

# Cyclists breathe the brunt of harmful pollution, commuter study finds

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Colorado State University researchers have exposed a sad irony to the seemingly healthy choice of bicycling to work: While cyclists are reaping the benefits of exercise, they may be increasing their exposure to harmful air pollution.

CSU air quality researchers John Volckens and Jennifer Peel have published the first set of results from their multi-year Fort Collins

Commuter Study. They recruited 45 non-smoking, healthy Fort Collins commuters to wear monitoring and GPS tracking equipment that measured their [air pollution exposure](#) as they commuted by bicycle and car between work and home within the city.

"We wanted to ask practical questions that would empower people to make choices to reduce their exposure," said Volckens, an associate professor of mechanical engineering and director of the Center for Energy Development and Health in the CSU Energy Institute. Peel is an associate professor in the Department of Environmental and Radiological Health Sciences.

## **Varying levels of exposure**

The researchers asked two questions: If you cycle or drive to work, how does your air pollution exposure change? Also, if you had a choice of route – the direct, busy one, or the less busy, longer one – could you change your exposure to pollution?

They found that exposures vary by pollutant. Drivers got the highest exposure to carbon monoxide and gaseous pollutants, whereas cyclists got higher exposure to particulate matter like black carbon.

They also found that both cyclists and drivers taking an alternative route, away from major roadways, can lower their exposure to pollutants by 20 percent to 30 percent. Great! They thought. But alas – the alternative routes almost always take longer, so in some cases, the benefits of decreased exposure could be offset by longer time on the road.

"That was disappointing," Volckens said.

What's more, cyclists, because they're breathing harder, inhale about three times as much pollution as people breathing normally – likely

increasing the exposure experienced while cycling.

## **Car-centric built environment**

The results seem to suggest that the built environment strongly affects how people are exposed to air pollution, the researchers said. While putting bicycle lanes on roads is a great way to promote exercise, that alone ignores the exposure problem. After all, the traditional built environment is and always has been centered around cars – the source of about a third to half the country's air pollution problem, depending on the region, Volckens said.

## **More to learn**

There's more to study, such as analyzing data from off-road bike paths, like the Spring Creek Trail. Hopefully those routes do offer some protection since they're farther from major roadways. Phase II of the study will also look at health indicators of the commuters.

Peel emphasized that the likely health benefits of cycling, overall, may still outweigh the risks. "But we simply do not have enough information to inform this decision – particularly regarding the adverse health effects due to the air pollution exposure. The next phase of our study may help to fill that gap."

"Our results can be put in a larger context of what others have already observed – that choosing different commute routes can have a significant effect on one's exposure to pollution – yet sometimes, those choices are limited," Peel added.

What's more, Volckens said, there are things communities can do in the long run that can offset these [air pollution](#) exposure levels, though they

might seem radical. One way would be establishing electric-only routes – think bikers and non-fossil-fuel-burning electric cars happily sharing the roads.

**More information:** Nicholas Good et al. The Fort Collins Commuter Study: Impact of route type and transport mode on personal exposure to multiple air pollutants, *Journal of Exposure Science and Environmental Epidemiology* (2015). [DOI: 10.1038/jes.2015.68](https://doi.org/10.1038/jes.2015.68)

Provided by Colorado State University

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