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It is not how far you go, it is whether you can get there: modeling the effects of mobility on quality of life in rural New England ☆

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ABSTRACT

Many northern rural areas in the United States present particular challenges to providing year-round transportation options for residents. Climate and the distribution of population and amenities present challenges to developing rural mobility systems that may result in a higher quality of life. Using structural equation modeling and a 2009 survey of residents of Vermont, Maine, and New Hampshire, this study estimated how the availability of built amenities, natural amenities, weather and attitudes toward travel explain actual and unserved travel demand and subsequently quality of life. The presence of unserved travel demand significantly decreased quality of life, while the predicted number of trips taken had no impact. With regard to quality of life in northern rural climates, future mobility initiatives would have more impact by addressing trips not taken as measured by unserved travel demand, instead of number of trips or vehicle miles traveled.

1. Introduction

Mobility is a concept that encompasses amenity availability, accessibility, and the ability to get to desired destinations (Miller et al., 2013; Steg and Gifford, 2005). Mobility provides physical, social, and psychological benefits (Metz, 2000) and is a component of quality of life (QOL) (Cutler, 1975; Mollenkopf et al., 2005).

Northern rural areas in the United States are particularly challenging environments in which to provide year-round transportation options that ensure people have access to work, services, social activities, and active, healthy travel options such as biking or walking. Rurality characterizes the human geography of Northern New England, a three-state region located at the northeastern extreme of the United States. A majority of the population resides outside US Census-designated urban areas (Bureau of the Census, 2000), defined by high-density population clusters (Bureau of the Census, 2011) (Fig. 1). The rural built environment and climate of Northern New England communities make the provision of public transit, whether local, regional, or inter-regional, particularly challenging and often cost-prohibitive. Given more poor and elderly residents, small population sizes, lower population densities, limited transportation options and fewer financial resources, important amenities and services (i.e. grocery stores, employment, and places you can walk to) are less available and less accessible in rural areas (Dillman and Tremblay, 1977; Goldsberry and Duvall, 2009; Hart et al., 2002; Hart et al., 2005; Hubsmith, 2007; Velaga et al., 2012). Mobility research has focused primarily on urban areas rather than rural communities (Velaga et al., 2012). Understanding the impacts of mobility on QOL is an important step in building a sustainable mobility system (Mollenkopf et al., 2005; Steg and Gifford, 2005).

Linking mobility and QOL, and building more robust QOL models, is of significant theoretical importance (Felce and Perry, 1995; Metz, 2000). Mobility studies have shown the cause of mobility-loss (Carp, 1988) or effects on QOL (Cutler, 1975), but fail to create a model that links the two. Mattson (2010) shows the factors contributing to unserved travel demand but does not demonstrate ef-

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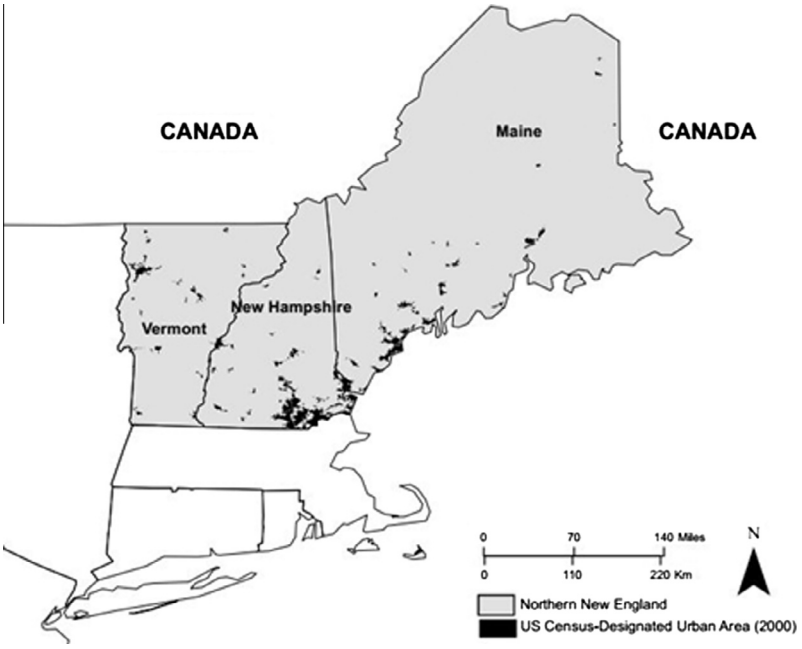

Fig. 1. Northern New England and its urban landscape.

fects on QOL. Felce and Perry (1995) and Mollenkopf et al. (2005) assert the importance of having a QOL model that incorporates a broad range of life domains with both objective and subjective measures.

QOL, though difficult to measure and generalize for entire populations, is most often measured through studying self-assessed life satisfaction and individual well-being (Sirgy et al., 2008; Theodori, 2001) and is believed to be influenced by mobility, the built environment, attitudes, and social wellbeing (Blunden, 1988; Felce and Perry, 1995; Mollenkopf et al., 2005). A summary of QOL drivers and the respective literature is shown in Table 1. This literature has focused on factors that have a positive impact on QOL; however, there are mediating factors that decrease mobility.

This study develops a model both of the factors affecting mobility and of the factors affecting QOL, linking the two in one study. The model presented in this paper captures both objective and subjective measures across multiple domains (e.g., built environment, natural environment). It uses a 2009 survey of residents of Vermont, Maine, and New Hampshire to examine how the availability of built and natural amenities, weather, and attitudes towards travel help to explain actual and unserved travel demand and subsequently QOL in northern rural climates. The specification includes the possibility that variables may have a positive, negative, or no association with QOL.

2. Methods

2.1. Sample and survey design

The data presented here were from the first phase of a four-season panel survey, which focused on the effects of seasonality on mobility and QOL. The survey instrument was informed by the findings from focus groups conducted in the Fall of 2008 and guided by the Transportation Research Center and Center for Rural Studies at the University of Vermont. This study was approved by the University of Vermont's Institutional Review Board (IRB). The survey was conducted using computer-aided telephone interviewing (CATI) and an online data-collection tool. Letters were mailed out on Friday, May 22, 2009 to potential respondents. These letters contained a short description of the survey, and alerted potential respondents to the availability and web address of the online survey (Dillman et al., 2009). Multiple collection techniques were used to capture a broader segment of the population. All computer-aided telephone interviews and online surveys were conducted between Tuesday, May 26, 2009 and Wednesday, June 10, 2009, Monday through Friday from 4:00 p.m. until 9 p.m. No difference was detected between the QOL of the two survey methodologies ($p > 0.10$).

In the first phase of the study, 1,417 surveys were completed out of 4,625 mail and voice contacts, a 31% response rate. The New England Transportation Institute (NETI) provided the list of residents of Vermont, Maine, and New Hampshire, which had been randomly sampled. Of those contacted, 2708 people refused to take the survey or terminated it after only a few questions, and 500 people who said they had completed, or would complete, the survey online did not. Respondents were required to be over the age of eighteen years and willing to participate in all four phases of the survey.

As shown in Table 2, 71.4% lived in a rural area, 45.5% of respondents were male, 47.1% had at least a bachelor's degree, the median age was 51 years – greater than the national average but expected given the exclusion of children from the survey – and 52.7% of households had a gross income of over $50,000. Table 3 presents respondents' general attitudes towards travel. One in five respondents (19.5%) reported some form of unserved travel demand, yet over 90% agreed they were able to get where they needed to go. Table 4 presents the perceived availability of eighteen community amenities hypothesized to affect travel demand, mobility and QOL. Neugarten et al. (1961) indicated that the subjective evaluation of quality of life is a valid indicator of overall happiness. Participants were asked to rate their quality of life on a scale of 0–10, with 0 being completely dissatisfied. The mean rating of quality of life was 7.83 among residents, signifying an overall happiness with living conditions despite the inaccessibility of certain amenities such as clothing stores (3.78) and employment (4.33). Note that the survey was administered during the 2008–2009 U.S. economic recession.