

# Researchers find 13% reduction in asthma in children born in an urban low emission zone

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For the first time, the long-term benefits of urban low emission zones for children's health have been scientifically quantified. A key finding is that, on average, simply being lucky enough to spend the time in the

womb and the first year of life in a low emission zone leads to a 13% reduction in prescriptions for asthma medication by the fifth birthday. The study breaks new ground in evaluating environmental and climate policy.

The research was conducted by the Berlin-based climate research institute MCC (Mercator Research Institute on Global Commons and Climate Change), in cooperation with the Universities of Frankfurt am Main and Maastricht, and [published](#) in the *American Economic Journal: Economic Policy*.

Primarily as a measure against [particulate matter](#) from [diesel engines](#), more than 200 cities in Europe alone have set up low emission zones, banning cars above certain exhaust emission levels. The research examines Germany and draws, among other things, on official air quality measurements as well as anonymized [patient data](#) from the largest public health insurance, AOK, which covers about a third of the population.

The focus is on the medical prescriptions for half a million newborn children living in an [urban environment](#) between 2006 (two years before the start of Germany's first low emission zone) and 2017.

"To isolate the causal relationship, we work with treatment and control groups, much like in a laboratory experiment," explains Hannah Klauber, postdoc in the Policy Evaluation Lab of MCC, and lead author of the study. "We compare children born before and after the introduction of the driving ban with a control group of children from cities that introduced a low emission zone at a later date, but are similar in terms of weather conditions and socio-economic composition."

This method enables quantifying the cause-effect relationship of interest, i.e., the extent to which health in the first five years of life benefits simply from the existence of the protective low emission zone

during the period from conception to the first birthday. During this period, rapid cell proliferation and an intense phase of epigenetic programming make children especially vulnerable to the toxicological effects of pollution.

The study confirms previous findings that low emission zones in Germany have led to a 5% reduction in particulate matter pollution. And the evaluation of medical prescriptions yields remarkable new findings.

In this field, the low emission zones generate a significant cost reduction for the health system over five years, 92% of which stem from asthma medications. The number of asthma prescriptions is reduced by 13%, and since these are predominantly high value preparations, the cost saving is as high as 21%. Overall, the data analysis shows that medication costs for children born into a low emission zone are reduced by around 30 million euros until 2017.

According to the study, this economic saving alone covers a quarter of the hypothetical retrofitting costs for the 200,000 older diesel vehicles that did not even receive the least ambitious "red badge," and were the first to be affected by the introduced low emission zones. However, in order to isolate the [causal relationship](#) properly, the study confines itself to only examining a small fraction of the savings.

The benefits of living in cleaner air even after the first birthday are not accounted for. Nor are the avoided costs of medical care, plus all savings after the fifth birthday. And the study does not include the long-term benefits of better health for educational success or employment prospects.

"Our quasi-experimental research approach offers plenty of room to look more broadly at the benefits of policies, depending on the data," says Nicolas Koch, head of the Policy Evaluation Lab at MCC and co-

author of the study.

"This is generally relevant for the evaluation of environmental and climate policies—and not least with regard to wider driving bans. There will likely be heated debates on this kind of interventions, and thus a need to quantify health effects properly."

**More information:** Hannah Klauber et al, Killing Prescriptions Softly: Low Emission Zones and Child Health from Birth to School, *American Economic Journal: Economic Policy* (2024). [DOI: 10.1257/pol.20210729](https://doi.org/10.1257/pol.20210729)

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