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Geographic variation in transportation concerns and adaptations to travel-limiting health conditions in the United States

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ABSTRACT

Transportation is a social determinant of health, and rural and urban locations are demonstratively different in their transportation availability and infrastructure. Rural and urban locations in the United States also differ in their socio-demographic and health profiles, with rural populations tending to be older, sicker, and poorer than their urban counterparts. Little is known, however, about how perceptions of transportation in the U.S. and adaptations to travel-limiting health conditions differ by geographic location. Using data from the 2009 National Household Travel Survey (n = 204,035), we found differences by geographic location in transportation concerns. For example, rural residents were more likely to list price of travel as their biggest concern and less likely to list highway congestion, availability of public transportation, and issues with other drivers as their biggest concern, compared with urban residents. Among respondents with health conditions that limit travel (n = 17,332), we found differences by location in adaptations to such conditions, with rural residents being less likely to reduce their travel, even if it may be safer to do so. Urban residents with travel-limiting health conditions were more likely than their rural counterparts to limit travel to daytime hours and to use reduced fare taxis and other specialized transportation services, which are not as readily available in rural locations. These findings call for attention to cost and availability of alternative transportation options for individuals with health conditions that make driving difficult, especially in rural areas.

1. Introduction

Transportation, defined broadly as the myriad ways that people get from place to place, is a social determinant of health (American Public Health Association, 2017; Marmot and Wilkinson, 2005). Access to transportation can be beneficial in promoting health, by helping individuals engage in employment, participate in social and civic activities, and access healthcare (Arcury et al., 2005; Haggerty et al., 2014; Syed et al., 2013). Certain modes of transportation, especially car travel, can also be harmful to health, by contributing to air pollution and by putting people at risk of disabling or fatal accidents (Haines and Dora, 2012; Savage, 2013). Long commutes can increase rates of physical inactivity and associated poor health outcomes (Hoehner et al., 2012; Robert Wood Johnson Foundation, 2012) and heavy traffic and transportation noise is associated with worse mental health (Putrik et al., 2015); conversely, walking and other forms of "active transit" can have significant health benefits for residents living in places where such activities are viable means of transportation (Hirsch et al., 2013; Mindell et al., 2014; Wasfi et al., 2013). Despite their importance, transportation issues have received little attention in the health literature; likewise, health outcomes are rarely included in policy decisions about transportation (Robert Wood Johnson Foundation, 2012).

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The majority of Americans are unsatisfied with the status quo in transportation access and options and would prefer more public transportation and general transportation improvement efforts (Mineta Transportation Institute, 2015; Navarro, 2009), yet these public perceptions and preferences are also missing from discussions about transportation and health. Adequate, efficient, and affordable transportation is especially important for individuals and families who may have difficulty affording or operating a private vehicle, but who may have limited access to affordable and accessible public transportation. Such populations include those with lower incomes, who are less likely to have access to reliable private vehicles (Blumenberg and Pierce, 2012; Murakami and Young, 1997); older adults and people with disabilities, who may have mobility, cognitive, or vision impairments that make driving difficult or impossible; and residents of rural areas, where public transportation and private taxi options are sparse or nonexistent (Mattson, 2012). Nearly 20 percent of the U.S. population has a disability; of those, more than one-fifth have a disability that requires specialized equipment or assistance for transportation. Individuals with disabilities are also four times as likely to have difficulty getting transportation when they need it and are significantly less likely to drive a vehicle (Bureau of Transportation Statistics, 2017). An analysis of the National Household Travel Survey showed that people with health conditions that make traveling difficult take significantly fewer trips and are more likely to stay in the same place, all day and week, across all age groups (Mattson, 2012). This may lead to difficulty accessing healthcare and increased social isolation, which can increase risks of hospitalization, falls, dementia, and mortality (Nicholson, 2012). People with transportation difficulty may also forgo necessary healthcare and other services, exacerbating existing health problems and leading to diminished wellbeing (Silverstein et al., 2017).

Transportation is often highlighted by researchers, advocacy groups, and people living and working in rural communities as a serious issue for rural populations (Vogelsang, 2016). However, there is little empirical research looking at differences by rural-urban location in perceptions about transportation and in transportation adaptations in response to health conditions. This is quite important, given the substantial differences between rural and urban areas, both in population structure (rural populations tend to be older, sicker, and poorer (US Census Bureau, 2015; USDA, 2016, 2017)) and in transportation services. In recent years, the federal government has shifted the onus for transportation funding and regulation to state legislatures and local communities (including rural counties and municipalities), which may exacerbate disparities in areas that are already struggling economically (Stommes and Brown, 2002). Indeed, there are significant differences across states and within rural areas in the funding, availability, and quality of transportation programs (Stommes and Brown, 2002). For example, federal aid for highway maintenance funding, which is allocated to local communities by states, varies from less than $15 per capita to more than $140 per capita across rural areas within the same states.

Research using the 2009 National Household Travel Survey (NHTS) finds that urban residents were nearly twice as likely as rural residents to engage in walks and bike trips of 30 min or more during a 24-h period (9.1 vs. 4.4 percent and 1.0 vs. 0.6 percent of the population, respectively) (Pucher et al., 2011). An analysis of the California sub-sample of the 2001 NHTS found that residents in lower-density areas (less than 1000 housing units per square mile) drove more miles and consumed more fuel than those in higher-density areas (Brownstone and Golob, 2009). According to data from the 2009 NHTS, other than traveling home from somewhere, the most common reasons that people engage in travel are to go shopping, run errands, and commute to work, although that research did not illuminate differences by rurality (Krumm, 2012). Transportation habits are affected by one's health, and older drivers are among the most likely to experience travel-limiting health conditions, but they may also have fewer options for transportation in rural areas, outside of driving themselves. This raises pressing issues in how to address individual transportation needs, as research using the 2009 NHTS has shown that older adults are becoming a larger share of all drivers, which is especially relevant to rural areas, where there are larger percentages of older residents compared with urban areas (Lynott and Figueiredo, 2011).

To be most effective, interventions to address transportation challenges should account for differences between rural and urban locations. For example, analysis of the 2009 NHTS shows that people living in rural areas are more likely to rate the cost of travel as a "big issue" (as opposed to a "moderate" or "little" issue), and people with health conditions that make travel difficult are more likely than those without such health conditions to rate price, safety, availability of public transit, aggressiveness of other drivers, highway congestion, and lack of walkways as "big" issues (Mattson, 2012). However, that analysis did not adjust for socio-demographic characteristics, which differ between rural and urban areas. Additionally, little is known about how rurality and health conditions together influence perceptions of travel. Arguably, issues of transit could be exacerbated in rural areas, where the population is older, has higher disability rates, higher poverty rates, and lower median incomes (USDA, 2016, 2017).

1.1. Research questions

This study seeks to address those gaps in the literature by examining rural-urban differences in perceptions about transportation issues and adaptations to travel-limiting health conditions, by answering the following research questions:

1. Are there differences by rural-urban location in the prevalence of travel-limiting health conditions?
2. For individuals with travel-limiting health conditions, are there differences by rural-urban location in the response or adaptation to those conditions?
3. Are there differences by rural-urban location and presence of travel-limiting health conditions in perceptions of transportation concerns?