

MOUNTAIN-PLAINS CONSORTIUM

RESEARCH BRIEF | MPC 17-326 (project 488) | June 2017

Transportation and Land Use as Social Determinants of Health: Analysis of Exposure to Traffic in the Denver Metropolitan Region



the **ISSUE**

Research from public health, sociology, geography, and urban planning has called for a deeper examination into the relatively under-studied—but overarching—problem of how urban development patterns in cities and regions influence health disparities. In this study, we focused on how transportation and land use, working together, influence residents' exposure to traffic.

the **RESEARCH**

Transportation systems generate certain health-promoting benefits such as access to social, economic, and cultural resources, but they are also a source of air pollution, noise, safety hazards, and barriers that diminish social cohesion in neighborhoods. Streets, in particular, are among the most important forms of public space in cities, yet they are also a main source of exposure to the negative externalities of traffic. Estimates of the proportion of the U.S. population living close to high-traffic roads range from 4 to 19 percent, depending on assumptions about distance and the type of roadway. These proportions are higher for minority and low-income populations. Although the relationships between traffic exposure, race, and socio-economic status have been consistent and reproducible, they have also been spatially heterogeneous and there has been limited investigation into the patterns or causes of the heterogeneity. Using spatially-explicit statistical techniques, we examined variation in residential exposure to traffic at regional and neighborhood levels with race and socio-economic status as variables of interest. We found that minority and lower socio-economic status populations are systematically linked to higher exposure to traffic in Denver, Colorado, at both regional- and neighborhood-level scales.



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the FINDINGS

All global model variables for the Denver metropolitan region were significant; this is consistent with the results of previous studies, and reinforces the premise that minority and lower socio-economic status in the U.S. is linked systematically to higher exposure to traffic. The global model showed that for the Denver metropolitan region, racial and ethnic minority residents, lower income residents, and residents without college education are significantly more afflicted by the nuisance of traffic than their white, higher income, and college educated counterparts. We found that poverty was the most consistent predictor of traffic density in the region.

the IMPACT

Our findings indicate that, regardless of cause, it is necessary for transportation and land-use decision-making to ameliorate differential exposures to traffic. The challenge, based on this analysis, is finding the appropriate scale of policy action. Certain underlying processes, such as the protective effects of suburban form, appear to be regional in scale and market-oriented. Other processes, such as redevelopment and transit-oriented development, are within the scope of local land use control. This represents an important step to better understand the spatial aspects of differential traffic exposure.

For more information on this project, download the entire report at <http://www.ugpti.org/resources/reports/details.php?id=877>

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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