Spokane and Spokane Valley Community 2025 Report

Publication Information

This report is available on the Department of Ecology's website at
https://apps.ecology.wa.gov/publications/summarypages/2502037.html

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Executive Summary

The Spokane and Spokane Valley Community Report provides community information, demographic data, greenhouse gas emissions data, and information about criteria air pollutant (CAPs) levels and their health impacts. This document provides information about air quality and health impacts to those who live, work, and play in the Spokane and Spokane Valley community.

For more information about the background and methodology of this document, please visit the *2025 Report: Overburdened Communities Highly Impacted by Air Pollution* (2025 Report).

Community Overview

The Spokane and Spokane Valley community was identified as overburdened and highly impacted by air pollution because it met the statewide screening criteria based on the Washington Environmental Health Disparities map[1] ranking and, the EJScreen demographic index.[2] It also[3], and experiences elevated levels of short-term and long-term exposure to fine particulate matter ($PM_{2.5}$), as well as cumulative criteria air pollution driven by levels of $PM_{2.5}$, ozone (O_3), and nitrogen dioxide (NO_2). Community identification is described in more detail in the [Overburdened Communities Highly Impacted by Air Pollution StoryMap](#).

Land Area: 42 sq. mi

Population: 150,692

County: Spokane

Municipal Government: Spokane, Spokane Valley, Millwood City Councils

Ecology Region: Eastern

Local Clean Air Authority: Spokane Regional Clean Air Agency

Local Health Jurisdiction: Spokane Regional Health District

Primary languages spoken: English, Spanish

Primary pollutant of concern: Short-term $PM_{2.5}$, long-term $PM_{2.5}$, cumulative criteria air pollution

Geographic characteristics

The Spokane and Spokane Valley community is located in the greater Spokane area, which is the second most populous metro area in Washington. The community boundaries encompass the Spokane River and Interstate 90, both of which run east-west through the Spokane metropolitan region. Neighboring Spokane Valley, the ninth-largest city in Washington, and the smaller suburb of Millwood are also included in the identified community. The western part of the community includes Spokane's downtown area, which is zoned for high-density housing, and Northeast Spokane, which is predominantly single-family housing

[1] Washington Environmental Health Disparities map https://doh.wa.gov/data-and-statistical-reports/washington-tracking-network-wtn/washington-environmental-health-disparities-map
[2] EJScreen demographic index https://www.epa.gov/ejscreen
[3] EJScreen demographic index https://www.epa.gov/ejscreen

with some industrial areas to the north and east. Industrial areas are primarily adjacent to railway lines into Spokane Valley. The eastern part of the community includes most of Spokane Valley north of Sprague Avenue and has some single-family residential and mixed-use areas.

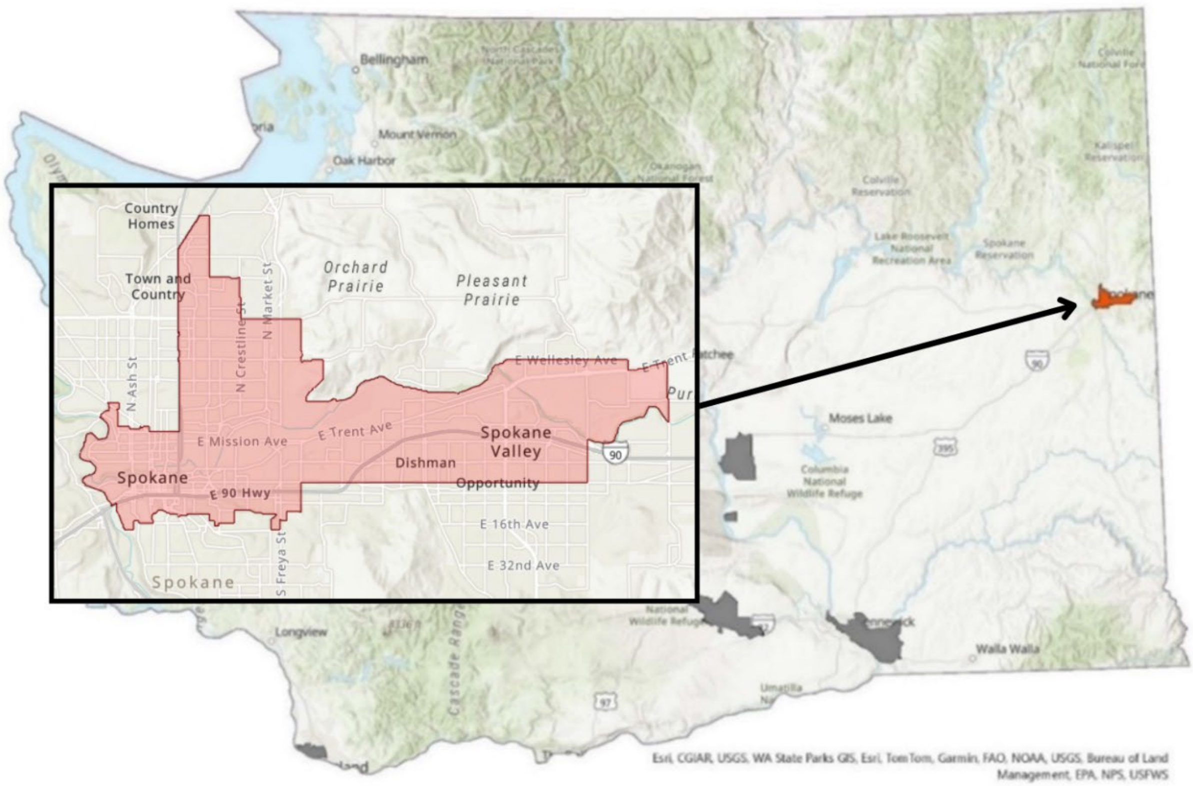

Figure 1. Map of the 16 overburdened communities highly impacted by air pollution in Washington State (gray), with Spokane and Spokane Valley highlighted (red).

Socioeconomic characteristics

Of all the sixteen communities identified as overburdened and highly impacted by air pollution, Spokane and Spokane Valley has the largest share of residents who are white, more than 7 in 10, and the largest share of residents who self-identify as American Indian/Alaska Native.[4,5] The community has many sensitive receptor locations, including schools, childcare facilities, hospitals, and prisons.

[4] American Community Survey Data https://www.census.gov/programs-surveys/acs/data.html
[5] WA Office of Financial Management, Estimates of April 1 population by age, sex, race and Hispanic origin https://ofm.wa.gov/data-research/population-demographics/forecasts-projections/age-sex-race-and-hispanic-origin/information/

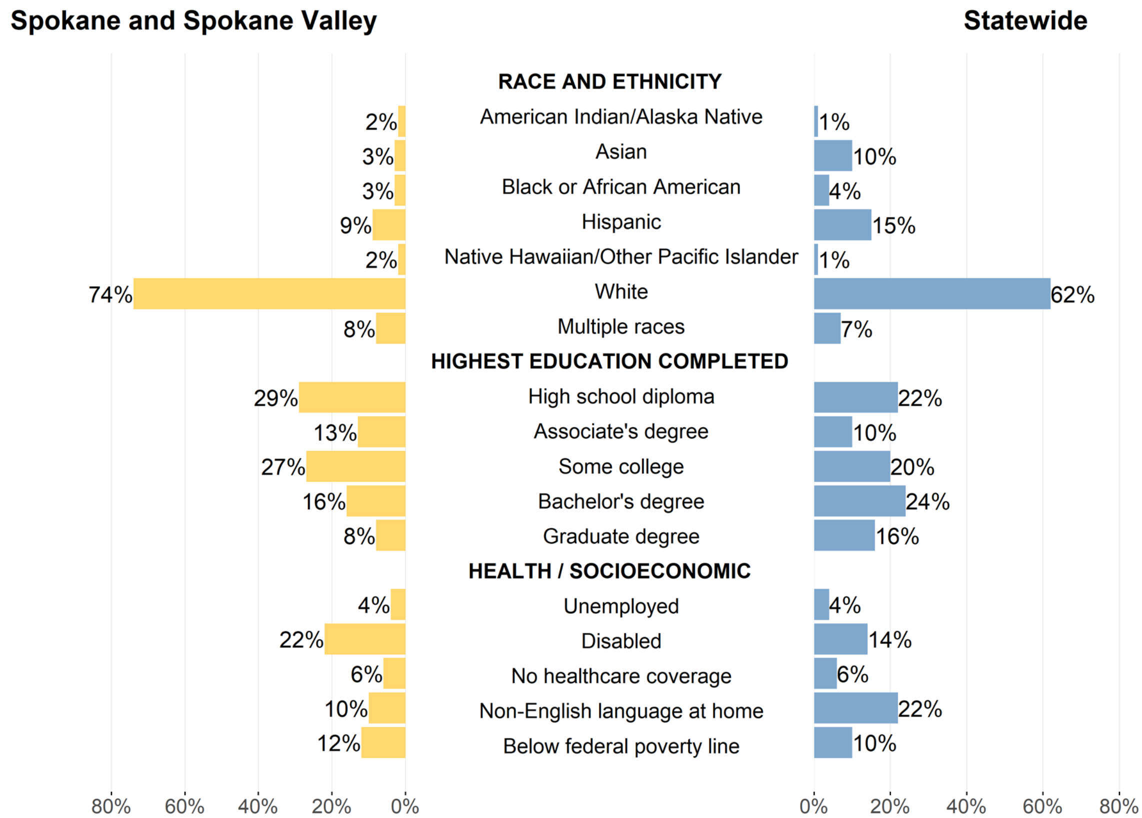

Figure 2. Sociodemographic characteristics of the Spokane and Spokane Valley community compared to statewide percentages, based on Washington State's 2024 estimated population of 8,035,700.[6]

Health characteristics

According to 2022 CDC health survey data,[7] Spokane and Spokane Valley has elevated prevalences of chronic health conditions among individuals ages 18 years and older relative to the statewide population, including asthma (13.6% vs. 11.4%), cardiovascular disease (6.3% vs. 5.7%), COPD (7.5% vs. 5.7%), diabetes (10.6% vs. 9.6%), and stroke (3.6% vs. 3.1%). These prevalences are not necessarily attributable to air pollution. Community and statewide prevalences that have overlapping 95% confidence intervals, as shown in Figure 3, might not be statistically significant.

[6] WA Office of Financial Management, Nov 2024 Data Tables, Population by age and sex https://ofm.wa.gov/wp-content/uploads/sites/default/files/public/dataresearch/pop/stfc/stfc_2024.xlsx

[7] U.S. Centers for Disease Control and Prevention, PLACES Data Portal https://www.cdc.gov/places/tools/data-portal.html

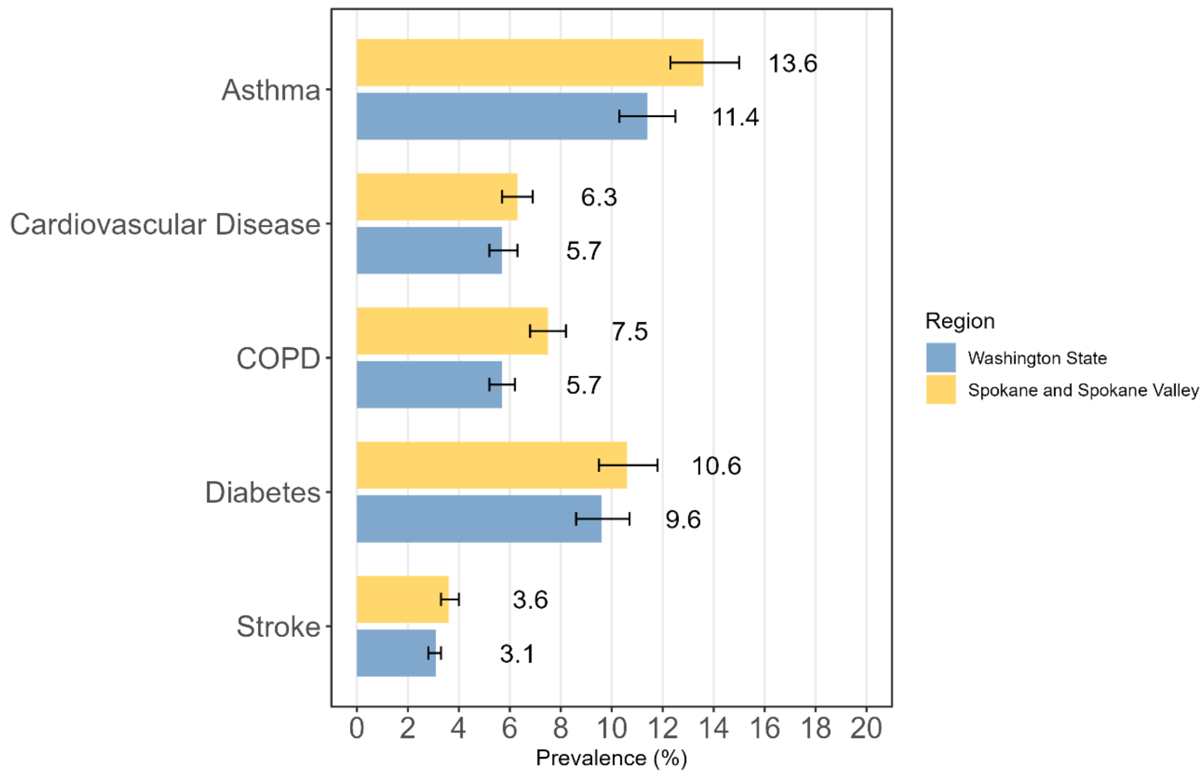

Figure 3. Prevalence of chronic health conditions among people ages 18 years and older in Spokane and Spokane Valley census tracts compared with Washington State.

Data come from CDC PLACES, 2024 release, which uses 2022 survey data.[7] Yellow and blue bars indicate the estimated prevalence of each condition. Black lines indicate the 95% confidence interval.

Air Monitoring

In the greater Spokane area, there are fifteen $PM_{2.5}$, one O_3, and two PM_{10} air monitors. The Spokane and Spokane Valley community have a robust air monitoring network (Table 1; Figure 4) with twelve $PM_{2.5}$ within and just outside the community boundary (within 500 meters), and two PM_{10} monitors. Three $PM_{2.5}$ monitors (Spokane-Monroe St, Spokane-E Thurston, and Spokane-Greenbluff) were excluded because they fall outside the middle-scale[8] assessment. The Spokane-Greenbluff ozone (O_3) monitor is outside the community boundary; however,

[8] Network Design Criteria for Ambient Air Quality Monitoring, 40 C.F.R. Part 58, Appendix D (2025) https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-58/appendix-Appendix%20D%20to%20Part%2058

because O_3 is a regional pollutant, Ecology considers the concentrations measured there to be representative of O_3 within the Spokane and Spokane Valley community.

Since early 2024, Ecology and the Spokane Regional Clean Air Agency (SRCAA) have installed ten $PM_{2.5}$ sensors (SensWA) and one non-regulatory monitor using Climate Commitment Act (CCA) funds. There was also a PM_{10} sensor installed with CCA funds at the Spokane Valley-E Buckeye Ave monitoring site, but it is not currently being used for public reporting due to performance issues with PM_{10} sensors.

The Spokane-Augusta St monitoring site is no longer part of the Washington Monitoring Network but regulatory instruments are still operated. Because the monitoring data have not undergone review by Ecology's Primary Quality Assurance Organization, it cannot formally be used for comparison to the NAAQS.

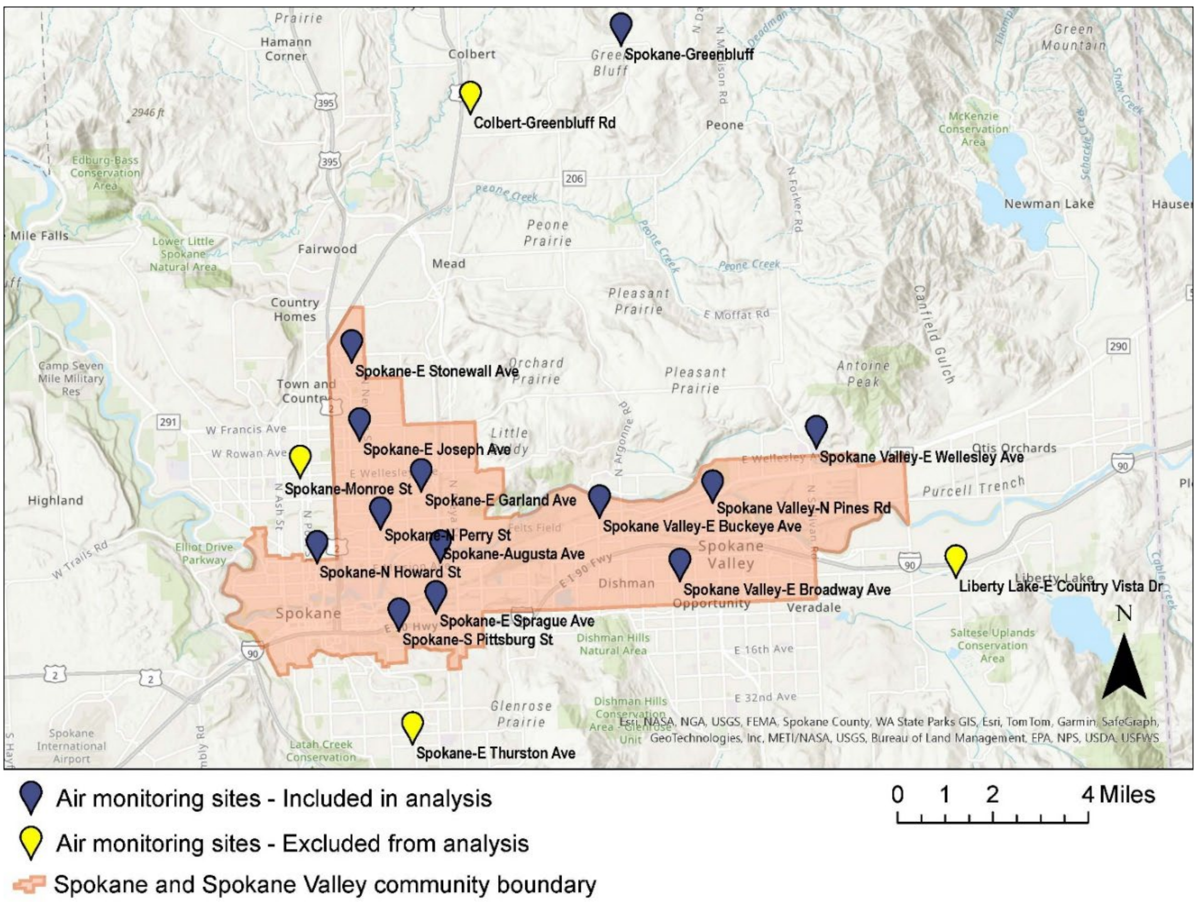

Figure 4. Map of Spokane and Spokane Valley air monitoring sites.

Table 1. *Spokane and Spokane Valley criteria air pollutant monitors*.

Monitoring Site	Type	Site Owner	Pollutants Monitored
Spokane-Augusta Ave	Non-Regulatory[2]	SRCAA	$PM_{2.5}$, PM_{10}
Spokane-E Broadway Ave	Regulatory	SRCAA	$PM_{2.5}$, PM_{10}
Spokane-E Joseph Ave	SensWA[1]	SRCAA	$PM_{2.5}$
Spokane-E Garland Ave	SensWA[1]	SRCAA	$PM_{2.5}$
Spokane-E Sprague Ave	Non-Regulatory[1]	SRCAA	$PM_{2.5}$
Spokane-E Stonewall Ave	SensWA[1]	SRCAA	$PM_{2.5}$
Spokane-N Howard St	SensWA[1]	SRCAA	$PM_{2.5}$
Spokane-S Pittsburg St	SensWA[1]	SRCAA	$PM_{2.5}$
Spokane-N Perry St	SensWA[1]	SRCAA	$PM_{2.5}$
Spokane Valley-Buckeye Ave	SensWA[1]	SRCAA	$PM_{2.5}$
Spokane Valley-E Wellesley Ave	SensWA[1]	SRCAA	$PM_{2.5}$
Spokane Valley-N Pines Road	SensWA[1]	SRCAA	$PM_{2.5}$
Spokane-Greenbluff	Regulatory	SRCAA	O_3

[1] Installed as part of the Climate Commitment Act implementation

[2]The Spokane-Augusta St monitoring site has regulatory instruments but are operated outside of Ecology's Primary Quality Assurance Organization, so they cannot be used for comparison to the NAAQS.

Criteria Air Pollution

This report summarizes criteria air pollutant (CAPs) concentrations in the Spokane and Spokane Valley community from 2022 through 2024. CAPs concentrations for $PM_{2.5}$, PM_{10}, and O_3 are calculated using data from the Washington Ambient Air Monitoring Network and reported according to the Environmental Protection Agency's (EPA) methodology. More information can be found in the background and methods sections of the 2025 Report.

In addition to analyzing monitored criteria air pollution concentrations, we calculated the number of days per year residents of the Spokane and Spokane Valley community experienced unhealthy air quality, according to EPA's Air Quality Index (AQI). The AQI is a six-category color-coded scale used to communicate daily air quality levels to the public. Days when an AQI above 100 are considered "unhealthy for sensitive groups" or worse.

Between 2022-2024, the Spokane and Spokane Valley community experienced an annual average of 3.7 days with unhealthy air (Figure 5). In comparison, between 2020-2022, the annual average was 7.3 days. Most unhealthy air quality days were primarily caused by wildfire smoke.

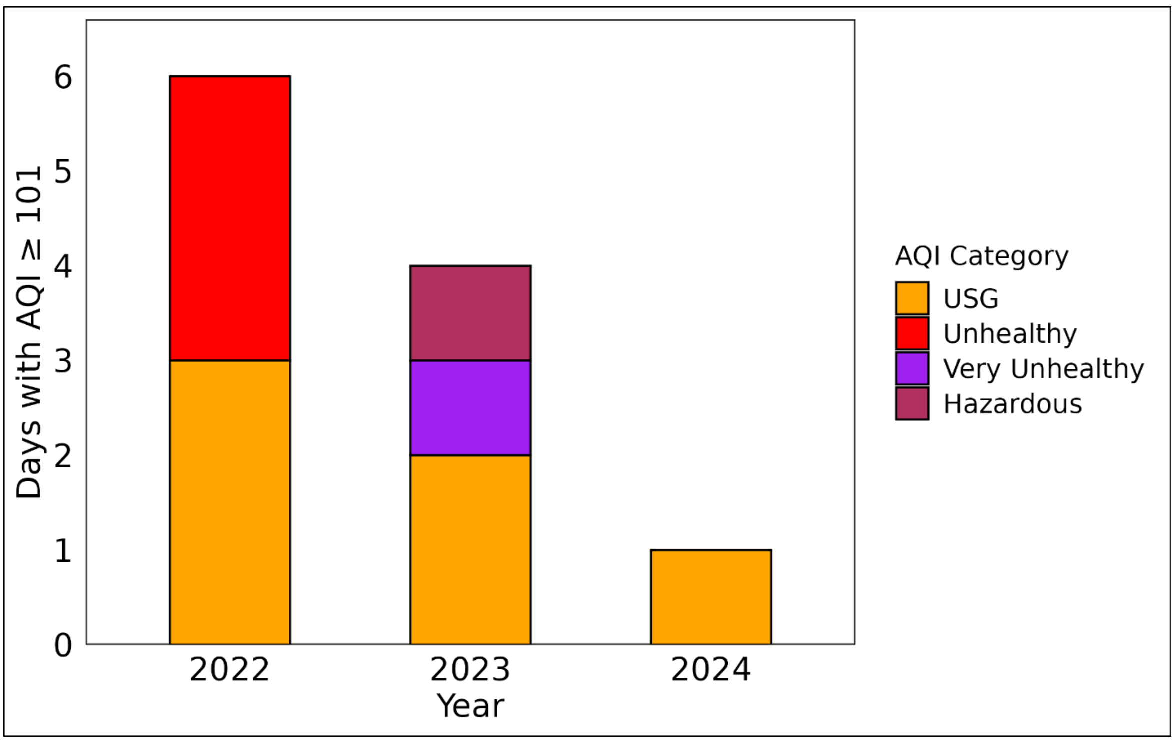

Figure 5. Number of days 2022-2024 with unhealthy air quality. Includes days impacted by wildfire smoke.

Table 2 includes 24-hour $PM_{2.5}$ (98th percentile) summary statistics. $PM_{2.5}$ concentrations are measured over 24-hour periods in micrograms per cubic meter (µg/m³). The EPA establishes national ambient air quality standards (NAAQS), which define the maximum allowable levels (thresholds) for each criteria pollutant. The NAAQS threshold for 24-hour $PM_{2.5}$ (98th percentile) is 35 µg/m³. The design value for 24-hour $PM_{2.5}$ (98th percentile) is a statistic that describes the air quality of a location relative to the NAAQS over a three-year period and is used to describe short-term fine particulate exposure.

Of the twelve $PM_{2.5}$ monitoring sites in Table 2, the Spokane-E Broadway Ave and Spokane-Augusta Ave sites recorded data from 2022 to 2024. Ten $PM_{2.5}$ monitors only include partial-year data from 2024. All of the 24-hour $PM_{2.5}$ (98th percentile) concentrations remained below the NAAQS threshold. The values in brackets in Table 2 exclude wildfire-impacted days when the 24-hour average $PM_{2.5}$ concentrations exceeded 35.4 µg/m³.

Table 2. ***24-hour $PM_{2.5}$ (98th percentile) summary statistics (2024) and 2024 design values (2022–2024).*** *Units are in µg/m³. Brackets [ ] exclude wildfire days when 24-hour average $PM_{2.5}$ concentration exceeded 35.4 µg/m³. 24-hour $PM_{2.5}$ (98th percentile) NAAQS is 35 µg/m³.*

Monitoring Site	2022 24-hour 98th Percentile	2023 24-hour 98th Percentile	2024 24-hour 98th Percentile	2024 Design Value
Spokane-Augusta Ave	33.3 [28.1]	*24.3 [23.1]*	21.2 [21.2]	*26 [24]*
Spokane-E Broadway Ave	29.7 [25.4]	24.7 [21.0]	21.4 [21.4]	25 [23]
Spokane-E Garland Ave	DNC	DNC	*22.7 [22.7]*	*
Spokane-E Joseph Ave	DNC	DNC	*24.4 [24.4]*	*
Spokane-E Sprague Ave	DNC	DNC	*23.6 [23.6]*	*
Spokane-E Stonewall Ave	DNC	DNC	*19.7 [19.7]*	*

Spokane-N Howard St	DNC	DNC	*28.8* *[28.8]*	*
Spokane-N Perry St	DNC	DNC	*26.5* *[26.5]*	*
Spokane-S Pittsburg St	DNC	DNC	*18.1* *[18.1]*	*
Spokane Valley-Buckeye Ave	DNC	DNC	*20.6* *[20.6]*	*
Spokane Valley-E Wellesley Ave	DNC	DNC	*18.3* *[18.3]*	*
Spokane Valley-N Pines Rd	DNC	DNC	*22.4* *[22.4]*	*

Italics indicate incomplete annual data, DNC = data not collected, NAAQS = national ambient air quality standards, PM = particulate matter, µg/m3 = micrograms per cubic meter, * = incomplete data for 3-year design value.

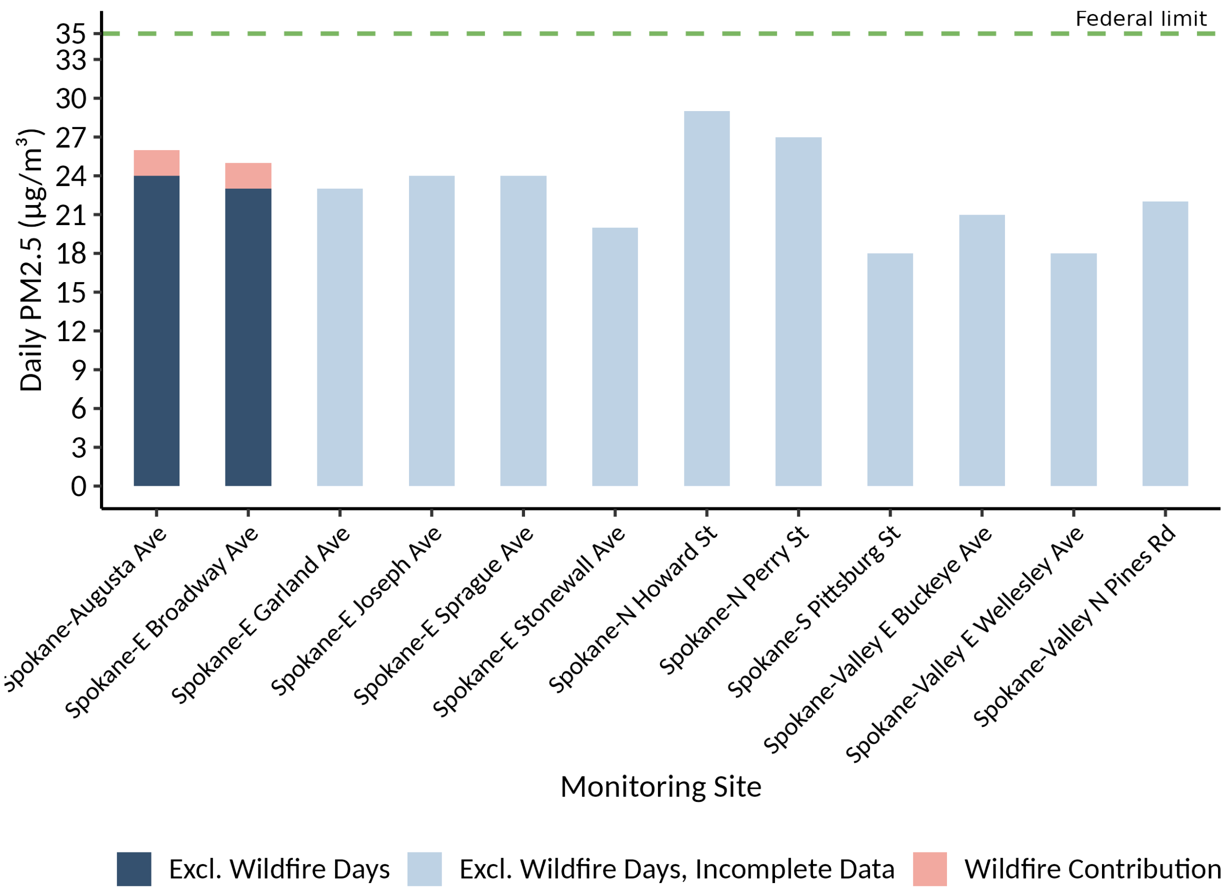

Figure 6. ***24-hour $PM_{2.5}$ (98^{th} percentile) summary statistics, 2022-2024.*** *Annual summary statistics calculated with and without days elevated from wildfire smoke. Dark blue bar includes three complete years of data, 2022-2024; light blue bars include average of available data from 2024; dashed line is the federal limit (NAAQS) for 24-hr $PM_{2.5}$.*

Table 3 includes annual mean $PM_{2.5}$ concentrations between 2022 to 2024 and 2024 design values. The annual $PM_{2.5}$ design value is a three-year average of annual mean $PM_{2.5}$ concentrations used to describe long-term exposure. The 2024 design value at the Spokane-E Broadway Ave and Spokane-Augusta Ave monitoring sites were below the NAAQS threshold of 9.0 µg/m³.

Table 3. ***Annual mean $PM_{2.5}$ concentrations and 2024 design values, 2022–2024****. Units are in µg/m³. Brackets [ ] exclude wildfire days when the average $PM_{2.5}$ concentration exceeded 15.0 µg/m³. Annual $PM_{2.5}$ NAAQS is 9.0 µg/m³.*

Monitoring Site	2022	2023	2024	2024 Design Value
Spokane-Augusta Ave	8.94 [7.52]	*8.64 [7.10]*	6.88 [6.46]	*8.2 [7.0]*
Spokane-E Broadway Ave	7.73 [6.36]	7.72 [6.290	5.81 [5.46]	7.1 [6.1]
Spokane-E Garland Ave	DNC	DNC	*6.09 [5.56]*	*
Spokane-E Joseph Ave	DNC	DNC	*5.98 [5.49]*	*
Spokane-E Sprague Ave	DNC	DNC	*5.21 [4.84]*	*
Spokane-E Stonewall Ave	DNC	DNC	*5.04 [4.68]*	*
Spokane-N Howard St	DNC	DNC	*6.92 [6.38]*	*
Spokane-N Perry St	DNC	DNC	*8.32 [7.30]*	*
Spokane-S Pittsburg St	DNC	DNC	*5.44 [5.09]*	*
Spokane-Valley E Buckeye Ave	DNC	DNC	*5.34 [4.94]*	*
Spokane-Valley E Wellesley Ave	DNC	DNC	*4.14 [3.86]*	*
Spokane-Valley N Pines Rd	DNC	DNC	*5.49 [5.06]*	*

Italics indicate incomplete annual data, DNC = data not collected, NAAQS = national ambient air quality standards, PM = particulate matter, µg/m³ = micrograms per cubic meter, * = incomplete data for 3-year design value.

For PM_{10}, 24-hour concentrations should not exceed 150 µg/m^3 more than once per year on average over a three-year period. The O_3 design values are a three-year average of the annual 4th-highest daily maximum 8-hour concentration at a monitor site. From 2022-2024, both annual PM_{10} and O_3 concentrations (Table 4) remained below the NAAQS thresholds. In 2023, there were two days that exceeded the PM_{10} standard due to wildfire smoke at the Spokane-E Broadway Ave monitor.

Table 4. ***Annual number of exceedances (PM_{10}); 4th highest daily maximum 8-hour average (O_3); and 2024 design values, 2022-2024*****.**

Monitoring Site	Pollutant	2022	2023	2024	2024 Design Value	NAAQS Level	Form
Spokane Valley-E Augusta Ave	PM_{10}	0	*2*	0	*0.7*	1 (µg/m^3)	# of annual exceedances >150 µg/m^3, averaged over 3 years
Spokane Valley-Broadway Ave	PM_{10}	0	2	0	0.7	1 (µg/m^3)	# annual exceedances >150 µg/m^3, averaged over 3 years
Spokane-Greenbluff	O_3	0.066	0.062	0.061	0.063	0.070 (ppm)	Annual 4th highest daily maximum 8-hour concentration, averaged over 3 years

Italics indicate incomplete annual data, DNC = data not collected, µg/m^3 = micrograms per cubic meter, ppm = parts per million

Health Impacts of Criteria Air Pollution

We estimated the number and rate of deaths and morbidities associated with $PM_{2.5}$ and O_3 concentrations by age range and using health effect estimates from peer-reviewed studies (Appendix B, Table 2 in the 2025 Report). All estimates are rounded to the nearest whole number. We present ranges of deaths or morbidities where multiple studies assessed that health outcome.

$PM_{2.5}$

We estimated 72 deaths by any cause (56 deaths per 100,000 population, Table B1) related to yearly $PM_{2.5}$ exposure. Among older adults, which is a smaller portion of the population, we estimated 45 total deaths (171 deaths per 100,000 population) each year associated with annual $PM_{2.5}$ exposure (Table B2).

Among different racial and ethnic groups (Figure 7), we estimated most $PM_{2.5}$ related deaths by any cause per year to be among non-Hispanic White people (57 deaths among 18–84-year-olds). However, when accounting for the ages of people in each racial and ethnic group[9], the annual age-adjusted mortality rate was highest among Hispanic people (96 deaths per 100,000 population) and non-Hispanic Black people (76 deaths per 100,000 population).

Figure 7 is based on the study by Pope et al. (2019),[10] where AIAN refers to American Indian and Alaska Native; NH to non-Hispanic; and NHOPI to Native Hawaiian and Other Pacific Islander. The bars indicate the 95% confidence interval (CI) for each rate.

[9] Age-adjusted mortality rates represent the mortality rate if the age distribution in that race category matched the age distribution of the total Washington State population. This allows for better comparability given that different race groups can have different age distributions and the risk of death is higher in older age groups. We see higher age-adjusted rates for race categories other than the non-Hispanic White group given that these groups are generally younger in overburdened communities compared to the statewide age distribution; when we standardize these groups to the state age distribution (which has a higher proportion of older people) the estimated mortality rates are higher. More information about our age-adjustment methods can be found in the 2025 Report.

[10] Pope, C.A., 3rd, Lefler, J.S., Ezzati, M., Higbee, J.D., Marshall, J.D., Kim, S.Y., Bechle, M., Gilliat, K.S., Vernon, S.E., Robinson, A.L., & Burnett, R.T. (2019). Mortality Risk and Fine Particulate Air Pollution in a Large, Representative Cohort of U.S. Adults. Environmental Health Perspectives, 127(7), 77007. https://doi.org/10.1289/EHP4438

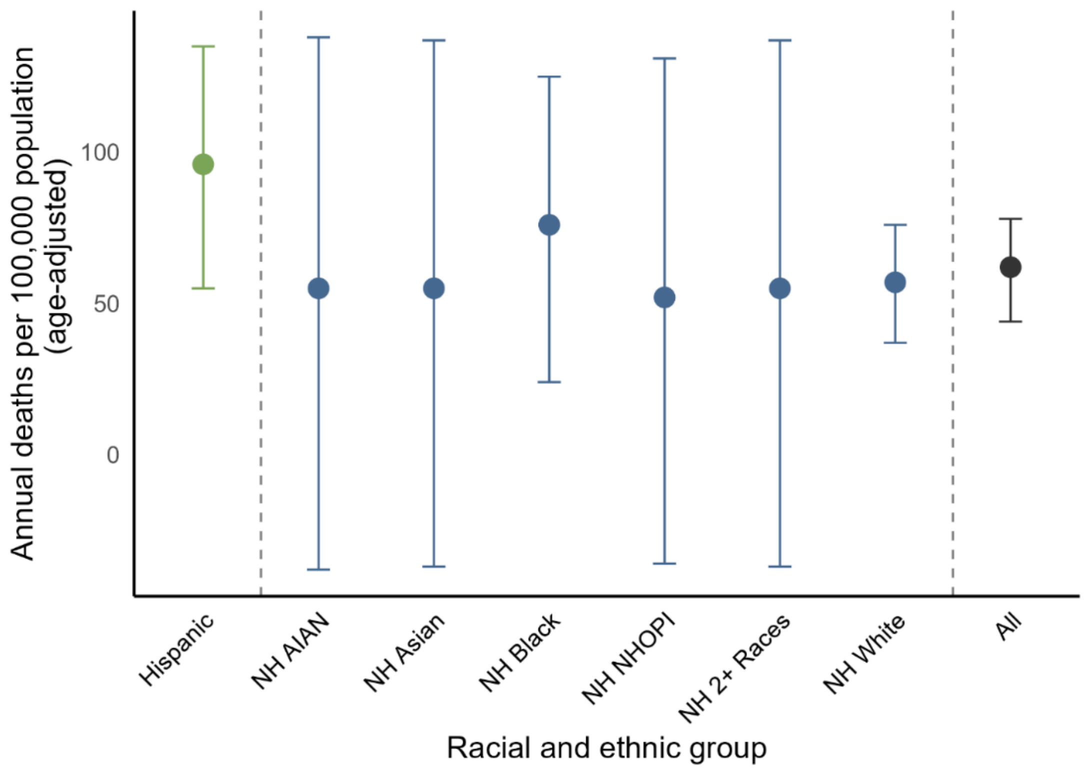

Figure 7. Age-adjusted annual death rates by any cause associated with annual $PM_{2.5}$ exposure among ages 18-84 by racial and ethnic group in Spokane and Spokane Valley.

When assessing specific causes of death related to yearly $PM_{2.5}$ concentrations (Table B3), we estimated 20 deaths due to cardiovascular disease (15 deaths per 100,000 population), 18 to 29 deaths due to ischemic heart disease (18 to 30 deaths per 100,000 population), and 4 to 6 deaths per year due to lung cancer (4 to 6 deaths per 100,000 population) among adults.

Regarding non-fatal health outcomes (Table B3), we estimated that 28 hospital admissions (21 visits per 100,000 population) for non-fatal acute myocardial infarction were associated with yearly $PM_{2.5}$ concentrations among adults. Additionally, 11 lung cancer diagnoses per year were associated with annual $PM_{2.5}$ exposure among all people (11 diagnoses per 100,000 population).

Daily $PM_{2.5}$ exposure (Table B4) was associated with 1 death by any cause (1 per 100,000 population) among all people and 4 deaths by any cause (15 per 100,000 population) among older adults ages 65 to 99. For non-fatal conditions, daily $PM_{2.5}$ was associated with 5 to 6 acute non-fatal myocardial infarction admissions (4 to 4 per 100,000 population) among all adults, 25 respiratory admissions (97 per 100,000 population) among older adults ages 65 to 99, 14 asthma hospital admissions (10 per 100,000 population) among people ages 0 to 64 years. Additionally, 60 to 112 asthma-related emergency department (ED) visits (36 to 67 per 100,000 population) among all people and 43 asthma-related ED visits (124 per 100,000 population) among youths ages 0 to 17 years were associated with daily $PM_{2.5}$ exposure.

Ozone

We estimated that O_3 exposure during the warm season (Table B5) was associated with 20 seasonal deaths by any cause (79 deaths per 100,000 population) among older adults ages 65 to 99. Daily O_3 exposure was associated with 6 deaths by any cause (4 per 100,000 population), 201 asthma-related ED visits (120 per 100,000 population) among all people, and 75 respiratory hospital admissions (288 per 100,000 population) among older adults ages 65–99.

Greenhouse Gas Emissions

Greenhouse gas emissions data for the Spokane and Spokane Valley overburdened community highly impacted by air pollution include: 1) Emissions from greenhouse gas reporting entities per RCW 70A.65[11] and WAC 173-441,[12] -446; [13]and 2) Mobile source emissions.[14]

We did not collect information or model greenhouse gas emissions from other sources at this time. The greenhouse gas information provided in this report aligns with the Climate Commitment Act's requirements. For further information on methods and statewide results, refer to the 2025 Report.

Facilities

Washington State requires certain businesses that emit more than 10,000 metric tons of carbon dioxide equivalents (MT CO_2e) to report to the Washington Greenhouse Gas Reporting Program.[15] Businesses that emit over 25,000 MT CO_2e are also subject to the Cap-and-Invest Program (covered sources). Each reporting facility is required to follow a compliance plan.

In the Spokane and Spokane Valley community, five facilities (Figure 8; Table 5) within and near the community boundary reported their emissions in 2022 and 2023. The total reported emissions from these facilities was 443,941 MT CO_2e in 2022 and 432,774 MT CO_2e in 2023, a 2.5% year-to-year decrease. Two facilities reported biogenic carbon (biogenic CO_2) [16] emissions,

[11] Greenhouse Gas Emissions – Cap-and-Invest Program https://app.leg.wa.gov/RCW/default.aspx?cite=70A.65
[12] Reporting of Emissions of Greenhouse Gases https://app.leg.wa.gov/WAC/default.aspx?cite=173-441
[13] Climate Commitment Act – Program Rule https://app.leg.wa.gov/WAC/default.aspx?cite=173-446
[14] Environmental Justice Review https://app.leg.wa.gov/RCW/default.aspx?cite=70A.65.020
[15] Mandatory greenhouse gas reports https://ecology.wa.gov/air-climate/reducing-greenhouse-gas-emissions/tracking-greenhouse-gases/mandatory-greenhouse-gas-reports
[16] Biogenic carbon refers to greenhouse gases released from the combustion, decomposition, or processing of materials derived from biological sources – such as wood, paper, biomass fuels, agriculture residues, food waste, or

which are expected to be partially recaptured as part of the natural carbon cycle. For reporting purposes, biogenic CO_2 is subtracted from total metric tons of CO_2e, even though it has the same atmospheric warming effect as non-biogenic CO_2. Excluding biogenic CO_2, total emissions were 294,696 MT CO_2e in 2022 and 285,491 MT CO_2e in 2023, a 3.1% year-to-year decrease. Since 2020, total reported greenhouse gas emissions from facilities within or near OBCs have decreased by 20.3%, and by 6.3% after subtracting biogenic CO_2 emissions.[17] Some year-to-year fluctuations in emissions from individual facilities are expected.

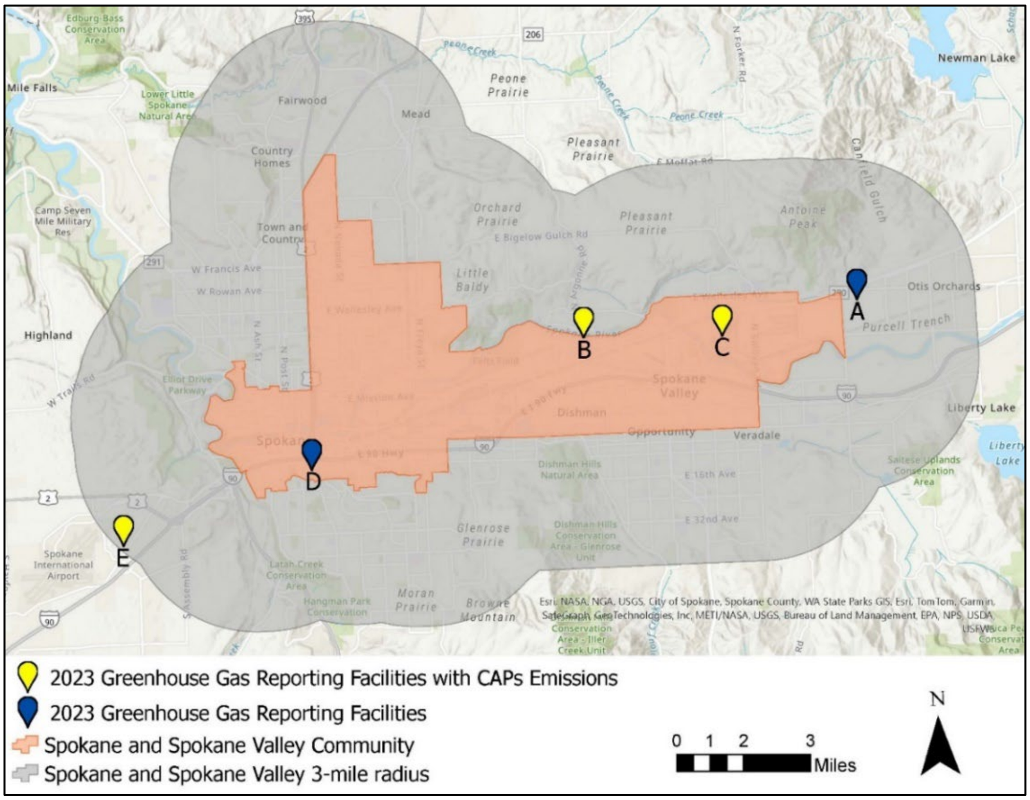

Figure 8. Reporting facilities as of 2023 that are in or near the Spokane and Spokane Valley community boundary. Facility letters correspond with Table 5.

The emissions in Table 5 are in MT CO_2e. Each greenhouse gas uses a conversion factor known as its Global Warming Potential (GWP), in this case AR4 GWP[18], to convert emissions into CO_2e.

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biogas. Under the Washington Greenhouse Gas Reporting Program, these emissions are reported separately from fossil-derived emissions because they result from carbon that circulates within the short-term natural carbon cycle rather than long-term carbon stores. Biogenic CO_2 acts the same way in the atmosphere as non-biogenic CO_2. Anthropogenic processes that include these emissions reduce a facility's environmental impact.

[17] Improving Air Quality in Overburdened Communities Highly Impacted by Air Pollution 2023 Report https://apps.ecology.wa.gov/publications/SummaryPages/2302115.html

[18] Reporting of Emissions of Greenhouse Gases https://app.leg.wa.gov/WAC/default.aspx?cite=173-441

A GWP describes how much heat a greenhouse gas traps in the atmosphere relative to carbon dioxide over a specific time horizon (20, 100, or 500 years). AR4 GWPs are published in the 2007 Intergovernmental Panel on Climate Change (IPCC).[19] The Greenhouse Gas Reporting Program uses AR4 GWPs mainly for regulatory stability, consistency, and alignment with other federal programs.

Table 5. Facility emissions in or nearby[20] the Spokane and Spokane Valley community. Biogenic CO_2 is in brackets [ ].

	Facility Name/City	Facility Sector	Within Community Boundary	CCA-Covered Facility[21]	Source of CAPs[22]	2022 Emissions ($MTCO_2e$)	2023 Emissions ($MTCO_2e$)
A	Boulder Park Generating Station – Spokane Valley	Power Plants	Nearby	Yes	No	39,549 [0]	31,456 [0]
B	Inland Empire Paper Company - Spokane	Pulp and Paper	Yes	No	Yes	37,290 [19,825]	32,249 [15,753]
C	Kaiser Aluminum Washington (Trentwood Works) – Spokane Valley	Metals	Yes	Yes	Yes	124,441 [0]	124,834 [0]
D	Providence Sacred Heart Medical Center - Spokane	Healthcare	Yes	No	No	12,778 [0]	12,106 [0]

[19] Intergovernmental Panel on Climate Change https://www.ipcc.ch/
[20] "Nearby" refers to facilities within a three-mile radius of the community boundary that were included in this analysis.
[21] Large emitters of greenhouse gases, specifically those emitting 25,000 or more MT CO_2e annually in Washington State that are part of the Cap-and-Invest program established by the Climate Commitment Act.
[22] Major sources of criteria air pollutants are designated in the Air Operating Permit program. A major source is any stationary source that has the actual or potential to emit ≥100 tons per year for any air pollutant. Many sources emit far below the threshold. More information can be found at https://ecology.wa.gov/regulations-permits/permits-certifications/air-quality-permits/air-operating-permit

E	Spokane Waste to Energy Facility - Spokane	Power Plants	Nearby	Beginning in 2027	Yes	229,883 [129,420]	232,129 [131,530]

Washington has local natural gas distribution and bulk electricity transmission companies that report emissions on a statewide basis, in which the emissions cannot be disaggregated.

Avista Corporation's natural gas pipeline distribution system and bulk electricity transmission runs through the community. They are excluded from this analysis because they report greenhouse gas emissions on a statewide basis for pipeline leaks and electrical transmission and distribution equipment. Avista's distribution system is not covered by the CCA for this reporting period, nor a major source of CAP emissions; however, Avista Generating Station in Kettle Falls is a major CAPs source. Statewide greenhouse gas emissions were 16,219 MT CO_2e in 2022 and 17,283 MT CO_2e in 2023.

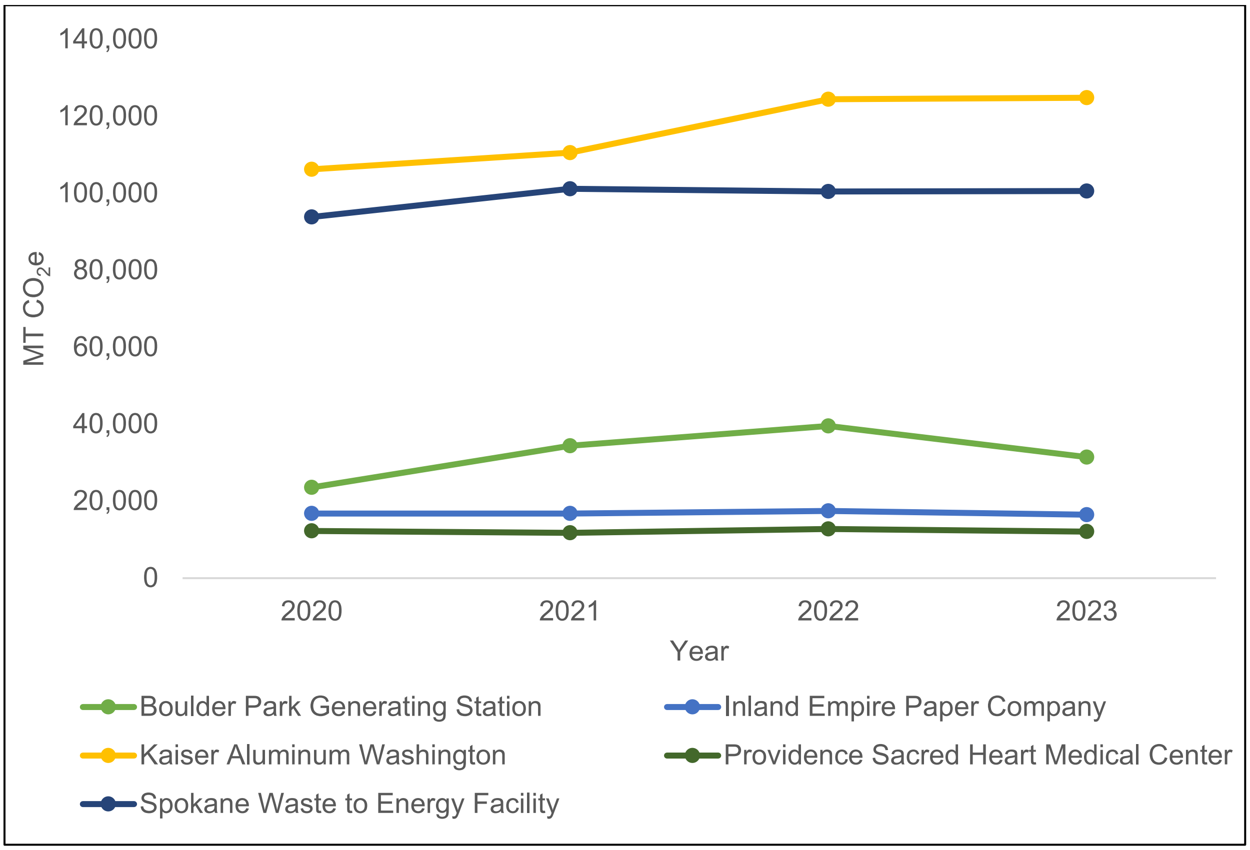

Figure 9. Greenhouse gas reporting facilities and their emissions from 2020-2023, excluding biogenic CO_2.

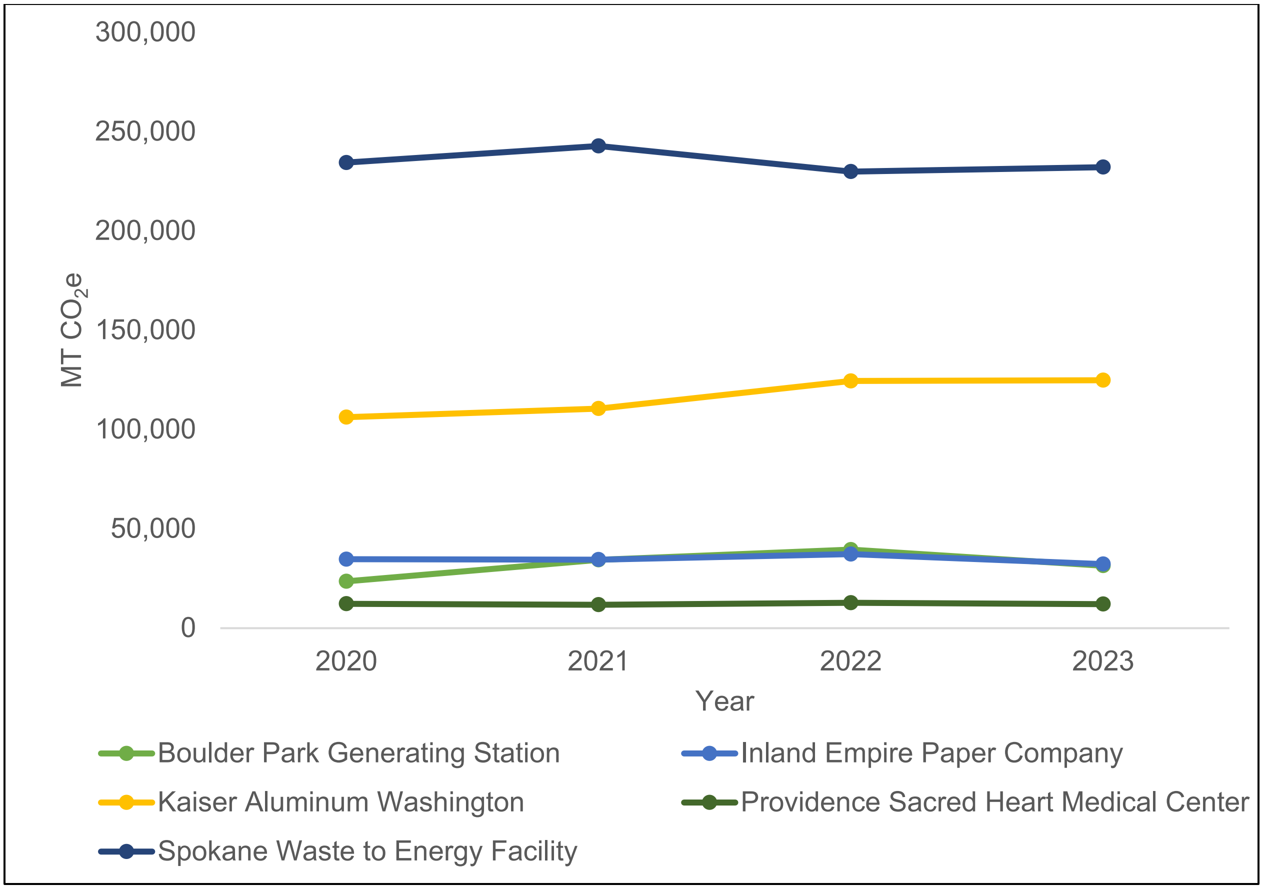

Figure 10. Greenhouse gas reporting facilities and their emissions from 2020-2023, including biogenic CO_2.

Mobile sources

In the Spokane and Spokane Valley community, greenhouse gas emissions from mobile sources increased by 21% from 2020 to 2021 (Table 6), but have decreased by 5.4% between 2019 to 2021.[23] Mobile sources consist of on-road and non-road emissions. The drop in emissions in 2020 was largely due to a decrease in vehicle traffic that was attributed to the COVID-19 pandemic.[24,25]

[23] Improving Air Quality in Overburdened Communities Highly Impacted by Air Pollution 2023 Report https://apps.ecology.wa.gov/publications/SummaryPages/2302115.html
[24] Washington State Greenhouse Gas Emissions Inventory: 1990-2021, Jan 2025 https://apps.ecology.wa.gov/publications/SummaryPages/2414077.html
[25] Reducing Greenhouse Gas Emissions from the Transportation Sector through Climate Planning, Dec 2024 https://www.epa.gov/system/files/documents/2024-12/420f24042.pdf

Similar to Table 5, the results in Table 6 use AR5 GWPs to convert greenhouse gas emissions into CO_2e. In 2013-2014, the IPCC published AR5 GWPs and AR6 GWPs in 2021-2022. The Washington Greenhouse Gas Emissions Inventory[26] uses AR5 GWPs in mobile source emission estimates, as the inventory models for greenhouse gas accounting are revised as science improves.

Table 6. Greenhouse gas emissions from mobile sources per capita from 2020-2021.

Population	2020 Emissions (MT CO_2e)	2020 Per Capita MT CO_2e	2021 Emissions (MT CO_2e)	2021 Per Capita MT CO_2e
147,407	557,022	3.8	673,831	4.6

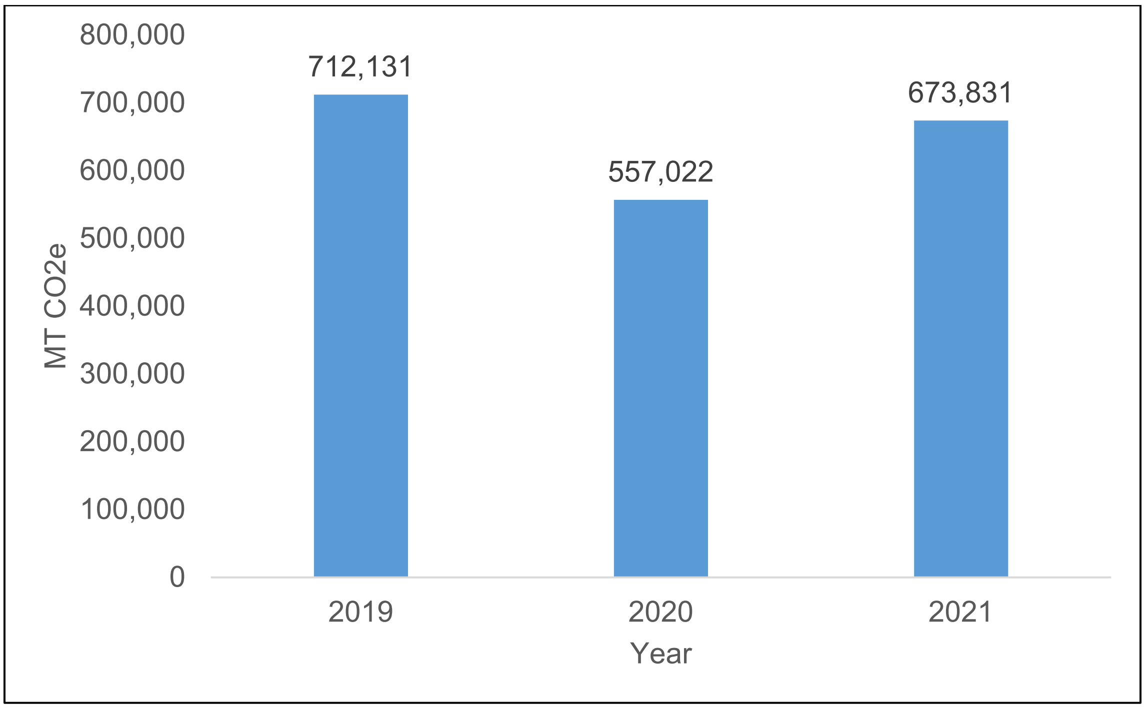

Figure 11. Annual greenhouse gas emissions from mobile sources in the Spokane and Spokane Valley community, 2019-2021.

[26] Washington State Greenhouse Gas Emissions Inventory: 1990-2021, Jan 2025 https://apps.ecology.wa.gov/publications/SummaryPages/2414077.html

Community Resources

These resources provide more information about air quality and health in the Spokane and Spokane Valley community:

- Wildfire Smoke | Gonzaga University[27]
- Spokane County Community Health Needs Assessment[28]
- Spokane County - County Health Insights[29]
- Spokane Trends - Spokane County Health Indicators[30]
- Priority Spokane--2023 Spokane County Needs Assessment summary[31]
- Providence Spokane Hospitals 2024 Community Health Needs Assessment[32]
- Research and Scholarship | Gonzaga University[33]
- Smoke Ready Spokane | Get Wildfire Smoke Ready[34]
- Washington climate action at work | Climate[35]
- Climate Change - Spokane Regional Clean Air Agency[36]
- Tracking Greenhouse Gas Emissions Matters - City of Spokane, Washington[37]
- Zero-emission and electric vehicles mapping tool | WSDOT[38]

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[27] https://www.gonzaga.edu/climate-institute/projects/climate-resilience-project/wildfire-smoke
[28] https://www.multicare.org/wp-content/uploads/2022/12/2022-Spokane-CHNA.pdf
[29] https://countyhealthinsights.org/county/spokane/
[30] https://www.spokanetrends.org/category.cfm?id=5
[31] https://priorityspokane.sfo3.cdn.digitaloceanspaces.com/uploads/2023/07/Top-4-Priorities-Guide.pdf
[32] https://www.providence.org/-/media/project/psjh/providence/socal/files/about/community-benefit/reports/2024-chna-providence-sacred-heart-medical-center.pdf?rev=384119296fe24af68a8aebdd3b568c77&hash=2A8167CB23D986169F67B937BF41AB6D
[33] https://www.gonzaga.edu/climate-institute/resources/research-and-scholarship
[34] https://www.smokereadyspokane.org/
[35] https://climate.wa.gov/washington-climate-action-work
[36] https://spokanecleanair.org/learning-center/climate-change/
[37] https://my.spokanecity.org/news/stories/2025/05/07/tracking-greenhouse-gas-emissions-matters/
[38] https://wsdot.wa.gov/business-wsdot/grants/zero-emission-vehicle-grants/zero-emission-and-electric-vehicles-mapping-tool

Appendix A. Criteria Air Pollution

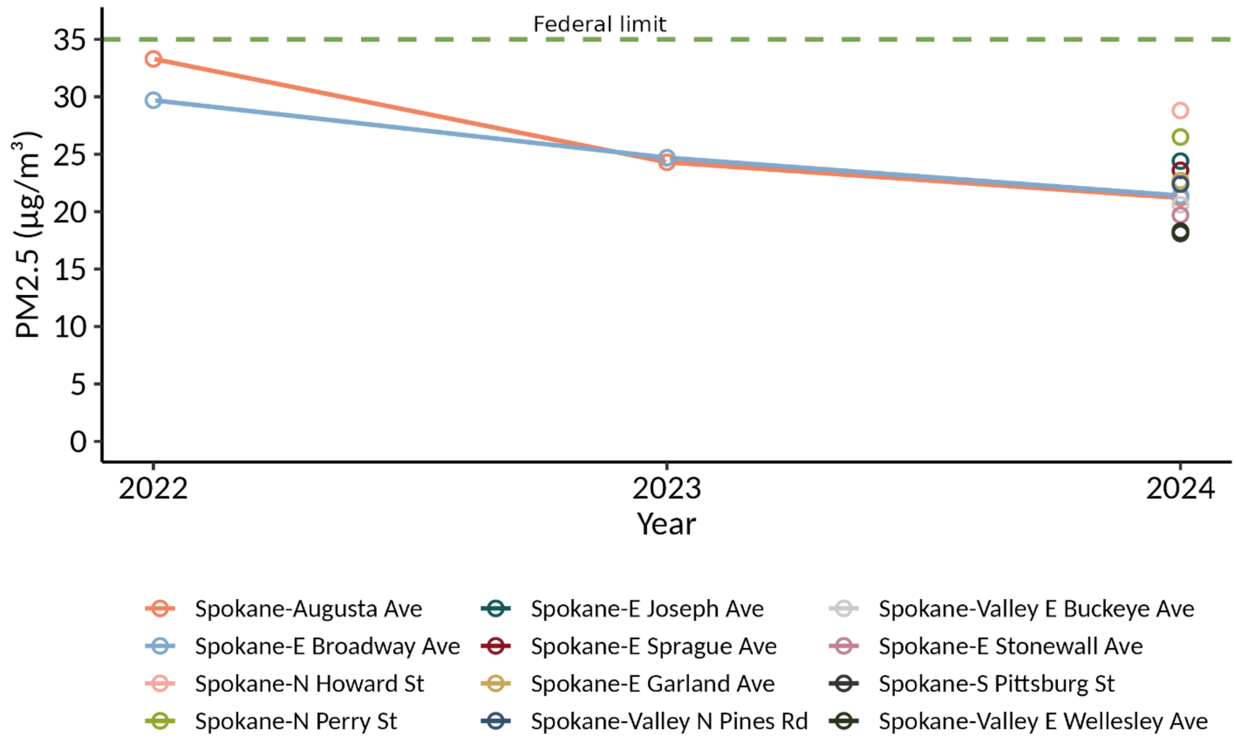

Figure A1. 24-hr $PM_{2.5}$ (98^{th} percentile) concentrations at Spokane and Spokane Valley monitoring sites. Days impacted by wildfire smoke are included. Dashed line is the 24-hr $PM_{2.5}$ NAAQS (35 µg/m³).

Appendix B. Supplemental Health Impacts Tables

Table B1. Estimated annual deaths by any cause related to yearly $PM_{2.5}$ exposure among 18–84-year-olds in Spokane and Spokane Valley by racial and ethnic group, 2022–2023 (based on effect estimates in study by Pope, et al., 2019[10]).

Racial and Ethnic Group	Population (18-84-year-olds)	Estimated Annual Deaths [95% CI]	Estimated annual deaths per 100,000 population [95% CI]	Estimated age-adjusted annual deaths per 100,000 population [95% CI]
All	129,724	72 [52 to 91]	56 [40 to 70]	62 [44 to 78]
Hispanic	9,082	4 [2 to 6]	47 [26 to 65]	96 [55 to 135]
Non-Hispanic AIAN	2,538	1 [-1 to 3]	48 [-33 to 121]	55 [-38 to 138]
Non-Hispanic Asian	3,769	2 [-1 to 4]	45 [-31 to 112]	55 [-37 to 137]
Non-Hispanic Black	3,931	2 [1 to 4]	55 [17 to 90]	76 [24 to 125]
Non-Hispanic NHOPI	1,703	1 [0 to 1]	30 [-20 to 75]	52 [-36 to 131]
Non-Hispanic 2+ races	8,353	3 [-2 to 7]	34 [-23 to 85]	55 [-37 to 137]
Non-Hispanic White	100,347	57 [37 to 75]	56 [37 to 75]	57 [37 to 76]

AIAN: American Indian and Alaska Native; CI: confidence interval; NHOPI: Native Hawaiian and Other Pacific Islander

Race categories only include people who identify as non-Hispanic to reflect the race categories used in the study by Pope, et al.

Population is the average of the 2022 and 2023 Washington State Office of Financial Management estimates for the census tracts that comprise this overburdened community.

The age-adjusted rate indicates the expected rate if the age distribution in this overburdened community matched that of Washington State.

Table B2. Estimated annual deaths by any cause related to yearly $PM_{2.5}$ exposure among 65–99-year-olds in Spokane and Spokane Valley by racial and ethnic group, 2022–2023 (based on effect estimates in study by Di, et al., 2017[39]).

Racial and Ethnic Group	Population (65-99-year-olds)	Estimated annual deaths [95% CI]	Estimated annual deaths per 100,000 population [95% CI]	Estimated age-adjusted annual deaths per 100,000 population [95% CI]
All	26,034	45 [43 to 46]	171 [166 to 176]	166 [161 to 170]
Hispanic	614	1 [1 to 1]	210 [182 to 237]	212 [183 to 239]
AIAN	373	<1 [0 to 1]	110 [68 to 151]	120 [73 to 163]
Asian	640	1 [1 to 1]	168 [133 to 202]	170 [134 to 204]
Black	438	1 [1 to 1]	246 [236 to 255]	278 [267 to 288]
NHOPI	142	<1 [range <1]	146 [90 to 199]	152 [93 to 207]
2+ races	945	1 [1 to 2]	138 [85 to 188]	154 [95 to 211]
White	23,495	24 [23 to 25]	103 [99 to 107]	99 [95 to 103]

AIAN: American Indian and Alaska Native; CI: confidence interval; NHOPI: Native Hawaiian and Other Pacific Islander

Race categories include people who identify as Hispanic and non-Hispanic to reflect the race categories used in the study by Di, et al.

Population is the average of the 2022 and 2023 Washington State Office of Financial Management estimates for the census tracts that comprise this overburdened community.

The age-adjusted rate indicates the expected rate if the age distribution in this overburdened community matched that of Washington State.

[39] Di, Q., Wang Y., Zanobetti, A., Wang, Y., Koutrakis, P., Choirat, C., Dominici, F., Schwartz, J.D. 2017. Air Pollution and Mortality in the Medicare Population. *The New England Journal of Medicine*, 376(26), pp. 2513-2522.

Table B3. Annual mortality and morbidity associated with annual $PM_{2.5}$ exposure (yearly 24-hour average concentrations) in Spokane and Spokane Valley, 2022-2023. Brackets [ ] include 95% confidence interval.

Health Outcome	Age Group	Source of Risk Estimate	Population	Estimated Annual Number [95% CI]	Estimated annual rate per 100,000 population [95% CI]
Deaths – Any cause	65 to 99	Di et al., 2017[40]	26,034	45 [43 to 46]	171 [166 to 176]
Deaths – Any cause	18 to 84	Pope et al., 2019[41]	129,724	72 [52 to 91]	56 [40 to 70]
Deaths – Cardiovascular disease	18 to 99	Alexeeff et al., 2023[42]	132,805	20 [8 to 31]	15 [6 to 23]
Deaths – Ischemic heart disease	30 to 99	Jerrett et al., 2017[43]	98,506	19 [15 to 24]	20 [15 to 24]
Deaths – Ischemic heart disease	30 to 99	Krewski et al., 2009[44]	98,506	29 [24 to 34]	30 [24 to 35]
Deaths – Ischemic heart disease	30 to 99	Pope et al., 2019[45]	98,506	18 [13 to 23]	18 [14 to 23]

[40] Di, Q., Wang Y., Zanobetti, A., Wang, Y., Koutrakis, P., Choirat, C., Dominici, F., Schwartz, J.D. 2017. Air Pollution and Mortality in the Medicare Population. *The New England Journal of Medicine*, 376(26), pp. 2513-2522.
[41] Pope, C.A., 3rd, Lefler, J.S., Ezzati, M., Higbee, J.D., Marshall, J.D., Kim, S.Y., Bechle, M., Gilliat, K.S., Vernon, S.E., Robinson, A.L., & Burnett, R.T. (2019). Mortality Risk and Fine Particulate Air Pollution in a Large, Representative Cohort of U.S. Adults. *Environmental Health Perspectives*, 127(7), 77007.
[42] Alexeeff SED, K.Van Den Eeden, S.Schwartz, J.Liao, N. S.Sidney, S. Association of Long-term Exposure to Particulate Air Pollution with Cardiovascular Events in California. *JAMA Network Open*. 2023;6(2):e230561.
[43] Jerrett, 2017. Comparing the Health Effects of Ambient Particulate Matter Estimated Using Ground-Based Versus Remote Sensing Exposure Estimates. *Environmental Health Perspectives*. 2017 Apr;125(4):552-559. doi: 10.1289/EHP575. Epub 2016 Sep 9.
[44] Krewski D, Jerrett M, Burnett R, et al. 2009. Extended Follow-Up and Spatial analysis of the American Cancer Society Linking Particulate Air Pollution and Mortality. Health Effects Institute, Cambridge MA
[45] Pope, C.A., 3rd, Lefler, J.S., Ezzati, M., Higbee, J.D., Marshall, J.D., Kim, S.Y., Bechle, M., Gilliat, K.S., Vernon, S.E., Robinson, A.L., & Burnett, R.T. (2019). Mortality Risk and Fine Particulate Air Pollution in a Large, Representative Cohort of U.S. Adults. *Environmental Health Perspectives*, 127(7), 77007.

Deaths – Lung Cancer	30 to 99	Krewski, et al., 2009[46]	98,506	6 [2 to 8]	6 [2 to 9]
Deaths – Lung Cancer	30 to 99	Turner et al., 2016[47]	98,506	4 [1 to 6]	4 [1 to 6]
Hospital Admissions – Acute Non-Fatal Myocardial Infarction	18 to 99	Alexeeff, et al., 2023[48]	132,805	28 [16 to 40]	21 [12 to 30]
Lung Cancer Diagnoses	30 to 99	Gharibvand et al., 2016[49]	98,506	11 [3 to 17]	11 [4 to 17]

CI: confidence interval. CIs are inversely proportional to population sizes reflecting higher uncertainty when estimating effects with smaller numbers of people. CIs that include 0 indicate that it is plausible that no deaths are associated with $PM_{2.5}$ in this group in this community.

Population is the average of the 2022 and 2023 Washington State Office of Financial Management estimates for the census tracts that comprise this overburdened community.

The age-adjusted rate indicates the expected rate if the age distribution in this overburdened community matched that of Washington State.

Health outcomes were selected based on the availability of effect estimates for that outcome relevant to the Washington population in the scientific literature. Where multiple effect estimates exist, we listed the model results separately for each. See the 2025 Report for more information.

46 Krewski D, Jerrett M, Burnett R, et al. 2009. Extended Follow-Up and Spatial analysis of the American Cancer Society Linking Particulate Air Pollution and Mortality. Health Effects Institute, Cambridge MA

47 Turner, M.C., Jerrett, M., Pope, C.A., III, Krewski, D., Gapstur, S.M., Diver, W.R., Beckerman, B.S., Marshall, J.D., Su, J., Crouse, D.L., & Burnett, R.T. (2016). Long-term ozone exposure and mortality in a large prospective study. *American Journal of Respiratory Critical Care Medicine* 193(10): 1134-1142.

48 Alexeeff SED, K.Van Den Eeden, S.Schwartz, J.Liao, N. S.Sidney, S. Association of Long-term Exposure to Particulate Air Pollution with Cardiovascular Events in California. *JAMA Network Open*. 2023;6(2):e230561.

49 Gharibvand, L., Shavlik, D., Ghamsary, M., Beeson, W.L., Soret, S., Knutsen, R., & Knutsen, S.F. (2016). The association between ambient fine particulate air pollution and lung cancer incidence: results from the AHSMOG-2 study. *Environmental Health Perspectives* 125 (3): 378?384

Table B4. Annual mortality and morbidity associated with daily $PM_{2.5}$ exposure (daily 24-hour average concentrations) in Spokane and Spokane Valley, 2022-2023. Brackets [ ] include 95% confidence interval.

Health Outcome	Age Group	Source of Risk Estimate	Population	Estimated Annual Number [95% CI]	Estimated annual rate per 100,000 population [95% CI]
Deaths – Any cause	0 to 99	Ito et al., 2013[50]	167,905	1 [0 to 3]	1 [0 to 2]
Deaths – Any cause	65 to 99	Zanobetti et al., 2014[51]	26,034	4 [3 to 5]	15 [10 to 20]
Deaths – Cardiovascular disease	0 to 99	Liu et al., 2022[52]	167,905	2 [0 to 4]	1 [0 to 2]
Deaths – Respiratory	0 to 99	Liu et al., 2022[53]	167,905	3 [0 to 6]	2 [0 to 4]
Hospital Admissions – Acute Non-Fatal Myocardial Infarction	18 to 99	Sullivan et al., 2005[54]	132,805	5 [-6 to 16]	4 [-5 to 12]

[50] Ito, K., Ross, Z., Zhou, J., Nádas, A., Lippmann, M. and Thurston, G.D., 2013. NPACT Study 3. Time-series analysis of mortality, hospitalizations, and ambient $PM_{2.5}$ and its components. National Particle Component Toxicity (NPACT) Initiative. https://www.healtheffects.org/publication/national-particle-component-toxicity-npact-initiative-integrated-epidemiologic-and

[51] Zanobetti, A., Dominici, F., Wang, Y. and Schwartz, J.D., 2014. A national case-crossover analysis of the short-term effect of $PM_{2.5}$ on hospitalizations and mortality in subjects with diabetes and neurological disorders. *Environmental Health*, 13(1), p.38.

[52] Liu, R.A., Wei, Y., Qiu, X., Kosheleva, A. and Schwartz, J.D., 2022. Short term exposure to air pollution and mortality in the US: a double negative control analysis. *Environmental Health*, 21(1), p.81.

[53] Liu, R.A., Wei, Y., Qiu, X., Kosheleva, A. and Schwartz, J.D., 2022. Short term exposure to air pollution and mortality in the US: a double negative control analysis. *Environmental Health*, 21(1), p.81.

[54] Sullivan, J., L. Sheppard, A. Schreuder, N. Ishikawa, D. Siscovick and J. Kaufman. 2005. Relation between short-term fine-particulate matter exposure and onset of myocardial infarction. Epidemiology. Vol. 16 (1): 41-8.

Hospital Admissions – Acute Non-Fatal Myocardial Infarction	18 to 99	Zanobetti et al., 2009[55]	132,805	6 [3 to 9]	4 [2 to 6]
Hospital Admissions – All Respiratory	65 to 99	Zanobetti et al., 2009[56]	26,034	25 [14 to 36]	97 [55 to 137]
Hospital Admissions – Asthma	0 to 64	Sheppard et al., 2003[57]	141,871	14 [5 to 22]	10 [4 to 15]
ED Visits – Asthma	0 to 99	Mar et al., 2010[58]	167,905	112 [28 to 191]	67 [17 to 114]
ED Visits – Asthma	0 to 99	Slaughter, J. C., et al., 2005[59]	167,905	60 [-52 to 163]	36 [-31 to 97]
ED Visits – Asthma	0 to 17	Norris, G., et al., 1999[60]	35,100	43 [22 to 62]	124 [64 to 178]

ED: emergency department; CI: confidence interval. CIs are inversely proportional to population sizes reflecting higher uncertainty when estimating effects with smaller numbers of people. CIs that include 0 indicate that it is plausible that no deaths are associated with $PM_{2.5}$ in this group in this community.

[55] Zanobetti, A., Franklin, M., Koutrakis, P. and Schwartz, J., 2009. Fine particulate air pollution and its components in association with cause-specific emergency admissions. *Environmental Health*, 8(1), p.58.
[56] Zanobetti, A., Franklin, M., Koutrakis, P. and Schwartz, J., 2009. Fine particulate air pollution and its components in association with cause-specific emergency admissions. *Environmental Health*, 8(1), p.58.
[57] Sheppard, L. Ambient Air Pollution and Nonelderly Asthma Hospital Admissions in Seattle, Washington, 1987-1994. In: Revised Analyses of Time-Series Studies of Air Pollution and Health. 2003, Health Effects Institute: Boston, MA. p. 227-230.
[58] Mar, T. F., J. Q. Koenig and J. Primomo. 2010. Associations between asthma emergency visits and particulate matter sources, including diesel emissions from stationary generators in Tacoma, Washington. *Inhalation Toxicology*. Vol. 22 (6): 445-8.
[59] Slaughter, J. C., E. Kim, L. Sheppard, J. H. Sullivan, T. V. Larson and C. Claiborn. 2005. Association between particulate matter and emergency room visits, hospital admissions and mortality in Spokane, Washington. *Journal of Exposure Analysis and Environmental Epidemiology*. Vol. 15
[60] Norris, G., et al. An association between fine particles and asthma emergency department visits for children in Seattle. *Environmental Health Perspectives*, 1999. 107(6): p. 489-93.

Population is the average of the 2022 and 2023 Washington State Office of Financial Management estimates for the census tracts that comprise this overburdened community.

The age-adjusted rate indicates the expected rate if the age distribution in this overburdened community matched that of Washington State.

Health outcomes were selected based on the availability of effect estimates for that outcome relevant to the Washington population in the scientific literature. Where multiple effect estimates exist, we listed the model results separately for each. See the 2025 Report for more information.

Table B5. Annual mortality and morbidity associated with seasonal and daily O_3 exposure (seasonal and daily 8-hour maximum concentrations) in Spokane and Spokane Valley, 2022-2023. Brackets [ ] include 95% confidence interval.

Health Outcome	Age Group	Source of Risk Estimate	Population	Estimated Annual Number [95% CI]	Estimated annual rate per 100,000 population [95% CI]
Deaths – Any cause (Seasonal)	65 to 99	Di, et al. 2017[61]	26,034	20 [14 to 27]	79 [54 to 102]
Deaths – Any cause (Daily)	0 to 99	Zanobetti and Schwartz, 2008[62]	167,905	6 [3 to 9]	4 [2 to 5]
ED Visits – Asthma (Daily)	0 to 99	Mar and Koenig, 2009[63]	167,905	201 [52 to 327]	120 [31 to 195]

[61] Di, Q., Wang Y., Zanobetti, A., Wang, Y., Koutrakis, P., Choirat, C., Dominici, F., Schwartz, J.D. 2017. Air Pollution and Mortality in the Medicare Population. *The New England Journal of Medicine*, 376(26), pp. 2513-2522.

[62] Zanobetti, A. and Schwartz, J., 2008. Mortality displacement in the association of ozone with mortality: an analysis of 48 cities in the United States. *American Journal of Respiratory and Critical Care Medicine*, 177(2), pp.184-189.

[63] Mar, T.F. and Koenig, J.Q. (2009). Relationship between visits to emergency departments for asthma and ozone exposure in greater Seattle, Washington. *Annals of Allergy, Asthma & Immunology*, 103, 474-479.

ED: emergency department; CI: confidence interval. CIs are inversely proportional to population sizes reflecting higher uncertainty when estimating effects with smaller numbers of people.[64] CIs that include 0 indicate that it is plausible that no deaths are associated with O_3 in this group in this community.

Population is the average of the 2022 and 2023 Washington State Office of Financial Management estimates for the census tracts that comprise this overburdened community.

Age-adjusted rate indicates the expected rate if the age distribution in this overburdened community matched that of Washington State.

Health outcomes were selected based on the availability of effect estimates for that outcome relevant to the Washington population in the scientific literature. Where multiple effect estimates exist, we listed the model results separately for each. See the 2025 Report for more information.

[64] Schwartz, J., 1995. Short term fluctuations in air pollution and hospital admissions of the elderly for respiratory disease. *Thorax*, 50(5), pp.531-538.