South Seattle Community
2025 Environmental Justice 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 South Seattle Community Report provides community information, demographic data, greenhouse gas emissions data, and information about criteria air pollutant levels and their health impacts. This document provides information about air quality and health impacts to those who live, work, and play in the South Seattle community.

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

Community Overview

The South Seattle 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 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 Story Map.

Land Area: 44 sq. mi

Population: 207,863

County: King

Municipal Government: Seattle, Tukwila, Burien, SeaTac City Councils

Ecology Region: Northwest

Local Clean Air Authority: Puget Sound Clean Air Agency

Local Health Jurisdiction: Seattle-King County Public Health

Primary languages spoken: English, Spanish, Ukrainian, Vietnamese, Russian, Korean, Chinese, Punjabi, Tagalog

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

Geographic characteristics

The South Seattle community is in King County, which is the most populous county in Washington and includes over a quarter of the state's residents. The community identified as highly impacted by air pollution stretches from the southern half of Seattle's downtown core in the north to SeaTac airport in the south. It includes a large portion of South Seattle, primarily consisting of neighborhoods near Interstate 5 and the Duwamish River, as well as parts of the suburban municipalities of Tukwila, Burien, and SeaTac. There has been significant housing and transit development in the recent decade, primarily centered around the recently opened Sound Transit Link rail line, which operates from SeaTac airport to Lynwood.

[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

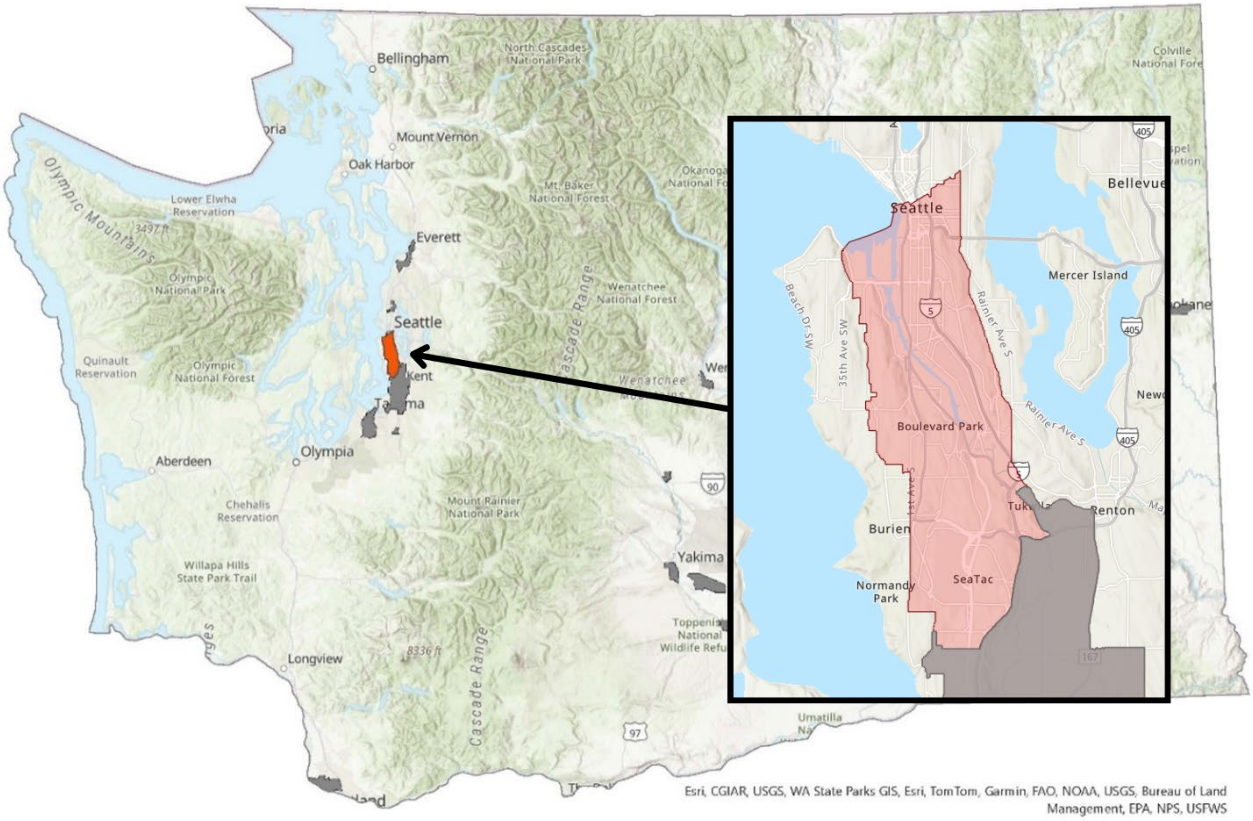

Figure 1. Map of the 16 overburdened communities highly impacted by air pollution in Washington state (gray), with South Seattle highlighted (red).

Socioeconomic characteristics

South Seattle and the surrounding areas are ethnically diverse, and 4 in 10 households speak a language other than English at home. Over a quarter of residents are Asian American and more than 1 in 7 identify as Black, the largest share for both groups among the 16 designated communities.[3,4] This community is a hub of transportation and industry, intermingled alongside residential areas.

[3] American Community Survey Data https://www.census.gov/programs-surveys/acs/data.html
[4] 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/

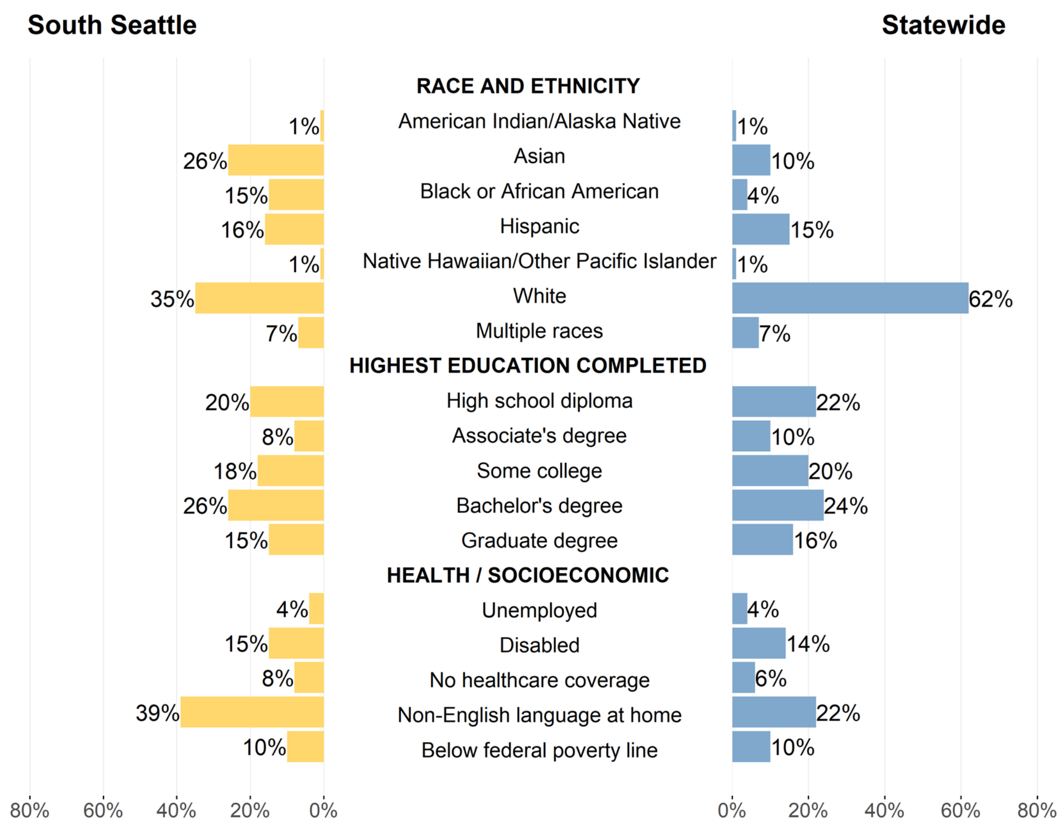

Figure 2. Sociodemographic characteristics of the South Seattle community compared to statewide percentages, based on Washington State's 2024 estimated population of 8,035,700.[5]

Health characteristics

According to 2022 CDC health survey data,[6] South Seattle has lower prevalences of chronic health conditions among individuals aged 18 years and older relative to the statewide population, including asthma (10.2% vs. 11.4%), cardiovascular disease (4.7% vs. 5.7%), COPD (4.5% vs. 5.7%), diabetes (9.1% vs. 9.6%), and stroke (2.9% 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.

[5] 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
[6] U.S. Centers for Disease Control and Prevention, PLACES Data Portal https://www.cdc.gov/places/tools/data-portal.html

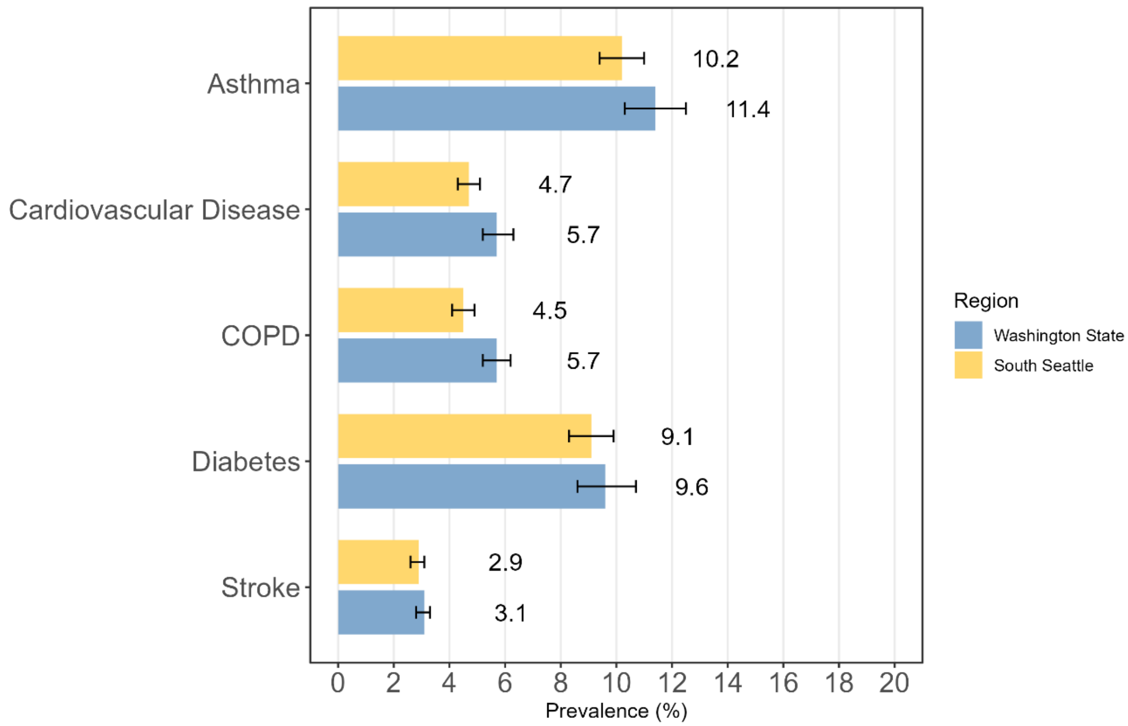

Figure 3. Prevalence of chronic health conditions among people ages 18 years and older in South Seattle census tracts compared with Washington State.

Data come from CDC PLACES, 2024 release, which uses 2022 survey data.[6] Yellow and blue bars indicate the estimated prevalence of each condition. Black lines indicate the 95% confidence interval.

Air Monitoring

The South Seattle community has a monitoring network that measures all six criteria air pollutants (CAPs) (Table 1). There are now eleven monitoring sites in this community, including three that measure multiple pollutants. This report includes data from eight of these monitors (Figure 4). A PM_{10} monitor and three $PM_{2.5}$ sensors (SensWA) were installed in 2024, providing only partial-year data, and an NO_2 monitor was added to the Seattle-Duwamish site in November 2024, though not enough data were available to include in this report. Two additional $PM_{2.5}$ sensors were installed in 2025 using Climate Commitment Act (CCA) funding, and one monitor (SeaTac-Sunset Park) was installed separate from the CCA. Washington's most comprehensive monitoring location is the Seattle-Beacon Hill site, where Ecology measures all six CAPs. Many monitoring sites across Seattle are operated or co-operated by the Puget Sound

Clean Air Agency, the local clean air authority. Future EJ Reports will include more complete datasets from the newly installed monitors and sensors.

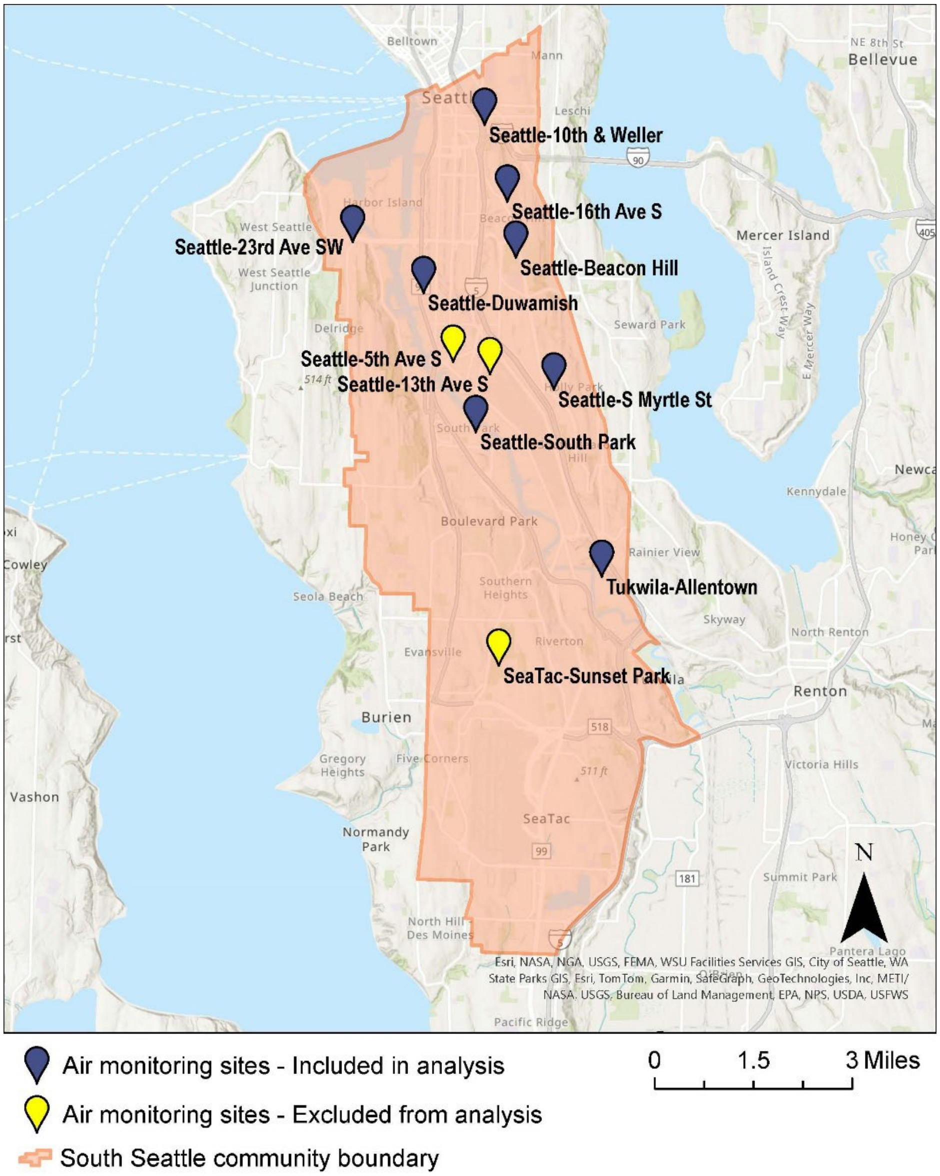

Figure 4. Map of South Seattle air monitoring sites.

Table 1. South Seattle criteria air pollutant monitors.

Monitoring Site	Type	Site Owner	Pollutants Monitored
Seattle-Duwamish	Regulatory [1]	PSCAA	$PM_{2.5}$, PM_{10} , NO_2*
Seattle-10th & Weller	Regulatory	Ecology-NWRO	$PM_{2.5}$, CO, NO_2
Seattle-Beacon Hill	Regulatory	Ecology-NWRO	$PM_{2.5}$, PM_{10} , NO_2, O_3, SO_2, CO, Pb
Tukwila-Allentown	Regulatory	PSCAA	$PM_{2.5}$
Seattle-South Park	Non-regulatory	PSCAA	$PM_{2.5}$
Seattle-S Myrtle St	SensWA [1]	Ecology-NWRO	$PM_{2.5}$
Seattle-23rd Ave SW	SensWA [1]	Ecology-NWRO	$PM_{2.5}$
Seattle-16th Ave S	SensWA [1]	Ecology-NWRO	$PM_{2.5}$

[1] Installed as part of Climate Commitment Act implementation

* = NO_2 monitor at Seattle-Duwamish was installed after November 2024, data not included in this report

Criteria Air Pollution

This report summarizes criteria air pollution (CAPs) concentrations in the South Seattle community from 2022 through 2024. CAPs concentrations for $PM_{2.5}$, PM_{10}, NO_2, O_3, SO_2, and CO are reported using data from the Washington State Air Monitoring Network and calculated according to the Environmental Protection Agency's (EPA) methodology. More information about the methods can be found in the methods section of the 2025 EJ Report.

In addition to analyzing monitored criteria air pollution concentrations, we calculated the number of days per year residents of the South Seattle 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.

From 2022-2024, the South Seattle community experienced an average of 4.7 days with unhealthy air quality (Figure 5). This is fewer than the annual average of 6.7 days with unhealthy air quality recorded between 2020-2022.

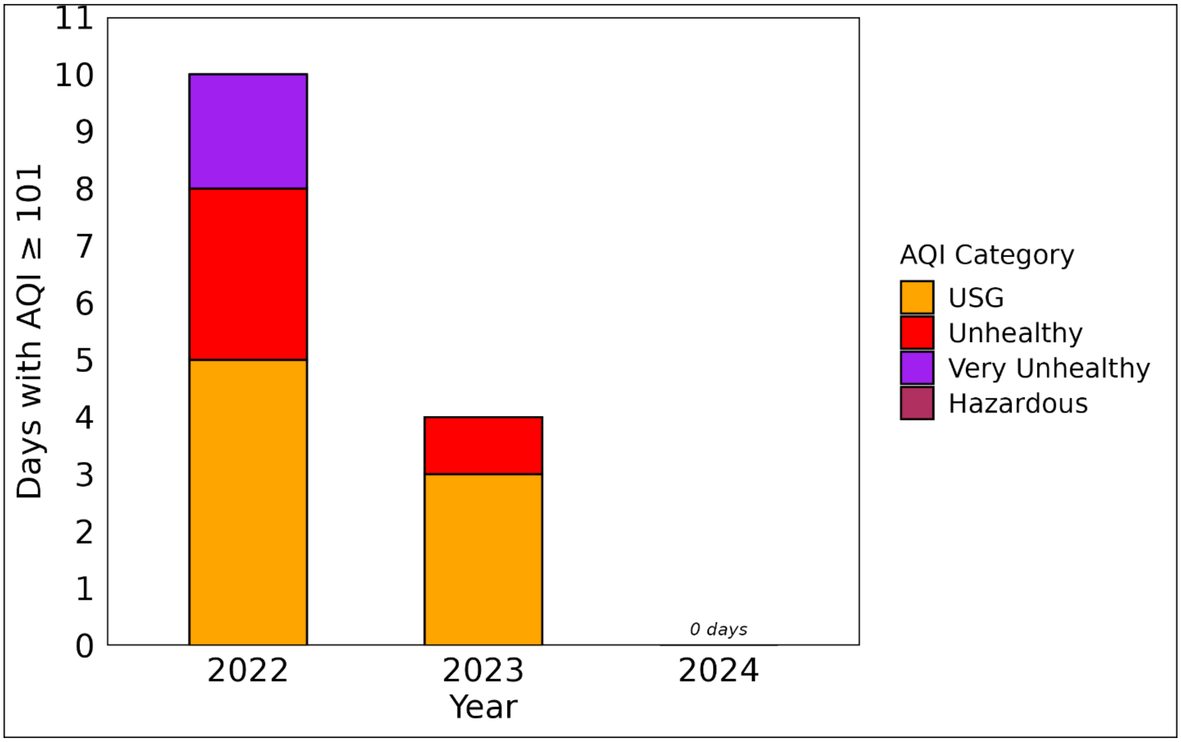

Figure 5*. Number of days 2022-2024 with unhealthy air quality. Includes days impacted by wildfire smoke.*

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.

Across the five monitoring sites that have data between 2022 to 2024, Table 2 shows that 24-hour $PM_{2.5}$ (98th percentile) concentrations decreased steadily during that period. Levels were highest in 2022, ranging from 27.6 to 31.1 µg/m³, when smoke from regional wildfires impacted communities across Washington (Table 2; Figure 6). 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. The 2024 design values at these five sites were well below the federal standard. The three additional sites with only partial-year 2024 data also reported 24-hour $PM_{2.5}$ concentrations below the federal standard.

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
Seattle-10th & Weller	*29.7* *[27.7]*	19.1 [18.3]	15.8 [15.8]	*22* *[21]*
Seattle-Beacon Hill	27.7 [23.3]	19.4 [15.9]	12.0 [12.0]	20 [17]
Seattle-Duwamish	27.6 [25.3]	22.7 [22.4]	16.5 [16.5]	22 [21]
Seattle-South Park	31.1 [24.3]	20.8 [20.8]	15.7 [15.7]	23 [20]
Tukwila-Allentown	30.5 [26.3]	24.2 [23.3]	18.7 [18.7]	24 [23]
Seattle-16th Ave S	DNC	DNC	*14.4* *[14.4]*	*
Seattle-23rd Ave SW	DNC	DNC	*21.8* *[21.8]*	*
Seattle-S Myrtle St	DNC	DNC	*16.5* *[16.5]*	*

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

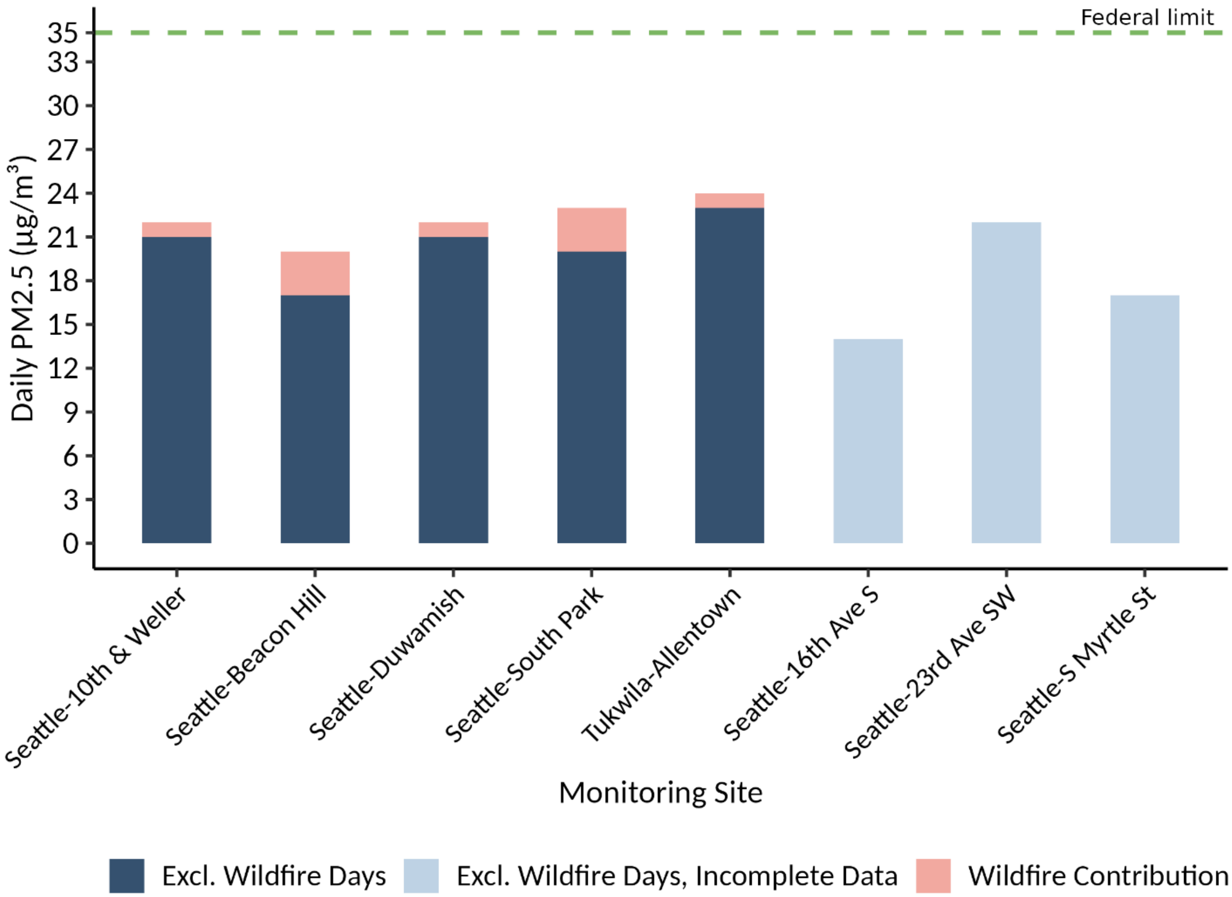

Figure 6. ***24-hour PM$_{2.5}$ (98th percentile) summary statistics, 2022-2024.*** *Annual summary statistics calculated with and without days elevated from wildfire smoke. Dark blue bar includes three complete years of data, 2022-2024; light blue bars include average of available data from 2024. Dashed 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 concentrations used to describe long-term exposure. In South Seattle, the 2024 design values from five monitoring sites remained below the federal standard (Table 3). Annual averages only exceeded the NAAQS in 2022, a year that had more days impacted by wildfire smoke than 2023 and 2024. Overall, annual mean concentrations showed a slight decrease from 2022 to 2024.

Table 3. ***Annual mean PM$_{2.5}$ concentrations and 2024 design values*** *(µg/m^3), 2022–2024. Annual means in brackets [ ] exclude wildfire days on which the average PM$_{2.5}$ concentration exceeded 15.0 µg/m^3. Annual PM$_{2.5}$ NAAQS is 9.0 µg/m^3.*

Monitoring Site	2022	2023	2024	2024 Design Value
Seattle-10th & Weller	*10.53* *[7.00]*	7.86 [7.46]	6.47 [6.39]	*8.3* *[7.0]*
Seattle-Beacon Hill	7.02 [5.47]	6.02 [5.66]	4.19 [4.19]	5.7 [5.1]
Seattle-Duwamish	8.78 [7.44]	7.75 [7.39]	6.47 [6.42]	7.7 [7.1]
Seattle-South Park	9.52 [7.72]	8.15 [7.80]	7.18 [7.13]	8.3 [7.5]
Tukwila-Allentown	8.11 [6.55]	7.51 [7.17]	6.84 [6.79]	7.5 [6.8]
Seattle-16th Ave S	DNC	DNC	*4.59* *[4.59]*	*
Seattle-23rd Ave SW	DNC	DNC	*7.05* *[7.05]*	*
Seattle-S Myrtle St	DNC	DNC	*4.58* *[4.58]*	*

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.

Each CAP monitored in South Seattle was below the national standard from 2022 to 2024. The annual concentrations for each monitored pollutant remained relatively consistent in the 2022 to 2024 period. Although lead is monitored in this community, lead concentrations are consistently significantly below the federal standard and were not included in this report.

Table 4. ***Annual summary statistics and design values for PM_{10} (µg/m³), NO_2 (ppb), O_3 (ppm), SO_2 (ppb), CO (ppm), SO_2 (ppb), 2022-2024.***

Monitoring Site	Pollutant	2022	2023	2024	2024 Design Value	NAAQS Level	Form
Seattle-Beacon Hill	O_3	0.048	0.049	0.047	0.048	0.070 (ppm)	Annual 4th highest daily maximum 8-hour concentration, averaged over 3 years
Seattle-Beacon Hill	PM_{10}	0	*0*	0	*0*	1 (µg/m³)	# annual exceedances >150 µg/m³, averaged over 3 years
Seattle-Duwamish	PM_{10}	DNC	DNC	*0*	*	0 (µg/m³)	# annual exceedances >150 µg/m³, averaged over 3 years
Seattle-10th & Weller	NO_2	54.0	50.4	46.7	50	100 (ppb)	Annual 98th percentile of 1-hr daily max concentrations, averaged over 3 years
Seattle-Beacon Hill	NO_2	43.0	42.0	40.3	42	100 (ppb)	Annual 98th percentile of 1-hr daily max concentrations, averaged over 3 years
Seattle-Beacon Hill	SO_2	3.4	2.6	2.0	3	75 (ppb)	Annual 99th percentile of 1-hr daily max concentrations, averaged over 3 years

Seattle-Beacon Hill	CO	1.2	0.7	0.6	0.7	9 (ppm)	8-hour average, not to be exceeded more than once/year
Seattle-10th & Weller	CO	1.1	1	0.6	1	9 (ppm)	8-hour average, not to be exceeded more than once/year

Italics indicate incomplete annual data, DNC = data not collected, * = incomplete data for 3-year design value, $\mu g/m^3$ = micrograms per cubic meter, ppb = parts per billion, 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 ozone concentrations by age range and using health effect estimates from peer-reviewed studies (Appendix B, Table 2 in 2025 EJ 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 57 deaths by any cause (35 deaths per 100,000 population, Table B1) related to yearly $PM_{2.5}$ exposure. Among older adults, we estimated 30 total deaths (112 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 (31 deaths among 18–84-year-olds). However, when accounting for the ages of people in each race and ethnicity group[7], the annual age-adjusted mortality rate was highest among Hispanic people (70 deaths per 100,000 population) and non-Hispanic Black people (70 deaths per 100,000 population).

[7] 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 EJ Report.

Figure 7 is based on the study by Pope et al. (2019),[8] 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.

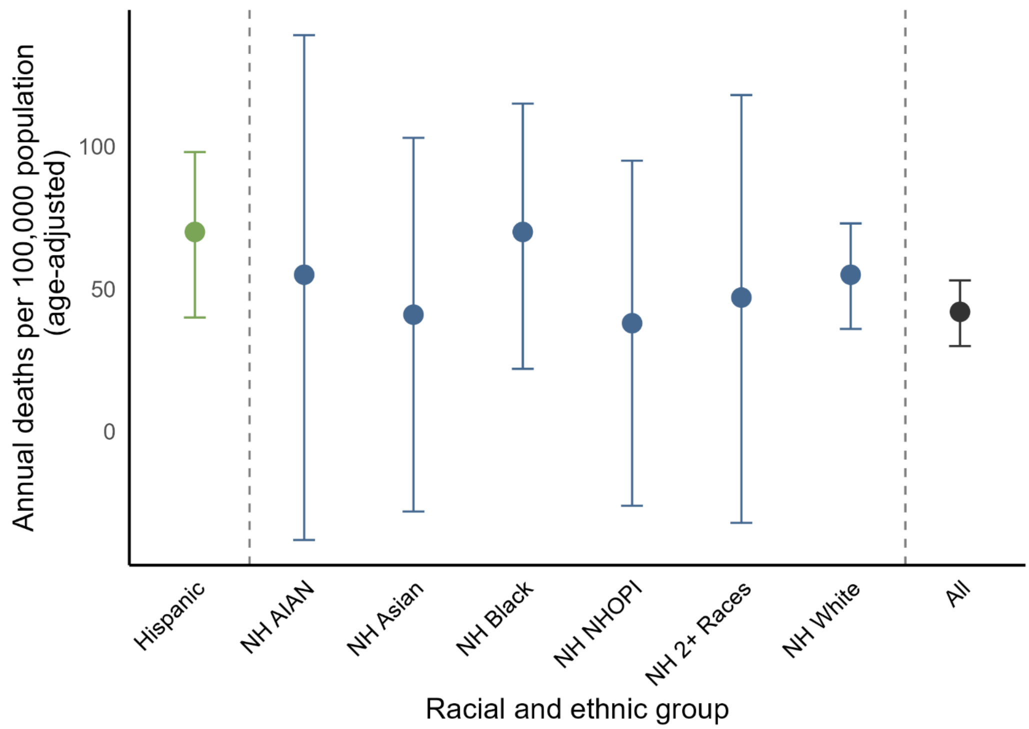

Figure 7. Age-adjusted annual death rates by any cause associated with annual $PM_{2.5}$ exposure among ages 18-84 by racial and ethnic group in South Seattle.

When assessing specific causes of death related to yearly $PM_{2.5}$ concentrations (Table B3), we estimated 16 deaths due to cardiovascular disease (10 deaths per 100,000 population), 15 to 25 deaths due to ischemic heart disease (12 to 19 deaths per 100,000 population), and 3 to 4 deaths per year due to lung cancer (2 to 3 deaths per 100,000 population) among adults.

Regarding non-fatal health outcomes (Table B3), we estimated that 32 hospital admissions (20 visits per 100,000 population) for acute non-fatal myocardial infarction were associated with yearly $PM_{2.5}$ concentrations among adults. Additionally, 15 lung cancer diagnoses per year were associated with yearly $PM_{2.5}$ exposure among all people (12 diagnoses per 100,000 population).

[8] 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.

Daily $PM_{2.5}$ exposure (Table B4) was associated with 1 death by any cause (1 per 100,000 population) among all people and 3 all-cause deaths (10 per 100,000 population) among older adults ages 65 to 99. For non-fatal conditions, daily $PM_{2.5}$ was associated with 6 acute non-fatal myocardial infarction admissions (3 to 4 per 100,000 population) among all adults, 20 respiratory admissions (74 per 100,000 population) among older adults ages 65 to 99, 12 asthma hospital admissions (7 per 100,000 population) among people ages 0 to 64 years. Additionally, 38 to 71 asthma-related emergency department (ED) visits (19 to 35 per 100,000 population) among all people and 32 asthma-related ED visits (93 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 3 seasonal deaths by any cause among older adults ages 65 to 99 (10 deaths per 100,000 population). Daily O_3 exposure was associated with 1 death by any cause (1 per 100,000 population) and 36 asthma-related ED visits (18 per 100,000 population) among all people, and 17 respiratory hospital admissions (62 per 100,000 population) among older adults ages 65–99.

Greenhouse Gas Emissions

Greenhouse gas emissions data for the South Seattle overburdened community highly impacted by air pollution include: 1) Emissions from greenhouse gas reporting entities per RCW 70A.65[9] and WAC 173-441,[10] -446;[11] and 2) Mobile source emissions.[12]

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 (CCA) requirements. For further information on methods and statewide results, refer to the 2025 EJ 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

[9] Greenhouse Gas Emissions – Cap-and-Invest Program https://app.leg.wa.gov/RCW/default.aspx?cite=70A.65
[10] Reporting of Emissions of Greenhouse Gases https://app.leg.wa.gov/WAC/default.aspx?cite=173-441
[11] Climate Commitment Act – Program Rule https://app.leg.wa.gov/WAC/default.aspx?cite=173-446
[12] Environmental Justice Review https://app.leg.wa.gov/RCW/default.aspx?cite=70A.65.020

Program.[13] 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 South Seattle community, nine 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 717,063 MT CO_2e in 2022 and 755,589 MT CO_2e in 2023, a 5.4% year-to-year increase. Some facilities in other communities report biogenic carbon (biogenic CO_2) [14] emissions, 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. There were no facilities that reported biogenic CO_2 in South Seattle. Since 2020, total reported greenhouse gas emissions from facilities within and near OBCs have decreased by 20.3%, and by 6.3% after subtracting biogenic CO_2 emissions. Some year-to-year fluctuations in emissions from individual facilities are expected.

[13] Mandatory greenhouse gas reports https://ecology.wa.gov/air-climate/reducing-greenhouse-gas-emissions/tracking-greenhouse-gases/mandatory-greenhouse-gas-reports

[14] 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 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.

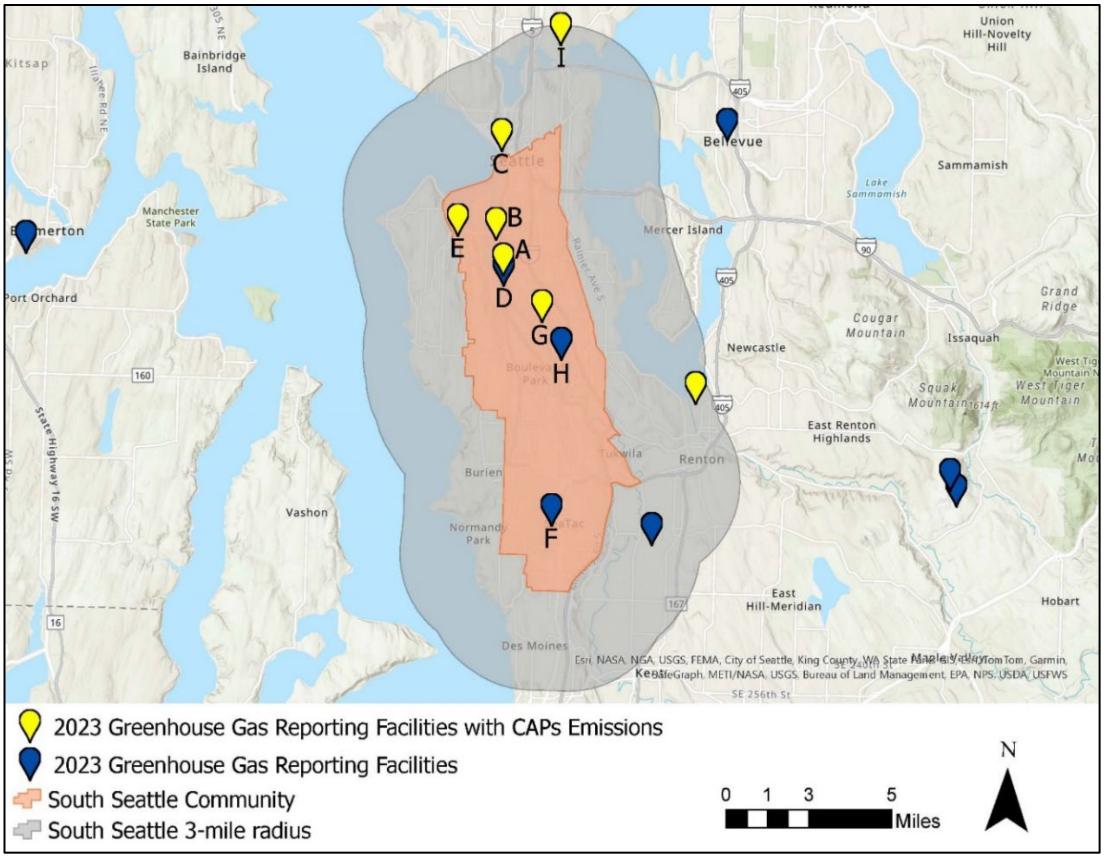

Figure 8. Reporting facilities as of 2023 that are in or near the South Seattle community boundary. Facility letters correspond with Table 5.

The sites in Figure 8 that are not labeled within the 3-mile radius around the South Seattle community are represented in neighboring overburdened communities highly impacted by air pollution.

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[15], to convert emissions into CO_2e. 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).[16] The Greenhouse Gas Reporting Program uses AR4 GWPs mainly for regulatory stability, consistency, and alignment with other federal programs.

[15] Reporting of Emissions of Greenhouse Gases https://app.leg.wa.gov/WAC/default.aspx?cite=173-441
[16] Intergovernmental Panel on Climate Change https://www.ipcc.ch/

Table 5. Facility emissions in or nearby[17] the South Seattle community. Biogenic CO_2 is in brackets [ ].

	Facility Name/City	Facility Sector	Within Community Boundary	CCA-Covered Facility[18]	Source of CAPs[19]	2022 Emissions ($MTCO_2e$)	2023 Emissions ($MTCO_2e$)
A	Ardagh Glass - Seattle	Minerals	Yes	Yes	Yes	54,049 [0]	44,364 [0]
B	Ash Grove - Seattle	Minerals	Yes	Yes	Yes	315,155 [0]	367,651 [0]
C	CenTrio Energy - Seattle	Power Plants	Nearby	Yes	Yes	69,446 [0]	68,651 [0]
D	CertainTeed Gypsum - Seattle	Manufacturing	Yes	Yes	No	52,402 [0]	55,645 [0]
E	Nucor Steel - Seattle	Metals	Yes	Yes	Yes	84,680 [0]	82,396 [0]
F	Seattle-Tacoma International Airport - Seattle	Government	Yes	No	No	16,094 [0]	16,544 [0]
G	The Boeing Company-Plant 2 - Seattle	Manufacturing	Yes	No	Yes	20,526 [0]	23,047 [0]

[17] "Nearby" refers to facilities within a three-mile radius of the community boundary that were included in this analysis.
[18] 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-Trade program established by the Climate Commitment Act.
[19] Major sources of criteria air pollutants (CAPs) 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

H	The Boeing Company-DC/MFC - Tukwila	Manufacturing	Yes	No	No	12,913 [0]	16,355 [0]
I	University of Washington - Seattle	Government	Nearby	Yes	Yes	91,798 [0]	80,936 [0]

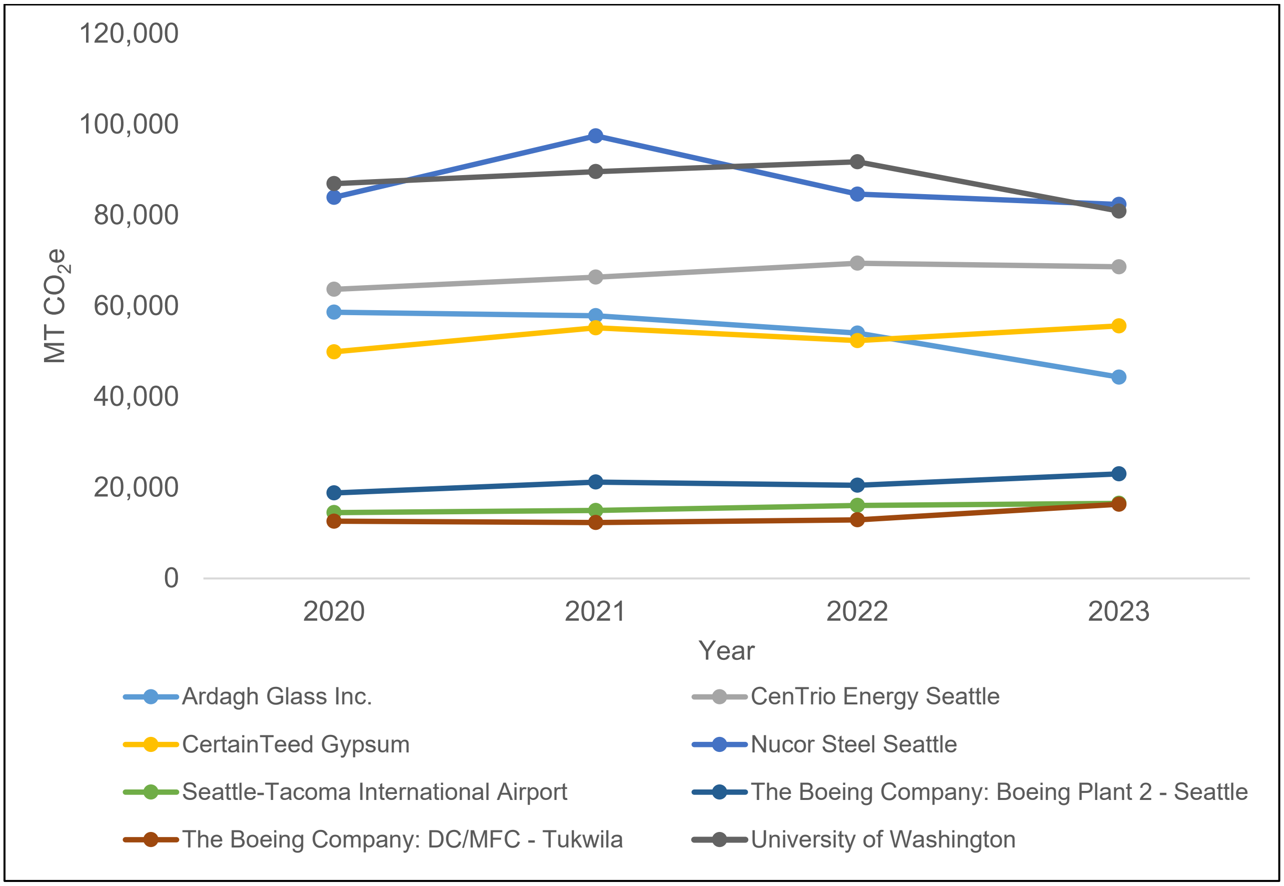

Figure 9. *Greenhouse gas reporting facilities and their emissions from 2020-2023.*

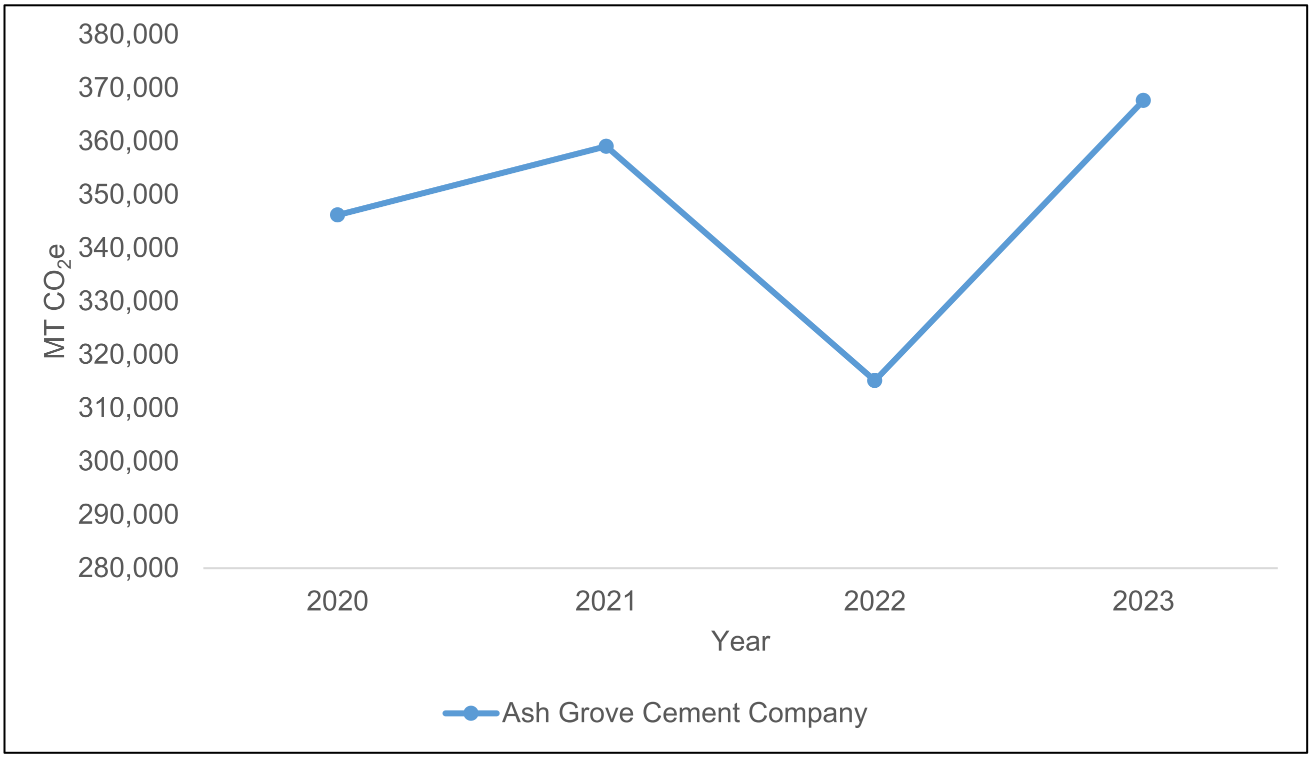

Figure 10. Ash Grove Cement Company greenhouse gas emissions from 2020-2023 (for visibility, facility is separated due to the difference in emission ranges).

Mobile sources

In the South Seattle 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.[20] 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.[21,22]

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[23] uses AR5 GWPs in mobile source emission

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

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 $MT\ CO_2e$
192,634	706,675	3.7	854,866	4.4

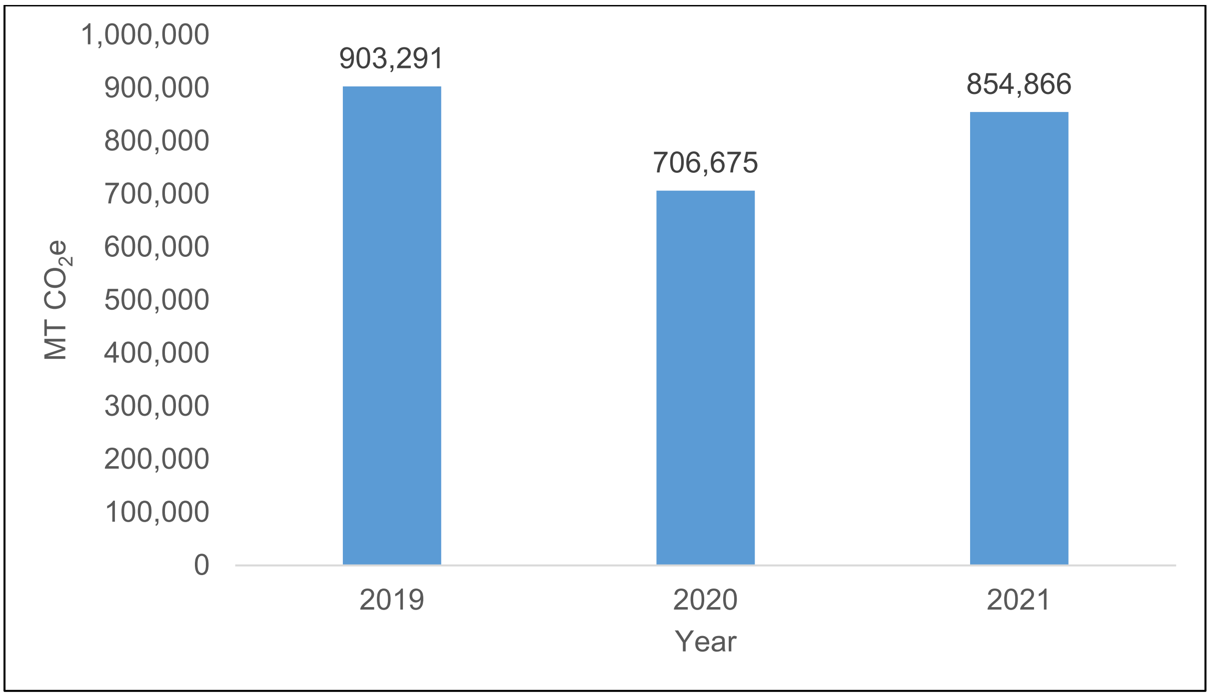

Figure 11. Annual greenhouse gas emissions from mobile sources in the South Seattle community, 2019-2021.

Listening session

Department of Ecology and Department of Health staff conducted a pilot listening session in Burien in June 2025 in collaboration with the Duwamish Valley Sustainability Alliance, a local community organization. It lasted 90 minutes and consisted of a brief presentation about the EJ report followed by facilitated conversation about topics including air pollution sources, health impacts of concern, highly exposed or highly sensitive populations, information needs, and useful communication channels. The session took place entirely in Spanish and twenty-two people who live in surrounding areas participated. The following includes a summary of the discussion and quotes from discussion participants.

Participants generally noted that air quality is typically worst closer to midday, when temperatures are highest, as well as during rush hour when more vehicles are on the road. They mentioned gray skies during wildfires, reduced visibility on the road, bad smells (e.g. fuel, burning, and sewage), and smoke coming from facilities as signs of poor air quality. Among pollution sources of concern, they listed wildfires, cars, freight trucks, fertilizers, garbage, air traffic, water pollution, and local industries.

> "In the morning, afternoon and evening, there are days during the cold season where you can see how the cloud goes up and stays there. In that regard, I've always wondered if there are regulations on how those industries pollute so much and for so long, because whenever you go by, there's usually smoke coming out. And I feel that is one of the main reasons, along with the number of cars in Seattle and the freight trucks—especially in the South Park area, which is one of the most industrial, it's more common to see trucks coming and going, aside from the freeway."

> "I'm thinking about wildfires, how there have been years where the sky looked dark for more than a week. The sun rises and sets with the constant layer of smoke. What do you do then? Whoever can stay home stays home, but those who can't, we go to work like that, right? We do try to avoid going to parks. But you have to take care of your basic and daily needs."

The health impacts from air pollution that participants mentioned included allergies, asthma, and shorter life expectancy, all of which were repeatedly mentioned in both breakout groups. They described feeling choked up, having a congested nose, itching, dry cough, and colds as symptoms related to air pollution. Participants also described how heavy wildfire smoke impacts physical and mental health because it limits people from going outdoors and exercising, in addition to other health impacts mentioned. In both breakout groups, participants mentioned the financial costs of health care for illnesses caused or aggravated by air pollution.

Participants described the South Park and Georgetown neighborhoods in Seattle as heavily polluted. Among groups more exposed to pollution, they mentioned concern for people living near freeways and industries or under flight paths, unhoused people, and truck drivers as well as bus drivers. They also listed people with cancer, respiratory illnesses, or suppressed immune systems as particularly sensitive to health impacts from air pollution, as well as babies, children and older adults.

> "The South Park community has a life expectancy that is eight years shorter than other communities. That is an indicator."

> "People who suffer from asthma or who are immunocompromised. We have two girls who have asthma and we notice it. Now that they're older, they're more resistant, but when they were little we frequently had to take them to the hospital."

> "The same thing happened to me because I moved to South Park two weeks ago and my daughter started with a cough, and now she has developed a kind of allergy. Since I moved to South Park, she started with a cold, allergy and a cough that won't go away. So, I think it could be pollution, the environment, because we used to live in Renton and she was in very good health."

Burien session participants shared that staying indoors is their primary way of protecting themselves from air pollution. Several also mentioned air filters or purifiers, whether purchasing their own or receiving them from community events and giveaways. Many participants were not aware of specific available resources, although some had heard of groups providing them.

> "In my case, if I see it's smoky, I prefer not to go out, and I try to put in one of those filters. I close my windows, put on a filter and stay home."

> "Something I found very interesting is that the community doesn't know about projects or programs that exist to educate, strategize and provide tools to be able to deal with this air pollution."

Participants mentioned community meetings, radio, television, classes, leadership trainings, community organizations, and printed materials such as flyers, posters and billboards among effective channels to disseminate information. Regarding information about air pollution and health, participants expressed interest in knowing more about:

- How air pollution impacts health
- Ways to reduce pollution
- Ways to protect family members from air pollution
- Available resources such as air filter giveaways
- Facilities that emit the most greenhouse gases and other pollutants
- Actions government agencies are taking to reduce air pollution

> "With regard to pollution, there hasn't been a solution for many years from what I'm hearing. So, we need a response to the issue of air pollution in South Park, right?

Because it's highly polluted and they've done studies and all that, showing a life expectancy that is 8 years shorter, which is concerning. What we would like to know is how that will be addressed, which plans will be carried out."

Community Resources

These resources provide more information about air quality and health in the South Seattle community:

- King County Community Health Needs Assessment information[24]
- Virginia Mason Franciscan Health - Community Health Needs Assessment information[25]
- King County Hospitals for a Healthier Community 2024-2025 Community Health Needs Assessment[26]
- Providence Swedish 2024 King County Community Health Needs Assessment[27]
- Seattle Children's 2022 Community Health Assessment[28]
- Public Health-Seattle/King County - Community Health Indicators[29]
- Public Health-Seattle/King County - Public health data[30]
- Communities Count - Data for King County Communities[31]
- Zero-emission and electric vehicles mapping tool | WSDOT[32]
- Home | Washington Climate Action[33]

[24] https://kingcounty.gov/en/dept/dph/about-king-county/about-public-health/chna
[25] https://www.vmfh.org/about-vmfh/why-choose-vmfh/reports-to-the-community/community-health-needs-assessment
[26] https://cdn.kingcounty.gov/-/media/king-county/depts/dph/documents/reports/chna/2024-2025-hhc-chna-report.pdf?rev=8f9684eda4ea4a0f93b0981d7ca00ffd&hash=6575EAE5EDBE57F8E3A4538E989AD8DA
[27] https://www.swedish.org/-/media/project/psjh/providence/socal/files/about/community-benefit/pdfs/2024-2025-chna-report.pdf?rev=86cd9bd48c764b15962deddf1484892d&hash=A1A7ED2E0F4E011981325A7E7C90FEAF
[28] https://www.seattlechildrens.org/globalassets/documents/about/community/2022-community-health-assessment-cha.pdf
[29] https://kingcounty.gov/en/dept/dph/about-king-county/about-public-health/data-reports/population-health-data/community-health-indicators
[30] https://kingcounty.gov/en/dept/dph/about-king-county/about-public-health/data-reports
[31] https://www.communitiescount.org/
[32] https://wsdot.wa.gov/business-wsdot/grants/zero-emission-vehicle-grants/zero-emission-and-electric-vehicles-mapping-tool
[33] https://climate.wa.gov/

Appendix A. Criteria Air Pollution

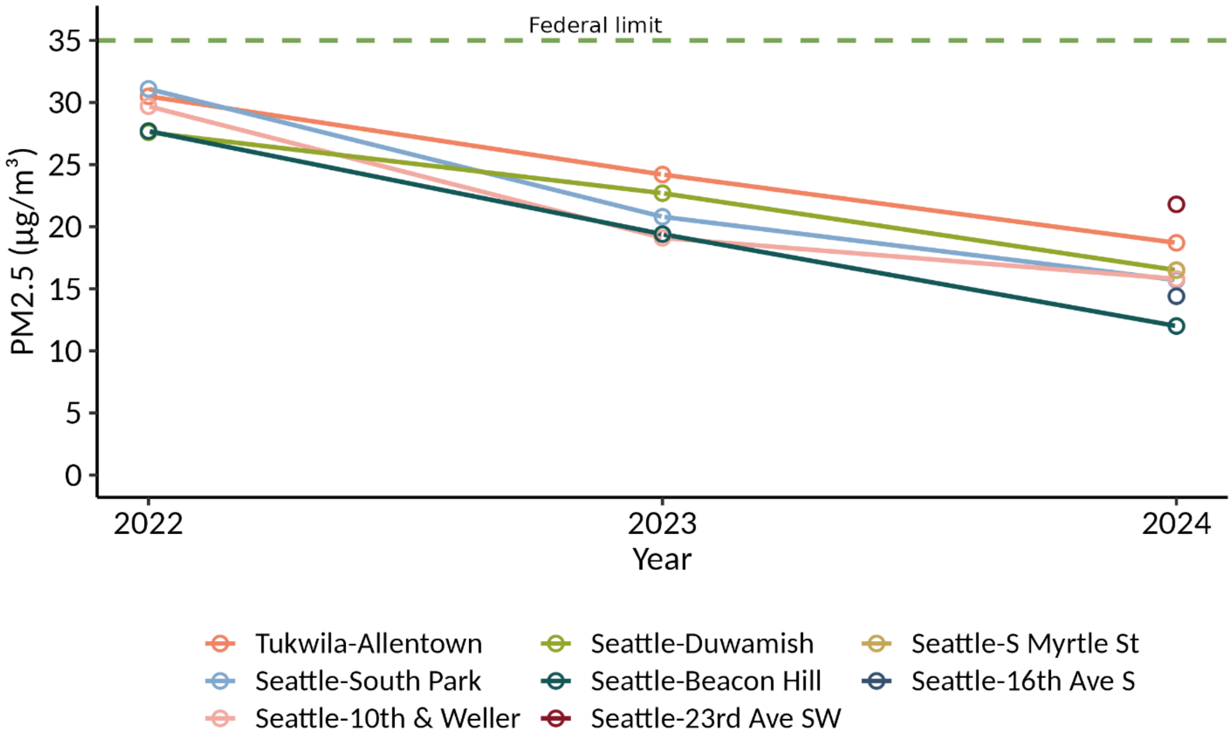

Figure 12. 24-hour $PM_{2.5}$ (98th percentile) concentrations at South Seattle monitoring sites. Days impacted by wildfire smoke are included. Dashed line is the 24-hr $PM_{2.5}$ NAAQS (35 µg/m³).

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 South Seattle by racial and ethnic group, 2022–2023 (based on effect estimates in study by Pope, et al., 2019[8]).

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	161,581	57 [41 to 72]	35 [25 to 44]	42 [30 to 53]
Hispanic	21,632	8 [4 to 11]	36 [20 to 50]	70 [40 to 98]
Non-Hispanic AIAN	1,133	1 [0 to 1]	49 [-34 to 123]	55 [-38 to 139]
Non-Hispanic Asian	42,338	17 [-12 to 44]	41 [-28 to 104]	41 [-28 to 103]
Non-Hispanic Black	22,015	13 [4 to 21]	58 [18 to 94]	70 [22 to 115]
Non-Hispanic NHOPI	1,853	0 [0 to 1]	24 [-17 to 61]	38 [-26 to 95]
Non-Hispanic 2+ races	9,132	3 [-2 to 6]	28 [-19 to 70]	47 [-32 to 118]
Non-Hispanic White	63,479	31 [20 to 41]	49 [32 to 65]	55 [36 to 73]

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 South Seattle by racial and ethnic group, 2022–2023 (based on effect estimates in study by Di, et al., 2017[34]).

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	27,128	30 [30 to 31]	112 [109 to 115]	110 [107 to 113]
Hispanic	1,321	2 [2 to 2]	162 [140 to 183]	181 [156 to 204]
AIAN	299	<1 [0 to 1]	164 [101 to 224]	183 [112 to 250]
Asian	9,951	13 [10 to 16]	130 [103 to 156]	122 [96 to 146]
Black	3,159	8 [8 to 8]	248 [238 to 257]	256 [246 to 266]
NHOPI	175	0 [0 to 0]	146 [89 to 199]	162 [99 to 221]
2+ races	973	2 [1 to 2]	165 [101 to 226]	170 [104 to 232]
White	12,571	15 [14 to 15]	118 [113 to 122]	118 [113 to 122]

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.

[34] 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 yearly $PM_{2.5}$ exposure (yearly 24-hour average concentrations) in South Seattle, 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[35]	27,128	30 [30 to 31]	112 [109 to 115]
Deaths – Any cause	18 to 84	Pope et al., 2019[36]	161,581	57 [41 to 72]	35 [25 to 44]
Deaths – Cardiovascular disease	18 to 99	Alexeeff et al., 2023[37]	164,447	16 [6 to 25]	10 [4 to 15]
Deaths – Ischemic heart disease	30 to 99	Jerrett et al., 2017[38]	127,214	16 [12 to 20]	13 [10 to 16]
Deaths – Ischemic heart disease	30 to 99	Krewski et al., 2009[39]	127,214	25 [20 to 29]	19 [16 to 23]
Deaths – Ischemic heart disease	30 to 99	Pope et al., 2019[40]	127,214	15 [11 to 19]	12 [9 to 15]

[35] 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.
[36] 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.
[37] 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.
[38] 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.
[39] 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
[40] 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[41]	127,214	4 [2 to 6]	3 [1 to 5]
Deaths – Lung Cancer	30 to 99	Turner et al., 2016[42]	127,214	3 [1 to 5]	2 [1 to 4]
Hospital Admissions – Acute Non-Fatal Myocardial Infarction	18 to 99	Alexeeff, et al., 2023[43]	164,447	33 [18 to 46]	20 [11 to 28]
Lung Cancer Diagnoses	30 to 99	Gharibvand et al., 2016[44]	127,214	15 [5 to 24]	12 [4 to 19]

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 EJ Report for more information.

41 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

42 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.

43 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.

44 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 South Seattle, 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[45]	199,164	1 [0 to 2]	1 [0 to 1]
Deaths – Any cause	65 to 99	Zanobetti et al., 2014[46]	27,128	3 [2 to 4]	10 [7 to 13]
Deaths – Cardiovascular disease	0 to 99	Liu et al., 2022[47]	199,164	2 [0 to 3]	1 [0 to 1]
Deaths – Respiratory	0 to 99	Liu et al., 2022[48]	199,164	2 [0 to 4]	1 [0 to 2]
Hospital Admissions – Acute Non-Fatal Myocardial Infarction	18 to 99	Sullivan et al., 2005[49]	164,447	6 [-7 to 18]	3 [-4 to 11]

[45] 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

[46] 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.

[47] 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.

[48] 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.

[49] 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[50]	164,447	6 [3 to 10]	4 [2 to 6]
Hospital Admissions – All Respiratory	65 to 99	Zanobetti et al., 2009[51]	27,128	20 [11 to 28]	74 [42 to 105]
Hospital Admissions – Asthma	0 to 64	Sheppard et al., 2003[52]	172,035	12 [4 to 19]	7 [3 to 11]
ED Visits – Asthma	0 to 99	Mar et al., 2010[53]	199,164	71 [18 to 120]	35 [9 to 60]
ED Visits – Asthma	0 to 99	Slaughter, J. C., et al., 2005[54]	199,164	38 [-32 to 102]	19 [-16 to 51]
ED Visits – Asthma	0 to 17	Norris, G., et al., 1999[55]	34,717	32 [16 to 47]	93 [48 to 135]

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.

[50] 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.
[51] 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.
[52] 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.
[53] 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.
[54] 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
[55] 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 EJ 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 South Seattle, 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[56]	27,128	3 [2 to 4]	10 [7 to 13]
Deaths – Any cause (Daily)	0 to 99	Zanobetti and Schwartz, 2008[57]	199,164	1 [1 to 2]	1 [0 to 1]
ED Visits – Asthma (Daily)	0 to 99	Mar and Koenig, 2009[58]	199,164	36 [9 to 61]	18 [4 to 31]

[56] 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.

[57] 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.

[58] 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.

Hospital Admissions – All Respiratory (Daily)	65 to 99	Schwartz, 1995[59]	27,128	17 [5 to 28]	62 [18 to 104]

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 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 EJ Report for more information.

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