

Medicaid Redesign Team Supportive Housing Evaluation:

# Effects of 6- and 12-Month Program Retention on Client Outcomes

**SEPTEMBER 2019**

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# Table of Contents

Executive Summary .....4

Introduction .....12

**Section 1:** MRT-SH Clients Overall .....17

**Section 2:** Full Population Retention Analysis..... 20

**Section 3:** Retention Effects by Type of Program.....29

**Section 4:** Retention Effects by Diagnosis.....45

**Section 5:** Retention Effects by Discharge Reason .....66

**Section 6:** Summary of Findings ..... 75

**Section 7:** Policy Implications.....78

**Appendix A:** Retention and Potentially Preventable ED Use .....81

**Appendix B:** Retention and Inpatient and ED Use for Housing-Sensitive Conditions ..... 84

**Appendix C:** Retention Effects by Program .....86

**Appendix D:** Retention Effects by Demographic and Coverage Characteristics ..... 90

**Appendix E:** Classification of Housing End Reason (non-OMH programs)  
or Post-Discharge Living Situation (OMH programs) .....98

# EXECUTIVE SUMMARY

# Executive Summary

## BACKGROUND.

This report presents findings on the effect of participant retention on outcomes in the Medicaid Redesign Team Supportive Housing (MRT-SH) program, with implications for provider practice and policy. It is intended to put findings from preceding pre-post cost and outcomes reports in context. Previous analyses may underestimate the effects of MRT-SH because they use an “intent to treat” methodology, which includes people who only received services for a short time. This examination explicitly separates out effects for those who received a certain minimum duration of services (6 or 12 months) versus those who did not. To the extent that longer retention is associated with improved outcomes, this research may also encourage a policy focus on improved retention within programs.

The report describes how different levels of “dosage,” or number of months enrolled in an MRT-SH program, impacted participant outcomes, such as inpatient hospitalization, ED usage, primary care usage, and overall Medicaid spending, as well as housing stability. Additionally, the relationship between pre-period and post-period resource use was accounted for to determine whether the associations between retention and outcomes were the result of lower resource-use clients being retained longer (i.e. a selection effect).

These effects were examined for participants retained 1 to 6 months, 6 to 12 months, and 12 or more months, and for high, medium, and low resource users. High utilizers or spenders were defined as the top quintile for all MRT-SH clients, medium utilizers or spenders were defined as the 3rd and 4th quintiles, and low utilizers as the 1st and 2nd quintiles<sup>1</sup>. The report also examines these patterns across programs by participant diagnosis and demographic characteristics, and within certain programs (the latter two included as appendices).

Data sources for this report include scholarly literature on supportive housing; Medicaid Data Warehouse (MDW) data; and provider-level documentation related to participant enrollment and discharge. Participants in MRT-SH were included if they enrolled prior to September 30, 2016 and if they had full Medicaid coverage throughout the 12 months prior to and following enrollment (with no gaps in coverage greater than 60 days).

As hypothesized, findings were stronger for participants who stayed enrolled in MRT-SH for a longer duration. However, clients with the highest utilization or spending were less likely to be retained. This relationship necessitated controlling for pre-period levels of costs and utilization.

## MEASURES.

The report examines the gross “retention benefit” associated with 6- and 12-month retention (i.e., the post-period difference between retained and non-retained clients), but also measures the “selection effect” (i.e., the absolute difference in pre-period values between retained and non-retained clients). Statistically significant retention benefits and selection effects will be identified. The “net retention effect” will be measured as the retention benefit adjusted by the selection effect, or the absolute difference in pre-post changes between the retained and non-retained group.

The net retention effect will be presented in raw numbers (e.g., how many fewer inpatient days or Medicaid dollars are associated with retention), but to contrast retention effects across groups that started with very different pre-period numbers (e.g., low utilizers to high utilizers), we also look at the net retention effect proportional to the base pre-period value for that group (the net retention effect divided by the pre-period base value). This adjustment attempts to account for the fact that, for example, a net reduction of 5 inpatient days is a much more substantial effect for a population that started with 6 inpatient days than a population that started with 50. However, from a policy perspective, a net reduction of 5 inpatient days represents the same spending decrease in both cases.

## KEY MESSAGES.

The majority (71%) of clients who had full, continuous Medicaid coverage from one year before enrollment through one year

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<sup>1</sup> In some cases, more than 40% of clients had a zero value for pre-period inpatient days or ED visits. All clients with a zero value are included in the low utilization category even though they constitute a larger percentage than the lowest mathematical quintiles.

after were retained in MRT-SH for at least one year. Thirteen percent were retained for less than 6 months, and 16% were retained for at least 6 but less than 12 months.

### Overall Retention Effects

Generally, clients who were retained longer in the MRT-SH programs showed greater post-period decreases in utilization and spending. These effects were typically strongest for participants retained at least 12 months, versus those retained between 1 and 6, or 6 and 12, months.

On an intent-to-treat basis, the forthcoming Cost Report 2 will show a Medicaid savings of \$5,522, or 15% of pre-period costs, for recipients who enrolled in MRT Supportive Housing. However, for individuals who stayed enrolled for 12 months or more (two thirds of enrollees), average savings were \$6,773, or 19% of pre-period costs.

Similarly, Outcomes Report 2 will show a reduction of 0.7 emergency room visits (23%) and 3.7 inpatient days (38%) overall. But clients retained at least 12 months had 0.8 fewer emergency room visits (29%) and 4.2 fewer inpatient days (48%).

Comparing the clients retained less than six months to those retained for 12 or more, one could summarize the results as follows: *If you simply get clients enrolled, you see a 4% savings, 16% reduction in ER visits, and 21% reduction in inpatient days. If you keep them for at least 12 months, you see a 19% savings, 29% reduction in ER visits, and 48% reduction in inpatient days.* These retention findings should be taken to supplement the findings from the overall outcomes and cost reports and help put those decreases in context.

**Table 1.** Comparison of pre-post changes, "intent to treat" methodology versus by dosage

Pre vs. Post Y1 (n=3,649)	Overall Change (Intent to Treat)		Change By Length of Stay (Retention Effects)		
Inpatient Days	-3.7 days	-38%	<6 months (n=482)	-3.2 days	-21%
			6-12 months (n=573)	-2.2 days	-21%
			12+ months (n=2,594)	-4.2 days	-48%
ER Visits	-0.7 visits	-23%	<6 months (n=482)	-0.7 visits	-16%
			6-12 months (n=573)	-0.7 visits	-22%
			12+ months (n=2,594)	-0.8 visits	-29%
Medicaid Cost	-\$5,522	-15%	<6 months (n=482)	-\$2,078	-4%
			6-12 months (n=573)	-\$3,061	-8%
			12+ months (n=2,594)	-\$6,773	-19%

Although the primary drivers of client retention may be beyond the ability of programs to influence, the presence of retention effects suggests that **providers should track client retention and pilot strategies to reduce attrition, especially among clients at the highest risk of leaving the program.**

Further, participants who were high pre-period utilizers or spenders tended to demonstrate the greatest drops in utilization or costs in the post-period. However, **there is a strong, consistent correlation (across demographics, programs, diagnoses, and coverage characteristics) between higher pre-period resource use and earlier discharge (see Table 6).** The exception was that among those discharged to a less restrictive setting, higher pre-period utilization correlated with a longer stay. **Overall, this pattern seems to indicate that the most vulnerable clients are those also at the highest risk of attrition.**

### Retention Effects Controlling for Pre-Period Utilization

Within the high-utilizer group (and sometimes in the medium-utilizer group), clients who were retained longer often demonstrated lower post-period utilization. **Although these high pre-period utilizers are at greater risk of attrition, their retention effects were usually more pronounced.** Evidence of such effects were found across programs for inpatient utilization, ED visits, Medicaid spending, and housing stability. Further effects were also seen across utilization levels.

- There was both a 6-month and 12-month retention effect on inpatient days among clients across all levels of pre-period resource use, where longer retention was associated with fewer days. For example, the chart below shows that within the high pre-period inpatient utilizers, those retained for at least 6 months started off with 3 fewer inpatient days than those not retained (a selection effect), but in the first year post-enrollment they experienced 12 fewer inpatient days than those not retained (a result that goes far beyond the selection effect).

**Figure 1.** Average Year 1 inpatient days by pre-period inpatient use and 6-month retention

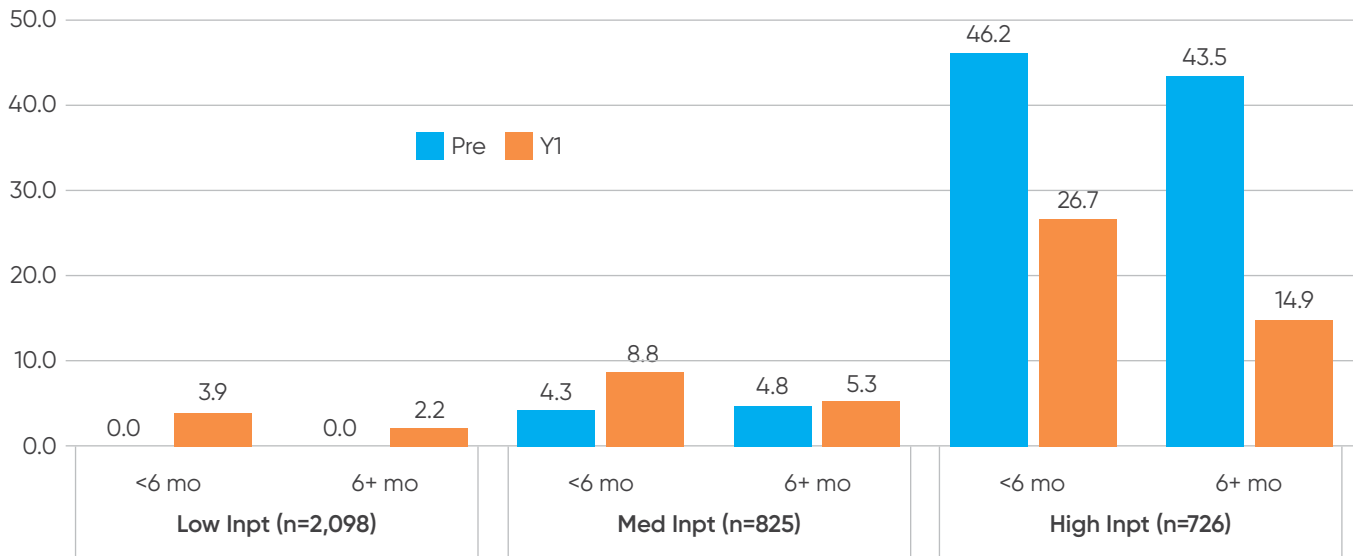


Table 2 breaks down the selection and retention effects on inpatient days associated with both 6-month and 12-month retention.

**Table 2.** Retention and selection effects on average Year 1 and Year 2 inpatient days, all clients

6-month retention	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low inpt (n=2,098)	-1.7*	0.0	-1.7*	0.0	--
Med inpt (n=825)	-3.5**	+0.5	-4.0**	4.8	-83%
High inpt (n=726)	-11.8***	-2.7	-9.1**	44.0	-21%
12-month retention	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low inpt (n=1,430)	-1.3*	0.0	-1.3*	0.0	--
Med inpt (n=557)	-5.7***	0.0	-5.7**	4.7	-121%
High inpt (n=491)	-8.5***	+0.7	-7.8†	42.9	-18%

- There was also evidence of a 12-month retention effect on decreased ED visits among clients with medium and high pre-period levels of ED use, and a 6-month retention effect for all levels of pre-period utilization. Results for different categories of potentially preventable ED visits are given in Appendix A.

Figure 2. Average Year 1 ED visits by pre-period ED use and 6-month retention

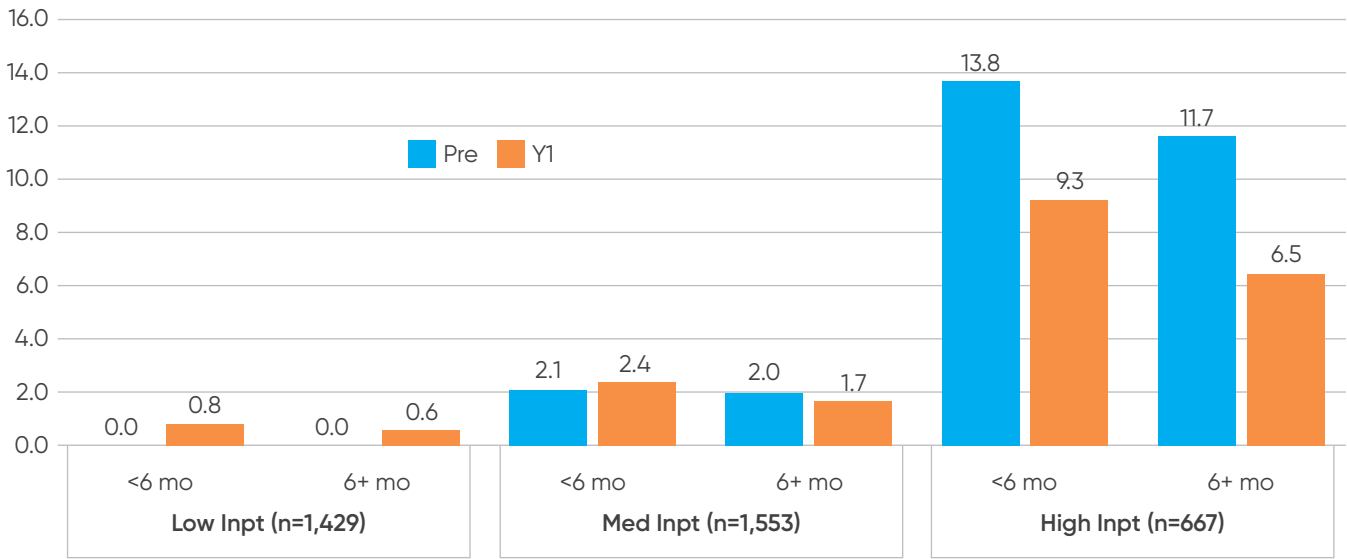


Table 3 breaks down the selection and retention effects on ED visits associated with both 6-month and 12-month retention.

Table 3. Retention and selection effects on average Year 1 and Year 2 ED visits, all clients

6-month retention	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low ED (n=1,429)	-0.2*	0.0	-0.2*	0.0	--
Med ED (n=1,553)	-0.7 ***	-0.1	-0.6***	2.0	-30%
High ED (n=667)	-2.8 ***	-2.1	-0.7**	12.0	-6%
12-month retention	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low ED (n=949)	-0.2	0.0	-0.2	0.0	--
Med ED (n=1,071)	-0.5 ***	0.0	-0.5***	2.0	-25%
High ED (n=458)	-2.2 **	+0.2	-2.0**	11.0	-18%

- There was a clear selection effect for Medicaid spending, wherein clients with higher pre-period spending tended to remain in the program for less time than their peers. However, there were still significant 6- and 12-month retention effects related to spending for both medium- and high-cost clients. The chart below shows that within the pre-period high-cost clients, those retained for at least 6 months started off with \$3,876 less in costs than those not retained (a selection effect), but in the first year post-enrollment they experienced \$21,181 less in costs than those not retained (for a net result, beyond selection, of \$17,305).

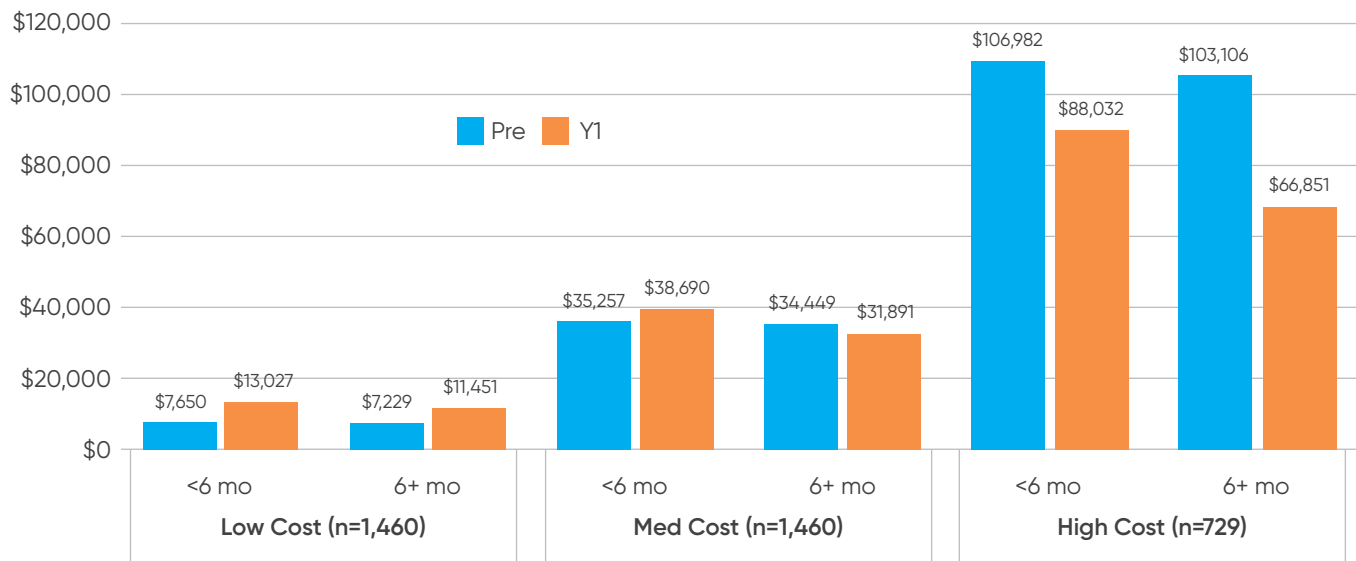
**Figure 3.** Average Year 1 Medicaid spending by pre-period spending and 6-month retention

Table 4 breaks down the selection and retention effects on Medicaid spending associated with both 6-month and 12-month retention.

**Table 4.** Retention and selection effects on average Year 1 and Year 2 Medicaid spending, all clients

6-month retention	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low cost (n=1,460)	-\$1,576†	+\$421	-\$1,155	\$7,268	-16%
Med cost (n=1,460)	-\$6,799***	+\$808	-\$5,991***	\$34,569	-17%
High cost (n=729)	-\$21,181***	+\$3,876	-\$17,305***	\$103,796	-17%
12-month retention	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low cost (n=937)	-\$918	+\$402***	-\$516	\$7,432	-7%
Med cost (n=1,026)	-\$11,178***	+\$178	-\$11,000***	\$34,989	-31%
High cost (n=515)	-\$30,332***	+\$8,204	-\$22,128***	\$101,845	-22%

In sum, after selection effects were accounted for among the high pre-period utilizers, those retained at least 6 months had 9 fewer inpatient days and 0.7 fewer ED visits in their first year post-enrollment than those not retained. Among high pre-period spenders, those retained for at least 6 months experienced \$17,305 less in costs than those not retained.

Among the smaller group of clients who had two years of post-period data, those high pre-period utilizers retained for at least 12 months had 8 fewer inpatient days and 2 fewer ED visits in their second year post-enrollment than those not retained. Among high pre-period spenders, those retained for at least 12 months experienced \$22,126 less in costs during their second post-enrollment year than those not retained.

### Other Outcomes

- Generally, there was a pre-post decrease in primary care visits; this change only varied by retention in that clients with low levels of pre-period primary care use had significantly fewer Year 2 primary care visits if they were retained for at least 12 months.



Outcomes with little or no evidence of retention effects beyond the impact of selection included primary care visits, housing-sensitive conditions, and various types of potentially preventable ED visits (the latter two included in the appendix). The lack of a significant retention effect should not be taken to indicate that supportive housing does not improve that outcome if a pre-post effect is observed in the overall outcomes report (true of potentially preventable ED visits and housing-sensitive conditions). Rather, even a short tenure in the program may confer benefits for participants. Also, it is more difficult to attain statistical significance with the smaller sample sizes within the different duration groups than for MRT-SH clients overall. Again, the results shown in this report should be taken to provide additional context for the overall outcomes and cost reports, but not supplant them.

### ***Retention Effects by Program Type***

While most MRT-SH programs provided housing and supportive services, some offered services only (to individuals who were already housed) or housing only. There was substantial variation by program type in the retention effects found for MRT-SH clients; however, these findings are difficult to interpret given the variation in sample size, location, and primary diagnoses between program types.

- There were a number of robust retention effects, net of selection, among clients in services and subsidies programs, especially those who were medium or high resource users in the pre-period. Medium- and high-using clients had significantly fewer Year 1 inpatient days if retained for 6 months, and significantly fewer ED visits and lower spending associated with both 6-month and 12-month retention. Among the low-utilizing clients, there was a nearly significant effect of both 6-month and 12-month retention on inpatient days, and a significant 6-month retention effect on ED visits.
- In contrast, retention effects for clients in services-only programs existed only among medium-utilizing clients for inpatient days (a nearly significant effect for 6-month retention and a significant effect for 12-month retention) and for spending (a significant effect for 12-month retention only).
- There were no significant retention effects for clients in housing-only programs, for whom only 12-month retention could be analyzed due to the very small numbers retained for less than 6 months. While the net retention effects on ED visits and spending for this group were very small, there was a sizable effect on inpatient days which may have been statistically non-significant primarily due to the relatively small size of this sample.

### ***Retention Effects by Diagnosis Category***

Retention appears to matter for all diagnostic categories, although the size of the retention effects varied by type of diagnosis.

- For the behavioral health population (those with severe mental illness and/or substance abuse disorders), 6- and/or 12-month retention effects were evident for inpatient days, ED visits, and overall Medicaid spending. This pattern was most pronounced among the high and medium utilizers.
- For the HIV-positive population, more of the results were accounted for by selection effects. Although there were several effects approaching statistical significance, the only significant results were fewer Year 2 inpatient days for medium-cost clients, and higher Year 2 costs for low-cost clients retained for 12 months. One hypothesis regarding the higher spending for retained low-cost clients is that these clients are receiving more antiretroviral medications, which would represent a positive outcome.
- For clients with other selected chronic medical conditions, dosage effects were found for inpatient days, ED visits (especially in Year 2), and costs, but primarily among clients with medium and high baseline levels of these metrics. These effects persisted even after accounting for selection effects.

### ***Retention Effects by Reason for Discharge***

Program discharge reasons were classified as positive (such as discharges to a lower level of care), as negative (e.g., discharges to a higher level of care), or as reflecting personal instability, but some of these groupings were too small to allow breakouts by pre-period utilization. Regardless of reasons for discharge, longer retention in the program was clearly related to lower post-period utilization and spending. The size of the effects, however, varied by both outcome and reason for discharge.

- After selection effects, clients discharged to a lower level of care had significantly fewer inpatient days if they had

been retained for 6 months (the effect for 12-month retention was not quite significant).

- All three discharge groups had significantly fewer ED visits if retained for 6 months (but no significant results for 12 months).
- Clients discharged to a higher level of care had significantly lower Year 1 spending if retained for 6 months (and there was a nearly significant effect for clients discharged to a lower level of care); clients discharged for reasons related to personal instability had significantly lower Year 2 spending if retained for at least 12 months.

### ***Policy Implications.***

- Across all programs and clients, maximum program benefit is associated with retention for at least one year post-enrollment, although net of selection effects the results vary by pre-period resource use.
- Discharge before 6 months – while associated with much less pre-post change than being retained for at least 12 months – is nonetheless associated with some level of pre-post decrease for inpatient and ED use, implying that any amount of time spent in MRT-SH confers at least some benefit on clients compared to their pre-enrollment use of care.
- Programs should plan to track retention, particularly 12-month retention, among their clients, and attempt to determine risk factors associated with avoidable or undesirable client attrition (as opposed to clients being discharged because they no longer need services). This data can facilitate a longer-term goal of identifying potentially preventable discharges – often, but not exclusively, those due to reasons of personal instability – and introducing programmatic changes that target clients' unmet needs before discharge occurs.
- A key conundrum faced by MRT-SH programs is that the same clients who seem to derive the most benefit from retention (i.e., those with higher levels of pre-period resource use) are also those clients who are at greatest risk of attrition. While this confound presents a challenge for program management, it also highlights the tremendous potential for improving program outcomes by increasing retention. For example, an average program would have to retain almost 43 low-cost clients for 12 months to realize the same cost savings as retaining a single high-cost client (i.e., the 12-month net retention effect for a high-cost client in dollars [–\$22,128] is nearly 43 times the 12-month net retention effect for a low-cost client [–\$516]).

### ***Conclusions.***

In sum, retention is related to stronger pre-post program effects, though these effects vary for different outcomes and between different groups of clients. When clients are retained for less than 6 months, they experience 4% savings, 16% reduction in ER visits, and 21% reduction in inpatient days. If they are retained for at least 12 months, they experience a 19% savings, 29% reduction in ER visits, and 48% reduction in inpatient days.

The findings also suggest that clients with the highest resource use in the 12 months prior to MRT-SH enrollment are those who benefit the most from retention, but these clients are also the most difficult to retain, presenting an important challenge for programs. The presence of retention effects suggests that providers should track client retention and pilot strategies to reduce avoidable or undesirable attrition (as opposed to clients who no longer need services), especially among clients at the highest risk of leaving the program.

# INTRODUCTION

# Introduction

This report presents findings on the effect of retention on participants in the Medicaid Redesign Team Supportive Housing (MRT-SH) program, with implications for provider practice and policy. This report constitutes a type of “dosage” study, used to determine the relationship between the quantity of an intervention received and the effectiveness of the intervention. In medicine, patients in clinical trials are usually randomly assigned to a dosage condition, but in the social sciences it is often not possible to achieve random assignment, so clients self-select into different dosage conditions by how long they choose to continue receiving an intervention.

This report is intended to put findings from previous reports in context. Some earlier findings may underestimate the effects of MRT-SH because they use an “intent to treat” methodology, which necessarily includes people who received few services. This report allows us to better separate out the program effects for those who received a certain minimum duration of services (6 months or 12 months). To the extent that retention is associated with improved outcomes, this report may also encourage a policy focus on improved retention within programs.

## LITERATURE RELATED TO SUPPORTIVE HOUSING

Permanent Supportive Housing has been credited with reducing homelessness, particularly among those with complex needs (HUD, 2010; Culhane et al., 2002; Metraux et al., 2003; Stefanic & Tsemberis, 2007).

Research indicates an association between housing instability, high utilization of acute hospital services, poor health outcomes, and high costs of care (Wright, 2016). Homeless individuals use emergency departments and require inpatient hospitalization at rates three to four times higher than other citizens (Chambers et al, 2013; Kushel et al., 2002; Kushel et al., 2001). However, rates of primary care use are low among homeless populations (Chambers et al., 2013; Hwang et al., 2001).

Previous studies of supportive housing outcomes and costs have focused on housing stability, health care utilization, shelter use, and incarceration rates. Health care utilization outcomes have been tracked through Medicaid data in most studies, with specific focus on emergency department visits, hospitalizations, hospital days, outpatient behavioral health, and primary care visits (Sadowski et al., 2009; Wright et al., 2016; Metraux et al., 2003; Culhane et al., 2002).

Emerging research has shown reductions in costs associated with health care utilization among formerly homeless individuals residing in supportive housing, guided by a Housing First model<sup>2</sup> (Metraux et al., 2003; Srebnik et al., 2013; Goering et al., 2015; Sadowski et al., 2009; Wright et al., 2016). Cost savings related to supportive housing are due to reductions in acute or “crisis-centered” services, such as emergency department use and inpatient hospitalization. These reductions offset increases in “community-based” services, such as primary care visits (Goering et al., 2015). Cost reductions are also reflected through reduced use of psychiatric inpatient services and reductions in incarcerations (Goering et al., 2015).

## NEW YORK STATE'S MEDICAID REDESIGN TEAM SUPPORTIVE HOUSING EVALUATION

In New York State, the Medicaid Redesign Team's Supportive Housing initiative (MRT-SH) has shown early signs of reducing overall Medicaid costs, as well as the use of inpatient and emergency department (ED) services, among a variety of client populations. The next phase of the evaluation, currently underway, will incorporate a matched comparison group to help isolate the effects of MRT-SH relative to other changes in the New York State and national health care system over the same period.

While the early findings are promising, they are based on analyses which use an “intent-to-treat” methodology, which includes all clients enrolled in MRT-SH regardless of how long they were retained in the program. This decision was made to reflect the reality that some MRT-SH programs will have substantial rates of attrition due to the inherently unstable nature of the populations they serve (e.g., those with substance abuse disorders, severe mental illness, histories of homelessness), and that programs will have limited control over how long clients stay. The intent-to-treat approach is a conservative approach that attempts to reflect real-world conditions rather than attempting to isolate the effectiveness of the intervention for only those clients retained for a specific period.

This choice comes at the cost, however, of underestimating the potential impact of the intervention by including clients in the treatment group who did not receive services for any meaningful length of time. It also leaves aside the potentially useful question of what constitutes a meaningful length of time in a program and how that amount varies by the needs and characteristics of the client population.

This report examines how pre-post program effects on Medicaid costs, inpatient and ED use, and selected other outcomes are mediated by length of time retained in the program. It also examines how this effect varies between different clinical groups, and (in appendices) between clients in different programs or with different demographic and coverage characteristics. Finally, this report examines reasons for discharge and tries to distinguish between the effects of various types of attrition. This component recognizes that program attrition can sometimes reflect circumstances which lead to better outcomes – for example, if a client is transferred to a level of care that is more appropriate for their needs or is no longer Medicaid eligible because they have rejoined the workforce.

## RESEARCH CONSIDERATIONS

The central question for this report is: among MRT-SH clients or a given subgroup of clients, is there a significant difference in outcomes between clients retained for a particular length of time and those who were not retained for that length of time?

Though seemingly simple, this question is more complex than it would appear. If clients who were discharged earlier tended to use resources more intensively than their peers during the post-enrollment period, it is tempting to ascribe this difference to their early discharge from the program. However, early analyses showed that clients who were discharged earlier also tended to use resources more intensively prior to MRT-SH enrollment. This pattern means that selection bias is built into the analyses and requires some kind of control for pre-enrollment resource use.

Another potentially confounding factor is regression to the mean, or the idea that more extreme values measured over time will tend to moderate – extremely low values will increase, and extremely high values will decrease. Therefore, if clients discharged early have substantially higher-than-average pre-period values (as we have established), we would expect them to experience a greater decrease in the post-period regardless of program effects. But if clients are compared by similar levels of pre-enrollment level of resource use, both retained and non-retained clients should experience a similar level of regression to the mean, and any further differences can be attributed to the program.

Finally, even the best methodology cannot rule out the potential for selection effects based on unobservable personality traits. Traits such as conscientiousness may predispose certain clients to be retained for longer in the program and also to reap more benefit from the program. Results showing a significant retention effect establish an association between retention and outcomes, but do not necessarily demonstrate that retention is the primary driver of the differences in outcomes. Given the limitations of the available data, there is no way to determine how much of the observed retention effects could be due to these unobservable individual characteristics and how much is truly due to the effects of retention.

## METHODOLOGY

The report describes how different levels of “dosage,” or number of months enrolled in an MRT-SH program, impacted participant outcomes, such as inpatient hospitalization, ED usage, primary care usage, and overall Medicaid spending. Additionally, the relationship between pre-period and post-period resource use was accounted for to determine whether the associations between retention and outcomes were the result of lower resource-use clients being retained longer (i.e. a selection effect).

High utilizers or spenders were defined as the top quintile for all MRT-SH clients, medium utilizers or spenders were defined as the 3rd and 4th quintiles, and low utilizers as the 1st and 2nd quintiles. *(Note: In some cases, more than 40% of clients had a zero value for pre-period inpatient days or ED visits. All clients with a zero value are included in the low utilization category even though they constitute a larger percentage than the 40% represented by the lowest two mathematical quintiles.)*

**Sample.** Participants in MRT-SH were included if they enrolled prior to September 30, 2016 and if they had full Medicaid coverage throughout the 12 months prior to and following enrollment (with no gaps in coverage greater than 59 days). The MRT-SH programs from which clients are taken include capital projects from Housing and Community Renewal (East 99th Street, VOA Creston, Third Avenue, Boston Road, Norwood Terrace, Access to Homes) and the Homeless Housing Assistance

Program (Son House, Happiness House, Opportunities for Broome, Hope Gardens, Evergreen). They also include programs providing subsidies and services (AIDS Institute Service and Subsidies program, AIDS Institute Pilot program, Office of Alcohol and Substance Abuse Services Rental Subsidies program, Office of Mental Health Rental Subsidies programs (Brooklyn and Statewide), Office for Persons with Developmental Disabilities Expansion program, and the Office of Health Insurance Programs' Health Home Supportive Housing Pilot and Nursing Home to Independent Living program [transition clients only]). Finally, there were two services-only programs (one through the AIDS Institute and another – the Senior Supportive Housing Pilot – through the Office of Health Insurance programs) and two housing-only programs (both through the Office of Temporary and Disability Assistance: the Disability Housing Subsidy Program [AKA Eviction Prevention for Vulnerable Adults] and the Homeless Senior and Disabled Placement Pilot).

It is worth noting that the overall sample thus includes participants in services-only and housing-only programs, as well as programs that provide both housing and supportive services. Analyses are broken out by type of program in a following section.

**Retention periods.** The two retention periods that are examined are 6 months or more (compared to less than 6 months) and 12 months or more (compared to less than 12 months). For 6-month retention, the dependent variable is utilization or spending in the first 12 months post-enrollment. For 12-month retention, the dependent variable is utilization or spending 12–24 months post-enrollment. Analyses of 6-month retention use a larger sample than analyses of 12-month retention, as fewer clients have data available for a full 12–24 months after their enrollment (either because they did not have consistent Medicaid coverage for this period, or because the most recent available Medicaid data did not yet extend to 24 months after their MRT-SH enrollment). These samples – 3,649 in Year 1 and 2,478 in Year 2 – are the same as those used in the Year 1 and Year 2 pre-post analyses in the cost and outcomes reports that will be published separately.

Both 6-month and 12-month retention are interesting in their own right and assist in determining what the “optimal dosage” is for a given outcome or population. However, they are not directly comparable for several reasons. First, these analyses associate 6-month retention with Year 1 outcomes and 12-month retention with Year 2 outcomes. This difference may predispose 12-month retention effects to appear weaker than 6-month effects, as more time has elapsed since the start of intervention. Also, the two measures are not independent – clients retained for at least 12 months by definition include those retained for at least 6 months. Finally, clients retained at least 6 months are by definition still enrolled in the program for at least half of Year 1, which is the examined post-period; in contrast, clients retained at least 12 months are not necessarily enrolled in the program for much of Year 2. A weaker or non-significant 12-month effect relative to a significant 6-month effect should not be taken to imply that retention beyond 6 months is not beneficial or that 6-month retention is necessarily better than 12-month retention, but rather that the 12-month retention effect as measured (i.e., using Year 2 outcomes) is not as strong as the 6-month effect as measured (i.e., using Year 1 outcomes). Further, weaker effects in Year 2 may reflect effects particularly contingent on continued enrollment, because any benefits observed in Year 2 could be those which especially outlast enrollment itself. Thus, while the absence of a significant 12-month retention effect does not necessarily indicate that there is no added value in keeping clients enrolled for at least 12 months versus 6 months, if the 12-month effect is larger than the 6-month effect this is good evidence that longer retention produces extended benefits and is a worthwhile program goal.

**Retention and selection measures.** The report examines the gross “retention benefit” associated with 6- and 12-month retention (i.e., the post-period difference between retained and non-retained clients), but also measures the “selection effect” (i.e., the absolute difference in pre-period values between retained and non-retained clients). Statistically significant retention benefits and selection effects will be identified. The “net retention effect” will be measured as the retention benefit adjusted by the selection effect, or the absolute difference in pre-post changes between the retained and non-retained group.

The net retention effect will be presented in raw numbers (e.g., how many fewer inpatient days or Medicaid dollars are associated with retention), but to contrast retention effects across groups that started with very different pre-period numbers (e.g., low utilizers to high utilizers), we also look at the net retention effect proportional to the base pre-period value for that group. This “proportional retention effect” is derived by dividing the net retention effect by the pre-period base value. This adjustment attempts to account for the fact that, for example, a net reduction of 5 inpatient days is a much more substantial effect for a population that started with 6 inpatient days than a population that started with 50. But in both cases, a reduction of 5 inpatient days represents a notable spending decrease and may substantially impact overall outcomes and cost savings.

Whether the net retention effect or the proportional retention effect is the most important metric varies according to a research versus a policy perspective. From a research perspective – determining the relative impact of different tenures in the program between groups – the key metric is the proportional reduction in services and spending relative to the base-line level. However, from a policy perspective, the key metric is more likely to be the net change in services and spending in raw numbers; as such, this report focuses on net changes.

### ORGANIZATION OF THE REPORT

Different sections of the report necessarily present results differently. Most sections show 6- and 12-month retention effects by pre-period levels of the same measure (e.g., retention effects on inpatient days are broken out by pre-period level of inpatient use; retention effects on ED visits are broken out by pre-period level of ED use, etc.).

The pre-period control break-out is not used for examining results by reason for discharge, as the sample sizes are too small to cut further by levels of pre-period resource use and again by retention. Sample size is also an issue within many categories of demographic and coverage characteristics, which are presented in an abbreviated form within the appendix.

A large, light orange, stylized number '1' is positioned in the background, centered vertically and horizontally. It has a thick, blocky appearance with a slight shadow effect.

# SECTION 1:

## MRT-SH Clients Overall



# Retention and Reasons for Discharge

The majority (71%) of clients who had full, continuous Medicaid coverage were retained in MRT-SH for at least one year. Thirteen percent were retained for less than 6 months, and 16% were retained for at least 6 but less than 12 months.

Retention varied by certain demographic characteristics and by diagnosis. Black and Hispanic clients were more likely to remain enrolled after one year than White clients and those who were multiracial or some other race. Retention also increased with age, with adults 60 and older having the highest retention rates. Clients with HIV or an SUD were more likely than other clients to leave within 6 months and less likely to stay a full year, but among the clients with HIV this outcome may be because a majority were in a services-only program, which had higher levels of attrition than the program serving this population with both services and subsidies (see Appendix C).

Retention also varied substantially by pre-period resource use, as shown below. The patients with the highest levels of pre-period inpatient use, ED use, and total Medicaid spending are the least likely to be retained for 12 months or more and the most likely to be discharged within 6 months of enrollment.

Figure 4. Distribution of retention lengths, all clients

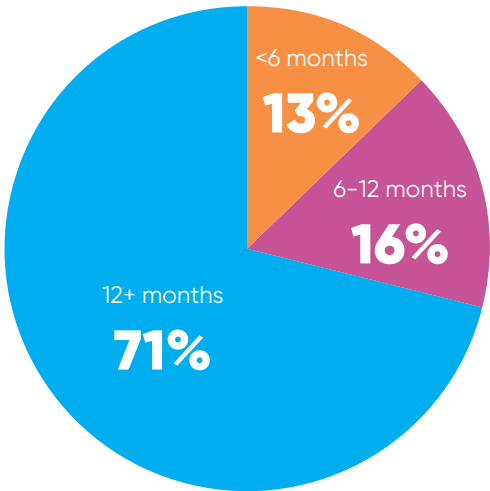


Table 5. Retention by Client Characteristics

	<6 months	6–12 months	12+ months
Gender			
Male	14%	16%	70%
Female	13%	15%	72%
Race/Ethnicity			
White, non-Hispanic	16%	16%	68%
Black, non-Hispanic	11%	16%	73%
Hispanic, any race	12%	15%	73%
Multiracial/Other	17%	16%	68%
Age			
Young adult (<40)	17%	18%	65%
Middle age	13%	15%	72%
Older adult (60+)	10%	15%	75%
Diagnosis			
SMI	13%	16%	71%
SUD	17%	18%	65%
HIV	18%	20%	62%
Chronic medical condition	13%	15%	72%

Table 6. Retention by Pre-Period Resource Use

	<6 months	6–12 months	12+ months
Inpatient Use			
Low Inpt	11%	15%	75%
Med Inpt	13%	17%	70%
High Inpt	20%	18%	62%
ED Use			
Low ED	10%	14%	76%
Med ED	14%	16%	70%
High ED	17%	19%	64%
Medicaid spending			
Low spend	9%	15%	76%
Med spend	15%	16%	69%
High spend	18%	17%	66%

REASONS FOR DISCHARGE

While there were a variety of specific reasons given for discharge, and many clients with discharge reason missing or unknown, a review of discharge reasons and (for OMH clients) discharge destinations pointed to three broad categories of reasons why people left the MRT-SH program.

Some clients appeared to be discharged because they needed a higher level of care than that provided by MRT-SH. This change likely occurred either because a client had not been appropriately placed (presumably among clients who were discharged to a higher level of care soon after enrollment), or because their health condition had deteriorated (possibly among clients discharged to a higher level of care after several months in MRT-SH).

Other clients appeared to be discharged because they did not need the level of support provided by MRT-SH. Again, this change was probably either because they were inappropriately placed to start or because their health condition stabilized or improved. An ideal outcome was if the client was able to return to living in a private residence or no longer needed Medicaid.

Finally, some clients were discharged for reasons that seemed to be related to instability in the client’s life – for example, they were incarcerated, had a long-term hospitalization, were evicted, or abandoned the apartment. For many of these clients, a behavioral health crisis may have precipitated their discharge.

Analyses confirmed that reason for discharge was significantly related to tenure in the program. As enrollment duration increased, discharges were more likely to occur due to a move to a lower level of care/less restrictive setting, and less likely to occur due to a move to a higher level of care/more restrictive setting. In other words, it appeared that people who were being discharged later were discharged healthier. Interestingly, there was little variation over time in the likelihood of being discharged due to personal instability: while it decreased very slightly as clients were in the program for longer, there was less change than might have been expected. The likelihood of being discharged for a specific reason that does not fit one of these categories decreases as time in the program increases, but the likelihood of being discharged for an unknown/unrecorded reason increases.

Reason for discharge is an important construct because discharges related to personal instability are potentially preventable, while discharges to a lower level of care can be considered ideal in terms of both client well-being and health system costs. Furthermore, reason for discharge may reflect unmeasured personal characteristics that can affect both program attrition and outcomes.

Table 7. Reasons for discharge by months retained, all clients

	<6 months	6-12 months	12+ months
Lower level of care (n=359)	16%	24%	24%
Higher level of care (n=191)	16%	12%	9%
Personal instability (n=184)	13%	11%	10%
Other reason (n=722)	28%	25%	17%
Unknown (n=1248)	29%	33%	36%
Not discharged (n=917)	--	--	--





# SECTION 2:

## Full Population Retention Analysis

# Full Population Retention Analyses

## OVERALL HEALTHCARE

**Inpatient Days.** The table below shows the changes in inpatient utilization over time for clients retained less than 6 months, between 6 and 12 months, and 12 or more months.

One way to examine the impact of time retained on inpatient utilization is to compare the size of the decreases across the three groups. This comparison can be misleading, however, since higher baseline values tend to moderate over time (known statistically as “regression to the mean”). It is clear that those retained for at least 12 months have the lowest levels of inpatient days in Years 1 and 2, but it is also clear that they started with the fewest inpatient days in the pre-period.

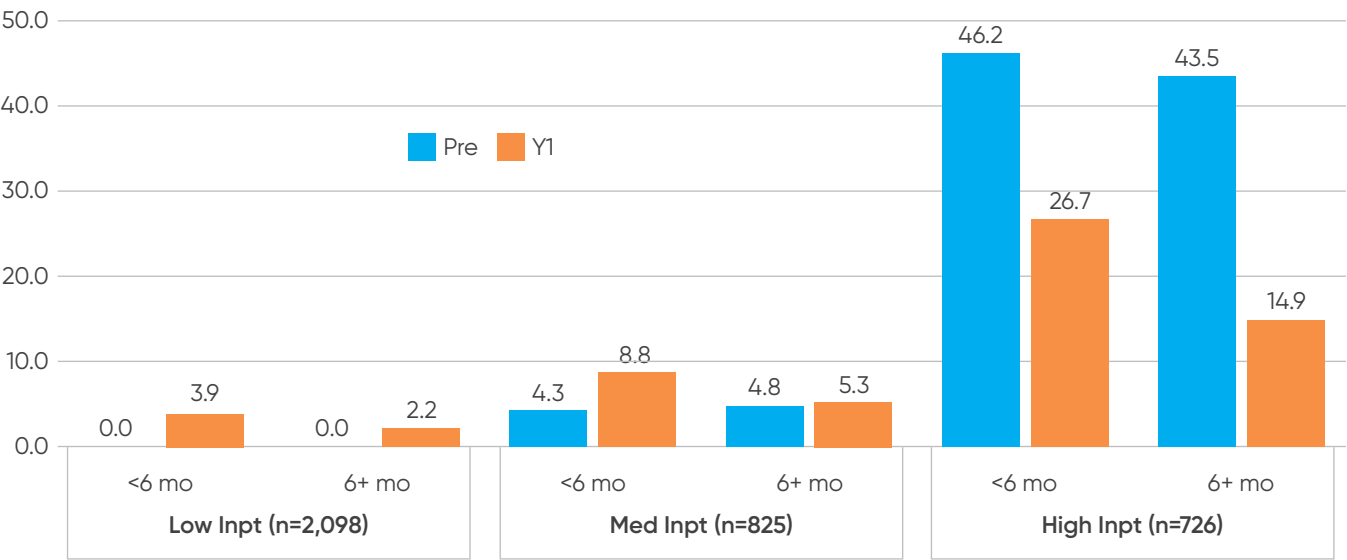
**Table 8.** Average inpatient days by months retained, all clients

	Pre	Year 1	Year 2†
<6 months (n=482)	15.2	12.0	10.1
6–12 months (n=573)	10.6	8.4	9.6
12+ months (n=2,594)	8.7	4.5	4.9

† Ns for the Year 2 data are: <6 = 317, 6–12 = 337, and 12+ = 1,824

The bar graphs below attempt to address the problem of regression to the mean by looking at the effects of 6- and 12-month retention within different levels of pre-period inpatient use. Without any true retention effect, we would expect comparable baseline values to “regress” by similar amounts. The 6-month retention graph illustrates this principle nicely. The retained and non-retained clients start at similar baseline levels within each group, and there is an increase for the low utilizers and a decrease for the high utilizers for both retained and non-retained clients (as both low and high utilizers move towards the mean). However, the clients retained for at least 6 months had less of an increase in the low utilization group and more of a decrease in the high utilization group than clients who were discharged within 6 months.

**Figure 5.** Average Year 1 inpatient days by pre-period inpatient use and 6-month retention



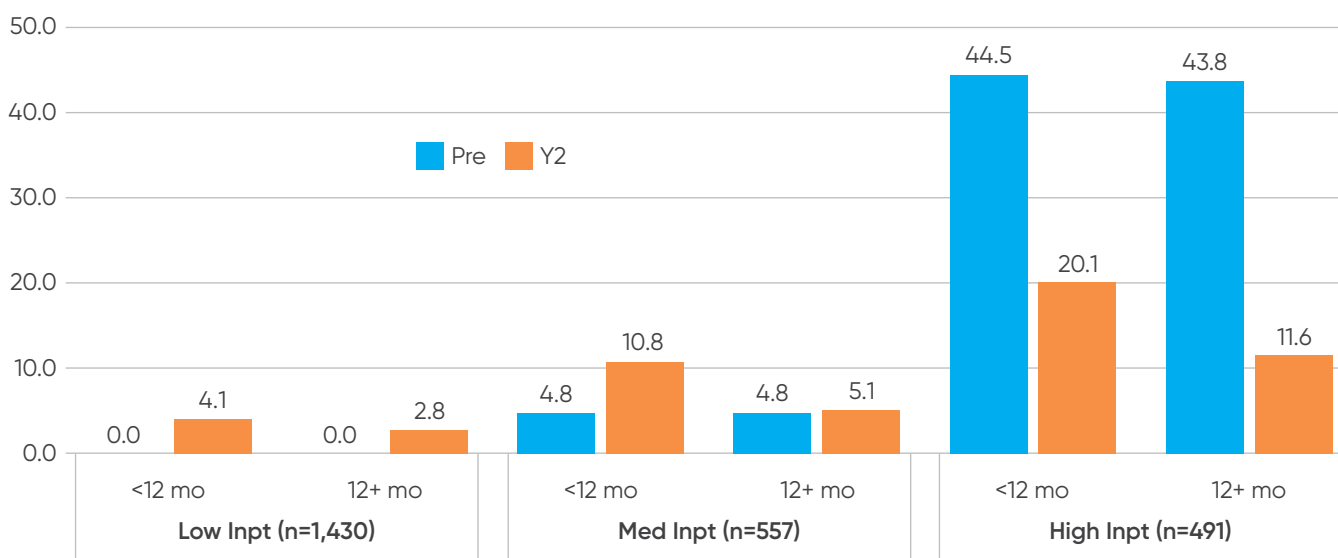
The unadjusted retention benefit (the post-period difference between retained and non-retained clients) ranges from 1.7 fewer inpatient days among low-utilizing clients to 11.8 fewer inpatient days among high utilizing clients. This benefit is statistically significant for all three groups of clients. There is also a moderate selection effect for both medium and high utilizers: medium utilizers who were retained started with 0.5 more inpatient days, and high utilizers who were retained started with 2.7 fewer. These differences were not statistically significant, however, and after adjusting for these selection effects all three groups continued to have significantly fewer Year 1 inpatient days if retained. Although the net retention effect is larger for high utilizers in raw numbers (4 versus 9.1 fewer inpatient days), the proportional retention effect (as a percentage of the base pre-period value) is larger for the medium utilizers (83 versus 21%).

**Table 9.** Retention and selection effects on average Year 1 inpatient days, all clients

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low inpt	-1.7*	0.0	-1.7*	0.0	--
Med inpt	-3.5**	+0.5	-4.0**	4.8	-83%
High inpt	-11.8***	-2.7	-9.1**	44.0	-21%

\* p=< 0.05, \*\* p=<0.01, \*\*\* p=<0.001

A similar pattern is found for 12-month retention and Year 2 inpatient days. Low utilizers showed an increase in the number of inpatient days; high utilizers a decrease. But within all three groups, clients retained for at least 12 months had fewer Year 2 inpatient days than clients discharged before 12 months. Thus, there is a statistically significant retention benefit for all three groups, with no or modest selection effects.

**Figure 6.** Average Year 2 inpatient days by pre-period inpatient use and 12-month retention

Although the net retention effect is larger for high utilizers than medium utilizers in raw numbers (7.8 versus 5.7 fewer inpatient days), the proportional retention effect is larger for the medium utilizers (a 121% reduction from the pre-period value, versus an 18% reduction for high utilizers).

**Table 10.** Retention and selection effects on average Year 2 inpatient days, all clients

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low inpt	-1.3*	0.0	-1.3*	0.0	--
Med inpt	-5.7***	0.0	-5.7**	4.7	-121%
High inpt	-8.5***	+0.7	-7.8†	42.9	-18%

In sum, the effect of 12-month retention as a percent of the base value was larger than that of 6-month retention for medium utilizers (121% versus 83%), but little different for high utilizers. Low utilizers saw a larger net retention effect of 6-month utilization than 12-month utilization (1.7 fewer Year 1 days with 6-month retention versus 1.3 fewer Year 2 days with 12-month retention).

**ED visits.** Across all clients, we see the same pattern with ED visits as with inpatient days – those retained the longest had fewer Year 1 and 2 ED visits, but also had fewer visits in the pre-period.

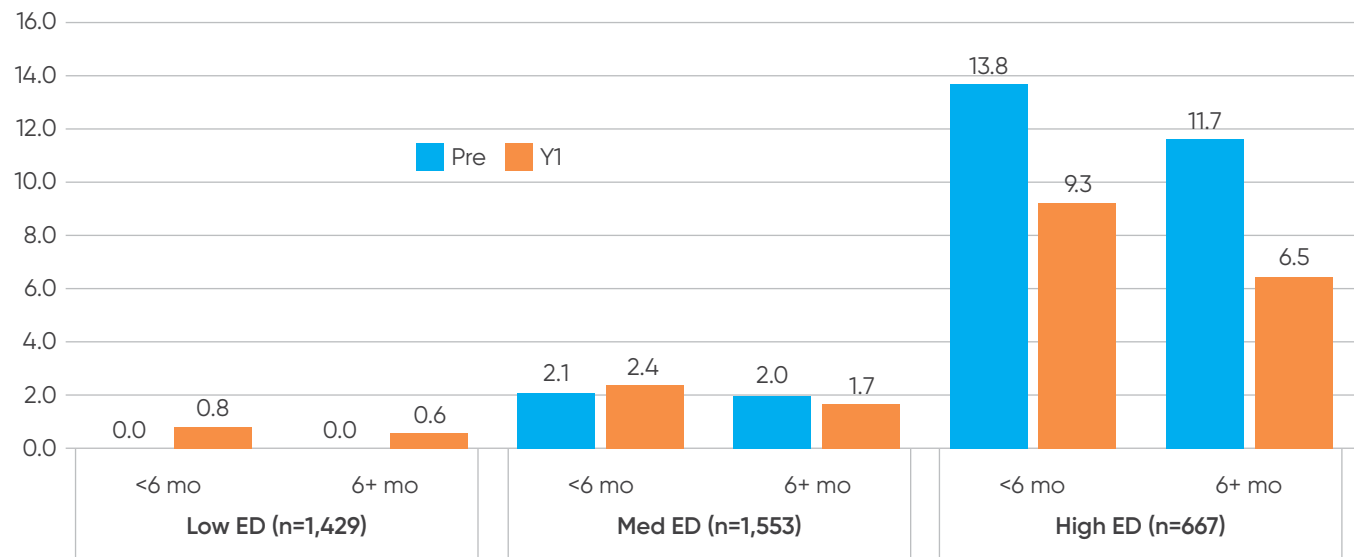
Again, regression to the mean can be observed when comparing pre-period to Year 1 ED visits for low and high utilizers, but the clients retained for at least 6 months are somewhat lower within all three groups.

**Table 11.** Average ED visits by months in MRT-SH, all clients

	Pre	Year 1	Year 2†
<6 months (n=482)	4.2	3.5	3.4
6–12 months (n=573)	3.2	2.5	3.0
12+ months (n=2,594)	2.8	2.0	2.0

† Ns for the Year 2 data are <6 = 317, 6–12 = 337, and 12+ = 1,824

**Figure 7.** Average Year 1 ED visits by pre-period ED use and 6-month retention



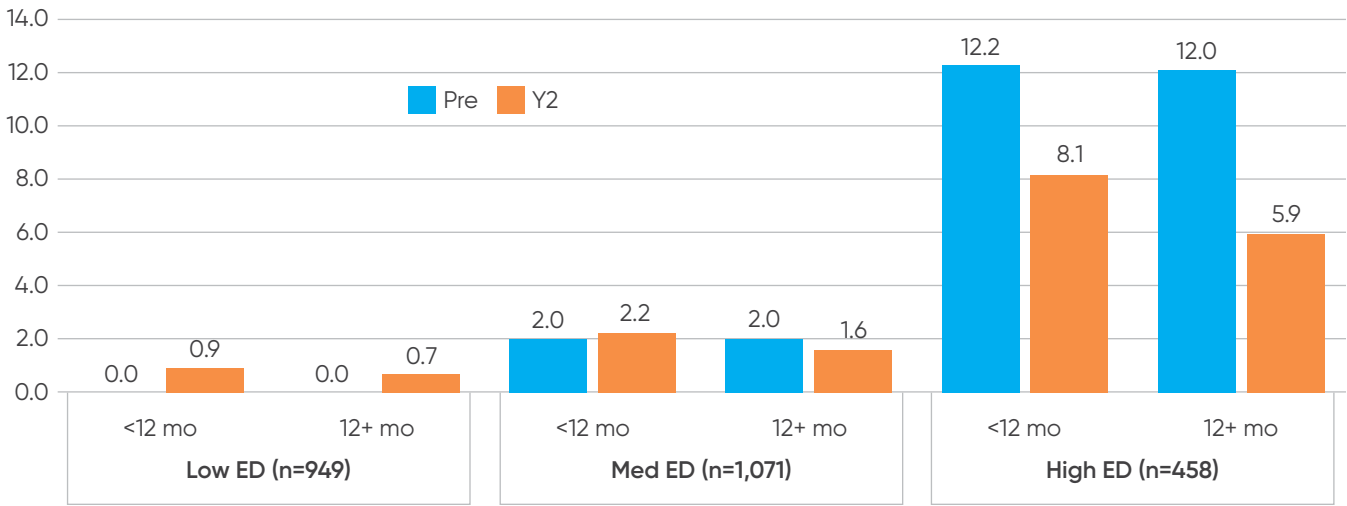
There is a statistically significant retention benefit for all groups, which ranged from 0.2 to 2.8 fewer ED visits. While there is a modest selection effect for high utilizers, it is not statistically significant. The net retention effect (adjusted for selection) is much reduced for high-utilizing clients but is still statistically significant. The proportional retention effect is larger for the medium utilizers (30% of the pre-period value versus 6% for high utilizers).

**Table 12.** Retention and selection effects on average Year 1 ED visits, all clients

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low ED	-0.2*	0.0	-0.2*	0.0	--
Med ED	-0.7 ***	-0.1	-0.6***	2.0	-30%
High ED	-2.8 ***	-2.1	-0.7**	12.0	-6%

Results are similar for Year 2 ED visits by 12-month retention. Clients retained for at least 12 months have lower post-period values in all three utilization groups.

Figure 8. Average Year 2 ED visits by pre-period ED use and 12-month retention



There is a statistically significant retention benefit for medium and high utilizers, and little or no selection effects. After adjusting for selection, the low utilizers had 0.2 fewer ED visits if retained, while the medium utilizers had 0.5 fewer and the high utilizers had 2.0 fewer. The proportional retention effect is larger for the medium utilizers (25% of the pre-period value versus 18% for high utilizers).

Table 13. Retention and selection effects on average Year 2 ED visits, all clients

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low ED	-0.2	0.0	-0.2	0.0	--
Med ED	-0.5 ***	0.0	-0.5***	2.0	-25%
High ED	-2.2 **	+0.2	-2.0**	11.0	-18%

In sum, the proportional effect of 12-month retention was higher than that of 6-month retention for high utilizers (18% versus 6%), but little different for medium utilizers (25% versus 30%). The net retention effect for low utilizers did not differ by 6- versus 12-month retention (0.2 fewer visits in both cases).

**Medicaid spending.** Year 1 and Year 2 spending is lowest for the clients retained more than 12 months, and highest for those retained less than 6 months. However, the same is true of pre-period spending.

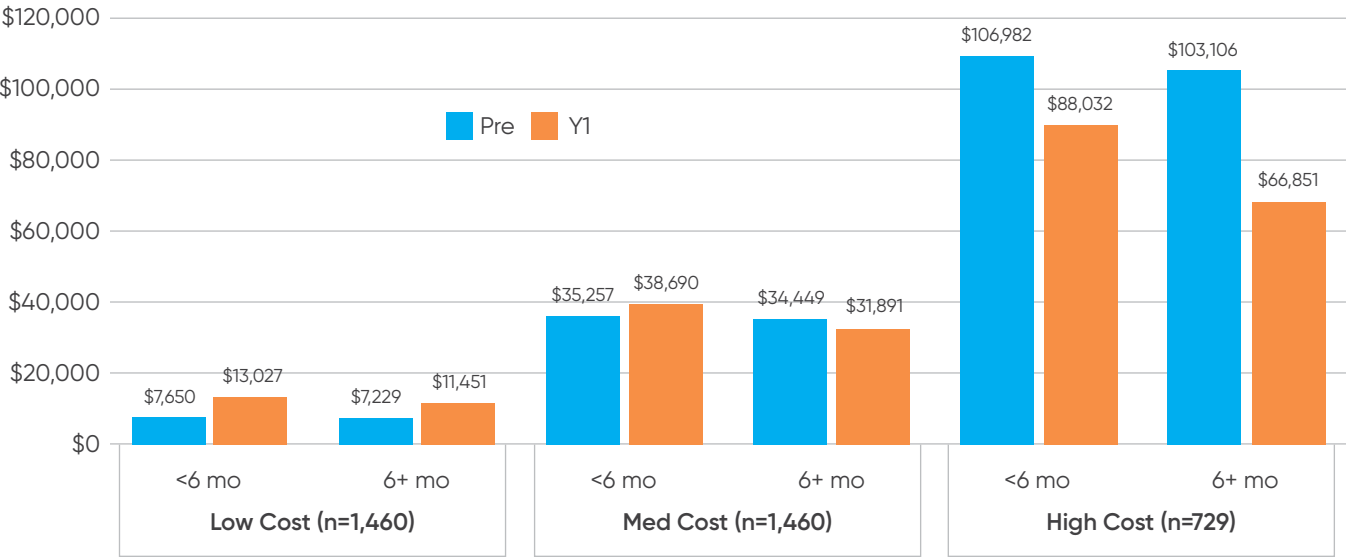
All utilization groups had lower Year 1 spending if they had been retained for at least 6 months, indicating at least some selection effect.

Table 14. Average Medicaid spending, by months in MRT-SH, all clients

	Pre	Year 1	Year 2†
<6 months (n=482)	\$46,957	\$44,879	\$47,253
6-12 months (n=573)	\$40,496	\$37,435	\$43,602
12+ months (n=2,594)	\$35,077	\$28,304	\$28,252

† Ns for the Year 2 data are <6 = 317, 6-12 = 337, and 12+ = 1,824

Figure 9. Average Year 1 Medicaid spending by pre-period spending and 6-month retention



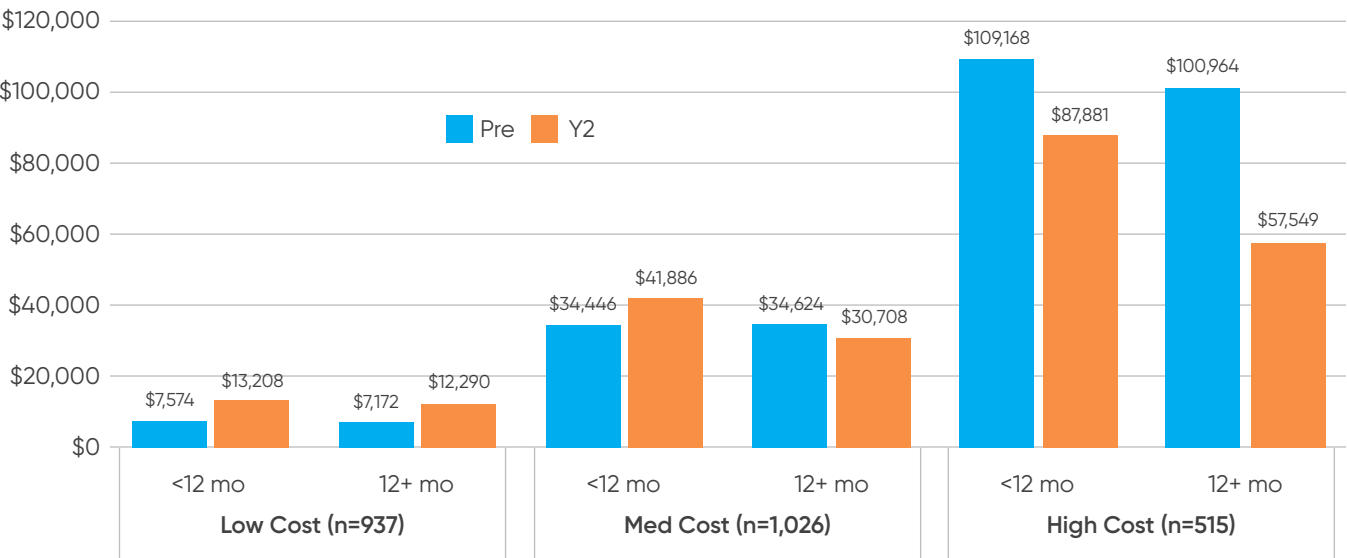
Both medium and high pre-period spenders had significant retention benefits, while the effect for the low-cost clients approached statistical significance. The modest selection effects were not statistically significant. The net retention effects in dollars varied substantially (from \$1,155 among the low-cost clients to \$17,305 for the high-cost clients), but as a percent of the base values the retention effects were similar for all three groups.

Table 15. Retention and selection effects on average Year 1 Medicaid spending, all clients

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low cost	-\$1,576†	+\$421	-\$1,155	\$7,268	-16%
Med cost	-\$6,799***	+\$808	-\$5,991***	\$34,569	-17%
High cost	-\$21,181***	+\$3,876	-\$17,305***	\$103,796	-17%

A similar pattern was found for 12-month retention and Year 2 Medicaid spending. Low- and medium-cost clients were similar in the pre-period regardless of retention, but in all three groups the retained clients had lower Year 2 spending.

Figure 10. Average Year 2 Medicaid spending by pre-period costs and 12-month retention





Again, there is a statistically significant retention benefit for medium and high utilizers, and these groups have only modest selection effects. Low utilizers, however, show a statistically significant selection effect of -\$402 in the pre-period. This group had little net retention effect after adjusting for selection (\$516 less spending among retained clients), but the net retention effects for the medium and high cost clients were statistically significant and substantial both in dollars and as a percent of the base value. The proportional retention effect is largest for the medium utilizers (31% of the pre-period value).

**Table 16.** Retention and selection effects on average Year 2 Medicaid spending, all clients

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low cost	-\$918	+\$402***	-\$516	\$7,432	-7%
Med cost	-\$11,178***	+\$178	-\$11,000***	\$34,989	-31%
High cost	-\$30,332***	+\$8,204	-\$22,128***	\$101,845	-22%

In sum, the proportional effect of 12-month retention was greater than the 6-month effect for medium spenders (31% versus 17%), while the proportional retention effect for high spenders was similar for both 6-month and 12-month retention (17% and 22%, respectively).

### Effects of 6 vs. 12-month retention

While 6-month and 12-month retention effects are not directly comparable, as the outcomes are taken from different time periods, a 12-month effect that is larger or stronger than the 6-month effect is good evidence that 12-month retention confers additional benefits beyond 6-month retention. (A smaller 12-month effect, however, does not necessarily mean that there is no additional benefit [see pg. 16].) The table below shows that 12-month retention effects are clearly larger for inpatient use among medium pre-period users, for ED use among high pre-period users, and for Medicaid spending among pre-period medium- and high-cost clients.

**Table 17.** Six-month and 12-month retention effects compared

	Net retention effect		Proportional retention effect	
	6-month retention (Year 1 outcomes)	12-month retention (Year 2 outcomes)	6-month retention (Year 1 outcomes)	12-month retention (Year 2 outcomes)
<b>Inpatient Use</b>				
Low Inpt	-1.7	-1.3	--	--
Med Inpt	-4.0	-5.7	-83%	-121%
High Inpt	-9.1	-7.8	-21%	-18%
<b>ED Use</b>				
Low ED	-0.2	-0.2	--	--
Med ED	-0.6	-0.5	-30%	-25%
High ED	-0.7	-2.0	-6%	-18%
<b>Medicaid spending</b>				
Low spend	-\$1,155	-\$516	-16%	-7%
Med spend	-\$5,991	-\$11,000	-17%	-31%
High spend	-\$17,305	-\$22,128	-17%	-22%

## PRIMARY CARE

**Primary care visits.** There was little pre-period difference between the three retention groups in the average number of primary care visits, and also little difference in Year 1. In the pre-post analyses based on “intent to treat,” there is a consistent statistically significant decrease in primary care visits (from 3.1 to 2.7); as such, some decrease occurs regardless of retention. While the decrease in primary care utilization following MRT-SH enrollment was unexpected, it appears that those MRT-SH clients with continuous Medicaid coverage (to whom the analysis is necessarily limited) were high pre-period users of all types of health care prior to their enrollment, including primary care. However, the <6-month and 6-12-month groups did not maintain the decrease that all three groups experienced in Year 1, returning in Year 2 to nearly their pre-period levels.

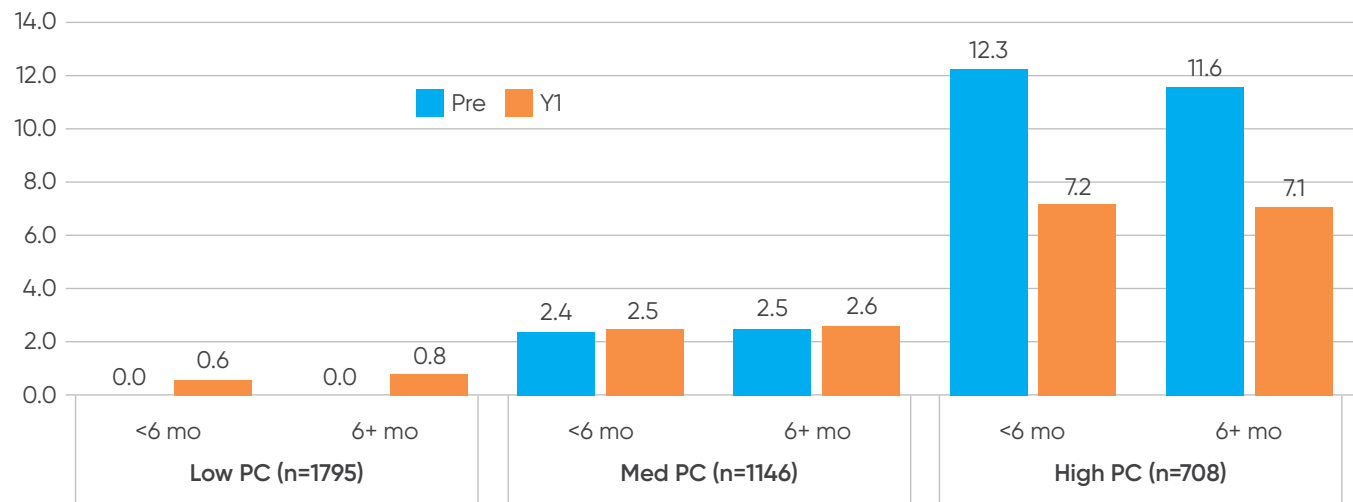
Within pre-period levels of primary care use, clients did not vary by retention in either their pre-period or Year 1 primary care visits. It is interesting to note, though, that only those who were high users in the pre-period saw substantial decreases post-enrollment (regardless of their retention).

**Table 18.** Average primary care visits, by months in MRT-SH, all clients

	Pre	Year 1	Year 2†
<6 months (n=482)	3.1	2.5	3.0
6-12 months (n=573)	3.1	2.6	2.9
12+ months (n=2,594)	3.0	2.6	2.5

† Ns for the Year 2 data are <6 = 317, 6-12 = 337, and 12+ = 1,824

**Figure 11.** Average Year 1 primary care visits by pre-period primary care use and 6-month retention

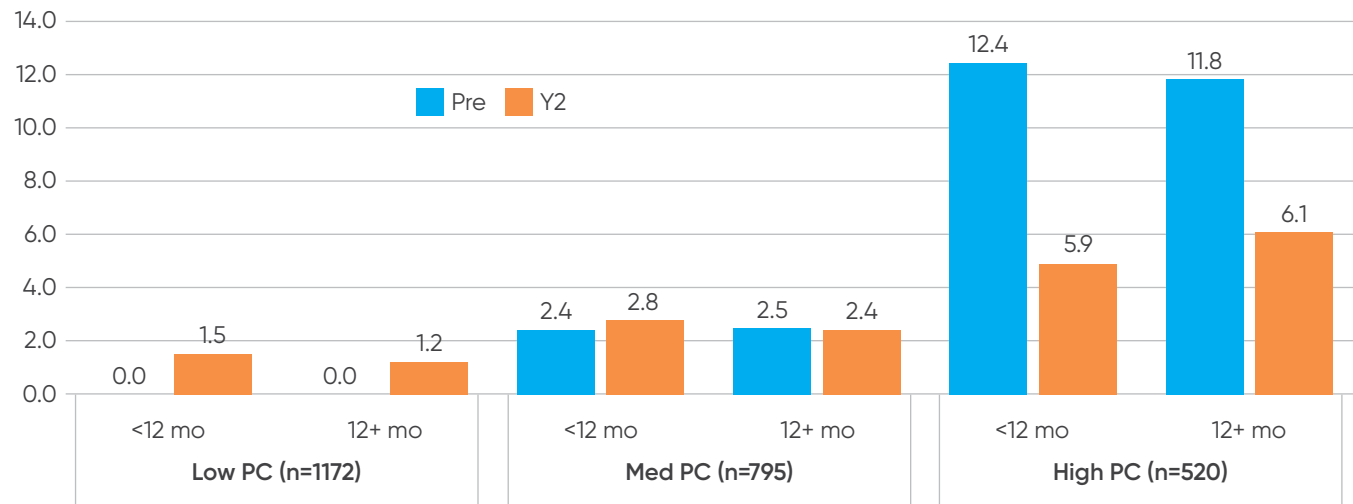


The high utilizers who were retained had a very slightly lower post-period average, but also began with a lower pre-period average. After adjusting for this selection effect, the retained clients saw a lesser pre-post decrease than the non-retained clients.

**Table 19.** Retention and selection effects on average Year 1 PC visits, all clients

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low PC	+0.2	0	+0.2	0	--
Med PC	+0.1	+0.1	0	2.5	0%
High PC	-0.1	-0.7	+0.6	11.7	+5%

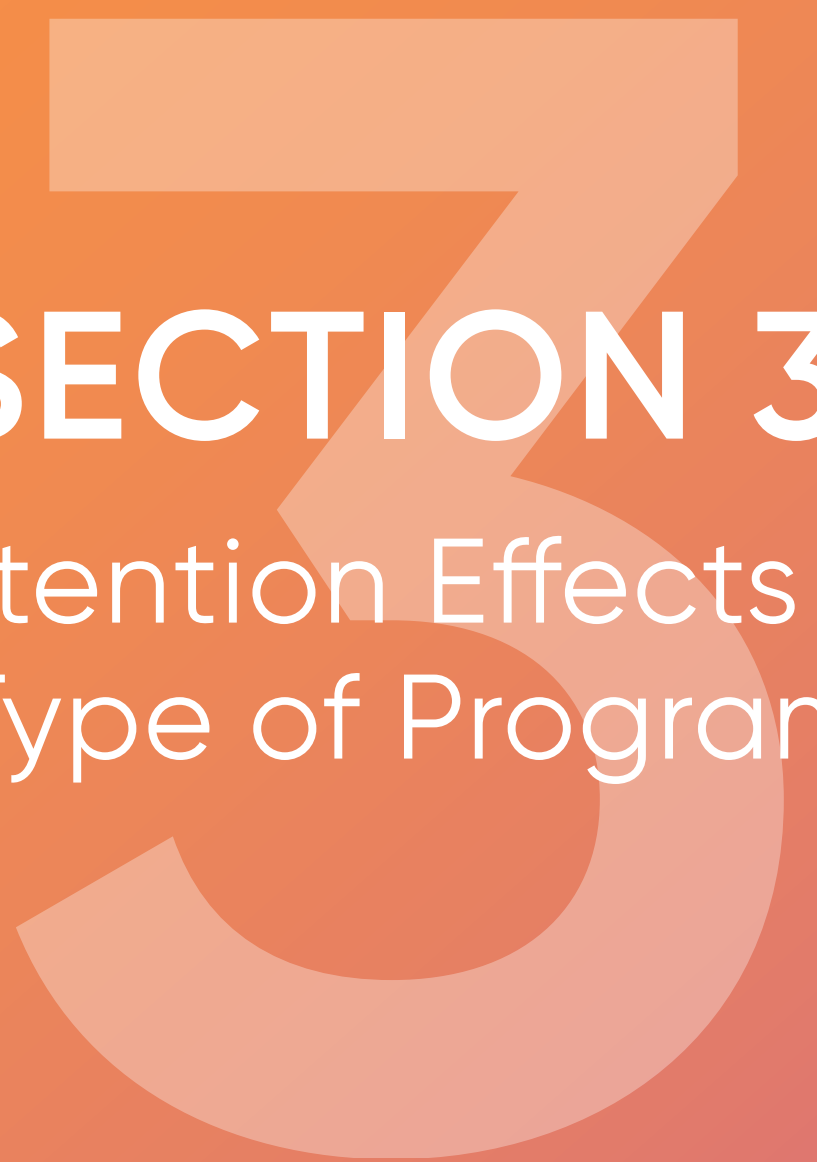
Similarly, the Year 2 primary care visits do not vary much by 12-month retention in any category of pre-period use, while again, only the high pre-period users had substantial pre-post changes (which did not vary by retention).

**Figure 12.** Average Year 2 primary care visits by pre-period primary care use and 12-month retention

While average Year 2 PC visits increased for both retained and non-retained low utilizers, they increased significantly less for those who were retained.

**Table 20.** Retention and selection effects on average Year 2 PC visits, all clients

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low PC	-0.3*	0	-0.3*	0	--
Med PC	-0.4	+0.1	-0.5	2.5	-20%
High PC	+0.2	-0.6	+0.8	12.0	+7%



# SECTION 3:

## Retention Effects by Type of Program

# Retention Effects by Type of Program

As noted previously, the above results are across clients from all of the MRT-SH programs. However, there is variation in the types of supports that MRT-SH programs provide. Most programs provide both housing subsidies and supportive services. But there are also two programs, both sponsored by the Office of Temporary and Disability Assistance, that provide housing only – the Disability Housing Subsidy program (AKA Eviction Prevention for Vulnerable Adults) and the Homeless Senior and Disabled Placement Pilot. Similarly, there are two programs that provide services only – the AIDS Institute’s services only program in New York City and the Office of Health Insurance Programs’ Senior Supportive Housing Pilot (which also provided a small minority of clients with accessibility modifications)<sup>3</sup>. One program, Housing and Community Renewal’s Access to Home program, only offered accessibility modifications and is excluded from the analyses in this section. The purpose of breaking out results by type of program is to determine whether the impact of retention on outcomes is different in different program types.

As shown below, the clients receiving housing (either alone or in conjunction with supportive services) had much higher rates of 12-month retention than the clients who were receiving only supportive services. Clients in services-only programs were also the most likely to be retained for less than six months.

Table 21. Retention in MRT-SH by program type, all clients

	<6 months	6–12 months	12+ months
Services and Subsidies (n=2206)	11%	13%	76%
Services only (n=518)	23%	25%	52%
Housing only (n=359)	s	10%	89%

s = Suppressed due to cell size <10

## SERVICES AND SUBSIDIES

**Inpatient Days.** There is clearly some selection effect in the number of pre-period inpatient days, with clients who are retained the longest starting out with substantially fewer inpatient days than those who are discharged within 6 months. Even so, all three retention groups had fewer inpatient days in Years 1 and 2.

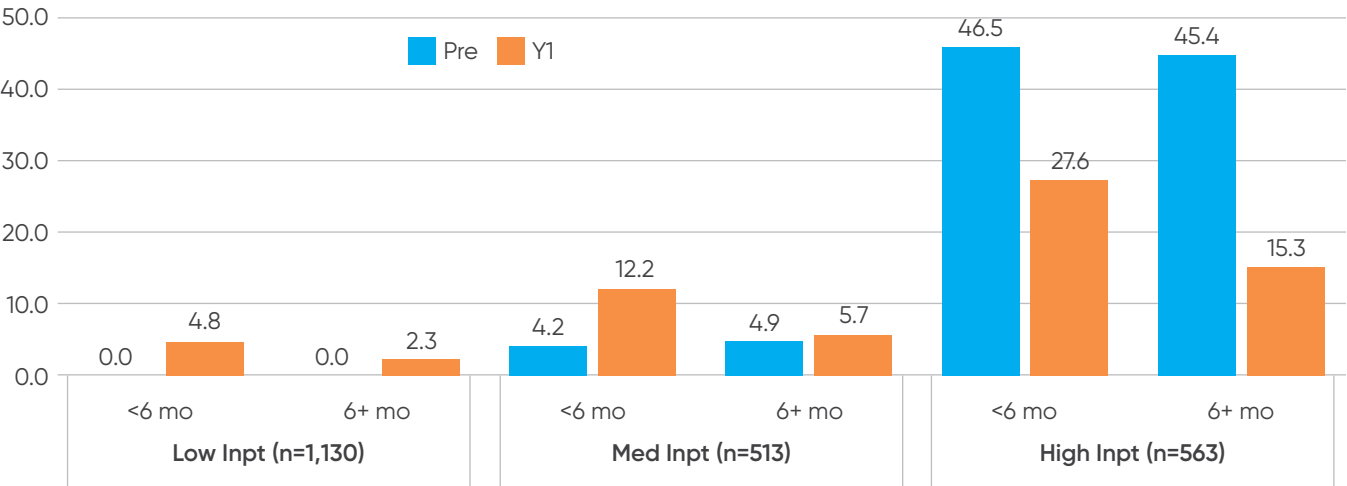
Among the high-utilizing clients, those retained had many fewer inpatient days in Year 1 yet had a fairly similar rate in the post-period. Inpatient days rose for both retained and not retained medium utilizers, but those retained for at least 6 months had fewer inpatient days in Year 1 than those not retained.

Table 22. Average inpatient days by months retained, clients in Services + Subsidy programs

	Pre	Year 1	Year 2†
<6 months (n=246)	19.5	15.6	9.3
6–12 months (n=283)	16.4	11.7	11.3
12+ months (n=1677)	11.1	5.3	5.7

†Ns for the Year 2 data are <6 = 317, 6–12 = 337, and 12+ = 1,824

Figure 15. Average Year 1 inpatient days by pre-period inpatient use and 6-month retention, services and subsidies clients



<sup>3</sup> Clients in both programs receive housing from other sources.

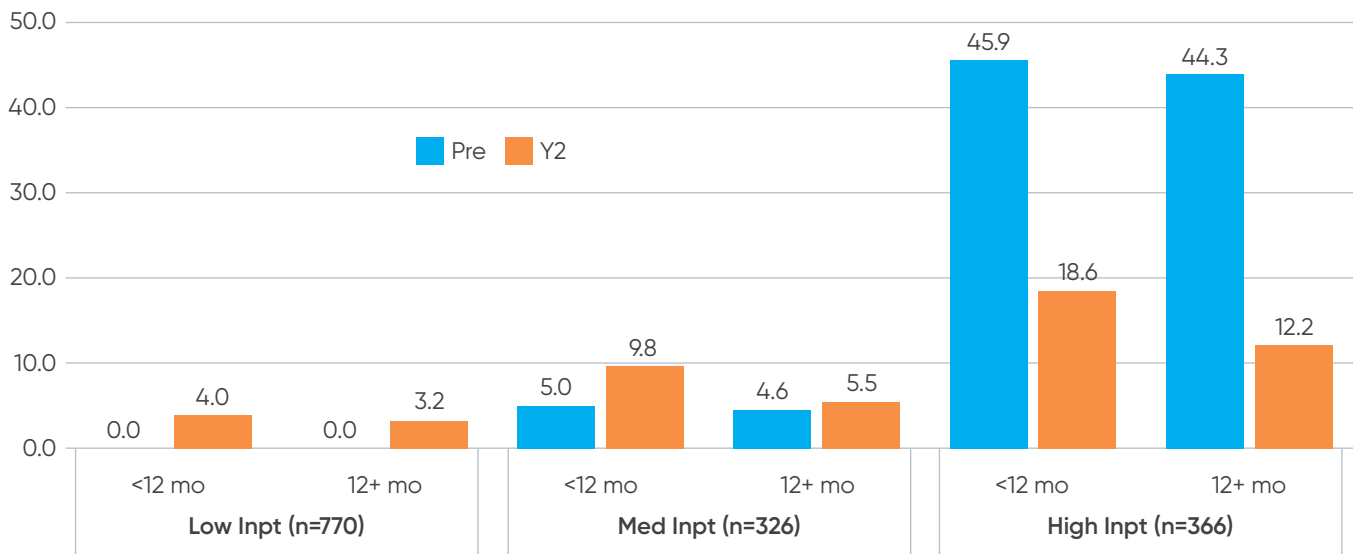
The high- and medium-utilizing clients had statistically significant retention benefits; the benefit for low-utilizing clients approached statistical significance. After adjusting for selection, the effect for medium-utilizers became even larger.

**Table 23.** Retention and selection effects on average Year 1 inpatient days, services and subsidies clients

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low inpt	-2.5†	0	-2.5†	0	--
Med inpt	-6.5*	+0.7	-7.2*	4.8	-150%
High inpt	-12.3***	-1.1	-11.2**	45.6	-25%

Among low- and medium-utilizing clients, both the retained and non-retained experienced increases in their Year 1 inpatient days. In both cases, however, the retained clients experienced a more modest increase. Among the high-utilizing clients, both the retained and non-retained clients experienced a substantial decrease between the pre-period and Year 1. The retained clients had lower Year 1 values than the non-retained, but also had somewhat lower pre-period values.

**Figure 16.** Average Year 2 inpatient days by pre-period inpatient use and 12-month retention, services and subsidies clients



The results for 12-month retention are very similar to those for 6-month retention, with all three groups experiencing a net retention benefit, but the adjusted effects are no longer statistically significant.

**Table 24.** Retention and selection effects on average Year 2 inpatient days, services and subsidies clients

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low inpt	-0.8†	0	-0.8†	0	--
Med inpt	-4.3**	-0.4	-3.9	4.7	-83%
High inpt	-6.4**	-1.6	-4.8	44.8	-11%

**ED visits.** The clients retained for less than 6 months had the highest average pre-period ED visits, and those retained for at least 12 months the lowest. In Year 1, the groups maintained these relative positions, but in Year 2 there was little difference between the <6-month and 6–12-month groups.

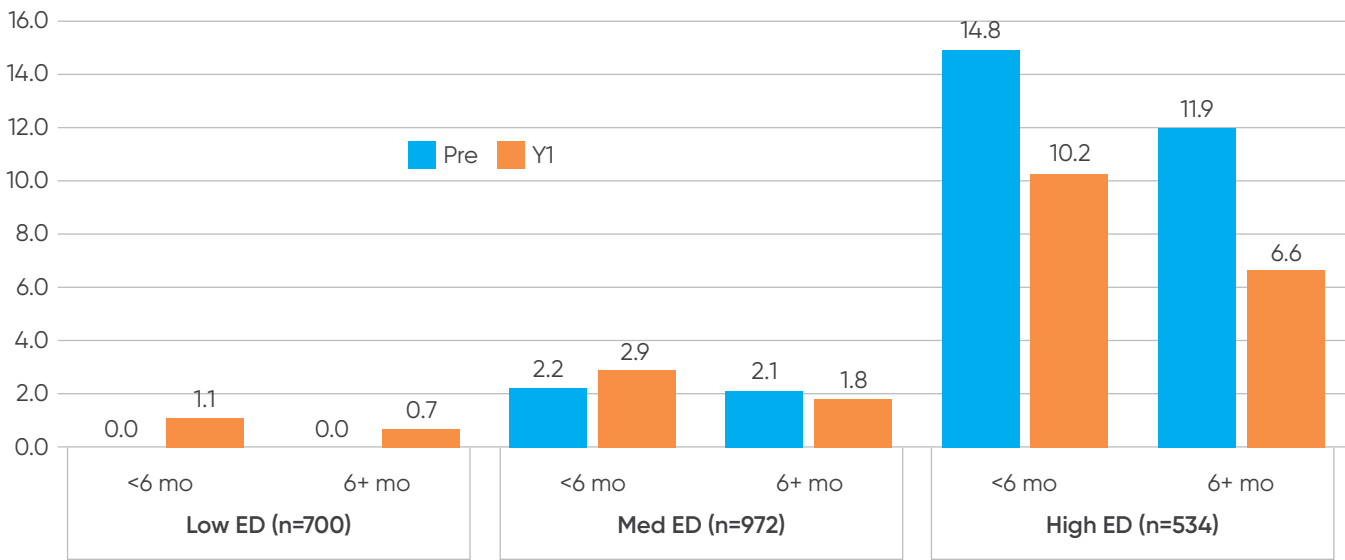
Across all three utilization groups, the retained clients had fewer Year 1 ED visits than the non-retained clients, but among the high utilizers they also started with substantially fewer pre-period visits. Medium utilizers had similar pre-period values, but those retained experienced a modest Year 1 decrease and those not retained an increase.

**Table 25.** Average ED visits by months retained, clients in Services + Subsidy programs

	Pre	Year 1	Year 2
<6 months (n=246)	5.7	4.8	4.1
6–12 months (n=283)	5.0	3.7	4.3
12+ months (n=1677)	3.5	2.4	2.3

† Ns for the Year 2 data are <6 = 161, 6–12 = 163, and 12+ = 1,140

**Figure 17.** Average Year 1 ED visits by pre-period ED use and 6-month retention, services and subsidies clients



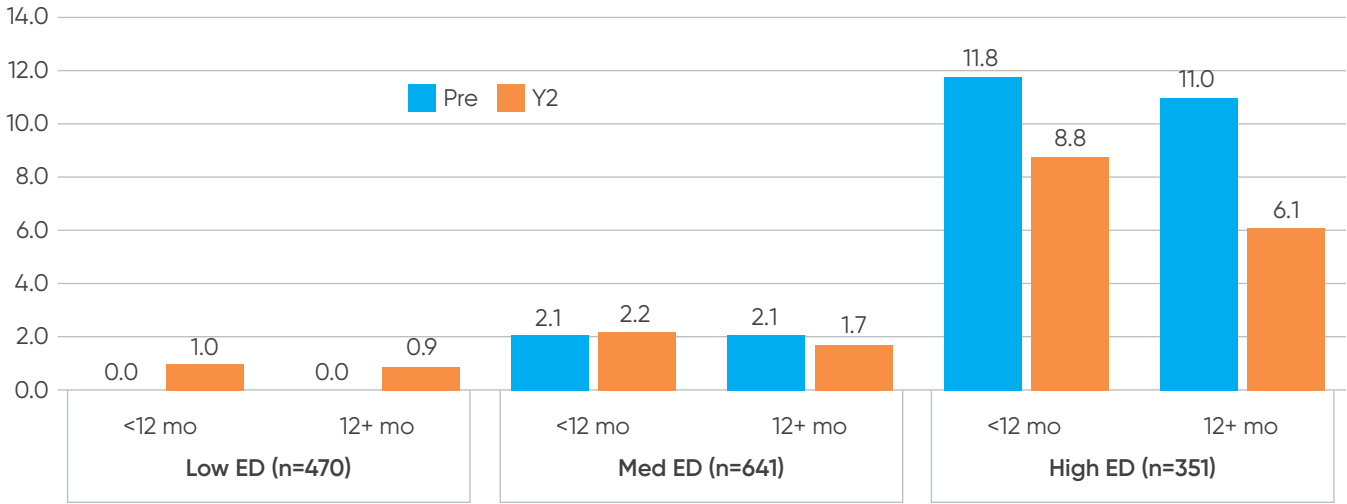
There is a statistically significant retention benefit in reduced ED visits for all three utilization groups. The selection effects are negligible for low and medium utilizers. For high utilizers, the selection effect is sufficiently large to account for much of the retention benefit; however, it is not statistically significant, and the net effect remains statistically significant.

**Table 26.** Retention and selection effects on average Year 1 ED visits, services and subsidies clients

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low ED	-0.4*	0	-0.4*	0	--
Med ED	-1.1***	-0.1	-1.0***	2.1	-48%
High ED	-3.6**	-2.9	-0.7***	12.3	-6%

The results for 12-month retention were similar, with retained clients having fewer Year 2 ED visits compared to non-retained clients. Among the high utilizers, both retention groups experienced a substantial pre-post drop, but the decrease was more pronounced for the clients who were retained for at least a year.

**Figure 18.** Average Year 2 ED visits by pre-period ED use and 12-month retention, services and subsidies clients



For 12-month retention, the net retention effect was smaller than the 6-month effect for medium utilizers, but larger for the high-utilizing group. The effect for low utilizers was not statistically significant. These effects were extremely similar to those for clients overall.

**Table 27.** Retention and selection effects on average Year 2 ED visits, services and subsidies clients

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low ED	0.1	0	-0.1	0	--
Med ED	0.5***	0	-0.5**	2.1	-24%
High ED	-2.7*	-0.8	-1.9*	11.3	-17%

**Medicaid spending.** Those services and subsidies clients who were retained for at least 12 months had *higher* pre-period spending than those retained less than 12 months, and also had the lowest spending in both Years 1 and 2.

In all three groups, Year 1 spending was lower for the retained than the non-retained clients, despite the fact that among medium- and high-utilizing clients, the retained clients started with slightly higher pre-period spending.

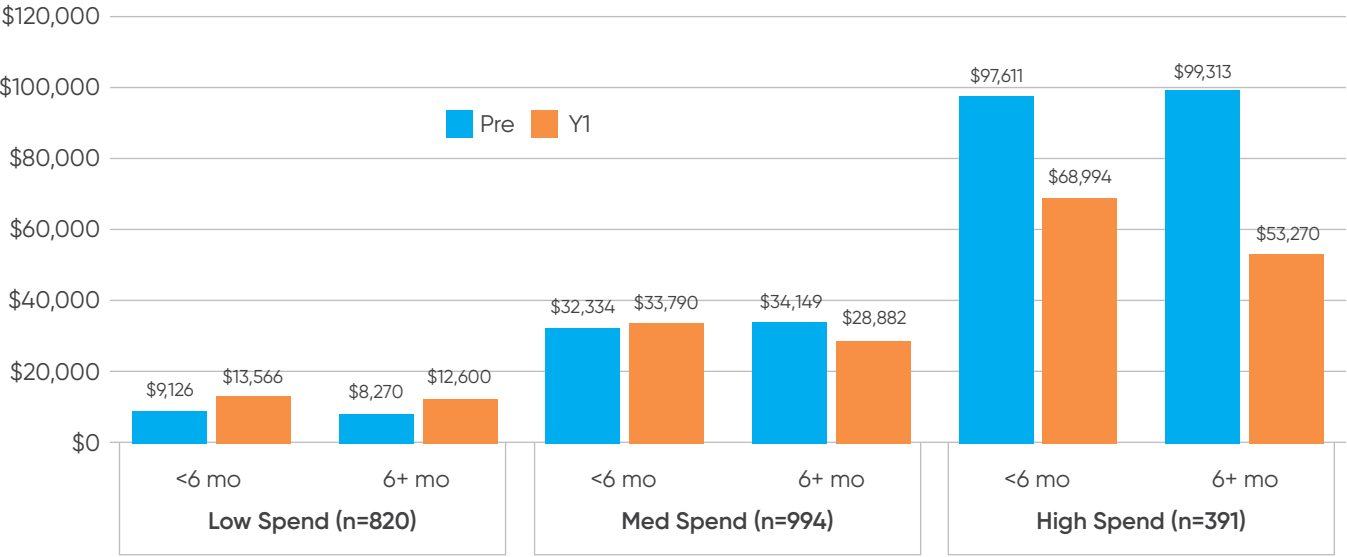
**Table 28.** Average Medicaid spending by months retained, clients in Services + Subsidy programs

	Pre	Year 1	Year 2†
<6 months (n=246)	\$35,052	\$32,708	\$29,068
6-12 months (n=283)	\$34,263	\$29,273	\$30,383
12+ months (n=1677)	\$36,403	\$26,760	\$26,323

† Ns for the Year 2 data are <6 = 161, 6-12 = 163, and 12+ = 1,140



**Figure 19.** Average Year 1 Medicaid spending by pre-period Medicaid costs and 6-month retention, services and subsidies clients



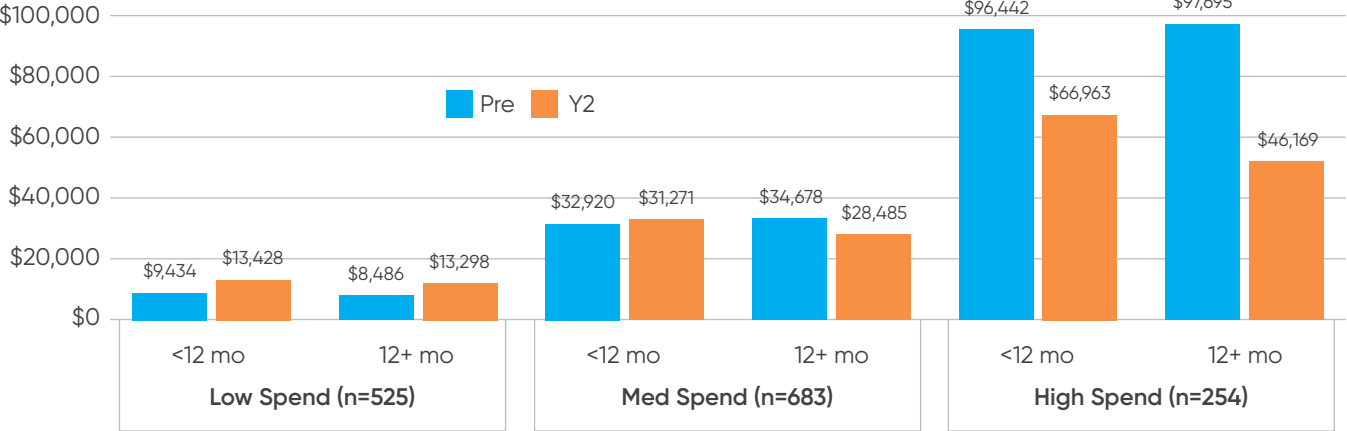
There was a statistically significant retention benefit for medium- and high-cost clients, and also a statistically significant selection effect for high-cost clients. This selection effect, however, was actually a significantly higher pre-period value for clients who were retained, so that the net benefit of retention was actually more pronounced than the unadjusted benefit. The proportional retention effects for medium- and high-cost clients were slightly higher than for clients overall.

**Table 29.** Retention and selection effects on average Year 1 Medicaid spending, services and subsidies clients

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low cost	-\$966	-\$856	-\$110	\$8,354	-1%
Med cost	-\$4,908*	+\$1,815	-\$6,723**	\$33,920	-20%
High cost	-\$15,724**	+\$1,702*	-\$17,426***	\$99,143	-18%

The pattern for 12-month retention closely mirrored the pattern for 6-month retention, with retention being associated with lower Year 2 values in all three groups, but with higher pre-period values among medium and high utilizers. The spending for low-utilizing clients increased between the pre-period and Year 2 for both retention groups, but unlike the 6-month finding, increased more for those who were retained.

**Figure 20.** Average Year 2 Medicaid spending by pre-period Medicaid costs and 12-month retention, services and subsidies clients



Medium and high utilizers experienced decreases that were greater for the retained clients. The unadjusted Year 2 values were only significantly different between the retained and non-retained clients among the high utilizers, but after the large (although not statistically significant unto itself) selection effect was accounted for, the net effect became statistically significant for medium utilizers.

**Table 30.** Retention and selection effects on average Year 2 Medicaid spending, services and subsidies clients

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low cost	-\$130	-\$948†	+\$818	\$8,706	+9%
Med cost	-\$2,786	+\$1758	-\$4,544*	\$34,279	-13%
High cost	-\$20,794**	+\$1253	-\$22,047**	\$99,463	-23%

There were no significant retention effects on spending for low utilizers, consistent with the analyses of clients overall. For medium utilizers, 6-month retention was associated with a larger net decrease in spending than 12-month retention (\$6,723 versus \$4,544), but for high utilizers, 12-month retention was associated with a larger net decrease in spending (\$22,047 versus \$17,426).

## SERVICES AND SUBSIDIES SUMMARY

Across utilization levels, clients in services and subsidies programs showed larger 6-month retention effects on inpatient day reductions than their counterparts overall, both in raw numbers and as a percent of the base values. However, the 12-month adjusted effects were more modest. After accounting for selection effects, services and subsidies clients showed a larger 6-month retention effect on ED visits for low and medium utilizers than for their counterparts overall, though the effect was similar for high utilizers. Finally, for Medicaid spending, medium-utilizing services and subsidies clients had a comparable net benefit of 6-month retention to their counterparts overall, but a lower net benefit of 12-month retention. High-utilizing services and subsidies clients experienced a similar retention benefit in lowered spending to clients overall.

## SERVICES ONLY

**Inpatient Days.** The apparent selection effect for services-only clients is dramatic. Those discharged within 6 months had an average number of pre-period inpatient days more than twice that of clients retained for 6 months or more. The clients who were retained for at least a year were the only group that experienced a decrease from the pre-period in Year 1 and did not experience a subsequent increase in Year 2.

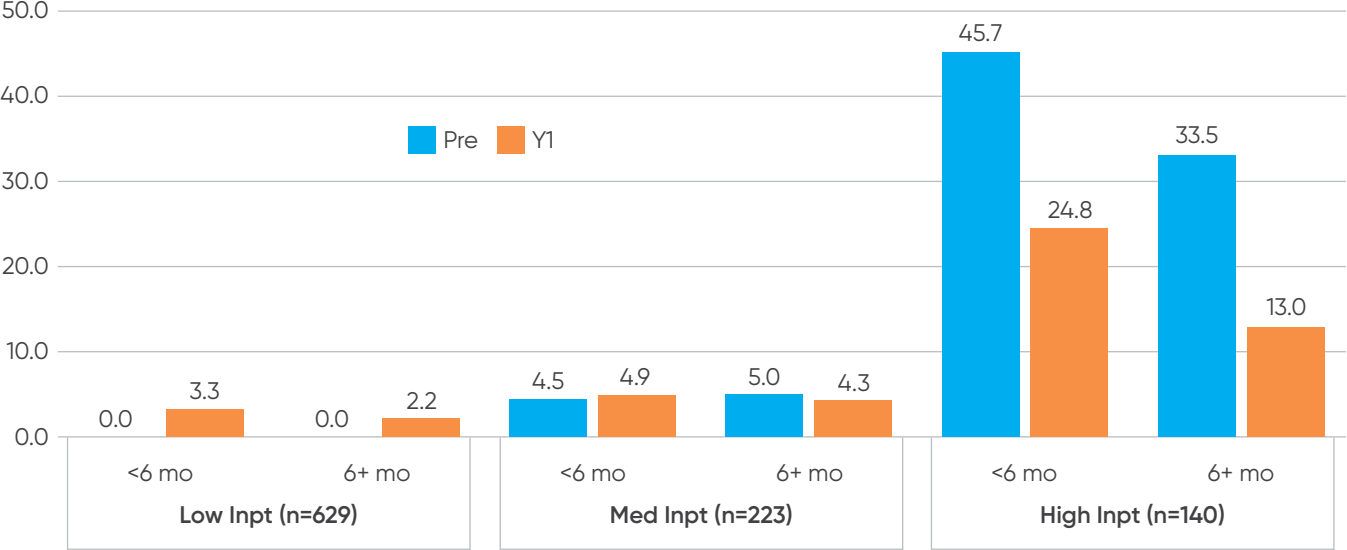
**Table 31.** Average inpatient days by months retained, clients in services-only programs

	Pre	Year 1	Year 2
<6 months (n=230)	10.7	8.2	11.0
6-12 months (n=244)	5.1	5.1	8.6
12+ months (n=518)	5.2	3.4	3.3

† Ns for the Year 2 data are <6 = 161, 6-12 = 163, and 12+ = 1,140

Within each utilization group, the retained clients have fewer Year 1 inpatient days than the non-retained clients. However, this pattern is most dramatic for the high utilizers, who also showed a substantial selection effect.

Figure 21. Average Year 1 inpatient days by pre-period inpatient use and 6-month retention, services-only clients



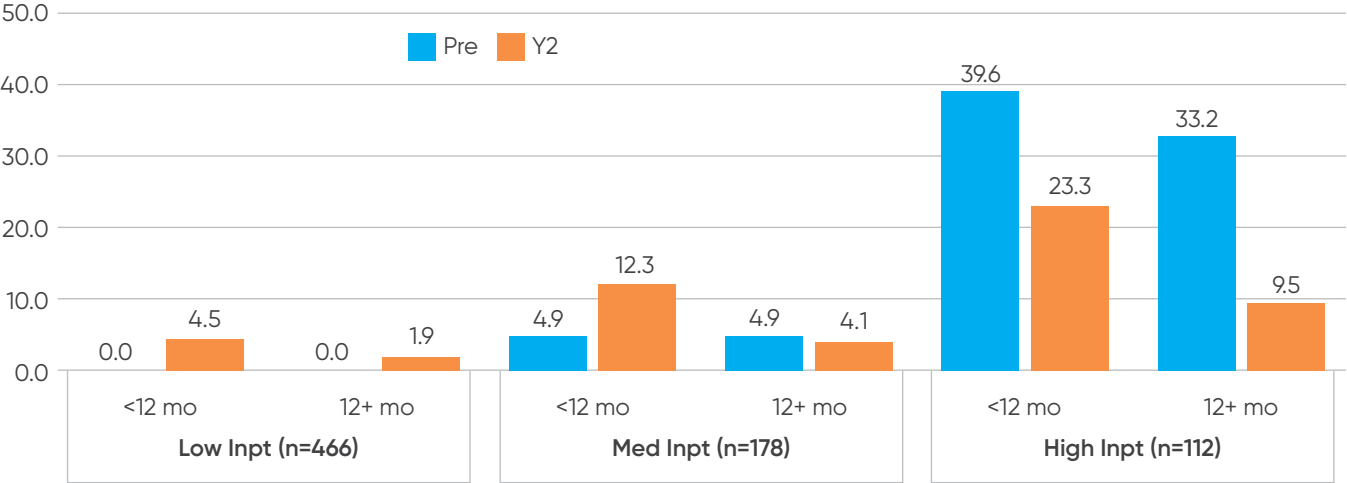
Both the Year 1 values and pre-period values were significantly lower for high utilizers who were retained for at least 6 months. As shown below, almost all of the Year 1 difference was accounted for by the pre-period difference, leaving very little net retention effect for this group. For medium utilizers, the unadjusted retention benefit was modest and not statistically significant, but retained clients actually started with higher values in the pre-period compared to non-retained clients, meaning that the net retention effect was higher than the unadjusted retention benefit (amounting to 1.1 fewer days, or 22% of the base value for medium utilizers).

Table 32. Retention and selection effects on average Year 1 inpatient days, services-only clients

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low inpt	-1.1	0	-1.1	0	--
Med inpt	-0.6	+0.5	-1.1†	4.9	-22%
High inpt	-11.8***	-12.2*	+0.4	37.8	+1%

A similar pattern is observed for 12-month retention. In all three groups, clients retained for 12 months or more have fewer Year 2 inpatient days than those not retained, but the high utilizers also started at a much lower rate in the pre-period.

Figure 22. Average Year 2 inpatient days by pre-period inpatient use and 12-month retention, services-only clients



The final picture, however, is dramatically different for 12-month retention. Medium utilizers show a statistically significant difference in Year 2 values, with no selection effect. The net retention effect of 8.2 inpatient days is 167% of pre-period values, a very large effect. For high utilizers, there is a statistically significant retention benefit in Year 2 inpatient days, but also a selection effect that is nearly statistically significant. Net of this selection effect, however, the retention effect of 7.4 fewer inpatient days is no longer statistically significant.

**Table 33.** Retention and selection effects on average Year 2 inpatient days, services-only clients

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low inpt	-2.1	0	-2.1	0	--
Med inpt	-8.2*	0	-8.2*	4.9	-167%
High inpt	-13.8**	-6.4†	-7.4	36.5	-20%

In sum, medium-utilizing services-only clients appear to benefit modestly from 6-month retention and substantially from 12-month retention. There are no significant retention effects for low- or high-utilizing clients in services-only programs.

**ED visits.** While services-only clients retained for less than 6 months have the highest number of ED visits in all three periods, ED visit rates are similar for clients retained 6–12 months and 12 months or more in both the pre-period or in Year 1. However, in Year 2, ED visits for clients with 6–12 months of retention increase, but visits for clients with 12 or more months of retention remain relatively stable. Clients who are retained for less than 6 months do show a notable drop in Year 1, though they still have more ED visits than their counterparts.

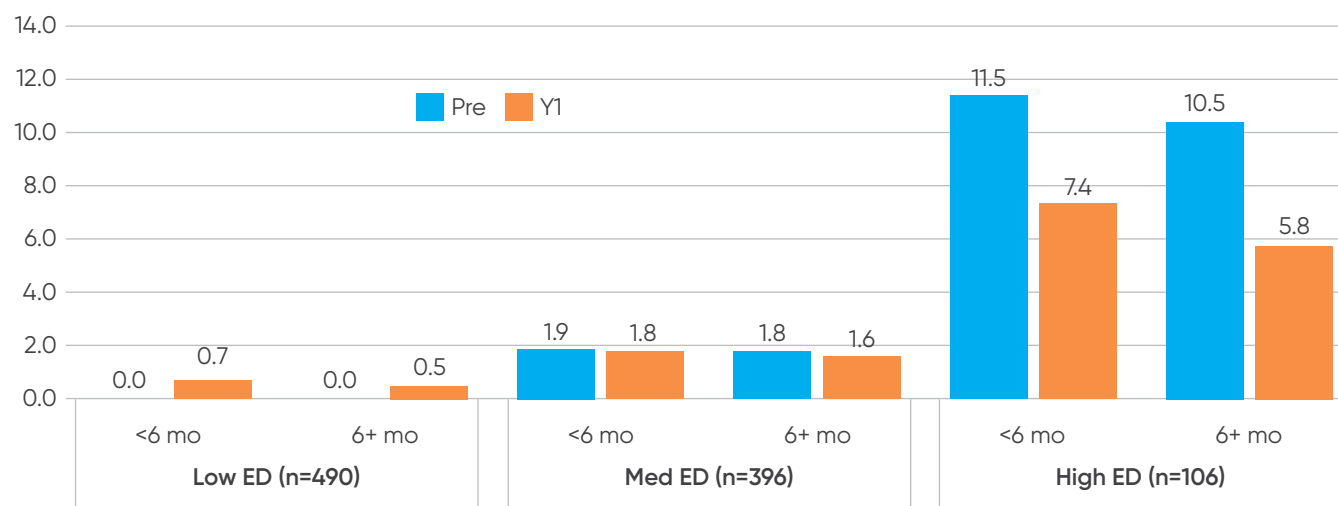
**Table 34.** Average ED visits by months retained, clients in Services Only programs

	Pre	Year 1	Year 2
<6 months (n=230)	2.7	2.2	2.8
6–12 months (n=244)	1.5	1.4	1.9
12+ months (n=518)	1.7	1.4	1.5

† Ns for the Year 2 data are <6 = 155, 6–12 = 145, and 12+ = 460

Retention effects are slight among low and medium utilizers. High utilizers have significantly fewer ED visits in Year 1 if they are retained for at least 6 months, but also started with somewhat lower ED visits in the pre-period.

**Figure 23.** Average Year 1 ED visits by pre-period ED use and 6-month retention, services-only clients

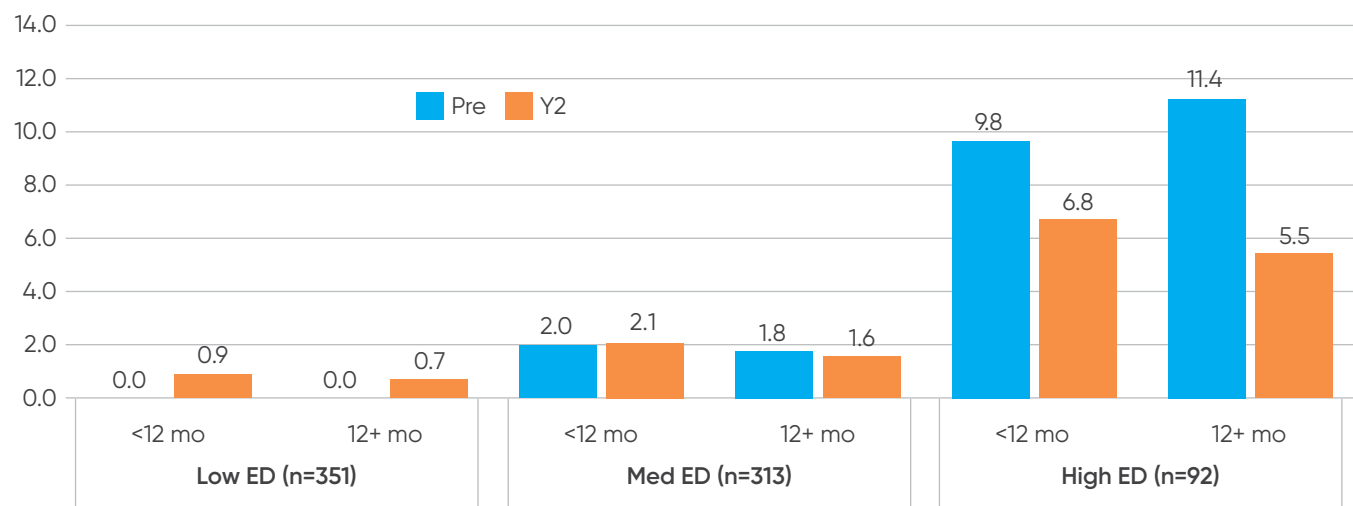


As shown below, the Year 1 retention benefit among high utilizers is much reduced after accounting for selection and is no longer statistically significant. The lack of significant results for low and medium utilizers was consistent with the findings for services and subsidies clients.

**Table 35.** Retention and selection effects on average Year 1 ED visits, services-only clients

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low ED	-0.2	0	-0.2	0	--
Med ED	-0.2	-0.1	-0.1	1.8	-6%
High ED	-1.6*	-1.0	-0.6	10.8	-6%

For 12-month retention, clients who are retained have lower Year 2 values in all three utilization groups. While the retained medium-utilizing clients started out with slightly fewer ED visits than those who were not retained, the retained high-utilizing clients actually started out with more pre-period ED visits.

**Figure 24.** Average Year 2 ED visits by pre-period ED use and 12-month retention, services-only clients

The medium-utilizing group had a statistically significant Year 2 retention benefit of 0.5 fewer ED visits, however the retained clients also started out with 0.2 fewer ED visits in the pre-period (significantly fewer than the retained clients). This starting difference reduced their net retention effect to only 0.3 ED visits, which was no longer statistically significant. High-utilizing clients had a larger retention benefit (1.3 fewer ED visits) and started with more ED visits in the pre-period if retained (1.6 more ED visits), leading to a larger – but still non-significant – net retention effect of 2.9 fewer ED visits if retained.

**Table 36.** Retention and selection effects on average Year 2 ED visits, services-only clients

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low ED	-0.2	0	-0.2	0	--
Med ED	-0.5*	-0.2**	-0.3	1.9	-16%
High ED	-1.3	+1.6	-2.9	10.6	-27%

**Medicaid spending.** In the pre-period, Medicaid spending for services-only clients relates to retention as expected, with longer retention related to lower spending. However, for clients retained less than a year, there is a modest spending decrease in Year 1 followed by an increase to above pre-period levels in Year 2. For clients retained for at least 12 months, the lower spending in Year 1 continues into Year 2.

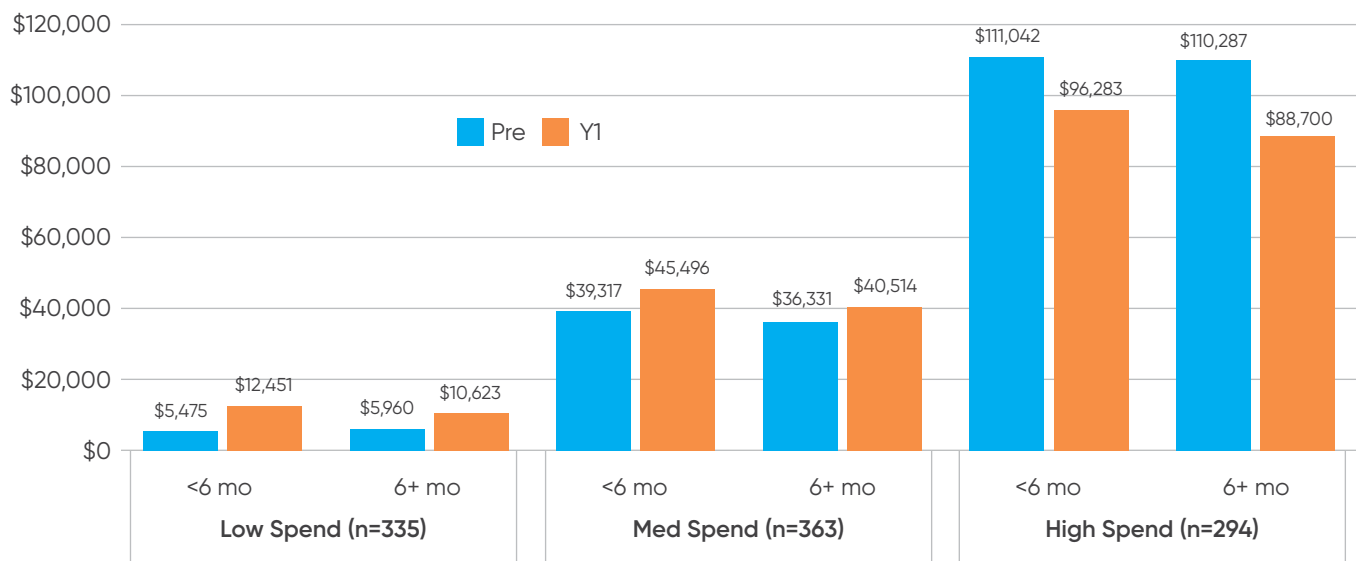
Among the services-only clients, Year 1 spending increased above pre-period levels among low- and medium-cost clients regardless of retention (although in both cases the retained clients had lower Year 1 values compared to the non-retained clients). The high-cost clients had a substantially lower Year 1 value if they were retained for at least 6 months.

**Table 37.** Average Medicaid spending by months retained, clients in services-only programs

	Pre	Year 1	Year 2
<6 months (n=230)	\$60,026	\$58,185	\$66,566
6-12 months (n=244)	\$51,332	\$50,075	\$63,156
12+ months (n=518)	\$41,680	\$38,541	\$38,259

† Ns for the Year 2 data are <6 = 155, 6-12 = 145, and 12+ = 460

**Figure 25.** Average Year 1 Medicaid spending by pre-period Medicaid costs and 6-month retention, services-only clients

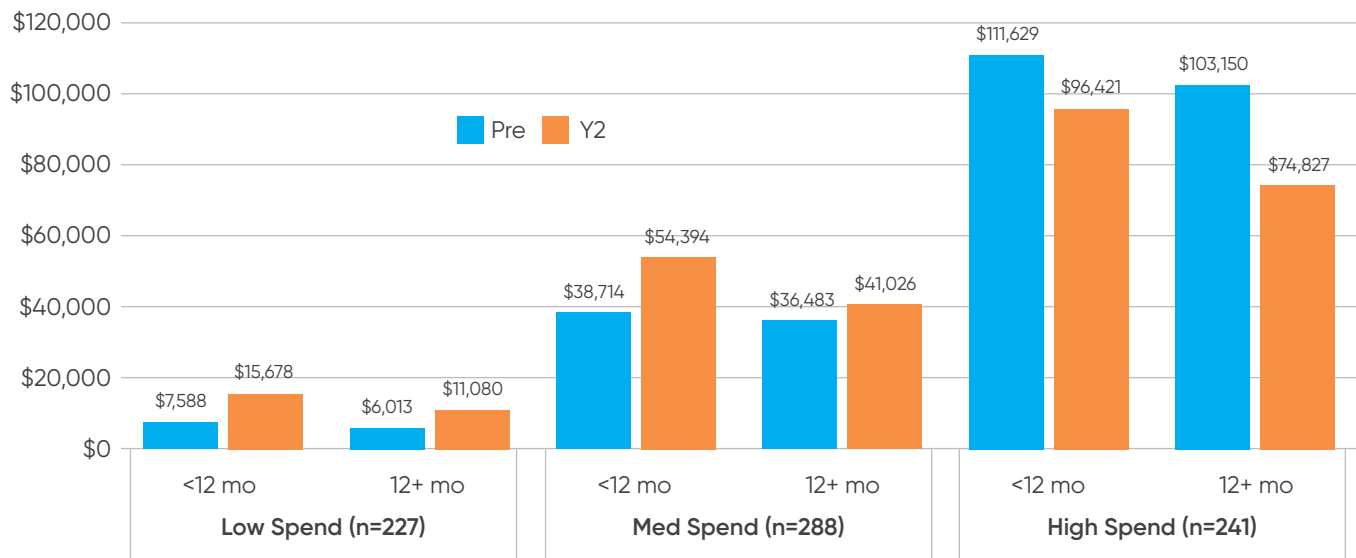


There were no statistically significant differences for low- and high-cost clients. Medium-cost clients showed a significant retention effect, but after accounting for the difference in initial spending, this change was no longer significant.

**Table 38.** Retention and selection effects on average Year 1 Medicaid spending, services-only clients

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low cost	-\$1,828	+\$485	-\$2,313	\$5,888	-39%
Med cost	-\$4,982*	-\$2,986	-\$1,996	\$37,071	-5%
High cost	-\$7,583	-\$755	-\$6,828	\$110,518	-6%

In Year 2, Medicaid spending was higher compared to the pre-period for both retained and non-retained low- and medium-utilizing clients but had increased less for the clients retained for at least 12 months. It is important to note that the two services-only programs focus on clients with long-term chronic conditions (older adults and those who are HIV+); for these populations, slowing the growth of spending may be a more reasonable goal than reduction of spending. Additionally, low-spending clients with HIV may not be receiving the recommended treatments and medication regimen in the pre-period, so increased spending for these clients may reflect a better standard of care. High-cost clients did experience a decrease in Year 2 spending relative to the pre-period, but the high-cost clients retained for at least 12 months experienced a larger decrease than those not retained.

**Figure 26.** Average Year 2 Medicaid spending by pre-period Medicaid costs and 12-month retention, services-only clients

For low-cost clients, there was no significant difference in Year 2 spending between those who were retained for 12 months and those who were not. For medium-cost clients, those retained had a significantly lower average Year 2 spend (by \$13,368), but also started with \$2,321 less in spending in the pre-period (a difference which approached statistical significance). The subsequent net retention effect of -\$11,137 remained statistically significant even after this adjustment. Although high-cost clients had the largest difference in Year 2 values between the retained and non-retained groups (-\$21,594), which was statistically significant, they also had the largest pre-period difference (-\$8,479). After adjusting for this pre-period difference, the estimated net effect of retention was only -\$13,115 and was no longer statistically significant.

**Table 39.** Retention and selection effects on average Year 2 Medicaid spending, services-only clients

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low cost	-\$4,598	-\$1,575*	-\$3,023	\$6,332	-48%
Med cost	-\$13,368***	-\$2,231†	-\$11,137**	\$37,529	-30%
High cost	-\$21,594**	-\$8,479	-\$13,115	\$107,266	-12%

In sum, there was a statistically significant net effect of 12-month retention on spending for medium-cost clients, but no significant net effects of 6-month retention.

## SERVICES-ONLY SUMMARY

While services-only clients did not show any significant 6-month retention effects on inpatient days, medium utilizers did demonstrate more significant effects from 12-month retention, and low- and high-utilizer results were on par with the full group (though with greater selection effects). Services-only clients do not show any significant net retention effects on ED visits for either 6- or 12-month retention, unlike the full group and unlike services-only clients. Finally, while no groups showed significant net 6-month retention effects on Medicaid spending (similar to the services and subsidy group), medium utilizers did show a significant net 12-month effect on par with that of the full population; however, the benefit for high utilizers was not significant after accounting for the selection effects. Compared to services and subsidy clients, services-only clients experienced less benefit of 6-month retention, but medium-cost clients had more benefit of 12-month retention.

## HOUSING ONLY

Given the small group of clients in housing-only programs discharged prior to 6 months, we present only analyses of 12-month retention. There are also too few medium- and high-utilizing clients discharged prior to 12 months to break out by inpatient level; as such, all clients are collapsed into one utilization group for net benefits analyses.

**Inpatient Days.** For the housing-only clients, inpatient days increased in the Year 1 post-period for those discharged within 6-12 months (sustained into Year 2), and increased in the Year 2 post-period for those retained for at least 12 months.

Relative to the pre-period, the Year 2 increase experienced for both retention groups is more moderate for those re-retained at least 12 months. While inpatient days increased by 1.9 for clients discharged before 12 months, the increase for retained clients was only 0.5 inpatient days.

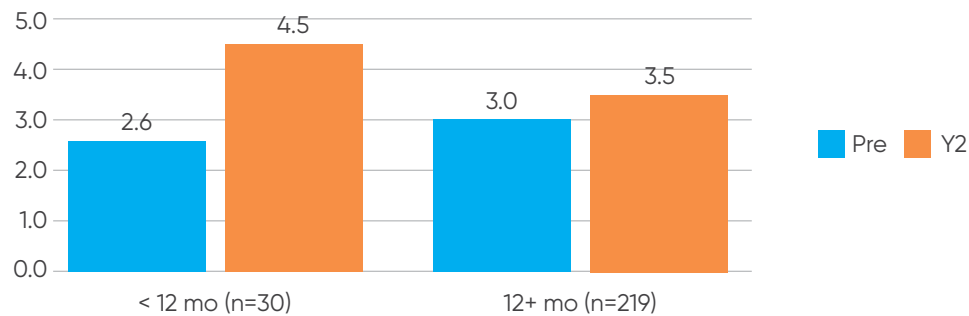
**Table 40.** Average inpatient days by months retained, clients in Housing Only programs

	Pre	Year 1	Year 2†
<6 months (n=2)	S	S	S
6-12 months (n=42)	3.7	5.0	4.7
12+ months (n=359)	2.6	2.4	3.5

S = suppressed due to small cell size

† Ns for the Year 2 data are <6 = 155, 6-12 = 145, and 12+ = 460

**Figure 27.** Average Year 2 inpatient days by 12-month retention, housing-only clients



Neither the difference in retention groups in Year 2 or in the pre-period were statistically significant. The retained group started off in the pre-period with a somewhat higher rate of inpatient days, so that the adjusted difference between retention groups was 1.4 inpatient days (however, still not significant).

**Table 41.** Retention and selection effects on average Year 2 inpatient days, housing-only clients (n=249)

Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
-1.0	+0.4	-1.4	2.9	-48%

**ED visits.** There was very little difference in the 3-year pattern of ED visits by retention. Both retention groups had modestly lower values in Year 2 compared to their pre-period.

Looking only at clients with 2 years of post-enrollment data available, there were no differences in either pre-period or Year 2 values.

**Table 42.** Average Year 2 ED visits by 12-month retention, housing-only clients

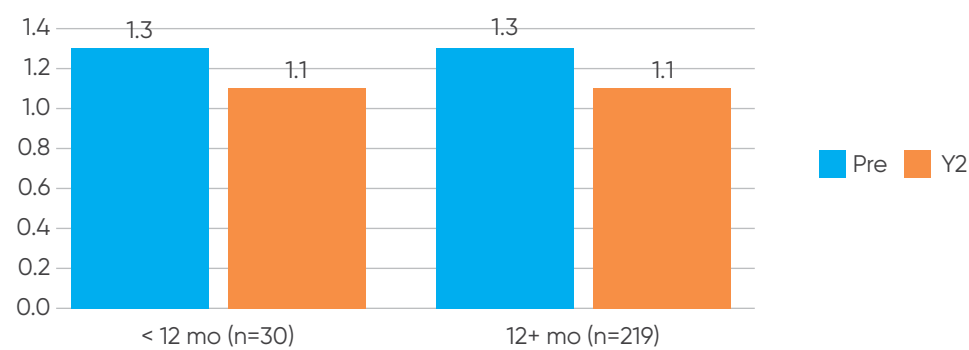
	Pre	Year 1	Year 2†
<6 (n=2)	S	S	S
6-12 (n=42)	1.5	1.4	1.1
12+ (n=359)	1.4	1.2	1.1

S = suppressed due to small cell size

† Ns for Year 2 data are <6 = 1, 6-12 = 29 and 12+ = 219



Figure 28. Average Year 2 ED visits by 12-month retention, housing-only clients



**Medicaid spending.** There is an interesting difference in the patterns of spending between the two retention groups. Those discharged between 6 and 12 months post-enrollment experienced a slight drop between the pre-period and Year 1, but then an increase above pre-period levels in Year 2. Those retained for at least 12 months experienced an increase between the pre-period and Year 1, and then a drop to below pre-period levels in Year 2. These fluctuations were relatively modest, however.

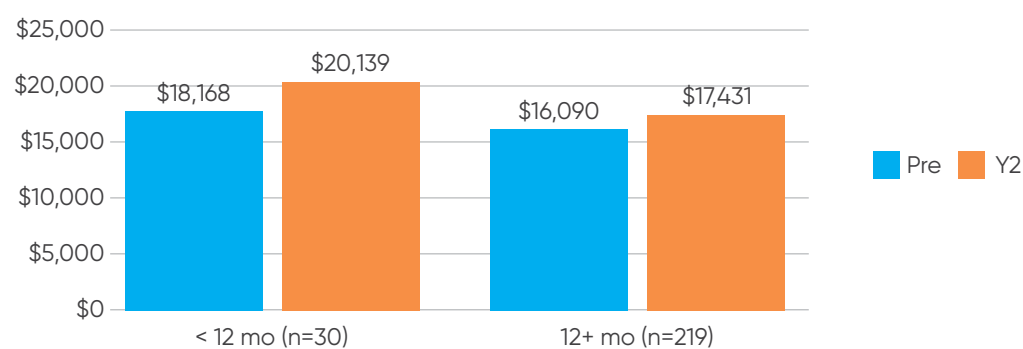
Table 43. Average Medicaid spending by months retained, clients in Housing Only programs

	Pre	Year 1	Year 2
<6 (n=2)	S	S	S
6-12 (n=42)	\$19,540	\$18,999	\$20,807
12+ (n=359)	\$18,847	\$20,134	\$17,431

S = suppressed due to small cell size  
Ns for Year 2 data are <6 = 1, 6-12 = 29 and 12+ = 219

Looking only at clients with 2 years of post-enrollment data available, both groups have a modest increase between the pre-period and Year 2.

Figure 29. Average Year 2 Medicaid spending by 12-month retention, housing-only clients



Neither the pre-period or Year 2 values were significantly different between the groups.

Table 44. Retention and selection effects on average Year 2 inpatient days, housing-only clients

Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
-\$2,708	-\$2,078	-\$630	\$16,340	-4%

HOUSING ONLY SUMMARY

Housing-only clients did not show any significant 12-month retention effects for inpatient days, ED visits, or Medicaid spending, and showed only modest raw retention benefits, unlike the full group or the other program-type cohorts. It should be noted, however, that housing-only clients had much lower average pre-period spending than clients in the other program types (\$16,340 versus \$50,393 for services-only clients and \$36,073 for services and subsidies clients), which likely made significant decreases much more difficult to achieve.

## COMPARISON OF RESULTS ACROSS PROGRAM TYPES

Six-month retention had a larger effect on Year 1 inpatient and ED utilization for clients in subsidies and services programs than in services-only programs. This was true across utilization groups, except that clients with high ED utilization had similar retention effects in both types of program. In terms of Medicaid spending, the lowest-cost clients experienced greater retention benefits in services-only programs, while the medium-cost and high-cost clients experienced greater retention benefits in services and subsidies programs. (Six-month retention could not be examined for housing-only clients.)

**Table 45.** Net and proportional retention effects of 6-month retention on Year 1 outcomes, services and subsidies versus services-only clients

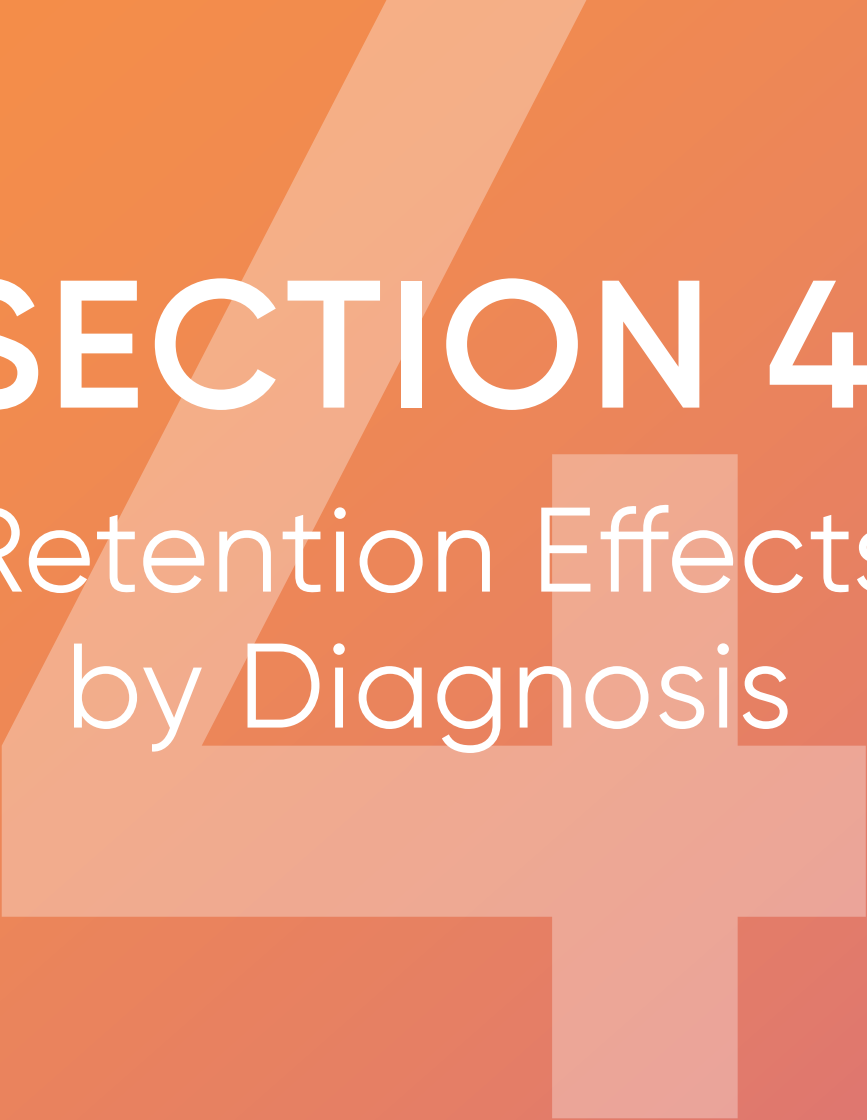
	Net retention effect		Proportional retention effect	
	Services and Subsidies	Services only	Services and Subsidies	Services only
<b>Inpatient Use</b>				
Low	-2.5	-1.1	--	--
Medium	-7.2	-1.1	-150%	-22%
High	-11.2	+0.4	-25%	+1%
<b>ED Use</b>				
Low	-0.4	-0.2	--	
Medium	-1.0	-0.1	-48%	-6%
High	-0.7	-0.6	-6%	-6%
<b>Spending</b>				
Low	-\$100	-\$2,313	-1%	-39%
Medium	-\$6,723	-\$1,996	-20%	-5%
High	-\$17,426	-\$6,828	-18%	-6%

Interestingly, when it came to 12-month retention effects, the services-only clients sometimes experienced greater retention benefits than the services and subsidies clients. This was true in regard to all levels of inpatient utilization, among clients with high ED utilization, and among clients with low and medium levels of spending. The housing-only clients could not be broken out by pre-period resource use, so it is difficult to make direct comparisons to the other two program types. However, they appear to derive less benefit from 12-month retention in terms of inpatient utilization and spending, and no benefit at all in terms of ED utilization.

**Table 46.** Net and proportional retention effects of 12-month retention on Year 2 outcomes, services and subsidies versus services-only clients and housing-only clients

	Net retention effect			Proportional retention effect		
	Services and Subsidies	Services only	Housing only	Services and Subsidies	Services only	Housing only
<b>Inpatient Use</b>						
Low	-0.8	-2.1		--	--	
Medium	-3.9	-8.2	-1.4	-83%	-167%	-48%
High	-4.8	-7.4		-11%	-20%	
<b>ED Use</b>						
Low	-0.1	-0.2		--	--	
Medium	-0.5	-0.3	0.0	-24%	-16%	0%
High	-1.9	-2.9		-17%	-27%	
<b>Spending</b>						
Low	+\$818	-\$3,023		+9%	-48%	
Medium	-\$4,544	-\$11,137	-\$630	-13%	-30%	-4%
High	-\$22,047	-\$13,115		-23%	-12%	

The overall picture is one in which retention has the greatest impact on clients in services and subsidies programs – especially 6-month retention – and little impact on clients in housing-only programs. Certain subgroups of services-only clients, however, derive more benefit from 12-month retention than their counterparts in services and subsidies programs.

A large, stylized number '4' in a light orange color, serving as a background graphic for the section header.

# SECTION 4:

## Retention Effects by Diagnosis

# Retention Effects By Diagnosis

## SEVERE MENTAL ILLNESS (SMI)

Overall, the duration in the program for people with and without an SMI is quite similar.

**Inpatient Days.** SMI clients demonstrate a clear selection effect: clients retained for at least 12 months had substantially fewer pre-period inpatient days than those discharged within 6 months. There is a clear indication that clients with an SMI who are retained for at least 12 months are those who have lower rates of inpatient days to start, while those who are discharged before 6 months had higher rates. Even so, all three groups experience a decrease in Year 1, and surprisingly, the only group with a substantial further decrease in Year 2 are those discharged before 6 months.

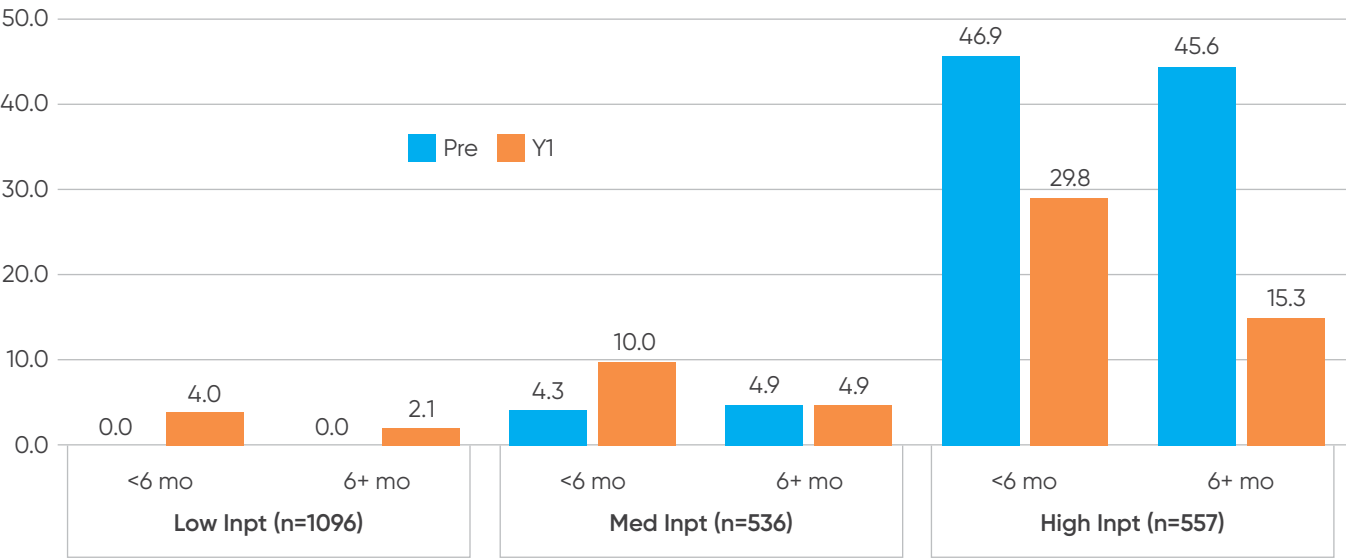
**Table 47.** Average inpatient days by months retained, clients with SMI

	Pre	Year 1	Year 2
<6 months (n=287)	19.8	15.8	11.8
6-12 months (n=343)	13.8	10.2	9.9
12+ months (n=1559)	11.4	4.9	5.5

† Ns for the Year 2 data are <6 = 204, 6-12 = 214, and 12+ = 1,122

Within all three utilization groups, clients have fairly similar pre-period inpatient days regardless of retention, but clients retained for at least 6 months have fewer inpatient days in Year 1.

**Figure 30.** Average Year 1 inpatient days by pre-period inpatient use and 6-month retention, clients with SMI



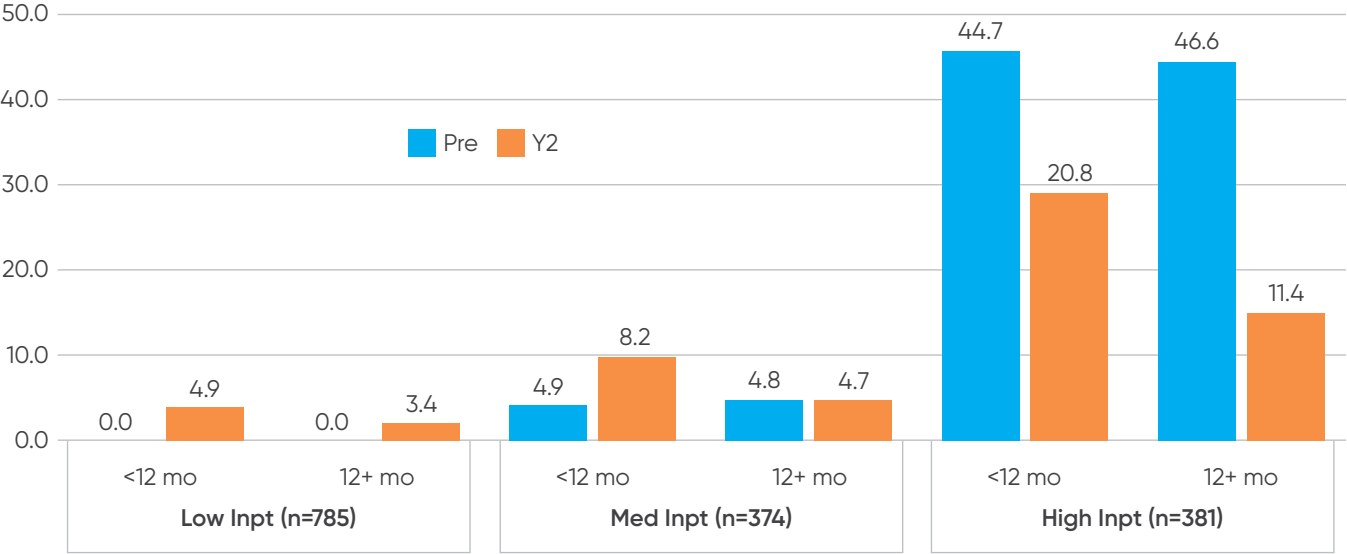
There are significant Year 1 differences in inpatient days between clients discharged within 6 months and those retained at every level of pre-period utilization. While there are some modest selection effects, none are statistically significant. Net of selection, clients who are retained experience an average retention effect of 1.9 fewer inpatient days for low utilizers, 5.7 fewer for medium utilizers, and 13.2 fewer for high utilizers.

**Table 48.** Retention and selection effects on average Year 1 inpatient days, clients with SMI

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low inpt	-1.9*	0	-1.9*	0	--
Med inpt	-5.1*	+0.6	-5.7*	4.8	-119%
High inpt	-14.5***	-1.3	-13.2***	45.9	-29%

This pattern continues with 12-month retention and Year 2 inpatient days. Retained clients in all three groups have fewer Year 2 inpatient days than their non-retained counterparts, despite having similar pre-period rates.

**Figure 31.** Average Year 2 inpatient days by pre-period inpatient use and 12-month retention, clients with SMI



The unadjusted benefits of 12-month retention are more modest than for 6-month retention, but they are statistically significant in all 3 utilization groups. Although the selection effect for medium utilizers is small and not statistically significant, the net difference in pre-post changes between retention groups was no longer statistically significant for these clients. Twelve-month retention thus seems to confer less proportional benefit on clients with SMI than 6-month retention, especially for medium utilizers.

**Table 49.** Retention and selection effects on average Year 2 inpatient days, clients with SMI

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low inpt	-1.5**	0	-1.5**	0	--
Med inpt	-3.5**	-0.1	-3.4	4.6	-74%
High inpt	-9.4**	+1.9	-11.3*	43.5	-26%

**ED visits.** The relationship between pre-period ED visits and time retained in the program also went in the expected direction, with the <6-month group having consistently higher ED visits and the 12+-month group having consistently lower.

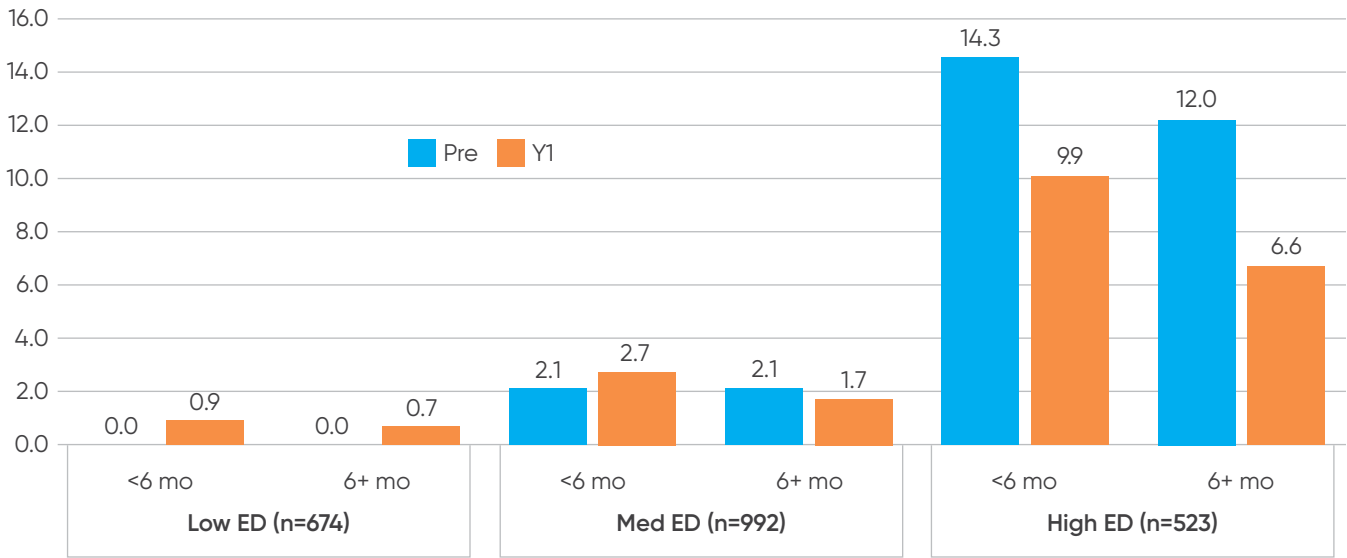
While the high utilization clients who were retained for 6 months started with somewhat lower ED visits, the difference between retained and non-retained clients became even broader in the year after MRT-SH enrollment. Among medium utilizers, clients who were retained experienced an increase in Year 1 ED visits, while clients who were not retained experienced a decrease.

**Table 50.** Average ED visits by months retained, clients with SMI

	Pre	Year 1	Year 2
<6 months (n=287)	5.4	4.6	4.0
6-12 months (n=343)	4.3	3.3	3.5
12+ months (n=1559)	3.5	2.3	2.2

† Ns for the Year 2 data are <6 = 204, 6-12 = 214, and 12+ = 1,122

Figure 32. Average Year 1 ED visits by pre-period ED visits and 6-month retention, clients with SMI



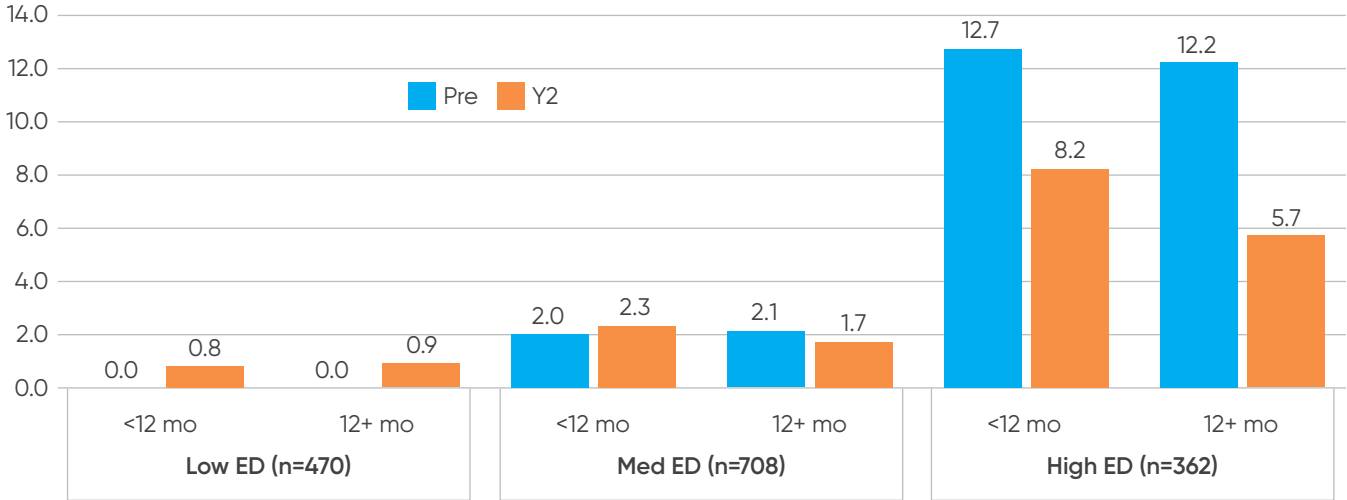
Year 1 ED visits were significantly lower for clients retained at least 6 months compared to those not retained among both medium and high utilizers. Retained clients did not differ in their pre-period ED visits from those who were discharged prior to 6 months among the low and medium utilizers. Among the highest utilizers a selection effect reduced the Year 1 difference, although it was still statistically significant.

Table 51. Retention and selection effects on average Year 1 ED visits, clients with SMI

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low ED	-0.2	0	-0.2	0	--
Med ED	-1.0***	0	-1.0***	2.1	-48%
High ED	-3.3***	-2.3	-1.0**	12.4	-8%

Patterns for 12-month retention are largely similar to those for 6-month retention. High-utilizing clients experience a decrease in both retention groups but experience a larger one if they are retained. Medium-utilizing clients experience a small decrease in ED visits if retained, but a slight increase if not retained.

Figure 33. Average Year 2 ED visits by pre-period ED visits and 12-month retention, clients with SMI



Clients who were retained for 12 months differed little in their pre-period ED visits from those who were discharged prior to 12 months within any of the levels of utilization, but their Year 1 ED visits were significantly lower among both medium and high utilizers.

**Table 52.** Retention and selection effects on average Year 2 ED visits, clients with SMI

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low ED	+0.1	0	+0.1	0	--
Med ED	-0.6***	+0.1	-0.7**	2.1	-33%
High ED	-2.5**	-0.5	-2.0*	11.1	-18%

**Medicaid spending.** Medicaid spending also followed a consistent pattern with retention, with the <6-month group having the highest spending starting in the pre-period and maintained through Year 2, and the 12+-month group having the lowest spending throughout all three periods.

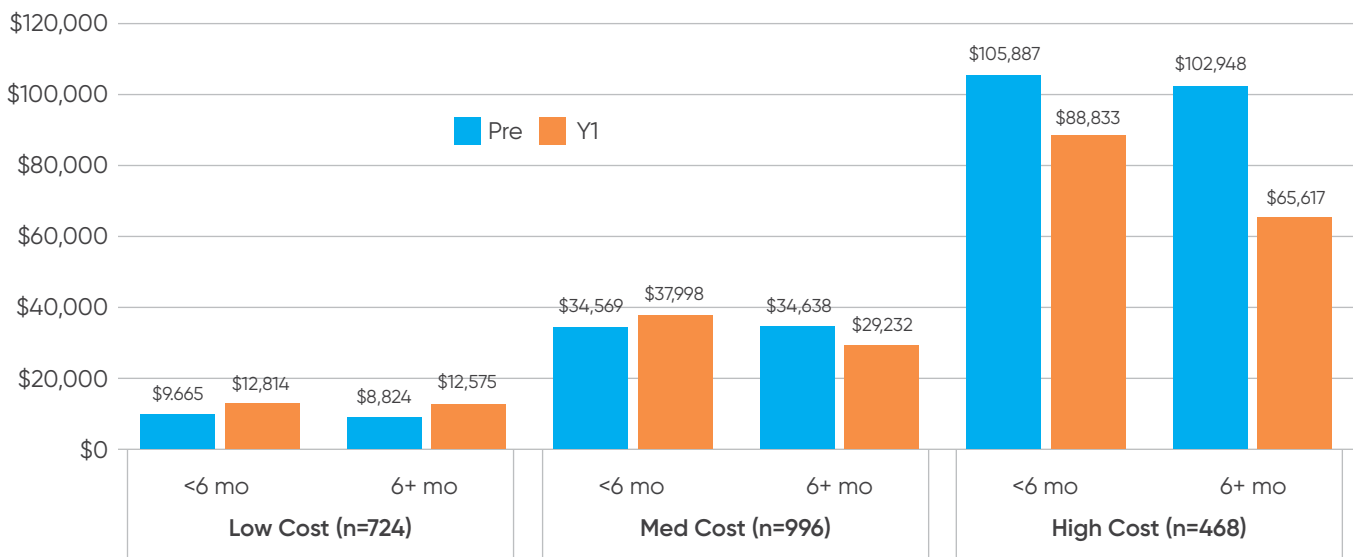
Clients in all three spending groups ended up with lower Year 1 costs when retained for at least 6 months, despite having similar pre-period costs to their non-retained peers.

**Table 53.** Average Medicaid spending by months retained, clients with SMI

	Pre	Year 1	Year 2
<6 months (n=287)	\$49,768	\$47,117	\$44,573
6-12 months (n=343)	\$46,286	\$39,539	\$42,544
12+ months (n=1559)	\$38,006	\$28,896	\$28,291

† Ns for the Year 2 data are <6 = 204, 6-12 = 214, and 12+ = 1,122

**Figure 34.** Average Year 1 Medicaid spending by pre-period Medicaid spending and 6-month retention, clients with SMI



Within all three spending groups, clients retained for at least 6 months have lower Year 1 spending than those not retained. The differences are statistically significant for medium- and high-cost clients. While there are some modest selection effects, none are statistically significant; however, the selection effect for low-cost clients account for all of the retention benefit observed and actually results in a greater net increase (by \$600) for the retained than the non-retained clients.

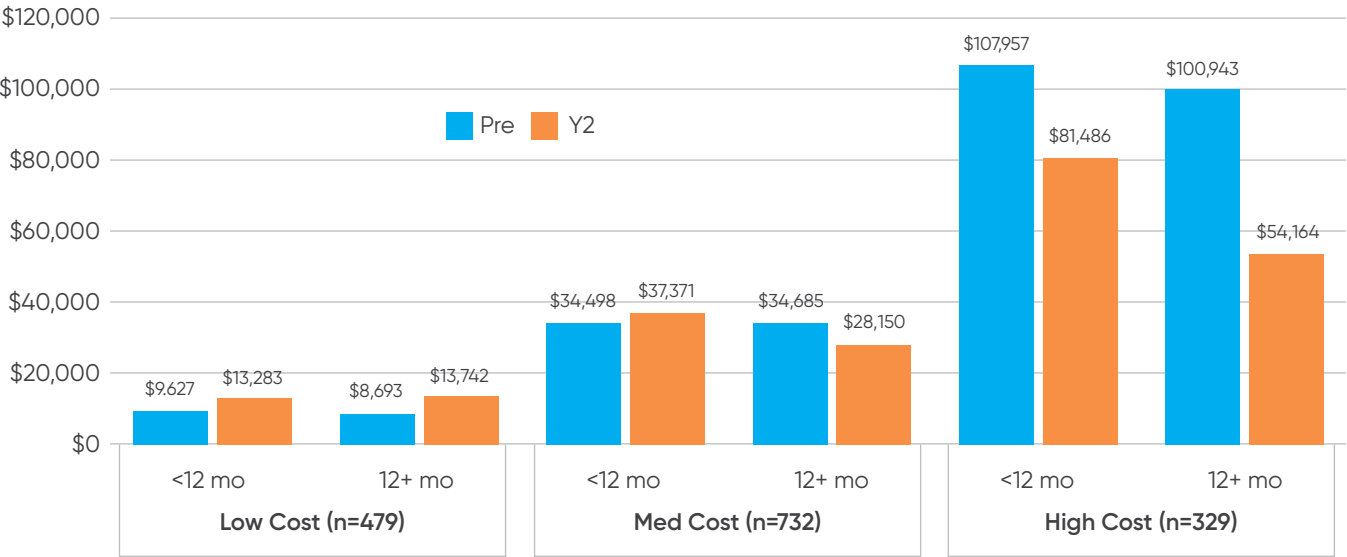
**Table 54.** Retention and selection effects on average Year 1 Medicaid spending, clients with SMI

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low cost	-\$239†	-\$839	+\$600	\$8,901	+7%
Med cost	-\$8,766***	+\$69	-\$8,835***	\$34,629	-25%
High cost	-\$23,216***	-\$2,939	-\$20,277***	\$103,476	-20%



Similar results were found with 12-month retention and Year 2 spending among both medium- and high-cost clients, with retained clients having lower Year 2 values than those not retained. Among low-cost clients, in contrast, retained clients had slightly higher Year 2 spending, despite starting with lower pre-period spending.

**Figure 35.** Average Year 2 Medicaid spending by pre-period Medicaid spending and 12-month retention, clients with SMI



For medium- and high-cost clients, there were statistically significant retention benefits. The selection effect for high-cost clients, while not statistically significant, was large, and reduced the net retention effect.

**Table 55.** Retention and selection effects on average Year 1 Medicaid spending, clients with SMI

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low cost	+\$459	-\$934*	+\$1,393	\$9,032	+15%
Med cost	-\$9,221***	+\$187	-\$9,408***	\$34,878	-26%
High cost	-\$27,322***	-\$7,014	-\$20,308***	\$99,075	-20%

**CLIENTS WITH SMI SUMMARY**

Across utilization groups, clients with SMI demonstrated significant Year 1 retention effect in inpatient days greater than those found for the full cohort. Clients also showed significant Year 2 retention effects similar to those of high-utilizing clients overall. For ED visits, clients with SMI again demonstrated similar or greater proportional retention effects to clients overall, for both Year 1 (medium utilizers demonstrated greater effects) and Year 2 (high utilizers demonstrated stronger effects) periods. Clients with SMI also demonstrated significant retention benefits on Medicaid spending, which were proportionally similar to clients overall (medium-cost clients experienced a greater proportional benefit of 6-month retention, but a similar effect for 12-month retention).

SUBSTANCE USE DISORDERS (SUD)

Clients with at least one SUD had rates of attrition that were much higher than for other clients. Seventeen percent were discharged within the first 6 months, another 17% were discharged in 6–12 months, and 65% were retained for at least a year.

**Inpatient days.** There was a clear selection effect in that the clients who were discharged earliest (<6 months) had the highest pre-period rates. By Year 2, however, they were not different from the 6–12-month group. In contrast, the 12+-month group consistently had the fewest inpatient days.

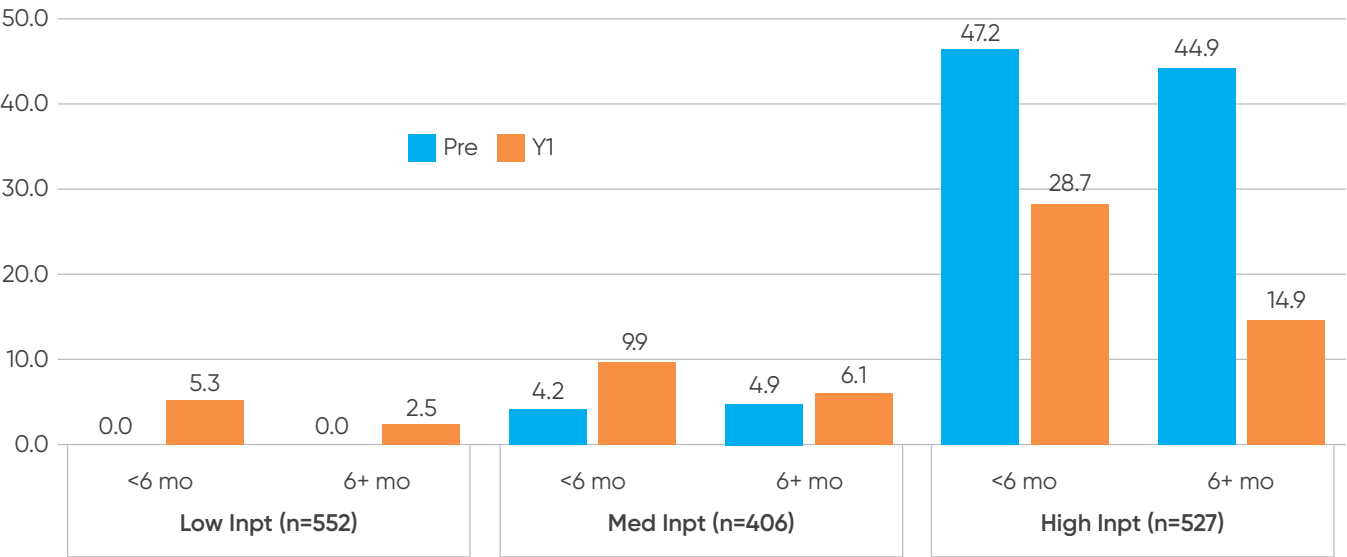
Year 1 inpatient days were lower for 6-month retained clients among all three groups. There was no pre-period difference within the low inpatient group, and only a small difference within the high inpatient group, implying that these differences were likely attributable to retention. The medium-cost clients who were retained actually started with higher pre-period inpatient use relative to non-retained clients.

Table 56. Average inpatient days by months retained, clients with SUD

	Pre	Year 1	Year 2
<6 months (n=256)	23.3	17.5	14.1
6–12 months (n=263)	16.7	11.2	15.4
12+ months (n=966)	16.0	6.6	7.1

† Ns for the Year 2 data are <6 = 180, 6–12 = 160, and 12+ = 660

Figure 36. Average Year 1 inpatient days by pre-period inpatient use and 6-month retention, clients with SUD



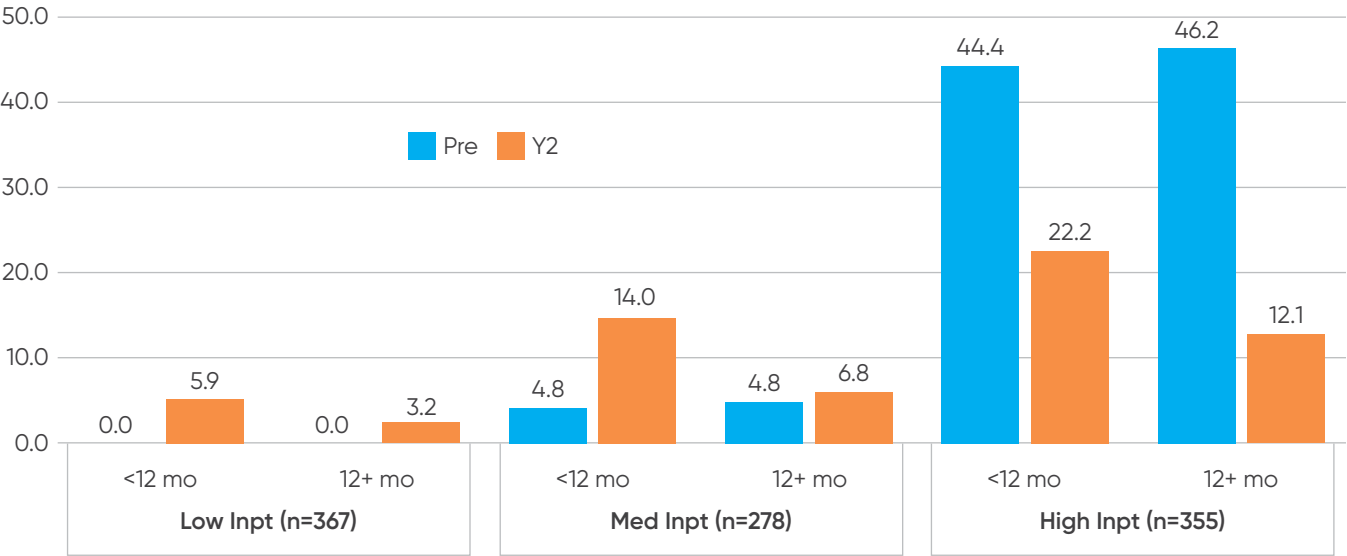
Medium- and high-utilizing clients with an SUD had significantly fewer Year 1 inpatient days if they were retained for at least 6 months, compared to those who were not retained. There were modest but not statistically significant selection effects for these clients. After adjusting for selection effects, medium-utilizing clients had 4.5 fewer days and high-utilizing clients had 11.5 fewer days.

Table 57. Retention and selection effects on average Year 1 inpatient days, clients with SUD

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low inpt	-2.8	0	-2.8	0	--
Med inpt	-3.8**	+0.7	-4.5**	4.8	-94%
High inpt	-13.8***	-2.3	-11.5**	45.4	-25%

In all three utilization groups, pre-period rates were comparable, but Year 2 inpatient days were lower for clients who were retained for at least 12months.

**Figure 37.** Average Year 2 inpatient days by pre-period inpatient use and 12-month retention, clients with SUD



SUD clients had significantly fewer Year 2 inpatient days in all utilization groups if they were retained for at least 12 months compared to those not retained. There was no selection effect for low and medium utilizers, and high utilizers who were retained had a higher pre-period value than those who were not.

**Table 58.** Retention and selection effects on average Year 2 inpatient days, clients with SUD

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low inpt	-2.7*	0	-2.7*	0	--
Med inpt	-7.2**	0	-7.2*	4.6	-157%
High inpt	-10.1***	+1.8	-11.9**	43.1	-28%

**ED visits.** ED visits were not dramatically different between retention groups in the pre-period, but the drop in Year 1 was much more robust for the 6-12 and 12+-month groups. Between those two groups, only the 12+-month group maintained their low rate in Year 2.

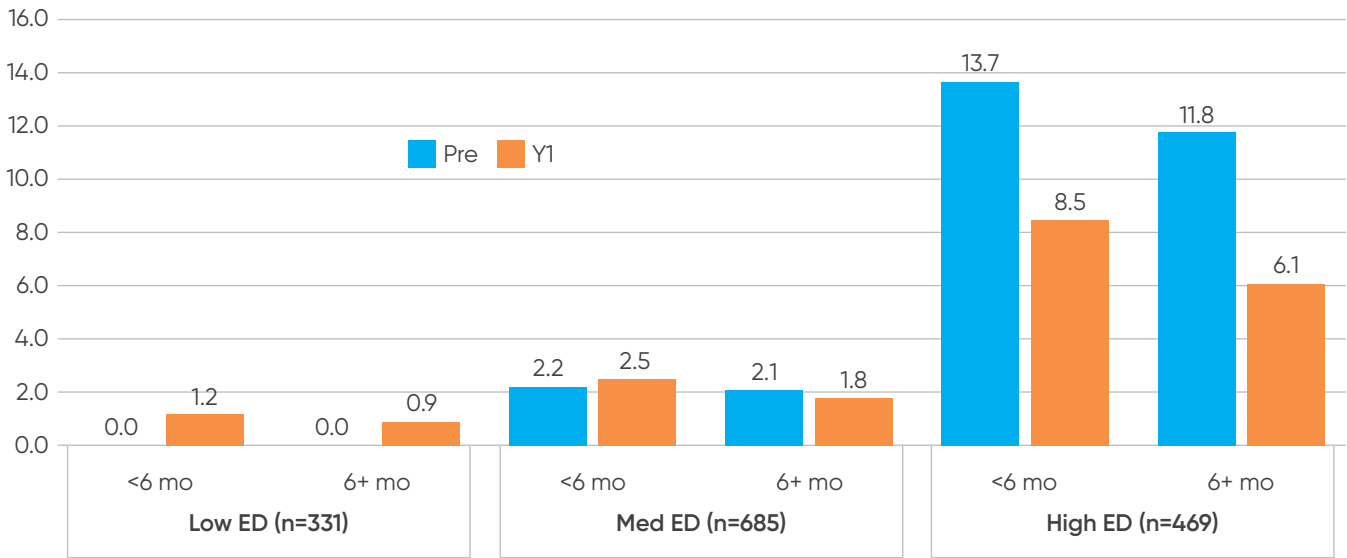
Clients in all three groups have lower Year 1 rates when re-retained for at least 6 months. Medium-utilizing clients began with very similar rates of ED visits, but among high-utilizing clients, those who were retained started with somewhat lower rates of ED visits in the pre-period.

**Table 59.** Average ED visits by months retained, clients with SUD

	Pre	Year 1	Year 2
<6 months (n=256)	5.6	4.2	4.1
6-12 months (n=263)	4.9	3.5	4.0
12+ months (n=966)	4.6	2.8	2.8

† Ns for the Year 2 data are <6 = 180, 6-12 = 160, and 12+ = 660

**Figure 38.** Average Year 1 ED visits by pre-period ED use and 6-month retention, clients with SUD



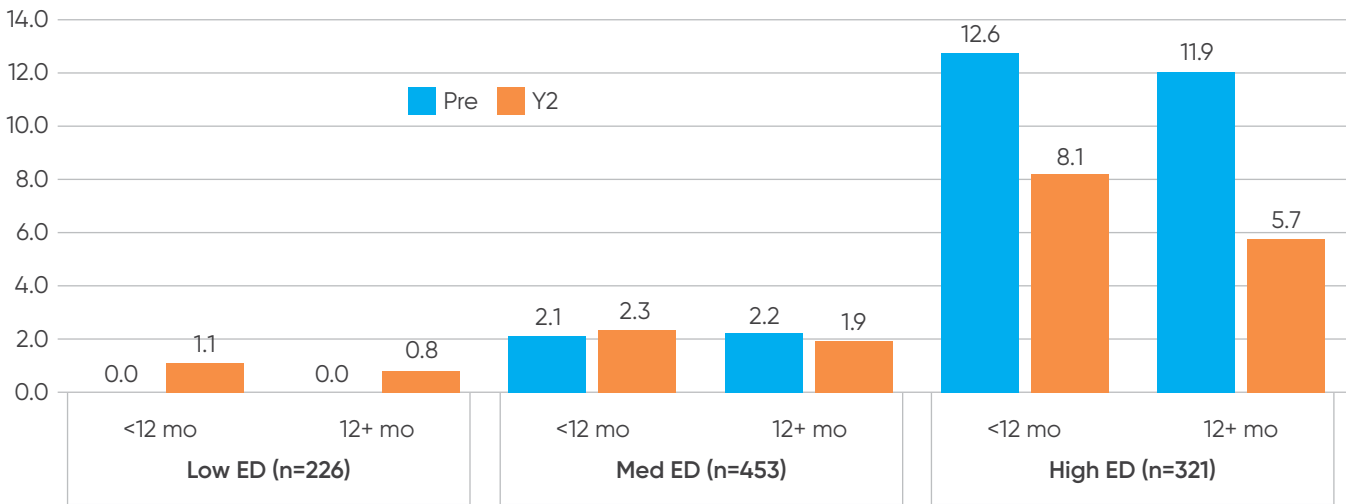
Medium and high utilizers who were retained for at least 6 months had significantly fewer ED visits than those not retained, but the high utilizers who were retained also started with a lower pre-period level than those who were not retained. Even after adjusting for this, however, the net retention effect was still statistically significant.

**Table 60.** Retention and selection effects on average Year 1 ED visits, clients with SUD

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low ED	-0.3	0	-0.3	0	--
Med ED	-0.7***	-0.1	-0.6**	2.1	-29%
High ED	-2.4**	-1.9	-0.5*	12.2	-4%

Year 2 ED visits increased for both groups of low utilizers but decreased slightly for the medium utilizers who were retained while increasing slightly for the medium utilizers who were not. There was a substantial post-period decrease for both groups of high utilizers.

**Figure 39.** Average Year 2 ED visits by pre-period ED use and 12-month retention, clients with SUD



The results for 12-month retention among SUD clients were very similar to those for 6-month retention. Medium utilizers who were retained for at least 12 months had significantly fewer ED visits than those not retained, but this dropped below the level of statistical significance when net changes were analyzed. High utilizers who were retained also had fewer ED visits (but this did not quite reach statistical significance). High utilizers with SUD experienced a larger proportional effect of 12-month retention than of 6-month retention, but it was not statistically significant.

**Table 61.** Retention and selection effects on average Year 2 ED visits, clients with SUD

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low ED	-0.3	0	-0.3	0	--
Med ED	-0.4*	+0.1	-0.5†	2.2	-23%
High ED	-2.4†	-0.7	-1.7	10.8	-16%

**Medicaid spending.** It appears clear that the clients who were retained for at least 12-months were lower-cost clients to begin with and maintained this distinction throughout Years 1 and 2.

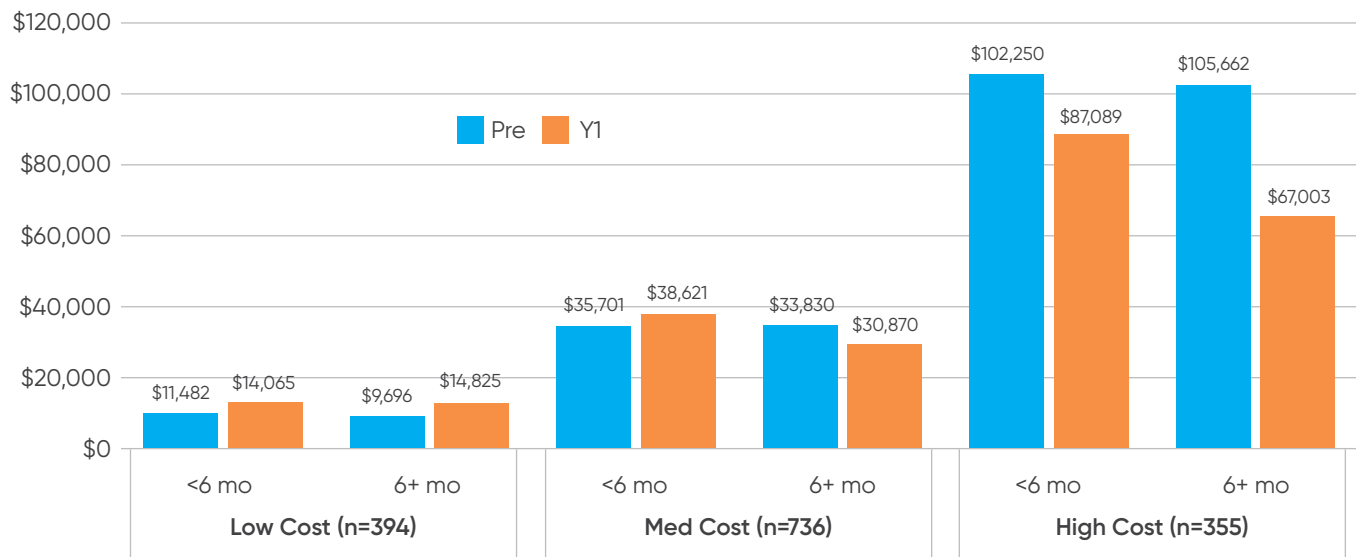
Within categories of pre-period spending, however, the pre-period costs were comparable for retained and non-retained clients. Medium- and high-cost clients had lower Medicaid spending when they were retained for at least 6 months.

**Table 62.** Average Medicaid spending by months retained, clients with SUD

	Pre	Year 1	Year 2
<6 (n=256)	\$51,271	\$48,691	\$51,244
6-12 (n=263)	\$48,656	\$42,540	\$51,672
12+ (n=966)	\$41,796	\$32,328	\$34,166

† Ns for the Year 2 data are <6 = 180, 6-12 = 160, and 12+ = 660

**Figure 40.** Average Year 1 Medicaid spending by pre-period spending and 6-month retention, clients with SUD



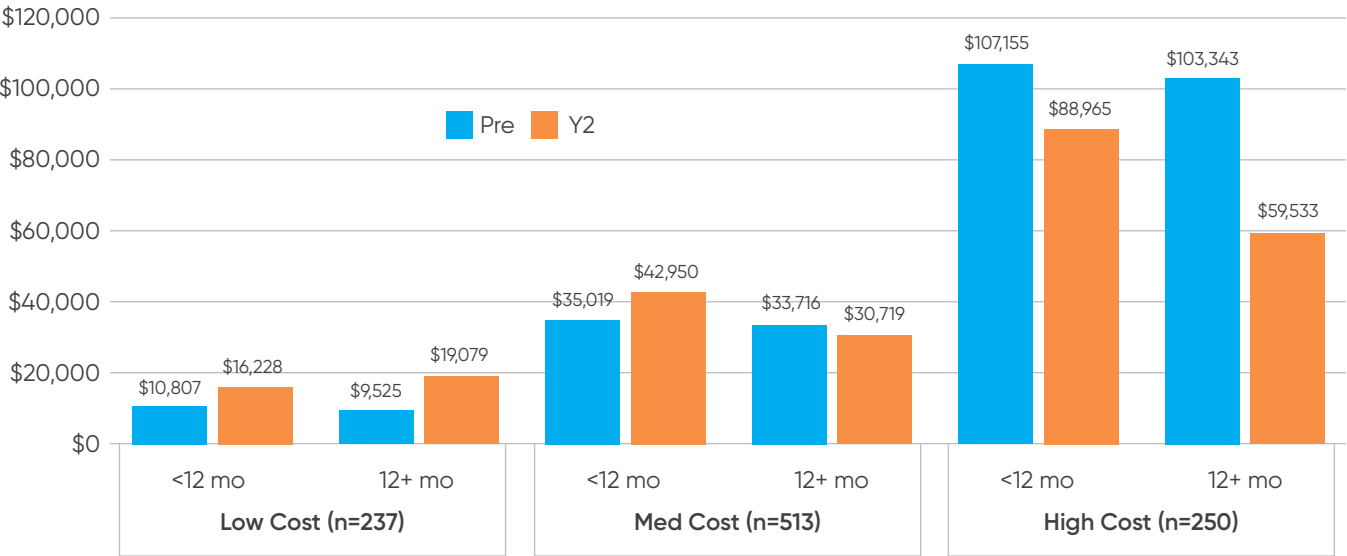
Medium- and high-cost clients both had significantly less spending in Year 1. Medium-cost clients who were retained, however, had somewhat less spending in the pre-period as well, which moderated their net retention effect. High-cost clients who were retained had higher spending in the pre-period, making their net retention effect larger than their unadjusted retention benefit. However, both effects retained statistical significance.

**Table 63.** Retention and selection effects on average Year 1 Medicaid spending, clients with SUD

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low cost	+\$760†	-\$1,785*	+\$2,545	\$990	+26%
Med cost	-\$7,751**	-\$1,871	-\$5,880**	\$34,166	-17%
High cost	-\$20,086***	+\$3,412	-\$23,498***	\$104,922	-22%

The same results were found with Year 2 costs and 12-month retention. Pre-period differences were minimal between groups, but post-period differences were quite robust for medium- and high-cost clients (although low-cost clients who were retained started with slightly lower pre-period costs and ended up with higher Year 2 costs).

**Figure 41.** Average Year 2 Medicaid spending by pre-period spending and 12-month retention, clients with SUD



The 12-month retention effects for medium-cost clients with SUD were similar to the 6-month effects, but more pronounced. They had a decrease in Year 2 spending if retained, but an increase if not retained, for a net effect that was 32% of the pre-period value (compared to 17% for the 6-month effect). The 12-month net retention effect for high-cost clients was similar to the 6-month effect as a proportion of the pre-period value (25% versus 22%).

**Table 64.** Retention and selection effects on average Year 2 Medicaid spending, clients with SUD

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low cost	+\$2,851	-\$1,282*	+\$4,133	\$10,427	+40%
Med cost	-\$12,231***	-\$1,303**	-\$10,926**	\$34,594	-32%
High cost	-\$29,432***	-\$3,812	-\$25,620***	\$101,792	-25%

CLIENTS WITH SUD SUMMARY

For clients with an SUD, medium and high utilizers demonstrated proportionally greater retention benefits on inpatient days in Year 1 and Year 2 than for clients overall (low utilizers also showed greater net retention effects, but no selection effects). Effects for ED visits and Medicaid spending were similar to the full group (though not significant for Year 2 ED visit analyses).

HIV

Clients with HIV had extremely high rates of attrition: 25% of clients were discharged within the first 6 months, another 24% were discharged in 6–12 months, and only 51% were retained for at least a year. The vast majority of individuals with HIV in MRT-SH are in one of the AIDS Institute programs. The largest of these, which was a services-only program serving New York City (see program appendix), had particularly high levels of attrition.

Inpatient days. The <6-month clients clearly had higher utilization in the pre-period than the other retention groups. In Year 1, they experienced a drop comparable to the 12+-month group in raw numbers, but smaller proportionally. The 12+-month group maintained the lowest level of inpatient days throughout.

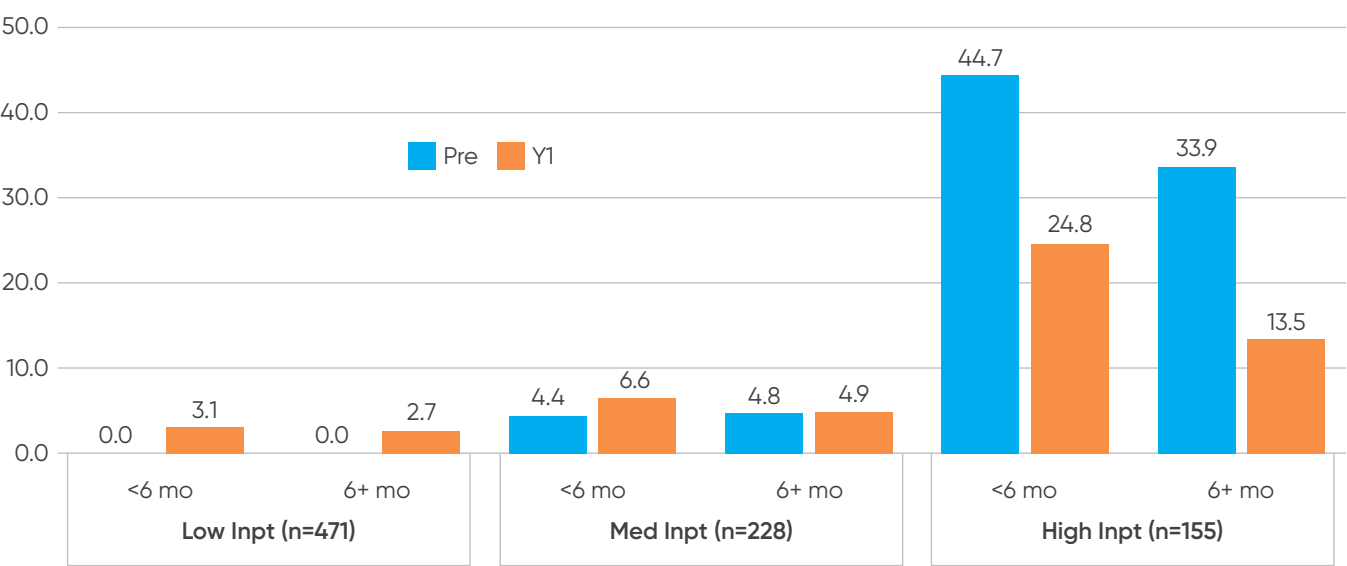
The high-utilizing clients who were retained had substantially fewer Year 1 inpatient days than their non-retained peers, but also started with substantially fewer in the pre-period. Medium-utilizing clients also had fewer Year 1 inpatient days when retained, but with a reversed selection effect.

Table 65. Average inpatient days by months retained, clients with HIV

	Pre	Year 1	Year 2
<6 months (n=215)	12.3	9.4	10.2
6–12 months (n=206)	6.0	6.1	8.9
12+ months (n=433)	7.0	4.5	4.3

† Ns for the Year 2 data are <6 = 165, 6–12 = 152, and 12+ = 339

Figure 42. Average Year 1 inpatient days by pre-period inpatient use and 6-month retention, clients with HIV



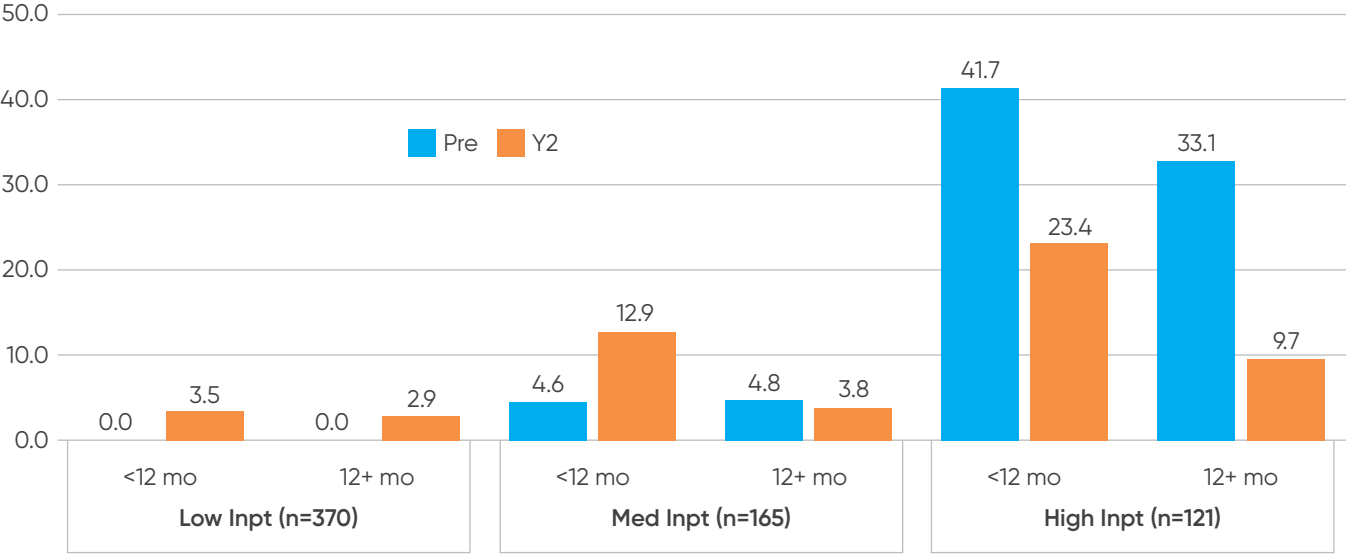
The unadjusted difference for medium utilizers is not statistically significant, but the retained clients also started with more pre-period inpatient days than the non-retained clients, making the net retention effect larger than the unadjusted effect and almost statistically significant. In contrast, the high utilizers had significantly fewer Year 1 inpatient days if they were retained for at least 6 months but started with significantly fewer pre-period days as well. After accounting for the selection effect, there is little net retention effect left for this group.

Table 66. Retention and selection effects on average Year 1 inpatient days, clients with HIV

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low inpt	-0.4	0	-0.4	0	--
Med inpt	-1.7	+0.4	-2.1†	4.7	-45%
High inpt	-11.3***	-10.8*	-0.5	37.6	-1%

For 12-month retention and Year 2 inpatient days, the pattern for high-utilizing clients was the same as in Year 1. Retained medium-utilizing clients also had lower Year 2 inpatient days versus those not retained, despite starting at comparable pre-period rates.

Figure 43. Average Year 2 inpatient days by pre-period inpatient use and 12-month retention, clients with HIV



Clients with HIV who are retained for at least 12 months had significantly fewer Year 2 inpatient days among the medium and high utilizers. There was little selection effect for the medium utilizers, but the selection effect for the high utilizers, while not itself statistical significance, moderated the net retention effect substantially so that it dropped below the level of statistical significance. The medium utilizers with HIV had a much more pronounced 12-month retention effect than 6-month effect.

Table 67. Retention and selection effects on average Year 2 inpatient days, clients with HIV

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low inpt	-0.6	0	-0.6	0	--
Med inpt	-9.1*	+0.2	-9.3*	4.7	198%
High inpt	-13.7***	-8.6	-5.1†	37.1	14%

**ED visits.** The <6-month group started with more ED visits than their peers; this pattern persisted through Years 1 and 2. The 6-12-month and 12+-month groups were somewhat more similar to each other during the pre-period and became even more similar through Years 1 and 2.

The Year 1 differences between retained and non-retained clients large among the high utilization group, but much of the difference was present prior to MRT-SH enrollment. There were minimal differences among clients with low or medium pre-period ED use.

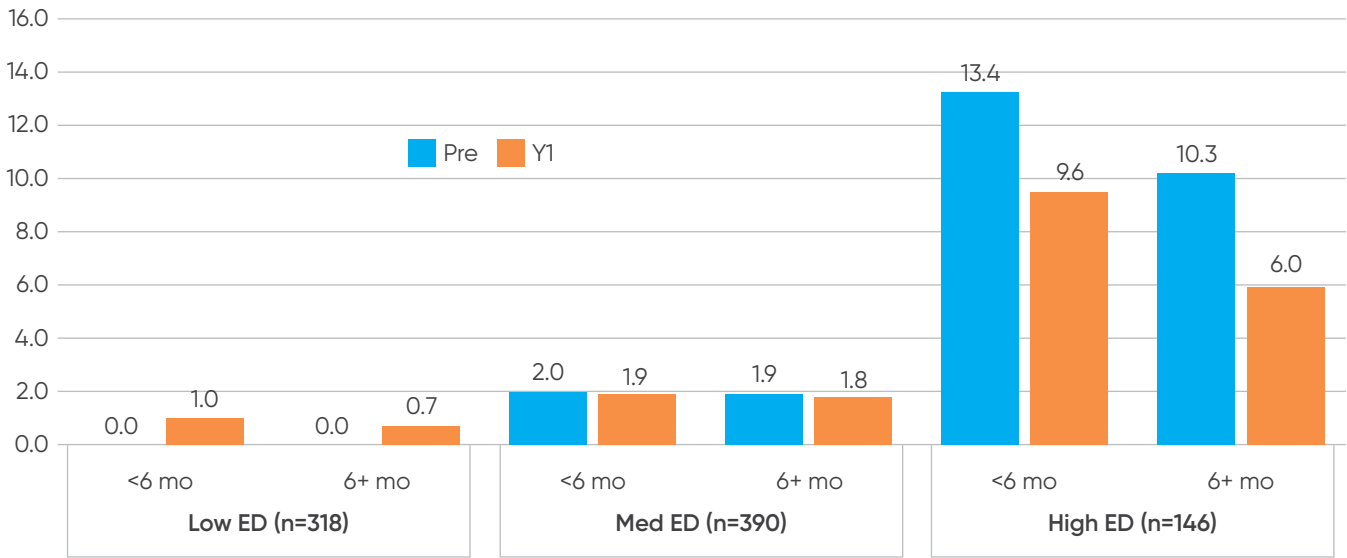
Table 68. Average ED visits by months retained, clients with HIV

	Pre	Year 1	Year 2
<6 months (n=215)	3.5	3.1	3.0
6-12 months (n=206)	2.1	1.9	2.2
12+ months (n=433)	2.8	2.2	2.1

† Ns for the Year 2 data are <6 = 165, 6-12 = 152, and 12+ = 339



Figure 44. Average Year 1 ED visits by pre-period ED use and 6-month retention, clients with HIV



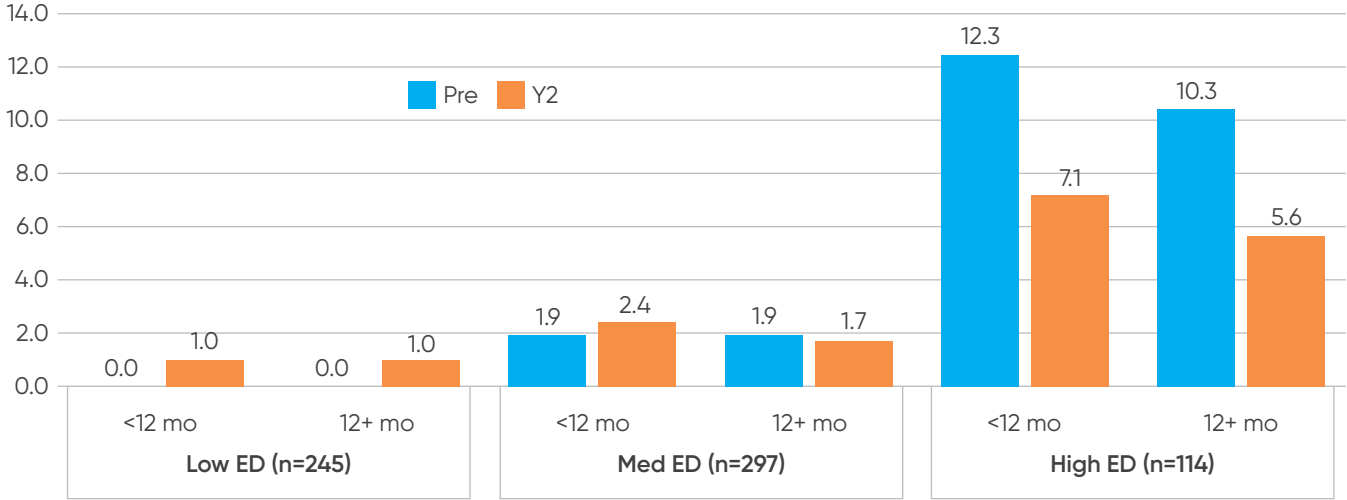
High utilizers with HIV had significantly fewer Year 1 ED visits if retained for at least 6 months compared to those not retained, but also had significantly fewer ED visits in the pre-period. After adjusting for this selection effect, the small remaining net effect is not statistically significant. Low utilizers had fewer Year 1 ED visits as well – although the difference was small, it approached statistical significance. However, medium utilizers did not show any retention effect.

Table 69. Retention and selection effects on average Year 1 ED visits, clients with HIV

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low ED	-0.3†	0	-0.3†	0	--
Med ED	-0.1	-0.1	0	1.9	0%
High ED	-3.6**	-3.1*	-0.5	11.2	4%

The pattern for 12-month retention among high-utilizers looked similar to that for 6-month retention, but 12-month retention appeared to have a larger effect on medium-utilizers than 6-month retention had (in that clients who were not retained experienced a modest pre-post increase in ED use, while retained clients experienced a slight decrease). There were no differences between retained and non-retained low-utilizing clients.

Figure 45. Average Year 2 ED visits by pre-period ED use and 12-month retention, clients with HIV



Medium utilizers had a nearly significant retention effect and no selection effect – but the net retention effect was not statistically significant. High utilizers had fewer Year 1 ED visits if they were retained (and this bordered on statistical significance), but there was an even greater difference in pre-period values. Even after adjusting for this, however, the net retention effect was still nearly significant.

Table 70. Retention and selection effects on average Year 2 ED visits, clients with HIV

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low ED	0	0	0	0	--
Med ED	-0.7†	0	-0.7	2.0	-35%
High ED	-1.5†	-2.0	+0.5†	10.5	+5%

**Medicaid spending.** Clients discharged within 6 months of enrollment had notably higher costs in the pre-period than their peers, and their spending remained higher in the post-period. The 6–12-month group showed a decrease in Year 1 spending, but a substantial increase in Year 2. The 12+–month group maintained a lower level of spending throughout.

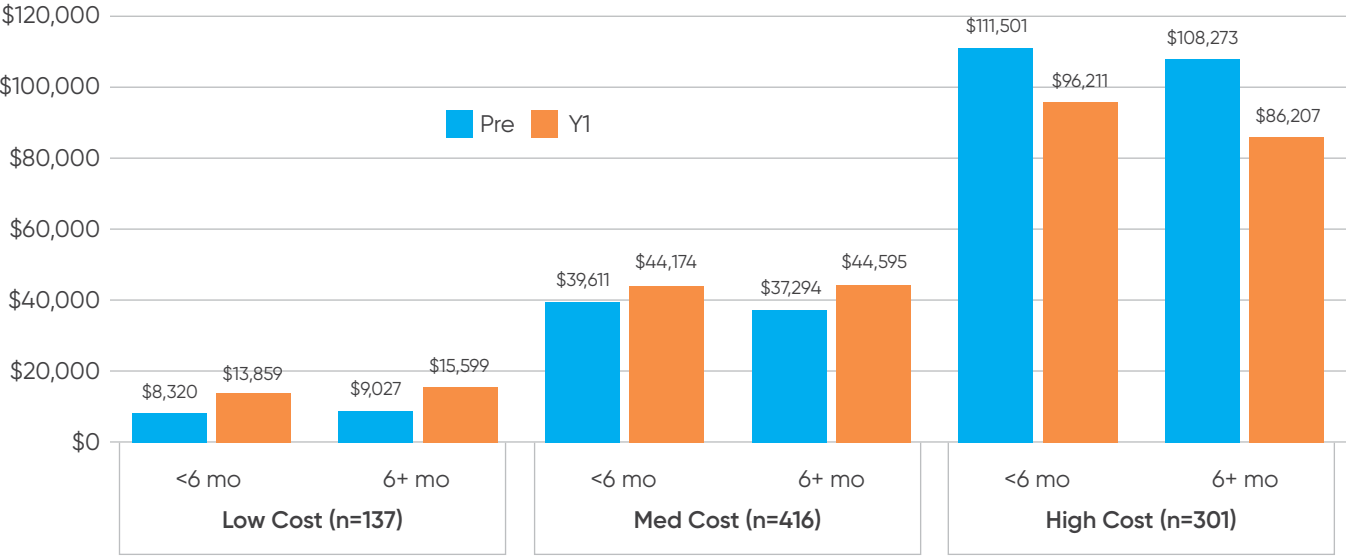
Spending among low and medium utilizers increased for both groups but increased more for retained clients. In contrast, spending fell among high utilizers in both groups, but appeared to fall more for retained clients.

Table 71. Average Medicaid spending by months retained, clients with HIV

	Pre	Year 1	Year 2
<6 months (n=215)	\$65,629	\$62,009	\$63,629
6–12 months (n=206)	\$58,002	\$54,659	\$61,491
12+ months (n=433)	\$54,915	\$52,785	\$52,928

† Ns for the Year 2 data are <6 = 165, 6–12 = 152, and 12+ = 339

Figure 46. Average Year 1 Medicaid spending by pre-period spending and 6-month retention, clients with HIV



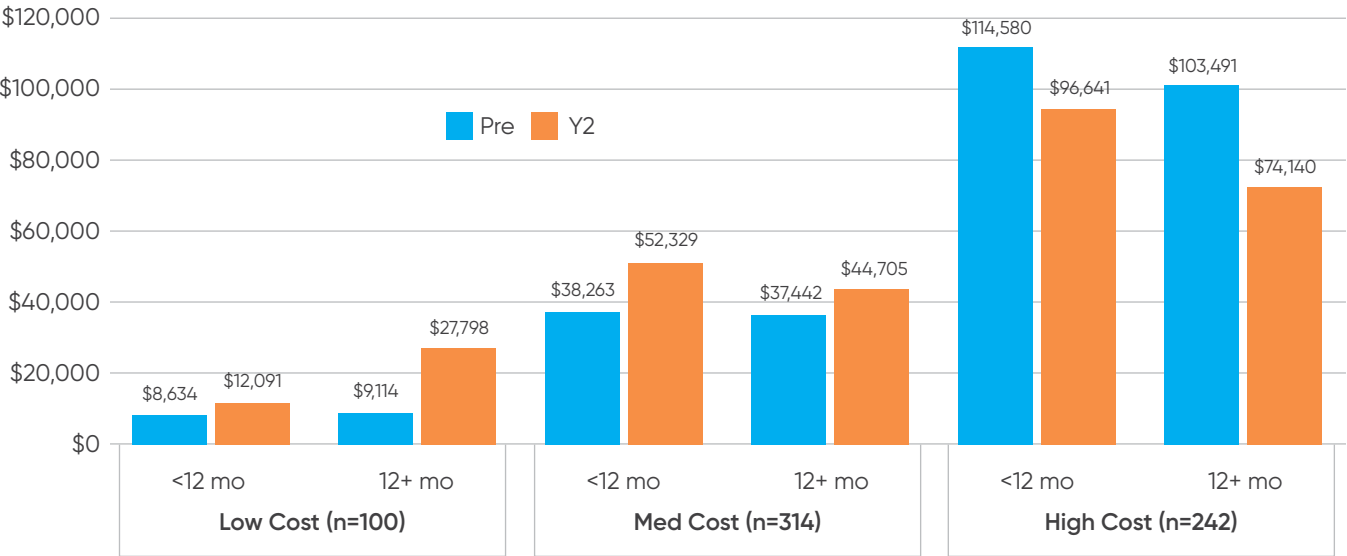
There were no statistically significant 6-month retention effects for any spending group, either before or after adjusting for selection effects.

Table 72. Retention and selection effects on average Year 1 Medicaid spending, clients with HIV

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low cost	+\$1,740	+\$707	+\$1,033	\$8,883	+12%
Med cost	+\$421	-\$2,317	+\$2,738	\$37,834	+7%
High cost	-\$10,004	-\$3,228	-\$6,776	\$109,238	-6%

Among the low-cost clients, however, those who were retained had higher costs in Year 2 than those not retained, while medium- and high-cost clients had lower Year 2 spending when they were retained. Medium-cost clients started at similar pre-period spending levels across both retention groups, but high-cost clients who were retained had lower pre-period spending.

**Figure 47.** Average Year 1 Medicaid spending by pre-period spending and 6-month retention, clients with HIV



Low-cost clients had \$15,707 more dollars in Year 2 spending if retained, and only a very small percentage (\$480) was explained by pre-period differences. This was the same pattern observed for 6-month retention, but the effect for 12-month retention was statistically significant and proportionately very large. As the previous cost report showed higher post-period spending for HIV clients in pharmacy in particular, one hypothesis is that this reflects increased use of antiretroviral medication among those who were initially low utilizers. High-cost clients had significantly lower Year 2 spending before accounting for selection effects, but their net retention effect was no longer statistically significant. There were no significant effects for medium-cost clients.

**Table 73.** Retention and selection effects on average Year 2 Medicaid spending, clients with HIV

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low cost	+\$15,707***	+\$480	+\$15,227**	\$8,663	+176%
Med cost	-\$7,624	-\$821	-\$6,803	\$38,117	-18%
High cost	-\$22,501**	-\$11,089	-\$11,412	\$106,657	-11%

CLIENTS WITH HIV SUMMARY

Given the substantial selection effects, high-utilizers did not show significant retention effects. Medium utilizers showed only a marginal 6-month effect, but a significant 12-month retention effect greater than that of the clients overall. In contrast to clients overall, retention effects were smaller or surprisingly nonexistent for all three utilization groups and for both 6- and 12-month retention. Medium utilizers showed a greater proportional 12-month retention effect, but this effect was not significant; high utilizers showed only a marginal 12-month effect. Medicaid spending, however, did not show any significant retention decreases: low utilizers actually demonstrated a significant spending increase with 12-month retention. However, this increase may be taken to indicate that these clients were not receiving adequate healthcare before MRT-SH enrollment, but received appropriate services in the program or showed declines in their condition after enrollment.

CHRONIC MEDICAL CONDITIONS

Clients with at least one chronic medical condition<sup>4</sup> (n=1,867) had rates of attrition that were comparable to the MRT-SH population overall: 13% of clients were discharged within the first 6 months, another 15% were discharged in 6–12 months, and 72% were retained for at least a year.

**Inpatient days.** Clients who were discharged within the first 6 months had more inpatient days in the pre-period than their peers. However, these rates converged with those of the 6–12-month group by Year 2. The 12+-month group had modestly fewer inpatient days in the pre-period compared to the 6–12-month group but dropped in Year 1 to become substantially lower and maintained this decrease into Year 2.

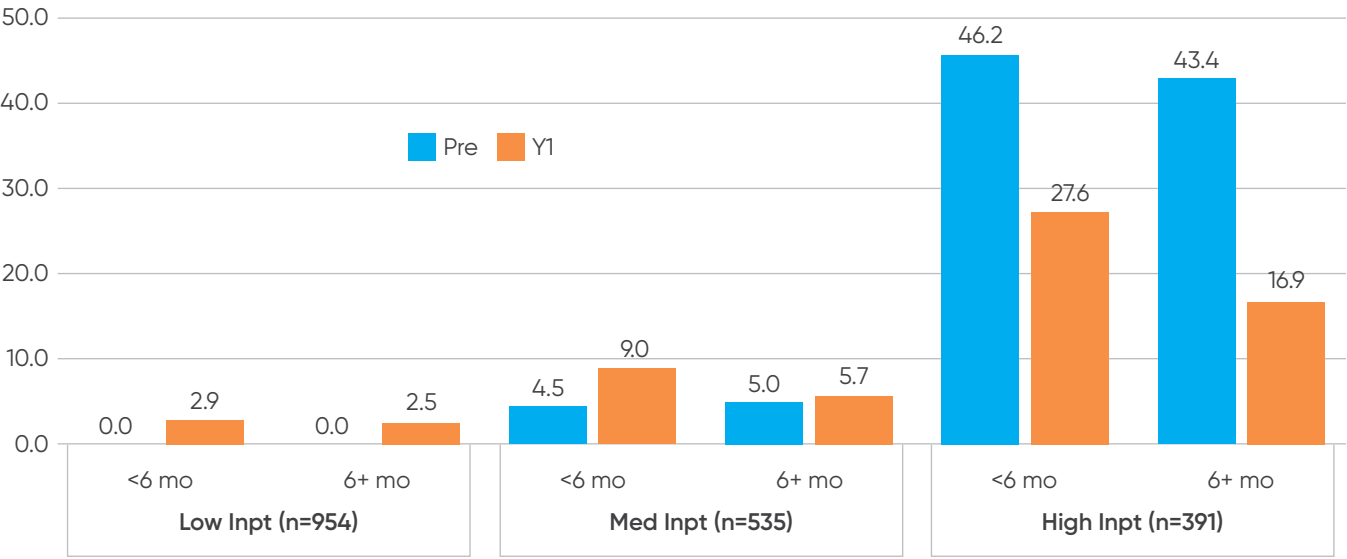
**Table 74.** Average inpatient days by months retained, clients with chronic medical conditions

	Pre	Year 1	Year 2
<6 months (n=246)	15.2	12	11.5
6–12 months (n=282)	10.6	9.5	12.7
12+ months (n=1,352)	9.7	5.5	5.4

† Ns for the Year 2 data are <6 = 159, 6–12 = 150, and 12+ = 915

Within all three utilization groups, pre-period inpatient days were similar between retained and non-retained clients, but Year 1 inpatient days were lower for those retained at least 6 months. Among low and medium utilizers both groups experienced a pre-post increase (but retained clients experienced less of an increase), while among high utilizers both groups experienced a pre-post decrease (but retained clients experienced more of a decrease).

**Figure 48.** Average Year 1 inpatient days by pre-period inpatient use and 6-month retention, clients with chronic medical conditions



There is a statistically significant retention benefit among high utilizers with chronic medical conditions, and a nearly significant benefit among medium utilizers. The net retention effects for clients retained for at least 6 months range from 0.4 to 7.9 fewer inpatient days compared to clients not retained.

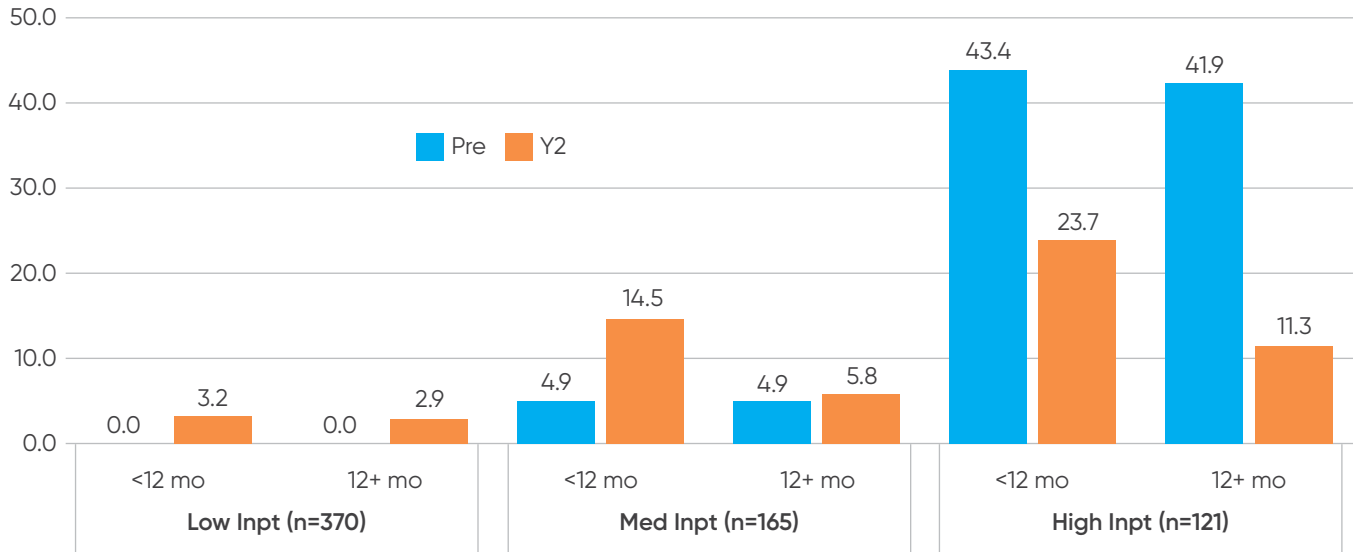
**Table 75.** Retention and selection effects on average Year 1 inpatient days, clients with chronic medical conditions

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low inpt	-0.4	0	-0.4	0	--
Med inpt	-3.3†	+0.5	-3.8†	4.9	-78%
High inpt	-10.7***	-2.8	-7.9*	43.9	-18%

<sup>4</sup> Selected conditions include osteoarthritis, cancer, asthma, COPD, chronic kidney disease, coronary heart disease, hypertension, angina, acute myocardial infarction, chronic heart failure, cerebrovascular disease, and diabetes. Behavioral health conditions and HIV are treated separately.

The relationships observed within all three groups for 6-month retention continued with Year 2 inpatient days and 12-month retention. Low and medium utilizers had increases regardless of retention, but the increases were smaller for retained clients. High utilizers had decrease regardless of retention, but the decreases were larger for retained clients.

**Figure 49.** Average Year 2 inpatient days by pre-period inpatient use and 12-month retention, clients with chronic medical conditions



There is a statistically significant unadjusted 12-month retention benefit for both medium and high utilizers, but the latter effect is no longer statistically significant after accounting for selection. The effects were larger for 12-month retention than for 6-month retention.

**Table 76.** Retention and selection effects on average Year 2 inpatient days, clients with chronic medical conditions

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low inpt	-0.3	0	-0.3	0	--
Med inpt	-8.7***	0	-8.7*	4.9	-178%
High inpt	-12.4***	-1.5	-10.9	42.4	-26%

**ED visits.** In the pre-period, ED visits were highest for those discharged within 6 months, while the 6-12- and 12+-month groups more similar. However, the difference between these two latter groups widened in Years 1 and 2, so that by Year 2 the 6-12-month group had the same average inpatient days as the <6-month group.

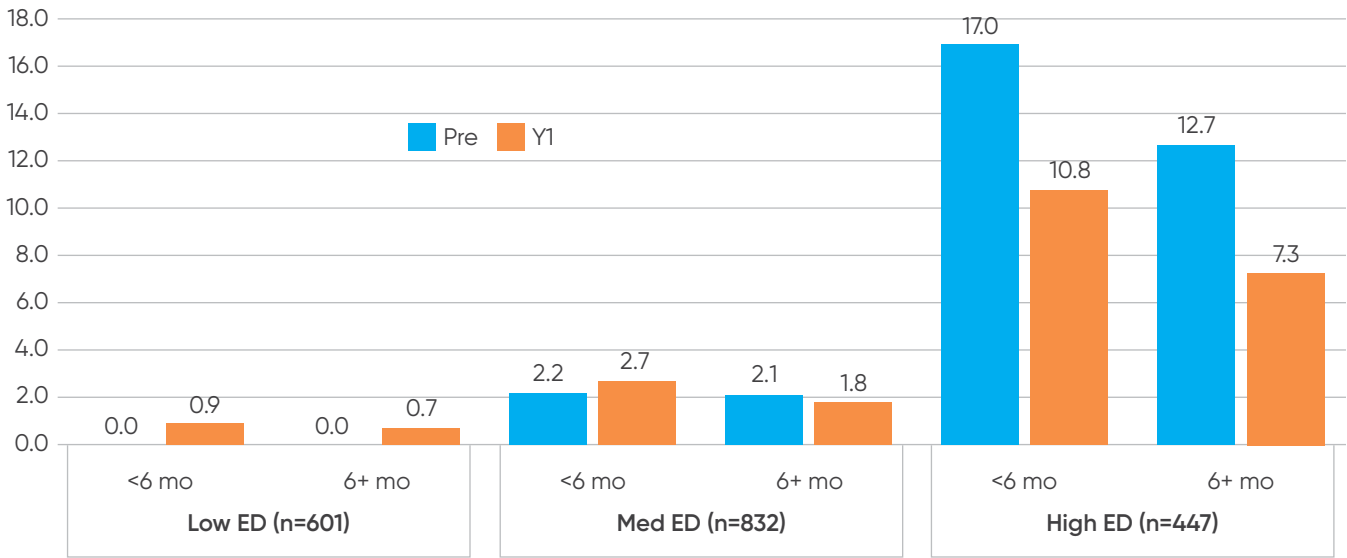
Within the medium-utilization group, pre-period ED visits did not vary by 6-month retention, but Year 1 ED visits were lower among those who were retained. There was also a lower rate of Year 1 ED visits among the high utilizers who were retained, but this group also started with many fewer pre-period ED visits.

**Table 77.** Average ED visits by months retained, clients with chronic medical conditions

	Pre	Year 1	Year 2
<6 months (n=246)	6.1	4.7	4.3
6-12 months (n=282)	4.1	3.1	4.3
12+ months (n=1,352)	3.8	2.6	2.3

† Ns for the Year 2 data are <6 = 159, 6-12 = 150, and 12+ = 915

**Figure 50.** Average Year 1 ED visits by pre-period ED use and 6-month retention, clients with chronic medical conditions



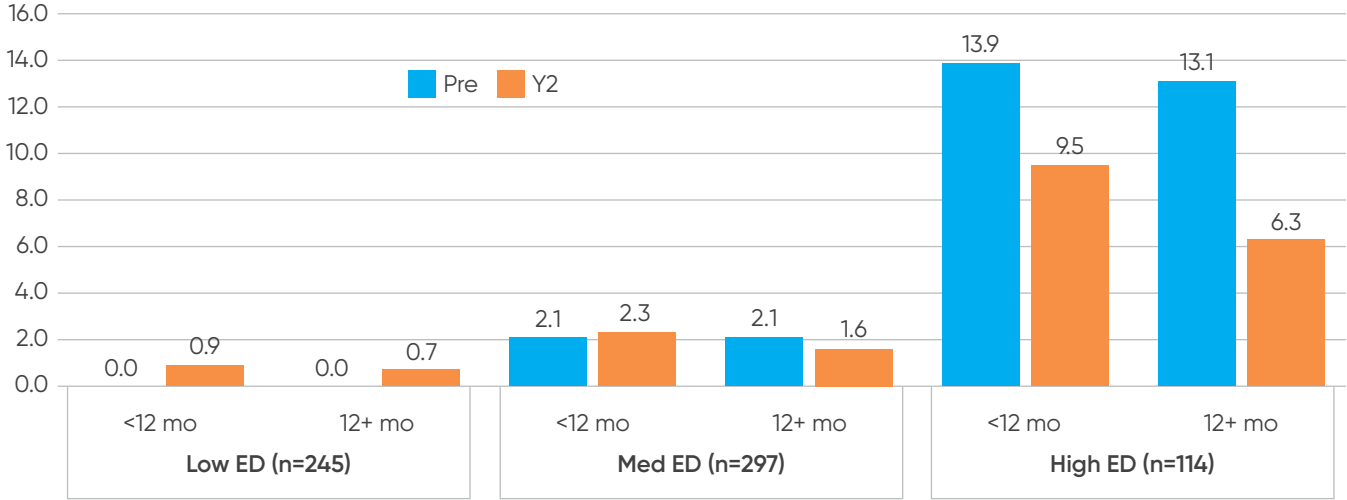
There were statistically significant unadjusted 6-month retention effects for medium and high utilizers. While there was a minimal selection effect for medium utilizers, there was a larger (but not statistically significant) selection effect for high utilizers. This selection effect, nonetheless, accounted for all of the difference between high-utilizing clients retained for at least 6 months and those not retained, and rendered the net retention effect for high utilizers statistically non-significant.

**Table 78.** Retention and selection effects on average Year 1 ED visits, clients with chronic medical conditions

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low ED	-0.2	0	-0.2	0	--
Med ED	-0.9***	-0.1	-0.8***	2.1	-38%
High ED	-3.5**	-4.3	+0.8	13.4	+6%

Regarding Year 2 ED visits and 12-month retention, the same pattern was evident for the medium utilizers as was found for Year 1 ED visits and 6-month retention. For high utilizers, the pre-period data were much more similar between the 12-month retained and non-retained than what was found for 6-month retention, but Year 2 values were lower for the retained than non-retained clients.

**Figure 51.** Average Year 2 ED visits by pre-period ED use and 12-month retention, clients with chronic medical conditions



There were statistically significant 12-month net retention effects for medium and high utilizers. While the net effect of 12-month retention was comparable to that of 6-month retention for medium utilizers, the 12-month effect for high utilizers did not exist for 6 months of retention.

Table 79. Retention and selection effects on average Year 2 ED visits, clients with chronic medical conditions

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low ED	-0.2	0	-0.2	0	--
Med ED	-0.7***	0	-0.7***	2.1	-33%
High ED	-3.2**	-0.8	-2.4**	11.9	-20%

**Medicaid spending.** The <6-month group had the highest Medicaid costs in the pre-period and experienced little change in Years 1 and 2. The 12+-month group had the lowest costs in the pre-period and a decrease in the post-period, and was the only group to show a notable change post-enrollment.

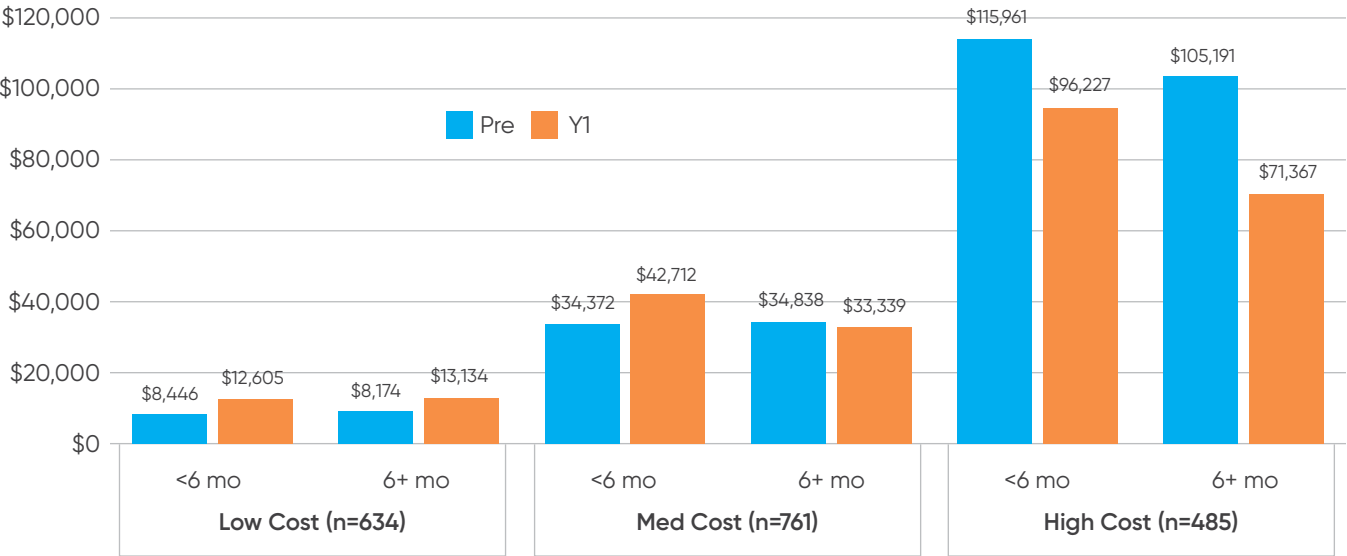
Medium-cost clients did not experience much pre-period variation between retained and non-retained clients, but the clients who were retained for at least 6 months had slightly lower Year 1 costs (largely because the non-retained clients experienced a substantial spending increase). Among high-cost clients, pre-period costs were somewhat lower for those retained at least 6 months, but were much lower in Year 1. Low-cost clients who were retained started out with slightly lower spending but had somewhat higher spending in Year 1.

Table 80. Average Medicaid spending by months retained, clients with chronic medical conditions

	Pre	Year 1	Year 2
<6 months (n=246)	\$56,135	\$53,738	\$54,327
6-12 months (n=282)	\$49,833	\$46,293	\$52,371
12+ months (n=1,352)	\$44,467	\$37,947	\$37,399

† Ns for the Year 2 data are <6 = 159, 6-12 = 150, and 12+ = 915

Figure 52. Average Year 1 Medicaid spending by pre-period spending and 6-month retention, clients with chronic medical conditions

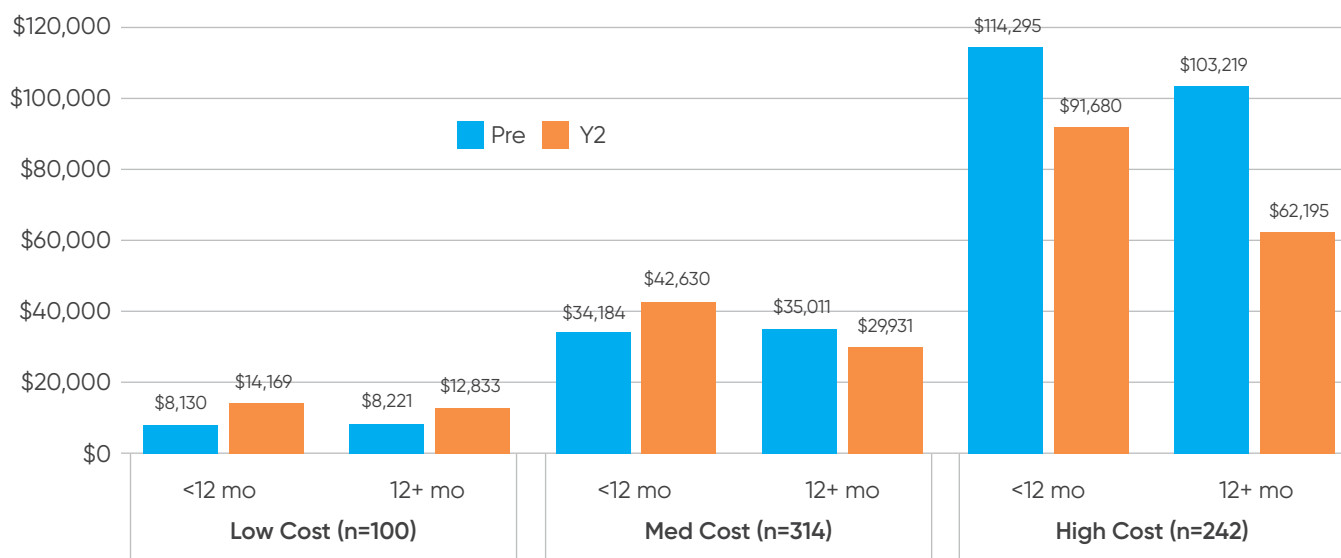


There are significant 6-month retention benefits for medium- and high-cost clients with chronic medical conditions. Although the effect for high-cost clients is reduced when adjusting for selection effects, it remains statistically significant.

**Table 81.** Retention and selection effects on average Year 1 Medicaid spending, clients with chronic medical conditions

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low cost	+\$529	-\$272	+\$801	\$8,200	+10%
Med cost	-\$9,378***	+\$466	-\$9,844***	\$34,776	-28%
High cost	-\$24,860***	-\$10,770	-\$14,090***	\$107,078	-13%

The same pattern was found for Year 2 costs and 12-month retention, except that low-cost clients who were retained experienced a slightly lesser increase in costs than clients who were not retained.

**Figure 53.** Average Year 2 Medicaid spending by pre-period spending and 12-month retention, clients with chronic medical conditions

There are significant 12-month retention benefits for medium- and high-cost clients with chronic medical conditions, and a nearly significant benefit for low-cost clients. After adjusting for selection effects (which were significant for high-cost clients and nearly significant for low-cost clients) the effects for the low-cost clients were no longer significant, but they persisted for the medium- and high-cost clients. The results for medium-cost and high-cost clients are also stronger for 12-months than for 6-months. There was a strong effect for low- and medium-cost clients with chronic medical conditions than for their counterparts among clients overall, although the effect for high-cost clients with chronic medical conditions was slightly weaker.

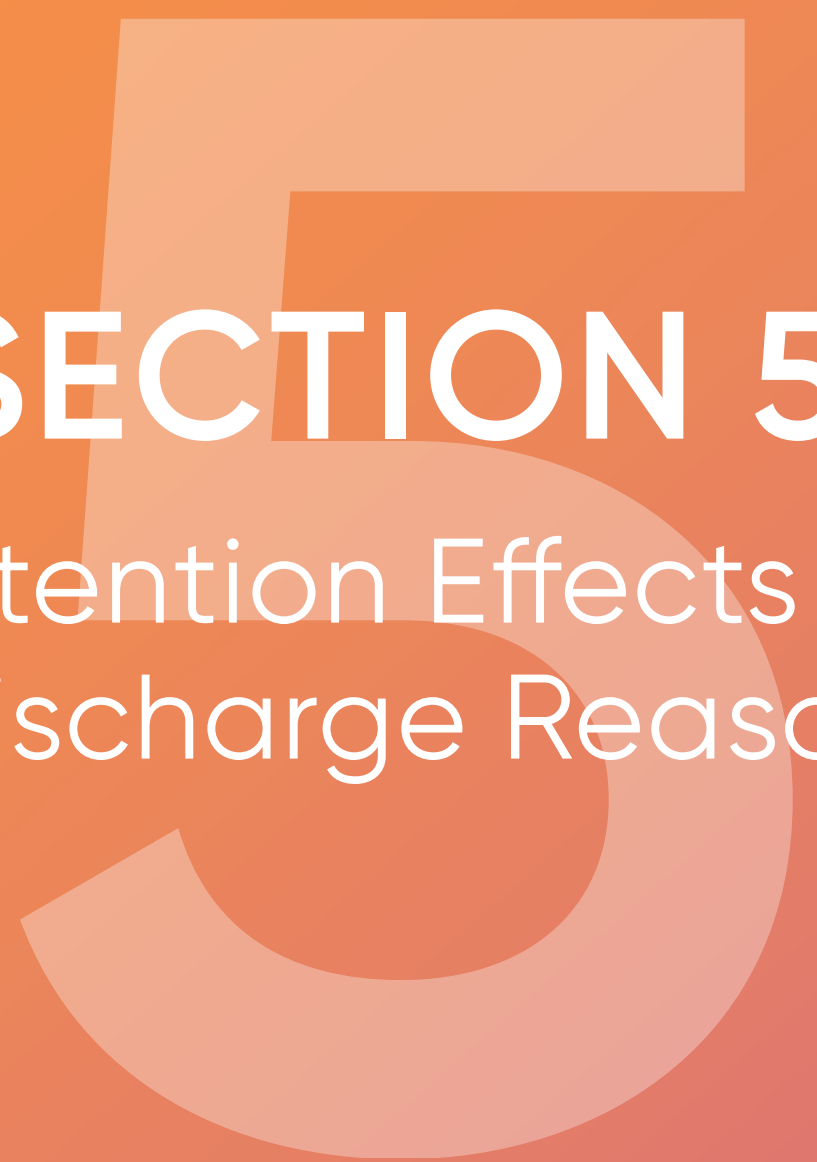
**Table 82.** Retention and selection effects on average Year 2 Medicaid spending, clients with chronic medical conditions

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Low cost	-\$1,336†	+\$91†	-\$1,427	\$8,629	-17%
Med cost	-\$12,699***	+\$827	-\$13,526***	\$34,900	-39%
High cost	\$29,485***	-\$11,076*	-\$18,409***	\$104,013	-18%

## CLIENTS WITH CHRONIC MEDICAL CONDITIONS SUMMARY

Clients with chronic medical conditions demonstrated 6-month proportional retention effects similar to the full population for inpatient days, but 12-month effects greater than the full group (though the net effect was not significant for high utilizers after accounting for selection). For ED visits, medium utilizers demonstrated retention effects larger than those of the full group for both 6- and 12-month retention; high utilizers showed a small reversed effect for 6 months but a similar effect for 12. For both 6- and 12-month retention, Medicaid spending retention effects were weaker for high-cost clients than their counterparts overall, but greater for low-cost (12-month only) and medium-cost (both periods) clients.





# SECTION 5:

## Retention Effects by Discharge Reason

# Retention Effects by Discharge Reason

The analyses given in the first section of this report demonstrate that length of stay is not random. While the question of interest is whether longer stays result in less post-period resource use, it is also true that clients with lower pre-period resource use tend to have longer stays. Therefore, throughout most of the report, results are broken out by levels of pre-period resource use.

Similarly, it seemed likely that reason for discharge (see Appendix E), which is related to length of time retained in the program (see Table 4), would also be related to patterns of utilization and spending before and after MRT-SH enrollment. Unfortunately, sample sizes for each identified type of discharge were too small to break out by both retention and pre-period resource use at the same time. However, the question remains – if people are discharged earlier from supportive housing and have poorer post-period outcomes, do the poorer outcomes occur because of the early discharge, or because they were not good candidates for supportive housing to begin with – not currently capable of maintaining an independent living situation without destabilizing? And if people who are retained longer have better post-period outcomes, do the better outcomes occur because they received services longer, or because they were better positioned at program entry to benefit from supportive housing? Looking at different types of discharges is another strategy to account for some of the potential impact of unmeasured personal characteristics that may be driving both retention and post-period outcomes. If retention effects persist across all groups of discharged clients, this further supports that we are observing “true” retention effects.

The chart below shows reasons for discharge by pre-period spending level, which is a measure of overall (as opposed to setting-specific) pre-period resource use. As might be expected, the percentage of clients discharged from MRT-SH to a lower level of care is highest among the low pre-period spenders and lowest among the high spenders. The reverse is true for discharge to a higher level of care. Interestingly, those with medium levels of pre-period spending are the most likely to be discharged due to reasons associated with personal instability.

**Table 83.** Reasons for discharge by pre-period Medicaid spending

	Low spend clients (n=1,030)	Medium-spend clients (n=1,096)	High-spend clients (n=577)
Lower level of care (n=359)	16.4%	13.5%	7.3%
Higher level of care (n=191)	3.9%	8.0%	10.9%
Personal instability (n=184)	4.9%	8.9%	6.4%
Other reason/unknown (n=1,970)	74.8%	69.6%	75.4%

As expected, clients who were discharged due to some sort of instability had higher average pre-period inpatient days, but interestingly, they also experienced the largest drop in inpatient days in Year 1 (-42%) and maintained the lower rate in Year 2. Clients discharged to a lower level of care also experienced a pronounced post-period decrease (-65%) in inpatient days, while those discharged to a higher level of care had minimal changes.

**Table 84.** Average inpatient days by reason for discharge, all clients

	Pre	Year 1	Year 2	
Lower level of care (n=359)	11.9	4.2	4.9	† Ns for the Year 2 data are “lower level of care” = 263, “higher level of care” = 145, and “personal instability” = 120
Higher level of care (n=191)	18.7	19.9	18.3	
Personal instability (n=184)	25.0	14.4	15.1	

Even within type of discharge, however, there were differences by retention in the percentage reduction in inpatient days. For clients discharged to a lower level of care, the 6–12- and 12+-month clients had larger Year 1 inpatient reductions than those discharged earlier (-72% and -65%, respectively, compared to -49%). However, it is important to note that the greater reduction was not due to longer-retained clients ending with fewer inpatient days than their peers, but due to them starting with more. This pattern may indicate that clients entering supportive housing with more inpatient days require more

time in programs before they are ready to move to a less restrictive setting.

For those discharged to a higher level of care, only the 12+-month clients experienced a reduction in Year 1, followed by a jump in Year 2 (e.g., possibly post-discharge) to a higher level than the pre-period. For the unstable clients, those retained for at least 12 months showed the greatest decrease in inpatient days (-57% versus -29% and -31% for the other groups).

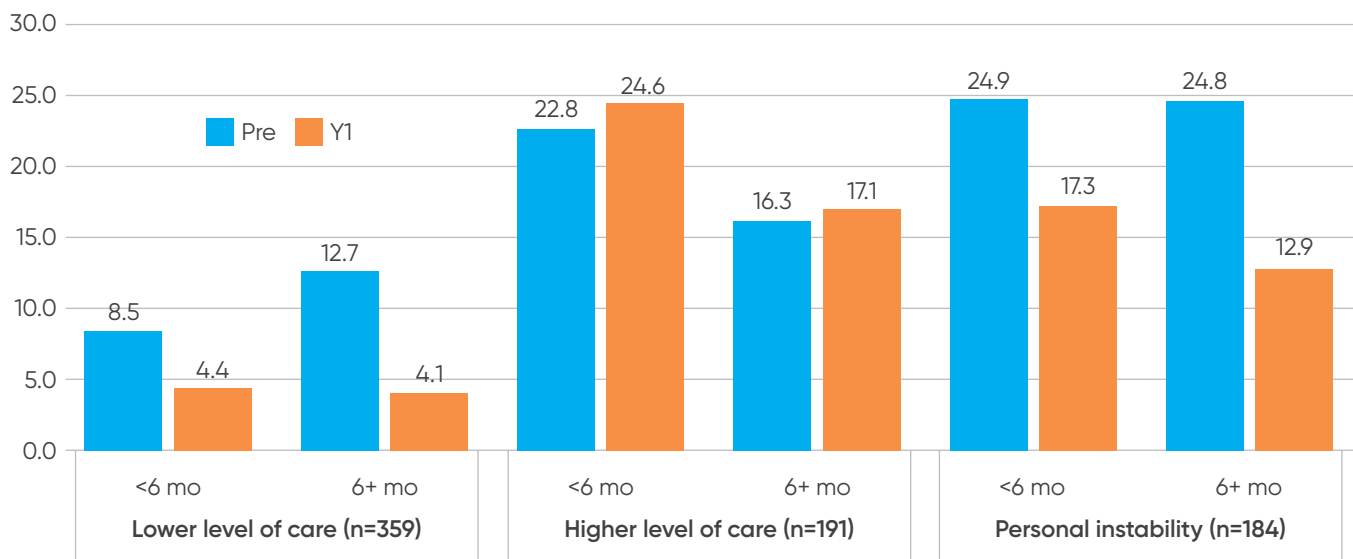
**Table 85.** Average inpatient days by months retained within reason for discharge, all clients

		Pre	Year 1	Year 2
Lower level of care	<6 months (n=72)	8.5	4.4	4.5
	6-12 months (n=121)	12.5	3.5	4.7
	12+ months (n=166)	12.9	4.5	5.1
Higher level of care	<6 months (n=71)	22.8	24.6	21.2
	6-12 months (n=60)	18.2	23.0	15.3
	12+ months (n=60)	14.4	11.2	17.5
Personal instability	<6 months (n=58)	24.9	17.3	14.1
	6-12 months (n=57)	17.6	12.4	20.6
	12+ months (n=69)	30.8	13.3	12.5

† Ns for the Year 2 data are "lower level of care" = 263, "higher level of care" = 145, and "personal instability" = 120

Within clients discharged to a lower level of care, those who were retained started with more inpatient use in the pre-period but ended with slightly less in Year 1. For those discharged to a higher level of care, both retained and non-retained clients experienced a pre-post increase in inpatient use, but there was slightly less of an increase for retained clients. Among those discharged due to reasons related to personal instability, both retained and non-retained clients experienced a pre-post decrease, but there was a larger decrease for retained than for non-retained clients.

**Figure 54.** Average Year 1 inpatient days by reason for discharge and 6-month retention, all clients

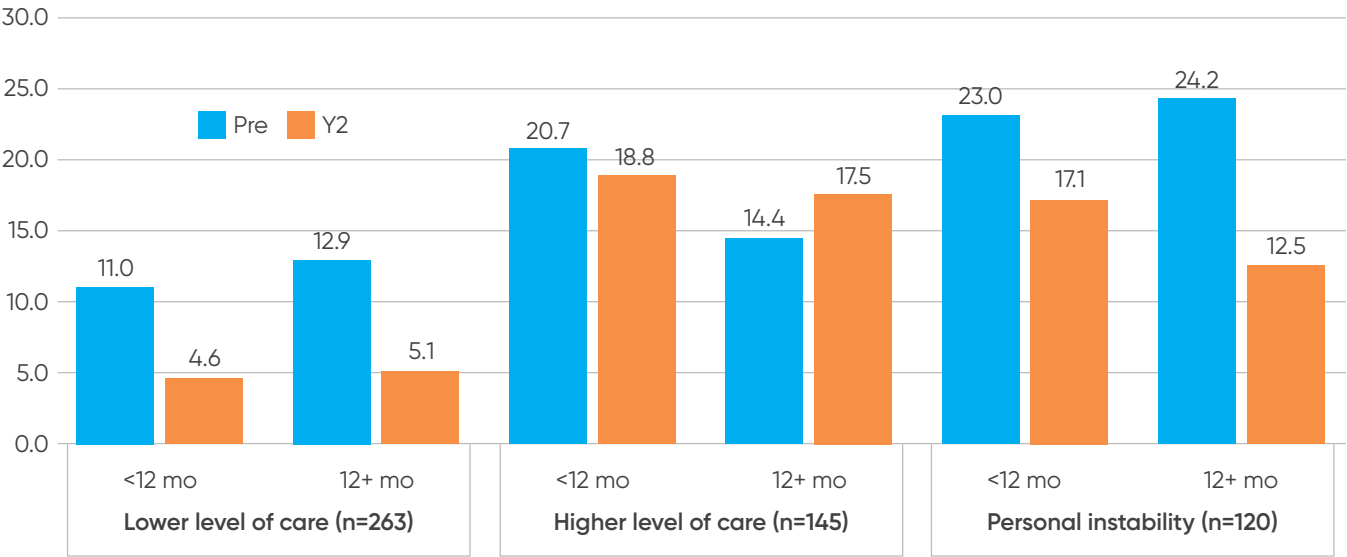


**Table 86.** Retention and selection effects on average Year 1 inpatient days, by reason for discharge

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Lower level of care	-0.3	+4.2†	-4.5***	11.9	-38%
Higher level of care	-7.5†	-6.5	-1.0	18.7	-5%
Personal instability	-4.4†	-0.1	-4.3	24.9	-17%

All groups experienced different pre-post patterns for Year 2 analyses. For clients discharged to a lower level of care, both retention groups experienced a decrease in inpatient days. For clients discharged to a higher level of care, those who were retained experienced an increase and those who were not retained experienced a decrease. For those discharged due to reasons of personal instability, both retention groups experienced a decrease, but those who were retained experienced a larger decrease.

Figure 55. Average Year 2 inpatient days by reason for discharge and 12-month retention, all clients



The unadjusted retention effects were not significant for any of the three discharge groups, but after accounting for the pre-period selection effect, the net retention effect for those discharged to a lower level of care was almost significant.

Table 87. Retention and selection effects on average Year 2 inpatient days, by reason for discharge

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Lower level of care	+0.5	+1.9†	-1.4†	11.8	-12%
Higher level of care	-1.3	-6.3	+5.0	18.9	+26%
Personal instability	-4.6	+1.2	-5.8	23.5	-25%

In sum, only clients discharged to a lower level of care seemed to be affected by either 6- or 12-month retention.

**ER visits.** Again, clients discharged due to instability had the highest pre-period ED usage, and those discharged to less restrictive settings had the lowest. All groups showed decreases in Year 1, but the unstable and lower level of care groups had larger decreases than those who went to a higher level of care (-33% and -28%, respectively, versus -11%).

Table 88. Average ED visits by reason for discharge, all clients

	Pre	Year 1	Year 2	
Lower level of care (n=359)	3.6	2.6	2.8	† Ns for the Year 2 data are "lower level of care" = 263, "higher level of care" = 145, and "personal instability" = 120
Higher level of care (n=191)	4.9	4.3	4.3	
Personal instability (n=184)	6.2	4.1	4.3	

For clients discharged to a lower level of care, the 6-12- and 12+-month clients had larger ED reductions in Year 1 than those discharged earlier (-30% and -33%, compared to -8%). For those discharged to a higher level of care, the 12+-month clients experienced the greatest reduction in Year 1 (-23%), but, as with inpatient days, this drop was followed by a jump

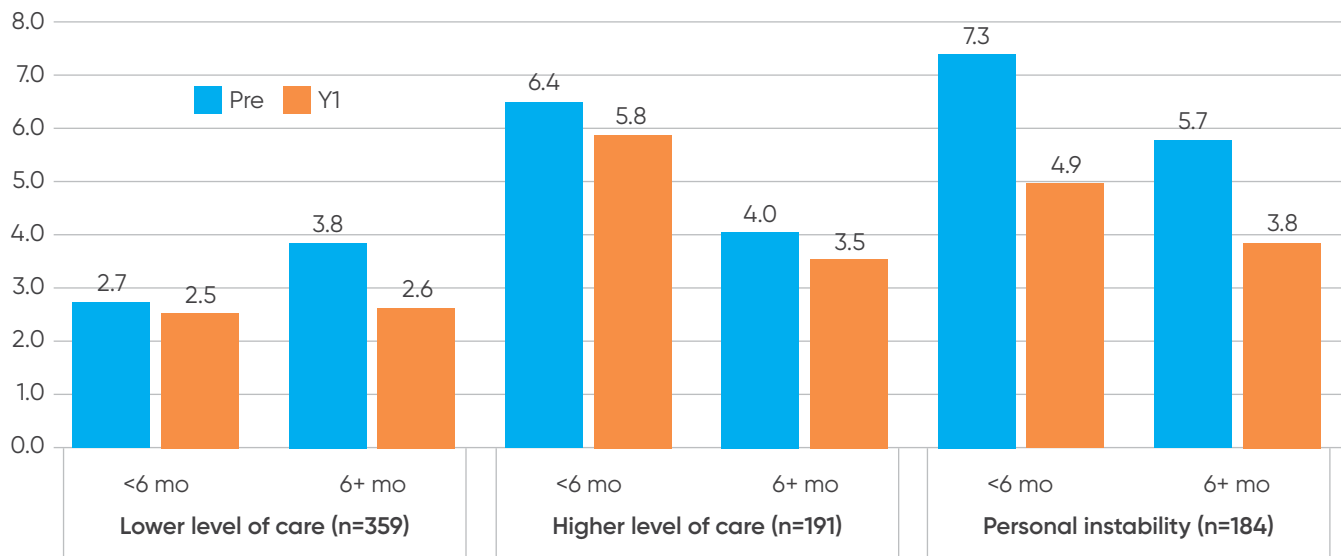
in Year 2 to a higher level than the pre-period. For the unstable clients, those retained for at least 12 months dropped the most in Year 1 (-38%), but those discharged within 6 months also had a larger drop than the 6-12-month group (-33% versus -28%).

**Table 89.** Average ED visits by months retained within reason for discharge, all clients

		Pre	Year 1	Year 2	
Lower level of care	<6 months (n=72)	2.7	2.5	2.6	† Ns for the Year 2 data are "lower level of care" = 263, "higher level of care" = 145, and "personal instability" = 120
	6-12 months (n=121)	3.8	2.6	3.0	
	12+ months (n=166)	3.8	2.6	2.7	
Higher level of care	<6 months (n=71)	6.4	5.8	4.8	
	6-12 months (n=60)	4.7	4.5	3.4	
	12+ months (n=60)	3.2	2.5	4.4	
Personal instability	<6 months (n=58)	7.3	4.9	4.8	
	6-12 months (n=57)	5.7	4.1	6.5	
	12+ months (n=69)	5.7	3.5	2.7	

Among clients discharged to a lower level of care, those who were retained for at least 6 months started out with substantially more ED visits in the pre-period but experienced a greater drop in Year 1 than clients who were not retained (although they still had slightly more Year 1 ED visits than their peers). Clients discharged to a higher level of care showed strong selection effects on retention, so while those discharged within 6 months had more Year 1 ED visits, they also had more in the pre-period. Finally, both retained and not retained clients discharged for reasons related to personal instability experienced substantial pre-post drops.

**Figure 56.** Average Year 1 ED visits by reason for discharge and 6-month retention, all clients

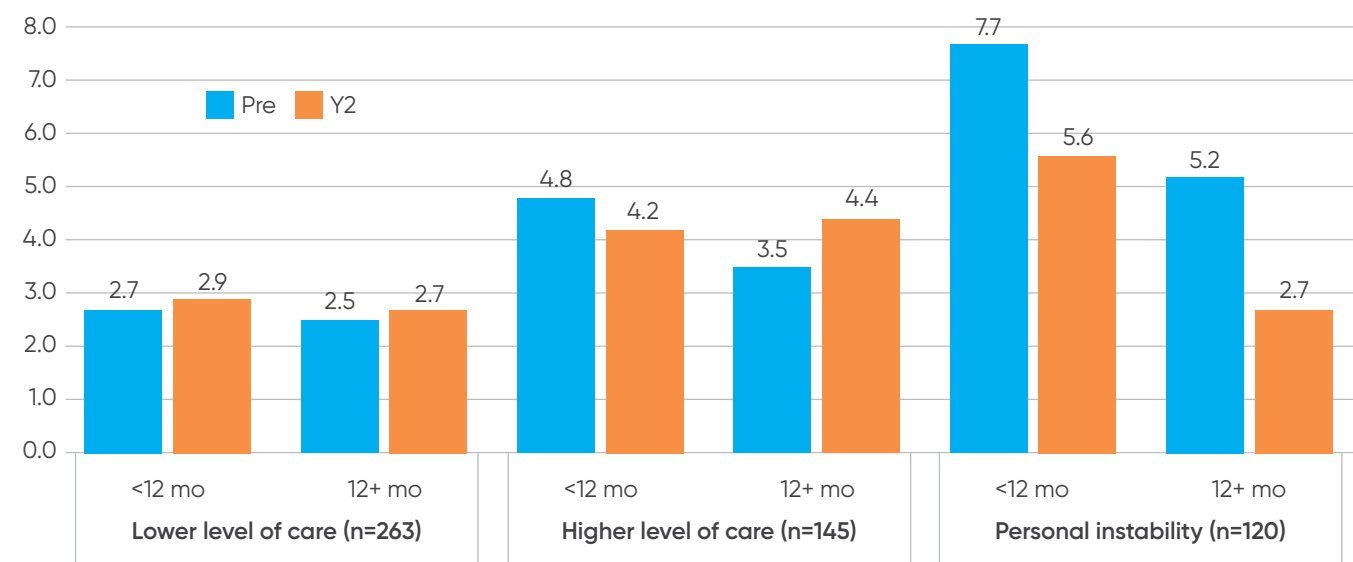


There were statistically significant net retention effects for all three discharge groups. For those discharged to a lower or a higher level of care, this result reflects greater pre-post decreases for clients who were retained for at least 6 months compared to those who were not. However, retained clients eventually discharged for reasons of personal instability showed less of a pre-post decrease than their non-retained counterparts.

**Table 90.** Retention and selection effects on average Year 2 inpatient days, by reason for discharge

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Lower level of care	+0.1	+1.1**	-1.0**	3.6	-28%
Higher level of care	-2.3*	-2.4*	+0.1*	4.9	-2%
Personal instability	-1.1†	-1.6	+0.5*	6.2	+8%

Clients discharged to a lower level of care had similar pre-period and Year 2 ED visits, regardless of retention. Clients discharged to a higher level of care had slightly higher Year 2 ED visits if they were retained versus not retained, despite starting with fewer in the pre-period. As with 6-month retention, both groups of clients discharged for reasons of personal instability had substantial pre-post decreases.

**Figure 57.** Average Year 2 ED visits by reason for discharge and 12-month retention, all clients

There were no statistically significant 12-month retention effects for any of the discharge categories. In fact, among those discharged to a higher or a lower level of care, the retained clients had a somewhat greater pre-post increase in ED visits than the non-retained clients.

**Table 91.** Retention and selection effects on average Year 2 ED visits, by reasons for discharge

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Lower level of care	-0.2	-0.4	+0.2	3.6	+6%
Higher level of care	+0.2	-1.3†	+1.5	4.3	+35%
Personal instability	-2.9	-2.5	-0.4	6.6	-6%

**Medicaid spending.** Clients discharged to a higher level of care had the highest pre-period spending, while those discharged to less restrictive settings had the lowest. Those discharged to a higher level of care also had an increase in spending into Year 1, while the other clients had decreases.

**Table 92.** Average Medicaid spending by reason for discharge, all clients

	Pre	Year 1	Year 2	
Lower level of care (n=359)	\$29,805	\$22,359	\$24,930	† Ns for the Year 2 data are "lower level of care" = 263, "higher level of care" = 145, and "personal instability" = 120
Higher level of care (n=191)	\$53,635	\$57,049	\$55,387	
Personal instability (n=184)	\$43,001	\$33,582	\$35,518	

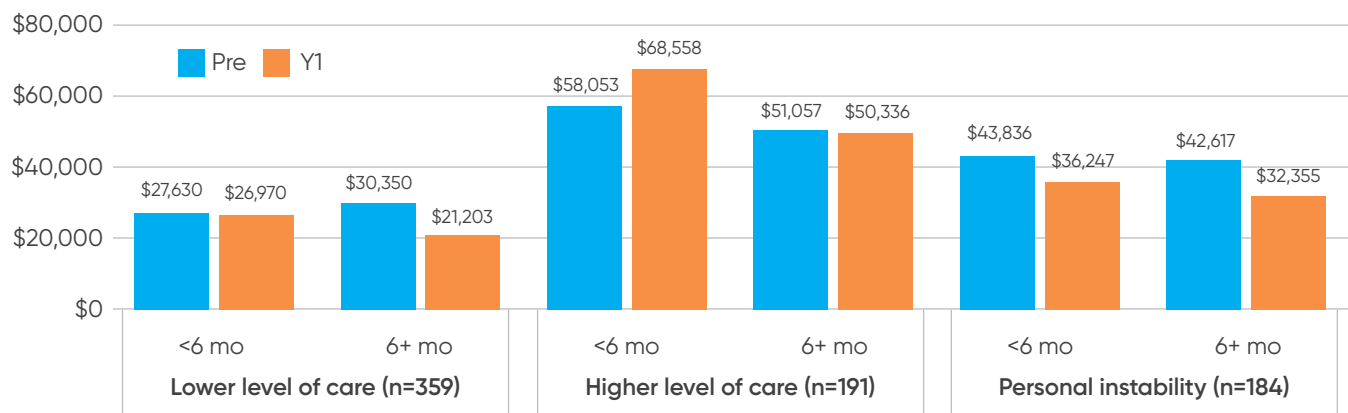
For clients discharged to a lower level of care, the 6-12 and 12+-month clients had the largest spending reductions in Year 1 compared to those discharged earlier (both -30%, compared to -2%), and ended up at lower spending levels even though they started higher. For those discharged to a higher level of care, the 6-12- and 12+-month clients experienced extremely slight reductions into Year 1 (-2% and -0.6%, respectively), but those discharged within 6 months experienced an increase of 18%. For the unstable clients, those retained for at least 12 months dropped the most in Year 1 (-31%), but also started with the highest spending. Those discharged in 6-12 months started with the lowest spending.

**Table 93.** Average Medicaid spending by months retained within reason for discharge, all clients

		Pre	Year 1	Year 2	
Lower level of care	<6 months (n=72)	\$27,630	\$26,970	\$30,782	† Ns for the Year 2 data are "lower level of care" = 263, "higher level of care" = 145, and "personal instability" = 120
	6-12 months (n=121)	\$28,598	\$20,007	\$20,478	
	12+ months (n=166)	\$31,627	\$22,074	\$25,021	
Higher level of care	<6 months (n=71)	\$58,053	\$68,558	\$65,142	
	6-12 months (n=60)	\$54,089	\$52,976	\$50,720	
	12+ months (n=60)	\$48,026	\$47,695	\$49,125	
Personal instability	<6 months (n=58)	\$43,836	\$36,247	\$40,219	
	6-12 months (n=57)	\$33,927	\$29,760	\$41,848	
	12+ months (n=69)	\$49,795	\$34,498	\$28,621	

Within the group discharged to a higher level of care, there was a stark and statistically significant difference in Year 1 Medicaid spending between those who were retained for at least 6 months and those who were not. The non-retained clients in this group started out with a higher level of spending in the pre-period but also showed a substantial spending increase in Year 1, while the retained group had a very slight decrease. The retention effect for this group appears to take the form of preventing increased spending (probably by delaying entry into more expensive care) rather than lowering spending. Within the other discharge groups, there was only modest variation in Year 1 spending by retention.

**Figure 58.** Average Year 1 Medicaid spending by reason for discharge and 6-month retention, all clients



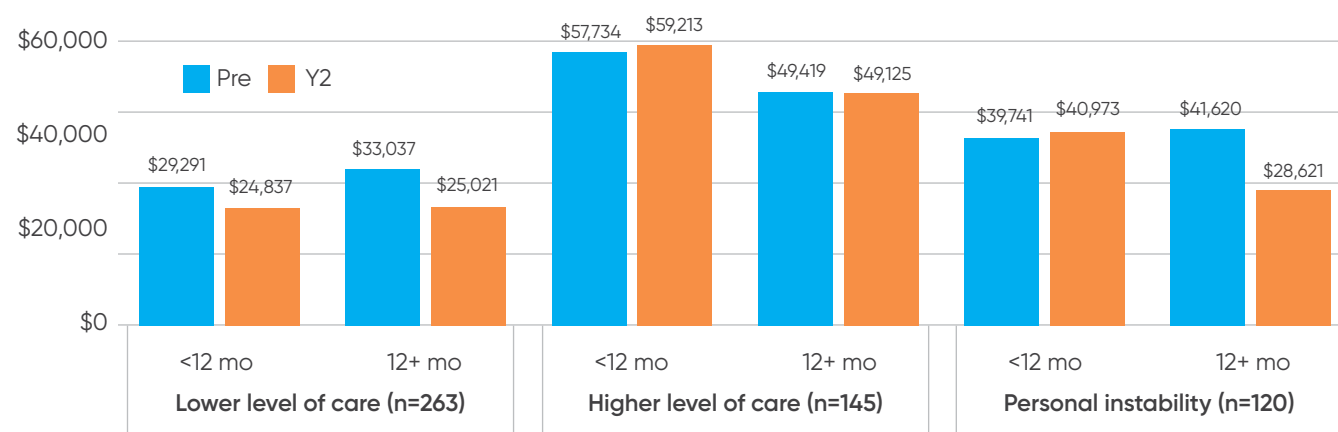
Among clients discharged to a lower level of care, the unadjusted retention effect of -\$5,767 was not statistically significant, but the net retention effect of -\$8,487 approached statistical significance. Clients discharged to a higher level of care had an unadjusted retention effect of -\$18,222, which was statistically significant, but also started with spending that was \$6,996 lower in the pre-period (an almost-significant selection effect). After this adjustment, however, these clients still had significantly lower spending if retained.

**Table 94.** Retention and selection effects on average Year 1 Medicaid spending, by reasons for discharge

	Y1 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Lower level of care	-\$5,767	+\$2,720	-\$8,487†	\$29,805	-28%
Higher level of care	-\$18,222***	-\$6,996†	-\$11,226*	\$53,635	-21%
Personal instability	-\$3,892	-\$1,219	-\$2,673	\$43,001	-6%

Year 2 spending was lower for clients with instability-related discharges if they were retained for at least 12 months, despite their pre-period spending being substantially higher than their non-retained peers. Clients discharged to a lower level of care had little difference by retention in their Year 2 spending (although the retained clients experienced a larger drop from pre-period levels). Neither retention group experienced much pre-post change within clients discharged to a higher level of care.

**Figure 59.** Average Year 2 Medicaid spending by reason for discharge and 12-month retention, all clients



None of the discharge categories showed a significant unadjusted retention benefit, although the effect for clients discharged to a higher level of care was close to statistical significance. However, this group started with lower pre-period spending among retained clients compared to non-retained, which accounted for most of the effect. In contrast, the clients discharged for reasons of personal instability started with higher pre-period spending if they were retained for 12 months; when this difference was accounted, for their net retention effect became statistically significant.

**Table 95.** Retention and selection effects on average Year 2 Medicaid spending, by reasons for discharge

	Y2 Retention benefit	Pre-period selection effect	Net retention effect	Base pre-period value	Proportional retention effect
Lower level of care	+\$184	+\$3,746	-\$3,562	\$31,185	-11%
Higher level of care	-\$10,088†	-\$8,315	-\$1,773	\$54,580	-3%
Personal instability	-\$12,352	+\$1,879	-\$14,231*	\$40,571	-35%



## DISCHARGE REASON SUMMARY

It was interesting to note that among the clients discharged to a lower level of care, those discharged within 6 months of enrollment had fewer inpatient days and ED visits in the pre-period than those discharged after 6 months. It is likely that these were clients with lower healthcare needs who did not need supportive housing to begin with and were soon discharged to a more appropriate placement. Only clients discharged to a lower level of care showed significant retention effects on the number of inpatient days experienced; this effect was greater for Year 1 than Year 2 analyses. Both clients discharged to lower and higher levels of care showed significant 6-month retention effects, but no 12-month effects were found. Finally, clients discharged to lower and higher levels of care showed significant 6-month retention effects on spending, but only unstable clients showed 12-month retention effects on spending.

Of particular interest are those discharges which are most likely to be preventable – those related to personal instability on the part of the client. These clients tended to come in with higher pre-period resource use than other clients and were also more likely to be discharged within 6 months. As clients with particularly complex sociobehavioral needs they represent a key subgroup with which programs might especially be able to intervene. Generally, these clients experienced fewer statistically significant net retention effects than clients discharged for other reasons, but they were also the smallest group. They experienced the most robust 12-month retention effect on Year 2 spending, while experiencing little 6-month retention effect on Year 1 spending, perhaps highlighting the importance of retaining these clients for at least a year. Their retention effects on inpatient days were not statistically significant but were as large or larger in raw numbers than for the other groups – among those clients discharged for reasons related to personal instability, those who were retained for at least 6 months had 4.3 fewer inpatient days than those not retained, while those who were retained for at least 12 months had 5.8 fewer inpatient days than those not retained. Finally, this group of clients had higher Year 1 ED visits if retained for at least 6 months, but this may have been a function of more ED use preventing inpatient use. They were also the only discharge category who had lower Year 2 ED visits if retained for at least a year. Retaining these clients may be challenging for programs, but there appears to be substantial benefit to being able to do so.



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# SECTION 6:

## Summary of Findings

## Summary of Findings

Generally, clients who were retained longer showed greater post-period decreases in utilization and spending. This pattern held especially among the higher pre-period service utilizers or higher-cost clients, and sometimes extended to the medium utilizers as well. There was evidence of a 6-month and/or 12-month retention effect for at least one resource-use subgroup for inpatient days, ED visits, Medicaid spending, and housing stability.

### OVERALL

- There was both a 6-month and 12-month retention effect on decreased inpatient days among clients across all levels of pre-period resource use.
- There was also evidence of a 12-month retention effect on decreased ED visits among clients with medium and high levels of ED use, and a 6-month retention effect for all levels of pre-period utilization. Results for different categories of potentially preventable ED visits are given in Appendix A.
- There was a clear selection effect for Medicaid spending, wherein clients with higher pre-period spending tended to remain in the program for less time than their peers. However, there were still significant 6- and 12-month retention effects related to spending for both medium- and high-cost clients.
- Twelve-month retention effects are clearly larger than 6-month effects for inpatient use among medium pre-period users, for ED use among high pre-period users, and for Medicaid spending among pre-period medium- and high-cost clients.
- Clients with low levels of pre-period primary care use had significantly fewer Year 2 primary care visits if retained for at least 12 months.

### BY PROGRAM TYPE

- There were several robust retention effects, net of selection, among clients in services and subsidies programs, especially those who were medium or high resource users in the pre-period. Medium- and high-using clients had significant fewer Year 1 inpatient days if retained for 6 months, and significantly fewer ED visits and lower spending associated with both 6-month and 12-month retention. Among the low-utilizing clients, there was a nearly significant effect of both 6-month and 12-month retention on inpatient days, and a significant 6-month retention effect on ED visits.
- Retention effects for clients in services-only programs existed only among medium-utilizing clients for inpatient days (a nearly significant effect for 6-month retention and a significant effect for 12-month retention) and for spending (a significant effect for 12-month retention only).
- There were no significant retention effects for clients in housing-only programs, for whom only 12-month retention could be analyzed due to the very small numbers retained for less than 6 months. While the net retention effects on ED visits and spending for this group were very small, there was a sizable effect on inpatient days, which may have been statistically non-significant primarily due to the relatively small size of this sample.

### BY DIAGNOSIS

- For the behavioral health population (those with severe mental illness and/or substance abuse disorders), there were 6- and/or 12-month retention effects evident for inpatient days, ED visits, and overall Medicaid spending. This pattern was most pronounced among the high and medium utilizers.
- For the HIV-positive population, more of the results were dwarfed by selection effects. The only statistically significant results were fewer Year 2 inpatient days for medium-cost clients and higher Year 2 costs for low-cost clients who were retained for 12 months (although there were some additional effects that were close to statistical significance). One hypothesis regarding the higher spending for retained low-cost clients is that these clients are receiving more antiretroviral medications, which would represent a positive outcome.

- For clients with other selected chronic medical conditions, there were dosage effects found for inpatient days, ED visits (especially in Year 2), and costs, but primarily among clients with medium and high baseline levels of these metrics. These effects persisted even after accounting for selection effects.

## BY DISCHARGE REASON

- After selection effects, clients discharged to a lower level of care had significantly fewer inpatient days if retained for 6 months (the effect for 12-month retention was not quite significant).
- All three discharge groups had significantly fewer ED visits if retained for 6 months (but no significant results for 12 months).
- Clients discharged to a higher level of care had significantly less Year 1 spending if retained for 6 months (and there was a nearly significant effect for clients discharged to a higher level of care); clients discharged for reasons related to personal instability had significantly less Year 2 spending if retained for at least 12 months.

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# SECTION 7:

## Policy Implications

## Policy Implications

One of the original goals for this report was to understand the implications of using an intent-to-treat approach in potentially underestimating “true” program effects, as it necessarily includes clients who have not received a meaningful dose of the intended intervention. The following table (derived from Tables 4, 7, and 10) highlights what client outcomes look like at various levels of retention versus the client population overall (including those discharged soon after enrollment). **It is clear that for each group, the overall findings are attenuated compared to the findings for clients retained in an MRT-SH program for at least 12 months. It is also clear that discharge before 6 months – while associated with much less pre-post change than being retained for at least 12 months – is nonetheless associated with some level of pre-post decrease for inpatient and ED use**, implying that any amount of time spent in MRT-SH confers at least some benefit on clients compared to their pre-enrollment use of care. Spending, in contrast, appears to be minimally affected by fewer than 6 months in the program.

**Table 105.** Comparison of pre-post changes, “intent to treat” methodology versus by dosage

Pre vs. Post Y1 (n=3,649)	Overall Change (Intent to Treat)		Change By Length of Stay (Retention Effects)		
Inpatient Days	-3.7 days	-38%	<6 months (n=482)	-3.2 days	-21%
			6-12 months (n=573)	-2.2 days	-21%
			12+ months (n=2,594)	-4.2 days	-48%
ER Visits	-0.7 visits	-23%	<6 months (n=482)	-0.7 visits	-16%
			6-12 months (n=573)	-0.7 visits	-22%
			12+ months (n=2,594)	-0.8 visits	-29%
Medicaid Cost	-\$5,522	-15%	<6 months (n=482)	-\$2,078	-4%
			6-12 months (n=573)	-\$3,061	-8%
			12+ months (n=2,594)	-\$6,773	-19%

Another implication of the data in the table above is that – particularly for Medicaid spending and inpatient days – 12 months of retention seems to produce a much larger benefit than even 6-12 months of retention. This difference is particularly true of inpatient days, where there is no difference in the pre-post change between clients retained fewer than 6 months and those retained 6-12 months. **Across all programs and clients, maximum program benefit is associated with retention for at least one year post-enrollment**, although net of selection effects the results vary by pre-period resource use. In the more detailed analyses, 12-month retention effects are clearly larger than 6-month effects for inpatient use among medium pre-period users, for ED use among high pre-period users, and for Medicaid spending among pre-period medium- and high-cost clients. Given the additional benefits of 12- versus 6-month retention for some clients and outcomes, 12 months should be considered “full dosage” and represent a benchmark to which programs should aspire.

Clearly, though, there are limitations to how much effect programs can have on client retention while still respecting the principles of client choice and self-direction that underlie supportive housing initiatives. Clients cannot and should not be forced or coerced to stay in programs that are not meeting their needs. **However, programs should plan to track retention, particularly 12-month retention, among their clients, and attempt to determine risk factors associated with avoidable or undesirable client attrition (as opposed to clients being discharged because they no longer need services)**. This data can facilitate a longer-term goal of identifying potentially preventable discharges – often, but not exclusively, those due to reasons of personal instability – and introducing programmatic changes that target clients’ unmet needs before discharge occurs.

A key conundrum faced by MRT-SH programs is that the same clients who seem to derive the most benefit from retention (i.e., those with higher levels of pre-period resource use) are also those clients who are at greatest risk of attrition. **While this confound presents a challenge for program management, it also highlights the tremendous potential for improving program outcomes by increasing retention.** For example, an average program would have to retain almost 43 low-cost clients for 12 months to realize the same cost savings as retaining a single high-cost client (i.e., the 12-month net retention effect for a high-cost client in dollars [-\$22,128] is nearly 43 times the 12-month net retention effect for a low-cost client [-\$516]). Additionally, there are other specific groups of clients who appear to derive greater benefit from retention. Clients in services and subsidies programs have greater retention effects than clients in programs that offer only services or only

housing. Clients discharged to a lower level of care (who probably represent the optimal outcome of MRT-SH) have more significant retention effects than clients discharged for other reasons.

It is difficult to judge retention effects by diagnosis. The patterns seem fairly similar for clients with behavioral health conditions (SMI or SUD) and chronic medical conditions. Clients with HIV have markedly different effects. However, this finding is difficult to interpret for several reasons. Clients with HIV represent the smallest diagnostic group of clients, and a majority are enrolled in a services-only program. Furthermore, those clients with HIV and low pre-period spending may be medically underserved and not receiving optimal medical care for their condition (which includes an expensive antiretroviral medication regimen). For these clients specifically, the increased medical spending associated with retention may represent a positive outcome, as it may indicate receipt of diagnosis-appropriate care. This hypothesis is supported by the fact that other cost analyses have found pre-post spending increases among clients in HIV-focused programs specifically for pharmacy claims.

It should be noted that despite a general trend towards greater effects for 12-month retention, these results vary widely by outcome, pre-period resource use, and client sub-group. For example, 12-month retention seems to be optimal for reducing ED use and spending, but 6-month retention appears somewhat more effective for reducing inpatient use.

It should also be noted that the comparison of effects across different groups can vary according to a research versus a policy perspective. From a research perspective – determining the relative impact of different tenures in the program between groups – the key metric is the proportional reduction in services and spending relative to the baseline level. From this point of view, medium utilizers generally experience greater retention benefits than high utilizers because their resource use decreases more as a percentage of baseline. This difference is most striking for inpatient use, where, for example, 6-month retention is associated with an effect that is 83% of the base pre-period value among medium utilizers, but only 21% of the base pre-period value among high utilizers.

However, from a policy perspective, the key metric is more likely to be the change in services and spending in raw numbers. By this metric, high utilizers generally experience greater retention benefits than medium utilizers – for example, 6-month retention is associated with a reduction of 9.1 inpatient days for high utilizers, but only 4 inpatient days for medium utilizers. From the policy perspective of conserving resources, programs would thus need to retain two medium-utilizing clients to achieve the same impact of reduced inpatient days as retaining one high-utilizing client.

From a practical standpoint, the best way for programs to understand and apply these findings is to look particularly at those results that apply to their program in terms of program type and client characteristics. This information is probably of greater use from a program management standpoint than understanding the different patterns for all subgroups of clients. Within their populations of interest, this report can provide important guidance about which clients are at greatest risk for attrition and what the relative benefits of achieving 6- or 12-month retention will be for different kinds of clients. These results, in concert with the program-specific information in Appendix C, can be used as a stepping-stone for program-level monitoring of retention, including the establishment of attainable benchmarks and targeting of retention initiatives to particular clients in order to maximize program-level impacts.

# APPENDIX A:

## Retention and Potentially Preventable ED Use



# Appendix A: Potentially Preventable ED Use

There are several different approaches to examining preventable ED use.

## ED USE FOR ROUTINE CONDITIONS

One is an analysis of ED use for routine conditions. There are 10 categories of conditions identified by Excellus Health<sup>5</sup> as constituting a high percentage of emergency department use for non-emergency conditions. These include headaches, ear infections, sinus infections, sore throats, back and neck problems, digestive problems (nausea, diarrhea and constipation), abdominal pain, urinary tract infections, bumps and bruises, joint pain, and sprains and strains.

**Table A1.** Average ED visits for routine conditions by months in MRT-SH, All Clients

	All clients			2-year post clients		
	Pre	Year 1	Pct. Chg.	Pre	Year 2	Pct Chg.
<6	0.91	0.67	-26%	0.95	0.58	-39%
6-12	0.57	0.41	-28%	0.61	0.44	-28%
12+	0.54	0.38	-30%	0.55	0.35	-36%

## POTENTIALLY AVOIDABLE ED VISITS

Another approach, used by researchers at NYU<sup>6</sup>, aims to categorize diagnoses according to the estimated percentage of ED visits for that condition that could have been avoided either: because they were non-emergent; because they could have been treated by a primary care doctor; or because they were avoidable if the patient had received adequate preventive care. The NYU team later created categories for ED visits that were potentially preventable on the basis of being related to drug or alcohol use, a mental health crisis, or an injury.

The analysis below assigns a condition to a particular category if the original research estimated it fell into that category at least 51% of the time. It is important to understand that not all of the ED visits in the "non-emergent" category, for example, were necessarily non-emergent, but were for conditions that are non-emergent more than half the time (e.g., ear infections, dermatitis, sunburn, osteoarthritis).

**Table A2.** Average potentially preventable ED visits by months in MRT-SH, All Clients

		All clients			2-year post clients		
		Pre	Year 1	Pct. Chg.	Pre	Year 2	Pct Chg.
Potentially avoidable	<6	0.17	0.13	-24%	0.16	0.18	+13%
	6-12	0.19	0.14	-26%	0.17	0.22	+29%
	12+	0.16	0.12	-25%	0.14	0.14	--
Potentially PC-treatable	<6	0.57	0.56	-2%	0.61	0.54	-11%
	6-12	0.43	0.37	-14%	0.45	0.45	--
	12+	0.43	0.35	-19%	0.44	0.34	-23%
Potentially non-emergent	<6	0.95	0.72	-23%	0.99	0.69	-30%
	6-12	0.61	0.45	-26%	0.67	0.52	-22%
		0.54	0.41	-24%	0.54	0.40	-26%

<sup>5</sup> <https://www.excellusbcbs.com/wps/wcm/connect/341d4367-74bd-48ef-b980-bffd2006ba44/ER+infographic-EX+FINAL+4-6-16.pdf?MOD=AJPERES&CACHEID=341d4367-74bd-48ef-b980-bffd2006ba44%20%20>

<sup>6</sup> <http://www.ajmc.com/journals/issue/2014/2014-vol20-n4/emergency-department-visit-classification-using-the-nyu-algorithm>

**Table A3.** Average ED visits for selected causes by months in MRT-SH, All Clients

		All clients			2-year post clients		
		Pre	Year 1	Pct. Chg.	Pre	Year 2	Pct Chg.
Alcohol-related ED use	<6	0.25	0.32	+28%	0.22	0.43	+95%
	6-12	0.27	0.22	-22%	0.26	0.34	+31%
	12+	0.28	0.12	-57%	0.16	0.09	-44%
Drug-related ED use	<6	0.14	0.11	-21%	0.14	0.07	-50%
	6-12	0.15	0.07	-53%	0.15	0.10	-33%
	12+	0.06	0.04	-33%	0.05	0.03	-40%
Psychiatric-related ED use	<6	0.47	0.35	-26%	0.33	0.35	+6%
	6-12	0.32	0.24	-25%	0.36	0.31	-14%
	12+	0.23	0.14	-39%	0.23	0.20	-13%
Injury-related ED use	<6	0.45	0.35	-22%	0.40	0.16	-60%
	6-12	0.39	0.28	-28%	0.37	0.14	-62%
	12+	0.30	0.24	-20%	0.30	0.12	-60%

**Summary.** Although not shown, significance testing was performed for unadjusted retention effects, selection effects, and net selection effects consistent with the body of the report. Net of selection there were no statistically significant retention effects for routine ED visits (Table A1) or potentially preventable ED visits (Table A2), although there was a nearly significant 6-month retention effect for potentially non-emergent ED visits ( $p<0.10$ ). There were, however, significant 6-month and 12-month retention effects for alcohol-related ED visits ( $p<0.05$ ), a 12-month retention effect for drug-related ED visits ( $p<0.05$ ), and a 6-month retention effect for psychiatric-related ED visits ( $p<0.01$ ).

# APPENDIX B:

## Retention and Inpatient and ED Use for Housing-Sensitive Conditions

# Appendix B: Retention and Housing-Sensitive Conditions

Housing-sensitive conditions are those often associated with living in environments not intended for habitation or in congregate living situations such as homeless shelters. Certain types of infections fall into this category (e.g., pneumonia, acute respiratory infections, cellulitis), as well as environmental injuries such as heat- or cold-related injuries or burns from unsafe heating sources.

There was not a statistically significant retention effect on inpatient days for housing-sensitive conditions, but the retention effect for ED visits for housing-sensitive conditions was nearly statistically significant ( $p<0.10$ ).

**Table B1.** Average inpatient days and ED visits for housing-sensitive conditions by months retained, all clients

		Pre	Year 1	Pct. Chg.
Inpatient days	<6 (n=482)	0.071	0.073	+3%
	6-12 (n=573)	0.048	0.058	+21%
	12+ (n=2,594)	0.040	0.031	-23%
ED visits	<6 (n=482)	0.20	0.23	+15%
	6-12 (n=573)	0.20	0.12	-40%
	12+ (n=2,594)	0.15	0.11	-27%



A large, stylized, light orange letter 'C' graphic that serves as a background for the title text.

# APPENDIX C:

## Retention Effects by Program

## Appendix C: Retention Effects By Program

To be included in the program-specific findings, presented as an appendix, programs had to have sufficient variation in the length of time participants were enrolled. This required the exclusion of program-specific findings for the AIDS Institute Pilot Program, the Housing and Community Renewal (HCR) projects, the Eviction Prevention for Vulnerable Adults program, the OMH Rental Subsidies – Brooklyn program, the OPWDD Expansion program, and the Nursing Home to Independent Living (NHIL) program. However, clients from all programs were included in the cross-program analyses.

**Table C1. Percent Retained by Program**

	Pre	Year 1	Pct. Chg.
Office of Temporary and Disability Assistance (OTDA): Homeless Senior & Disabled Pilot	0%	17%	83%
Office of Mental Health: Rental Subsidy Statewide (OMH-RSS)	19%	14%	68%
Office for Alcohol and Substance Abuse Services: Rental Subsidy (OASAS-RS)	15%	18%	66%
AIDS Institute: Services Only program	29%	28%	43%
AIDS Institute: Services and Subsidies program	17%	14%	69%
Office of Health Insurance Programs: Health Home Supportive Housing Pilot (HHSHP)	11%	29%	60%
Office of Health Insurance Programs: Senior Supportive Housing Pilot (SSHP)	13%	19%	68%

Although not shown, significance testing was performed for unadjusted retention effects, selection effects, and net selection effects consistent with the body of the report. Net of selection, the only statistically significant retention effect for inpatient days was that of 12-month retention in the AIDS Institute services-only program ( $p < 0.05$ ). *It should be noted that the relatively small sample sizes within many individual programs make statistical significance difficult to establish.*

**Table C2. Pre-post change in inpatient days by program and retention**

MRT-SH Program		#	Pre Inpt Days	Year 1 Inpt	Pct Chg	#	Pre Inpt Days	Year 2 Inpt Days	Pct Chg
OMH- RSS	<6	87	14.8	9.2	-38%	63	13.6	6.6	-51%
	6-12	63	15.4	12.5	-19%	42	15.8	9.1	-42%
	12+	317	12.2	4.7	-61%	257	12.0	6.1	-50%
OASAS-RS	<6	68	33.2	25.0	-25%	50	33.7	13.9	-59%
	6-12	81	24.5	13.0	-47%	48	15.6	16.0	+2%
	12+	292	26.5	10.0	-62%	215	24.5	9.1	-63%
Homeless Senior and Disabled Pilot	<6	--	--	--	--	--	--	--	--
	6-12	33	4.5	6.3	+40%	22	3.1	5.4	+74%
	12+	164	1.7	2.3	+35%	42	2.8	3.3	+18%
AIDS Institute - Services only	<6	182	13.1	9.5	-28%	147	11.6	10.4	-10%
	6-12	174	6.2	5.7	-7%	136	6.2	9.0	+46%
	12+	266	8.5	4.3	-49%	246	8.2	4.1	-50%
AIDS Institute - Services & Subsidies	<6	24	7.0	10.4	+48%	16	6.9	5.4	-22%
	6-12	20	6.1	10.8	+79%	12	6.0	10.5	+75%
	12+	100	3.1	5.3	+72%	56	3.2	6.1	+94%
OHIP: HHSHP	<6	36	19.3	18.9	-2%	14	--	--	--
	6-12	91	14.3	9.0	-37%	43	13.4	8.3	-38%
	12+	190	14.0	6.2	-56%	90	14.0	5.0	-64%
OHIP: SSHP	<6	48	1.4	3.4	+150%	7	--	--	--
	6-12	70	2.4	3.6	+53%	8	--	--	--
		252	1.7	2.4	+45%	212	1.6	2.5	+52%

There were several program-level retention effects on ED visits that were statistically significant after accounting for selection (analyses not shown). There were significant 6-month retention and 12-month retention effects for OASAS clients ( $p < 0.001$  &  $p < 0.01$ , respectively); a 6-month retention effect for NHIL clients ( $p < 0.05$ ); and a 12-month retention effect for HHSP clients ( $p < 0.05$ ).

**Table C3.** Pre-post change in ED visits by program and retention

MRTSH Program		Pre ED Visits	Year 1 ED		Pre ED Visits	Year 2 ED Visits	
OMH- RSS	<6	6.3	3.8	-40%	5.7	3.4	-40%
	6-12	4.1	3.6	-13%	4.0	3.9	-4%
	12+	3.5	2.8	-20%	3.7	3.1	-15%
OASAS-RS	<6	5.4	5.3	-3%	5.7	5.0	-12%
	6-12	5.6	4.0	-27%	5.5	4.6	-15%
	12+	5.2	2.9	-44%	5.4	2.9	-46%
Homeless Senior and Disabled Pilot	<6	--	--	--	--	--	--
	6-12	1.7	1.6	-6%	1.5	1.0	-33%
	12+	1.0	0.9	-10%	0.9	1.1	+22%
AIDS Institute - Services only	<6	3.1	2.6	-16%	3.0	2.9	0%
	6-12	1.9	1.6	-12%	2.1	1.9	-7%
	12+	2.5	1.9	-23%	2.6	2.0	-23%
AIDS Institute - Services & Subsidies	<6	6.8	6.6	-2%	2.9	2.9	+2%
	6-12	2.5	4.1	+64%	2.3	5.9	154%
	12+	3.1	2.8	-11%	3.4	2.6	-21%
OHIP: HHSHP	<6	6.6	5.2	-21%	--	--	--
	6-12	6.1	3.7	-39%	5.5	3.9	-29%
	12+	6.1	3.7	-40%	4.7	4.0	-16%
OHIP: SSHP	<6	1.0	0.8	-20%	--	--	--
	6-12	0.6	0.8	+23%	--	--	-44%
	12+	0.9	0.9	-2%	1.0	1.0	+2%

Note: See Table C2 for Ns

There were a few program-level retention effects on Medicaid spending that were statistically significant after accounting for selection (analyses not shown). There was a significant 6-month retention effect for OASAS clients ( $p < 0.05$ ), and a significant 12-month retention effect for Senior Supportive Housing clients ( $p < 0.01$ ). (The latter, however, was based on a very small number of clients with less than 12 months retention.) There was also a nearly significant 6-month retention effect for the OMH Rental Subsidies program ( $p < 0.10$ ).

**Table C4.** Pre-post change in Medicaid spending by program and retention

		Pre	Year 1	Pct Chg	Pre	Year 2	Pct Chg
OMH- RSS	<6	\$26,033	\$26,131	0%	\$27,085	\$26,457	-2%
	6-12	\$30,433	\$27,227	-11%	\$31,418	\$26,044	-17%
	12+	\$29,881	\$22,358	-25%	\$31,853	\$23,118	-27%
OASAS-RS	<6	\$32,980	\$30,941	-6%	\$34,065	\$27,360	-20%
	6-12	\$37,446	\$25,096	-33%	\$36,214	\$25,468	-30%
	12+	\$42,662	\$28,868	-32%	\$41,108	\$29,003	-29%
Homeless	<6	--	--	--	--	--	--
Senior and	6-12	\$23,269	\$22,203	-5%	\$22,811	\$24,089	+6%
Disabled Pilot	12+	\$20,802	\$24,692	+19%	\$19,568	\$22,424	+15%
AIDS Institute - Services only	<6	\$69,156	\$65,665	-5%	\$66,408	\$66,447	0%
	6-12	\$62,904	\$58,162	-8%	\$62,401	\$64,553	+3%
	12+	\$64,598	\$59,873	-7%	\$63,680	\$56,712	-11%
AIDS Institute - Services & Subsidies	<6	\$49,894	\$46,440	-7%	\$--	\$--	+15%
	6-12	\$29,566	\$42,693	+44%	\$--	\$39,473	+59%
	12+	\$38,281	\$44,488	+16%	\$36,247	\$46,586	+29%
OHIP: HHSHP	<6	\$33,638	\$29,021	-14%	\$29,946	\$20,458	-32%
	6-12	\$28,681	\$26,911	-6%	\$28,368	\$29,650	+5%
	12+	\$38,512	\$31,212	-19%	\$37,771	\$28,500	-25%
OHIP: SSHP	<6	\$25,411	\$29,825	+17%	\$23,201	\$69,065	+198%
	6-12	\$22,566	\$29,974	+33%	\$28,140	\$39,402	+40%
	12+	\$17,490	\$16,024	-8%	\$17,903	\$17,028	-5%

Note: See Table C2 for Ns



# APPENDIX D:

## Retention Effects by Demographic and Coverage Characteristics

# Appendix D: Retention Effects by Demographic and Coverage Characteristics

**Inpatient days.** At all levels of retention, men had more inpatient days than women. For those retained for at least 12 months, the decrease between the pre-period and Year 1 inpatient days was proportionally similar for both women and men (-46% and -50%, respectively). However, men had larger decreases at lower levels of retention: clients retained less than 6 months experienced a 15% decrease in inpatient days if they were women, but a 24% decrease in inpatient days if they were men. There was a similar pattern among those retained 6-12 months (-10% for women and -28% for men). Thus, females may show maximal program effects after 12 months of retention, while males show large effects after only 6 months.

For most groups of clients, Year 2 values were very similar to Year 1.

For most racial/ethnic groupings, pre-period utilization was similar for the 6-12 month and 12+-month retention groups. White, non-Hispanic clients showed a separation of the 12+-month group and were also the only group in which longer retention was associated with greater percentage decreases at each level. Among the other three groups, decreases were smallest for the 6-12-month group and higher for those with <6 or 12+ months in the program.

There was a very interesting interaction between age and retention. Among young adults, longer retention in the program was associated with greater proportional decreases between pre-period and Year 1 inpatient days. For middle-aged clients, being retained for at least 12 months was associated with the greatest decrease but being retained for 6-12 months was associated with the smallest decrease. And among older adults, who had the lowest pre-period values in all retention categories, the largest Year 1 decreases in inpatient days occurred among those retained for less than 6 months, while those retained for 12 months or more experienced an increase of 5% on average in their inpatient days. However, the older adult clients who were retained for less than 6 months had a large increase in Year 2, ending with a much higher Year 2 rate than their age-peers who were retained for longer. It should be noted that a large proportion of the older adults were enrolled in the Senior Supportive Housing pilot, which is a services-only preventive program where the program goal is to prevent an increase in costs rather than to achieve a reduction.



**Table D1.** Average inpatient days by months retained within sex, race/ethnicity, and age category

	Retention	Pre	Year 1	Year 2	Y1 – Pre	% Change
<b>Sex</b>						
Female	<6	12.7	10.8	10.6	-1.9	-15%
	6-12	8.4	7.6	7.3	-0.8	-10%
	12+	7.1	3.8	4.4	-3.3	-46%
Male	<6	17.2	13	9.7	-4.2	-24%
	6-12	12.4	9	11.2	-3.4	-28%
	12+	10.1	5.1	5.3	-5	-50%
<b>Race/Ethnicity</b>						
White, non-Hispanic	<6	14.0	12.5	8.2	-1.5	-11%
	6-12	15.8	10.4	9.1	-5.4	-34%
	12+	11.5	4.7	4.9	-6.8	-59%
Black, non-Hispanic	<6	18.5	13.7	14.8	-4.8	-26%
	6-12	8.5	7.9	10.6	-0.6	-7%
	12+	7.7	5.1	5.0	-2.6	-34%
Hispanic, any race	<6	12.6	10.4	7.7	-2.2	-18%
	6-12	7.4	6.2	7.8	-1.2	-17%
	12+	6.4	3.4	4.4	-3.0	-47%
Multiracial/Other	<6	13.4	6.1	4.1	-7.2	-54%
	6-12	6.7	7.7	11.0	1.0	14%
	12+	9.0	3.6	5.2	-5.3	-60%
<b>Age</b>						
Young Adult (<40)	<6	18.8	15.3	9.1	-3.5	-18%
	6-12	13.1	7.9	5.6	-5.2	-40%
	12+	12.7	4.0	5.1	-8.8	-69%
Midlife	<6	15.5	12.0	10.7	-3.5	-23%
	6-12	11.1	9.9	12.7	-1.2	-11%
	12+	9.4	5.1	5.5	-4.3	-46%
Older Adult (60+)	<6	7.5	6.0	9.3	-1.5	-20%
	6-12	6.4	5.5	4.3	-1.0	-15%
	12+	3.5	3.7	3.2	0.2	5%

**ED visits.** At all levels of retention, men and women had similar rates of pre-period ED visits. For those retained for at least 12 months, the decrease between the pre-period and Year 1 inpatient days was larger for men than for women (-35% versus -21%). However, women had larger decreases at lower levels of retention: clients retained less than 6 months experienced a 22% decrease in ED visits if they were women, but a 9% decrease in inpatient days if they were men. There was a similar but less dramatic pattern among those retained 6-12 months (-25% for women and -20% for men). For most groups of clients, Year 2 values were very similar to Year 1.

For most racial/ethnic groupings, pre-period utilization was highest for the <6-month group. Among Hispanic clients the 6-12-month group had the highest pre-period rate and also the largest decrease between the pre-period and Year 1. For all groups, the 12+-month group had the lowest pre-period ED use, but only for non-Hispanic whites was the decrease associated with 12-month retention substantially larger than the decrease experienced by groups retained for less time.

There was very little retention effect observed for older adults. Their decrease in ED visits between the pre-period and Year 1 was almost identical between the three retention groups. Young adults who were discharged earlier than 6 months had

high rates of pre-period ED use and stayed high in Years 1 and 2, despite a 25% decrease between the pre-period and Year 1. There was no consistent evidence of a retention effect among this age group either. Indeed, adults between the ages of 40 and 60 were the only group where a consistent dosage effect was observed, with little reduction among the <6-month group but a higher reduction in ED use among the groups retained for more than 6 months.

**Table D2.** Average ED visits by months retained within sex, race/ethnicity, and age category

	Retention	Pre	Year 1	Year 2	Y1 – Pre	% Change
<b>Sex</b>						
Female	<6	5.0	3.9	3.5	-1.1	-22%
	6-12	3.3	2.5	2.7	-0.8	-25%
	12+	2.8	2.2	2.1	-0.6	-21%
Male	<6	3.5	3.2	3.4	-0.3	-9%
	6-12	3.2	2.5	3.2	-0.6	-20%
	12+	2.8	1.8	1.8	-1.0	-35%
<b>Race/Ethnicity</b>						
White, non-Hispanic	<6	5.3	4.2	3.6	-1.0	-20%
	6-12	3.9	3.5	4.2	-0.4	-10%
	12+	3.3	2.2	2.3	-1.2	-35%
Black, non-Hispanic	<6	4.1	3.5	3.5	-0.6	-16%
	6-12	2.8	2.2	2.6	-0.6	-22%
	12+	2.7	2.2	2.0	-0.5	-20%
Hispanic, any race	<6	2.7	2.7	3.2	0.0	0%
	6-12	3.3	1.8	2.1	-1.5	-45%
	12+	2.4	1.6	1.5	-0.8	-33%
Multiracial/Other	<6	2.8	2.3	2.3	-0.5	-18%
	6-12	2.4	1.7	2.3	-0.7	-28%
	12+	2.3	1.6	1.7	-0.7	-31%
<b>Age</b>						
Young Adult (<40)	<6	5.7	4.3	4.5	-1.4	-25%
	6-12	3.5	2.9	2.9	-0.6	-16%
	12+	3.0	2.2	2.4	-0.8	-26%
Midlife	<6	4.2	3.8	3.3	-0.3	-8%
	6-12	3.8	2.8	3.1	-1.0	-27%
	12+	3.4	2.3	2.2	-1.1	-32%
Older Adult (60+)	<6	1.4	1.1	1.0	-0.3	-20%
	6-12	1.7	1.4	2.7	-0.3	-18%
	12+	1.4	1.1	1.0	-0.2	-18%

**Medicaid spending.** There was a consistent dosage effect observed for men in that the longer they were retained in the program the more their pre-period Medicaid spending was reduced by. For women this effect was not consistent – although women who were retained for at least 12 months had the largest reduction in Medicaid spending, those retained between 6 and 12 months had very little reduction (much less than those retained for less than 6 months).

Both non-Hispanic white and Hispanic clients show a consistent dosage effect, with the pre-post reduction in Medicaid spending becoming larger as they are retained longer. Among non-Hispanic black clients and those who are multiracial or another race the greatest reductions in spending occur among clients who have been in the program for the longest or the shortest amount of time, with minimal effects for those retained 6-12 months.

Both young adults and those ages 40–60 show consistent dosage effects, with the Year 1 drop in Medicaid spending substantially higher for those retained for at least 12 months. In contrast, older adults have changed little in their Medicaid spending between the pre-period and Year 1, regardless of their time retained.

**Table D3.** Average Medicaid spending by months retained within sex, race/ethnicity, and age category

	Retention	Pre	Year 1	Year 2	Y1 – Pre	% Change
<b>Sex</b>						
Female	<6	\$43,588	\$39,419	\$48,667	\$(4,169)	-10%
	6–12	\$36,611	\$35,651	\$37,176	\$(960)	-3%
	12+	\$31,553	\$26,787	\$25,718	\$(4,766)	-15%
Male	<6	\$49,721	\$49,359	\$46,098	\$(362)	-1%
	6–12	\$43,584	\$38,853	\$48,363	\$(4,731)	-11%
	12+	\$38,193	\$29,646	\$30,601	\$(8,547)	-22%
<b>Race/Ethnicity</b>						
White, non-Hispanic	<6	\$38,066	\$37,700	\$36,276	\$(366.0)	-1%
	6–12	\$38,367	\$31,730	\$38,377	\$(6,636)	-17%
	12+	\$35,812	\$25,088	\$24,620	\$(10,723)	-30%
Black, non-Hispanic	<6	\$57,511	\$54,281	\$59,430	\$(3,230)	-6%
	6–12	\$39,400	\$39,644	\$47,799	\$245	1%
	12+	\$34,800	\$30,430	\$30,130	\$(4,371)	-13%
Hispanic, any race	<6	\$51,521	\$49,837	\$52,369	\$(1,685)	-3%
	6–12	\$47,670	\$43,480	\$42,674	\$(4,190)	-9%
	12+	\$35,035	\$29,928	\$30,335	\$(5,107)	-15%
Multiracial/Other	<6	\$35,738	\$28,009	\$30,946	\$(7,729)	-22%
	6–12	\$33,816	\$33,342	\$43,699	\$(473)	-1%
	12+	\$32,820	\$24,664	\$27,417	\$(8,156)	-25%
<b>Age</b>						
Young Adult (<40)	<6	\$39,421	\$33,716	\$32,086	\$(5,704.7)	-14%
	6–12	\$32,668	\$27,042	\$30,570	\$(5,625.6)	-17%
	12+	\$36,329	\$25,404	\$23,811	\$(10,925.2)	-30%
Midlife	<6	\$51,092	\$49,710	\$53,318	\$(1,382.3)	-3%
	6–12	\$48,483	\$44,635	\$51,906	\$(3,847.8)	-8%
	12+	\$38,750	\$30,681	\$32,835	\$(8,069.1)	-21%
Older Adult (60+)	<6	\$48,353	\$50,879	\$57,658	\$2,525.4	5%
	6–12	\$32,373	\$34,264	\$34,390	\$1,890.6	6%
	12+	\$26,057	\$25,742	\$22,162	\$(314.2)	-1%

**Summary.** There were differences in retention effects by sex, race/ethnicity, and age. While 12-month retention was more important to reducing inpatient days for women than for men, retention was more important for men in reducing ED visits. Dosage also had larger effects on overall Medicaid spending for men than for women. Dosage effects were most consistent across outcomes for non-Hispanic white clients. In other racial/ethnic groups, the clients retained both the shortest and longest amounts of time often had greater reductions in utilization and spending than those retained for 6–12 months. There was very little evidence of dosage effects for older adults.

## BY COVERAGE CHARACTERISTICS

**Inpatient days.** For clients with or without managed care participation in the pre-period, retention of at least 12 months was associated with the largest Year 1 decrease in inpatient days (-48% for both groups). For clients who had not participated in a managed care plan in the pre-period, those discharged within 6 months showed the smallest decrease (-7%). In contrast, for clients who did participate in managed care, those retained 6-12 months showed the smallest decrease (-15%).

For clients with or without Health Home participation in the pre-period, retention of at least 12 months was associated with the largest Year 1 decrease in inpatient days (-38% for clients with no Health Home participation and -54% with clients with at least some Health Home participation). Clients with Health Home participation had larger decreases in inpatient days at every level of retention, but only at the 12+-month level was the difference substantial. For both groups of clients, there was very little difference between being retained for less than 6 months and being retained for 6-12 months.

There were minimal differences in retention effects between clients with dual Medicare eligibility and those without. Both groups of clients experienced little difference between being retained for <6 or 6-12 months, but a substantially greater decrease in inpatient days when retained for at least 12 months.

**Table D4.** Average inpatient days by months retained by coverage characteristics in pre-period

	Retention	Pre	Year 1	Year 2	Y1 – Pre	Pct Chg
Not managed care	<6	14.1	13.1	10.6	-1.0	-7%
	6-12	12.0	7.9	7.6	-4.1	-34%
	12+	6.9	3.6	4.7	-3.3	-48%
Managed Care	<6	15.6	11.6	9.9	-3.9	-25%
	6-12	10.1	8.5	10.2	-1.5	-15%
	12+	9.4	4.9	4.9	-4.6	-48%
Not Health Home	<6	15.3	12.4	8.9	-2.9	-19%
	6-12	9.9	8.0	11.8	-2.0	-20%
	12+	6.5	4.0	4.1	-2.5	-38%
Health Home	<6	15.1	11.8	10.7	-3.3	-22%
	6-12	11.0	8.6	8.6	-2.4	-22%
	12+	10.6	4.9	5.5	-5.7	-54%
Not dual eligible	<6	16.5	13.2	10.4	-3.3	-20%
	6-12	10.8	8.5	10.4	-2.3	-22%
	12+	9.2	4.7	4.9	-4.5	-49%
Dual eligible	<6	10.0	7.5	8.8	-2.6	-26%
	6-12	10.0	8.0	5.4	-2.0	-20%
		7.0	3.9	4.7	-3.1	-44%

**ED visits.** While clients with and without managed care participation had similar reductions in ED visits between the pre-period and Year 1, the effects of longer retention appeared more pronounced for those in managed care during the pre-period.

There were very different patterns by retention between clients who were in a Health Home during the pre-period and those who were not. For those not enrolled in a Health Home at any point during their pre-period, there was little reduction in ED visits in Year 1 except for those who were retained for at least 12 months. In contrast, all of the Health Home clients appeared to have substantial reductions in ED visits during their first year after MRT-SH enrollment, although the reductions were larger for those retained for longer.

There was a clear dosage effect among clients who were not dually eligible for Medicare, but for those who were there was actually a larger reduction in ED visits among those who were retained for the least amount of time. It is not clear why this would be the case.

**Table D5.** Average ED visits by months retained by coverage characteristics in pre-period

	Retention	Pre	Year 1	Year 2	Y1 – Pre	Pct Chg
Not managed care	<6	3.4	2.8	3.1	-0.6	-18%
	6-12	2.0	1.8	3.1	-0.2	-11%
	12+	1.8	1.4	1.4	-0.4	-22%
Managed Care	<6	4.5	3.8	3.6	-0.7	-15%
	6-12	3.7	2.8	2.9	-0.9	-25%
	12+	3.3	2.3	2.2	-1.0	-30%
Not Health Home	<6	3.2	3.1	3.4	-0.2	-6%
	6-12	2.2	2.1	1.8	-0.1	-5%
	12+	1.9	1.4	1.6	-0.4	-22%
Health Home	<6	4.8	3.8	3.5	-0.9	-20%
	6-12	3.9	2.8	3.5	-1.1	-28%
	12+	3.7	2.5	2.3	-1.2	-32%
Not dual eligible	<6	4.5	3.9	3.9	-0.5	-12%
	6-12	3.6	2.8	3.2	-0.8	-21%
	12+	3.1	2.2	2.2	-1.0	-31%
Dual eligible	<6	3.2	2.0	1.4	-1.2	-38%
	6-12	2.0	1.4	1.8	-0.6	-30%
	12+	1.7	1.4	1.4	-0.3	-18%

**Medicaid spending.** Clients with and without managed care participation both experienced consistent dosage effects, with 12-month retention being particularly impactful. The 12-month retention effect appeared to be somewhat stronger for clients with managed care participation, however.

Clients with and without Health Home participation experienced a substantial effect of 12-month retention on their Medicaid spending, while only those with Health Home participation appeared to receive any benefit from being retained 6-12 months.

Similarly, clients who were dually eligible for Medicare and those who were not both experienced a substantial 12-month retention effect, but this was more substantial for the dually eligible clients than for the others (a reduction of 28% between the pre-period and Year 1, compared to 17% for those were not dually eligible).

**Table D6.** Average ED visits by months retained by coverage characteristics in pre-period

	Retention	Pre	Year 1	Year 2	Y1 – Pre	Pct Chg
Not managed care	<6	\$42,402	\$43,863	\$34,849	\$1,461	3%
	6-12	\$37,978	\$33,519	\$39,619	\$(4,459)	-12%
	12+	\$35,438	\$23,019	\$24,456	\$(12,419)	-35%
Managed Care	<6	\$48,557	\$45,236	\$51,318	\$(3,321)	-7%
	6-12	\$41,455	\$38,927	\$44,930	\$(2,528)	-6%
	12+	\$34,920	\$30,594	\$30,091	\$(4,327)	-12%
Not Health Home	<6	\$40,923	\$39,370	\$41,023	\$(1,553)	-4%
	6-12	\$31,603	\$32,930	\$41,036	\$1,327	4%
	12+	\$30,896	\$24,092	\$23,904	\$(6,804)	-22%
Health Home	<6	\$50,549	\$48,158	\$50,137	\$(2,390)	-5%
	6-12	\$45,896	\$40,171	\$44,721	\$(5,725)	-12%
	12+	\$38,832	\$32,088	\$32,409	\$(6,744)	-17%
Not dual eligible	<6	\$48,844	\$47,472	\$50,767	\$1,373	-3%
	6-12	\$42,088	\$38,938	\$45,950	\$(3,150)	-7%
	12+	\$35,981	\$29,895	\$30,268	\$(6,086)	-17%
Dual eligible	<6	\$39,656	\$34,850	\$30,936	\$(4,806)	-12%
	6-12	\$34,955	\$32,206	\$32,351	\$(2,750)	-8%
		\$32,042	\$22,967	\$21,924	\$(9,076)	-28%

**Summary.** The effects of dosage and retention on utilization and spending varied by client coverage characteristics. Clients who were enrolled in managed care at some point during their pre-period had similar 12-month retention effects to other clients but experienced a more pronounced dosage effect on ED visits than their peers, as well as a more pronounced effect of 12-month retention in particular on their Year 1 Medicaid spending. Twelve-month retention was associated with a greater reduction in inpatient days among Health Home clients, but Health Home clients had more reduction in ED visits at lower dosages compared to their peers (i.e., 12-month retention was more critical for clients who were not in Health Homes). Health Home clients experienced a modest benefit of 6-12-month retention on spending, while other clients did not. Clients who were dually eligible for Medicare did not differ from other clients in the effects of retention on inpatient days. For ED visits, higher dosages were actually associated with lesser Year 1 reductions for dual eligible, while this was not the case with other clients. There was a greater 12-month effect on Medicaid spending for dually eligible clients than for their peers.



# APPENDIX E:

Classification of Housing End Reason (non-OMH programs) or Post-Discharge Living Situation (OMH programs)

# Appendix E: Classification of Housing End Reason (non-OMH programs) or Post-Discharge Living Situation (OMH programs)

## LESS RESTRICTIVE SETTING/LOWER LEVEL OF CARE

- Private residence alone
- Private residence with spouse or domestic partner
- Private residence with parent, child, or other family
- Family reunification
- No longer in need
- Less restrictive setting

## MORE RESTRICTIVE SETTING/HIGHER LEVEL OF CARE

- Member moved/returned to more restrictive/supervised housing
- Member no longer appropriate for housing due to health reasons
- Member hospitalized
- Voluntary operated MH Supported Housing (Supported Housing or Supported SRO)
- Voluntary operated MH Apartment Treatment Program
- Voluntary operated MH Congregate Treatment Program (CR)
- State operated residential program (RCCA, community residence, TPP, TLR, CPP)
- Inpatient, general hospital or private psychiatric center
- Inpatient, State psychiatric center
- Residential Treatment Facility
- DOH Adult Home
- Nursing Home

## PERSONAL INSTABILITY

- Member demonstrates disruptive or uncooperative behavior
- Member incarcerated
- Member abandoned apartment unit with no contact during the last 30 days.
- Member evicted by housing provider
- Homeless shelter or emergency housing
- State prison
- Local jail
- Homeless-street, parks
- Homeless-drop in center or other undomiciled

## NOT CLASSIFIED

- Unknown
- Blank
- Other
- No longer interested
- Deceased
- Member admitted and remained in a residential SUD treatment program for more than 90 days
- Drug or alcohol abuse residence or inpatient setting
- Moved out of area
- Member moved out of country
- Member dissatisfied with housing program
- No longer Medicaid eligible
- Court ruling
- Member has a new CIN

Medicaid Redesign Team Supportive Housing Evaluation:

# **Effects of 6- and 12-Month Program Retention on Client Outcomes**

**SEPTEMBER 2019**



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