Vehicle pollutes the atmosphere and poses health hazards

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EDITORIAL

Over the last 20 years, vehicle traffic in the United States and worldwide has expanded dramatically. Vehicle emissions, which include Carbon Monoxide (CO), Carbon Dioxide (CO_2), Volatile Organic Compounds (VOCs) or Hydrocarbons (HCs), Nitrogen Oxides (NO_x), and particulate matter, have become the primary source of air pollution in many locations. The rising severity and duration of traffic congestion has the potential to significantly increase pollutant emissions and deteriorate air quality, particularly along major thoroughfares.

As evidenced by epidemiological studies, evaluations of proposed vehicle emission standards, and environmental impact assessments for specific road projects World Health Organization and Health Effects Institute, these emissions contribute to morbidity and mortality risks for drivers, commuters, and individuals living near roadways. It is useful to categorise traffic-related pollution impacts and dangers into two groups.

To begin, "congestion-free" consequences are those caused by traffic loads that are lower than those that cause considerable congestion. In this instance, each new car on the road has no significant effect on traffic patterns, e.g., the speed and travel time of other vehicles are unaffected, and so vehicle emission factors are unaffected by traffic volume. As a result, the marginal impact of an additional vehicle is equal to the fleet's average impact. This is not always the case during congestion, which is the second group under consideration.

While there are numerous definitions of congestion, it is commonly characterised as periods when traffic volume exceeds road capacity. (Other definitions employ a speed threshold, a fraction of a roadway's free-flow speed, or another indicator.) The current study focuses on what is known as "recurring congestion," or congestion induced by high traffic volumes during weekday peak "rush hour" times.

However, because traffic volume is regarded as a continuous quantity, rigorous definitions of congestion are unnecessary. In the current analysis, "congestion-related" consequences include a variety of interactions that occur as a result of congestion. For starters, congestion reduces average speed, which increases travel time and exposure per car.

This effect can be significant; for example, the average annual travel delay for a passenger making rush hour journeys in the United States was 38 hours in 2005, based on 437 metro regions. Second, because vehicle-induced turbulence is proportional to vehicle speed, congestion reduces the dispersion of vehicle-related pollutants. As a result, lower vehicle speeds can raise pollution concentrations from road sources.

Third, traffic congestion might alter driving behaviours, leading to an increase in the number of speedups. Stops and starts increase emissions when compared to "cruise" circumstances, especially when high power acceleration is used. As a result, it is critical to distinguish between congestion-free and congestion-related travel. Since emissions, consequences, and hazards might vary widely and because such evaluations can better inform traffic-related choices and management of air quality, as well as impact and risk assessments.

Few analyses of congestion-related impacts have been conducted, and existing research have largely mixed congestion and non-congestion related impacts. Estimated that the congestion charge zone in London, where drivers must pay fees when their vehicles enter, would gain 183 years of life per 100,000 inhabitants and a total of 1,888 years of life in the broader London area.

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