

Public health equity, pandemic preparedness, and climate action:

A planetary experiment in future-proofing urban mobility



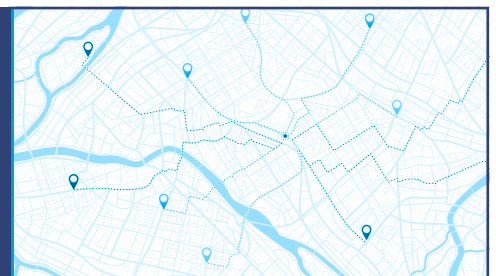
Why this matters

Understanding how pandemic preparedness and response measures affected city mobility is important to help devise strategies to prevent the health and social impacts of declining walking and cycling levels. It can also help us future-proof our cities against the impacts of impending pandemics and climate change.

We need robust, evidence-based policies that both improve active mobility opportunities and mitigate, or reduce, health, social and environmental inequalities. Scientific advances mean that this is the first time we can track and analyse changes in mobility, including walking and cycling, using data from hundreds of thousands of people. Advanced techniques enable us to investigate the world at scales not possible in previous crises.

3 studies:

City mobility patterns during the COVID-19 pandemic



Effects of city design on transport mode choice and exposure to health risks during and after a crisis

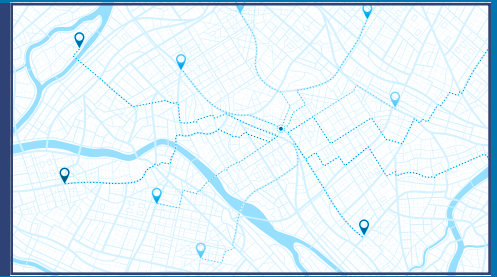


Future-proofing cities against negative city mobility and public health impacts of impending natural hazards



City mobility patterns during the COVID-19 pandemic: analysis of a global natural experiment

[Link to paper](#)



What did we do?



Evaluated the effect of city-based active transport policies and infrastructure interventions during the pandemic on walking behaviour and public transit use.



Included cities around the globe, many reporting high SARS-CoV-2 infection rates, with wide variations in existing active travel infrastructure, walking behaviours, and public transit use.



Used mobile data from hundreds of thousands of people for the first time to track and analyse changes in walking behaviour and public transit use during the pandemic.



230
cities



33
countries



19 high income



11 middle income



3 low income

Results

587
relevant policies
identified



- New cycle lanes
- Financial support
- Cycle parking provision
- Reallocation of road space for cyclists
- Reallocation of road space for driving
- Motor vehicle speed reduction
- Road closure to motor vehicles
- Information provision for cyclists
- Cycling direction designation
- Closure of cycle lanes
- Training



321
on cycling and
micromobility



305
on walking

- Automated crossing signals
- Reduced waiting times at crossings
- Walking direction designation
- Motor vehicle speed reduction
- Road closure to motor vehicles
- Reallocation of road space for pedestrians
- Reallocation of road space for driving
- Information provision for pedestrians
- Public space creation or revitalisation
- Closure of pedestrian paths

143
on public
transit

- COVID-19 control measures on public transit
- Financial support
- Service improvement
- Reduced parking fees
- Service reductions



Key messages

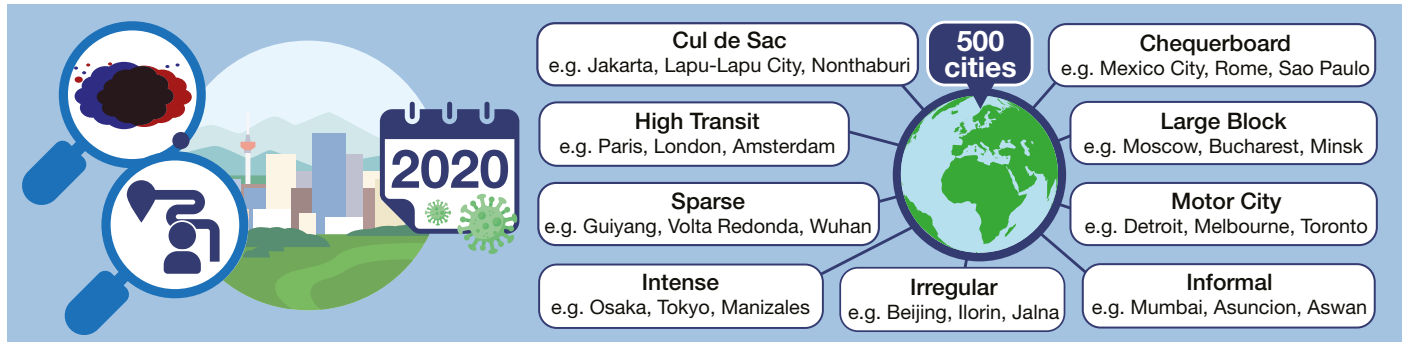
- Implementation of policy interventions promoting walking was associated with higher levels of walking index compared with pre-pandemic levels.
- No associations were seen for public transit-promoting policies with the changes in the public transit index.
- Road closures to motor vehicles policies were significantly associated with a higher absolute value of the walking index after the intervention.
- Financial support policies were significantly associated with a higher absolute value of the public transit use index after the intervention.

Effects of city design on transport mode choice and exposure to health risks during and after a crisis: a retrospective observational analysis

[Link to paper](#)



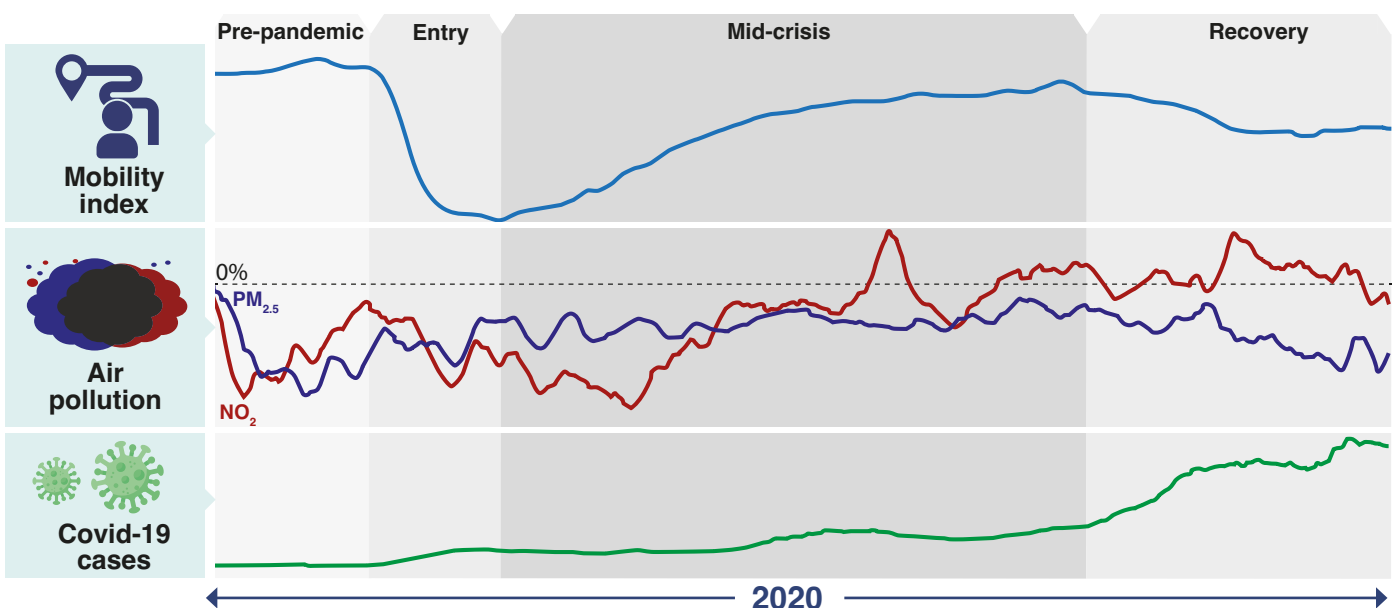
What did we do?



We analysed mobility and pollution data from more than 500 cities, during the COVID-19 pandemic in 2020.

We compared trends in mobility and transport-related pollution data associated with pre-, mid-, and late-stages of the pandemic across all cities.

Results



Key messages

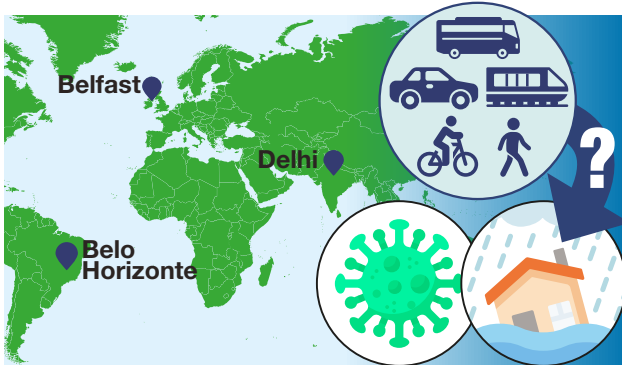
- Mobility and associated transport-related air pollution declined across all city types in the early to mid-stages of the pandemic, leading to reduced risk of chronic disease.
- In late 2020, levels of transport-related pollution and chronic disease risk rebounded most strongly in cities that afforded a mode shift toward private motor vehicles and away from public transit. This shift is also associated with higher rates of road trauma.
- In the face of infectious disease threats, city designs able to maintain levels of public transport and constrain growth in private vehicle use expose citizens to lower disease, illness, and transport injury risk.

Future-proofing cities against negative city mobility and public health impacts of impending natural hazards: a system dynamics modelling study

[Link to paper](#)



What did we do?



System dynamics modeling was used to assess how urban mobility scenarios could influence health and mobility outcomes during future Infectious Disease Outbreaks and climate change-related Extreme Weather Events in three cities.

Scenario 1



Private motor vehicle use reduced to **50%***

Scenario 2



Private motor vehicle use reduced to **20%***

Scenario 3



All motor vehicle use reduced to **20%***

Three scenarios which encourage shifts towards active travel were tested. The percentage of deaths prevented by each scenario, as well as changes in mode share over time were estimated.

**of total road trip volume*

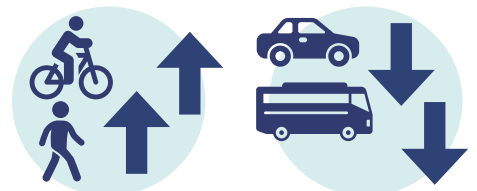
Results



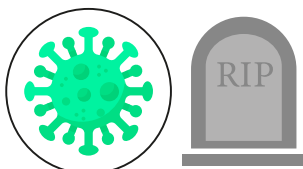
Susceptibility to flooding reduced in all cities in all 3 scenarios



4 – 50% of deaths potentially prevented, depending on case study city, city mobility, and Extreme Weather Event scenario.



The more ambitious the transition towards healthier city mobility patterns, the greater the resilience against flooding.



Only Scenario 3 showed reduced vulnerability to Infectious Disease Outbreaks, with **6 – 19%** of deaths potentially prevented.

Evolution of mode share varied greatly across cities and mobility scenarios under the Infectious Disease Outbreak shocks.

Key messages

- City designs that promote active transportation and reduce car dependency are crucial for building resilient urban environments, reducing the negative impacts of these natural hazards.
- Urban and transport planning policies should focus on creating sustainable, equitable, and resilient transport systems to protect city mobility and public health from natural hazards.

Novel contributions of the series

- The COVID-19 pandemic presented a once in a generation opportunity to shift travel behaviour to meet health, social, environmental and equity objectives.
- This series of studies modelled the potential health impacts of implemented and future policy scenarios regarding recovery and climate actions across the globe.
- Our analyses include real-time data captured on an unprecedented global scale.
- The world has faced mass disruptions and climate emergencies before but never at this scale. Scientific advances mean that this is the first time we can track and analyse changes in walking and cycling behaviour using mobility data from hundreds of millions of people.
- We need to be ready to mitigate public health and environmental harms from similar impending mass disruptions and climate emergencies. This study provides evidence for policies and recovery actions that could help future-proof societies, globally.

Conclusion

In this series, the novel methods applied and our findings can help us to design and inform communities, policies, and actions that promote healthy urban and transport planning, reducing global inequalities while supporting pandemic preparedness and climate action, future-proofing our cities against the impact of impending pandemics and climate emergencies.

References

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