

Preliminary Review on Excessive Heat Deaths

Multnomah County
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The heat dome that settled over Multnomah County and the Portland metro area from June 25 to June 28, 2021, created an extreme heat event that occurred both earlier in the summer, before residents naturally acclimate to warmer temperatures, and at a prolonged intensity never experienced before. High daytime temperatures reached triple digits for three days, peaking at 116° F at Portland International Airport on June 28, with little of the overnight cooling the region has historically depended upon. The magnitude of the heat was not just unprecedented for the temperate Pacific Northwest, but it also was exceedingly rare for most of the United States.

This heat resulted in the deaths of at least 54 Multnomah County residents. Most of those who died were older, lived alone and had no air conditioning. Most were white, and most were men.

While the County responded with the full set of public health interventions — intensive communication, outreach and public cooling spaces — we are humbled by the death toll and are committed to learning all we can about who succumbed and why.

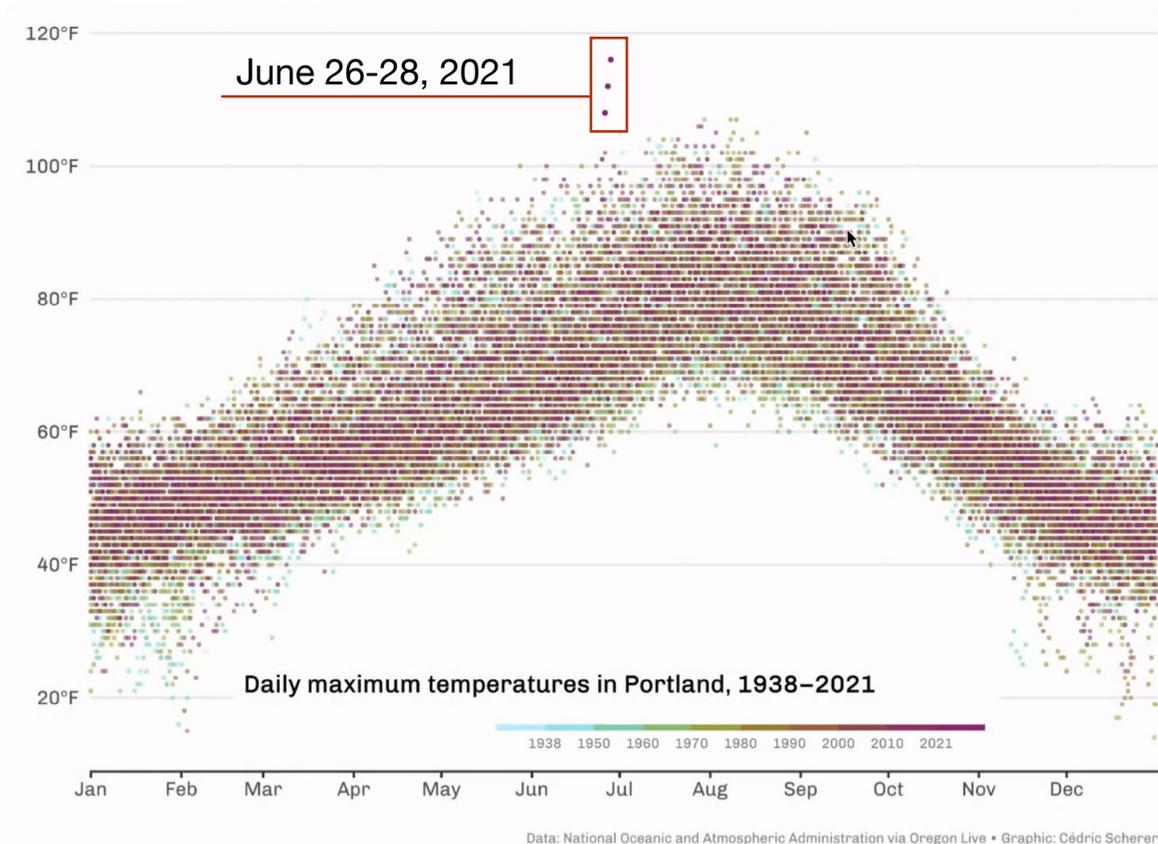
We also want to acknowledge the dedication of death investigators from the Multnomah County Medical Examiners Program who responded in person throughout this mass casualty event, then worked with Public Health to analyze and characterize what happened in order to share these findings with the community.

The following report is a preliminary look at confirmed deaths due to hyperthermia (which literally means “excessive heat”). We expect numbers to change and our understanding of this event to evolve.

What is clear even now is that climate disruption is making extreme heat events more frequent, more intense and longer in duration.

In a little more than 50 years, within the lifetimes of our children, the Centers for Disease Control and Prevention projects Multnomah County will experience 38 days over 90 degrees each year, far surpassing the current record of 29 days set in 2015.

Portland Daily Maximum Temperatures



Nighttime heat waves have an even greater influence on human health than daytime heat waves and, according to the National Climate Assessment, nighttime heat waves have increased in frequency in the Northwest since 1901.

Over the last several years, Multnomah County developed an extreme heat response plan with a range of interventions meant to help the community prepare for events of differing severity. But no one predicted a heat event of this magnitude at this time. We used every intervention in our plan and several that we improvised in short order.

Yet as the deaths recorded here make clear, the devastating effects of climate disruption have arrived much faster than predicted. Our community must come together around both shorter- and longer-term strategies, from investing in cooler indoor spaces to reducing greenhouse gas emissions. At the County, we will refine our response plan to include a broader range of partners and interventions for more severe events and the possibility of multiple hazards happening at the same time. This convening and preparation work will require dedicated staff to research science-backed interventions, review available community resources, build strategic partnerships, and then revise our response protocols accordingly.

In solidarity,

Jessica Guernsey, MPH
Local Public Health Administrator

Jennifer Vines, MD, MPH
Health Officer

Data: Source, Analysis and Limitations

As of July 9, the Multnomah County Medical Examiner's Office identified 71 deaths in which the suspected cause of death is hyperthermia. Of those, 54 had been formally ruled hyperthermia deaths.

The following is an analysis of those 54 confirmed cases.

Data Source

The Oregon State Medical Examiner (OSME) maintains a database of all deaths investigated under its jurisdiction. County death investigators gather information about residence and housing status and important details from scene investigations and interviews with relatives and social contacts. That information allows the State Medical Examiner's Office to certify cause and manner of death.

According to ORS 146.090, the Medical Examiner investigates and certifies the cause and manner of all human deaths that are:

- a. Apparently homicidal, suicidal or occurring under suspicious or unknown circumstances;
- b. Resulting from the unlawful use of controlled substances or the use or abuse of chemicals or toxic agents;
- c. Occurring while incarcerated in any jail, correction facility or in police custody;
- d. Apparently accidental or following an injury;
- e. By disease, injury or toxic agent during or arising from employment;
- f. While not under the care of a physician during the period immediately previous to death;
- g. Related to disease which might constitute a threat to the public health; or
- h. In which a human body apparently has been disposed of in an offensive manner.

For the period beginning June 25, 2021, we extracted from the database deaths suspected as hyperthermia, or excessive heat, as well as narrative description and incident/death location information to assist in categorization and mapping.

Case information for all investigated deaths under Medical Examiner jurisdiction was extracted from the corresponding database. Seventy-one deaths were flagged as suspected hyperthermia and underwent additional review. Two reviewers independently assessed death narrative reports, supplemental information, and address information for each case.

Data Limitations

The findings presented in this report are considered preliminary. For example, information related to housing may change as additional investigation is required to establish whether the person met the classification of homelessness using definitions set by the U.S. Department of Housing and Urban Development or U.S. Department of Health and Human Services.

Many findings may change as case investigations continue and toxicology results return in the coming months. Some cases may also be determined to have another cause of death. Additional cases may be discovered. The County will refine and produce a final report when that work is complete.



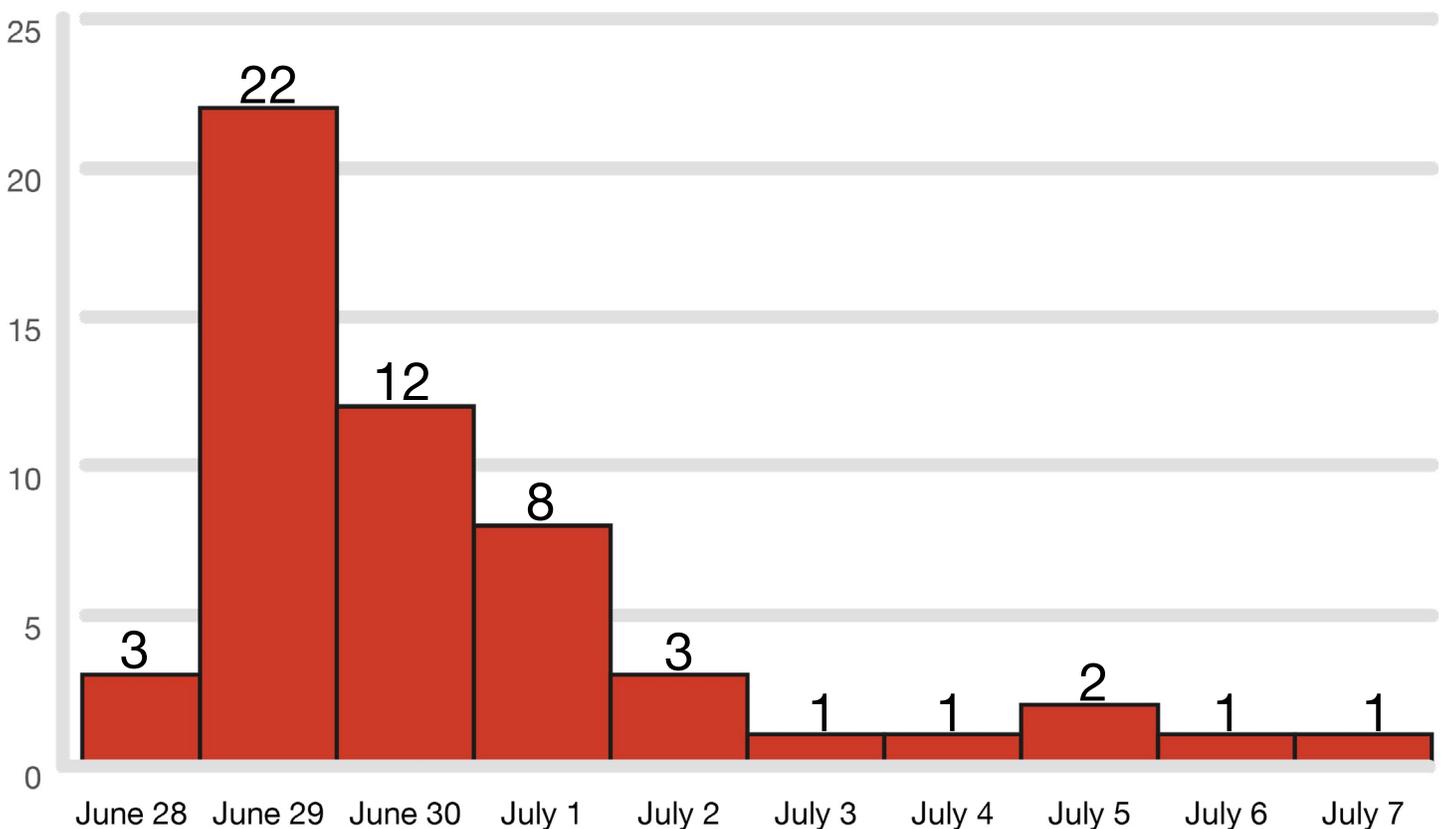
Preliminary Findings

Reported Date of Death

The National Weather Service issued an excessive heat warning for the Portland Metro region beginning Friday, June 25, through Monday, June 28. The first three reports of possible hyperthermia deaths were reported to the Multnomah County Medical Examiner on Sunday, June 27; those cases are still pending. Three confirmed deaths were reported June 28, with the majority reported June 29 and after. Multnomah County Medical Examiners continued to respond to reports in the following days.

Confirmed cases were reported to the Multnomah County Medical Examiner on the following dates:

Reported Date of Death



Note: Date of death reported to Multnomah County Medical Examiner's Office

Age, Race and Gender

Most of those who died were older adults — the youngest was 48, and the oldest 97; the average age was 70. All but four people were identified in preliminary investigations as white.

Age

Age	Number (%)
45 to 59	10 (18.5%)
60 to 69	18 (33%)
70 to 79	16 (30%)
80+	10 (18.5%)
TOTAL	54 (100%)

Race

Race	Number (%)
White	50 (92%)
African American/Black	2 (4%)
American Indian/Alaskan Native	1 (2%)
Asian	1 (2%)
TOTAL	54 (100%)

Sex

Sex	Number (%)
Male	34 (63%)
Female	20 (37%)
TOTAL	54 (100%)

Location: Housing Type

The vast majority of deaths occurred in the decedent's own residence, more than half of which were multifamily dwellings. Of the people who succumbed to the heat in multifamily dwellings, 45 percent lived on an upper floor (floor 3 or higher) of that building.

Of all those who died in their homes, 78 percent lived alone.

At least four people died in apartment buildings charged with caring for vulnerable people. Three people died in apartment buildings owned and managed by Home Forward. And one person died in a building owned and operated by Central City Concern.

Two individuals died in an independent senior living community. An earlier version of this preliminary report, released July 13, incorrectly described the facility as an assisted living facility. We regret the error.

Two people have been identified through an initial review of housing status as experiencing homelessness. Both were found in their vehicles. The number of cases may increase as case investigations continue and toxicology results return in the coming weeks and months.

Residence type among people who died of hyperthermia

Location	Number (%)
Multifamily*	29 (55%)
Single Family*	15 (28%)
Mobile Home, RV park, Automobile	10 (18%)
TOTAL	54 (100%)

Note: Housing type is where the individual permanently or temporarily resided at time of death, regardless of location of death

**Multifamily includes apartment buildings, SRO, hotels, duplexes, and single family home with attached apartment/ADU. Single family includes ONLY single family dwellings.*



Cooling

Lack of air conditioning was a key driver in mortality. Whereas about 80 percent of people in the Portland area have some level of air conditioning in their homes — and about 50 percent have central air — none of those who died had central air, and only eight people had a portable air conditioning unit in their home.

Of those eight individuals, at least seven had units that were unplugged or not working properly. In one case, for example, an individual did not use the unit out of fear it would catch fire. In another case, the portable air conditioning unit was found in use, but unable to keep up with the heat to sufficiently cool the home.

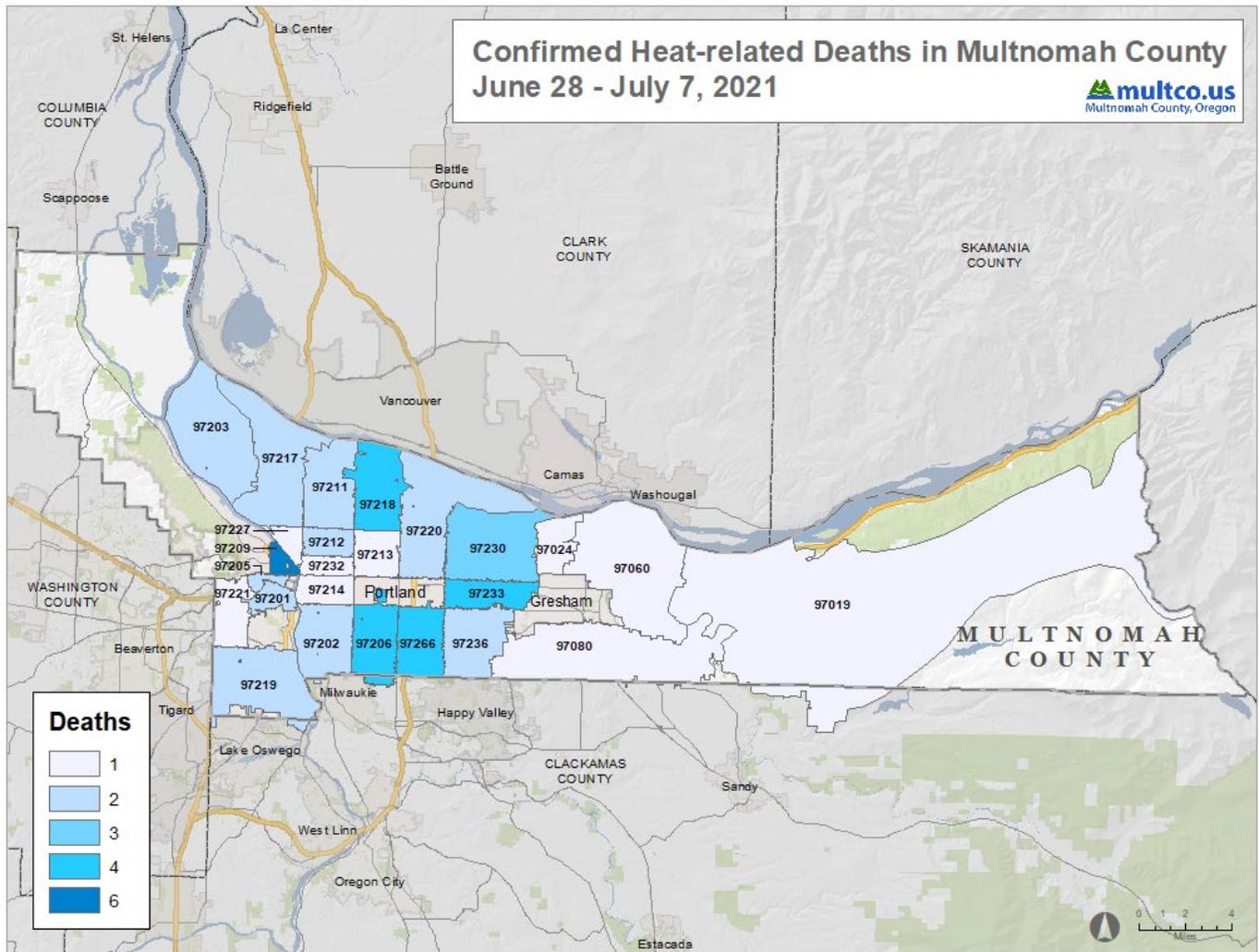
More than half of those who died had only a fan, which, at the outdoor temperatures reached during this event, can actually make the body warmer and dryer. At temperatures in the upper 90s, fans simply move hot air around; the breeze they produce must be cooler than body temperature to actually cool the body down.

Cooling Type in Housing

Cooling Type	Number (%)
Fan Only	28 (52%)
None	13 (24%)
Portable AC w/ or w/o Fan	8 (15%)
Unknown	5 (9%)
TOTAL	54 (100%)

Location: Geography

Deaths occurred in nearly every corner of Multnomah County, with at least one person succumbing in 25 of the County's ZIP codes. No ZIP code had more than six deaths. The map of heat-related deaths by ZIP code shows the primary location of residence for confirmed cases throughout the duration of the heat event. These counts are likely to change as more cases are confirmed.





Trend Over Time

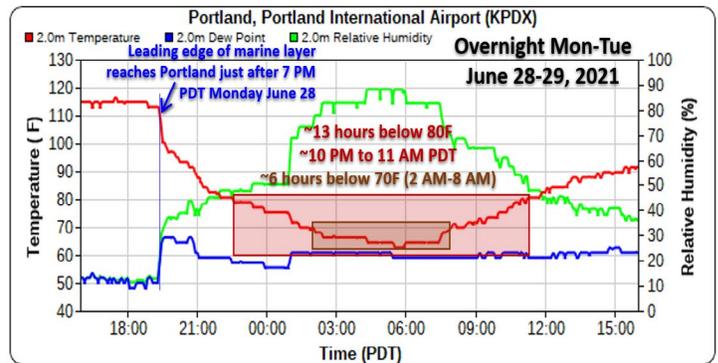
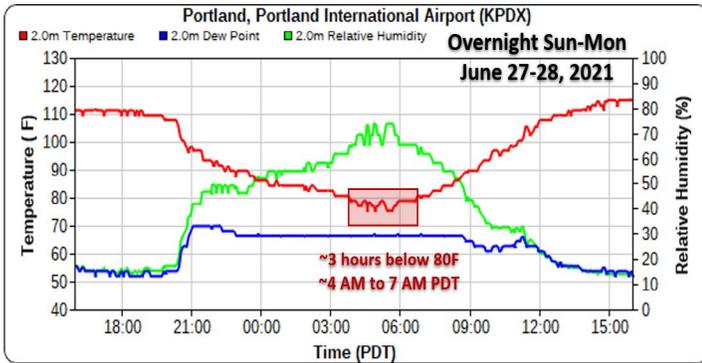
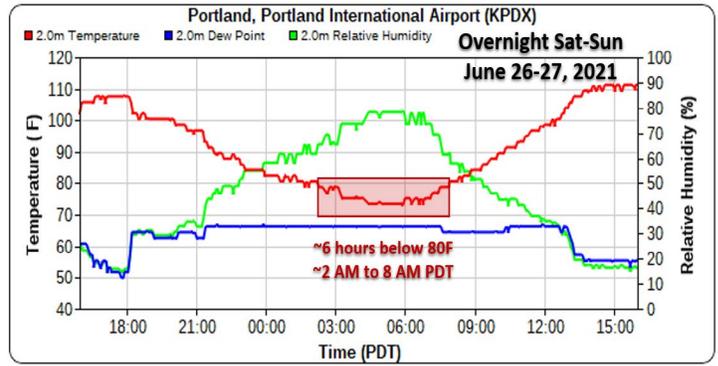
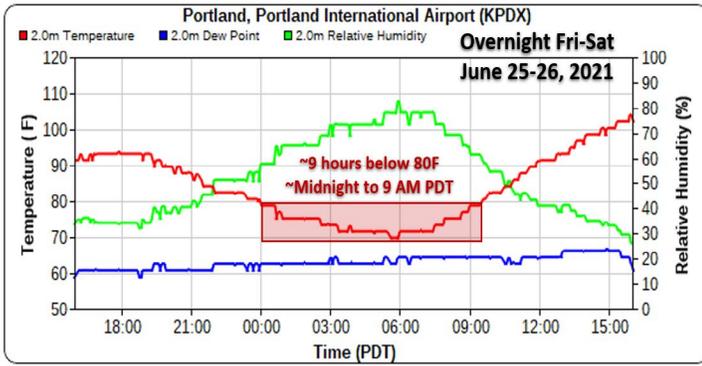
The June 2021 heat wave was so extreme that it was difficult to describe just how unusual it actually was.

[Temperatures jumped](#) more than 30 points above average beginning Saturday, June 26, when the temperature registered 108 degrees at 5 p.m. The previous record high, 107 degrees, had been reached only three times: on Aug. 8 and 10, 1981, and July 30, 1965.

On Sunday, June 27, temperatures rose an additional 4 degrees, breaking the prior day's record. Then on Monday, June 28, the temperature at Portland International Airport registered 116 degrees, nearly 40 points above normal, with a 24-hour average of 96 degrees.

Warm overnight temperatures over consecutive days — when homes and apartments without air conditioning do not cool down at night — are a primary driver of heat-related illness, hospital visits and deaths during extreme heat.

In many instances, indoor temperatures didn't peak until as late as 11 p.m, and remained high all night long. According to the National Weather Service, this aspect of the event acted as a “force multiplier” to the extreme daytime temperatures.



Over the course of the heat wave and in the days that followed, Multnomah County Medical Examiners identified at least 54 people who were confirmed to have succumbed from the heat, with additional cases pending investigation and toxicology.

Prior to June 2021, Multnomah County had recorded only two hyperthermia deaths since 2010 — one each in 2016 and 2018. In fact, more people died from the June 2021 heat wave in Multnomah County than died from heat in the entire state of Oregon in the past 20 years.

Multnomah County Environmental Health, in partnership with Washington and Clackamas counties, began tracking these deaths in a [Regional Climate and Health Monitoring Report](#) published in 2019. An update to that report is planned for later this year.



Taking Action

The Multnomah County Medical Examiner's Office will be actively working to finalize the heat death data as toxicology and housing information become available.

Multnomah County Emergency Management will also convene city, transportation and communication partners to identify short-term interventions in advance of further heat events this year, and to produce a more in-depth after action report to increase preparedness and resiliency.

To be clear, no amount of individual, community or County interventions will fully head off the dangers of a hotter and more unpredictable climate. But as we remember all those who died last month, we are committed to learning as much as we can to help our community prepare as best as it can for the future. And we will continue advocating for state and federal action to reduce carbon emissions.



Two families' stories

Lyle Crawford:

“It didn’t occur to him he was going to die”

Lyle Crawford died in the house where he was born and raised, where he knocked elbows with his big sister at the dinner table, where he and an older brother cared for their aging parents, where he strung guitars in the garage, and where he tended his father’s fruit trees.

Crawford, 62 and single, died alone, as a box fan churned scorching air through his little yellow home.

“I’m sure it didn’t occur to him that he was going to die,” said his sister, Donna Crawford, who lives in Richmond, Virginia. She was the only family he had, but it had been a month since they had spoken by phone.

“I hadn’t talked to him. I wish I had,” she said. “Why didn’t I call him before? I feel horrible. I’m just going to have to feel that for a while.”

Lyle attended Gresham High, where he loved his shop classes. Later, he became a welder. For much of his life he lived at home and cared for their mother, who had Alzheimer’s. His one international adventure was a trip to South Korea leading up to the 1988 Olympics, while he served in the Oregon National Guard. But he trekked all through the trails, mountains and rivers of Oregon.

He was musically gifted, playing the banjo, guitar and ukulele. He loved fishing, although he could rarely afford the license. He did not use a computer and never bought a smartphone.

He used to insist, “I’m not a Luddite; I just don’t see the point.”

In 2001, the year their mother died, he launched a business making stringed instruments, building ukuleles. He was skilled, but too generous to earn a living. “If someone couldn’t afford to pay full price, he would simply drop the price,” Donna said.

Lyle wasn’t very social, keeping close to home, his sister said. But he was friendly, and enjoyed his casual interactions with people around town. He filled Donna in on the latest in his barber’s life, for example. But he had few close friends in his later years, and the pandemic isolated him further. Even Donna, who usually visited during summer breaks from her academic job, hadn’t come to visit in two years.

Donna called her brother late Saturday, June 26, the day temperatures reached 108 in Gresham. “I hope you’re doing OK in the heat,” she said into the home answering machine. She said she would be away the next day, but would check back in on Monday, June 28.

“I wasn’t totally surprised he didn’t call me back. Then on Monday I didn’t hear from him and I started to get a not-great feeling,” she said. She tried again the next day. “I’m worried about you,” she said into the machine.

She called a former girlfriend Lyle had stayed friendly with, to check on him. The house was shuttered and locked. That’s when Donna called Gresham police.

“He used to nag my father, ‘Couldn’t we get an air conditioner?’” Donna recalled. In his later years, Lyle couldn’t afford to buy one of his own. And he would have been too proud — and stubborn — to ask for help.

Donna wonders if she could have made a difference, even from 3,000 miles away.

If she had called before the heat started, she says she could have told him to go to the library, and read a book. But he probably would have answered, “That’s interesting,” she says, the thing he said whenever he disregarded someone’s suggestion.

“He would have answered the door if someone knocked, and that might have done it. An actual human being,” she said. “But how can there be enough human beings to go to the door of every older person?”



Jollene “Jolly” Brown:

“She didn’t want to be an inconvenience”

Jollene “Jolly” Brown lived alone, but she was just an eight-minute drive from her son Shane. Twice a week, he would come by her apartment, picking up groceries, helping with chores and taking his 67-year-old mother to her medical appointments.

Once a week, they would sit down for a meal and watch “The Masked Singer” on TV. Jolly Brown would talk during the show, and it drove Shane crazy. Now, he says, “all I want to do is hear her talking again.”

Shane last saw his mother Sunday night, June 27. He brought a swamp cooler over to help his mother, who had been in poor health and needed something to replace her broken air conditioner. The cooler didn’t work either. Jolly asked Shane to see if he could fix her air conditioner and bring it back.

The next morning, June 28, when Shane called to check in, she didn't pick up. He drove over and found her in her recliner, feet down as if she meant to stand up. Inside it was already 99.5 degrees.

"Maybe we need to get you a real air conditioner," Shane remembered telling his mother the night before. She shrugged it off. She said she would get through this heat wave, and then they could talk. After all, air conditioners were expensive and too heavy for an older person to carry.

"I'll be fine" she would say. "I'll get through it."

By then it was too late.

Shane said Jolly might have survived if she had taken up a friend's offer to stay with them during the worst of the heat. But she never wanted to impose, didn't want to be a bother. And she might have survived if she had a working air conditioner, her son said.

He said that's something to consider for those vulnerable older people without the means to buy a unit of their own.

"Especially people who aren't able to get to cooling spaces, or, like my mom, who didn't want to put people out, didn't want to be an inconvenience," he said.

Shane said Jolly kept to herself, struggling with her health and living on a meager income in her tiny studio apartment. But he said she never focused on her troubles.

"She had this optimism that things would work out."

She loved things like rose gold and opals, and Dolly Parton and Patsy Cline. Her favorite birds were puffins. And she loved "American Idol." She had one overarching goal — to be a good mom.

"She was just genuinely one of the best people I have ever known," he said. "She had that capacity of love, and when I needed her, she was always there."



Acknowledgements

Multnomah County Medical Examiner's Office

Multnomah County Health Officer

Multnomah County Public Health

Multnomah County Communications Office

National Weather Service

Special thanks to the families' of Lyle Crawford and Jollene "Jolly" Brown for sharing their stories.

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