



# COVID-19 and Air Quality

## Impact on public health

Board Meeting April 23, 2020





# Outline

- Brief review of health (particularly respiratory) impacts of air pollution
- Brief review of studies linking air pollution to virus susceptibility
- Higher-risk populations
- Brief summary of recent air quality, media inquiries, and voluntary call to action

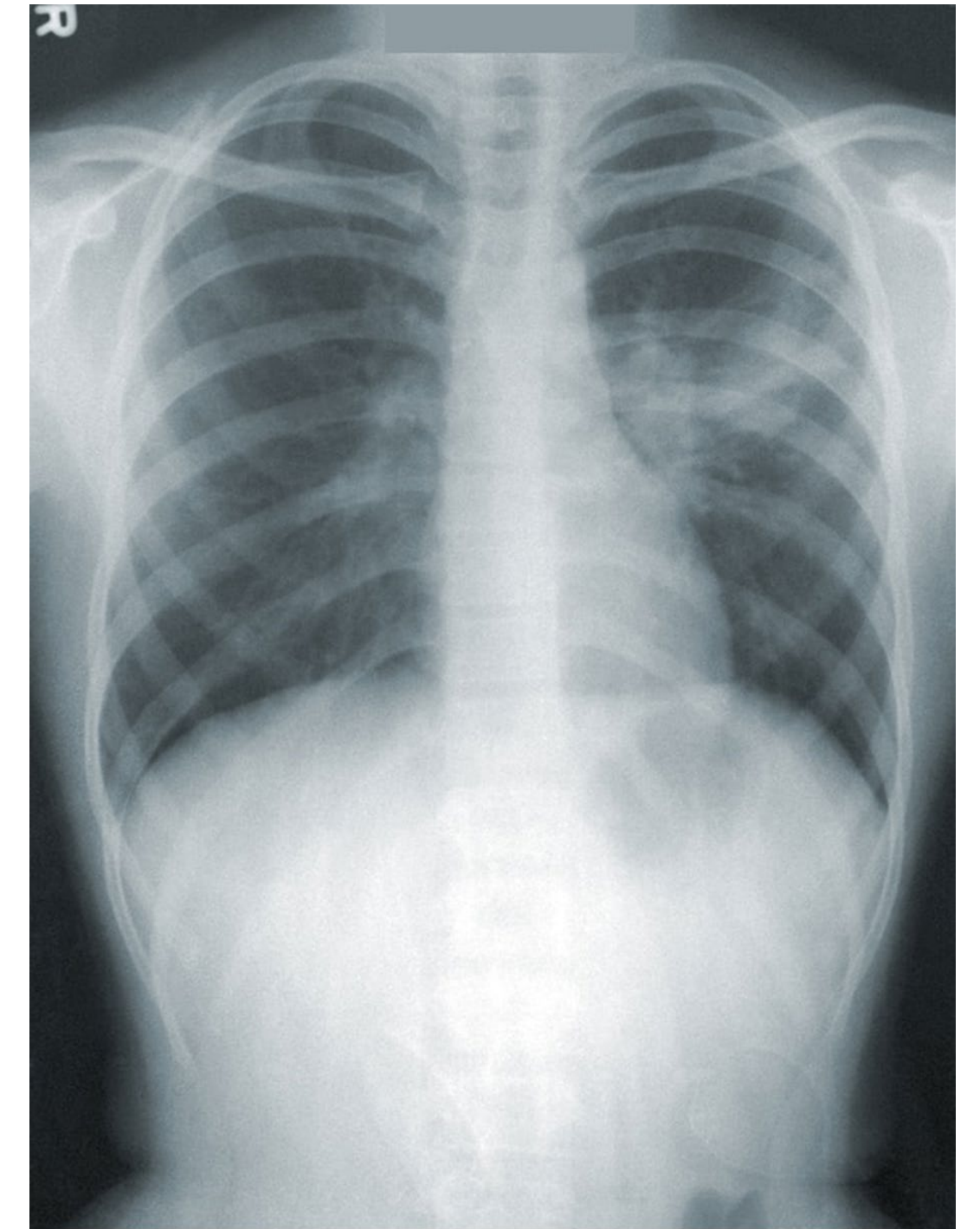
# Established Health Effects of Air Pollution<sup>1</sup>

- Respiratory
  - Reduced lung function
  - Aggravation of lung disease
  - Increased lung infections
  - Asthma attacks
- Cardiovascular
  - Heart disease
  - Stroke
- Emerging studies showing other health links, but still early (worsen insulin sensitivity, neurological impacts)



# Air Pollution and Respiratory Impacts

- Air pollution contributes to the health conditions that could increase risk from a virus or bacteria (like COVID-19)<sup>1</sup>
- Particle pollution impairs the body's built-in protection mechanisms<sup>1</sup>
- Linked to hospital admission for respiratory infection<sup>1</sup> and Acute Respiratory Distress Syndrome (ARDS)<sup>2</sup>
- Led to a higher viral load in-vitro<sup>3</sup> and higher mortality from influenza in mice<sup>4</sup>

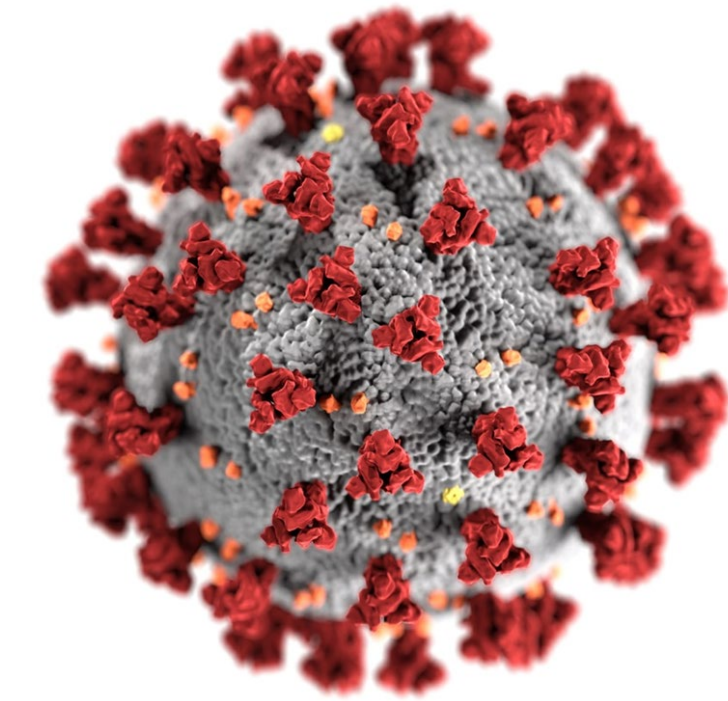


<https://unsplash.com/photos/NMZdj2Zu36M>



# Pandemics and Air Quality

- Limited research—difficult to estimate effect because of many confounders
- 1918 flu<sup>5</sup>
  - Tens of thousands of excess deaths due to air pollution
  - A loss of \$45.9 billion; 6 percent of GDP
- SARS<sup>6</sup>
  - Somewhat limited study with five cities in China
  - Showed positive association between air pollution and SARS case fatality
- COVID-19<sup>7</sup>
  - A very recent study looking at 3,000 counties across the US
  - A small increase in long-term exposure to PM<sub>2.5</sub> leads to a large increase in COVID-19 death rate
  - A “1  $\mu\text{g}/\text{m}^3$  in PM<sub>2.5</sub> is associated with a 15% increase in the COVID-19 death rate”
  - Interesting result – will need to be more vetted with more analysis and duration



<https://unsplash.com/photos/k0KRNtgcjfw>

# Populations at Increased Risk

- Elderly, people with pre-existing conditions
- Equity: People of color and low-income residents
  - More pre-existing conditions, under-insured, racial bias, higher pollution exposure<sup>8,9,10</sup>
  - Ability to work from home<sup>11</sup>
    - High-income (60%), low-income (9%)
    - Asian (37%), White (30%), Black (20%), Hispanic (16%)



# Recent Air Quality

In our region:

- Traffic pollutants, such as black carbon and NO<sub>x</sub>, are down 20–30% (preliminary analysis)
- Fine particle pollution has been higher than expected
- Meteorology has a large effect, difficult to isolate the response to COVID-19

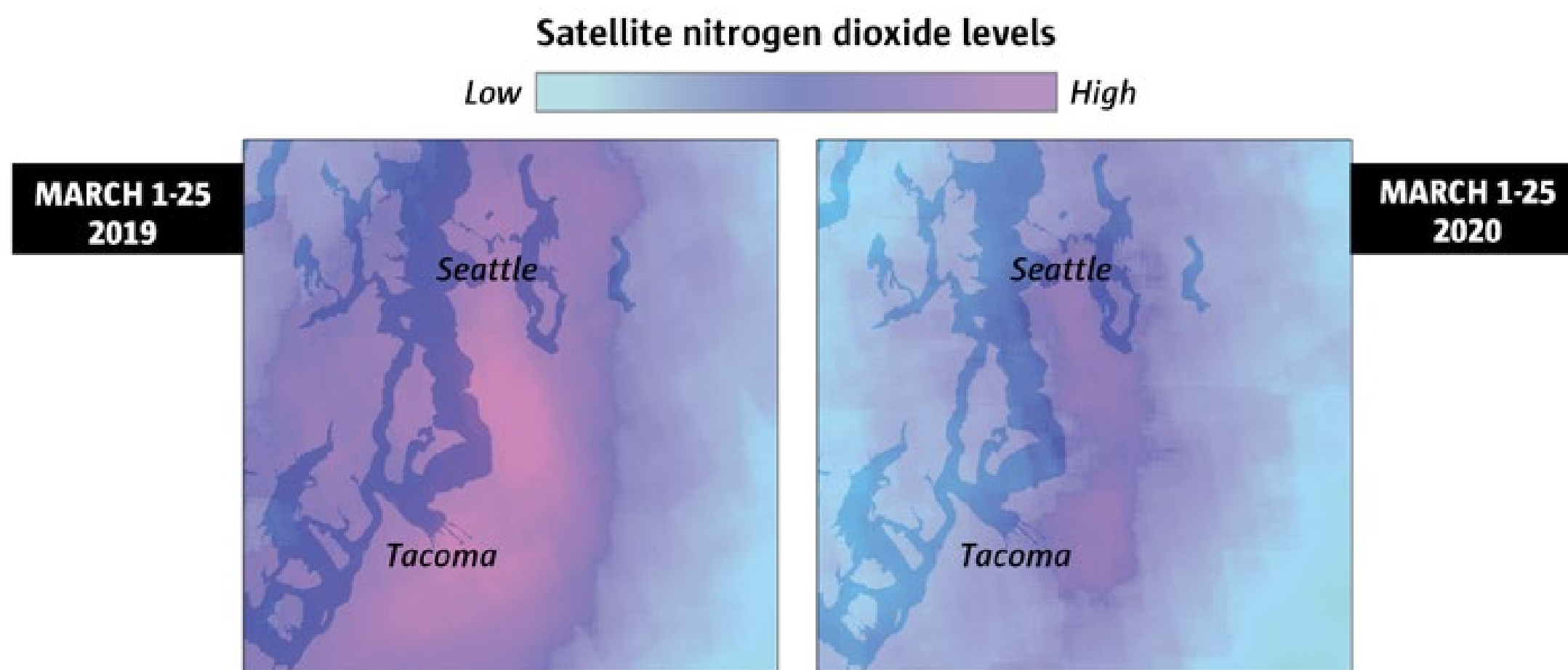
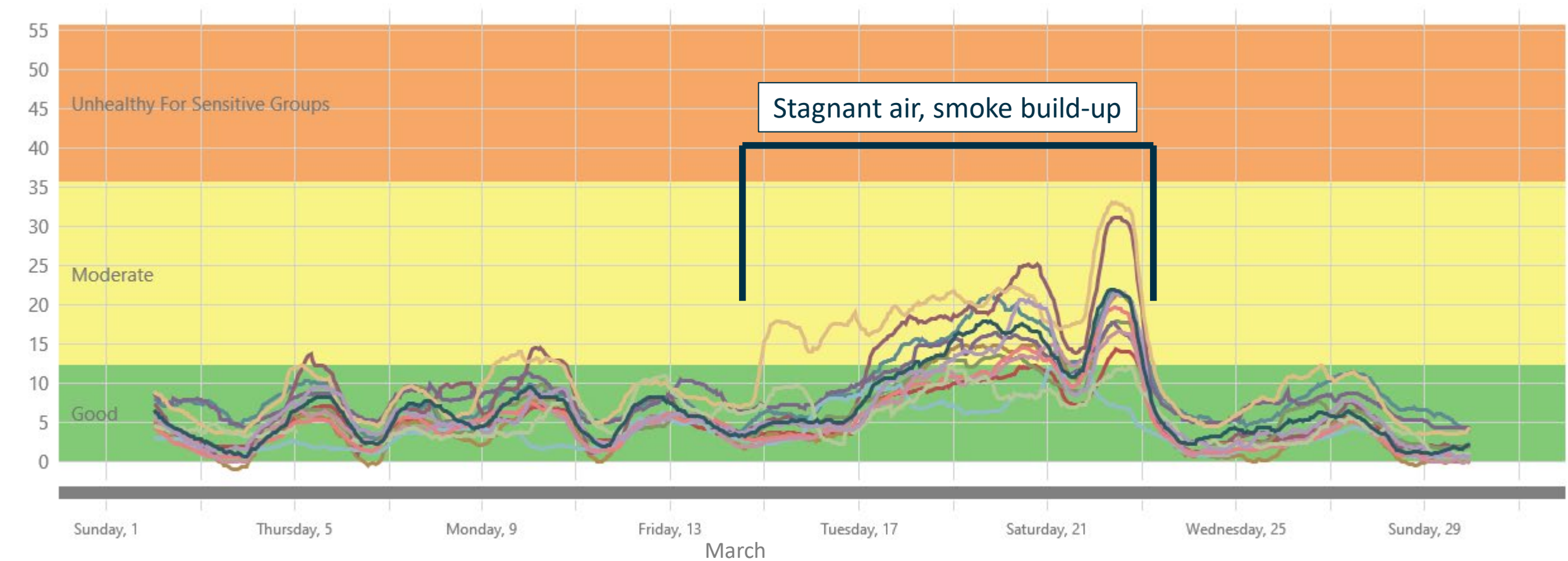


Image source: Satellite Sentinel-5P NRTI NO<sub>2</sub> - near real time nitrogen dioxide as imaged from space by satellite.  
Provided by the European Union/ESA/Copernicus, Scripps Institution of Oceanography

<https://www.seattletimes.com/seattle-news/environment/coronavirus-closures-reduce-seattle-area-air-pollution-but-not-global-warming/>





# Media Inquiries

- “One good thing about the stay-at-home order – better air quality. With fewer cars on the road, there’s **less tailpipe pollution**. While roadway pollution is down, the [Puget Sound Clean Air Agency](#) (CAA) has noticed an **increase in very small particle pollution**, the type of pollution created by burning things.”<sup>12</sup> KOMO, 4/7, author and Phil Swartzendruber
- “the amount of very small particular pollution is actually up, probably because so **many people are home burning** fireplaces and wood stoves.”<sup>13</sup> Seattle Times, 3/31, Craig Kenworthy
- “having a viral pandemic isn’t the way we want to see air pollution improve.”<sup>14</sup> Crosscut, 4/6, Erik Saganić
- “more extensive research is necessary to understand how polluted air could impact the outcomes of coronavirus patients.”<sup>15</sup> KOMO, 4/8, Erik Saganić



# Actions

- Media inquiries and social media
- Voluntary burn ban
  - Our message: *To reduce local pollution and help our most at-risk friends and neighbors during the COVID-19 pandemic, please burn wood only for heating purposes and avoid any outdoor fires.*
  - Coordination with other local air quality agencies and state





# References

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11. <https://www.epi.org/blog/black-and-hispanic-workers-are-much-less-likely-to-be-able-to-work-from-home/>



# References

12. <https://komonews.com/news/consumer/wood-should-only-be-burned-for-heating-agency-advises>
13. <https://www.seattletimes.com/seattle-news/environment/coronavirus-closures-reduce-seattle-area-air-pollution-but-not-global-warming/>
14. <https://crosscut.com/2020/04/more-people-staying-home-washington-skies-are-cleaner>
15. <https://komonews.com/news/coronavirus/study-air-pollution-may-increase-risk-of-dying-from-covid-19>