Executive Summary: Cost-Benefit Analysis of Providing Non-Emergency Medical Transportation

DETAILS

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EXECUTIVE SUMMARY: COST BENEFIT ANALYSIS OF PROVIDING NON-EMERGENCY MEDICAL TRANSPORTATION

This digest summarizes the final report of TCRP Project B-27, "Cost Benefit Analysis of Providing Non-Emergency Medical Transportation." The final report is available as *TCRP Web-Only Document 29.* This digest was written by P. Hughes-Cromwick and R. Wallace of Altarum Institute.

This digest contains information on the relative costs and benefits of providing transportation to non-emergency medical care for individuals who miss or delay healthcare appointments because of transportation issues. Paratransit operators and other transportation providers, legislative policy makers, and healthcare providers responsible for cost-effective transportation and healthcare decisions will find this digest of interest.

INTRODUCTION

Millions of Americans are considered to be "transportation disadvantaged," because they cannot provide or purchase their own transportation. As a result, this population—which is disproportionately elderly, poor, mobility-impaired, minority, or some combination of these—depends on others to access employment, education, shopping, and healthcare. Because they depend on others for transportation, the persons in this population have reduced access to healthcare services, and this places them at risk for poor health outcomes. Lacking available or affordable transportation, they miss or postpone routine care or preventive services, which can lead to a need for emergency care and preventable hospitalizations. For example, poorly managed asthma, a problem among children in the inner city with unique transportation barriers, can cause a major asthma episode (or attack). Access to non-emergency medical transportation (NEMT) can reduce emergency room and hospital expenditures for members of the transportation-disadvantaged population.

In response to the importance of examining the need for improved access to NEMT nationally, TCRP launched Project B-27, "Cost Benefit Analysis of Providing Non-Emergency Medical Transportation." The goal of this study was to compare the costs and benefits, including potentially large net health benefits, of providing NEMT to those who lack access to it. To achieve this goal, the objectives of this study were to

- Identify the transportation-disadvantaged population that misses non-emergency medical care because of a lack of available transportation (the target population);
- Determine the medical conditions that this target population suffers from and describe other important characteristics of these individuals, such as their distribution across urban and rural areas;

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- Estimate the cost of providing the transportation that this population would need to obtain medical transportation according to various transportation service needs and trip modes;
- Estimate the healthcare costs and benefits that would result if these individuals obtained transportation to non-emergency medical care for key healthcare conditions prevalent for this population; and
- Compare the relative costs (from transportation and routine healthcare) and benefits (such as improved quality of life and better managed care, leading to less emergency care) to determine the cost-effectiveness of providing transportation for selected conditions.

This study investigated the hypothesis that improving access to healthcare for the transportation-disadvantaged population will lead to improved quality of life and an overall decrease in healthcare costs. Furthermore, this study examined whether this hypothesized net decrease in healthcare costs exceeds the incremental increase in transportation costs. *TCRP Web-Only Document 29* (www4.trb.org/trb/onlinepubs.nsf/) explains the methods used in the Altarum Institute's study of this novel and complex issue and presents the findings, along with supporting documentation.

SUMMARY OF RESULTS

An analysis of nationally representative healthcare datasets revealed that about 3.6 million Americans miss or delay non-emergency medical care each year because of transportation issues. This target population of 3.6 million persons was found to have a higher prevalence of chronic diseases and a higher rate of multiple chronic conditions. The reasons for this higher prevalence and rate are described in *TCRP Web-Only Document 29,* as are the reasons chronic conditions and preventive care conditions were selected for the economic evaluation of providing transportation.

The researchers determined that the most appropriate method of evaluating the benefits of improved access to medical care is cost-effectiveness analysis (CEA). *For all 12 medical conditions analyzed, the researchers found that providing additional NEMT is cost-effective;* for four of these conditions, the researchers found that providing additional NEMT is actually *cost saving*—additional investment in transportation leads to a net decrease in total costs when both transportation and healthcare are examined. Table 1 summarizes the condition-specific results highlighting the most likely estimates.

The CEA method measures the effectiveness-per-unit cost, as opposed to a cost-to-cost comparison. As described in the final report, healthcare improvements are worth the amount invested when the cost is reasonable in light of improvements in mortality (enhanced life expectancy) and morbidity (health-related quality of life). Thus, while cost savings are the best possible outcome, cost increases may nevertheless be seen as worthwhile—i.e., cost-effective if they provide sufficient improvement in quality of life, life expectancy, or both. This standard is met for the eight conditions that are not estimated to be cost saving.

Table 1 Summary of Condition-Specific Cost-Effectiveness

Condition	Type	Result
Influenza Vaccinations	Preventive	Highly Cost-Effective
Prenatal Care	Preventive	**Cost Saving**
Breast Cancer Screening	Preventive	Moderately Cost-Effective
Colorectal Cancer Screening	Preventive	Moderately Cost-Effective
Dental Care	Preventive	Highly Cost-Effective
Asthma	Chronic	**Cost Saving**
Heart Disease (Congestive Heart Failure, CHF)	Chronic	**Cost Saving**
Chronic Obstructive Pulmonary Disease (COPD)	Chronic	Highly Cost-Effective
Hypertension (HTN)	Chronic	Highly Cost-Effective
Diabetes	Chronic	**Cost Saving**
Depression / Mental Health	Chronic	Highly Cost-Effective
End-Stage Renal Disease (ESRD)	Chronic	Highly Cost-Effective

Based on the convention frequently cited in health economics literature, investments that provide one additional Quality Adjusted Life-Year (QALY) are valued at $50,000 (see Appendix C in *TCRP Web-Only Document 29*). Interventions that provide one QALY and cost less than $50,000, therefore, are deemed to be cost-effective—worth the investment. Each of the analyses yielded either a cost saving or a net cost increase of less than $50,000 per QALY. Due to variations in cost per QALY, the researchers labeled NEMT for specific conditions as either highly or moderately cost-effective, with the former referring to costs far less than $50,000 per QALY and the latter referring to costs closer to $50,000 per QALY.

Using two approaches—one for chronic conditions amenable to disease management and one for conditions amenable to preventive care—the researchers were able to determine reasonable healthcare cost differences between well and poorly managed care. These differences were applied to the target population, which is assumed to have poorly managed care due to its transportation barriers. For chronic conditions, the researchers used the Medical Expenditure Panel Study data to determine these cost differences and, for preventive care, used values derived from the literature.

The net healthcare benefits of increased access to medical care for the transportation- disadvantaged exceed the additional costs of transportation for all of these conditions. These benefits include both actual decreases in healthcare costs for some conditions (e.g., emergency care replaced by routine care) and improved quality of life for those who receive access. For three of the chronic conditions (asthma, heart disease, and diabetes), results show net cost savings; for the other four (depression, hypertension, chronic obstructive pulmonary disease, and end-stage renal disease), improvements in life expectancy or quality of life are sufficient to justify the added expense.

These results evince a major finding and theme of this project: adding relatively small transportation costs does not make a disease-specific, otherwise cost-effective environment non-cost-effective. For example, a congestive heart failure monitoring program, already evaluated as highly cost-effective, will not become cost-*ineffective* by only adding incremental transportation costs. In other words, in today's economy, transportation is relatively inexpensive compared with the high and rapidly growing cost of healthcare.

WHO MISSES NON-EMERGENCY MEDICAL TREATMENT BECAUSE OF LACK OF TRANSPORTATION: DEFINING THE TARGET POPULATION

The estimate of 3.6 million Americans who miss or delay medical care because of a lack of access to NEMT each year, derived from analysis of the National Health Interview Survey (NHIS) and the Medical Expenditures Panel Survey (MEPS), is conservative and should be seen as a lower bound estimate. Response bias inherent in these studies, e.g., their difficulty in surveying the homeless and other truly disadvantaged individuals, lowers the estimate, and some populations may be totally ignored in the data. This bias will tend to make the estimate lower than if the studies truly represented the entire U.S. population. Furthermore, because people can fall into and out of transportation-disadvantaged status over time, as well as change healthcare status (e.g., healthy or not, have insurance or not), results suggest that only some of the Americans who are at risk of missing non-emergency care because of a lack of transportation actually do miss medical treatment in a given year. This phenomenon is shown in Figure 1. Finally, several factors and trends—disproportionate population growth of groups in the current target population; the aging of the U.S. population; more expensive, less affordable healthcare; rising disease prevalence—will conspire to dramatically increase the future projection of transportation-disadvantaged individuals at risk of missing health care, i.e., this study's target population.

Those who fall into the target population of 3.6 million for this study have characteristics that clearly distinguish them from the rest of the U.S. population. Demographically and socio-economically, the findings show that, compared to the rest of the U.S. population, this target population

- Has relatively low income (54.6 percent have household incomes less than $20,000 per year compared with only 17.7 percent for the remainder of the U.S. population);
- Is disproportionately female (62.8 percent female versus 51.9 percent) and non-white (19.1 percent non-white versus 17.7 percent);
- Has a higher minority representation (13.5 percent African American versus 12.6 percent; 16.7 percent Hispanic versus 13.2 percent);
- Is roughly one-half as likely to possess a four-year college degree;

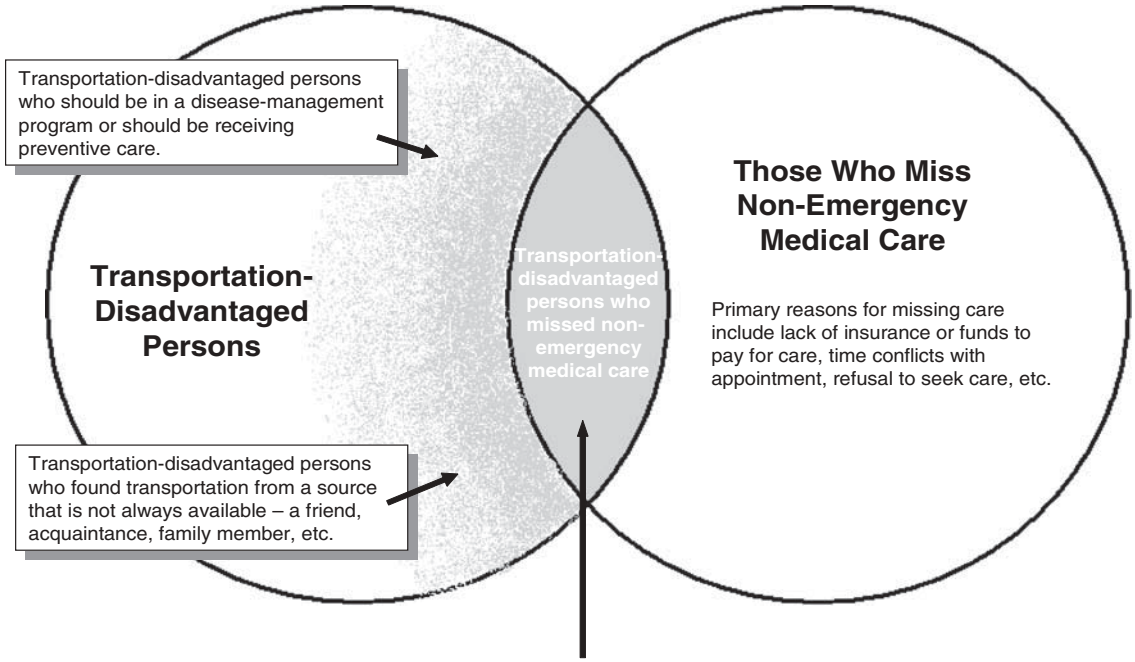

Figure 1 Transportation-Disadvantaged Population at Risk of Missing Non-Emergency Care

- Is older (16.3 percent are 70 or older compared with 11.5 percent); and
- Is distributed across urban and rural America much the same as the U.S. population as a whole, although children are slightly more concentrated in urban areas.

In terms of health status, the target population suffers from critical diseases at a higher rate than does the rest of the U.S. population, and it generally accesses more medical care than does the rest of the U.S. population, despite its transportation barriers, almost certainly because it is much more ill on average.

SELECTION OF HEALTH CONDITIONS FOR THE ANALYSIS

The examined diseases were drawn from the prevalence data in NHIS and MEPS. While there is clear value in a condition-by-condition approach for evaluating the costs and benefits of providing transportation to transportation-disadvantaged individuals, there is an obvious trade-off between the number of conditions that are evaluated and the quality of these analyses. For this study, a limited number of health conditions, both chronic and preventive, were analyzed. These conditions were selected primarily because of their prevalence in the target population. The final list was reviewed and approved by the panel convened by TCRP to oversee the project. The conditions are listed in Table 2.

Members of the target population are extremely high healthcare users, despite the barriers they face getting to appointments, because they have high disease prevalence, multiple simultaneous diseases, and high disease severity. Based on their demographic, socio-economic, and health characteristics, members of the target population also appear to be more likely than others are to live in less healthy environments, exacerbating their need for healthcare visits. Recent research shows that a significant portion of overall healthcare cost inflation derives from a small set of healthcare conditions—on the order of 30 percent of cost growth is accounted for by five conditions (heart disease, pulmonary disease, mental health, cancer, and hypertension). These findings strongly argue for a condition-specific method, in which a selective set of conditions is intensively studied.

THE COST OF NEMT

To determine the costs associated with providing additional transportation, the researchers analyzed trip cost data for the year 2004 obtained from transportation providers located throughout the United

Table 2 Critical Medical Conditions Affecting Transportation-Disadvantaged Persons

Type of Care	Medical Condition	Prevalence in the Target Population (%)
Chronic	Depression or Other Mental Health Problem	50
	Hypertension	37
	Heart Disease	26
	Asthma	20
	Chronic Obstructive Pulmonary Disease (COPD)	19
	Diabetes	15
	End-stage Renal Disease (ESRD)	7
Preventive	Dental Problems	28
	Cancer	12
	Prenatal Care	2
	Vaccinations	N/A

Source: National Center for Health Statistics, Centers for Disease Control and Prevention, NHIS (2002).

States. The ambulatory, wheelchair, and stretcher costs of various trip types were determined in both urban and rural locations. Although persons who are ambulatory could, in theory, access fixed-route transportation, the research suggests that those who actually have such access are or could be using it to obtain medical care. Thus, paratransit service was the focus for these three service types in urban and rural areas, resulting in six transportation cost categories. These categories and costs are listed in Table 3.

A small portion of missed trips could be provided by fixed-route public transportation. Using data from the National Transit Database (NTD), the researchers also determined that the average cost of providing a one-way, fixed-route trip is $2.86 (using 2002 data). Using these average costs—paratransit and fixed-route public transportation—for providing the unmet NEMT needs of the target population, the researchers were able to determine whether the net healthcare cost savings exceed the costs, by medical condition.

Table 3 NEMT Costs for Paratransit Services in Urban and Rural Areas

Service Type	Region	Average Cost per One-Way Trip ($)
Ambulatory	Urban	19.95
	Rural	20.95
Wheelchair	Urban	28.52
	Rural	33.02
Stretcher	Urban	89.68
	Rural	86.20

Source: Proprietary cost data (from 2004) based on 800,000 trips provided by services located in 20 locales across the United States.

MISSING LINKS: SHORTCOMINGS IN AVAILABLE DATA

Addressing the study's objectives was difficult using the available datasets from the healthcare and transportation fields. Simply put, healthcare data lack sufficient information on transportation and access to care, while transportation data contain little on healthcare utilization and nothing on utilization by medical condition. To allow more detailed study of the nationally important questions and hypotheses addressed in this study, both transportation and healthcare professionals and researchers need better data.

PROMISING AVENUES FOR FUTURE RESEARCH

The current study was not able to investigate two important dimensions of the problem associated with the transportation-disadvantaged and access to non-emergency medical care. First, the researchers were not able to examine the target population over time (longitudinally), meaning that the cumulative health benefits derived from improved access to transportation were not captured. Second, the researchers were not able to investigate the effects of disease severity on cost-effectiveness and to identify the individuals most likely to benefit from improved access to NEMT. Both of these limitations are in line with the conservative nature of the research and, when studied in more detail, should contribute to even more significant findings than this study obtained.

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