Multnomah County

WINTER 2023-24

SEASONAL HEALTH HAZARDS BRIEF

December 2024

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Acknowledgements

Dedication
Seventeen community members died this past winter due to weather and storm-related causes. We continue to feel their absences today, and hope the information presented here will support progress towards a safer community.

Land
This brief was developed and written on the ancestral lands of the Multnomah, Kathlamet, Clackamas, Chinook, Tualatin Kalapuya, and Molalla.

Multnomah County Health Department
Environmental Health Services
Community Epidemiology Services

Oregon Health Authority
Environmental Public Health
Acute and Communicable Disease

National Weather Service
Portland Weather Forecast Office

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Additional analysis and methods documentation is available upon request.

Introduction

Winter 2023-24

While winters are expected to become warmer in Oregon, extreme cold events are likely to continue in the future. Winter 2023-2024 exemplified this forecast. The winter began and ended with warmer than normal temperatures from October through December and March through April. Yet, in January, there was a 12-day severe winter storm. The storm disrupted daily life in the Portland Metro region. It brought sub-zero wind chills, freezing rain, and ice accumulation. As a result, it led to record numbers of illness and injury.

What is in this Brief

This brief uses data from multiple sources to provide a snapshot of illness and injury that occurred in Multnomah County from October 1st, 2023 through April 30th, 2024. This brief includes health care data on the illnesses and injuries outlined below.

Type of Injury/Illness	Data Source
Cold-Related Illness	ESSENCE, OHA Hospitalizations Data, Vital Records
Carbon Monoxide Poisonings	ESSENCE, Vital Records
Falls due to Ice and Snow	ESSENCE, OHA Hospitalization Data
Non-Infectious Respiratory Illness	ESSENCE

Details on data sources and methodologies are included at the end of the report.

Cold weather hazards remain an environmental health threat in Multnomah County. Compared to the past five-year rate, the rate of most outcomes has increased. Weather conditions also make existing inequities worse, widening disparities between demographic groups. Ongoing systemic causes, exposures, and outcomes of concern from the season include:

HOUSELESSNESS x **COLD WEATHER + RAIN** x **COLD-RELATED ILLNESS.** Emergency room and urgent care visits, hospitalizations, and fatalities caused by cold-related illnesses remain elevated compared to 5-year average trends. The houseless community is disproportionately exposed and affected. They make up at least 41.5% of the 527 seasonal visits.

ALTERNATIVE HOME HEATING x **COLD WEATHER** x **UNINTENTIONAL CARBON MONOXIDE POISONING.** Unintentional carbon monoxide poisoning led to a record number of emergency room and urgent care visits (n=42). Just over half occurred during the January severe winter storm. A majority of exposures occurred in homes. Records identified gas or kerosene stoves and heaters as the source of exposure in 58% (n=15) of visits.

ICY CONDITIONS x **FALLS.** There were a record number of emergency room and urgent care visits (n=982) and hospitalizations (n=132) related to fall injuries from winter conditions.

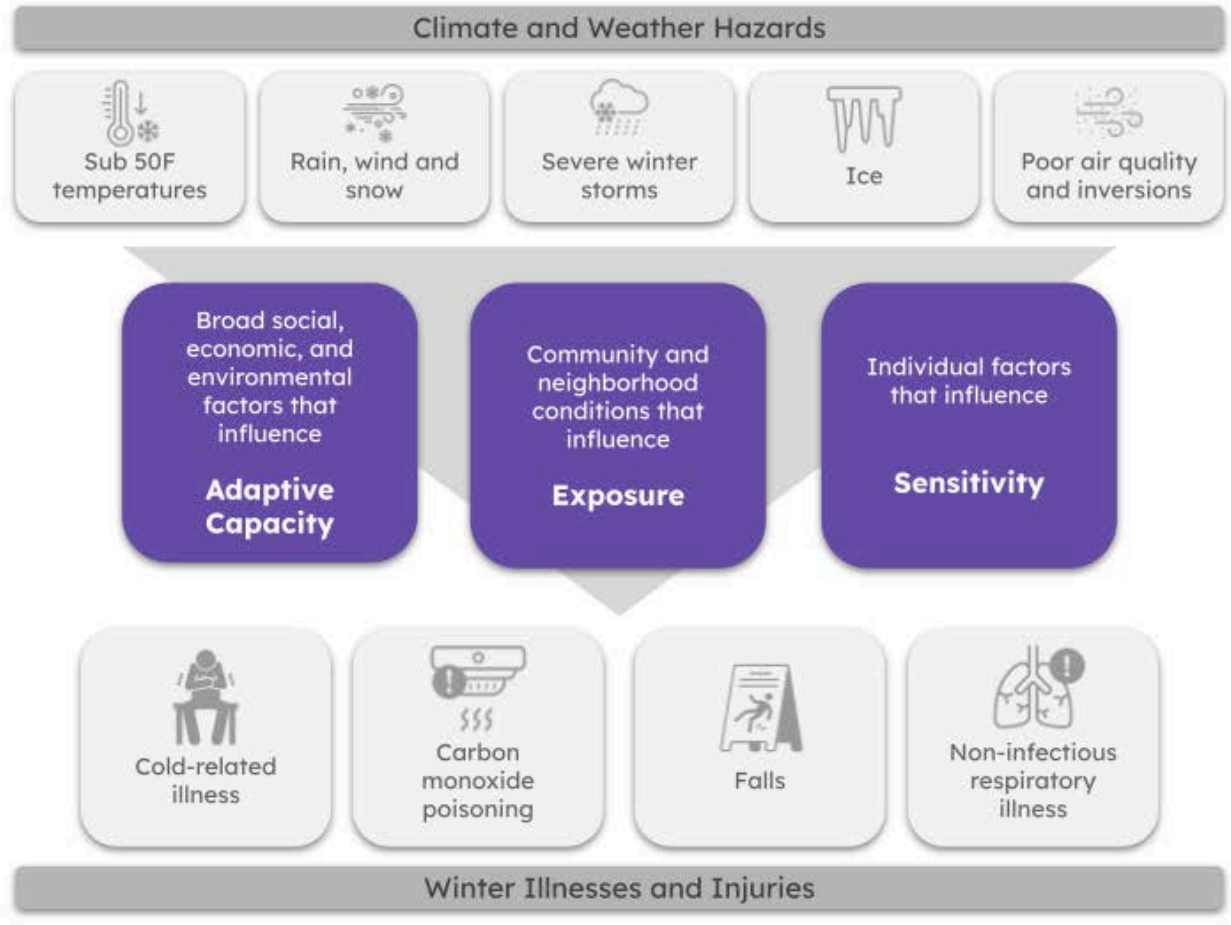
Winter Illness and Injury Pathways

Winter-related illnesses and injuries are influenced by more than the weather. There are factors that influence how community experiences environmental hazards:

Adaptive Capacity
Adaptive capacity is the ability of a group or individual to react to a climate hazard and avoid harm. It is reflected in community conditions, access to resources, and ability to mobilize action. Systemic factors like past and present policies and investments shape the adaptive capacity groups have. These systems have historically centered the needs of able-bodied euro-americans and marginalized people of color, people living with low-incomes, and people living with disabilities.

Exposure
These are factors that influence how long, how often, and to how many winter hazards someone may experience. Housing conditions, housing status, and travel needs all shape exposure.

Sensitivity
Individual factors can affect how sensitive someone is to a winter hazard, meaning their bodies' ability to respond to the environmental stressor. While these reflect the health status of one person, these factors are also influenced by past exposures and systemic factors.

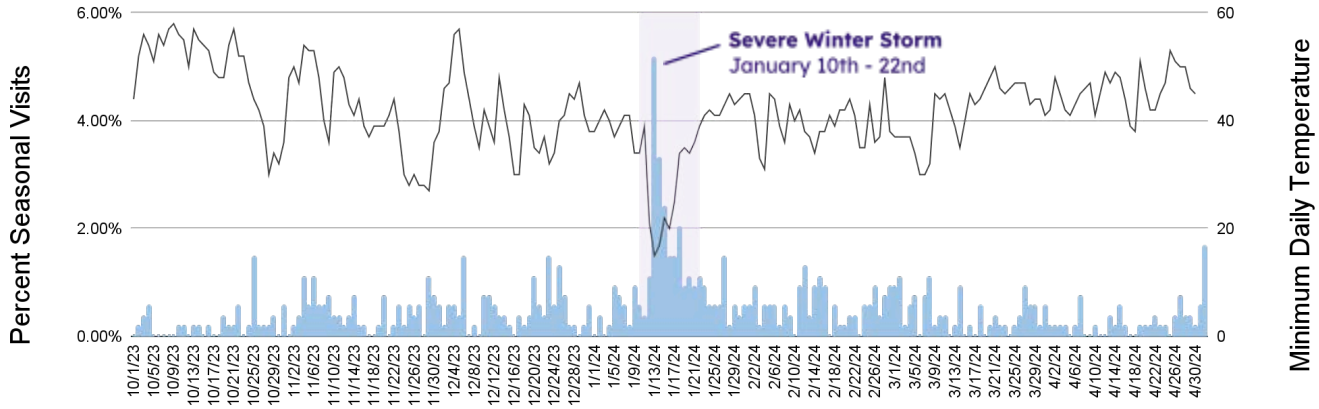


Emergency rooms and urgent care centers saw spikes in winter-related injuries and illnesses during the severe winter storm in January:

Cold-Related Illness // Season Total Visit Count = 527 Visits

15% lower than the 621 visits last year

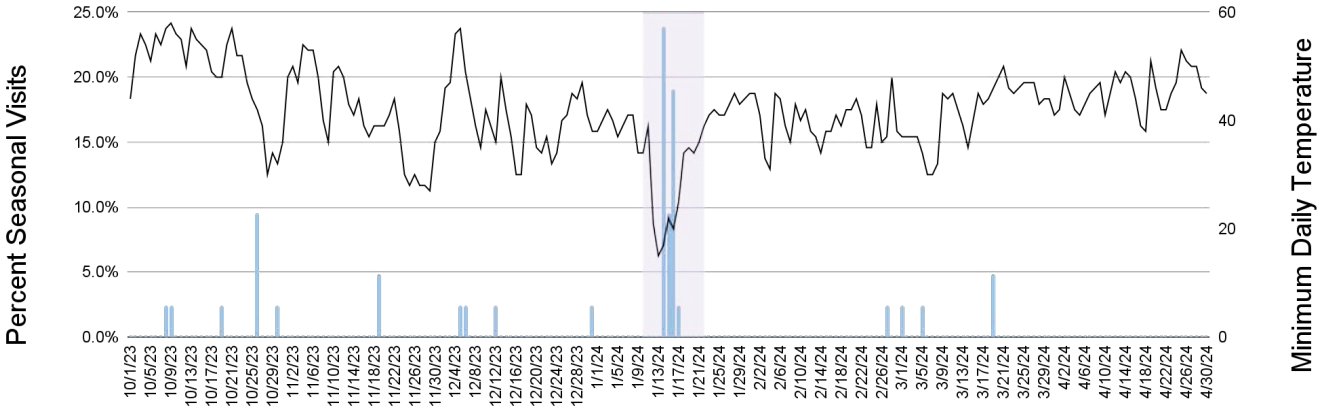
29% higher Than the 407 avg visits over the past five years



Carbon Monoxide Poisonings // Season Total Visit Count = 42 Visits

50% higher than the 28 visits last year

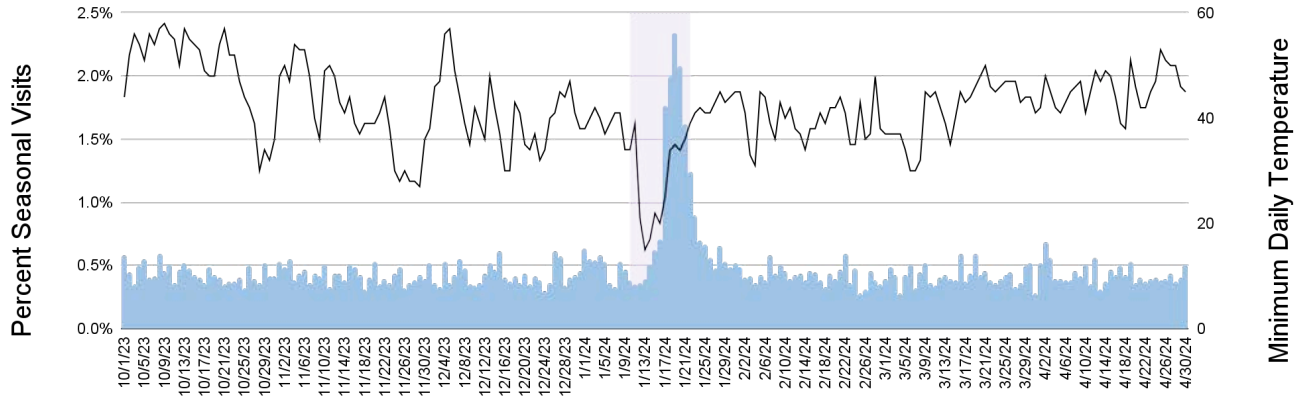
110% higher Than the 20 avg visits over the past five years



Fall-Related Injury // Season Total Visit Count = 9,838 Visits (982 specific to ice and snow)

28% higher than the 7657 visits last year

45% higher Than the 6768 avg visits over the past five years

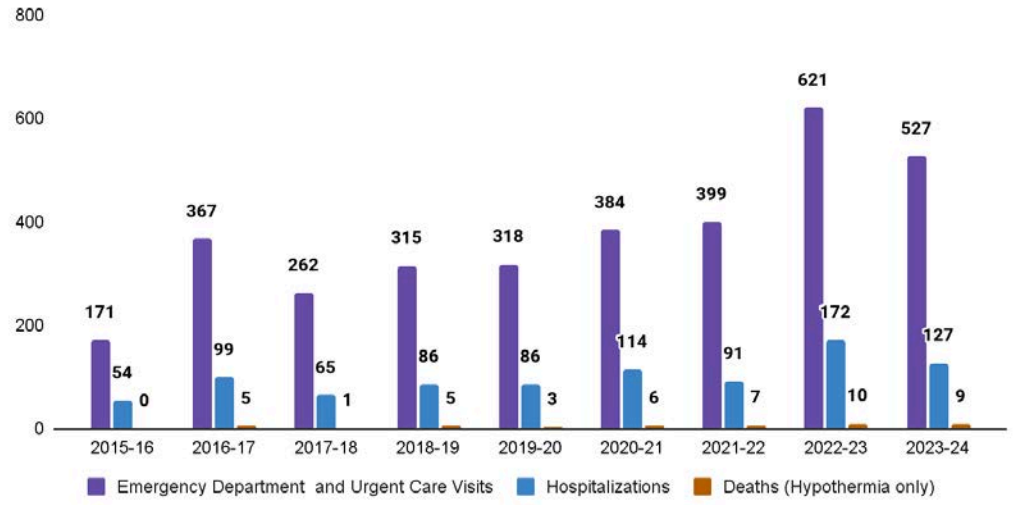


Cold-Related Illness

Cold-related illness (CRI) is a large category of health concerns related to cold exposure and wet conditions. It includes hypothermia, frostbite, and immersion syndrome (also known as trench foot). The severity of conditions depends on the degree of exposure. Yet it is important to note that some CRI can occur at relatively warm temperatures (up to 50F).

Greater Adaptive Capacity	Greater Exposure	Greater Sensitivity
• Access to shelter • Budget for energy cost	• People experiencing homelessness • People without home heating	• Older adults • Children and infants • People with chronic health conditions • People who have recently consumed alcohol or other substances

Cold-related illness and injuries decreased compared to last winter. Yet they remain elevated compared to the past five winters.



Emergency room and urgent care visits	• There were 527 cold-related illness visits (65 visits per 100k residents).
	• Groups with disproportionately high visit rates this season were:
	  ○ Black or African Americans (216.2 visits per 100k residents),
	  ○ American Indian or Alaskan Natives (83.5 visits per 100k residents)
	  ○ People who identified as a race not listed* (94.1 visits per 100k residents)
	  ○ Males (99.4 visits per 100k), and
	  ○ People ages 44-64 (99.8 visits per 100k residents)
	• Average daily visits increased above the seasonal average (2.5) on days that dropped below 38F or when it rained more than .25".
	• Homelessness (41%), wet clothing (15%), substance use (10%), and alcohol use (7%) were identified factors in triage notes.
	• People visiting the ER/UC multiple times contributed to a total of 97 visits (18% of the season total).

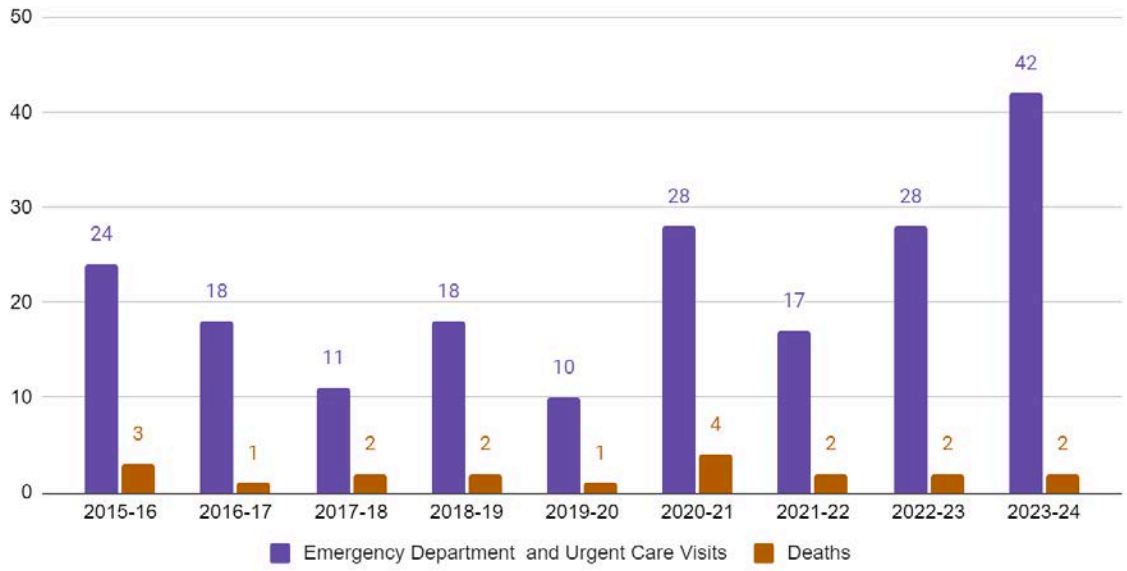
Fatalities	• 55% of fatalities occurred during the January severe winter storm.

Unintentional Carbon Monoxide Poisoning

Carbon monoxide (CO) is a colorless, odorless gas that can cause illness or death when inhaled. CO impacts the body's ability to use oxygen. Common sources of exposure include vehicle exhaust, generators, and heating and cooking equipment like gas or wood stoves. CO poisoning is more common in the winter months when people need heat and they tend to close windows (Moberg et al., 2023). It is also more common during and after winter storms. This is when power outages occur and households look to alternative sources of power (Stevens & Ashley, 2022).

Greater Adaptive Capacity	Greater Exposure	Greater Sensitivity
• Access to safe heating alternatives • Access to CO detectors	• Men • People who live in older housing with appliances that use gas or wood	• People who have consumed alcohol • Children and infants • People with chronic health conditions • People who are pregnant

There were a record number of carbon monoxide poisoning-related visits during winter '23-'24. The number of fatalities was similar to past years.



Among emergency room and urgent care visits:

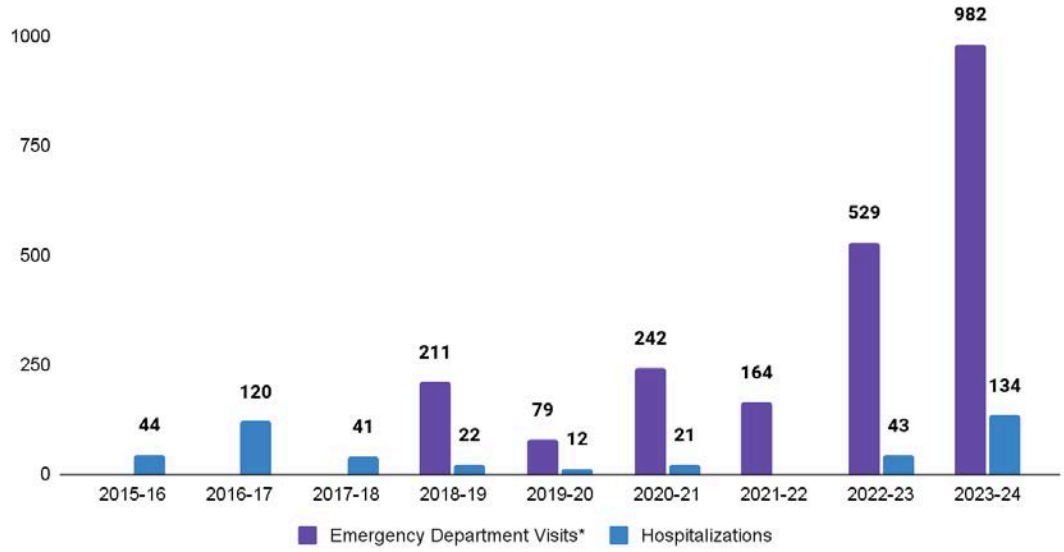
- There were 42 CO poisoning visits (5 visits per 100k residents).
- Slightly over half of the visits (55%, n= 23) that occurred coincided with the severe winter storm experienced from Saturday 1/13 through Thursday 1/18.
- Groups with disproportionately high visit rates this season were:
    - Hispanic people** (20.1 visits per 100k residents),
    - individuals who identified as a race other than those listed (43.1 visits per 100k residents), and
    - youth between the ages of 5 and 17 (8.4 visits per 100k residents).
- Residential exposure were involved in at least 47% (n = 20) of visits. Gas or kerosene stoves and heaters were identified as a source of exposure in at least 35% (n=15) of visits.

Falls due to Ice and Snow

It is common for older adults to visit emergency rooms or urgent care for fall-related injuries. These are falls that occur indoors or outdoors and happen throughout the year. However, severe winter weather with ice and snow increases the risk of slips and falls for the general population as well (Kakara et al., 2021). Falls due to ice and snow also result in more wrist and forearm fractures (Hajat, 2017).

Greater Adaptive Capacity	Greater Sensitivity	Greater Exposure
• Flexibility in travel needs • Resources for cleaning snow and de-icing	• Older adults • People with limited vision, balance, or muscle strength • Medication or substance use	• People experiencing homelessness • People working or traveling outdoors

There was a record number of falls related to ice and snow in winter 2023.



*The emergency data presented in the chart above is from OHA emergency department discharge data, a different source than ESSENCE. Data is only available from 2018 on.

Among emergency room and urgent care visits:

- The ice accumulation during the January severe winter storm drove sharp increases in fall-related injury. Emergency department and urgent care visits related to falls at large were elevated 3-4 times regular counts from Wednesday 1/17 through Monday 1/22. A record high daily visit count was set at 229 visits on Friday 1/19.
- The average daily fall-related visit rate for the whole season for all groups was 5.7 visits per 100k residents. Visit rates increased for all groups during the ice storm, but rates increased the most for:
    - People ages 18-64 (2.3 visits per 100k residents to 15.4 visits per 100k residents)
    - Males (4.8 visits per 100k residents to 24.3 visits per 100k residents)
    - Hispanic people** (3.9 visits per 100k residents to 17.1 visits per 100k residents)

Non-Infectious Respiratory Conditions

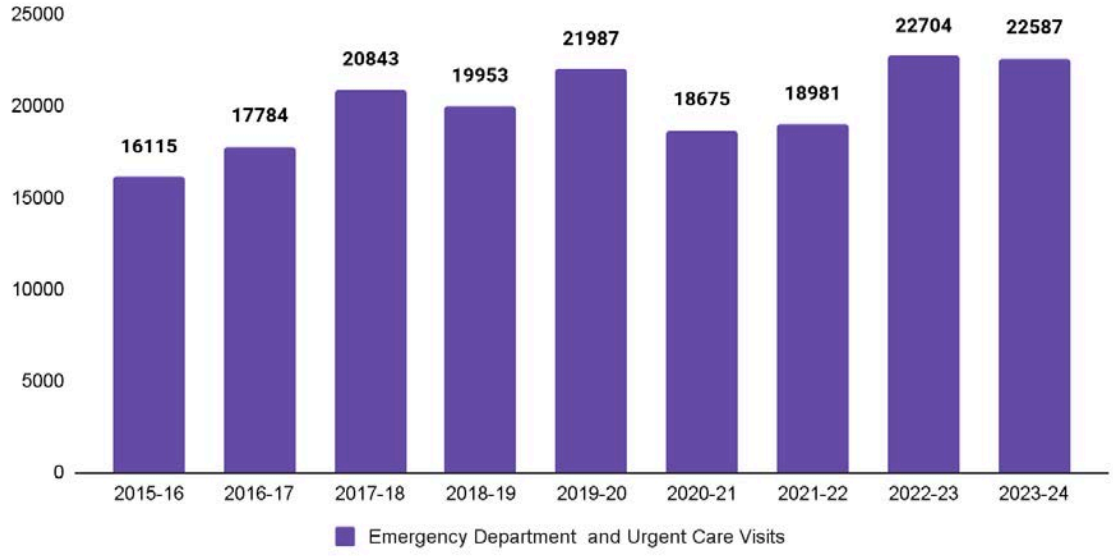
Community exposure to pollutants can increase during the winter. This is a time of year when:

- People tend to burn wood more often (Kotchenruther, 2016),
- People let their vehicles idle for longer periods to warm up (Wine et al., 2022), and
- Thermal inversions trap cold air and emissions near the ground.

Cold temperatures and dry conditions can also cause respiratory problems like shortness of breath, wheezing, and coughing. The combination of cold temperatures and air pollution can lead to constriction of the blood vessels in the lungs. This can worsen existing respiratory conditions like asthma or bronchitis.

Greater Adaptive Capacity	Greater Sensitivity	Greater Exposure
• Awareness of poor air quality conditions • Ability to restrict time outdoors • Access to air filtration devices	• People with chronic health conditions • Children and infants • Older adults • People who are pregnant	• People who work or exercise outside • People experiencing homelessness

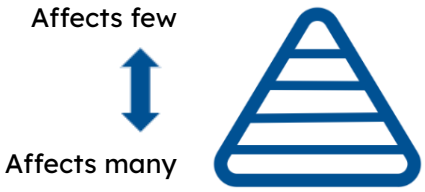
Non-infectious respiratory illnesses are common conditions. They make up the largest burden of disease of winter hazards in this assessment.



- There were 22,587 outdoor air quality-related respiratory visits (2,795 per 100K residents).
- Groups with disproportionately high visit rates this season were:
    - People over the age of 65,
    - Individuals who identified as a race other than those listed,
    - Blacks or African Americans, and
    - Native Hawaiian or Pacific Islanders.

Actions

Strategies to reduce exposure and improve adaptive capacity can improve community health. Public health interventions are commonly conceptualized within the health impact pyramid. The model organizes five categories of strategies along a continuum from those that have greater individual impact to those that have greater population impact (Frieden, 2010). Categories include:



- Educational interventions
- Ongoing interventions
- Long-lasting protective interventions
- Making the healthy option the default option
- Socioeconomic factors

The table below provides ideas for strategies to reduce winter illnesses and injuries. Not all health impact pyramid categories apply. Non-infectious respiratory conditions were at normal levels compared to last year, and are not highlighted in the table below.

Table 1. Strategies to improve winter-related injury and illnesses

Winter Injury and Illnesses (row to right) **Strategy level** (column below)	 **Cold-Related Illness**	 **Carbon Monoxide Poisoning**	 **Fall-Related Injury**
Educational interventions	Communication and awareness campaigns; transcreated messages co-created with community partners	Communication and awareness campaigns; transcreated messages co-created with community partners	Communication and awareness campaigns; transcreated messages co-created with community partners
Ongoing interventions	Resource distribution to keep people warm and dry	CO detector distribution	Evaluate and prioritize de-icing methods and locations
Long-lasting protective interventions	Reducing homelessness	Reduce prevalence of gas stoves and generators	
Making the healthy option the default option		Support community transition to clean energy and microgrids	Encouraging organizational policies to reduce travel in hazardous conditions
Socioeconomic Factors	Reducing energy burden and other housing costs		Developing financial supports for those who miss work due to hazardous travel conditions

References + Methods

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Wine, O., Osornio Vargas, A., Campbell, S., Hosseini, V., Koch, C., & Shahbakhti, M. (2022). Cold Climate Impact on Air-Pollution-Related Health Outcomes: A Scoping Review. International Journal of Environmental Research and Public Health, 19(3), 1473. https://doi.org/10.3390/ijerph19031473

**ESSENCE race categories include: American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, White, Other Race.*
***ESSENCE ethnicity categories include: Hispanic, Not Hispanic.*

Table A. Data sources, variables, and data limitations

National Weather Service		
Description	**Variables**	**Limitations**
The NWS provides weather and climate information to inform decision-making to protect community well-being.	• Temperature • Rain • Snow • Wind chill	• 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. Rates were calculated using ACS five-year estimates from 2018-2022.	• Cold-related illness visits • Carbon monoxide poisoning visits • All fall injury visits • Non-infectious respiratory illness visits	• 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 data use agreements • 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.	• Cold-related illness hospitalizations (T68, T33, T34, T69) • Fall injuries related to icy conditions (W00)	• 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 Emergency Discharge Records		
Description	**Variables**	**Limitations**
This data set is official and final emergency room data based on administrative claims and ICD-9/10 codes.	• Fall visits specific to ice and snow	• Only available since 2018 • Several month lag in reporting • 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.	• Hypothermia deaths (underlying X31 or contributing T68-T69) • Carbon monoxide deaths (contributing cause of T58 when underlying cause is X47, Y17, X00, or Y26)	• Numbers are considered provisional and subject to change • Limited to Multnomah County residents, excludes deaths of outside residents that occurred within Multnomah County