A Section 508–conformant HTML version of this article is available at https://doi.org/10.1289/EHP2948.

TB and Tailpipes: Does Traffic-Related Air Pollution Affect Mortality during Tuberculosis Treatment?

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https://doi.org/10.1289/EHP2948

Although the success rate for treating tuberculosis (TB) is high in the United States, there remains variation in mortality rates during treatment.[1] Thus, identifying modifiable risk factors may lead to novel interventions to reduce mortality. Results from an epidemiologic study published in *Environmental Health Perspectives* suggest that air pollution from nearby traffic may be one such modifiable risk factor for mortality during TB treatment.[2]

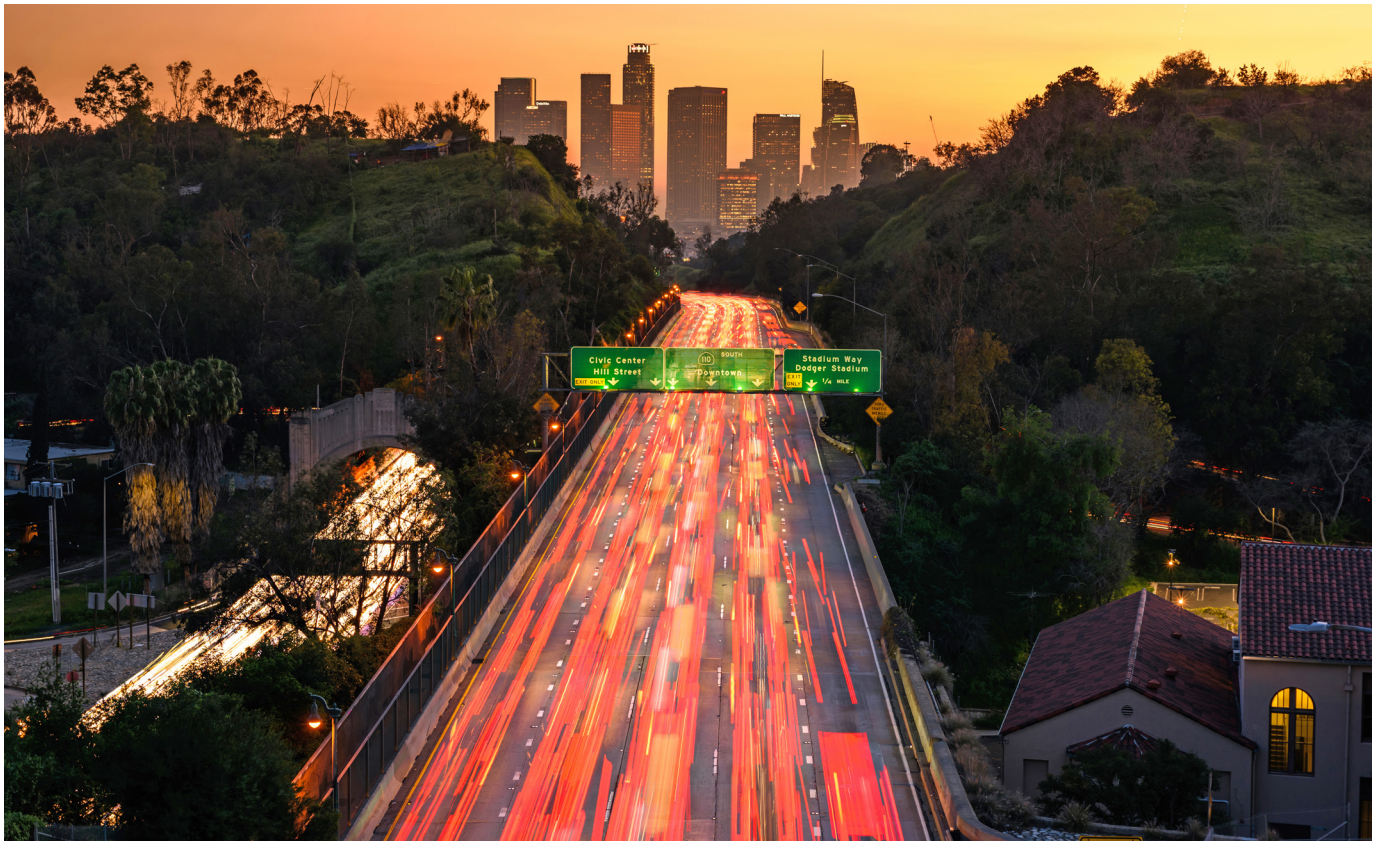
Robert Blount, the study's first author and an assistant professor of pulmonary medicine at the University of California, San Francisco, notes that recent observational studies[3,4] and basic science experiments[5] support the previously observed association between cigarette smoking and the risk of both acquiring and dying from TB. "The similarity of the chemicals in cigarette smoke and ambient air pollution prompted us to study the association [between] traffic proximity and mortality," he says.

According to Blount, California is a good place for this kind of study because it has long accounted for a large proportion of TB cases in the United States.[6] The largely vehicle-dependent state also has many cities with very high levels of ground-level ozone and particle pollution.[7]

Working with the California Department of Public Health, the researchers enrolled more than 32,000 patients identified as having active TB between 2000 and 2012. More than two-thirds of the patients were foreign-born, originating mostly from countries in Asia and Latin America where TB is endemic. Many patients faced socioeconomic hardship: 53% were unemployed, and 6% were homeless.

Measures of traffic volume and density were based on 24-hour vehicle counts around the patients' residential addresses, as recorded by the California Department of Transportation. These measures served as proxies for ambient air pollution. The authors used buffer zones of 100, 200, 300, and 400 meters around each patient's home to determine the effects of traffic at different distances from the residence. Traffic volumes in each buffer zone were then divided into quintiles of estimated exposure.

The authors estimated that patients who lived at addresses where the nearest road had the highest traffic volume were 28% more likely to die during treatment than patients who lived where the nearest road had the lowest volume of traffic. Estimates were adjusted for several factors related to both traffic exposures and mortality, including homelessness, unemployment, HIV infection, recent immigration, and race/ethnicity. However, the authors did not have individual-level information on cigarette smoking or income.



Much more study is necessary before concluding that exposure to traffic-related pollution is a risk factor for dying during TB treatment. However, if this hypothesis is proven, it might lead to individual-level interventions to improve the success of treatment. It also could provide additional support for measures to reduce population-wide exposures to traffic-related pollution. Image: © Chones/Shutterstock.

For David Dowdy, an associate professor of epidemiology at the Johns Hopkins University who was not involved in the study, the results add to the larger body of literature suggesting that traffic proximity may increase mortality overall, but they do not support a TB-specific effect. "The low- and high-traffic groups of patients did not have any differences in TB markers, such as days to culture conversion [i.e., evidence of recovery], and we do not know the events leading to their death," he says. "I think it is more likely that this study population represents a high-risk group for which it is easier to detect a more general effect of air pollution on mortality."

The authors themselves caution against overinterpreting the findings and consider the study to be hypothesis-generating. Ideally, replication studies would be conducted in countries with high levels of air pollution and a greater incidence of TB than California, such as China, Vietnam, or India. "If replicated," Blount says, "our study would have implications at the public policy and individual level. It would provide additional motivation for government officials to curb vehicle emissions and would also support the clinical counseling of patients to stay inside when air pollution indices are high."

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