



Effects of lock downs

Before, during and after

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The lock-down





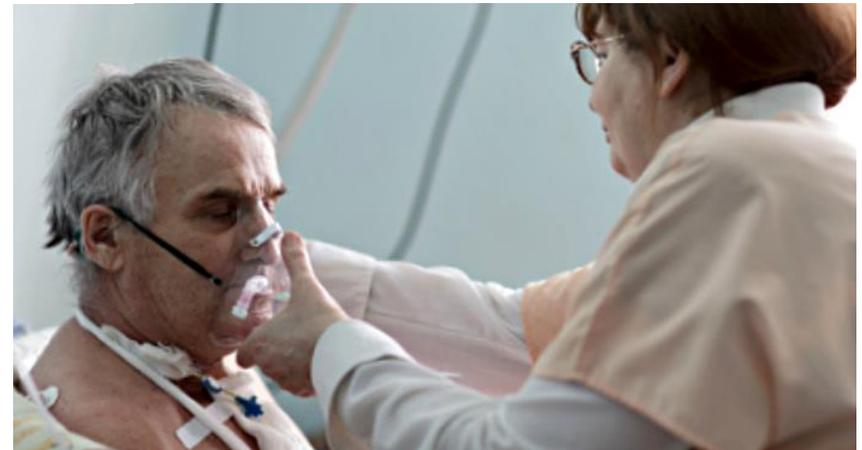
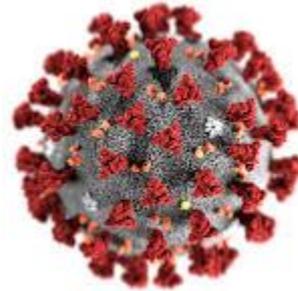
Air pollution health effects



- Respiratory diseases, but also:
 - Cardiovascular diseases
 - Cancer
 - Preterm birth and low birth weight
 - Reduced cognitive development
 - Neurodegenerative diseases like Alzheimer
 - Diabetes
 - Inflammatory disease like arthritis
 -

Effects

- Long-term effects due to chronic exposure
 - Long-term moderate air pollution levels increase risk of chronic disease development
- Short-term effects due to acute exposure
 - Short-term high air pollution levels increase risk of aggravation of health status of person with chronic disease





Before

Vulnerability and susceptibility
to COVID-19



Evidence from Italy



- PM in worsening the impact of respiratory viruses (Sciomer et al., 2020)
 - Air pollution weakens the immune defences of the upper airways, that facilitate entry of SARS-CoV-2 into the lower airways
 - Air pollution has been considered a co-factor in the high level of fatality in Northern Italy (Conticini et al., 2020)
- Earlier air pollution exposure among cases of COVID-19 in up to 71 Italian provinces suggested that chronic exposure provides a favourable context for the spread of the virus (Fattorini and Regoli, 2020)



Evidence from US, Netherlands, UK and China



- Study in the US found 1 $\mu\text{g}/\text{m}^3$ increase in $\text{PM}_{2.5}$ concentration to be associated with 8% increase in the COVID-19 death rate (Wu et al., 2020)
- Similar study in the Netherlands found 1 $\mu\text{g}/\text{m}^3$ increase in $\text{PM}_{2.5}$ concentration to be associated with 13–21.4% increase in the COVID-19 death rate (Cole et al., 2020)
- The UK study found deaths from COVID-19 to be more common in highly polluted areas – the long-term exposure to $\text{PM}_{2.5}$ increased risk of dying from COVID-19 by up to 7% (Office for National Statistics, 2020)
- In China 1 $\mu\text{g}/\text{m}^3$ increase in $\text{PM}_{2.5}$ was associated with 0.22% increase in daily counts of confirmed cases (Zhu et al. 2020)



Air pollution as SARS-CoV-2 carrier



- In general this is much more indoor air pollution than ambient air pollution issue
 - COVID-19 is transmitted from human to human by infectious droplets which are expelled when a person with COVID-19 coughs, sneezes, or speaks
- In Italy, genetic material from the SARS-CoV-2 virus was detected on PM samples from the city of Bergamo in Northern Italy (Setti et al., 2020)
 - the presence of the SARS-CoV-2 virus in ambient particulate matter does not necessarily imply sufficient dose for infection



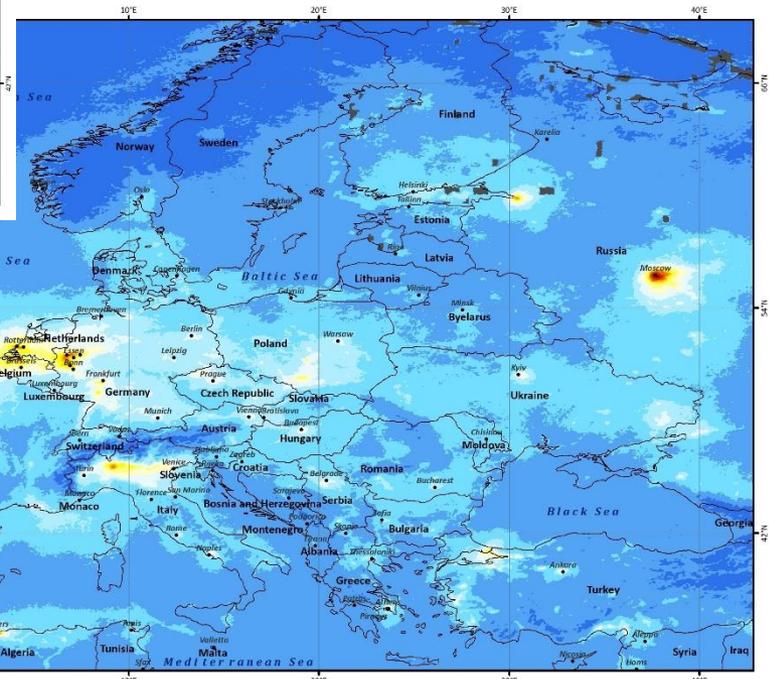
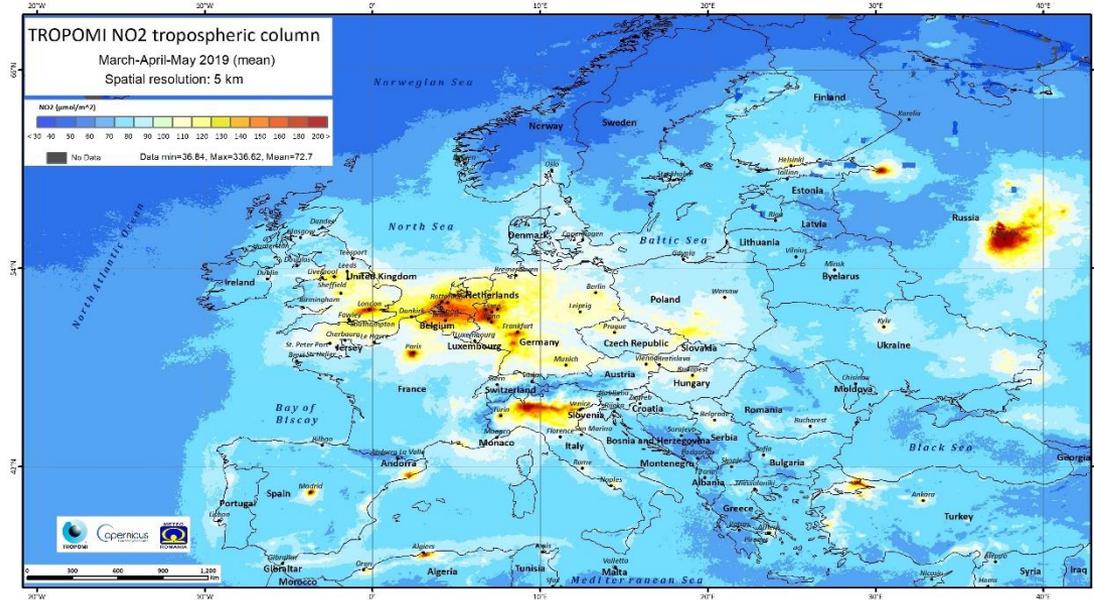
During



Air quality before and during



NO₂ March-April-May 2019 vs 2020



Short-term and long-term health impacts of air pollution reductions from COVID-19 lockdowns in China and Europe: a modelling study



Paolo Giani, Stefano Castruccio, Alessandro Anav, Don Howard, Wenjing Hu, Paola Crippa

Summary

Background Exposure to poor air quality leads to increased premature mortality from cardiovascular and respiratory diseases. Among the far-reaching implications of the ongoing COVID-19 pandemic, a substantial improvement in air quality was observed worldwide after the lockdowns imposed by many countries. We aimed to assess the implications of different lockdown measures on air pollution levels in Europe and China, as well as the short-term and long-term health impact.

Methods For this modelling study, observations of fine particulate matter ($PM_{2.5}$) concentrations from more than 2500 stations in Europe and China during 2016–20 were integrated with chemical transport model simulations to reconstruct $PM_{2.5}$ fields at high spatiotemporal resolution. The health benefits, expressed as short-term and long-term avoided mortality from $PM_{2.5}$ exposure associated with the interventions imposed to control the COVID-19 pandemic, were quantified on the basis of the latest epidemiological studies. To explore the long-term variability in air quality and associated premature mortality, we built different scenarios of economic recovery (immediate or gradual resumption of activities, a second outbreak in autumn, and permanent lockdown for the whole of 2020).

Findings The lockdown interventions led to a reduction in population-weighted $PM_{2.5}$ of $14.5 \mu g m^{-3}$ across China (-29.7%) and $2.2 \mu g m^{-3}$ across Europe (-17.1%), with unprecedented reductions of $40 \mu g m^{-3}$ in bimonthly mean $PM_{2.5}$ in the areas most affected by COVID-19 in China. In the short term, an estimated 24 200 (95% CI 22 380–26 010) premature deaths were averted throughout China between Feb 1 and March 31, and an estimated 2190 (1960–2420) deaths were averted in Europe between Feb 21 and May 17. We also estimated a positive number of long-term avoided premature fatalities due to reduced $PM_{2.5}$ concentrations, ranging from 76 400 (95% CI 62 600–86 900) to 287 000 (233 700–328 300) for China, and from 13 600 (11 900–15 300) to 29 500 (25 800–33 300) for Europe, depending on the future scenarios of economic recovery adopted.

Interpretation These results indicate that lockdown interventions led to substantial reductions in $PM_{2.5}$ concentrations in China and Europe. We estimated that tens of thousands of premature deaths from air pollution were avoided, although with significant differences observed in Europe and China. Our findings suggest that considerable improvements in air quality are achievable in both China and Europe when stringent emission control policies are adopted.



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Lockdown did not reduce “most harmful” type of air pollution in Scotland





After

The impacts could not be that positive as people behavior might have changed



Car as self-protective equipment



AUTOLEHT

FOORUMID

TESTID

TELLI AJAKIRI

Avaleht » Uudised » Autondus » Kolumn. Ots: Oluline isikukaitsevahend

Kolumn. Ots: Oluline isikukaitsevahend (2)

Autondus

25. märts 2020



Viimased aastad oleme kuulnud roheaktivistide ja loomakasvatust maailmalõpu põhjustajana nägevate süvariigi paljastajate ajupesu, milline kurja juur on eraauto. Soome liiklusminister teatas, et teid ei tohi juurde ehitada ega laiendada: elu näitab, et need täituvad autodega. Kohutav ju, inimesed sõidavad oma pere, sõprade ning kolleegidega ringi eraautoga! Nüüd on teatud ootamatus viinud nii kaugele, et Eesti „süvariigi“ uudistesaaetes kurdeti, kuidas vanem naine ei saanud viirustesti teha, sest ilmus kohale ... jalgsi, mitte autoga.

Loodetavasti toovad praegused raputused roheterroristid mõistusele, sest isiklik auto on tänapäeva ühiskonna asendamatu.



In recent years, we have heard the brainwashing of green activists that the root of evil is in a private car. The Finnish Minister of Transport has even stated that new roads must not be built or current expanded: life shows that they are filled with cars. Awful, people drive around with their families, friends and colleagues in a private car!

*Recently Estonian news program complained that an older woman could not take a virus test because she showed up on foot, not by car as demanded. **Hopefully, the current COVID shocks will bring green terrorists to their senses, because the private car is crucial in today's society.***



Decrease in public transport usage by 80%



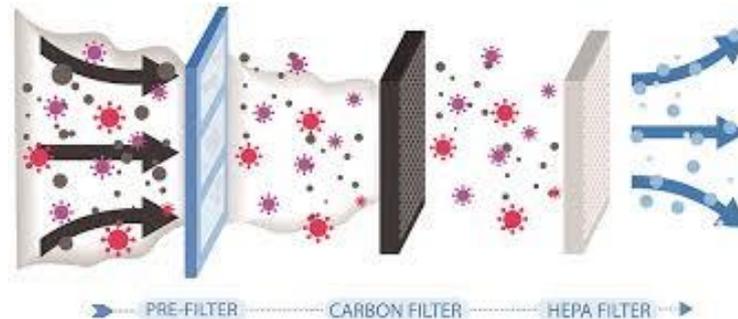
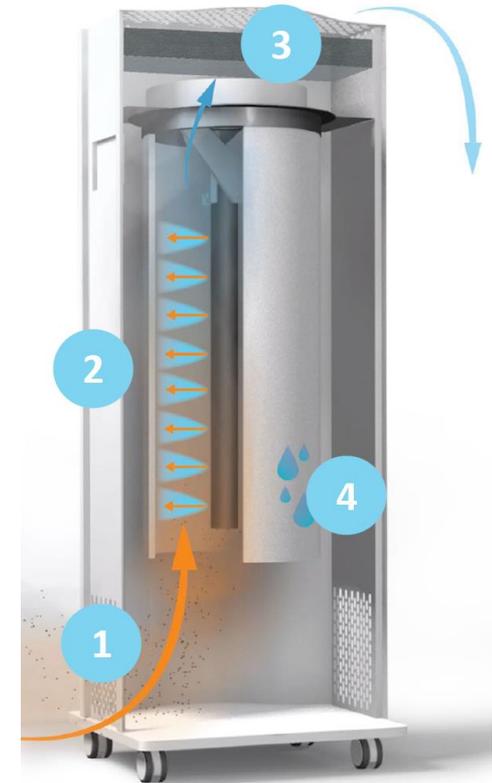
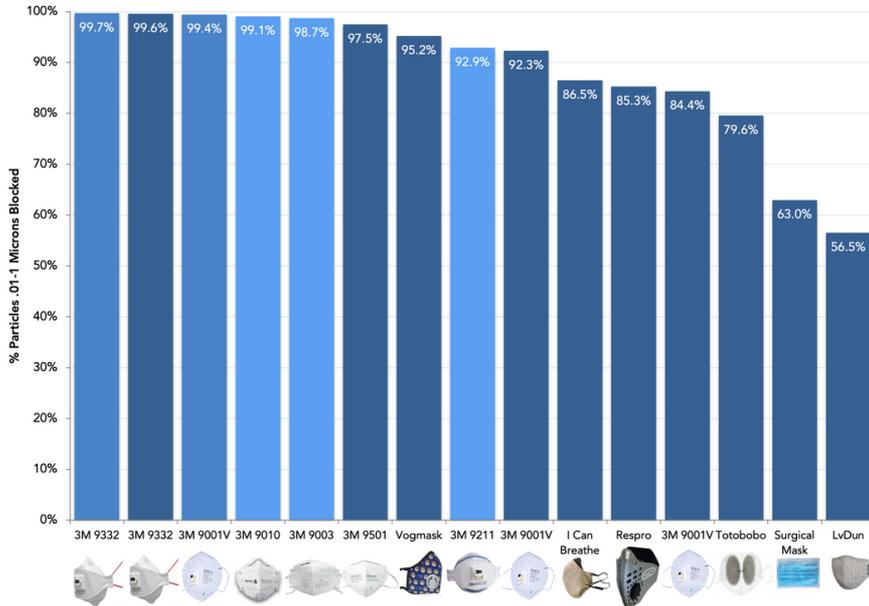


Cleaner air indoors & cleaner air inhaled



Fit Test

Open Data Tests
Smart Air smartairfilters.com





Conclusions



- Earlier air pollution exposure might have increased susceptibility to COVID-19
- During lock-down the traffic related air pollution emissions decreased, but there was fewer change in air pollution from other sources as local heating
- Because of COVID-19 pandemic the people transport behavior have changed that might change air pollution emissions in the future
- Face mask and air purifier are more often used that might decrease air pollution human exposures



Thank you!