024 the US Environmental Protection Agency announced that Oregon would be awarded \$197 million in federal Inflation Reduction Act funds as a [Climate Pollution Reduction Planning Grant \(CPRG\)](#). Led by DEQ and the Oregon Department of Energy (ODOE), the state is using the funds to develop by late 2025, and implement by spring 2027, a required [Oregon Comprehensive Climate](#)

[Action Plan](#). The Comprehensive plan will build on [Oregon's Priority Climate Action Plan](#) (PCAP) that DEQ and ODOE submitted to EPA in February 2024 as part of the CPRG funding application. Priorities of the plan are to develop economy-wide greenhouse gas (GHG) reductions that deliver community benefits by identifying gaps in policies and data and workforce needs, and engaging with Tribes, impacted communities, and state agencies to inform plan implementation. OHA acts as a planning partner to DEQ, with \$1.8 million of the award designated for grantees of OHA's Healthy Homes Grant Program (see above discussion) as a way to deliver GHG reductions that achieve health and equity co-benefits to low income Oregonians.

Oregon Smoke Management Program for Prescribed Burning

The Oregon Department of Forestry (ODF) and DEQ implement the [Oregon Smoke Management Program](#) in consultation with OHA. ODF implements the rules for [prescribed forest burning](#), a land management practice that reduces the risk of severe wildfires through controlled burns in high-risk areas during times of low wildfire risk (typically in the fall and spring). OHA advises the agencies on how to balance smoke exposure to vulnerable populations from prescribed fire with the reduced health and life safety risk associated with preventing wildfires. The Smoke Management Program promotes communication among the entities conducting prescribed fire, public health authorities, vulnerable communities, and the public. OHA advises and reviews [Community Response Plans for Prescribed Burning](#) submitted to DEQ. When local public health authorities are unavailable to participate in developing of a Community Response Plan, OHA participates to represent public health considerations.

West Bend Prescribed Fire Pilot Under a Northwest Regional Agreement

In 2024, the regional directors of the US Environmental Protection Agency (EPA), the US Forest Service, and directors of state health, environmental, and forestry agencies of Oregon and Washington signed [a joint regional agreement](#) to increase the pace and scale of prescribed fire in the Pacific Northwest while centering protection of public health. Prescribed fire or burning is a land management practice that reduces the risk of wildfires through controlled burns in high-risk areas. In Spring 2024, the interagency group designated and carried out the [West Bend Prescribed Fire Pilot Project](#) under this agreement. The pilot included intensive outreach and education to the public and succeeded in treating seven times more acres of forest than in past years. This effort complements Oregon's long-standing Smoke Management Program implemented by the Oregon Department of Forestry (ODF) in collaboration with DEQ and in consultation with OHA. See also above *"Spotlight: Smoke Survey Post-West Bend Prescribed Fire Pilot."*

Oregon Climate Action Commission

The [Oregon Climate Action Commission \(OCAC\)](#) recommends state policy to advance greenhouse gas reduction goals and climate solutions including strategies for implementing and incentivizing greenhouse gas (GHG) emissions reductions and carbon sequestration. OHA informs OCAC regarding opportunities to prioritize health and equity co-benefits of GHG mitigation investments, including through contributions to OCAC's biennial report to the legislature. The OHA Director participates as a statutorily-mandated non-voting member of the commission.

Oregon Climate Change Adaptation Framework

The [Oregon Climate Change Adaptation Framework \(OCCAF\)](#) identifies how state agencies can effectively respond to the impacts of climate change on Oregon communities and captures government response strategies. The Department of Land Conservation and Development (DLCD) facilitated involvement of 24 state agencies in developing the framework in 2021. OHA participates as an agency partner in weekly agency coordination meetings that facilitate ongoing collaboration on climate adaptation efforts. OHA led development of OCCAF's 2021 [Oregon Climate Equity Blueprint](#).

Natural Hazards Mitigation Plan

In 2024, DLCD facilitated an update to the OCCAF, with the goal of integrating the framework into the [Natural Hazards Mitigation Plan](#) in 2025. OHA contributed to the Extreme Heat chapter, which includes information on the public health impacts of heat.

Oregon Energy Strategy

In 2024 Oregon Department of Energy (ODOE) launched the development of a comprehensive [Oregon Energy Strategy](#) to lay out a path to achieve the state's energy and climate policy goals. The strategy, which ODOE expects to complete in late 2025 through a robust engagement process, will evaluate statewide transitions toward emissions reductions and increased clean energy while analyzing impacts on transportation, commerce, energy, infrastructure, and other cascading impacts. OHA participates in two of five workgroups that are developing the strategy: (1) Environmental Justice and Equity Workgroup and (2) the Building Efficiency, Electrification, and Distributed Energy Workgroup.

State Agency Indoor Air Quality meetings

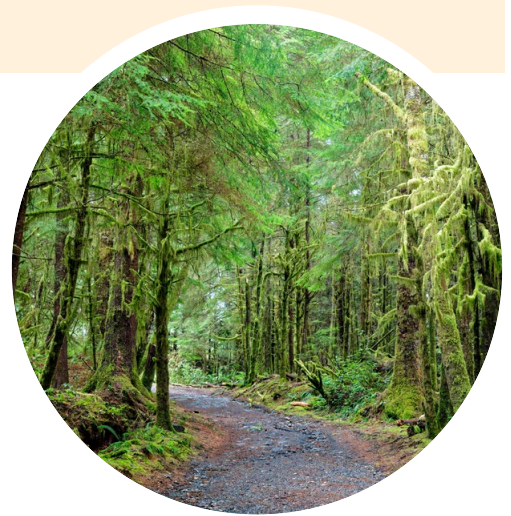
OHA convenes and facilitates an interagency workgroup with opportunities for peer learning, data review, resource sharing, and coordination regarding indoor air quality. Because state agencies do not possess regulatory authority in this area, there has historically been limited coordination to improve indoor air quality. As a result, indoor air quality standards, testing resources, and improvement resources are often outside the scope of agency work. Oregon Department of Education, Department of Energy, Department of Consumer and Business Services, Housing and Community Services, DEQ, and OHA collaborate on a quarterly basis, with a recent focus on indoor air quality in schools.

Innovative Mobility Program

The Oregon Department of Transportation (ODOT) developed the [Innovative Mobility Program](#) to provide grants and supports that improve community access to public and active transportation, particularly among those who have been historically underserved due to systemic barriers. In 2024 ODOT consulted OHA in the development of community engagement strategies, and aligned its grant program with the approaches of OHA's Public Health Equity Grants program.

Preview of the 2025 report

These are some of the developments OHA will detail in the *2025 Climate and Health in Oregon* report.



Governor's Climate Resilience Executive Order

In October 2025 Governor Tina Kotek signed Executive Order 25–26 to prioritize and increase the pace and scale of adoption of climate resilient strategies into existing state programs to deliver benefits for communities and ecosystems. The executive order calls on OHA to support actions that foster community resilience. OHA will report on engagement in development of a [Plan for a Resilient Oregon](#) to protect communities from climate threats, including catastrophic wildfires, heat and flooding. As noted elsewhere in this report, OHA is engaged with natural resource state agency partners in efforts to build fire-adapted communities by using tools and strategies to expand forest treatments and prescribed burns, improve air quality alerts during fire season, and coordinate efforts to reduce wildfire risk while minimizing health impacts from smoke. OHA will report on strengthened engagement and coordination of the public health system in this work in the *Climate and Health in Oregon 2025* report.

Federal policy and program impacts

OHA and partners are experiencing policy and programmatic shifts due to restructuring of federal agencies particularly under the U.S. Department of Health and Human Services' Centers for Disease Control and Prevention, and the Environmental Protection Agency. Changes in climate data access, grant and cooperative agreement administration, funding availability, technical assistance, and public policy changes are impacting climate and health partners in Oregon. OHA is currently working to systematically track these impacts particularly as they relate to internal budgets and staffing. OHA will aim to collaborate with partners to articulate impacts to climate and health resilience work more broadly.

Climate and mental health

OHA published a 2022 study of the impacts of climate change on youth mental health. While the study increased our understanding of the unique ways in which climate change can affect youth mental health, it did not measure the prevalence of the issue. The Oregon Student Health Survey (SHS) is a school-based, anonymous and voluntary health survey of sixth, eighth and 11th graders. In 2024, the 11th grade SHS included three climate and mental health questions to assess climate stress and climate impact on youth. Analysis of the survey results will be shared in future *Climate and Health in Oregon* reports. This analysis will also help to establish benchmarks for PHAB's mental health effects of climate change metric which is currently under development.

Public health modernization initiative reporting

As the current biennium of the public health modernization funding period ends, multiple OHA teams are engaged in monitoring and evaluation efforts surrounding LPHAs and CBOs funded through the Public Health Equity Grant. Findings from these evaluations will give insight into county and community-level climate adaptation work and priorities.

Heat and pesticides

Temperature modifies the behavior and use of pesticides in the environment. Increased pesticide use due to changing pest prevalence and vegetation growth, volatilization of some classes of pesticides at higher temperatures, and physiological changes resulting from heat stress could increase the risk of pesticide-related health problems. An increased understanding of these impacts in Oregon will inform community and occupational outreach efforts and inform public health investigations.



Data sources

Mid-Year Population Estimates. *Population Research Center, Portland State University.*

- Time period: 2024
- Description: Annual population counts for Oregon.
- Use in this report: Population counts were used to calculate rates to ensure standardized comparisons across demographic groups.
- Limitations: Populations estimates rely on models, surveys, and administrative data which may be incomplete or inaccurate.

Oregon ESSENCE. *Oregon Health Authority.*

- Time period: 2023–2024
- Description: ESSENCE (Electronic Surveillance System for the Early Notification of Community-based Epidemics) is a near-real time syndromic surveillance system that collects information on emergency department and urgent care visits. Data are collected on patient information, diagnosis codes, chief complaints and triage notes.
- Use in this report: ESSENCE data were used to identify urgent care and emergency department visits for heat-related illness, non-infectious respiratory illness, and cold-related illness.
- Limitations: Chief complaints or diagnosis codes in the data can be incomplete or inconsistent. Does not include visits for Oregonians that sought care at urgent care centers or emergency departments outside of Oregon.

Oregon Vital Records. *Oregon Health Authority.*

- Time period: 1989–2024
- Description: Vital statistics death data are data collected from death certificates. These data include information on cause of death, contributing causes of death, and demographic information.
- Use in this report: Death certificate data were used to identify deaths where contributing causes were due to exposure to heat or cold.
- Limitations: Heat exposure may not be listed on the death certificate, especially if there are multiple contributing factors. Heat may exacerbate chronic condition, such as heart disease, but may not be listed as a contributing cause of death.

Emergency Department Data. *Hospital Reporting Program, Oregon Health Authority.*

- Time period: 2023–2024
- Description: Emergency Department Data are administrative data collected by hospitals for billing purposes. The data include patient information, diagnosis codes and the care received.
- Use in this report: Emergency Department Data were used to identify falls due to snow and ice. Emergency Department Data were used instead of ESSENCE because ESSENCE data do not have the level of detail to differentiate between all falls and falls due to snow and ice. However, unlike Oregon ESSENCE, these data do not include urgent care center visits.
- Limitations: Only includes visits to emergency departments in Oregon acute care hospitals and does not include information for those who sought care out of state, or from other facilities such as urgent care centers.

Table A1: Detailed descriptions of health outcome data shown in report figures

Figure #	Health Outcome	Data details
Figure 3 ; Figure A1 , A2	Heat-related deaths	<p>Data source: Oregon Vital Records</p> <p>Definition: Death records that list exposure to excessive natural heat (ICD-10 code X30), and effects of heat and light (ICD-10 code T67) as a contributing cause of death. Excludes exposure to excessive heat of man-made origin (ICD-10 code W92). Includes deaths that occur during May 1 – October 31.</p> <p>Data for 2024 are preliminary and subject to change.</p>
Figure 5 ; Figure A3 , A4 , A5 , A6	Heat-related illness ED and UC visits	<p>Data source: Oregon ESSENCE</p> <p>Definition: The ESSENCE heat-related illness query identifies visits with diagnosis codes for effects of heat and light (ICD-10 code T67) and/or triage notes with words like “heat,” “sun stroke,” and “hyperthermia.” Includes visits that occur during May 1 – October 31.</p>
Figure 6	Non-fatal drowning and submersion ED and UC visits	<p>Data source: Oregon ESSENCE</p> <p>Definition: The ESSENCE non-fatal drowning and submersion query identifies visits with diagnosis codes for non-fatal drownings (ICD-10 code T751) and/or triage notes with words like “drown,” or “under water.” Includes visits that occur during May 1 – October 31.</p>
Figure 8 , 9 ; Figure A7 , A8 , A9 , A10	Cold-related deaths	<p>Data source: Oregon Vital Records</p> <p>Definition: Death records that list exposures to excessive natural cold (ICD-10 code X31), hypothermia (ICD-10 code T69), or other effects of reduced temperature (ICD-10 code T68) as a contributing cause of death. Excludes exposure to excessive cold of man-made origin (ICD-10 code W93). Includes deaths that occur during October 1 – April 30.</p> <p>Data for 2024 are preliminary and subject to change.</p>
Figure 19 ; Table A2 ; Figure A15 , A16 , A17 , A18	Cold-related illness ED and UC visits	<p>Data source: Oregon ESSENCE</p> <p>Definition: The ESSENCE cold-related illness query identifies visits with diagnosis codes for hypothermia and frostbite (ICD-10 codes T68, X31, T33, T34) and/or triage notes that include words like “cold exposure.” Includes visits that occur during October 1 – April 30.</p>
Figure 20	Falls due to ice and snow ED visits	<p>Data source: Emergency Department Data</p> <p>Definition: Emergency department visits with a diagnosis code for fall due to ice and snow (ICD-10 code W00). Includes visits that occur during October 1 – April 30.</p>

Supplemental figures

Figure A1: Heat-related deaths by age, May 1–October 31, 2024

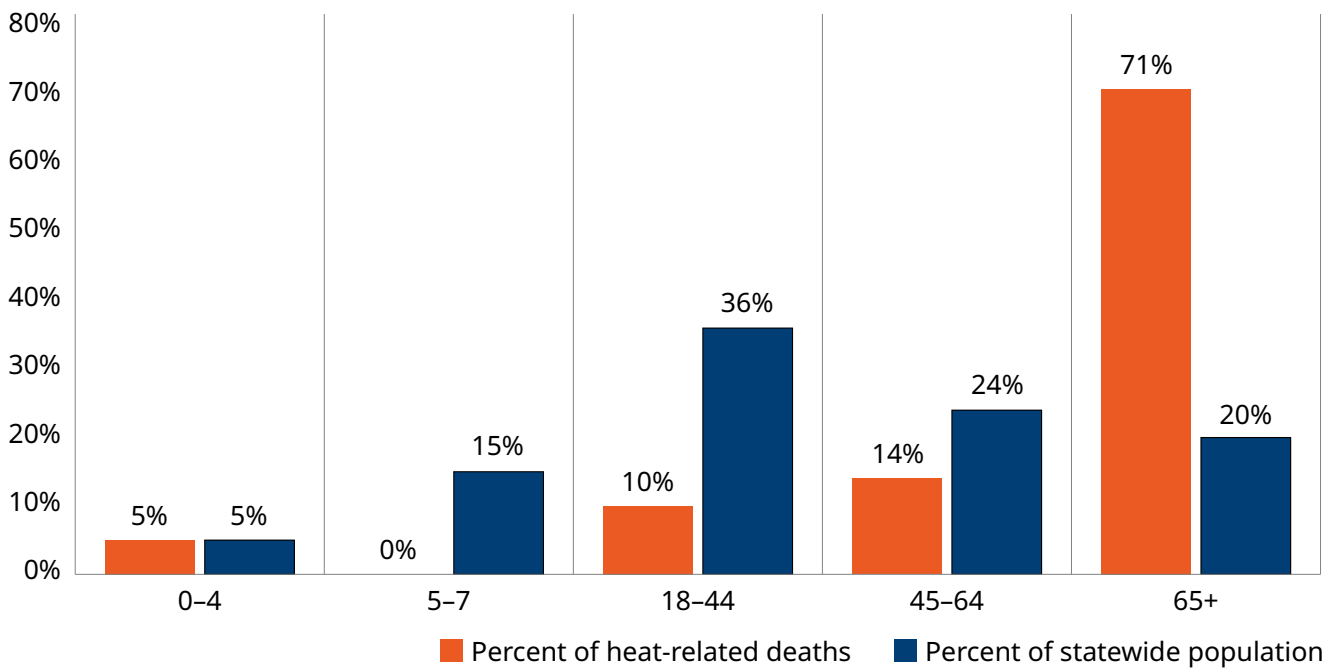


Figure A2: Heat-related deaths by sex, May 1–October 31, 2024

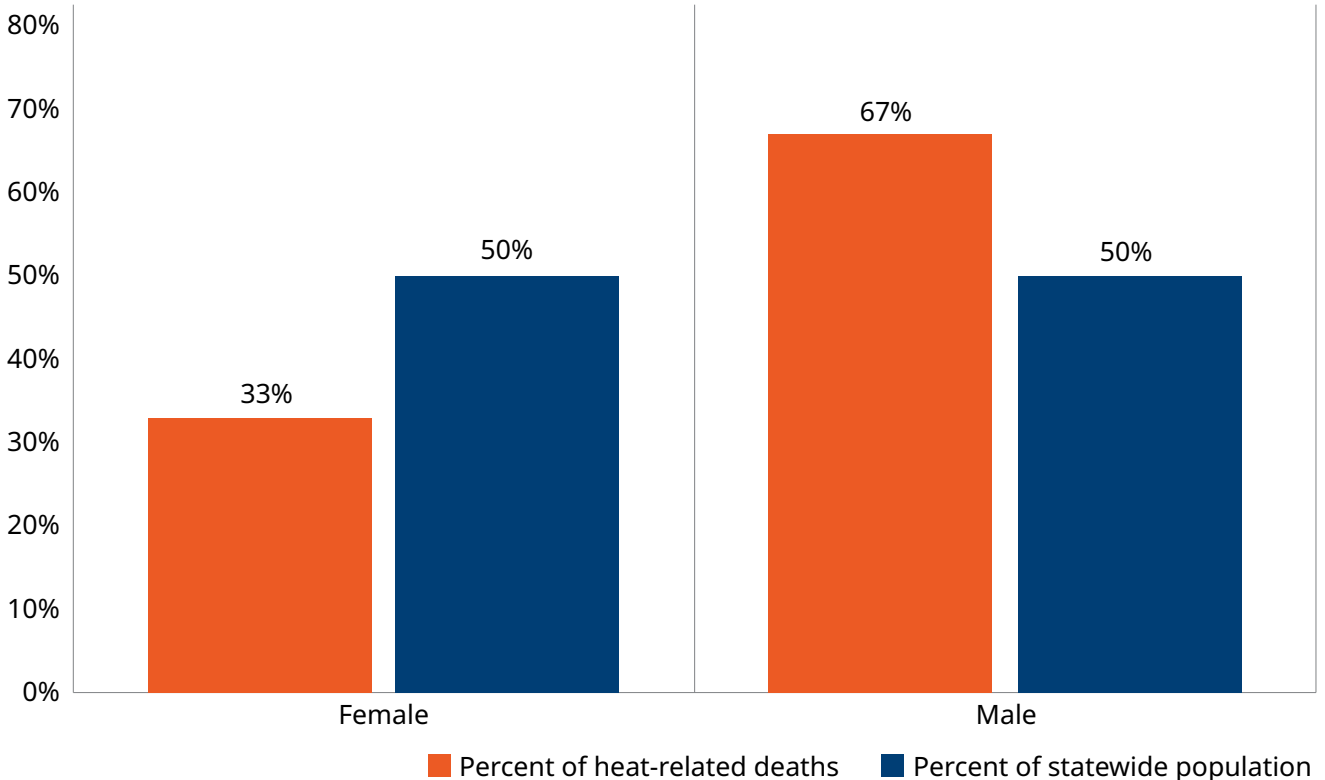


Figure A3: Heat-related illness emergency department and urgent care visits by age, May 1–October 31, 2024

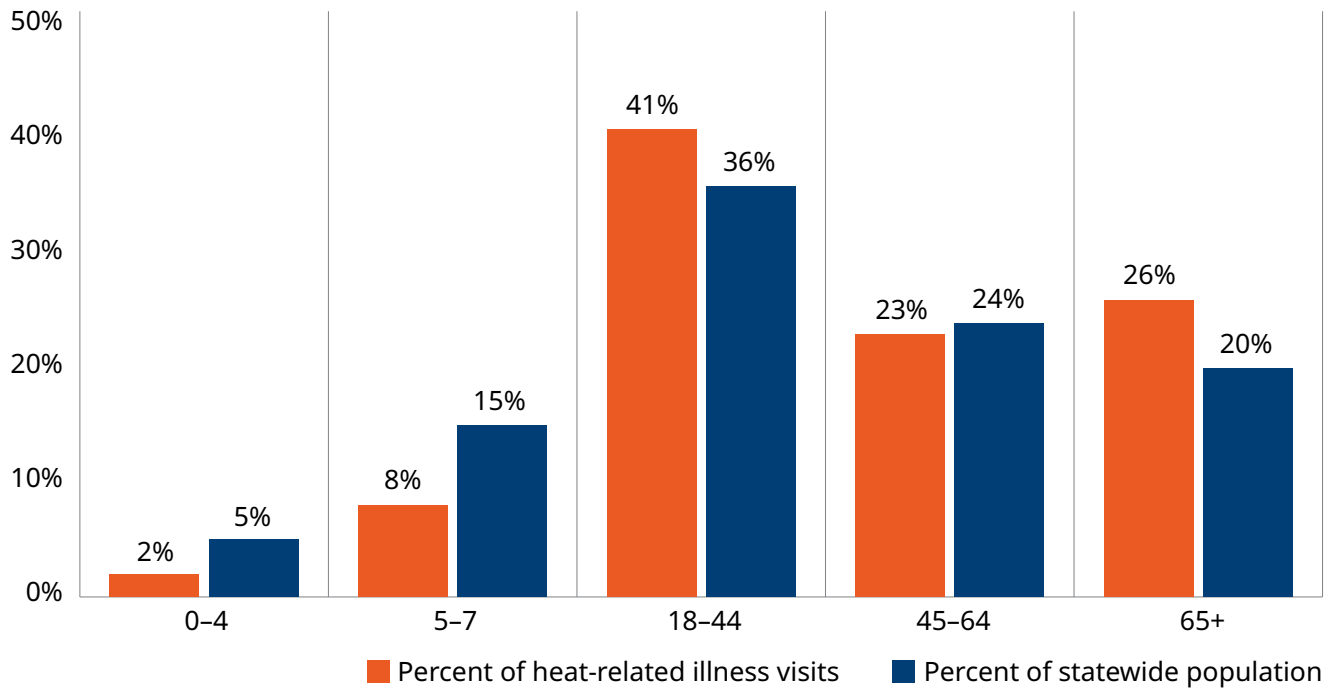


Figure A4: Heat-related illness emergency department and urgent care visits by sex, May 1–October 31, 2024

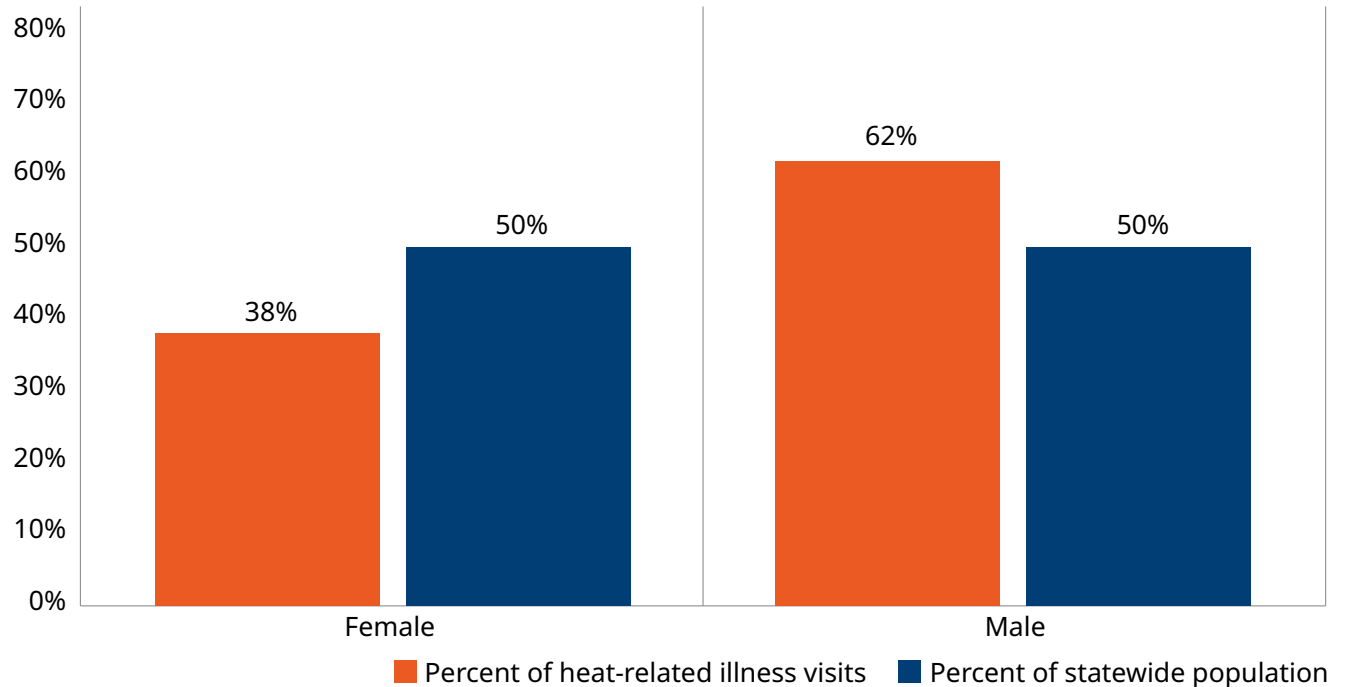


Figure A5: Heat-related illness emergency department and urgent care visits by race, May 1–October 31, 2024

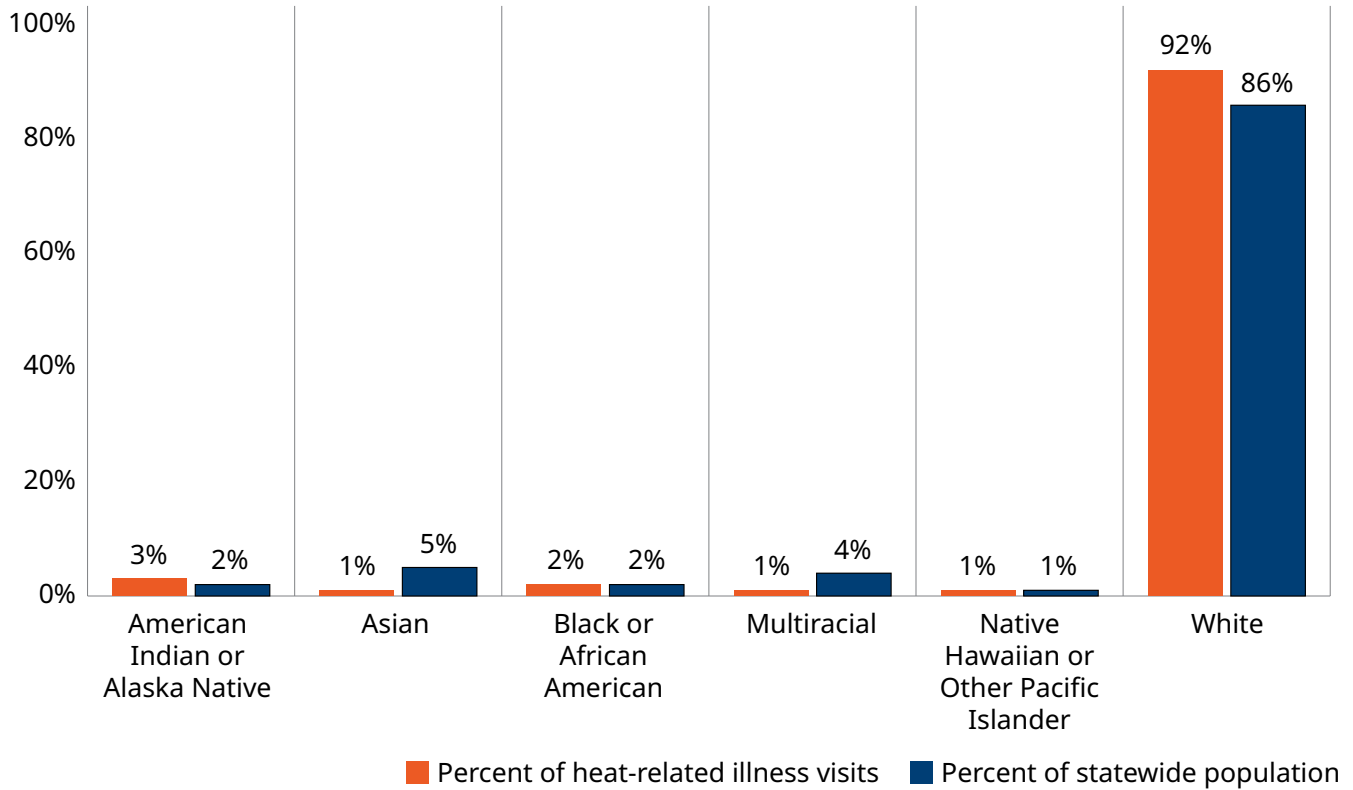


Figure A6: Heat-related illness emergency department and urgent care visits by ethnicity, May 1–October 31, 2024

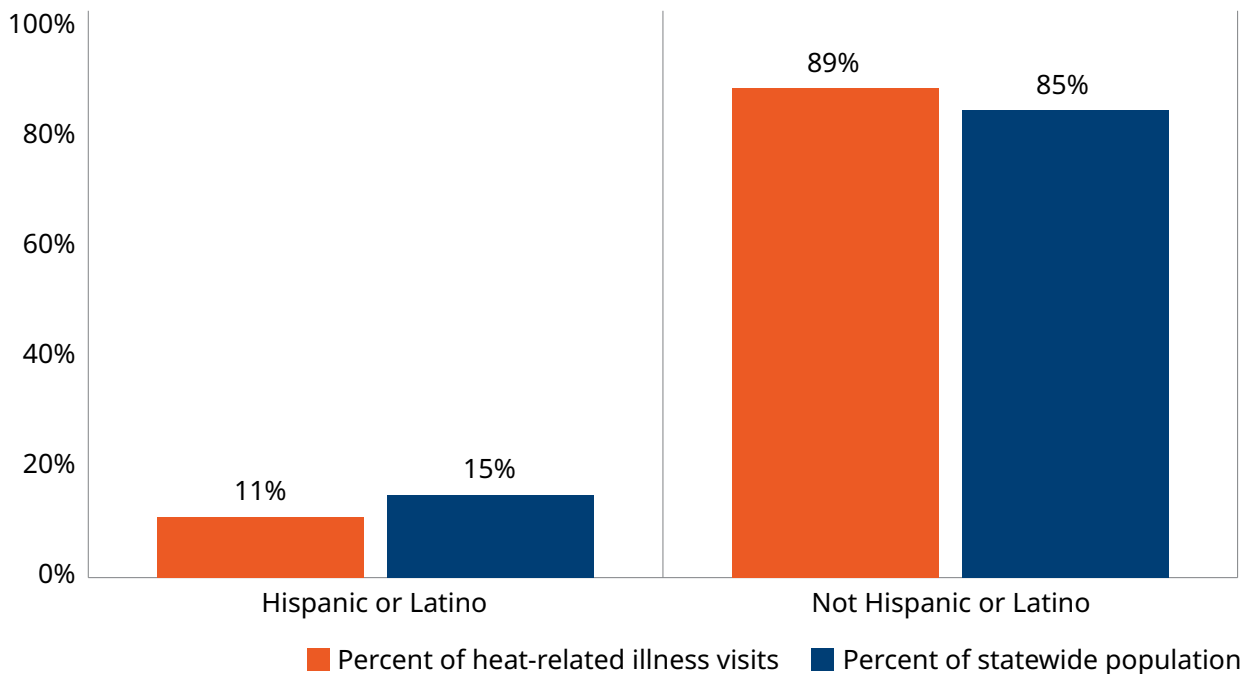


Figure A7: Non-infectious respiratory illness emergency department and urgent care visits by age, May–October 2024

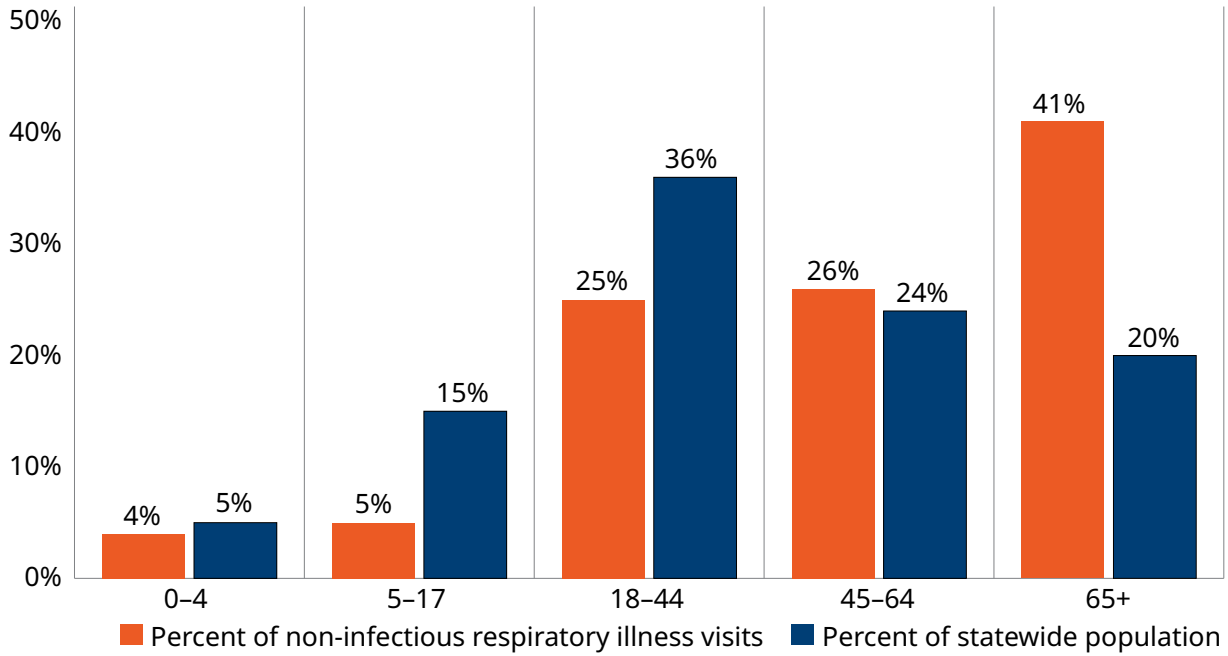


Figure A8: Non-infectious respiratory illness emergency department and urgent care visits by sex, May–October 2024

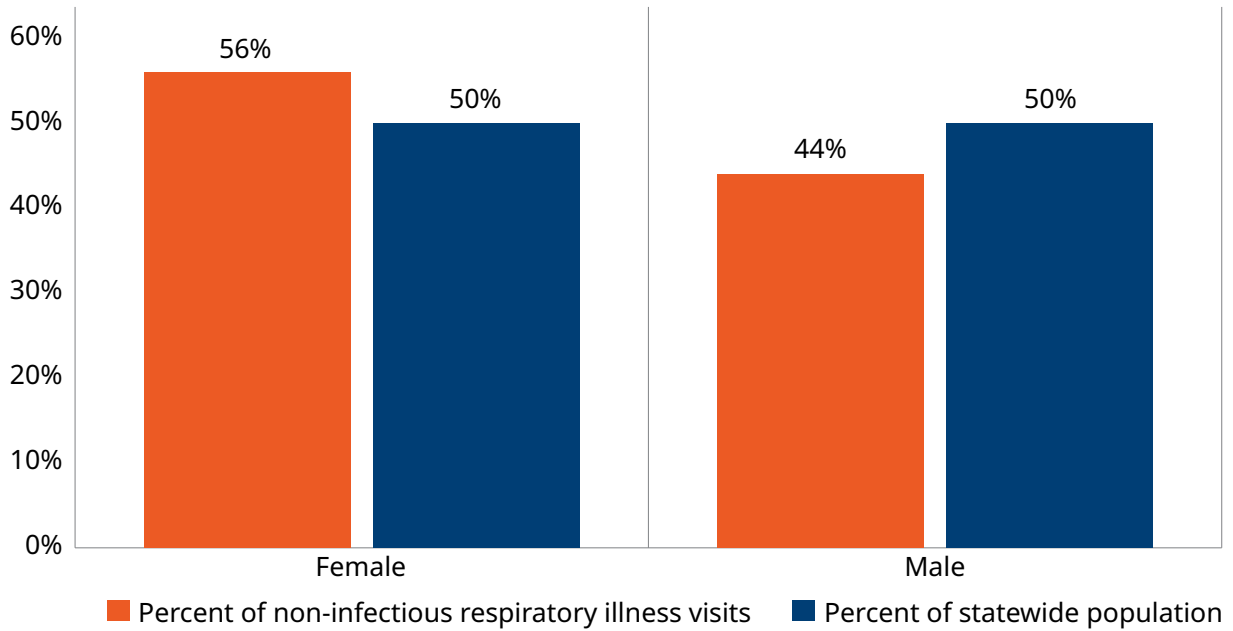


Figure A9: Non-infectious respiratory illness emergency department and urgent care visits by race, May–October 2024

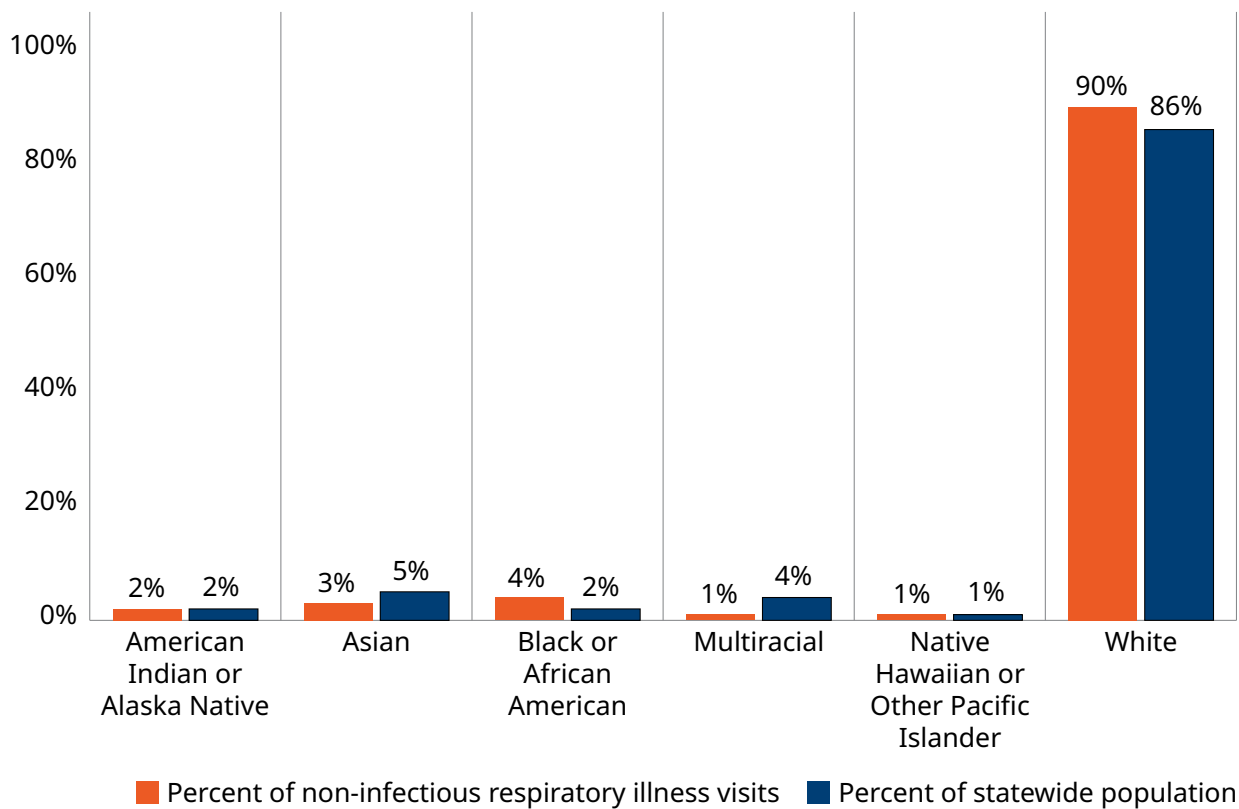


Figure A10: Non-infectious respiratory illness emergency department and urgent care visits by ethnicity, May–October

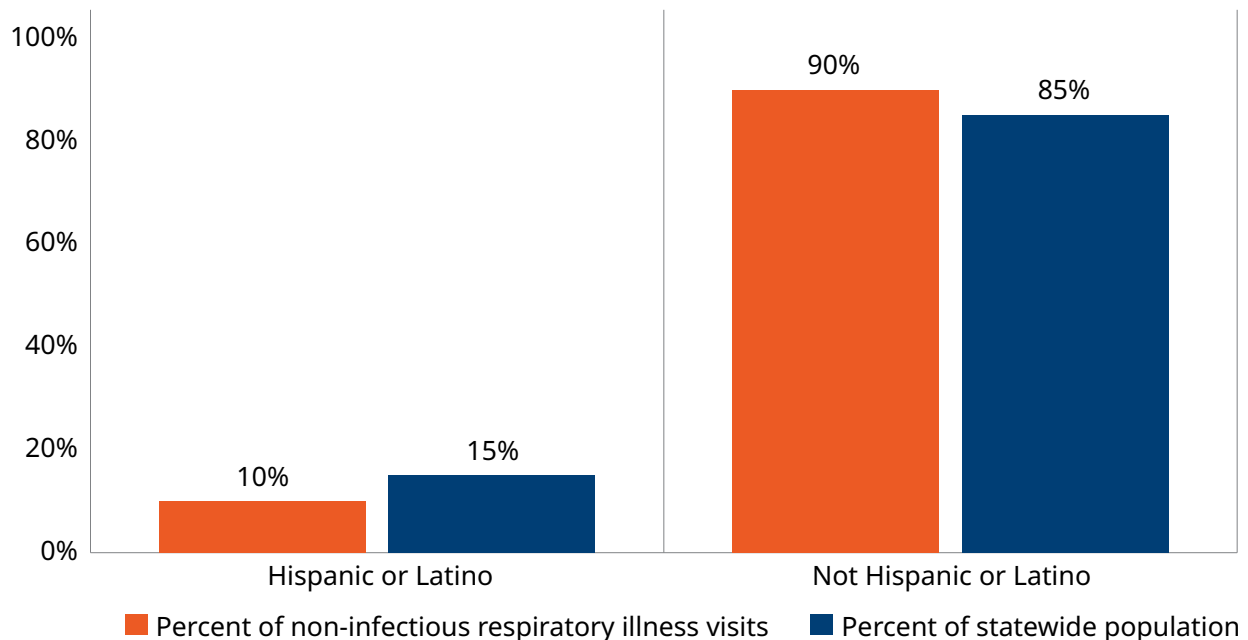


Figure A11: Cold-related deaths by age group, Winter 23/2024

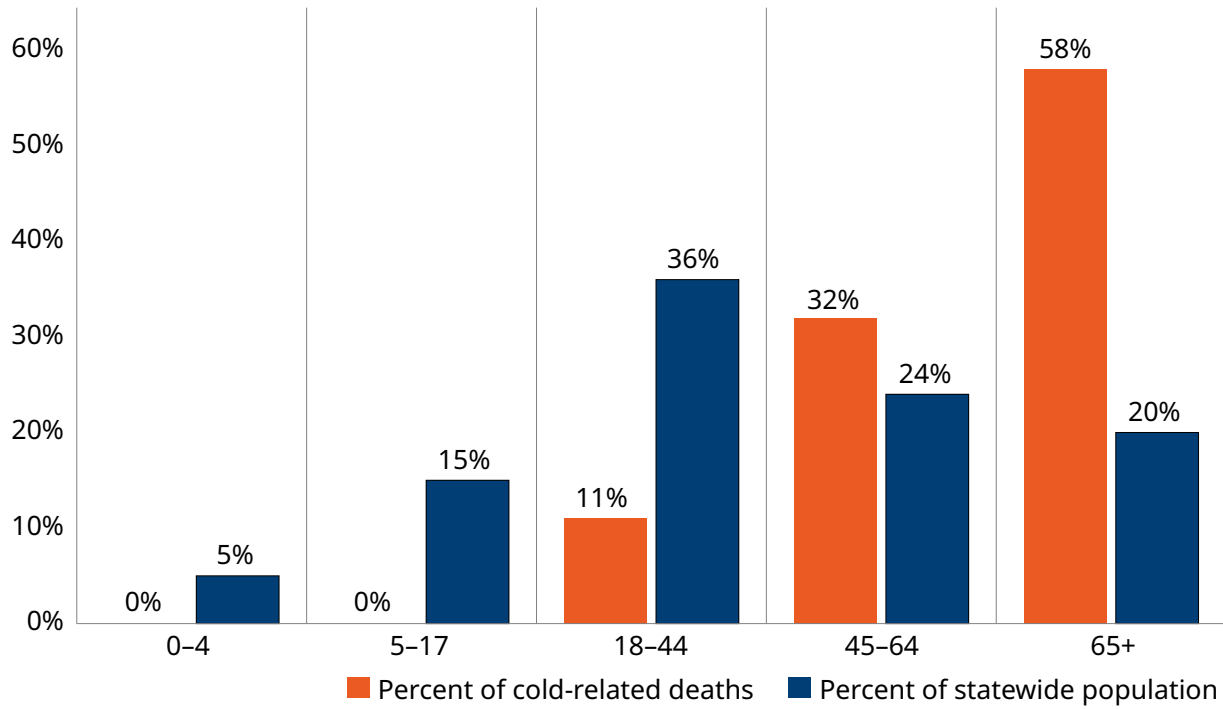


Figure A12: Cold-related deaths by sex, Winter 2023/2024

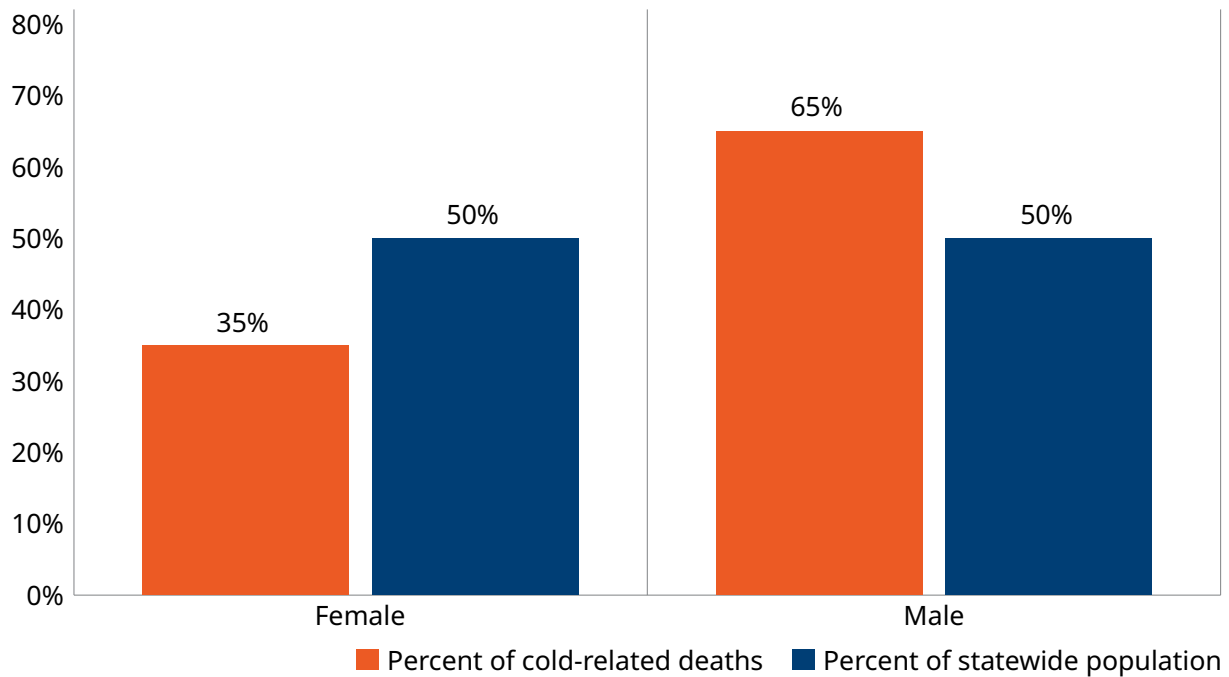


Figure A13: Cold-related deaths by race, Winter 2023/2024

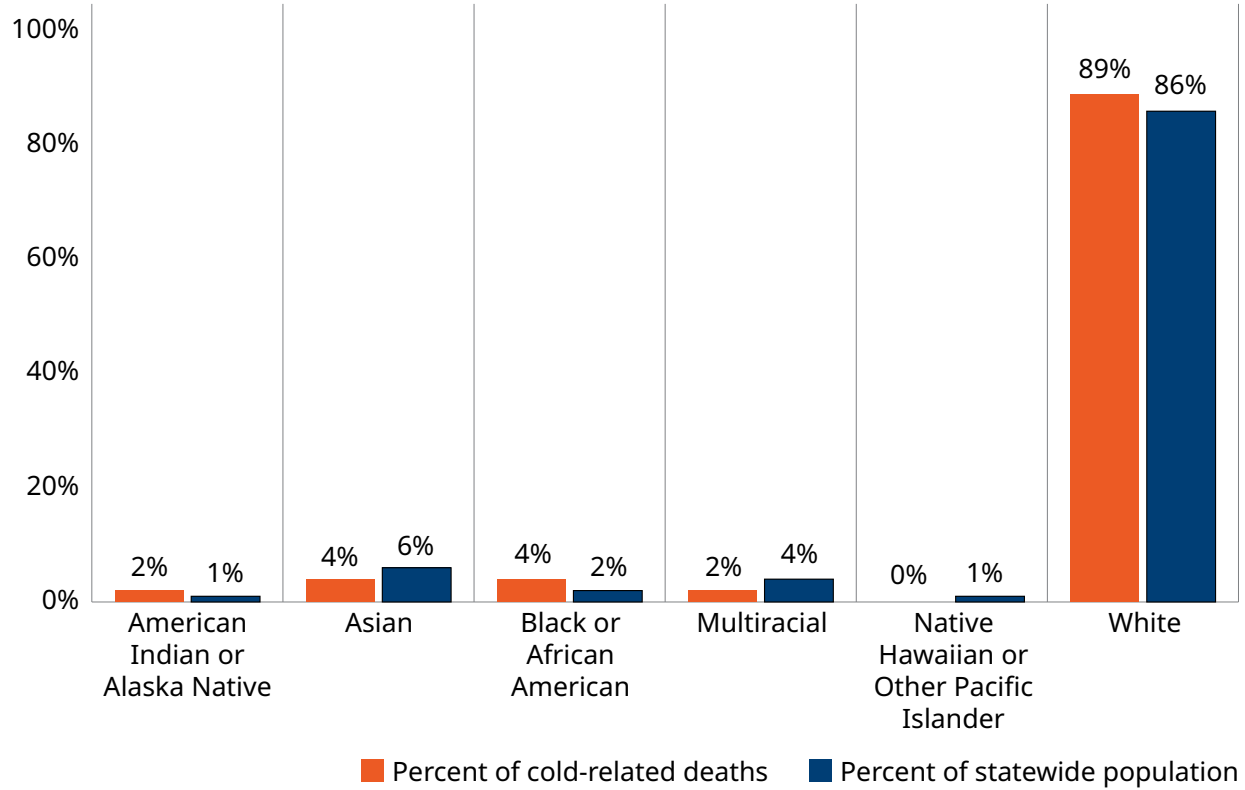


Figure A14: Cold-related deaths by ethnicity, Winter 2023/2024

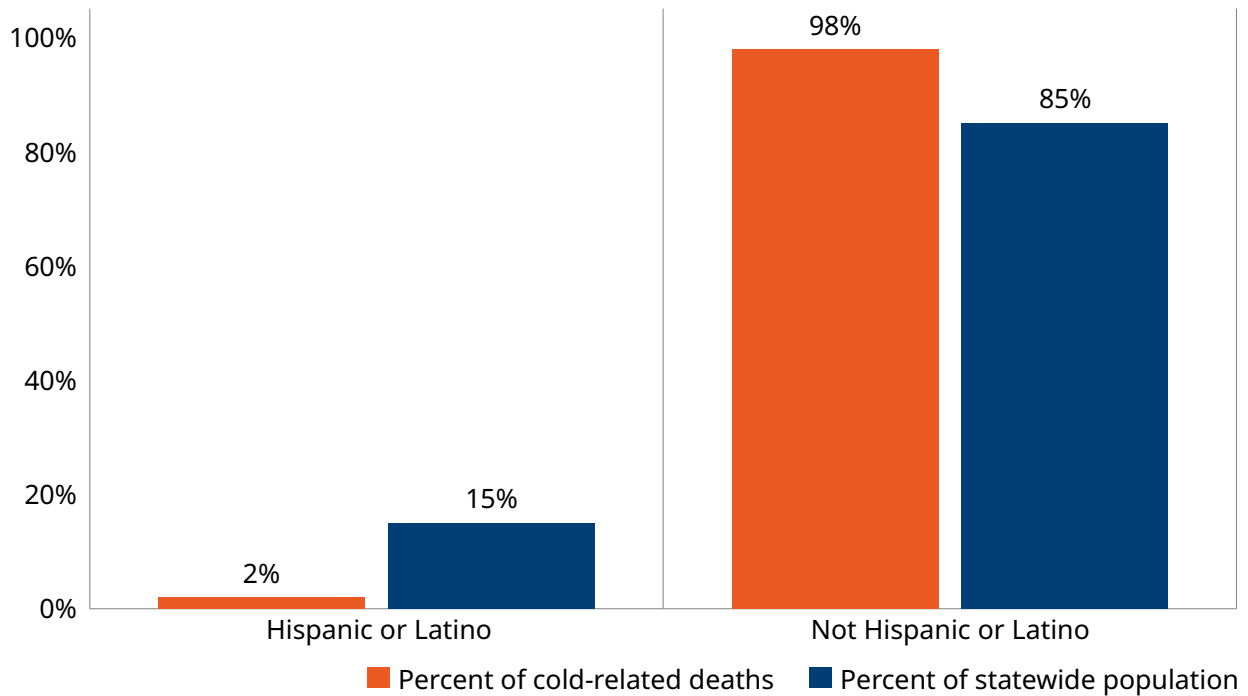


Table A2: Cold-related illness emergency department and urgent care center visits, Winter 2020/2021 – Winter 2023/2024

Winter	Number of ED and UC Center Visits	Rate per 100,000
Population	1,508	35.3
2021–2022	1,636	38.2
2022–2023	2,061	48.0
2023–2024	1,902	44.6

Figure A15: Cold-related illness emergency department and urgent care center visits by age group, Winter 2023/2024

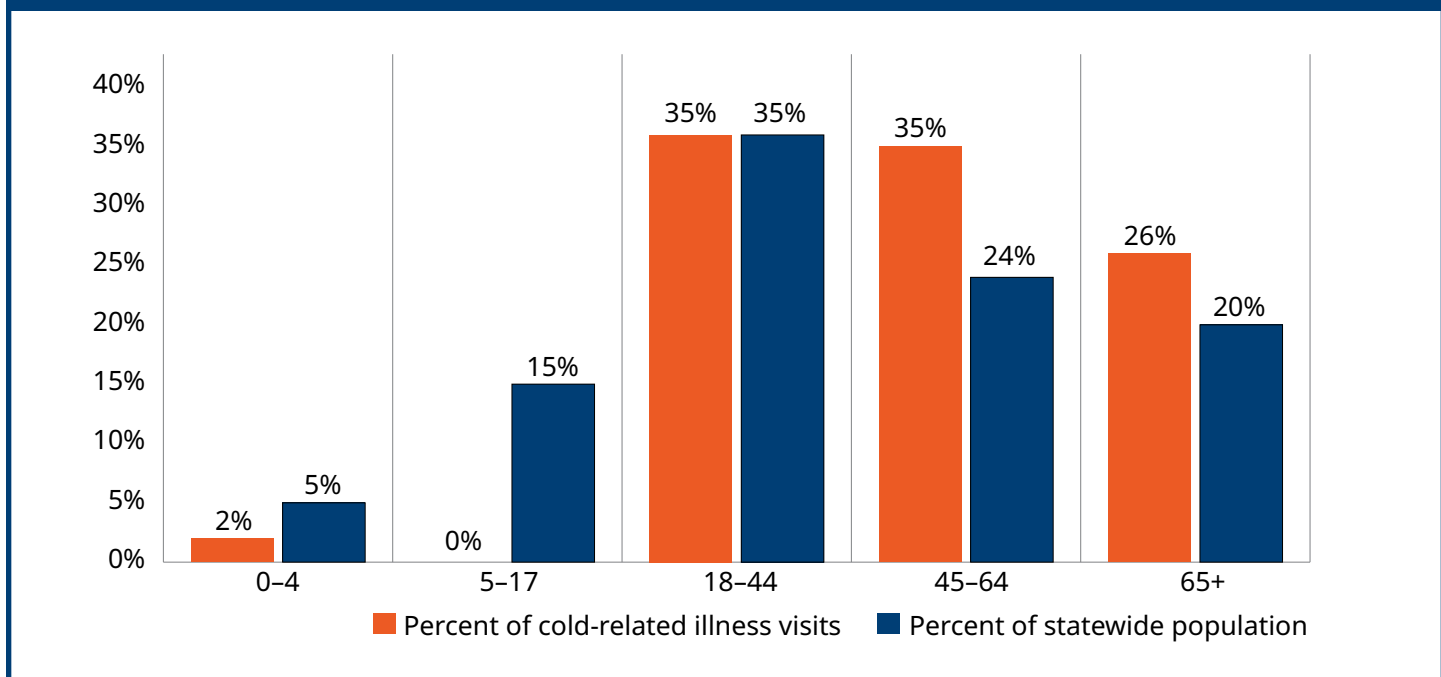


Figure A16: Cold-related illness emergency department and urgent care center visits by sex, Winter 2023/2024

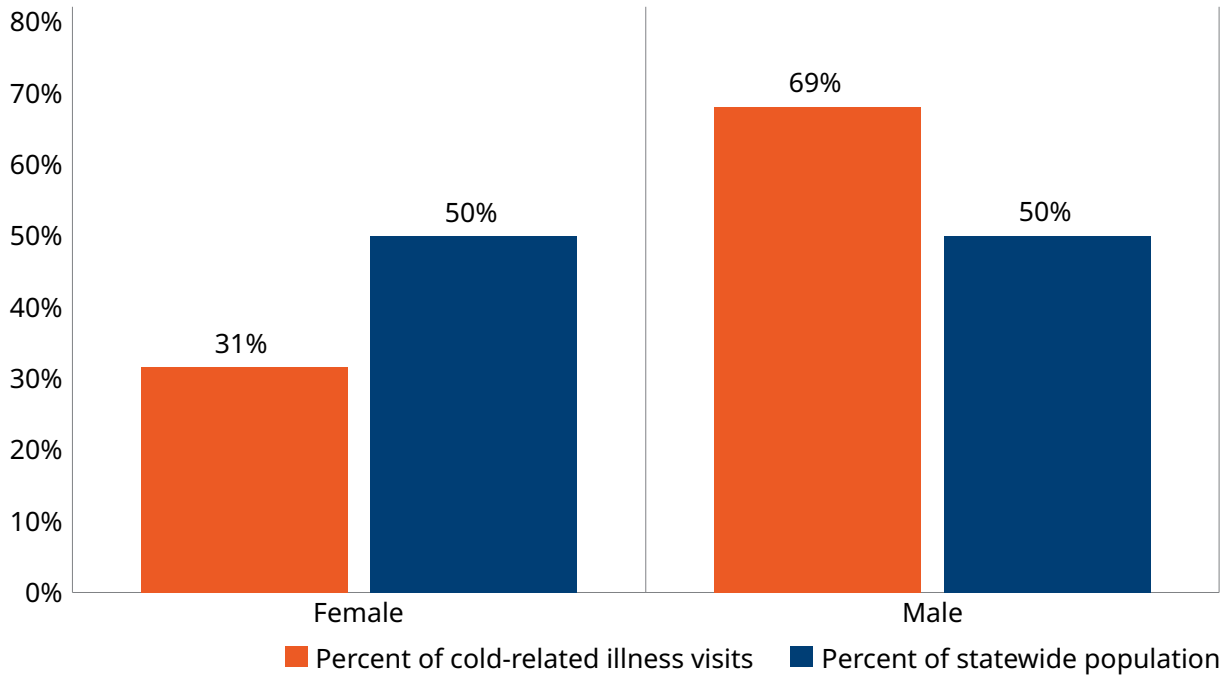


Figure A17: Cold-related illness emergency department and urgent care center visits by race, Winter 2023/2024

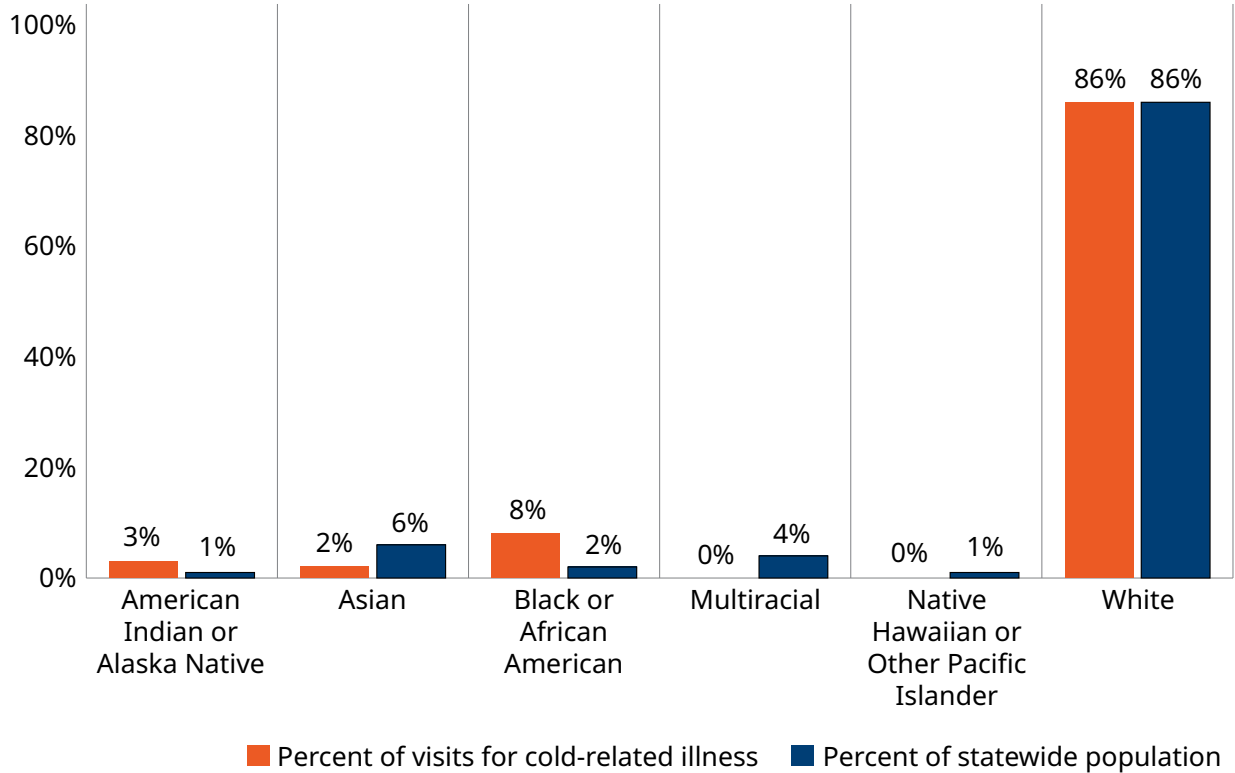
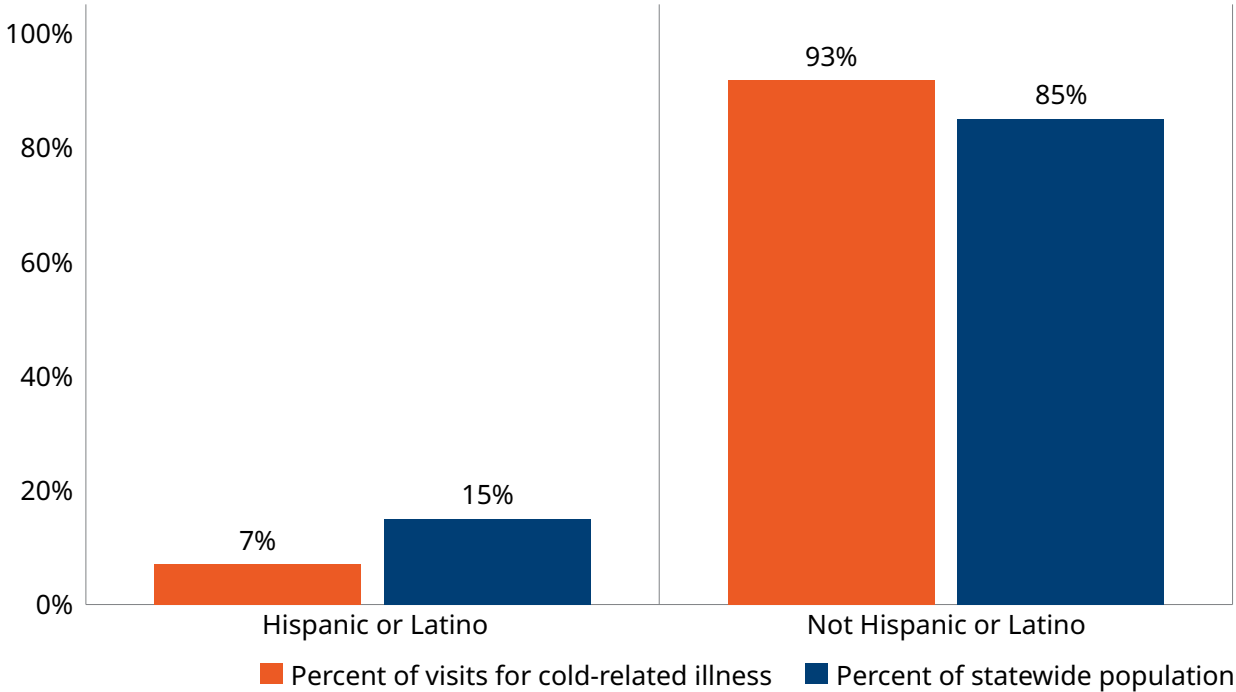


Figure A18: Cold-related illness emergency department and urgent care center visits by ethnicity, Winter 2023/2024



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