

Non-Emergency Medical Transportation: Findings from a Return on Investment Study

Americans with low incomes may lack access to reliable transportation, and lack reliable of transportation can lead to missed medical appointments and poor health outcomes. To check this problem, Non-Emergency Medical Transportation (“NEMT”)—free or low-cost transport to medical appointments for beneficiaries who need it—has been a mandatory Medicaid benefit since the program’s inception in 1966. It is codified in regulation.¹ States can limit its availability through federal waivers. The Trump Administration’s budget would allow states to limit the benefit without seeking a waiver.² Indiana and Iowa do not provide the benefit to a most beneficiaries within their Medicaid expansion populations, and Kentucky and Massachusetts plan to do so.³

We face an unusual moment where NEMT is being expanded across multiple health insurance markets even as it faces curtailment in Medicaid.⁴ Perhaps this is because we lack strong evidence of the financial benefit of NEMT, although a few studies have offered positive savings frameworks.⁵ Because there is limited research on the financial benefit of NEMT, the [Medical Transportation Access Coalition](#) commissioned Faegre Baker Daniels Consulting, Wakely Consulting Group, and Patricia Salber, M.D., to conduct a first of its kind study to examine NEMT’s return on investment. The findings suggest that NEMT more than pays for itself as part of a care management strategy for people with chronic diseases, resulting in a total positive return on investment of over \$40 million per month (\$480 million annually) per 30,000 Medicaid beneficiaries. The methodology used to conduct the study and calculate disease specific results is detailed below.

Methodology Used to Calculate ROI

The financial benefit of NEMT is likely to be shown most clearly in the costs avoided due to increased utilization of lower cost medical services (i.e., physician appointments) to increase adherent treatment care. The theory goes: missed medical appointments lead to deviations from clinical guidelines which, in turn, lead to complications and increased expensive medical services, such as hospitalizations. Therefore, for each disease and corresponding treatment, our ROI methodology involved: (1) determining the present-state treatment volumes of NEMT users and expected future-state treatment volumes if NEMT were not provided; (2) calculating the difference in total medical costs at the present-state and future-state treatment volume levels; (3) subtracting the cost of NEMT from change in total medical costs; and (4) extrapolating the per member per month ROI to the appropriate disease population.

¹ See: <https://www.healthaffairs.org/doi/10.1377/hblog20180608.971229/full/> . See also: 42 CFR § 431.53: “Assurance of transportation. A State plan must—(a) Specify that the Medicaid agency will ensure necessary transportation for recipients to and from providers; and (b) Describe the methods that the agency will use to meet this requirement.”

² Per the President’s budget: “Make Medicaid Non-Emergency Medical Transportation Optional: Under current regulations, states are required to provide Non-Emergency Medical Transportation to all Medicaid beneficiaries. The Budget commits to using regulatory authority to change provision of this benefit from mandatory to optional.” See also: <https://www.hhs.gov/sites/default/files/fy-2019-budget-in-brief.pdf>

³ Iowa, Indiana, and Kentucky eliminate the benefit for most non-medically frail adults covered by Medicaid expansion; Massachusetts and Arizona may implement similar cuts.

⁴ See: <https://www.healthaffairs.org/doi/10.1377/hblog20170920.062063/full/>

⁵ A 2008 [study](#) conducted by Florida State University concluded that if only 1 percent of the medical trips funded resulted in the avoidance of an emergency department visit, the payback to the State would be 1108 percent. A 2013 [study](#) in the *Journal of Health Economics and Outcomes Research* examined the high costs of ambulance transportation and suggested that greater use of public transportation and NEMT might save as much as \$1 billion a year.

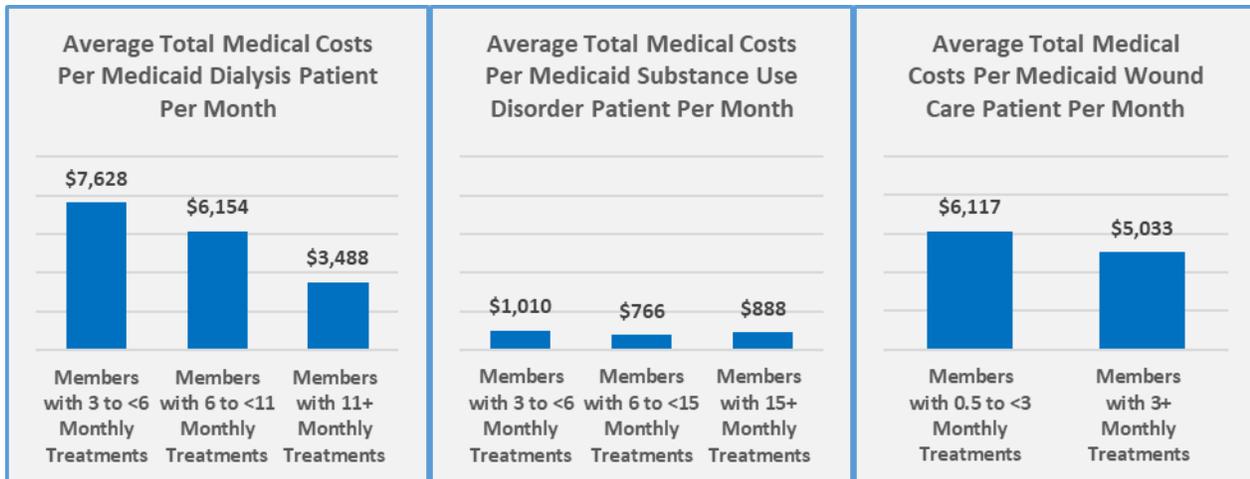
Calculating Medical Costs by Treatment Volumes

Six diseases and corresponding treatments were identified as potentially having sufficient monthly treatment volumes to be evaluated for this study: (1) wound care for diabetic wounds, (2) dialysis for kidney disease, (3) treatment for bipolar disorder, (4) treatment for schizophrenia, (5) adult day care for dementia, and (6) treatment for substance use disorder. We reviewed 2014 and 2015 Medicaid claims for each type of treatment using the Truven Health MarketScan® Database. For each disease and treatment, medical claims, pharmacy claims, and long-term care claims for members⁶ enrolled during the 24-month period were processed based on the following logic:

1. Members were identified based on an initial indicator claim and the earliest date of treatment was recorded (the “identification date”). Members whose identification date was after August 31, 2015, were excluded from the analysis. This restriction was included to ensure that an adequate number of months were used to determine the monthly adherence rate (defined below).
2. Adherence events occurring after the identification date were counted and recorded, and members were segmented by the number of days containing an adherence event post-identification divided by the member months post-identification (the “monthly adherence rate”).
3. All medical costs for each monthly adherence rate segment were summed together and divided by the total number of member months for the segment to determine the average total medical costs per member per month for the segment.
4. Finally, monthly adherence rate segments were combined based on clinical treatment protocols and medical cost changes, and very low volume treatment segments were excluded.

Additional parameters were used for dialysis and diabetic wound care. Members identified as having had a kidney transplant were removed from the analysis at the date of transplant. Members with wound care treatments spanning fewer than sixty days were not included in this study and the observation window used to calculate the monthly adherence rate for the remaining members was limited to sixteen weeks during the 24-month period after the initial treatment, since regular treatment for a wound is generally limited to 16 weeks. We did not find credible population sizes or claims for bipolar disorder, schizophrenia, and adult day care for dementia. Hence, these diseases were dropped from the analysis. The following charts show the average total medical costs for each of the remaining conditions by monthly adherence rate categories.

⁶ We use the term “members” in this paper in the interest of conforming with common health insurance industry terminology (i.e., per-member per-month). Use of this term is not meant to imply that this study controlled for a managed care delivery system. Rather, both the claims dataset and survey included a mix of fee-for-service and managed care enrollees.



Survey to Determine Treatment Volumes with and without NEMT

To determine the present-state treatment volumes of NEMT users and expected future-state treatment volumes if NEMT were not provided, we surveyed Medicaid beneficiaries who use NEMT to attend their medical appointments. We surveyed Medicaid beneficiaries in New Jersey, Louisiana, and Michigan who use NEMT services provided by LogistiCare, the nation’s largest NEMT broker.

We asked survey participants the following questions: what disease treatment he or she uses NEMT to attend; whether he or she has access to public or private transportation; what type of NEMT he or she uses; how many treatments he or she attends per month and uses NEMT to attend; how many treatments he or she would attend per month absent the availability of NEMT; how his or her health has been affected by NEMT; and what would happen if NEMT were not provided.

The survey vendor collected 460 surveys from respondents who self-identified as dialysis patients, 311 who self-identified as substance use disorder patients, and 206 who self-identified as diabetic wound care patients. We then calculated the self-reported average treatment volumes with and without NEMT per disease/treatment. See the averages and standard deviations below. (Note: nearly all survey respondents reported that they used NEMT to attend all of their treatments.)

Dialysis			Treatment for SUD			Wound Care		
Survey Count	Average Treatments per Month with NEMT (SD)	Average Expected Treatments per Month without NEMT (SD)	Survey Count	Average Treatments per Month with NEMT (SD)	Average Expected Treatments per Month without NEMT (SD)	Survey Count	Average Treatments per Month with NEMT (SD)	Average Expected Treatments per Month without NEMT (SD)
460	12.0 (1.5)	4.1 (5.3)	311	16.4 (6.1)	4.3 (7.2)	206	5.5 (3.7)	1.3 (2.7)

Overall, 58% of respondents reported that they would make none of their treatments if NEMT were not provided, 22% reported that they would make all of their treatments if NEMT were not provided, and

20% reported that they would make less than all but more than none of their treatments if NEMT were not provided. Importantly, in open-ended response to the question “what would happen if you did not have the transportation ride services you currently receive,” 103 respondents (10%) reported that they would die or probably die.

We found limited variation in the survey data by different demographics. No significant variations were found between members in different states, different genders, different marital statuses, different ethnicities, different living environments (urban/rural/suburban), or different age ranges. The only significant variations were found between members that responded “yes” or “no” to the question “do you have access to public or private transportation.” “Yes” respondents were approximately two times higher on average than “no” respondents in projecting the number of expected treatments per month without NEMT.

Specific Disease Results

A positive ROI was found for both dialysis for kidney disease and wound care for diabetes. The study failed to determine a positive ROI for SUD, though we believe our methods were ill-suited for SUD treatment and might have had better results under different study parameters.

Survey respondents reported attending 12.0 dialysis treatments per month on average with NEMT and would expect to attend 4.1 treatments per month without NEMT. The Medicaid cost analysis shows that dialysis patients who attend 3 to 6 dialysis treatments per month incur on average \$4,140 more per month in total medical costs than dialysis patients who attend 11+ dialysis treatments per month.⁷ The cost of the average round trip of NEMT for dialysis patients (based on private broker data) is \$60.24, so the average cost of NEMT per survey respondent per month for dialysis is $11.9^8 \times \$60.24 = \717.25 . Therefore, the Medicaid cost avoided due to NEMT per survey respondent per month is $\$4,140 - \$717.25 = \$3,423$. Assuming that the survey represents at least 10,000 like Medicaid members, the ROI of NEMT for treating kidney disease with dialysis per 10,000 members per month is \$34,229,448.

Survey respondents reported attending 16.4 treatments for SUD per month on average with NEMT and would expect to attend 4.3 treatments for SUD per month without NEMT. The Medicaid cost analysis shows that SUD members who attend 3 to 6 treatments per month incur on average \$123 more per month in total medical costs than SUD members who attend 15+ SUD treatments per month. The cost of the average round trip of NEMT for SUD patients (based on private broker data) is \$20.47, so the average cost of NEMT per survey respondent per month for SUD is $16.3 \times \$20.47 = \333.71 . Therefore, the Medicaid cost avoided due to NEMT per survey respondent per month is $\$123 - \$333.71 = (\$211)$. Assuming that the survey represents at least 10,000 like Medicaid members, the ROI of NEMT for treating SUD per 10,000 members per month is $(\$2,109,779)$. While our analysis does not yield positive ROI for SUD transportation, we believe different study parameters, i.e., a longer claims analysis period, relapse rates, quantification of social costs (e.g., increased employment and productivity, less law enforcement and judicial system costs, less strain on child services agencies and foster care system), likely would have led to positive ROI.

⁷ We note that alignment with the survey results with the similar average bucket is a simplifying assumption as the distribution may be non-normal. However, given data limitations, we believe this assumption is appropriate.

⁸ The average NEMT round trips per member per month (11.9) is slightly less than average treatments per member per month for dialysis (12) since a few dialysis survey respondents reported that they used NEMT to attend less than all of their treatments.

For diabetic wound care, survey respondents reported attending 5.5 wound care treatments per month on average with NEMT and would expect to attend 1.3 treatments per month without NEMT. The Medicaid cost analysis shows that wound care patients who attend 0.5 to 3 wound care treatments per month incur on average \$1,084 more monthly medical costs than wound care patients who attend 3+ wound care treatments per month. The cost of the average round trip of NEMT for wound care patients (based on private broker data) is \$53.25, so the average cost of NEMT per survey respondent per month for wound care is $5.5 \times \$53.25 = \291.96 . Therefore, the Medicaid cost avoided due to NEMT per survey respondent per month is $\$1,084 - \$291.96 = \$792$. Assuming that the survey represents at least 10,000 like Medicaid members, the ROI of NEMT for attending diabetic wound care treatments per 10,000 members per month is \$7,920,635.

Disease/ Treatment	Average Treat. per Month with NEMT	Average Monthly Medical Cost with NEMT	Average Treat. per Month without NEMT	Average Monthly Medical Cost without NEMT	Average Monthly Medical Cost Increase without NEMT	Average Cost per NEMT Round Trip	Average NEMT Round Trips PMPM	Total Cost of NEMT PMPM	Avg. ROI of NEMT PMPM	ROI Per 10,000 Members Per Month
Dialysis for Kidney Disease	12.0	\$3,488	4.1	\$7,628	\$4,140	\$60.24	11.9	\$717.25	\$3,423	\$34,229,448
Treatment for Substance Use	16.4	\$888	4.3	\$1,010	\$123	\$20.47	16.3	\$333.71	(\$211)	(\$2,109,779)
Wound Care for Diabetes	5.5	\$5,033	1.3	\$6,117	\$1,084	\$53.25	5.5	\$291.96	\$792	\$7,920,635

For all conditions, the total ROI per month is \$40,040,304 (per 30,000 members; 10,000 in each condition).

Policy Implications

The significant positive ROI associated with dialysis and wound care transport demonstrate that, at least for these conditions and presumably others (such as asthma and heart disease), curtailing NEMT is penny-wise, pound-foolish. While our analysis does not yield positive ROI for SUD transportation, we believe that speaks to study limitations rather than the value of the benefit. The data presented above offers a strong indication that NEMT more than pays for itself as part of a care management strategy for people with chronic diseases within and outside of Medicaid.

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The authors thank the Medical Transportation Access Coalition for supporting this research. We also thank Tricia Beckmann and Kacey Stotler for their important contributions to this project.