



# Sacramento Region COVID-19 Shelter-in-Place Air Quality Benefit Analysis

Sacramento Metropolitan Air Quality Management  
Board of Director's Meeting  
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# Studies linking COVID-19 and Air Quality

- COVID-19 global pandemic has affected air pollution emissions through shelter-in-place orders
- **Harvard study<sup>1</sup>** to show a link between long term air pollution exposure and death or serious illness from COVID-19
- **UC Davis special report:** US traffic reduction has resulted in reduction in greenhouse gas (GHG) emissions

<sup>1</sup><https://projects.iq.harvard.edu/covid-pm>

<sup>2</sup>[https://roadeology.ucdavis.edu/files/content/projects/COVID\\_CHIPs\\_Impacts\\_updated\\_430.pdf](https://roadeology.ucdavis.edu/files/content/projects/COVID_CHIPs_Impacts_updated_430.pdf)

## *New Research Links Air Pollution to Higher Coronavirus Death Rates*



Atlanta on Saturday evening. The area is likely to suffer more deaths than the adjacent Douglas County, Ga. Kevin C. Cox/Getty Images



By [Lisa Friedman](#)

Published April 7, 2020 Updated April 17, 2020



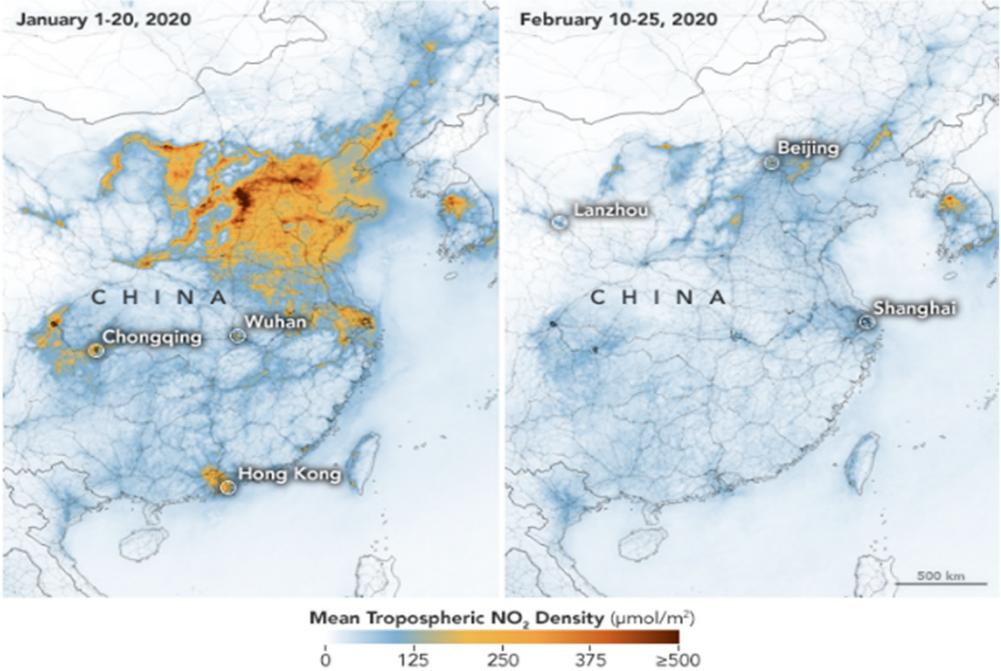
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WASHINGTON — Coronavirus patients in areas that had high levels of air pollution before the pandemic are more likely to die from the infection than patients in cleaner parts of the country, according to a [new nationwide study](#) that offers the first clear link between long-term exposure to pollution and [Covid-19 death rates](#).

<https://www.nytimes.com/2020/04/07/climate/air-pollution-coronavirus-covid.html>

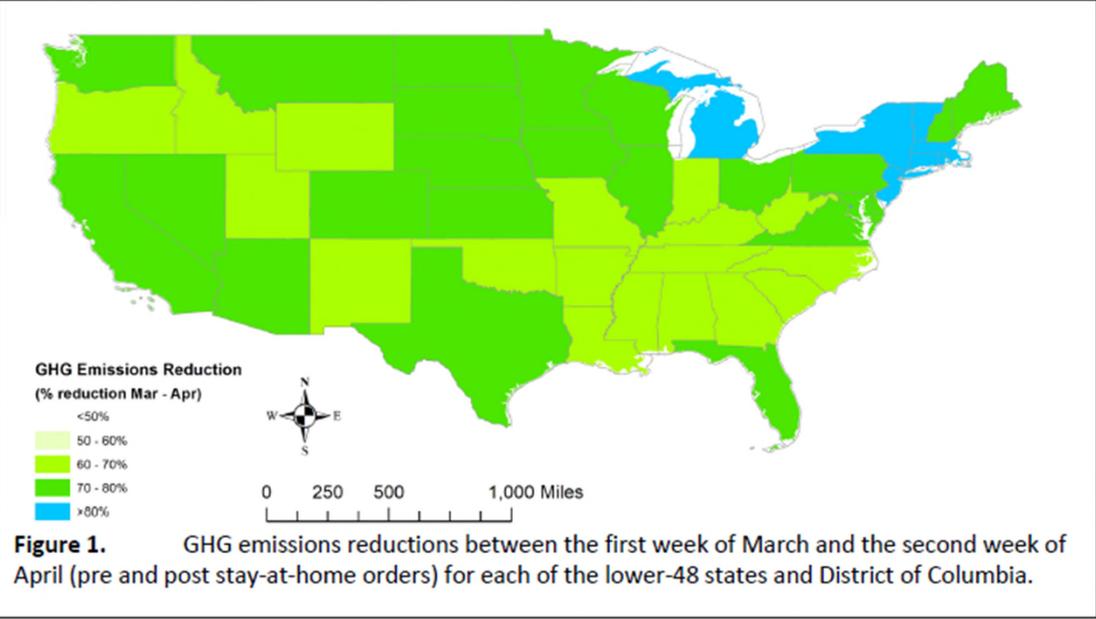
# Silver Lining: Air and Climate Pollution Improvements

Reduction in traffic related emissions (NO<sub>2</sub>, PM<sub>2.5</sub>, Ozone precursors, CO<sub>2</sub>e) across the globe being investigated



<https://earthobservatory.nasa.gov/images/146362/airborne-nitrogen-dioxide-plummets-over-china?>

**“..US greenhouse gas (GHG) emissions that cause climate change were reduced by 4% in total and by 13% from transportation in the almost 8 weeks since many stay-at-home orders went into effect.”**



**Figure 1.** GHG emissions reductions between the first week of March and the second week of April (pre and post stay-at-home orders) for each of the lower-48 states and District of Columbia.

**Reference: UC Davis Special Report 3:** Impact of COVID19 Mitigation on Traffic, Fuel Use and Climate Change; Fraser Shilling, Ph.D.

[https://roadeology.ucdavis.edu/files/content/projects/COVID\\_CHIPs\\_Impacts\\_updated\\_430.pdf](https://roadeology.ucdavis.edu/files/content/projects/COVID_CHIPs_Impacts_updated_430.pdf)

# Untangling shelter-in-place AQ benefit from seasonal trend to inform future telework policy



**Task 1:** Determine whether the AQ during SIP period is cleaner than historical periods

**Task 2:** Did meteorology play a significant role in the improvement in air quality

**Task 3:** Develop a model to estimate what the AQ would have been absent Shelter-in-Place orders.

**Task 4:** Estimate impact of reduced on-road traffic on overall emissions during Shelter-in-Place orders

**Goal: Scientifically Defensible  
Quantification of Air Quality  
Improvement**

# Task 2: Preliminary results

## Sacramento County, April 2020

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	2012, 2015, 2019 average	2020	Conc. Difference	% Improvements
<b>PM<sub>2.5</sub> (ug/m<sup>3</sup>*)</b>	7.5	4.7	-2.8	37%
<b>NO<sub>2</sub> (ppbC**)</b>	20.1	14.0	-6.1	30%
<b>Ozone (ppbC**)</b>	49.3	44.0	-5.3	11%

\*micrograms per cubic meter

\*\*parts per billion concentration

- Compared to meteorologically similar years, monthly average concentrations for all three pollutants were lower in April 2020.
- Reductions were observed in all three pollutants

# Stay Tuned....

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**Task 3:** Develop a model to estimate what the AQ would have been absent Shelter-in-Place orders.

**Task 4:** Estimate impact of reduced on-road traffic on overall emissions during Shelter-in-Place orders

# Planning and Policy Implications

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- Public health and air quality – scientifically defensible quantification of air quality improvements due to COVID-19 shelter-in-place
- Couple air quality improvements with SACOG's analysis of VMT reductions
- Support future policy recommendations for teleworking in the greater Sacramento region