

# In China, quarantine improves air quality and prevents thousands of deaths

May 15 2020, by Michael Greenwood

---



Improved air quality in China during the coronavirus quarantine significantly improved the country's air quality and, in turn, prevented thousands of pollution-related deaths. Credit: Dreamstime

Soon after coronavirus appeared, an all-encompassing quarantine put into effect by the Chinese government slowed the spread of the disease and saved lives, but the quarantine also produced another unanticipated

health benefit.

A new study led by researchers at the Yale School of Public Health and published in the journal *Lancet Planetary Health*, finds that China's countrywide ban on traffic mobility from February 10 to March 14 greatly limited automobile emissions and sharply reduced the country's often [severe air pollution](#).

The improved air quality, in turn, prevented thousands of pollution-related deaths. More premature deaths were avoided by cleaner air—an estimated 12,125—than lives lost from the pandemic—4,633 as of May 4, the study finds.

"This is a very surprising result. The pandemic continues to be a terrible thing for China and the rest of the world, but the decrease in emissions that accompanied it has actually conferred some positive health results," said Kai Chen, assistant professor at the Yale School of Public Health and the study's first author. "The question is, how can we have one without the other?"

Although the findings cannot be directly applied to other countries due to different severity of and responses to COVID-19, as well as differing [air pollution levels](#) and population characteristics, reduced air pollution levels have been detected in other Asian and European countries and the U.S. after their own lockdowns, Chen said. He notes that this reduction in pollution has likely conferred similar health benefits.

The study found that ground-level air pollution levels dropped remarkably throughout China, with nitrogen dioxide (NO<sub>2</sub>) dropping by 12.9  $\mu\text{g}/\text{m}^3$  (or 37% compared with before the quarantine period) and [fine particulate matter](#) (PM<sub>2.5</sub>) dropping by 18.9  $\mu\text{g}/\text{m}^3$  (30%) across 367 Chinese cities. The decline in NO<sub>2</sub> across China during the quarantine period was so dramatic that it was detected by satellite

measurements.

NO<sub>2</sub> is a gaseous air pollutant, which is mainly produced from fuel burning in vehicles and power plants. NO<sub>2</sub> level before the quarantine (January 5 to 20) was as high as 40.5 µg/m<sup>3</sup> in Wuhan, where the outbreak began in China. During the quarantine (February 10 to March 14), those levels had fallen to 18.8 µg/m<sup>3</sup> (micrograms per cubic meter).

Particulate matter includes all solid and liquid particles suspended in air, many of which are hazardous when inhaled. This mixture includes both organic and inorganic particles, such as dust, pollen, soot, smoke, and liquid droplets. Before the quarantine, PM 2.5 (fine inhalable particles with diameters of 2.5 micrometers or smaller) levels were measured at 62.5 µg/m<sup>3</sup> in many Chinese cities. During the quarantine, the fine particulate matter reading has been 36.5 µg/m<sup>3</sup> in those same locations.

The authors then calculated the number of avoided deaths attributable to these decreases in NO<sub>2</sub> and PM<sub>2.5</sub> across China based on the short-term association between these pollutants and daily mortality using data from a previous epidemiological study of 272 Chinese cities, and mortality data from the China Health and Family Planning Statistical Yearbook 2018. The authors found that among the more than 12,000 avoided deaths, about two-thirds were from avoided cardiovascular diseases (hypertensive disease, coronary heart disease and stroke) and chronic obstructive pulmonary disease.

The findings illustrate the substantial human health benefits related to cardiovascular disease morbidity and mortality that can be achieved when aggressive air pollution control measures are put in place to reduce emissions from vehicles, such as through climate mitigation-related traffic restrictions or efforts to accelerate the transition to electric vehicles, the authors said.

"This unexpected health benefit suggests that if we were to address the climate crisis as aggressively as we are combating the COVID-19 pandemic with strong political will and urgent action, we could prevent the enormous health burdens associated with climate change," said co-author Paul T. Anastas, professor at the Yale School of Public Health and the Teresa and H. John Heinz III Chair of Chemistry for the Environment.

The authors said that they want to further identify whether climate or weather-related factors and air pollution could influence population susceptibility to COVID-19.

**More information:** Kai Chen et al. Air pollution reduction and mortality benefit during the COVID-19 outbreak in China, *The Lancet Planetary Health* (2020). [DOI: 10.1016/S2542-5196\(20\)30107-8](https://doi.org/10.1016/S2542-5196(20)30107-8)

Provided by Yale University

Citation: In China, quarantine improves air quality and prevents thousands of deaths (2020, May 15) retrieved 3 May 2024 from <https://phys.org/news/2020-05-china-quarantine-air-quality-thousands.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.