

Publication

Stringency of COVID-19 containment response policies and air quality changes: a global analysis across 1851 cities

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)**ID** 4651935**Author(s)** Zhang, J.; Lim, Y. H.; Andersen, Z. J.; Napolitano, G.; Taghavi Shahri, S. M.; So, R.; Plucker, M.; Danesh-Yazdi, M.; Cole-Hunter, T.; Therning Jørgensen, J.; Liu, S.; Bergmann, M.; Jayant Mehta, A.; Mortensen, L. H.; Requia, W.; Lange, T.; Loft, S.; Künzli, N.; Schwartz, J.; Amini, H.**Author(s) at UniBasel** Künzli, Nino ;**Year** 2022**Title** Stringency of COVID-19 containment response policies and air quality changes: a global analysis across 1851 cities**Journal** Environmental science & technology**Volume** 56**Number** 17**Pages / Article-Number** 12086-12096**Keywords** SARS-CoV-2; air pollution; lockdown; policies; worsened**Mesh terms** Air Pollutants, analysis; Air Pollution, analysis; COVID-19, epidemiology; Cities, epidemiology; Communicable Disease Control; Environmental Monitoring; Humans; Nitrogen Dioxide, analysis; Particulate Matter, analysis; Policy; SARS-CoV-2

The COVID-19 containment response policies (CRPs) had a major impact on air quality (AQ). These CRPs have been time-varying and location-specific. So far, despite having numerous studies on the effect of COVID-19 lockdown on AQ, a knowledge gap remains on the association between stringency of CRPs and AQ changes across the world, regions, nations, and cities. Here, we show that globally across 1851 cities (each more than 300000 people) in 149 countries, after controlling for the impacts of relevant covariates (e.g., meteorology), Sentinel-5P satellite-observed nitrogen dioxide (NO₂) levels decreased by 4.9% (95% CI: 2.2, 7.6%) during lockdowns following stringent CRPs compared to pre-CRPs. The NO₂ levels did not change significantly during moderate CRPs and even increased during mild CRPs by 2.3% (95% CI: 0.7, 4.0%), which was 6.8% (95% CI: 2.0, 12.0%) across Europe and Central Asia, possibly due to population avoidance of public transportation in favor of private transportation. Among 1768 cities implementing stringent CRPs, we observed the most NO₂ reduction in more populated and polluted cities. Our results demonstrate that AQ improved when and where stringent COVID-19 CRPs were implemented, changed less under moderate CRPs, and even deteriorated under mild CRPs. These changes were location-, region-, and CRP-specific.

ISSN/ISBN 0013-936X**URL** <https://doi.org/10.1021/acs.est.2c04303>**edoc-URL** <https://edoc.unibas.ch/91026/>**Full Text on edoc** Available;**Digital Object Identifier DOI** 10.1021/acs.est.2c04303**PubMed ID** <http://www.ncbi.nlm.nih.gov/pubmed/35968717>**ISI-Number** WOS:000855255100001**Document type (ISI)** Journal Article