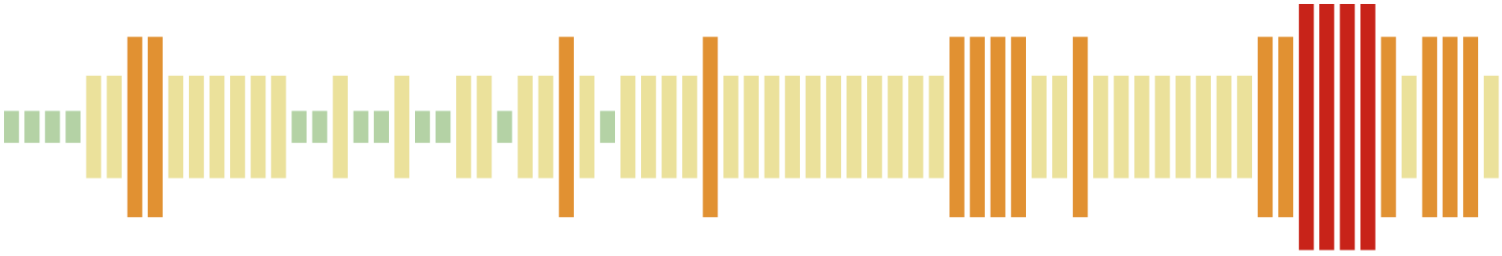
SEASONAL HEAT HAZARD BRIEF



SUMMER 2024

Multnomah County

Table of Contents

Acknowledgements

Six community members died this past summer due to heat-related causes or drownings. We continue to feel their absences today, and provide the information in this report to support progress towards a safer community.

This report was developed and written on the current and unceded lands of many tribes and Nations, including the Multnomah, Kathlamet, Clackamas, Chinook, Tualatin Kalapuya, and Molalla.

Review and Contributions

Multnomah County
Environmental Health Services
Community Epidemiology Services
Communications
County Assets

Oregon Health Authority
Acute and Communicable Disease

National Weather Service
Portland Weather Forecast Office

Tri-County Decolonization Working Group

Citation

Multnomah County Health Department (2025). Summer 2024 Seasonal Hazard Report. Multnomah County, OR. Environmental Health Services.

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Additional analysis and methods documentation is available upon request.

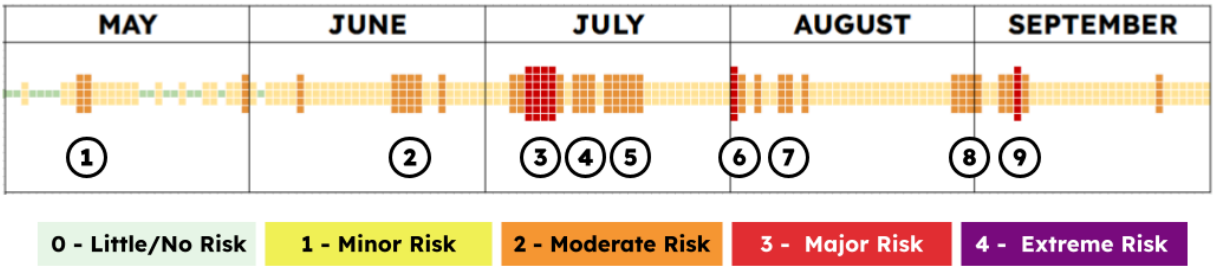
Overview

Summer 2024 was the hottest year on record in North America.
Oregon experienced extremely hot temperatures throughout the summer. There was record-breaking heat in early May. The month of July was the hottest ever, and included an intense heat wave that set multiple daily record highs. The season also ended warm, and the month of September was the second hottest ever.

The National Weather Service calculates a **HeatRisk Index** value (0-4) that accounts for both temperature and humidity that communicates risk. There were nine heat events throughout the summer where there were at least two days in a row of a HeatRisk index of '2 - moderate risk' or higher (Figure 1 below).

Illness and injury related to extreme heat continue to be a concern in Multnomah County because of these warming conditions and the existing, preventable conditions that lead to uneven and inequitable exposure.

Figure 1. Daily Heat Risk in 2024. Each column is one day and color-coded according to daily HeatRisk value. Two or more days in a row of moderate or major risk days are numbered. National Weather Service, Multnomah County, May - September 2024.



What is in this Brief
This brief uses data from multiple government and health care sources to provide a snapshot of illness and injury that occurred in Multnomah County. The summer time period covered is from May 1st, 2024 through September 30th, 2024. Details on data sources and methodologies are included at the end of the brief.

Type of Injury/Illness	Data Sources
Heat-Related Illness (HRI)	ESSENCE, OHA Hospitalizations Data, Vital Records
Near-Drowning and Drowning	ESSENCE, Vital Records

While these data are informative, they also have limitations. They are often collected using Western approaches. These tend to focus on numbers, problems instead of strengths, and the individual rather than the connection between individual and place. We acknowledge the need for expanded methods to capture strengths and stories.

Heat Illness and Injury Pathways

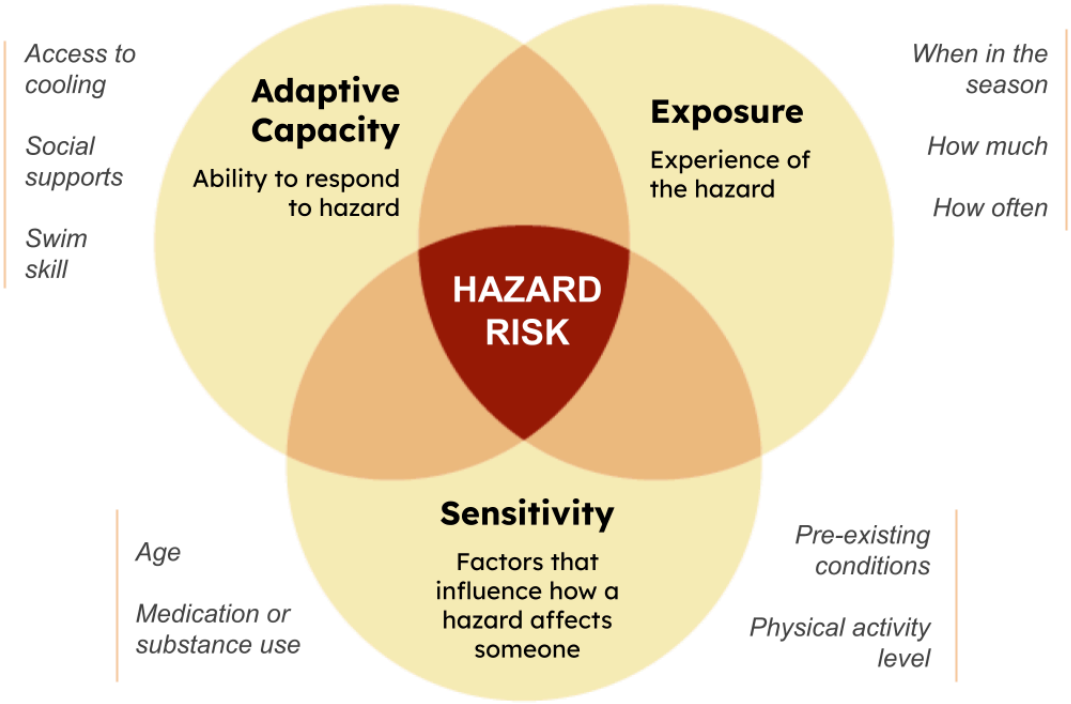
Heat-related illnesses and injuries are influenced by more than the weather. Adaptive capacity, exposure, and sensitivity influence how communities experience environmental hazards like heat and water risk.

Adaptive Capacity
Adaptive capacity is the ability of a group or individual to avoid harm and stay safe from heat. This ability depends on access to resources and protective community conditions. Policy and design choices have often not focused on the needs of people of color, people living with low-incomes, and people living with disabilities. This can make it harder for these groups to protect themselves today.

Exposure
Factors such as how long, how often, and how many summer hazards someone experiences contribute to exposure. These include housing conditions, housing status, travel needs, and access to swimming water.

Sensitivity
Individual factors can affect how sensitive someone is to heat, meaning how their body responds to the environment. While these reflect the health status of one person, individual sensitivities are also influenced by past exposures and systemic factors.

Figure 2. Adaptive capacity, exposure, and sensitivity combine to influence risk to summer seasonal hazards.



Heat-Related Illness Trends

Heat-related illness (HRI) includes a wide range of conditions and symptoms caused by continuous exposure to warm temperatures. To cool down, our body sweats, increasing heart rate and causing water and salt loss. This can lead to dehydration, blood pressure changes, and stress on organs. Every person's sensitivity to heat is different and can change over time. Sudden exposure can cause heat exhaustion or stroke, especially for those on certain medications.

There were **170 emergency and urgent care (ED/UC) visits** for HRI visits throughout the 2024 summer. This was the second highest visit count for HRI since record keeping began in 2016. This is slightly elevated compared to the 2019-2023 5-year average of 157 visits.

There were **18 hospitalizations** for heat-related illness in 2024, the same as in 2023. There were typically fewer than 10 heat-related hospitalizations each year before the heat dome in 2021. Years with fewer than 10 visits are not in the chart below.

There were **four deaths** in 2024 associated with heat. This marks the fourth year in a row the County lost residents due to extreme heat. There were no fatalities related to heat in the five years prior to the heat dome.

Heat-related emergency room and urgent care visits, hospitalizations, and fatalities continue to remain higher than normal since the heat dome in 2021.

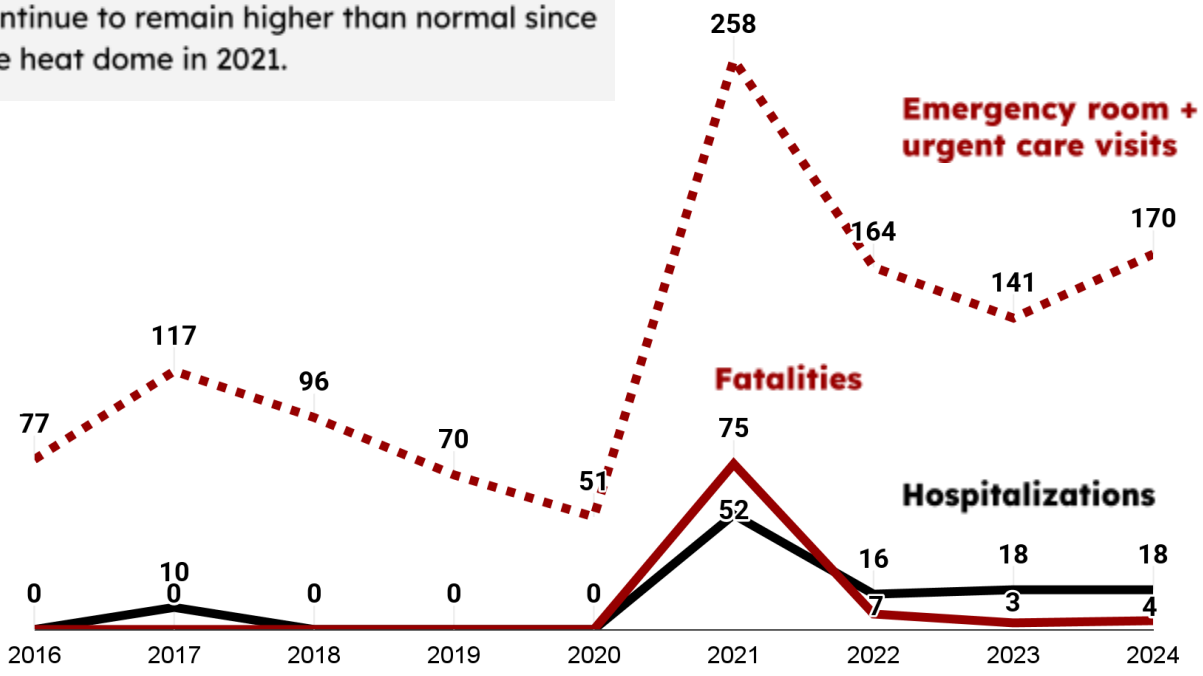


Figure 3. Annual emergency room and urgent care visits, hospitalizations, and fatalities related to heat. ESSENCE, OHA, Vital Records. Multnomah County, May - September 2016 - 2024

Emergency room and urgent care visits

A majority (n=141, 82%) of seasonal HRI visits occurred during a heat event where there were at least two days in a row of moderate HeatRisk (2) or higher. Days with major HeatRisk (3) made up just 4% of the season, but one third of visits (n=56) occurred on these days. The average daily HRI visit count on these days was 9 visits.

Overall, the HRI visit rate per 100k visits was 86.3 visits. People who identified as two or more races, White, American Indian/Alaskan Native, men, or in age ranges of 25-34 or 55+ had visit rates 15-45% higher than the County overall. Visit rates for people who identified as Black/African American, Hispanic/Latino, and are in the age range of 45-55 decreased by 23%, 16%, and 5% respectively compared to 5-year visit rate from 2019-2023.

Triage notes from the ED/UC visits provide written information about visit context. 14% of visits were associated with exposure at work (n=24). This count doubled compared to last year. 13% of visits were related to substance use (n=21, mostly alcohol and cannabis). This count tripled compared to last year. Visits associated with homelessness (8% of visits, n=13) were similar to 2023 counts.

Hospitalizations

A majority of hospitalizatized patients were male (n=15, 83%). The average age was 60 years old (ranging from 23 to 77). Half of hospitalized patients were White (n=9), and slightly over a quarter (n=5) were Black or African American.

A majority of the admission diagnoses were for a condition that heat contributed to, like organ failure or general weakness. Fewer than five cases had an admission diagnosis for heat exhaustion. The average length of stay was five days (ranging from 1 to 19 days). A majority of visits were made by Medicaid/Medicare patients (n=14, 77%).

Fatalities

There were 14 heat-associated deaths during the 2022-2024 summers. A majority were male (n=12), people 60 years or older (n=12), White (n=13), and non-Hispanic (n=13).

Half of those who died (n=7) were veterans. For all those who died where marital status was known (n=13), all were either divorced, widowed, or single. A majority of those who died (n=10) had underlying conditions that contributed to the death. Common conditions included hypertension, kidney disease, and diabetes. Almost all (n=13) were housed.

Submersion and Drowning Trends

As the weather gets warmer, people tend to spend more time around water for recreation. This increases water exposure and risk of drowning. Drowning is the process of not being able to breathe due to water submersion. It is not always fatal. Water submersion can have a range of health outcomes from mild to severe. These include discomfort breathing or swallowing, continued mental distress, long term disability and brain injury.

There were **13 emergency room or urgent care visits** for near-drowning or submersion in 2024. This is a small decrease from the previous summer (n=15, 13% decrease), as well as the 2019-2023 average (average n= 16, 19% decrease). The overall visit rate per 100k visits was 6.6. This is lower than the five-year average rate from 2019-2023. People who identified as Hispanic/Latino, men, or were between the ages of 1-25 had higher visit rates per 100k than the County overall. Children ages 10-14 had the highest visit rate (52.9 per 100k). This is over eight times the County rate overall.

There were **two drowning deaths** in 2024. This is one fewer than the five-year average of 3 drowning deaths per year. Over the past seven years, people who identify as Hispanic/Latino, Black/African American, men, or who were under the age of 25 experienced higher drowning fatality rates than the County overall.

In 2024, emergency room and urgent care visits and fatalities related to **submersion and drowning** improved compared to previous years, but remained in typical ranges.

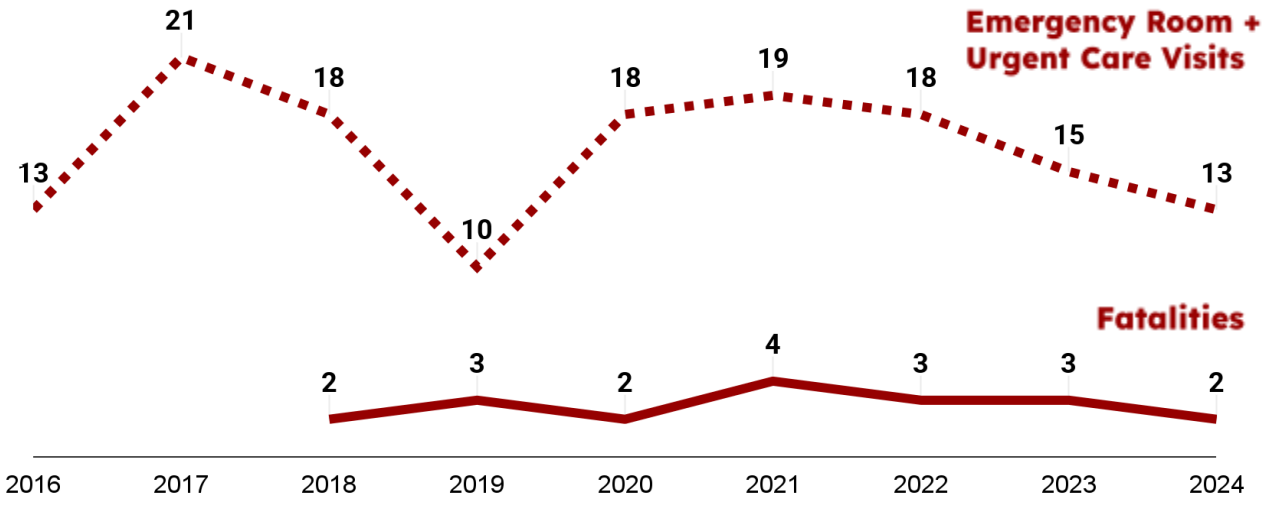


Figure 4. Annual emergency room and urgent care visits and fatalities related to submersion and drowning. ESSENCE, Vital Records. Multnomah County, May - September 2016 - 2024.

Heat and Other Illness Outcomes

Heat exposure can influence other outcomes besides heat-related illness. This can be seen in patterns in emergency room and urgent care visits. When looking at health outcomes known to be sensitive to heat in our region, the following visit types had statistically significant (p<.05) increases on days with a Heat Risk value of '3 - major risk', compared to days with a value of '0 - no risk':

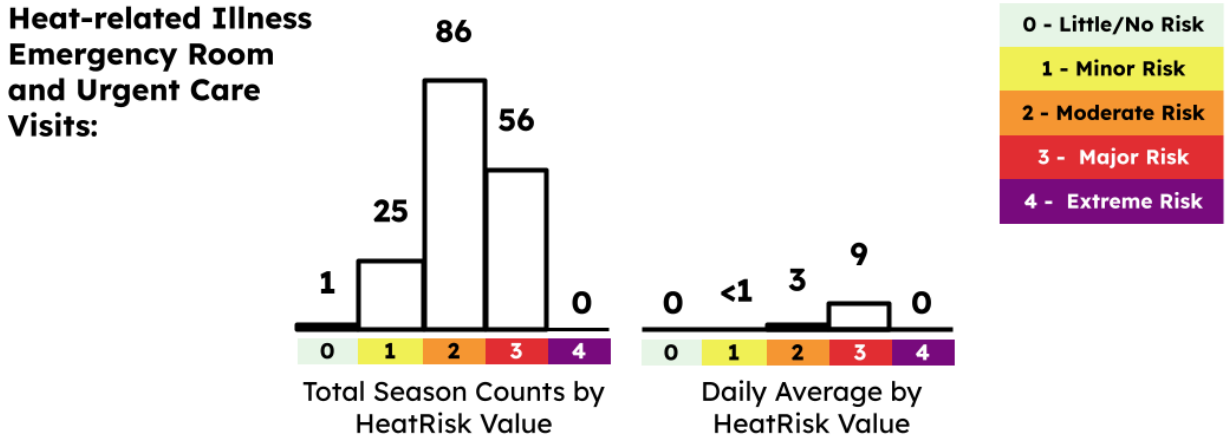
Table 1. Outcomes with higher average daily visits on days with a Heat Risk value of 3. ESSENCE, Multnomah County, May - September 2024.

	Outcome	Average Daily Visits	
		0 No Risk	3 Major Risk
	Dehydration This is when the body has low volume of fluid caused by water loss. Dehydration is a symptom and mechanism in heat-related illness, so significant increases are likely with high Heat Risk values.	15	26
	Acute Kidney Failure This is when the kidneys suddenly lose their ability to remove waste and balance fluids. Dehydration, reduced blood flow, and overheating can lead to overload and failure of the kidneys. Heat exposure has been shown to increase acute kidney failure (Liu et al., 2021).	17	24
	Symptoms and signs involving cognition, perception, emotional state and behavior This includes nervousness, agitation, anger, shock, or violent behavior towards oneself or others. Long heat exposure can lead to discomfort, sleep disruption and changes in stress, anxiety and brain function. These all can affect mood (Rony & Alamgir, 2023).	40	52
	Long COVID Symptoms include fatigue, brain fog, difficulty breathing, insomnia, joint issues, and heart issues that last four weeks after a COVID-19 infection. Since COVID-19 is so new, there is limited information on the connection to heat. Early evidence suggests heat worsens long COVID symptoms like fatigue, shortness of breath, and chest pain (D et al., 2022). The count and change is small, and warrants further exploration to draw conclusions.	0	<1

Actions

Summer 2024 broke several temperature records, including the hottest July ever recorded in Multnomah County. In turn, the County experienced high ED/UC visits, elevated hospitalizations, and continued fatalities related to heat. ED/UC visits and deaths related to water submersion and drowning also persisted, but remained in normal ranges. Multnomah County activates emergency operations on the highest Heat Risk days when HRI visit rates are highest. This includes opening cooling centers and reaching out to known at-risk populations in multi-family housing and those experiencing homelessness.

Figure 5. Seasonal counts and average daily HRI emergency department and urgent care visits by Heat Risk value, ESSENCE, NWS, Multnomah County, May - September 2024.



Risk also exists on days with lower Heat Risk values. Ways to begin to focus and expand interventions to improve heat safety, as well as the ways we analyze and evaluate it, include:

- Launching place-based cooling interventions that address adaptive capacity and exposure in high risk areas. Strategies could include neighborhood design that reduces heat, encourages community connection, or increases mobile cooling resources.
- Identifying opportunities to expand cooling relief at work sites. Common sectors identified include transportation and warehousing, landscaping, construction, and food preparation.
- Expanding community-led communication and intervention that highlight increased risk of using substances like alcohol, cannabis, and stimulants in warm conditions.
- Assessing and expanding opportunities for community-led, culturally-specific, and affordable swim lessons and water safety interventions.
- Incorporating additional outcomes sensitive to heat, like kidney disease and emotional stress, into regular summer hazard assessments.
- Identifying and incorporating strength-based metrics that emphasize well-being and connection to community and land during the summer season.

References + Methods

D, H., I, S., & T, V. (2022). Influence of high temperatures on Post-COVID-19 conditions. *Annals of Environmental Science and Toxicology*, *6*(1), 120–128. https://doi.org/10.17352/aest.000062

Liu, J., Varghese, B. M., Hansen, A., Borg, M. A., Zhang, Y., Driscoll, T., Morgan, G., Dear, K., Gourley, M., Capon, A., & Bi, P. (2021). Hot weather as a risk factor for kidney disease outcomes: A systematic review and meta-analysis of epidemiological evidence. *Science of The Total Environment*, *801*, 149806. https://doi.org/10.1016/j.scitotenv.2021.149806

Rony, M. K. K., & Alamgir, H. M. (2023). High temperatures on mental health: Recognizing the association and the need for proactive strategies—A perspective. *Health Science Reports*, *6*(12), e1729. https://doi.org/10.1002/hsr2.1729

National Weather Service		
Description	**Variables**	**Limitations**
The NWS provides weather and climate information to inform decision-making to protect community well-being.	• Heat Risk	• Data used are collected from one site (PDX), while variation exists throughout the county depending on built and natural environment

Oregon ESSENCE		
Description	**Variables**	**Limitations**
The Oregon ESSENCE database tracks near-real time visits to local emergency departments and some urgent care clinics. Records include diagnoses, demographic information, and additional context from triage notes..	• Heat-related illness • Near-drowning • Dehydration • Acute kidney failure • Emotional state • Long COVID	• Counts may include the same person visiting on separate occasions • Some triage notes not complete and completeness varies by provider • Counts <5 suppressed due to protect patient confidentiality • Race can be provider recorded or incomplete • Represents people able to access care, therefore a likely undercount of full illness and injury incidence

Oregon Health Authority Hospital Discharge Records		
Description	**Variables**	**Limitations**
This data includes information about residents who received inpatient care at a hospital. This includes why they were admitted and the care they received.	• Heat-related illness	• Counts <10 are suppressed due to data use agreements • Represents people able to access care, therefore a likely undercount of full illness and injury incidence

Oregon Health Authority Vital Records		
Description	**Variables**	**Limitations**
These records are the most stable source of information about death trends. It includes cause of death and some demographic information.	• Hyperthermia deaths (underlying X30 or contributing T67) • Drowning deaths (underlying cause is V90, V92, W16, W67, W69, W73, W74)	• Numbers are considered provisional and subject to change • Limited to Multnomah County residents, excludes deaths of outside residents that occurred within Multnomah County

Table 2. Report outcome counts

	Heat-Related Illness			Submersion and Drowning	
Year	Emergency Department / Urgent Care Center Visits	Hospitalization	Fatalities	Emergency Department / Urgent Care Center Visits	Fatalities
2016	77	0	0	13	n/a
2017	117	10	0	21	n/a
2018	96	<10	0	18	2
2019	70	<10	0	10	3
2020	51	<10	0	18	2
2021	258	52	75	19	4
2022	164	16	7	18	3
2023	141	18	3	15	3
2024	170	18	4	13	2