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Speed Limit Policy in Michigan: The Effects on Air Pollution and Human Health

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Highest Scoring Abstract: Doctoral

Background: In 2017, Michigan raised the speed limit from 70 to 75 mph for passenger vehicles on 614 miles of freeways and raised the truck speed limit from 60 to 65 mph on all freeways statewide. While most of the focus of this policy change has focused on weighing the cost of safety and fuel consumption with the benefit of reduced travel times, little attention has been paid to the impact this policy will have on air pollution and human health.
Methods: Speed data were collected using LIDAR speed detectors from a vehicle not readily visible to motorists. At each site, it was attempted to collect 100 readings for passenger vehicles and 10 readings for trucks in each direction, alongside volume counts. Before data consisted of 85 sites (59 study sites and 26 control sites); after data were collected for 42 sites (19 control sites and 23 increase sites). Average speed data were weighted by volume, which was used to estimate fuel economy of vehicles. Exposure data was then used to estimate the increase in fuel consumption and literature values were used to estimate the impacts to human health and air pollution.
Results: A t-test demonstrated that there was a significant increase ($p < 0.0001$) in passenger car speeds on study segments, while speeds on control segments did not change ($p = 0.997$). Speeds for trucks, however, significantly increased for both control and study segments ($p < 0.0001$), which is to be expected, as the speed limit for trucks increased statewide. Passenger car speeds increased from an average of 72.0 to 74.0 mph while truck speeds increased from 61.1 to 62.7 mph along study corridors and from 61.0 to 62.5 mph along control corridors. Passenger car fuel economy did not change along control corridors and declined from 24.2 to 23.4 mpgUS along study corridors. Truck fuel economy declined from 6.4 to 6.2 mpgUS statewide. Ultimately, it was estimated that CO emissions will increase by 1,490 tonsUS, NOx by 213 tonsUS, PM2.5 by 3.32 tonsUS, and CO2 by 77,100 tonsUS annually. The greatest concern for human health is PM2.5, with costs to human health of $88,000-$130,000/metric ton.
Conclusions: Operating speeds increased for passenger cars along study corridors, and truck operating speeds increased statewide after freeway speed limits increased. This resulted in fuel economy declining, and consequently, emissions increasing. The increase in PM2.5 emissions is the most concerning emissions increase due to the large cost to human health.

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Intercity Transportation's Role in Affecting Distal Area's Urbanization/Green Coverage – a High-Speed Rail's Case in Urban Land Teleconnections

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Background: The urban land teleconnections' (ULT) research is emerging largely due to more local urbanization being attributable to distal land demand. The knowledge on ULT and how ULT is driven by transportation is significant because urban growth or shrinkage, and green coverage probably sets the city's foundation of natural, healthy living settings. However, transportation's role in driving ULT is barely studied. This study aims to contribute to the theoretical role of intercity transportation in the ULT arena, and to explore empirically the spatial pattern of high-speed rail (HSR) trips, as well as to probe HSR's impact on ULT.
Methods: The 2007 inaugurated Taiwan HSR (THSR) is selected for this study. The data sources include the

THSR ticket database, a THSR passenger survey, the employment and population databases, and the United States Geological Survey/USGS's free 30-meter resolution Landsat satellite images. The primary analysis tools include descriptive statistics, spatial analysis, and hierarchical linear modeling (HLM).
Results: Theoretically, the intercity transportation may play as a necessity factor in driving ULT; while the local attractiveness factors play the sufficiency roles. The ULT land is used for producing products or services for distant needs, for which transportation is required to ship inbound remote passengers or companies and outbound products and services, which are materialized as trips. Hence, traffic data have the potential to depict teleconnection. Furthermore, different trips/activities likely affect land consumption differently, and different intercity transportation modes likely affect distal land consumption differently. The preliminary empirical analysis on the green land coverage shows that ULT phenomenon seems existing in Taiwan based on the mismatched spatial distributions of incremental population and the loss of green coverage between 2006-11. This finding could be the joint result of the tourism attraction of the Eastern counties and the elevated accessibility to tourists/population due to the new intercity transportation infrastructure. A two-level green coverage HLM model shows that at the regional level, the increased employment accessibility brought by the THSR for a town/district is statistically significant ($p=0.05$) in reducing its green coverage. At the local level, the closer a town/district is to an HSR station; the higher its green coverage is reduced.
Conclusions: The preliminary policy implications include precautious planning for potential increasing land demand from distant areas and the reduction in green coverage and collecting taxes from the distant land demand consumers to cope for these impacts of the tele-connected land demand.

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Move Utah - Planning for Active, Healthy, and Connected Communities

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The Utah Department of Transportation (UDOT) has developed the Move Utah program to better work with communities to improve active transportation throughout the state. The Move Utah program is dedicated to providing local governments and municipalities across Utah with technical support and guidance as they pursue their active transportation planning efforts. Our team, along with our partners from the Utah Department of Health (UDOH), the Utah Department of Public Safety, Bike Utah, and the Utah Highway Patrol provides technical expertise, resources and funding opportunities to help communities advance through our Move Utah Community designation process, and to help them develop activities and events that build a solid foundation of community support for active transportation.
To provide a better overview of the Move Utah Program, the mission, initiatives, and goals are outlined below: MOVE UTAH MISSION Engaging Utah communities to improve active transportation planning and implementation. MOVE UTAH INITIATIVES Emphasize integrated transportation planning Identify benefits of health and activity Improve quality of life for communities Enhance law enforcement through education Encourage respect between roadway users MOVE UTAH GOALS Help communities identify their benefits of active transportation Guide communities to develop an Active Transportation Plan Encourage partner development and coordination Plan for and/or join community outreach events Assist in building personalized education and safety initiatives The team is currently working with communities throughout the state to achieve a designation status that creates more active, healthy, and connected communities. Move Utah community designation levels (Activate, Ascend and Peak) outlined through the program encourage communities to create walking and biking initiatives that are context-sensitive solutions to a community's needs and desires when it comes to active transportation. Each level has general requirements to meet in order to become a Move Utah Community. The requirements are meant to be flexible enough to fit the context and meet the needs of each individual community.
The UDOH is supporting the program through the Utah Comprehensive Cancer Program by providing funding to help communities reach a designation status. The UDOH and UDOT aim to reach multiple communities with diverse contexts and ensure a statewide effort is in place. The creative and interactive presentation will focus on