

Does It Cost More to Provide Home Healthcare to Patients in Rural Areas?

Assessing the Travel Costs Associated with the Care of Home Health Patients in Rural and Non-Rural Settings

Prepared on behalf of:

Partnership for Quality Home Healthcare

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Overview

Skilled home healthcare workers and therapists often must commute long distances to serve patients in their homes. This study explores the transportation cost difference between providing care to rural and non-rural patients.

In summary, this study found that transportation costs of episodes of care provided to rural patients averaged \$229, relative to the average transportation costs of episodes of care provided to non-rural patients of \$168.

Methods

Estimating Mileage

The dataset used for this analysis was drawn from the ABILITY Network home health data warehouse and included standard Medicare-Traditional PPS episodes starting in 2015. In order to eliminate the influence of spurious patient location information, we restricted the dataset to include patients located in the service areas for an agency as defined in the *Home Health Compare* dataset provided by CMS.

Actual mileage at an episode level is not available for the majority of agencies in the ABILITY data warehouse. Therefore, we used the agency and patient zip codes as a first step to calculate distance traveled. Given that the actual mileage traveled for a single patient visit is not likely to be equal to the distance between the home health agency and patient (for example, clinicians may visit several patients in a succession without returning to the agency between each visit), we estimated a model based on episode-level actual mileage data made available to ABILITY by a subset of home health agencies. We used this model to obtain an adjustment factor so that we could better estimate mileage traveled for patient visits. This factor enabled us to estimate travel mileage and costs for all agencies in the ABILITY database. This model assumes that agencies not part of the subset with actual mileage data have similar office location distribution and similar travel practices when visiting patients.

To create this model, we first calculated a base estimate of mileage traveled by calculating the distance between the patient's zip code and the agency's zip code. We then multiplied the distance by 2 to get approximate round trip distance between the two locations and multiplied by total visits to get a representative total mileage traveled during the episode.

Using episodes from the subset of agencies with actual mileage, we then regressed actual mileage traveled on this base mileage estimate to get a round trip factor. We trimmed the bottom and top 1% actual mileage and base mileage amounts to remove outliers and improve the model's fit. The final model equation resulted in a R^2 of 0.20, meaning 20% of the variance in actual episode mileage can be explained by the base estimate of mileage traveled using zip-to-zip distance. The model used to derive the adjustment factor was: $\text{actual mileage (log)} = 1.8606 + .4457(\text{base mileage (log)})$.

Using this model, we estimated total mileage traveled for all agencies in the ABILITY database.

Estimating Travel Cost

To calculate travel cost we made the following assumptions:

- We used the federal reimbursement rate for mileage cost (\$0.575) in 2015
- To calculate travel time, we used 30 MPH as the average speed clinicians drive to see patients. We based this off the average speed identified in a 2009 report prepared by LHC Group, *Reauthorization of the 5% rural add-on and development of a population density adjustment*.
- We based the average hourly wage by discipline on the wages from the [Bureau of Labor Statistics](#) for the home health industry. The average wages:
 - Registered Nurse: \$32.94
 - Occupational Therapist: \$44.17
 - Physical Therapist: \$46.42
 - Speech Therapist: \$46.83
 - Medical Social Worker: \$28.16
 - Home Health Aide: \$10.93

The formula used for calculating travel cost at the episode level:

$(\text{mileage} * 0.575) + [((\text{mileage} / \text{Total Visits}) / 30 \text{ MPH}) * \# \text{ visits by discipline} * \text{hourly wage by discipline}]$

Results

Rural Home Healthcare Experiences Higher Costs

Visiting patients in rural areas results in higher mileage and travel cost when compared with patients in non-rural areas. Average travel cost per visit for patients in rural areas is 36% higher than in non-rural areas. The average travel cost at the episode level is \$229 for rural episodes and \$168 for non-rural episodes.

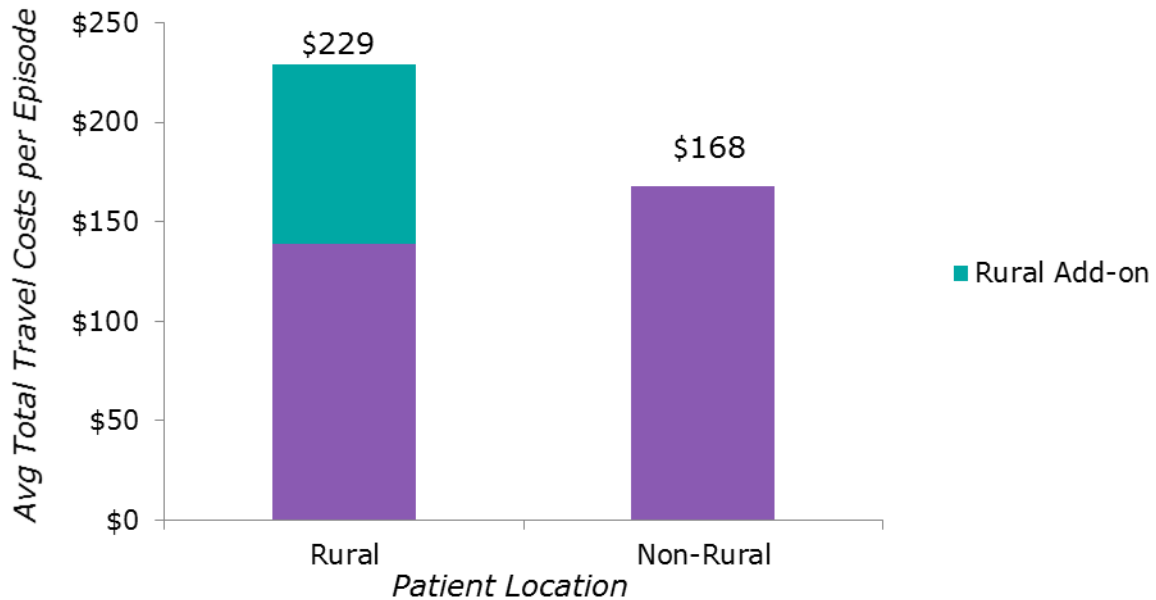
Table 1: Rural/Non-Rural Comparison on Travel and PPS Metrics

	All Agencies (estimated mileage)	
	Rural	Non-Rural
Volume		
Episodes (standard, Medicare-Traditional)	275,453	792,968
Agencies	663	882
Patients	151,176	540,304
Episode Metrics		
Avg. Episode Length (in days)	50.5	43.7
Avg. Visits	15.6	16.5
Avg. Therapy Visits	6.1	7.1
Avg. Case Weight	1.0004	1.0533
Travel Metrics (per episode)		
Avg. Miles Traveled	131.2	93.8
Avg. Travel Time (in hours)	4.4	3.1
Avg. Total Travel Cost	\$229	\$168
Avg. Rural Add-on	\$90	\$0
Travel Metrics (per visit)		
Avg. Miles Traveled	11.2	8.0
Avg. Travel Time (in hours)	0.4	0.3
Avg. Total Travel Cost	\$19	\$14

Rural Add-on Offsets the Higher Costs of Providing Care to Patients in Rural Areas

The average 3% rural add-on was \$90 per episode in 2015. This covers the higher transportation cost when providing care to patients in rural areas.

Graph 1: Rural/Non-Rural Comparison of Travel Cost per Episode



Significant Proportion of Home Healthcare Agencies Are in Rural Areas

Fifty-eight percent of states have a significant number of rural home healthcare agencies (see *Table 2*). Based on agencies in the ABILITY database, 83% of patients cared for by rural agencies live in rural areas. Rural patients also make up a significant proportion (13%) of patients cared for by non-rural agencies.

Table 2: Percent of Rural Providers by State

Source: September 2015 Provider of Service file from the Limited Data Set for Home Health Agencies

STATE	Total HHA Providers	Rural Providers	Percent Rural
AK*	12	6	50%
AL*	126	61	48%
AR*	160	108	68%
AZ	153	14	9%
CA	1188	20	2%

STATE	Total HHA Providers	Rural Providers	Percent Rural
CO*	149	27	18%
CT	83	1	1%
DC	19		0%
DE	21	5	24%
FL	1201	38	3%
GA*	93	25	27%
GU*	4	4	100%
HI*	15	8	53%
IA*	127	88	69%
ID*	32	10	31%
IL	723	49	7%
IN	253	38	15%
KS*	113	64	57%
KY*	97	54	56%
LA*	206	70	34%
MA	182	1	1%
MD	53	3	6%
ME*	26	12	46%
MI	579	48	8%
MN*	190	81	43%
MO*	151	62	41%
MP			0%
MS*	46	32	70%
MT*	22	16	73%
NC*	172	71	41%
ND*	17	10	59%
NE*	76	37	49%
NH*	36	11	31%
NJ	44		0%
NM*	69	35	51%
NV	121	4	3%
NY	149	20	13%
OH	727	105	14%
OK*	260	122	47%
OR*	57	25	44%
PA	414	66	16%
PR	38	2	5%
RI	29		0%
SC*	65	20	31%
SD*	32	24	75%
TN*	129	44	34%
TX	2576	232	9%

STATE	Total HHA Providers	Rural Providers	Percent Rural
UT	92	9	10%
VA	228	47	21%
VI*	2	2	100%
VT*	12	9	75%
WA	61	11	18%
WI*	115	39	34%
WV*	56	27	48%
WY*	15	14	93%
Total	11616	1931	17%

**25% or more rural agencies*

Conclusion

As discussed above, skilled home healthcare providers often commute long distances to serve patients in their homes. Based upon this study's analysis of the transportation cost difference between providing care to rural and non-rural patients, we find that the transportation costs associated with the delivery of care to rural patients averaged \$61 more per episode than the transportation costs associated with the delivery of care to non-rural patients. As a result, these findings appear to confirm the necessity and utility of add-on funds via the rural safeguard in securing delivery of skilled home healthcare services to rural patients.