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Wildfire Smoke Stakeholder Meeting: Respirators for Exposed Workers

L&I Division of Occupational Safety and Health (DOSH)

August 10, 2022



Washington State Department of
Labor & Industries

Division of Occupational Safety and Health

Agenda for Today's Meeting

August 10, 2022

- Next steps for permanent rulemaking
- PM_{2.5} and the Hazard of Wildfire Smoke
 - Background on the hazard of PM_{2.5} in wildfire smoke
 - Historic levels of PM_{2.5} from wildfire smoke in Washington State
- 5-minute break
- Respirators
 - The purpose of respirators and how they work
 - Elements of a required use respiratory protection program
- Policy Options for Respirator Use in the Permanent Rule
- 10-minute break
- Question & answer session

L&I Rulemaking re: Wildfire Smoke

- Today: discussing wildfire smoke data and thresholds for the required use of respirators
- Next up: Stakeholder meeting in late September or October 2022 where the permanent rule draft will be shared and reviewed
- L&I intends to adopt permanent rules by summer 2023
- Stakeholder input and experience feedback will help rulemaking team to develop the most effective proposed rule

A Little Background on Wildfire Smoke Hazards

- Extensive hazard information presented at earlier stakeholder meetings
- Primary pollutant in wildfire smoke is $PM_{2.5}$ (very small particles), which is incorporated into EPA's Air Quality Index (AQI)
- Short-term and long-term exposures to $PM_{2.5}$ can cause:
 - Hospitalization or death
 - Cardiovascular effects
 - Respiratory effects
 - Nervous system effects
 - Cancer

THE RELATIVE SIZE OF PARTICLES

From the COVID-19 pandemic to the U.S. West Coast wildfires, some of the biggest threats now are also the most microscopic.

A particle needs to be 10 microns (μm) or less before it can be inhaled into your respiratory tract. But just how small are these specks?

Here's a look at the relative sizes of some familiar particles »



SOURCES Clearstream, Daniel Loberbey, EPA, Financial Times, News Medical, Science Direct, SCMR, Susan Sokolowski, Petroleos, U.S. Dept. of Energy
COLLABORATORS RESEARCH • WRITING Carmen Ang, Imran Ghosh | DESIGN • ART DIRECTION Harrison Schell



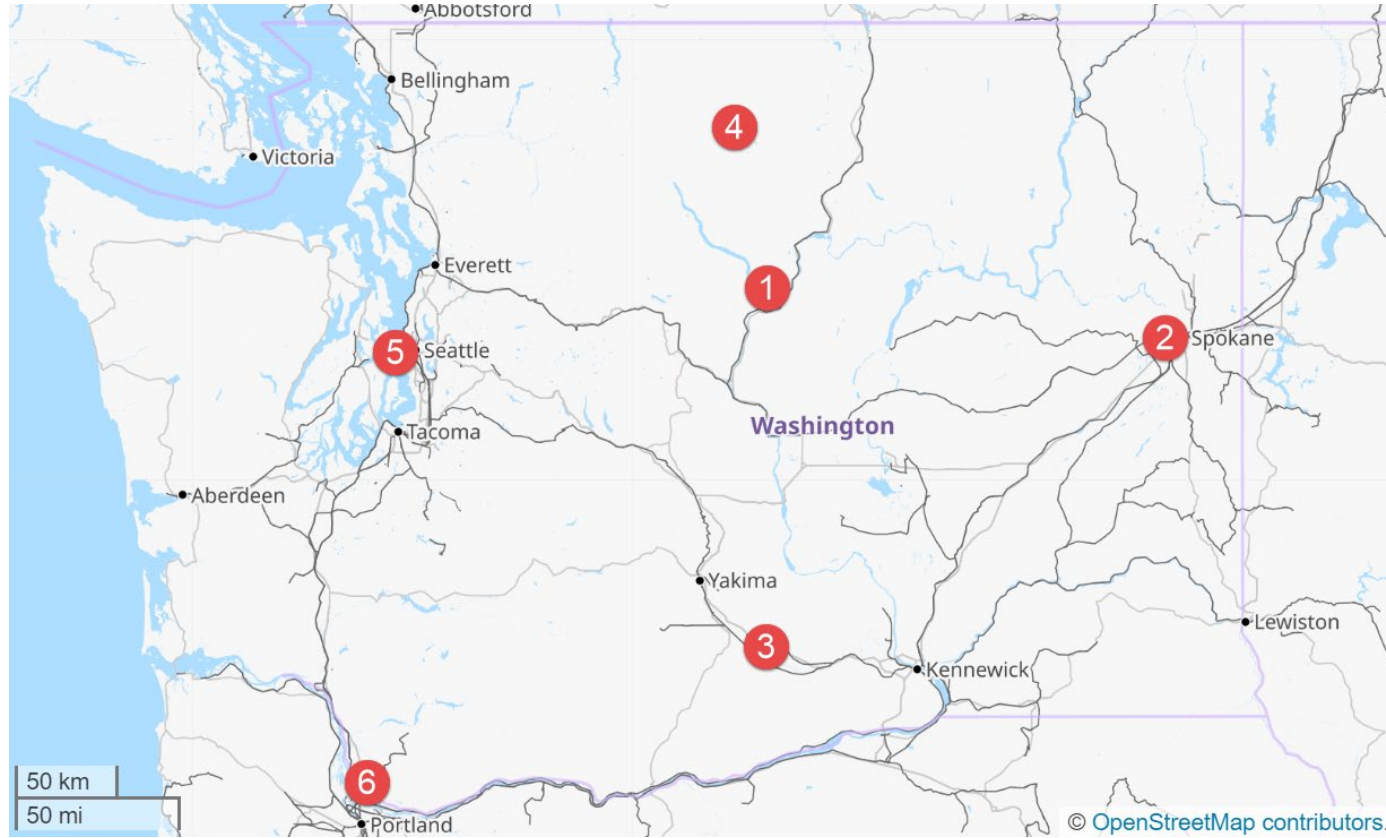
f /visualcapitalist @visualcap visualcapitalist.com

How we measure wildfire smoke

- $PM_{2.5}$ is the primary pollutant in wildfire smoke.
- $PM_{2.5}$ measures mass of small particles per volume of air ($\mu\text{g}/\text{m}^3$) and is a scientific calculation of particulate air pollution
- The EPA produces the AQI index, which incorporates $PM_{2.5}$ concentration
- AQI is not an especially protective communication tool for human health; most other organizations set hazard messaging lower
- AQI is nonlinear. The difference between AQI 101 and 151 is $20 \mu\text{g}/\text{m}^3$, the difference between 151 and 201 is $100 \mu\text{g}/\text{m}^3$

$PM_{2.5}$	AQI Message	AQI
0 $\mu\text{g}/\text{m}^3$	Good	0
12.1 $\mu\text{g}/\text{m}^3$	Moderate	51
35.5 $\mu\text{g}/\text{m}^3$	U.F.S.G.	101
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150.5 $\mu\text{g}/\text{m}^3$	Very Unhealthy	201
250.5 $\mu\text{g}/\text{m}^3$	Hazardous	301
500.4 $\mu\text{g}/\text{m}^3$	Beyond the AQI	500

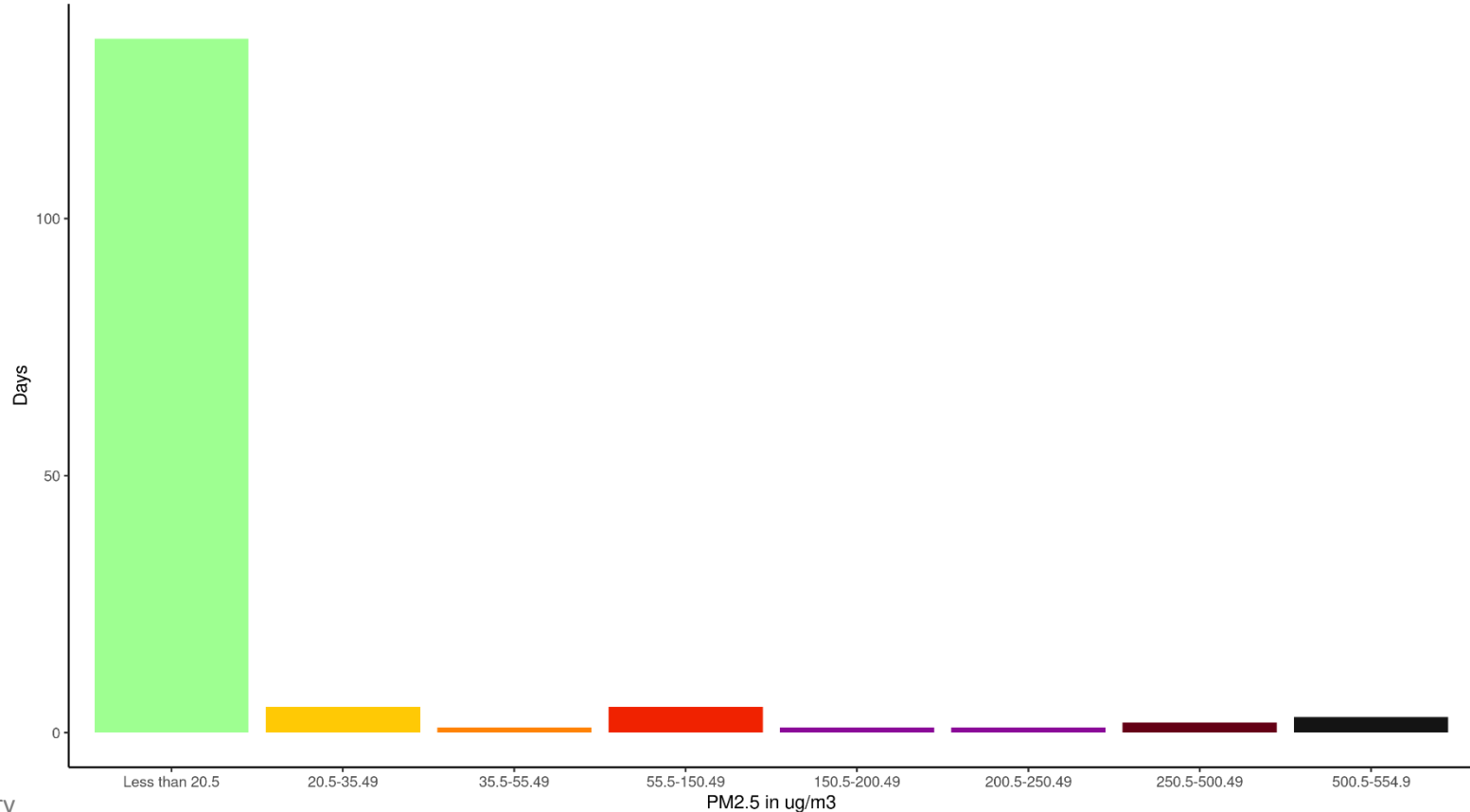
Historic levels of PM2.5 from wildfire smoke in WA



*Preliminary

Historic levels of PM2.5 from wildfire smoke in WA

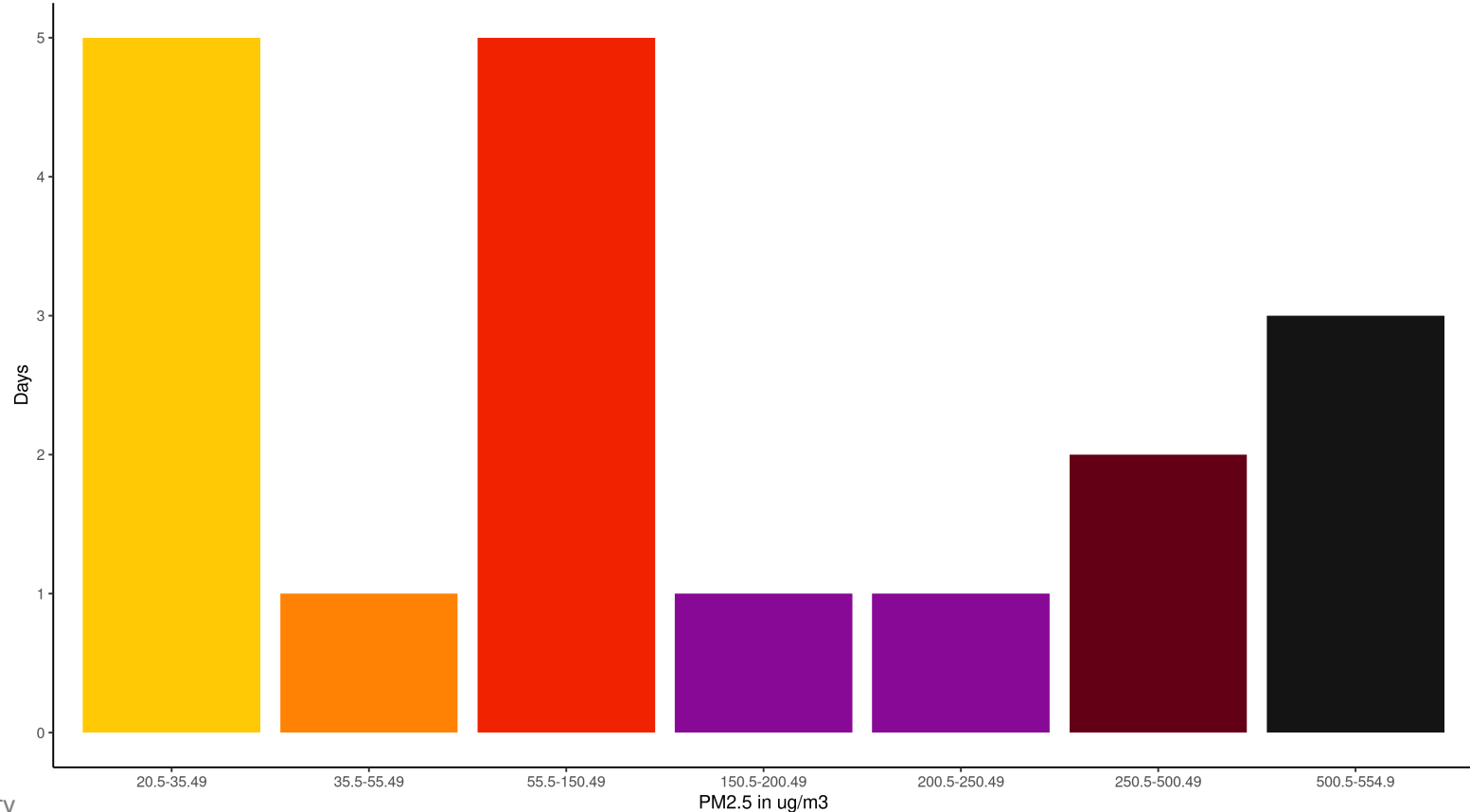
Chelan: Total days in each PM2.5 range for June to Oct 2020



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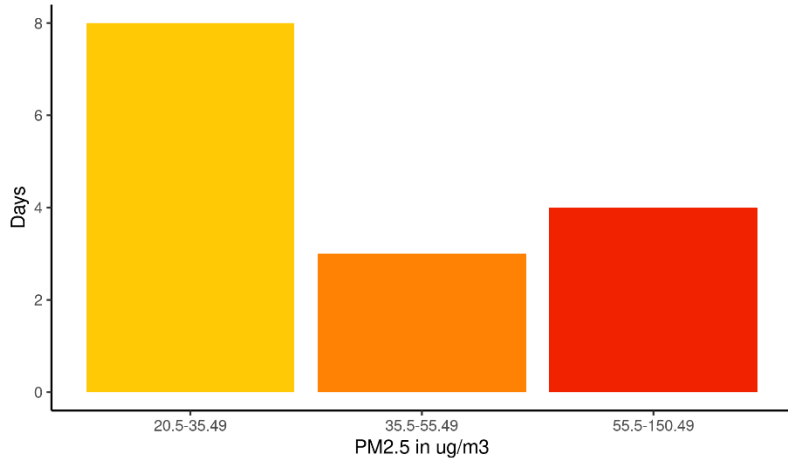
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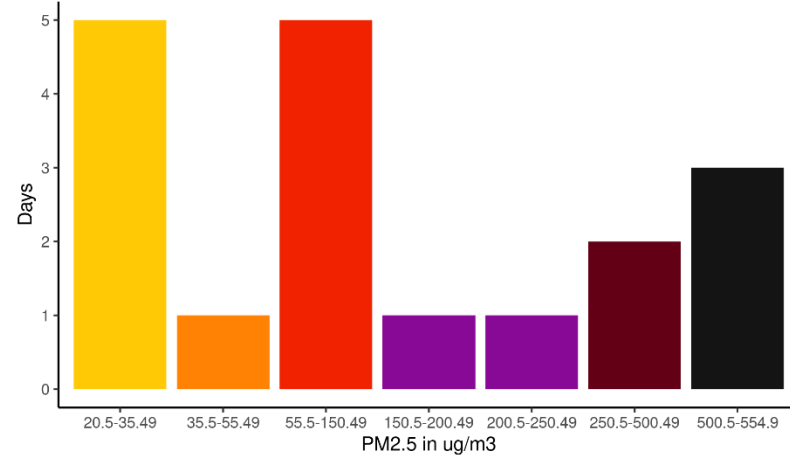


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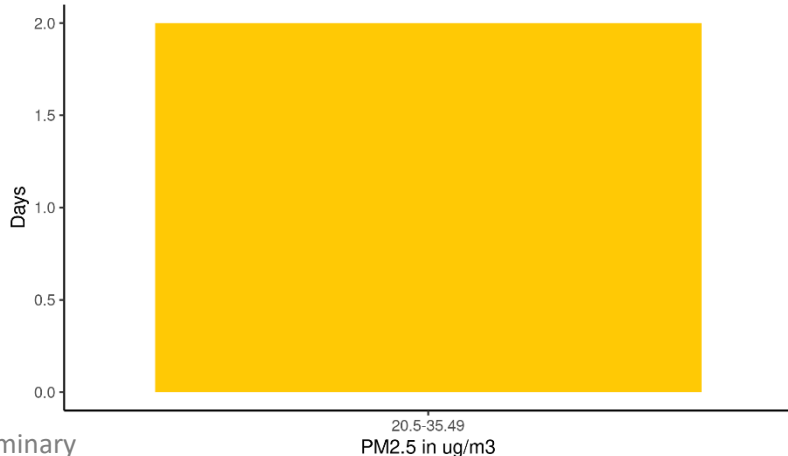
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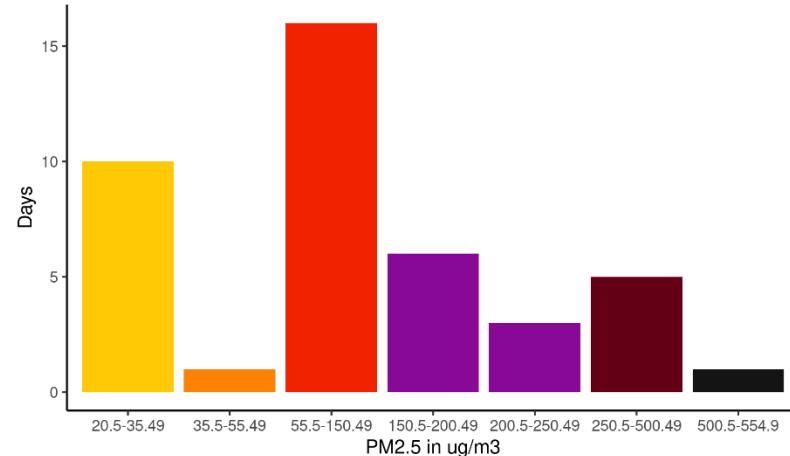
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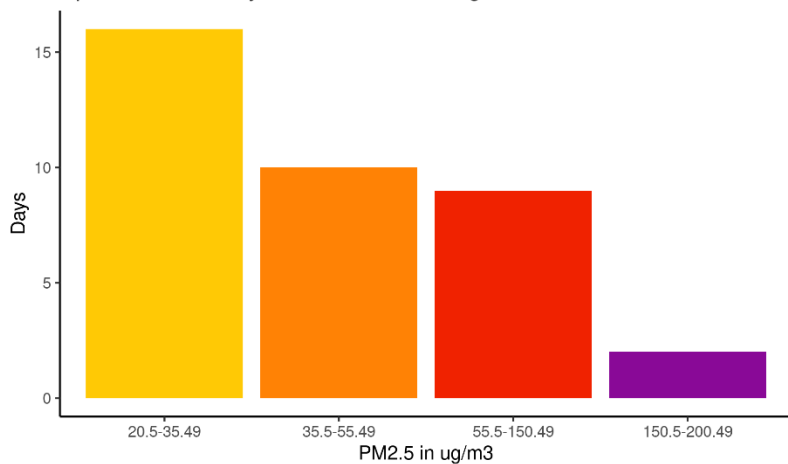


Chelan: Total days in each PM2.5 range for June to Oct 2018

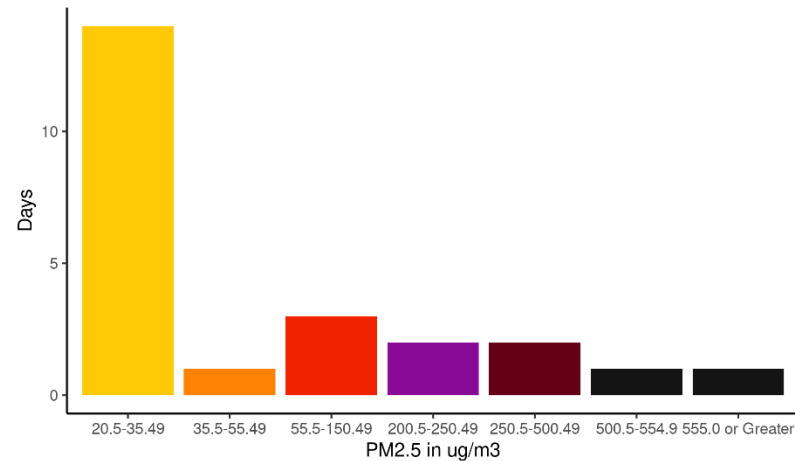


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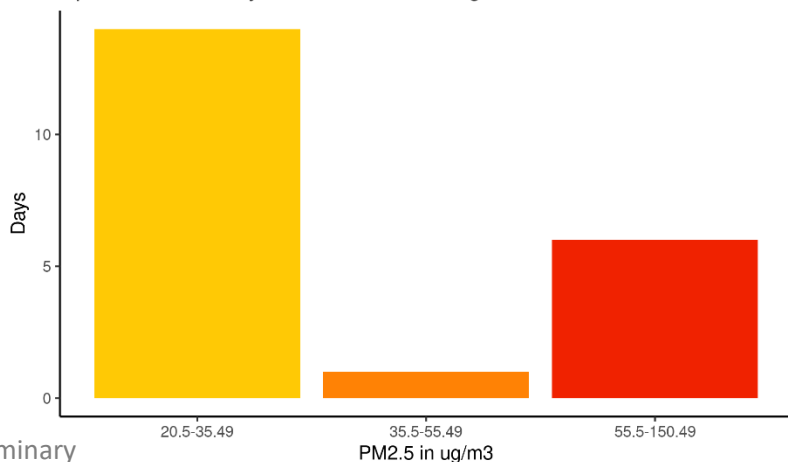
Spokane: Total days in each PM2.5 range for June to Oct 2021



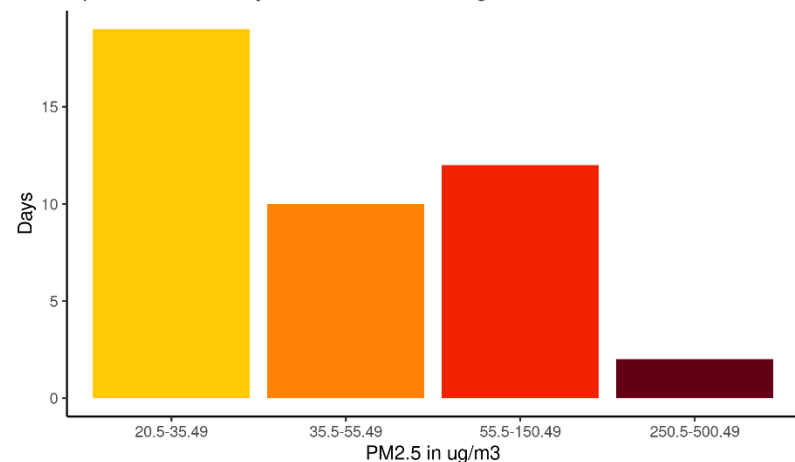
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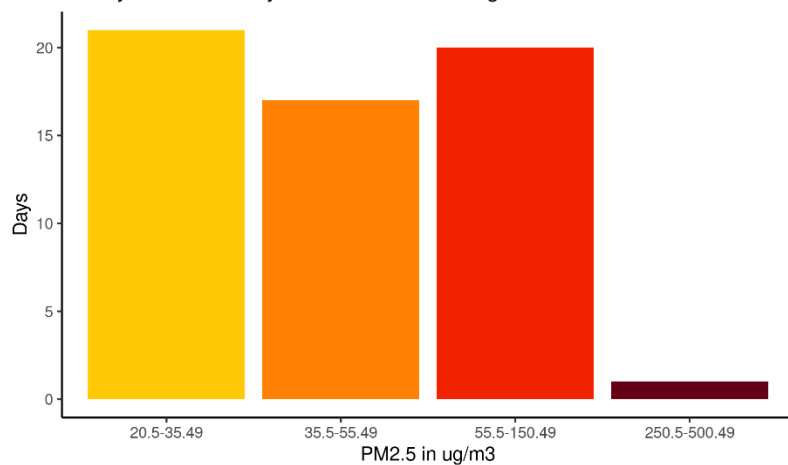


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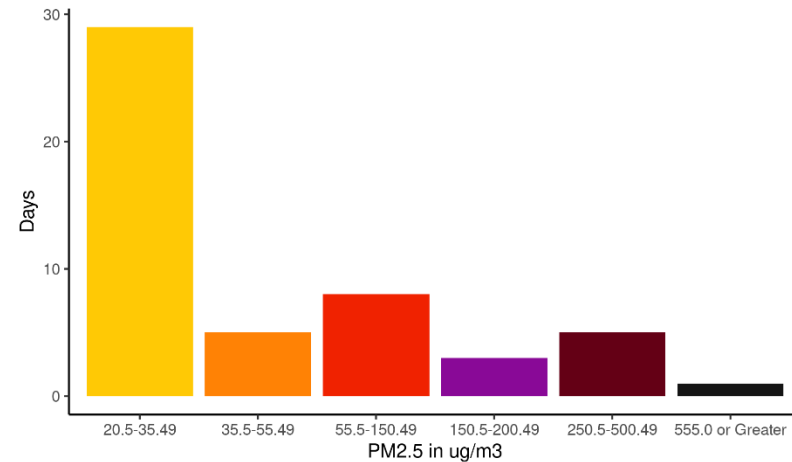


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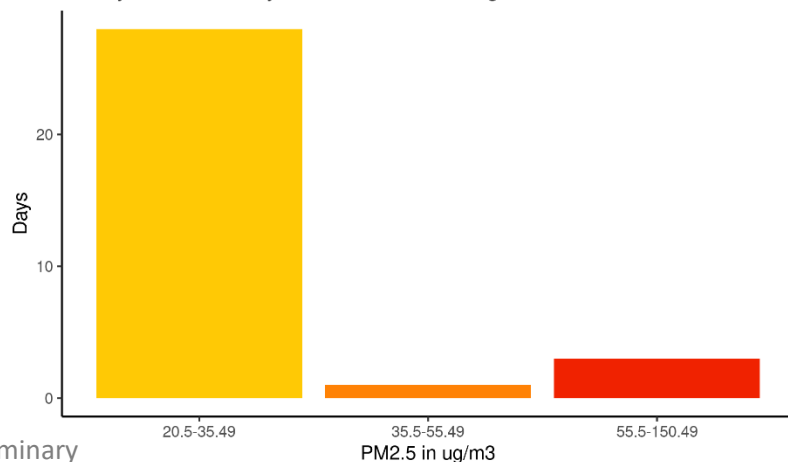
Sunnyside: Total days in each PM2.5 range for June to Oct 2021



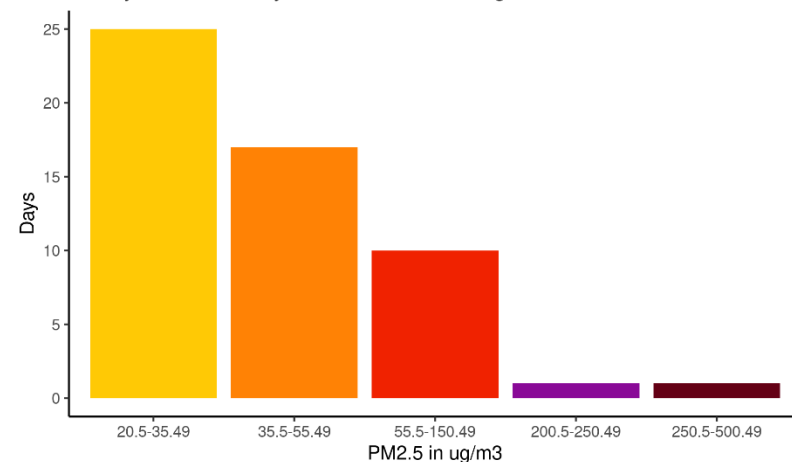
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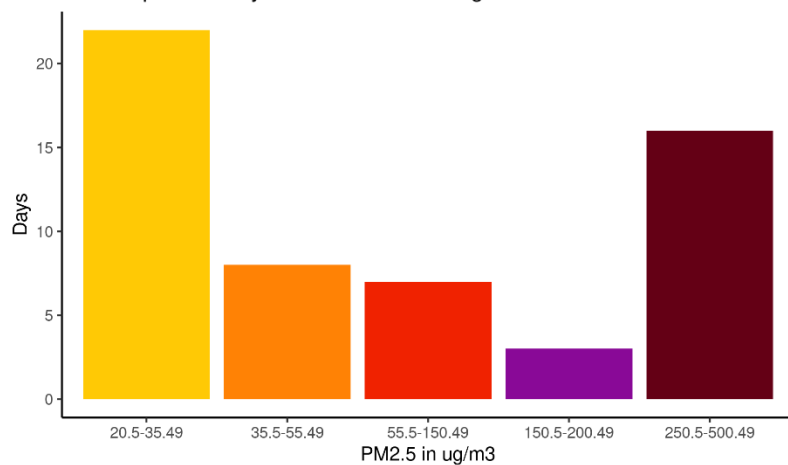


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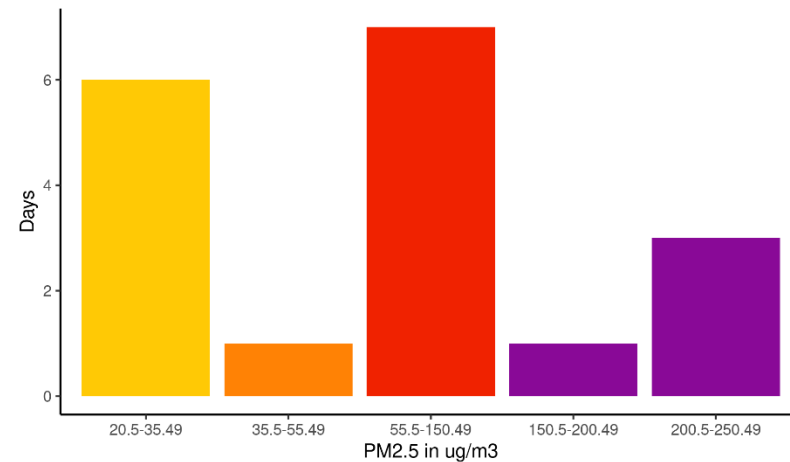


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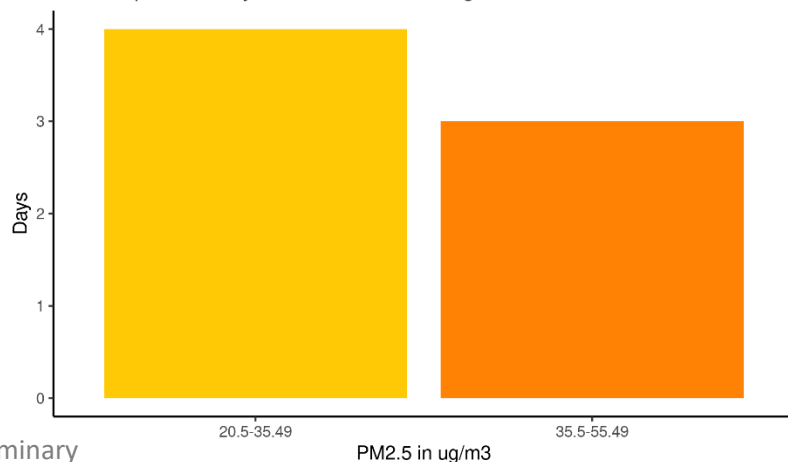
Winthrop: Total days in each PM2.5 range for June to Oct 2021



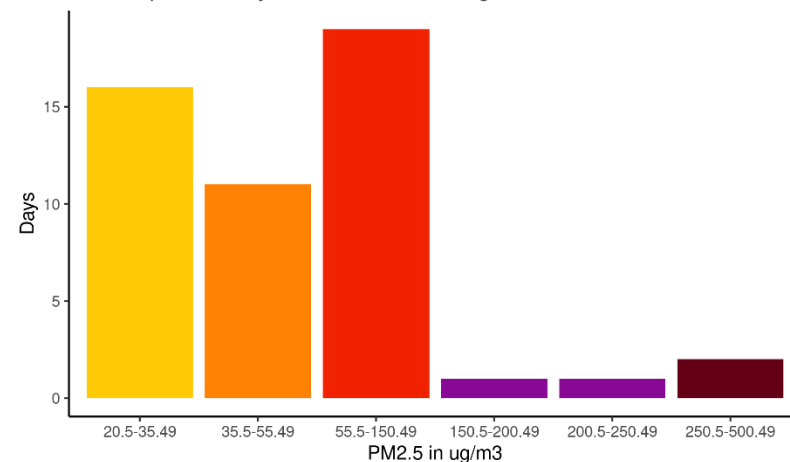
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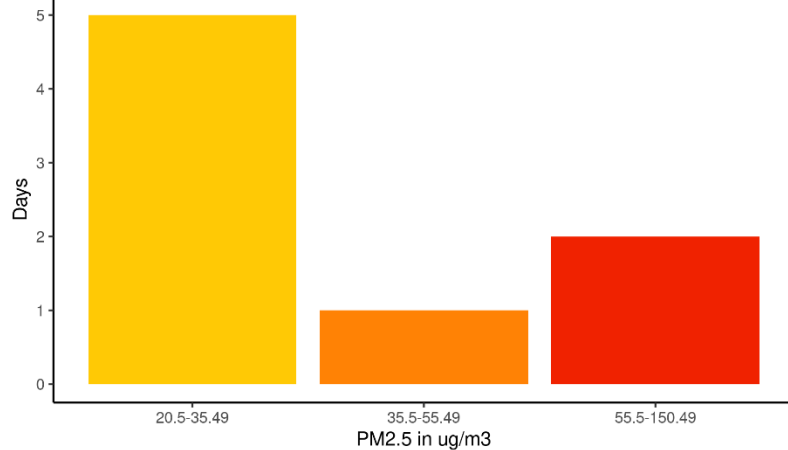


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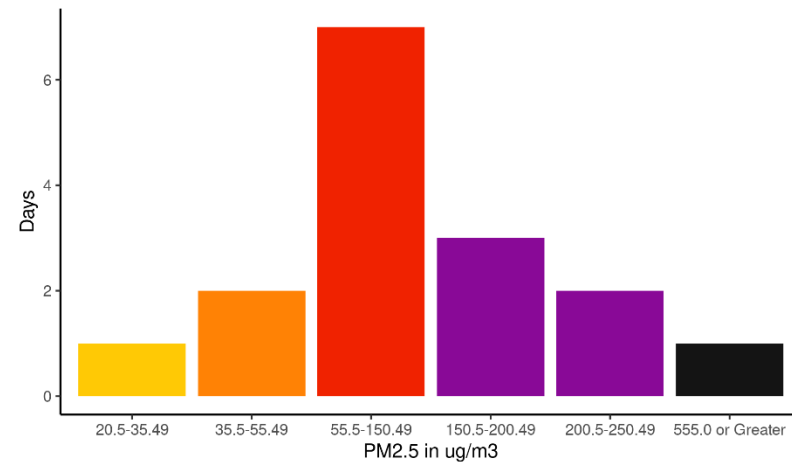


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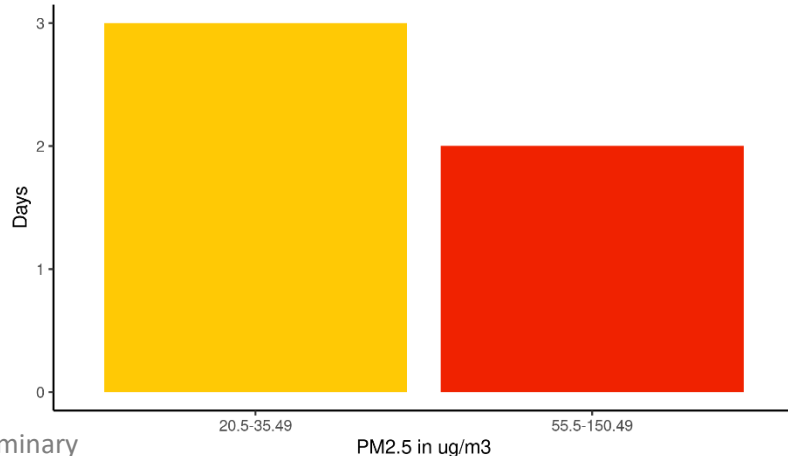
Seattle: Total days in each PM2.5 range for June to Oct 2021



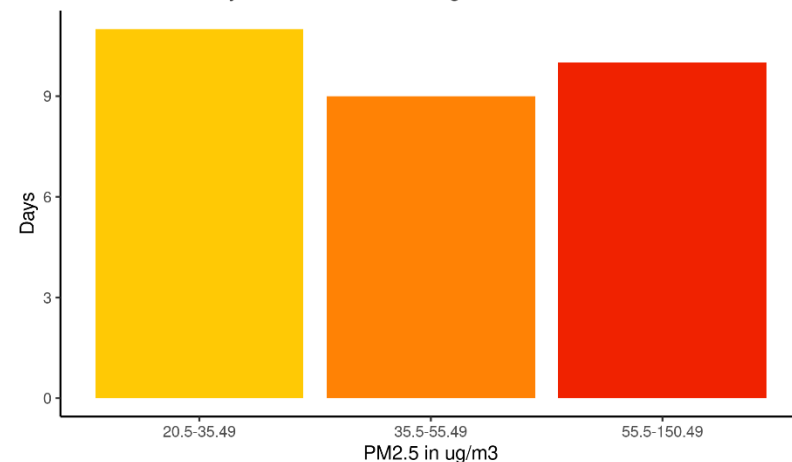
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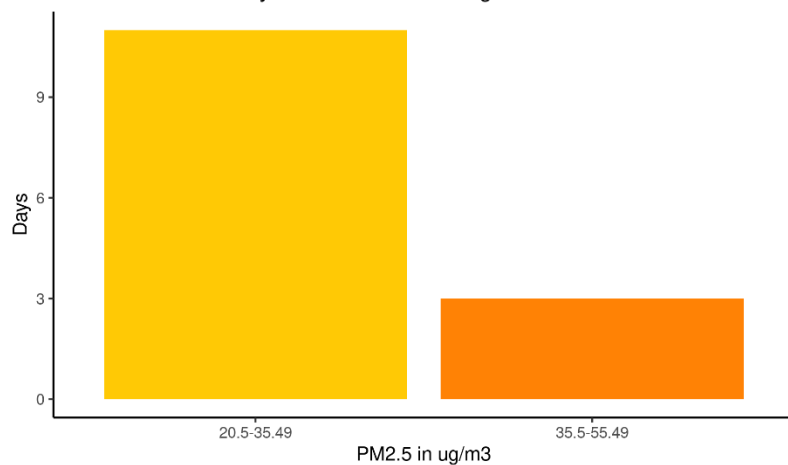


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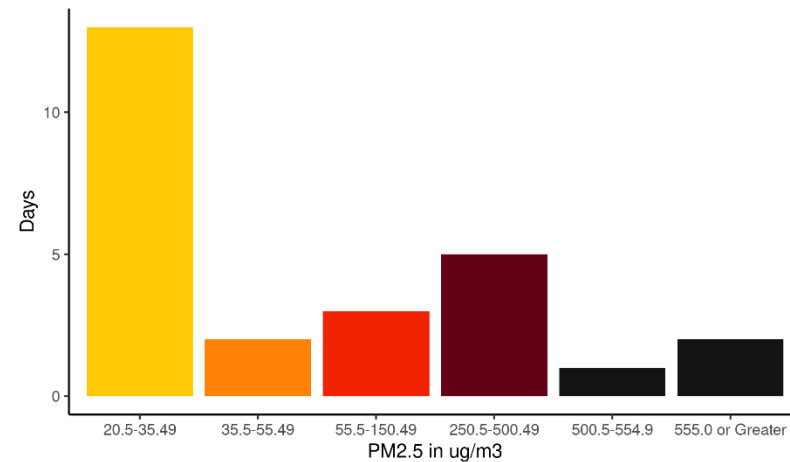


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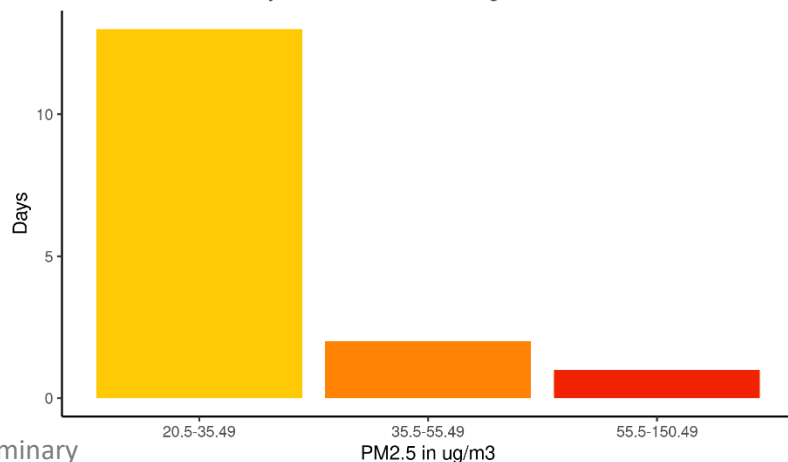
Vancouver: Total days in each PM2.5 range for June to Oct 2021



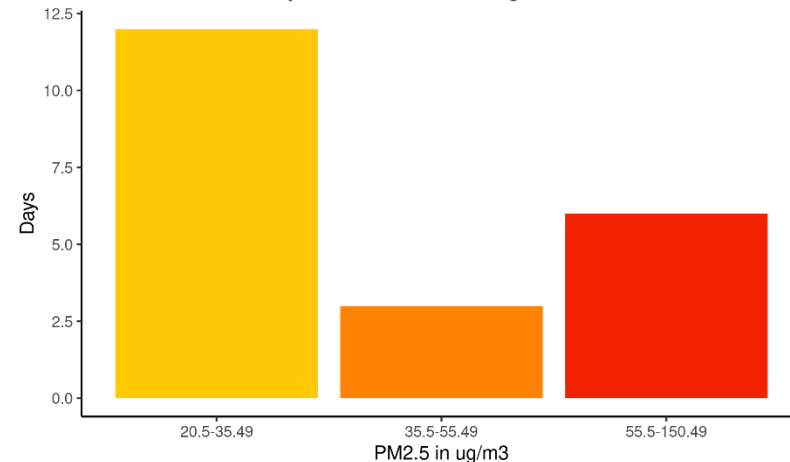
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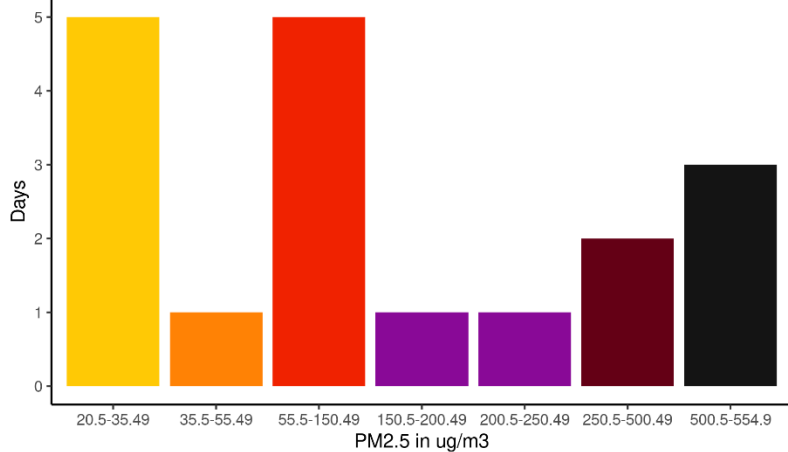


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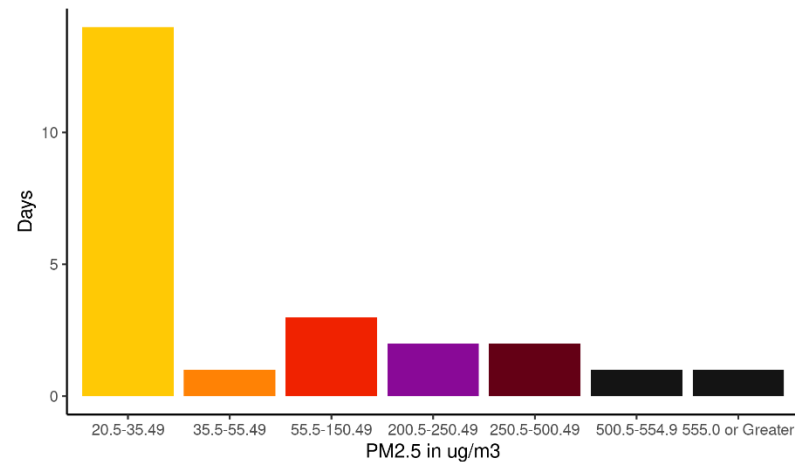


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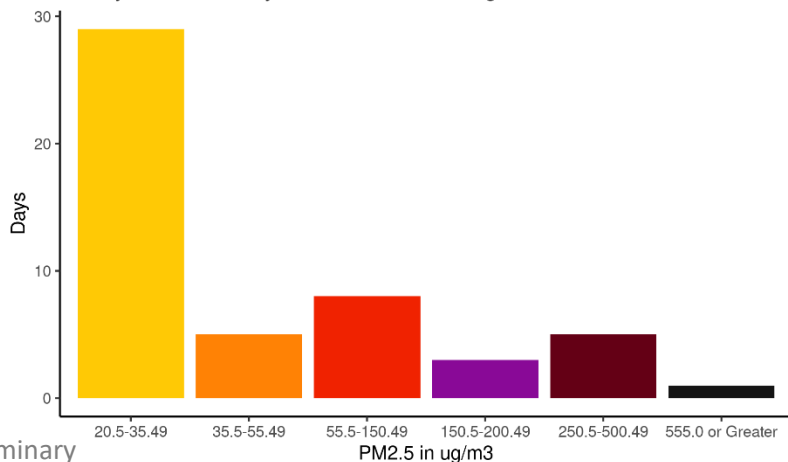
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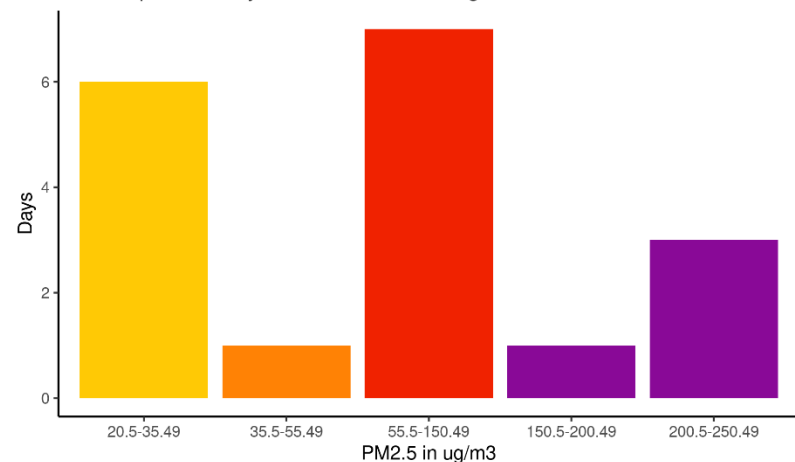
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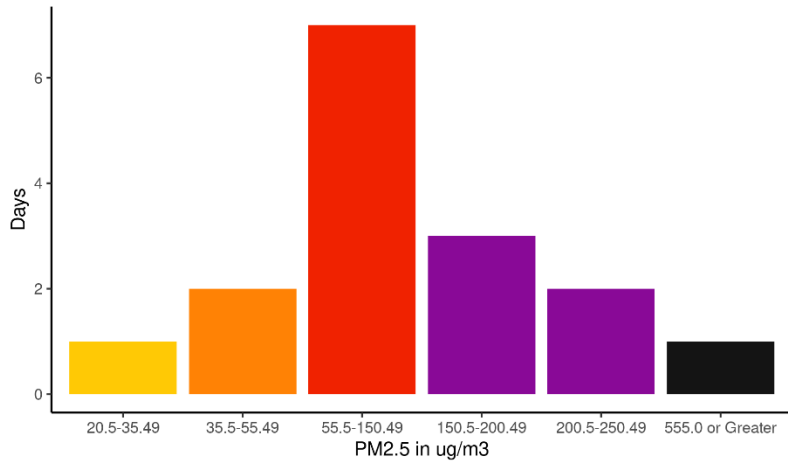


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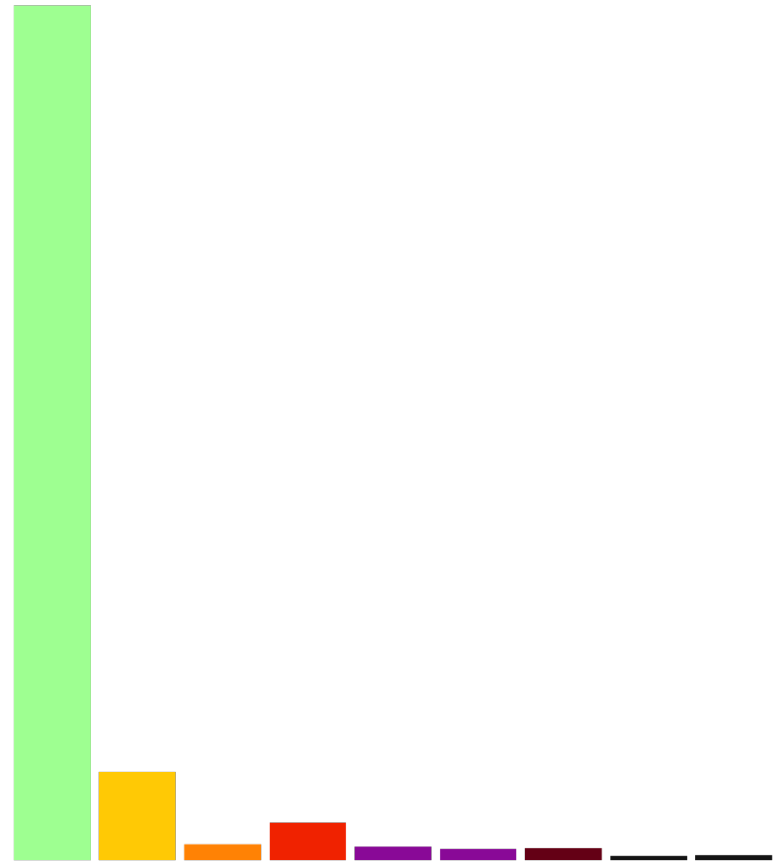


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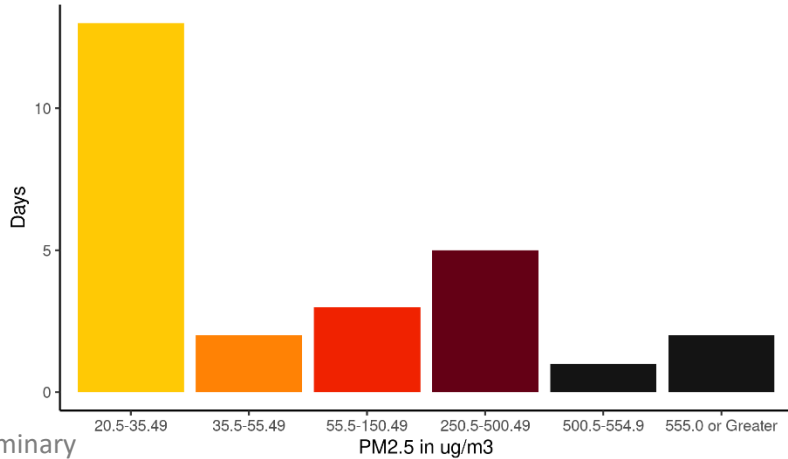
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All stations: Total days in each PM2.5 range for June to Oct 2020



Vancouver: Total days in each PM2.5 range for June to Oct 2020



*Preliminary

L&I DOSH Wildfire Smoke Rulemaking:

5 minute break

Please see Zoom chat for return time

A chance to stretch your
legs and take a deep
breath

What is a respirator?

- A respirator is a type of personal protective equipment (PPE) designed to protect the wearer from contaminants in the air when properly fitted
- Respirators are regulated by Chapter 296-842 WAC, Respirators

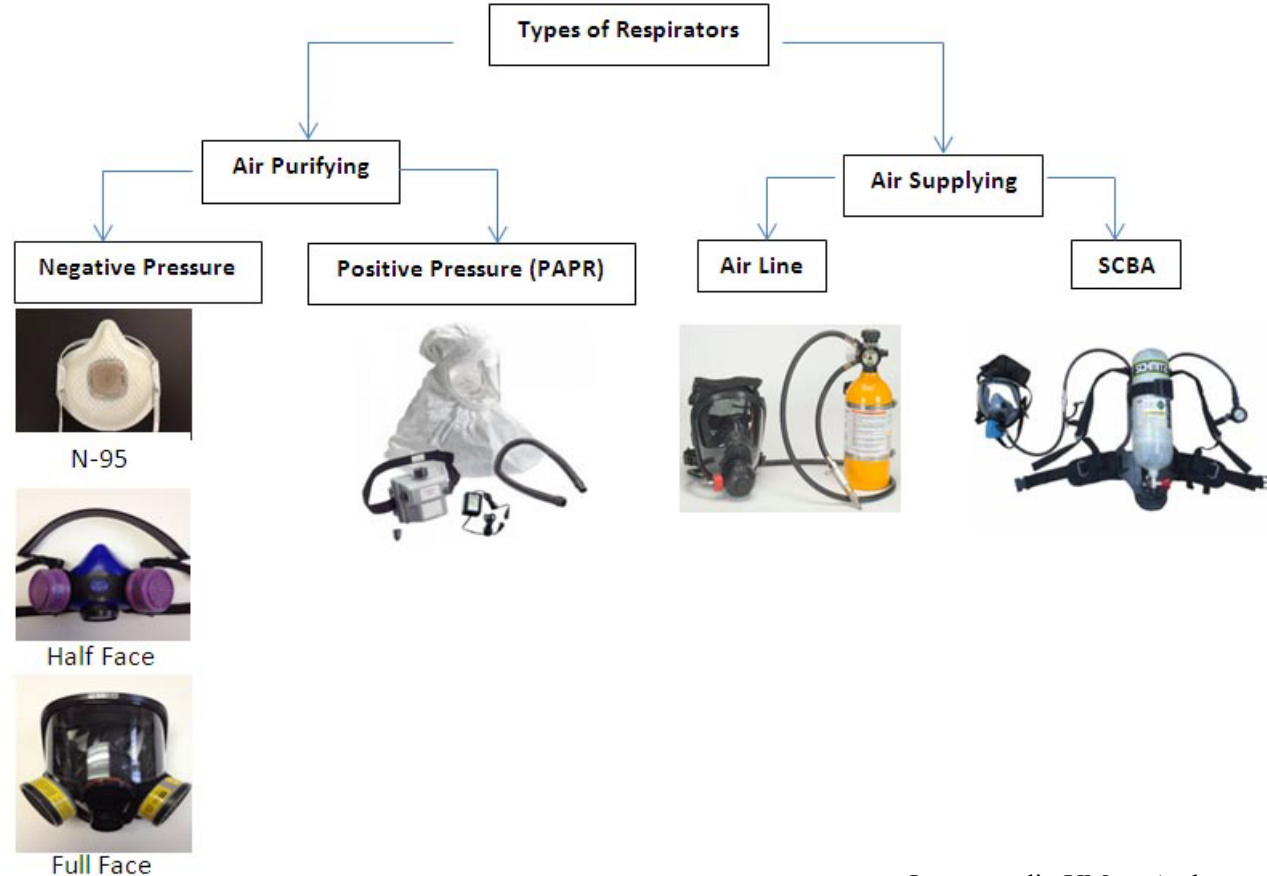


Image credit: UMass Amherst

Source Control vs. Respirators

Protections for COVID-19 and wildfire smoke are different

Mask for source control, not wildfire smoke

- If someone has an infectious disease, they may wear **Source Control (a mask)** to protect people near them from the infectious disease
- **Source Control** is an important way to protect one another from COVID-19
- **Source Control** does not ensure that the wearer is adequately protected from infectious diseases
- **Source control** will **not** protect the wearer from wildfire smoke, or other fine particulates in the air



Respirator for personal protection

- **Respirators** protect the wearer from contaminants in the air, including wildfire smoke and COVID-19
- **Respirators** are certified by the National Institute of Occupational Safety and Health (NIOSH)
- **Respirators** may also function as source control



Photos sourced from Shutterstock

Elements of a required use respiratory protection program?

Use of respirators is regulated by Chapter 296-842 WAC. There are 6 elements to a required use respiratory protection program:

1. A **written program** that details the employer's plan for implementing respiratory protection
2. A **medical evaluation** to ensure that it is safe for an employee to wear a respirator
May be done with a questionnaire, online, or in-person
3. A **fit-test** to ensure the respirator is providing protection to the employee
May be performed by the employer or a third party
4. Employee **training** to ensure employees properly and safely use respirators
5. Providing **respirators** to the employees
6. Ensuring employees have **no facial hair** that interferes with the respirator seal.

* Fit-test and shaving are not required for employees who use loose-fitting powered air purifying respirators (PAPR)

What is a respirator medical evaluation?

- A medical evaluation determines a worker's ability to select and wear a respirator.
- Some workers have medical conditions that would make it hazardous to wear certain respirators, including:
 - Certain cardiovascular conditions, claustrophobia, and others
- Medical evaluations involve filling out a survey and/or being examined by a healthcare provider
 - May be done online, in-person, or via telehealth

How do you fit-test N95 respirators?

- Ensures that the respirator provides the wearer with the expected level of protection from air contaminants
- **Qualitative Fit-Testing:** is used to detect respirator fit leaks
- Without fit-testing, there is often undetected leakage into the respirator
 - A wearer's sense of smell is not a good indicator of whether they are safe
 - Wearing a respirator that has not been fit-tested could mean a worker is exposed to hazardous levels of an air contaminant
 - The fit-testing process includes assistance selecting and ensuring the respirator fits

Effectiveness of N95 respirators without fit-testing?

“Fit is critical to the level of protection offered by respirators. For an N95 respirator to provide the promised protection, it must fit the participant. Performing a fit check via NHS self assessment guidelines was an unreliable way of determining fit.”

- O’Kelly et al. 2021: Comparing the fit of N95, KN95, surgical, and cloth face masks and assessing the accuracy of fit checking

“...fit-testing of N95 respirators is necessary to ensure that the user receives the expected level of protection.”

- Coffey et al. 1999: Simulated Workplace Performance of N95 Respirators

PM2.5 Concentration Inside Respirator (µg/m³)

The impact of fit-testing

PM _{2.5} (µg/m ³)	EPA AQI	Unfitted N95		Fit-tested N95	Loose-fitting powered air purifying respirator	Full facepiece air purifying respirator	Full facepiece powered air purifying respirator
20.5	AQI 69-100	18	10	2	1	0	0
35.5	AQI 101-150	31	18	4	1	1	0
55.5	AQI 151-200	49	28	6	2	1	0
100		88	50	10	4	2	0
150.5	AQI 201-300	132	75	15	6	3	0
175		154	88	18	7	4	0
200		176	100	20	8	4	0
250.5	AQI 301-500	220	125	25	10	5	0
300		264	150	30	12	6	0
350		308	175	35	14	7	0
400		352	200	40	16	8	0
450		396	225	45	18	9	0
500.4		440	250	50	20	10	1
555	<i>Beyond the AQI</i>	488	278	56	22	11	1
Assigned Protection Factor (APF)		NA	NA	10	25	50	1000

Required use respiratory protection program vs. partial respirator program

Required use respiratory protection program includes*:

1. Written program
2. Medical evaluation
3. Fit-testing
4. Worker training
5. Providing and requiring the use of respirators
6. Shaving of facial hair, if applicable

Partial respirator program will include:

1. Providing and requiring the use of respirators
2. Worker training
3. Modified medical evaluation

If modified medical evaluation indicates:

4. Fit-testing

* Per WAC 296-842. Fit-test and shaving are not required for employees who use loose-fitting powered air purifying respirators (PAPR)

Permanent Rule Respirator Policy Discussions

Topic	2022 Emergency Rule	Permanent Rule
Employers must provide filtering face-piece (N95) respirators for voluntary use	35µg/m ³ (101 AQI)	35µg/m ³ (101 AQI)
Employers must establish a partial respirator program	None	To be determined: seeking your feedback
Employers must establish a required use respiratory protection program	None	To be determined: seeking your feedback
More protective respirators threshold	555µg/m ³ (Beyond AQI)	555µg/m ³ (Beyond AQI)

Partial Respirator Program

PM_{2.5} thresholds under consideration:

- 35.5 µg/m³ (AQI 101)
- 55.5 µg/m³ (AQI 151)
- 150.5 µg/m³ (AQI 201)
- 200.9 µg/m³ (AQI 251)

All stations: Total days in each PM2.5 range for June to Oct 2020



PM _{2.5}	AQI Message	AQI
0 µg/m ³	Good	0
12.1 µg/m ³	Moderate	51
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Required Respiratory Protection Program

PM_{2.5} thresholds under consideration:

- 150.5 µg/m³ (AQI 201)
- 250.5 µg/m³ (AQI 301)
- 500.4 µg/m³ (AQI 500)

All stations: Total days in each PM2.5 range for June to Oct 2020



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L&I DOSH Wildfire Smoke Rulemaking:

10 minute break

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breath

Please provide us written feedback!

- We realize this is a complex topic and we may not get to all comments today
- Please provide us any written feedback on this topic by **August 24, 2022**. Please consider the following questions:
 1. What is important to take into consideration when selecting the thresholds for partial respirator program and required use respiratory protection program?
 2. What concerns do you have regarding worker protection?
 3. What concerns do you have regarding feasibility?
- Please send comments to Cindy Ireland: Cynthia.Ireland@Lni.wa.gov

Question & Answer Session

- There are two ways to participate:
 - Write and submit questions and/or comments regarding the rule in the Q&A feature. We will answer questions in the order in which they are asked.
 - Raise your hand to speak aloud. The meeting facilitator will call on everyone who wishes to speak. If you raise your hand, **you will be allowed 2 minutes to speak as we have limited time for comments.** Please say your name and the organization you represent if you raise your hand.
- You may also submit questions or comments after the meeting to our designated staff.
- A court reporter will be recording questions and answers, which will be available on our website.
- Please speak slowly to ensure adequate interpretation and transcription

Note: If you are on the phone, to raise/lower hand use *9. To mute/unmute use *6.

Thank you!

Please send questions or comments to:

Technical: Chris Pyke or Dr. Nicholas Reul

Chris.pyke@Lni.wa.gov

Nicholas.reul@Lni.wa.gov

Process: Cindy Ireland

Cynthia.Ireland@Lni.wa.gov