

MOUNTAIN-PLAINS CONSORTIUM

RESEARCH BRIEF | MPC 24-554 (project 662) | September 2024

Impacts of Area-Wide Air Pollution on Multimodal Traffic Volumes in Utah



the **ISSUE**

During area-wide episodes of poor air quality, people may reduce their transportation-related emissions by driving less, reducing their exposure to emissions by walking/bicycling less, or going about their lives as usual. These three reactions have different consequences for transportation, health, and the environment.

During area-wide air pollution events, governments often resort to hard and soft policies to induce behavior changes in people. For example, air quality alerts are often issued to spread awareness regarding high pollution levels and to encourage (or discourage) travel behaviors that would contribute to reduced (or increased) transportation emissions, e.g., carpooling, trip chaining, teleworking, postponing trips, or using public and active transportation modes. However, without detailed study of the link between air pollution and travel behavior, policy design is far from effective.

the **RESEARCH**

Researchers investigated the aggregate effects of air pollution on multimodal traffic volumes by comparing associations of the daily air quality index with pedestrian and automobile traffic volumes (collected at many different locations) and system-wide bus/rail ridership over a two-year period in two regions of Utah. They used multilevel modeling to measure how these relationships differ by mode and across locations, while controlling for weather and investigating built/social environmental characteristics.



A University Transportation Center sponsored by the U.S. Department of Transportation serving the Mountain-Plains Region. Consortium members:

Colorado State University
North Dakota State University
South Dakota State University

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Project Title

Impacts of Wildfire Smoke and Other Area-Wide Air Pollution on Multimodal Traffic Volumes

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the FINDINGS

Overall, the researchers found strong evidence that pedestrian volumes declined by 10% or more, on average, on days when the air quality was “unhealthy for sensitive groups” (orange). There was some evidence that automobile traffic volumes increased on poor air quality days, especially on the way to mountainous recreation areas surrounding urban valleys. Decreases in bus/rail ridership were not statistically significant. Overall, there was more evidence for “risk averse” reactions than for “altruistic” travel behavior changes.

the IMPACT

This study informs stakeholders in air quality and transportation by highlighting the aggregate behavior of travelers during periods of area-wide air pollution, such as that caused by wintertime inversions, summertime ozone, or wildfire smoke. These findings are especially relevant for efforts to affect changes in travel and other health-related behaviors through air quality alerts. Overall, there was more evidence for “risk averse” reactions than for “altruistic” travel behavior changes, suggesting that newer or stronger policies may be needed in order to reduce driving and encourage more sustainable and healthful travel behavior changes in regions when faced with periods of area-wide poor air quality.

For more information on this project, download the Main report at <https://www.ugpti.org/resources/reports/details.php?id=1201>

For more information or additional copies, visit the Web site at www.mountain-plains.org, call (701) 231-7767 or write to Mountain-Plains Consortium, Upper Great Plains Transportation Institute, North Dakota State University, Dept. 2880, PO Box 6050, Fargo, ND 58108-6050.



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