The Price of Choice
what it costs to make home-based care work

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Abstract

The cost of home and community based long-term care has been difficult to compare to that of long-term care in a skilled nursing setting. The Money Follows the Person Project was conceived as a way to transition residents of skilled nursing facilities to home and community based residences in order to better study this phenomena. In this article, we use the data provided from eleven years of transitions in one small state to construct a model of the successful provision of home and community based services to high-needs Medicaid recipients. This model allows accurate comparison of the average cost of home and community based service delivery with that of skilled nursing facility care. Results indicate that the home and community based services provide a nearly $30,000/client annual savings.

1. Introduction

Since 2011, the Vermont Money Follows the Person Project (VTMFP) has been transitioning Vermont residents with high long-term care needs from nursing homes, hospitals, and institutional settings to home and community based residences. The numerous transitions provide significant insight into the cost of providing home and community based residential care in place of institutional care for this population. In this paper, we will discuss the aggregate results of the VTMFP program and examine a model of the average cost for a client to successfully remain in the community.

During its eleven year existence, VTMFP has overseen nearly 600 transitions from institution to community serving over 550 different individuals. A *transition* is defined as the movement of an individual from an in-patient skilled nursing residential setting, such as a nursing home or hospital, to a home or community based residential setting. Individuals who transition through VTMFP are followed for up to one year and are classified with an outcome. One of four outcomes is possible for each transition. An individual may be said to *graduate* if they have resided 365 days in their home or community based residence. An individual may be *institutionalized* or *hospitalized* if they returned to live in an institution for more than 90 days. An individual may have *deceased* during the year following transition. Finally, an individual may have *terminated* MFP participation for another reason, such as loss of Medicaid eligibility, declining services, or moving out of state. Generally, a graduation outcome is considered a success by the program and an institutionalization outcome is considered a failure.

Two cost values are associated with each Medicaid client in the MFP program. The first is the *care plan* value, which is the total authorized cost of the services the client is to receive. The second value is the *claim* value, or the actual cost of services delivered during the client's enrollment in MFP. Different timescales for care plans and claims can create difficulty in comparison of values and outcomes. To account for this, the *daily rate* value was established for both care plans and claims by dividing the total amount of the care plan (or claims) by the number of days the care plan (claims) covered. These daily rates provide useful categorization and comparison tools for our analysis. The ratio of claims daily rate to care plan daily rate is

expressed as a percent and referred to as the *utilization* of the client's care plan throughout this paper.

The purpose of this report is to examine the factors associated with client success and determine the cost of claims associated with providing sufficient supports for individuals to remain in a home or community based residential setting by analyzing the eleven years of data collected by the VTMFP project.

2. Data Set

Of the 590 total transitions conducted by 05 October 2022, 511 were for unique individuals and 79 involved multiple transitions by the same individuals. To perform our analysis, the 511 unique transitions were considered due to both ease of data collection and the understanding that individuals who conduct multiple transitions out of facilities likely represent highly complex situations. From the 511 unique transitions, 464 had outcomes and 47 were actively being followed by the MFP program. These 464 unique outcomes and their associated claims and care plans served as the basis for cost analysis.

Due to the significant time interval covered by the data set, all claims and care plan values were adjusted to 2022 dollars via the US Consumer Price Index (CPI) to account for differences in cost of health care over the past eleven years. This adjustment allows for a more level comparison of care plan, claims, and utilization despite the differences in dates of service. After CPI adjustment, the 464 unique outcomes contained two data points with care plans for over $600,000.00, which represented significant outliers to the data as the next highest value was under $350,000.00. These individual cases were investigated and are considered exceptions to the standard of care. Removing these two data points reduced the standard fourth moment kurtosis (a measure of the extremity of outliers) of the care plan data set from 87.5 to 2.0 and that of the claims data set from 50.0 to 0.3. The remainder of this analysis and discussion is conducted with the 462 unique outcomes excluding the two care plan outliers.

3. Analysis and Methodology

3.1 Initial Analysis and Influential Factors

After initial sorting and cleaning of the data, basic descriptive statistics were computed. These statistics for care plan and claims amounts, utilization rates, and numbers of each outcome are listed in Tables 1 and 2 below.

Measure	Care Plans	Claims	Utilization	Daily Rate
Mean	$94,873.44	$41,840.29	56.53%	$138.21
Median	$85,569.37	$34,906.19	57.10%	$119.72
First Quartile	$57,032.82	$13,235.37	29.26%	$68.24
Third Quartile	$120,838.24	$64,674.98	81.04%	$192.65
Standard Deviation	55,779.30	33,862.17	0.34	95.31
Minimum	$7,438.29	$0.00	0.00%	$0.00

Maximum	$341,758.27	$167,409.22	243.93%	$634.40
Skewness	1.16	0.89	0.73	1.13
Kurtosis	2.04	0.26	2.36	2.03

Table 1: Descriptive Statistics

Outcome	Number	Rate
Graduated	283	61.26%
Institutionalized	75	16.23%
Deceased	73	15.80%
Terminated – Other	31	6.71%

Table 2: Outcomes and Outcome Rates

Immediately apparent from these basic statistics is the difference between authorized care plan amounts and delivered claims values with a median utilization of 57.1%, indicating that nearly half of clients are receiving less than half of their authorized services. This observation prompted investigation into the utilization of services as a factor that affects the graduation of participants.

Once basic descriptive statistics had been computed and examined, data was then sorted into categories based on utilization rates, as shown in Table 3. Each category is labeled representing the least upper bound of utilization rate, i.e. a category labeled 10-20% means that the clients in this category had claims for at least 10% and strictly less than 20% of their authorized care plan value. This categorization allowed for the computation of outcome rates for each outcome in each category, found in Table 4.

Utilization Category	Total	Graduated	Hospitalized	Deceased	Terminated – Other
<10 %	40	9	16	10	5
10-20 %	36	16	10	7	3
20-30 %	43	19	14	8	2
30-40 %	39	22	8	4	5
40-50 %	38	17	7	8	6
50-60 %	51	31	4	15	1
60-70 %	52	34	7	7	4
70-80 %	44	35	2	3	4
80-90 %	44	38	2	4	0
90-100 %	43	38	1	3	1
>=100 %	32	24	4	4	0

Table 3: Outcomes in Utilization Categories

Individuals whose MFP participation terminated for reasons outside re-institutionalization or successful completion of a year in a home or community setting are not considered further in this analysis as they neither represent a significant portion of the total participants nor are their cases particularly relevant to the current question of the cost to sustain home-based care.

Utilization Category	Graduation	Institutionalization	Mortality
<10 %	22.5%	40.0%	25.0%
10-20 %	44.4%	27.8%	19.4%
20-30 %	44.2%	32.6%	18.6%
30-40 %	56.4%	20.5%	10.3%
40-50 %	44.7%	18.4%	21.1%
50-60 %	60.8%	7.8%	29.4%
60-70 %	65.4%	13.5%	13.5%
70-80 %	79.5%	4.5%	6.8%
80-90 %	86.4%	4.5%	9.1%
90-100 %	88.4%	2.3%	7.0%
>=100 %	75.0%	12.5%	12.5%

Table 4: Outcome Rates by Utilization Category

From Table 4, a significant increase in the graduation rate, or successful outcome rate, is noticed once the care plan utilization exceeds 50%; in addition, a steady upward trend in successful outcome rate accompanies increases in care plan utilization. The data from Table 4 were plotted against the lower bound of utilization category, as seen in Figure 1, and the correlation coefficients between utilization category and outcome rate were computed.

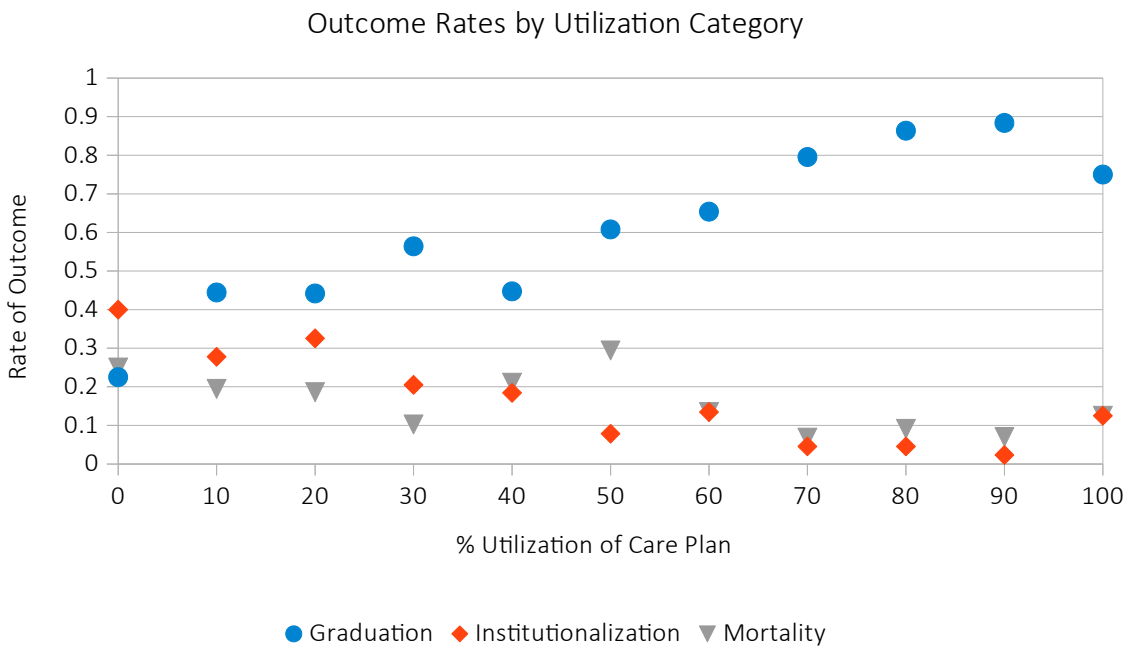

Figure 1: Outcome Rates by Utilization Category

The correlation coefficient of graduation rate and care-plan utilization is 0.92, indicating a strong positive relationship between utilization of care-plan and clients remaining in a home or community based setting for at least one year, while the correlation coefficient of institutionalization rate and care-plan utilization is -0.87, indicative of a strong negative relationship between care-plan utilization and re-institutionalization. The strong correlation between successful home or community placement and care-plan utilization provides encouraging evidence for the appropriateness of answering the question regarding the cost to sustain home and community based long term care.

In fact, the correlation between care-plan utilization and graduation rate was the strongest association found in analysis of other factors including housing type and age. For housing-type a two factor ANOVA test was run comparing the variance produced by housing type with that by produced by care-plan utilization to isolate which factor caused differences. The p-value was greater than 0.15 for housing type and the p-value was less than 0.01 for utilization. For age, some initial correlation was found between age and graduation rate. However, this correlation became weak after accounting for utilization of care-plan. Running a two factor ANOVA test on age and care-plan utilization resulted in a p-value greater than 0.15 for age and less than 0.01 for utilization. This supports the use of utilization of care-plan as a predictive factor for success.

3.2 Analysis for Cost of Success

Several methods of determining the approximate cost for graduation from the MFP program were employed, each giving similar values. Before using any measures of central tendency from the broad data set, a simple frequency distribution of care-plan values in each outcome category was created, shown in Figure 2 below. The distribution offers insight into the association between care-plan value and outcome. The fact that more participants ended their enrollment with a hospitalized outcome than with a graduated outcome for all care-plan values

below around $60,000 suggests that successful completion of 365 days in a home or community based setting is less likely beneath some minimum care-plan threshold.

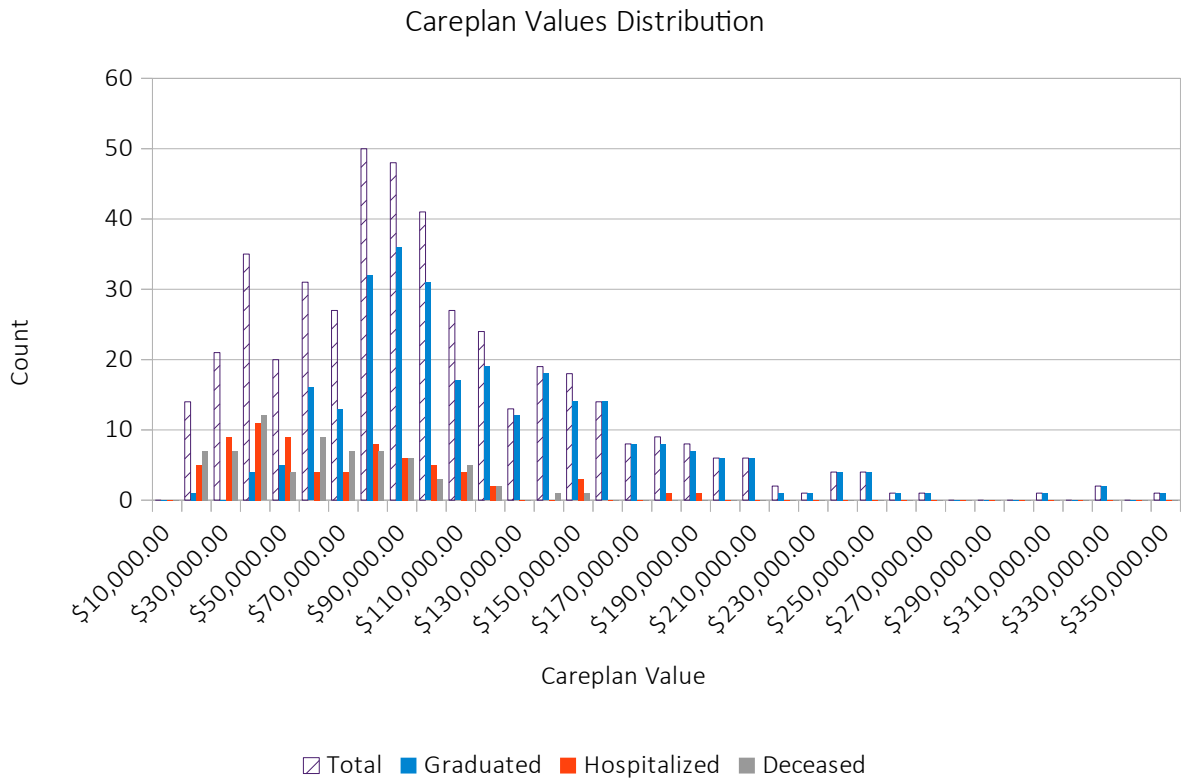

Figure 2: Care-Plan Value Distributions

With the frequency distributions indicating differences in central tendencies for different outcomes, the first, and most straightforward, method for determining the cost of successful community-based care involves calculating the means for the care-plan values and claims submitted for those MFP clients who graduated from the program. The results generated in this way is shown in Table 5 below.

	Care Plans	Claims	Utilization	Daily Rate
Mean	$117,347.80	$57,111.28	64.92%	$154.46

Table 5: Graduate Cost Values

The basic averages computed in Table 5 offer both some initial values for estimation of the average cost of a successful transition and some cautionary evidence regarding these values. These initial computations provide two beginning estimates of annual costs: $57,111.28, the mean of claims values, and $56,377.90, from computing the mean daily claims rate multiplied by 365. However, one particularly noticeable discrepancy is that between the mean of the utilization data (64.92%) and the observation that the mean claims are only 48.67% of the mean authorized care-plan. This prompts the exploration of a more thoughtful value than these basic measures appear to provide.

To determine a more suggestive estimate of the average cost of successful transitions to home and community based services, a model of successful home and community based service provision is first constructed based on the strong correlation between care-plan utilization and outcome. Given the fact that graduates of the program utilize, on average, nearly 65% of their care-plan values, outcome rates for clients utilizing at least 60% or less than 60% of their care-plan were determined. These rates are shown in Table 6 below.

	Graduation	Institutionalization	Mortality
> 60%	78.6%	7.4%	9.8%
< 60%	46.2%	23.9%	21.1%

Table 6: Outcome Rates for Utilization over and under 60%

With mortality and institutionalization rates both below 10% and a graduation rate of nearly 80% among all participants utilizing at least 60% of their care-plan, this 60% utilization cutoff provides a base level of expected utilization for success in the home and community based setting. This allows us to estimate the cost of a successful transition to the community in two additional ways: first, by computing the mean of claims for all clients graduating and utilizing at least 60% of their care-plan value; and second, by estimating 60% of the mean care-plan of graduates.

The first method measures the expected cost by looking at only those data associated with a utilization of at least 60% and the computations are shown in Table 7. These computations provide three important values for our estimations of expected cost. The second method takes the mean care-plan value of all graduates from Table 5 and multiplies by 0.60 to produce an expected cost of $70,408.68.

	Care Plans	Claims	Daily Rate
Mean	$113,944.87	$72,648.83	$192.16
Expected Mean Cost	$68,366.92	$72,648.83	$70,138.40

Table 7: Estimated Graduate Costs for data with at least 60% Utilization

These four estimates have an average of $70,390.71, a significant increase over the basic averages taken over the claims from Table 5. Indeed, even the lowest of the four values is over $10,000 more than the initial estimates. Because our goal is to estimate the cost for successful home and community based care, these values based on factors associated with graduation suggest a more appropriate measure of the average cost for such care to be successful is around $70,000.

4. Discussion

The strong correlation between care-plan utilization and success remaining in the community for a minimum of one year allows for the construction of a model scenario regarding successful home and community based care and resulting in the following conclusion. Given a care-plan with a utilization rate of at least 60% and annual claims of approximately $70,400,

about 78% of home and community based clients will be expected to remain in the community while only 7.5% of clients are expected to return to an institution.

This model provides the basis for continuing program improvement and sound estimation of cost comparison of home and community based services with nursing home services. In Vermont, at the time of this article, the average daily Medicaid rate for skilled nursing facility care is $295.44 which results in an average annual cost of $107,836.46 per client.

The MFP project has been transitioning individuals currently residing in skilled nursing facilities to the community in order to demonstrate the costs and viability of this form of care. With the model constructed from our eleven years of data, we can estimate the savings of home and community based care over nursing home care to the Medicaid program. Applying basic expected value with the rates of successful completion from our model, the expected annual savings to the program is $29,172 per client ($37,400*.78). As of October 2022, over 2500 of the approximately 7000 Vermont Choices for Care Medicaid recipients are residing in skilled nursing facilities. If just one-tenth of these residents could be served in a home or community based setting, the savings would be around seven million dollars annually.

In order to realize this savings, it is imperative that clients are receiving the majority (60% or more) of their authorized care-plan and services when residing in their home. We cannot expect the transition to home and community based services to reduce the cost by half or more in most cases, but there are significant savings to be had if the Medicaid program can ensure delivery of home-based services. This emphasizes the reality of the direct care service shortfall but encourages investment in the industry as substantial savings stand to be realized. Even with an additional $8,000/client investment into home based services, the savings can have a significant impact on our aging state’s ability to care for our most vulnerable people.