Road pricing most effective in reducing vehicle emissions

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Credit: University of British Columbia

Motor vehicles are a major source of air pollution in urban areas, and for decades municipal and regional governments have used various traffic management strategies in an effort to reduce vehicle emissions, alongside advancements like cleaner fuel and greener cars.

But not all traffic management strategies are created equal, says UBC transportation expert and civil engineering professor Alexander Bigazzi. In a review of more than 60 studies on the subject, Bigazzi has

concluded that road pricing - or pay per use - is the most effective strategy to reduce emissions and traffic.

You reviewed traffic management strategies (TMS) in Asia, Europe and the Americas. What did you find?

We looked at the entire body of literature, including hundreds of published papers, and identified 65 studies documenting the real-world effects of 22 types of traffic management strategies including speed enforcement programs, lane management such as HOV lanes, road and congestion pricing, and trip reduction strategies like incentives for telecommuting or ride sharing.

The strategies with the best evidence of air quality improvements are area road/congestion pricing and low-emission zones. Other strategies have potential benefits, but there is less empirical evidence, either because the benefits are very small or because the benefits are offset by some other effect.

Why is it important to understand the impact of traffic management strategies?

Traffic-generated air pollution remains a substantial public health risk, despite progress made in reducing emissions in the past few decades. TMS can reduce emissions and improve urban air quality by reducing the amount of travel by cars and the rate at which cars generate air pollution, in addition to other effects such as improving travel time and safety. Government invests a lot of resources in these programs, so planners and city executives should know more about how well they work. It's often assumed that any traffic management strategy that reduces congestion will also reduce emissions, but that's not always the case.

UBC civil engineering professor Alex Bigazzi. Credit: University of British Columbia

Why do road pricing and low-emission zones work better in improving air quality? Which cities can Vancouver learn from?

A major reason is that they reduce the amount of driving, in addition to easing congestion and reducing emission rates per kilometre driven. Low-emission zones also encourage the purchase and use of cleaner motor vehicles.

Still, to be most effective these strategies need to be deployed on a fairly large scale, not just on individual corridors. Hundreds of cities in Europe

have congestion pricing or low-emission zones in their city centres and are enjoying improved traffic flow and air quality. These strategies haven't been embraced in North America in the same way for a variety of reasons, but there are great potential benefits for cities here ready to embrace innovation.

In Vancouver, road and congestion pricing strategies could potentially be very effective in easing congestion and improving air quality. The natural boundaries of the downtown peninsula provide a clear potential starting point for designating a low-emission or cordoned pricing zone. New pricing or driving restrictions in Europe have generally faced initial public opposition, but increasing acceptance from travelers once they realize the benefits of reduced traffic congestion.

More information: Alexander York Bigazzi et al, Can traffic management strategies improve urban air quality? A review of the evidence, *Journal of Transport & Health* (2017). DOI: 10.1016/j.jth.2017.08.001

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