



Care Compass Network

DSRIP Project Evaluations Summary Results

Summary Analysis– March 2021

Population Health Team
3-19-2021

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Introduction

This document is an executive summary of CCN’s DSRIP project evaluation. The purpose is to summarize project evaluation findings in the areas of clinical and partner impact and the financial impact of the project activities. This information will serve as an input into CCN’s program continuation decisions. Please note that other factors will also affect continuation decisions, including alignment with CCN’s strategic plan, alignment with performance-based contracting, as well as budgetary considerations.

DSRIP Project Evaluation

Table 1 presents the project scores developed through project evaluation of the 11 projects listed below. CCN Population Health conducted project evaluations by accessing information gathered from four primary sources: CCN partners who participated in the project, Medicaid members and community members who participate in the periodic online panel (“RMS Panel”), CCN project managers, and quantitative analysis conducted by CCN Population Health. Refer to the individual project white papers for more information on the analysis, scoring, and individual project results.

Table 1: Summary Clinical and Partner Impact Assessment – Overall Results

Project	Project Name	Project Evaluation Score	Project Evaluation Impact	Rating
3ai M1	Integrating PC & BH – Model 1	85.0	High	Green
2biv	Care Transitions	82.3	High	Green
2ci	Community Navigation	81.6	High	Green
4aiii	Strengthening MHSA	79.0	Medium	Green
3ai M2	Integrating PC & MH – Model 2	78.6	Medium	Green
3bi	CVD Self-Management	73.7	Medium	Yellow
3gi	Palliative Care	67.4	Medium	Yellow
2bvii	INTERACT	60.8	Low	Red
3aii	Crisis Stabilization	56.6	Low	Red
2di	PAM Surveys	52.0	Low	Red
4bii	COPD Self-Management	44.5	Low	Red

Description of Table 1:

Project Evaluation Score: Accounts for both Quantitative and Qualitative analysis. Quantitative Analysis includes Regression Analysis, Causal Effect Analysis and Cost Effectiveness Analysis. Qualitative Analysis includes Feedback from PMO, Partners, Patient Panel and RPU.

Project Evaluation Impact: Refers to current and potential to impact patients and overall health outcomes.

Table 2: Project Engagement and Expenditure

Project	Total Cost Incurred	# Total Services Provided	# Unique Members Engaged	#Partners Engaged	Average Expenditure Per Service	Average Expenditure Per Member	Average Expenditure Per Partner
2biv	\$4,103,075	80,465	32,134	15	\$50.99	\$127.69	\$273,538.33
2bvii	\$2,119,827	10,164	2,514	17	\$208.56	\$843.21	\$124,695.71
2ci	\$8,544,670	219,641	103,768	65	\$38.90	\$82.34	\$131,456.46
2di	\$291,750	29,175	27,486	47	\$10.00	\$10.61	\$6,207.45
3ai M1	\$2,899,220	142,695	57,600	15	\$20.32	\$50.33	\$193,281.34
3ai M2	\$258,991	4424	3456	5	\$58.54	\$74.94	\$51,798.20
3aii	\$691,435	5,148	1,558	12	\$134.31	\$443.80	\$57,619.58
3bi	\$2,835,684	23,439	5,885	14	\$120.98	\$481.85	\$202,548.86
3gi	\$1,477,684	7,218	2,822	9	\$204.72	\$523.63	\$164,187.11
4bii	\$61,119	3,277	1,582	4	\$18.65	\$38.63	\$15,279.75
4aiii	\$780,212	43,833	22,748	26	\$17.80	\$34.30	\$30,008.15

Description of Table 2:

- Time Period: DSRIP period: 2015 to 2020
- Average Expenditure Per Service: Total Cost Incurred/Total Services Provided
- Average Expenditure Per Member: Total Cost Incurred/Total Unique Members Engaged
- Average Expenditure Per Partner: Total Cost Incurred/Total Partners Engaged

Estimated Project Impact and Estimated Change in Expenses/Savings due to Avoided Utilization

The following tables present the estimated impact on Potentially Preventable ED Visits (PPV) PPV rates, hospital admissions, and primary care utilization as well as the economic value of that impact. Universally, but to varying extents, the projects were designed to reduce unnecessary use of emergency care and need for hospitalization by creating new opportunities for care delivery and/or supporting patient engagement in community-based care and primary care.

Using data from CCN’s MY5 attributed population, we compared PPV, hospitalization, and primary care utilization rates before and after project engagement. The rates reflect the percentages of MY5 attributed members engaged in projects between July 2017 and June 2018 with utilization preceding and/or succeeding engagement in the project. Statistically significant differences are noted with * (10% significance (modest)), ** (5% (medium)), or *** (1% significance (high)). Using both the direction of change and the statistical significance of the change as inputs, we created a Red/Yellow/Green rating to summarize the impact.

Estimated Change in Expenses/Savings due to Avoided Utilization of the projects is also presented in the tables. Net Savings per Project dollar is an estimate of the savings due to avoided utilization that resulted from the project, net of CCN project costs. Net Savings is expressed as a dollar figure per dollar spent on the project. The inputs into include estimated avoided utilization due the project (PPV, hospitalization, and primary care utilization), the system savings associated with that impact, DSRIP Year 4 project

engagement, and DSRIP 4 project variable costs. Savings to the system are based on average charges: an average charge of \$1,389 for an ED visit encounter¹, an average charge of \$2,877 per inpatient day multiplied by 4.6 days i.e., the average number of days of hospitalization in NY state², and an average charge of \$78 for a primary care encounter³. The project variable costs reflect CCN's per-service reimbursement rates to partners participating in the projects. CCN's fixed costs and early infrastructure investments were largely completed by DSRIP Year 4; by this point, the projects were fully implemented. Net Savings is calculated to compare the service-related variable costs of the project to the service-related value of avoided utilization (using charges as the cost factor). Excluding fixed costs from the analysis is appropriate in order to make a more direct comparison of service-related variable costs between the project and their health impact. Including fixed costs may unduly weight the analysis against the projects since the fixed cost savings related to ED visits, hospitalizations and primary care utilization are not directly reflected in the service charges. We analyzed each project independently and assume the results are independent. While there was overlap in patient engagement across the projects, it was relatively minor. We do not anticipate that overlap in project engagement causes cross-contamination of results.

The final table (Table 7) in this section presents summary ratings and total net savings related to the project, which summarize the impact across PPV, hospitalization, and primary care utilization.

Table 3: Estimated Impact on PPV and Estimated Change in Expenses/ Savings due to Avoided PPV

This table presents the estimated impact on Potentially Preventable ED Visits (PPV) as well as the economic value of that impact. Using data from CCN's MY5 attributed population, we compared PPV rates before and after project engagement which occurred between July 2017 and June 2018. The rates reflect the percentages of MY5 attributed members engaged in projects between July 2017 and June 2018 with a PPV preceding and/or succeeding engagement in the project. The intended effect is to observe a reduction in rates of PPV after project engagement compared to before. Using both the direction of change in PPV and the statistical significance of the change as input, a Red/Yellow/Green rating summarized the impact (Impact Rating in the table below).

Estimated Change in Expenses/Savings due to avoided PPV is derived by multiplying avoided PPV with the average cost of ED visit. Avoided PPV is calculated by subtracting the difference between PPV rate before project activity and PPV rate after project activity. Impact rating is based on two factors: Decline in avoided PPV and statistical significance. If for a particular project, there is a decline in avoided PPV and it is also statistically significant, then the impact rating is Green. However, if there is a decline in avoided PPV and it is not statistically significant, impact rating is yellow. If avoided PPV increases, even though it is statistically significant, impact rating is red.

¹ Health Care Cost Institute (2019). The average emergency room visit cost \$1389 in 2017. Available from: [Average Cost of ER Visit \(2017\)](#)

²2018 Hospital Adjusted Expenses per Inpatient day: Kaiser Family Foundation / State Health Facts Available from: [Hospital Adjusted Expenses per Inpatient Day \(2018\)](#). Data from 1999 - 2018 AHA Annual Survey, Copyright 2019 by Health Forum, LLC, an affiliate of the American Hospital Association. Note: Average length of stay in NY (2016) was 4.6 days. [Overview of U.S. Hospital Stays in 2016: Variation by Geographic Region #246 \(ahrq.gov\)](#)

³Health Care Cost Institute (2016-2017); Binghamton, NY Average (Office Visit – Primary Doctor – Established Patient – Moderate Complexity. Range is \$69-\$87. We used \$78 as a point estimate. Available from: [Average Cost of PC Visit in Binghamton](#)

Project	Project Name	PPV Rate – Total Project Engaged	PPV before Project Activity (DY4)	PPV after Project Activity (DY4)	Impact Rating	Estimated Change in Expenses (DY4)
2biv	Care Transitions	12.30	7.5	4.8***	Green	\$ (480,001)
2bvii	INTERACT	12	8.3	3.7	Yellow	\$ (73,606)
2ci	Community Navigation	9	5.4	3.7**	Green	\$ (1,090,047)
3ai M1	Integrating PC & BH – Model 1	9	5.3	4.0*	Green	\$ (514,895)
3ai M2	Integrating PC & BH – Model 2	13.70	6.4	7.4	Red	\$ 17,321
3aii	Crisis Stabilization	11.50	7.0	4.5	Yellow	\$ (21,252)
3bi	CVD Self-Management	12	8.0	4.0	Yellow	\$ (188,626)
3gi	Palliative Care	12.50	7.8	4.7	Yellow	\$ (74,750)
4aiii	Strengthening MHSA	14.60	9.0	5.6***	Green	\$ (504,751)
4bii	COPD Self-Management	8	5.0	3.0	Yellow	\$ (16,085)

Note: Negative change in Estimated Expenses denote savings and positive change indicates expenditure. Savings due to avoided PPV is the desired result.

Description of Table 3:

- Time Period: CCN Attributed Members MY5 from July 2017 to June 2018 for the percentages.
- Methodology: Estimated change in expenses due to avoided utilization is calculated by comparing 12-month utilization rates before and after project engagement (July 2017- June 2018) and then change in utilization, multiplied by cost factors from published sources
- Significance level means that the chances of difference between PPV rate before project activity and PPV rate after project activity by pure chance are extremely low.
 - i) ***Significant at 1% (High Significance) = Green
 - ii) **Significant at 5% (Medium Significance) = Green
 - iii) *Significant at 10% (Modest Significance) = Green
 - iv) Reduction in PPV, but No Significance = Yellow
 - v) No Reduction in PPV = Red

Table 4: Estimated Impact on Hospitalizations and Estimated Change in Expenses /Savings due to Avoided Hospitalizations

This table presents the estimated impact on hospitalizations as well as the economic value of that impact. Using data from CCN’s MY5 attributed population, we compared hospitalization rates before and after project engagement which occurred between July 2017 and June 2018. The rates reflect the percentages of MY5 attributed members engaged in projects between July 2017 and June 2018 with a hospital admission preceding and/or succeeding engagement in the project. The intended effect is to observe a reduction in rates of admissions after project engagement compared to before. Using both the direction of change in hospitalizations and the statistical significance of the change as input, a Red/Yellow/Green rating summarized the impact (Impact Rating in the table below).

Estimated change in Expenses/Savings due to avoided hospitalizations is derived by multiplying avoided hospitalizations with the average cost of an inpatient visits*average no. of days of inpatient stay. Avoided hospitalization is calculated by subtracting the difference between hospitalization rate before project activity and hospitalization rate after project activity. Impact rating is based on two factors: Decline in avoided hospitalizations and statistical significance. If for a particular project, there is a decline in avoided hospitalization and it is also statistically significant, then the impact rating is Green. However, if there is a decline in avoided hospitalization and it is not statistically significant, impact rating is yellow. If avoided hospitalization increases, even though it is statistically significant, impact rating is red.

Project	Project Name	Hospitalization Rate - Total Project Engaged (DY4)	Hospitalizations before Project Activity (DY4)	Hospitalizations after Project Activity (DY4)	Impact Rating	Estimated Change in Expenses (DY4)
2biv	Care Transitions	4.60	3.40	1.20***	Green	\$ (3,726,460)
2bvii	INTERACT	8.00	6.50	1.60**	Green	\$(747,044)
2ci	Community Navigation	1.80	1.00	0.80**	Green	\$(1,221,861)
3ai M1	Integrating PC & BH – Model 1	1.92	0.97	0.95	Yellow	\$(75,475)
3ai M2	Integrating PC & BH – Model 2	2.64	1.38	1.26	Yellow	\$(19,804)
3aii	Crisis Stabilization	4.10	1.90	2.30	Red	\$ 32,397
3bi	CVD Self-Management	3.90	1.30	2.60	Red	\$ 584,091
3gi	Palliative Care	4.70	1.90	2.90	Red	\$229,746
4aiii	Strengthening MHSA	2.90	1.60	1.30**	Green	\$(424,341)
4bii	COPD Self-Management	3.90	2.40	1.50	Yellow	\$(68,963)

Note: Negative change in Estimated Expenses denote savings and positive change indicates expenditure. Savings due to avoided Hospitalizations is the desired result.

Description of Table 4:

- Time Period: CCN Attributed Members MY5 from July 2017 to June 2018 for the percentages.
- Methodology: Estimated change in expenses due to avoided utilization is calculated by comparing 12-month utilization rates before and after project engagement (July 2017- June 2018) and then change in utilization, multiplied by cost factors from published sources
- Significance level means that the chances of difference between hospitalization rate before project activity and hospitalization rate after project activity by pure chance are extremely low.
 - ***Significant at 1% (High Significance) = Green
 - **Significant at 5% (Medium Significance) = Green
 - *Significant at 10% (Modest Significance) = Green
 - Reduction in hospitalization, but No Significance = Yellow
 - Increase in hospitalizations, but No Significance = Red

Table 5: Estimated Impact on Primary Care and Estimated Change in Expenses due to Increased PC Visits.

This table presents the estimated impact on primary care utilization as well as the economic value of that impact. Using data from CCN's MY5 attributed population, we compared use rates before and after project engagement which occurred between July 2017 and June 2018. The rates reflect the percentages of MY5 attributed members engaged in projects between July 2017 and June 2018 with a primary care visit preceding and/or succeeding engagement in the project. The intended effect is to observe an increase in primary care visit rates after project engagement compared to before. Using both the direction of change in utilization and the statistical significance of the change as input, a Red/Yellow/Green rating summarizes the impact (Impact Rating in the table below).

Increased spending on PC visits is a desirable result as the aim of DSRIP projects is to increase primary care engagement. Positive change implies increased spending whereas negative change implies that there was a decrease in primary care engagement after project activity and thus a reduction in spending on primary care. It is derived by multiplying increase in primary care engagement with the average cost of primary care visit. Increase in primary care engagement is calculated by subtracting the difference between PC rate before project activity and PC rate after project activity. Impact rating is based on two factors: Increase in primary care engagement and statistical significance. If for a particular project, there is an increase in primary care engagement and it is also statistically significant, then the impact rating is Green. However, if there is an increase in primary care engagement and it is not statistically significant, impact rating is yellow. If primary care engagement decreases, even though it is statistically significant, impact rating is red.

Project	Project Name	PC Utilization Rate - Total Project Engaged	PC Visits before Project Activity (DY4)	Project Activity after PC Visits (DY4)	Impact Rating	Estimated Change in Expenses (DY4)
2biv	Care Transitions	65	32	33.3*	Green	\$12,978
2bvii	INTERACT	NA	NA	NA	NA	NA
2ci	Community Navigation	87	45	42***	Red	\$(108,021)
3ai M1	Integrating PC & BH – Model 1	NA	NA	NA	NA	NA
3ai M2	Integrating PC & BH – Model 2	78	41	37	Red	\$ (3,891)
3aii	Crisis Stabilization	82	38	44	Yellow	\$ 2,864
3bi	CVD Self-Management	86	46	40	Red	\$(15,889)
3gi	Palliative Care	82	44	38	Red	\$ (8,124)
4aiii	Strengthening MHSA	79	41	38***	Red	\$ (25,010)
4bii	COPD Self-Management	92	50	41	Red	\$ (4,065)

Note: Negative change in Estimated Expenses denote savings and positive change indicates expenditure. Expenditure due to increased primary care engagement is the desired result

Description of Table 5:

- Time Period: CCN Attributed Members MY5 from July 2017 to June 2018 for the percentages.
- Methodology: Estimated change in expenses due to avoided utilization is calculated by comparing 12-month utilization rates before and after project engagement (July 2017- June 2018) and then change in utilization, multiplied by cost factors from published sources
- Significance level means that the chances of difference between PC engagement rate before project activity and PC engagement after project activity by pure chance are extremely low.
 - i) ***Significant at 1% (High Significance) = Green
 - ii) **Significant at 5% (Medium Significance) = Green
 - iii) *Significant at 10% (Low Significance) = Green
 - iv) Increase in utilization, but No Significance = Yellow
 - v) Decrease in utilization, but No Significance = Red
 - vi) Decrease in utilization and Significant = Red

Table 6: Metrics Impacted (Regression Analysis)

Metric	2biv	2bvii	2ci	2di	3ai M1	3ai M2	3aii	3bi	3gi	4bii	4aii
AAP	☒		☒								
PPV					☒						
AMM	☒				☒	☒					☒
AAM					☒	☒	☒		☒		
FUH -7	☒				☒				☒		
AOD	☒				☒						
CVD					☒	☒		☒	☒		
DM					☒	☒			☒		
ST	☒				☒			☒	☒		

Description of Table 6: Project activities that showed positive statistical association with key HEDIS (Healthcare Effectiveness Data and Information Set) measures. This analysis doesn't account for the timing of the project activities relative to the metrics.

Abbreviations Used in Table 6:

AAP: Adult Access to Preventive or Ambulatory Care

PPV: Potentially Preventable ED visits

AMM: Antidepressant Medication Management

AAM: Adherence to Antipsychotic Medications for People with Schizophrenia

FUH -7: Follow-up after hospitalization for Mental Illness – within 7 days

AOD: Initiation/Engagement of Alcohol and Other Drug Dependence Treatment

CVD: Cardiovascular Disease Monitoring

DM: Diabetes Monitoring & Screening for People with Diabetes who are Using Antipsychotic Medication

ST: Statin Therapy for Patients with Cardiovascular Disease (Receive and Adhere)

Table 7: Summary Financial Impact Assessment (DY4 Estimate)

This table summarizes information presented in the previous tables. Total Avoided Expenses is the summation of estimated change in expenses due to avoided utilization related to impacting ED visits, hospital admission rates, and increased primary care utilization. Total Avoided Expenses is calculated only if the difference between utilization before project engagement and after project engagement is statistically significant. Total Net Savings is Savings, net of CCN’s total variable costs. Net Savings per project dollar normalizes net savings by expressing the term per dollar spent on the project. This allows net savings to be compared more readily across large and small projects.

Project	Total Avoided Expenses is significant (DY4)	Total Variable Cost (DY4)	Total Net Savings	Net Savings per Project \$	Rating (Based on Total Savings and Significance Level)
2biv	\$ 4,219,439	\$ 772,508	\$ 3,446,931	\$ 4.46	Green
2bvii	\$ 747,044	\$ 521,580	\$ 225,464	\$ 0.43	Green
2ci	\$ 2,203,886	\$ 1,833,306	\$ 370,581	\$ 0.20	Green
3ai M1	\$ 514,895	\$ 668,945	\$ (154,050)	\$ (0.23)	Yellow
3ai M2	\$ 0	\$ 25,220	\$ (25,220)	\$ 0	Red
3aii	\$ 0	\$ 457,690	\$ (457,690)	\$ 0	Red
3bi	\$ 0	\$ 767,740	\$ (767,740)	\$ 0	Red
3gi	\$ 0	\$ 194,760	\$ (194,760)	\$ 0	Red
4aiii	\$ 904,083	\$ 263,320	\$ 640,763	\$ 2.43	Green
4bii	\$ 0	\$ 12,040	\$ (12,040)	\$ 0	Red

Note: * Only statistically significant savings are included in the Total Avoided Expenses and Net Savings calculations. If Total Avoided Expenses are zero, it indicates that the difference in utilization before and after project engagement is not statistically significant and hence not accounted for in the calculations above

Description of Table 7:

- Time Period: CCN Attributed Members MY5 from July 2017 to June 2018.
- Total Avoided Expenses: Sum of change in expenses due to avoided PPVs, Change in expenses due to avoided hospitalizations, increased expenditure on PC visits.
- Total Variable Costs: Obtained from MY4 Financial Summary
- Net Savings: Total Avoided Expenses – Total Variable Cost
- Net Savings per Project \$ Spent: Net Savings/Total Variable Costs
- Combined Financial Rating: Is based on average of the rating obtained due to total savings and rating due to overall significance level.

Table 8: Combined Rating: Summary of Clinical and Partner Impact and Financial Impact

Below table is based on the clinical and partner summary impact ([Table 1](#)), combined utilization rating (PPV, Hospitalization and PC impact) and the Financial Impact Summary ([Table7](#)).

Project	Project Name	Clinical and Partner Impact Rating	Utilization Impact Rating	Rating (Based on Total Savings and Significance Level)	Combined Rating
2biv	Care Transitions	Green	Green	Green	Green
2ci	Community Navigation	Green	Green	Green	Green
4aiii	Strengthening MHSA	Green	Green	Green	Green
3ai M1	Integrating PC & BH – Model 1	Green	Green	Yellow	Green
2bvii	INTERACT	Red	Green	Green	Green
3ai M2	Integrating PC & BH – Model 2	Green	Red	Red	Yellow
3aii	Crisis Stabilization	Red	Yellow	Red	Red
3bi	CVD Self-Management	Yellow	Red	Red	Red
3gi	Palliative Care	Yellow	Red	Red	Red
4bii	COPD Self-Management	Red	Yellow	Red	Red
2di	PAM Survey	Red	NA	NA	Red

Description of Table 8:

The above table gives the final assessment of the DSRIP projects. Combined savings is derived from Clinical and Partner Impact (Based on both quantitative and qualitative analysis), utilization impact rating (Based on avoided change in PPV, hospitalizations and increased expenses), and Financial Impact rating (Based on total savings and significance level). The above table is ranked in the order of most impactful projects to least impactful projects

Potentially Preventable ED Visits

Causal Effect Analysis (What drove Value?)

The following projects showed a consistent decline in PPV after the project activities within 365 days of the project activity.

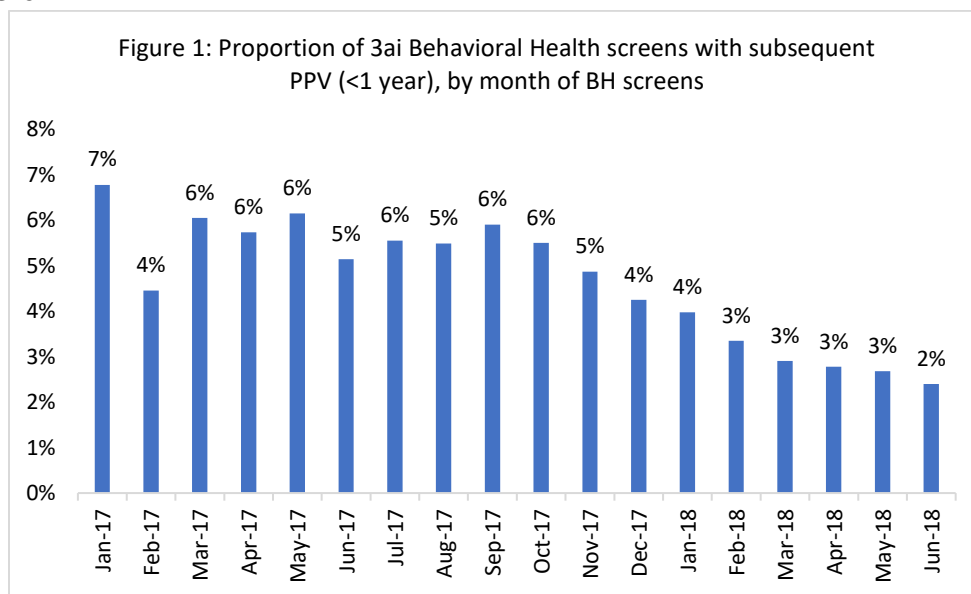
Project	Total PPV (Average)	PPV before Project Activity (Average)	PPV after Project Activity (Average)	PPV after Project Activity Trend
2ci	9%	5.4%	3.7%**	Decreasing
3ai Model 1	9%	5.3%	4%*	Decreasing

- Time Period: CCN Attributed Members MY5 from July 2017 to June 2018.
- Total PPV Average: Project activities followed by PPV and PPV followed by project activities.
- PPV before Project Activity: Project activities preceding PPV within 365 days, by month of PPV. Based on service volume.
- PPV after Project Activity: Project activities with subsequent PPV within 365 days, by month of Project activities. Based on service volume.
- PPV Trend: The outcome decreasing indicates that project activities have been successful in bringing down the PPV's within 365 days after the project activity.

The below example shows the effect of BH screens on PPV. The below graph is volume based.

Causal Effect Graph: In Figure 1, we present monthly proportions of BH screens offered to CCN attributed Medicaid Members in MY5 that had a PPV in the year following their BH screens.

- 65,268 CCN attributed BH screens offered between January 2017 and June 2018.
- Cumulatively, 3,001 (5%) BH screens services were followed by a PPV in the year following their BH screens; PPVs had to occur within 365 days of the BH screens.
- PPVs after 3ai Services have a somewhat downward trend starting June 2017 after the BH screens.



Cost-Effectiveness Analysis: DY4 Estimates only

Key Statistics	2ci	3ai Model 1	Calculation
DY Engagement	46,163	28,515	DY4 project Engagement
PPVs after Project Activity	3.7	4	Causal Effect Analysis
PPVs before Project Activity (Used as Baseline)	5.4	5.3	Causal Effect Analysis
Total Volume Based on Baseline	2493	1511	(PPV after project Activity* DY4 Engagement)/100
Total Volume under Program	1708	1141	(PPV before project Activity* DY4 Engagement)/100
Avoided Volume	785	371	Total Volume based on Baseline – Total Volume Under Program
Savings due to Avoided ED Visits	\$1,090,047	\$514,895	Avoided Volume* Average Cost of an ED Visit in NY state
Total Variable Cost (TVC)	\$1,833,306	\$668,945	Obtained from Financial summary. Based on MY4
Net Savings per \$ spent (Based on VC)	-\$0.41	-\$0.23	(Savings due to Avoided ED Visits – TVC)/ TVC

Conclusion

Causal effect analysis and cost effectiveness analysis reveal that navigations and BH screens are among a few select projects that were instrumental in reducing reliance on emergency departments for non-emergency care needs.

Hospitalizations

Causal Effect Analysis (What drove Value?)

The following projects showed a consistent decline in hospitalizations after the project activities within 365 days of the project activity.

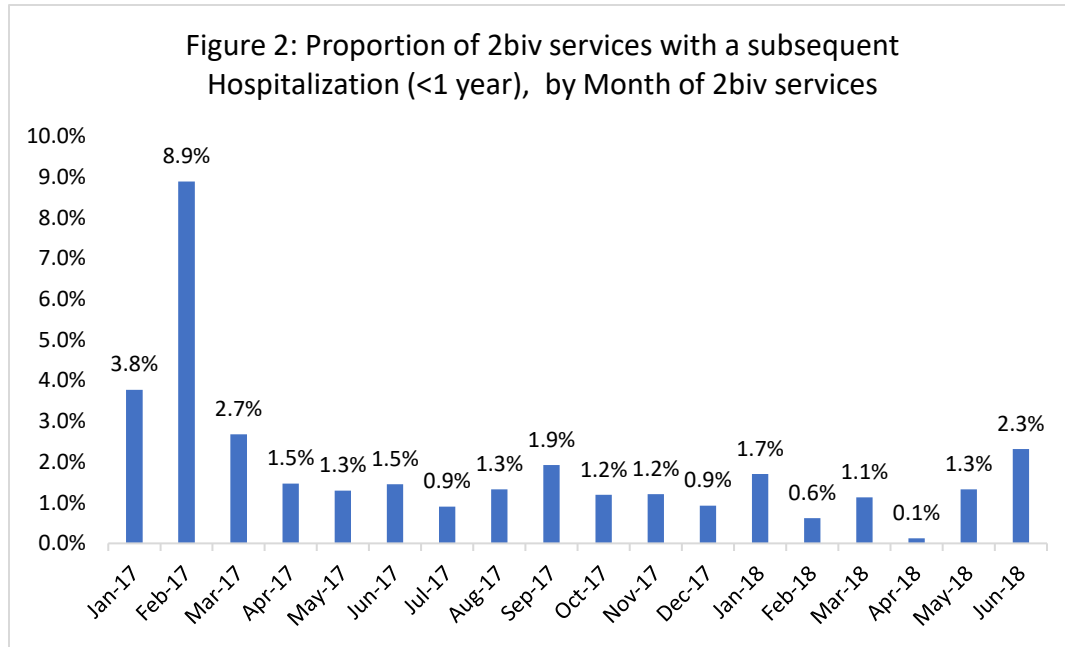
Project	Total Hospitalization Rate	Hospitalization Rate before Project Activity	Hospitalization Rate after Project Activity	Hospitalization Trend
2biv	4.60%	3.40%	1.20%***	Mostly Decreasing. Increases during some months

- Time Period: CCN Attributed Members MY5 from July 2017 to June 2018.
- Total Hospitalization Rate: Project activities followed by hospitalization and hospitalization followed by project activities.
- Hospitalizations after project activity: Project activities preceding Inpatient Admissions within 365 days, by month of Inpatient Admissions. Based on service volume
- Hospitalizations after project activity: Project activities with subsequent Inpatient Admissions within 365 days, by month of Project activities. Based on service volume
- Hospitalization Trend: The outcome decreasing indicates that project activities have been successful in bringing down the hospitalizations within 365 days after the project activity.

The below example shows the effect of care transitions on Hospitalizations. The below graph is volume based.

Causal Effect Graph: In Figure 2, we present monthly proportions of navigations offered to CCN attributed Medicaid Members that had a hospitalization within 365 days in the year following the care transition services.

- 16,068 2biv services between January 2017 and June 2018
- Cumulatively, there were 220 (1.4%) 2biv services that were followed by hospitalization within a year.



Cost-Effectiveness Analysis: DY4 Estimates only

Key Statistics	2biv	Calculation
DY Engagement	12,799	DY4 project Engagement
PPVs after Project Activity (Average)	1.20	Causal Effect Analysis
PPVs before Project Activity (Average) Used as Baseline	3.4	Causal Effect Analysis
Total Volume Based on Baseline	435	(PPV after project Activity* DY4 Engagement)/100
Total Volume under Program	154	(PPV before project Activity* DY4 Engagement)/100
Avoided Volume	282	Total Volume based on Baseline – Total Volume Under Program
Savings due to avoided hospitalization visits	\$3,726,459	Avoided Volume* Average Cost of a hospitalization in NY state
Total Variable Cost	\$772,508	Obtained from Financial summary. Based on DY4
Net Savings per \$ spent (Based on VC)	\$3.82	(Savings due to Avoided hospitalization visits – TVC)/ TVC

Conclusion

Causal effect and cost effectiveness analysis reveal that care transition services were instrumental in reducing hospitalizations.

Primary Care Visits

Causal Effect Analysis (What drove Value?)

The following projects showed a consistent increase in primary care after the project activities within 365 days of the project activity.

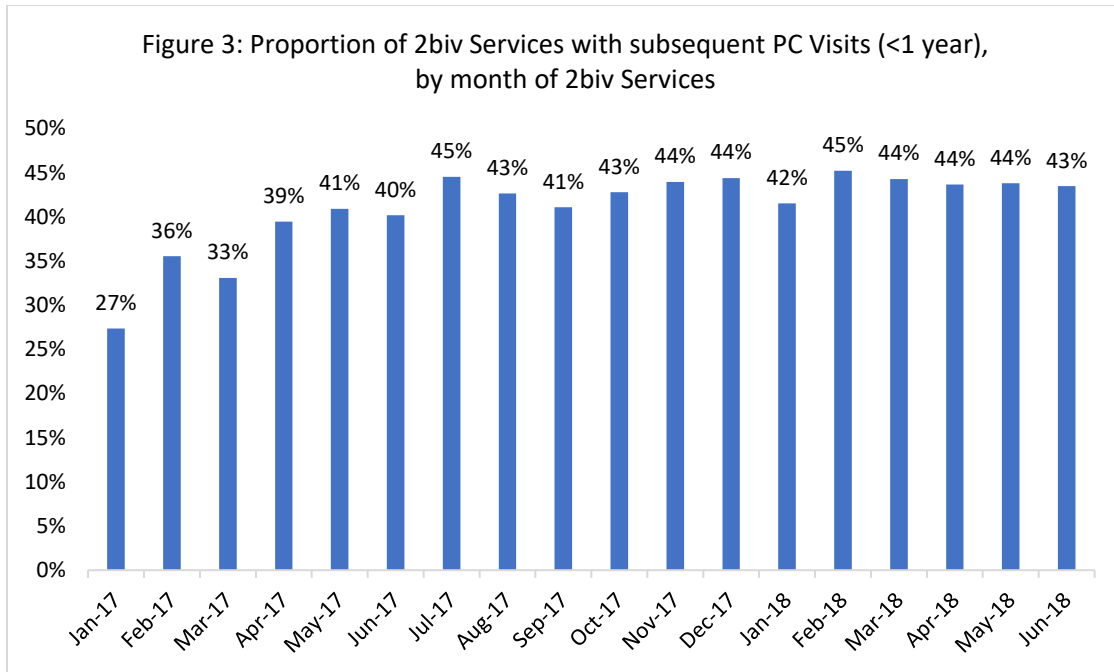
Project	PC Total (Average)	PC Visit before Project Activity (Average)	PC Visit after Project Activity (Average)	Primary Care Trend
2biv	65%	32%	33.3%*	Mostly Stable. Somewhat Increasing

- Time Period: CCN Attributed Members MY5 from July 2017 to June 2018.
- PC Visit Total Average: Project activities followed by PC visits and PC visits followed by project activities. Based on unique members.
- PC Visit before Project Activity: Project activities with preceding PC Visits within 365 days, by month of Project activities. Based on service volume
- PC Visit after Project Activity: Project activities with subsequent PC Visits within 365 days, by month of Project activities. Based on service volume
- Primary Care Trend: The outcome increasing indicates that project activities have been successful in diverting patients from emergency care settings to Primary care within 365 days after the project activity.

The below example shows the effect of care transition services on Primary Care Visits. The below graph is volume based.

Causal Effect Graph: In Figure 3, we present monthly proportions of care transition services offered to CCN attributed Medicaid Members that had a PC visit within 365 days in the year following the care transition services.

- 16,068 care transition services were offered between January 2017 and June 2018
- 6804 (42%) were followed by a PC Visit in the year following the care transition service.



Cost-Effectiveness Analysis: D4 Estimates Only

Key Statistics	2biv	Calculation
DY Engagement	12,799	DY4 Project Engagement
PC Visits after project activity per 100 people (Average)	33.3	Causal Effect Analysis
PC Visits before project activity per 100 people (Average) Used as Baseline	32	Causal Effect Analysis
Total Volume Based on Baseline	4096	(PPV after project Activity*DY4 Engagement)/100
Total Volume under Program	4262	(PPV before project Activity* DY4 Engagement)/100
Increased Volume	166	Total Volume based on Baseline – Total Volume Under Program
Avoided PC Expenses	(\$12,978)	Increased Volume* Average Cost of PC Visit in NY state
Variable Cost	\$772,508	Obtained from Financial summary. Based on DY4
Net PC Savings per \$ spent (VC): negative indicates additional spending),	-\$1.02	(Avoided PC Expenses – Variable Cost)/Variable Cost

Conclusion

Causal effect and cost effectiveness analysis reveal that care transition services were instrumental in increasing PC visits. The current average cost of a primary care office visit (established patient, moderate complexity) is \$69 - \$87. (Average - \$78)

Antidepressant Medication Management

Table 9: Regression Analysis

The following projects showed a positive statistical significance between project activities and antidepressant medication management. However, regression analysis unlike causal effect analysis doesn't account for the timing of the project activity relative to metric.

Project	Statistical Association
2biv	Completing a Care Transitions service is associated with a 36% greater likelihood of filling at least one antidepressant medication
3ai Model 1	Completing a Behavioral health screen in the context of a PC/MH visit is associated with a 18% greater likelihood of antidepressant Rx fills among Medicaid Members.
3ai Model 2	Providing a primary care service in the context of mental health visit is associated with an odd of 4.50 greater likelihood of adhering to Antidepressant Medication Fill.
4aiii	Completing a Behavioral health screen to increase awareness and minimize stigma is associated with a 99% greater likelihood of antidepressant Rx fills among Medicaid Members.

Adherence to Antipsychotic Medications for People with Schizophrenia

Table 10: Regression Analysis

The following projects showed a positive statistical significance between project activities and adherence to antipsychotic medications. However, regression analysis unlike causal effect analysis doesn't account for the timing of the project activity relative to metric.

Project	Statistical Association
3ai Model 1	Completing a Behavioral health screen in the context of a PC visit is associated with an 85% greater likelihood of people antipsychotic medications fills among Medicaid Members with Schizophrenia.
3ai Model 2	Providing a primary care service in the context of mental health visit is associated with an odd of 3.24 greater likelihood of people antipsychotic medications fills among Medicaid Members with Schizophrenia.
3aii	Receiving a crisis service is associated with an odd of 5.80 greater likelihood of people antipsychotic medications fills among Medicaid Members with Schizophrenia.
3gi	Providing a Palliative Care service is associated with an odd of 2.16 greater likelihood of people antipsychotic medications fills among Medicaid Members with Schizophrenia.

Initiation/Engagement of Alcohol and Other Drug Dependence Treatment

Table 11: Regression Analysis

The following projects showed a positive statistical significance between project activities and Alcohol and Other Drug Dependence Treatment. However, regression analysis unlike causal effect analysis doesn't account for the timing of the project activity relative to metric.

Project	Statistical Association
2biv	Members completing a Care Transitions are 2.66 times more likely to receive AOD treatment.
3ai Model 1	Completing a Behavioral health screen in the context of a PC visit is associated with a 95% greater likelihood of being treated for Alcohol and Other drugs diagnosis among Medicaid Members.

Follow-up after hospitalization for Mental Illness – within 7 days

Table 12: Regression Analysis

The following projects showed a positive statistical significance between project activities and Follow-up after hospitalization for Mental Illness – within 7 days. However, regression analysis unlike causal effect analysis doesn't account for the timing of the project activity relative to metric.

Project	Statistical Association
2biv	Completing a Care Transitions service is associated with a 35% greater likelihood of follow up after hospitalization for mental illness within 7 days.
3ai Model 1	Completing a Behavioral health screen in the context of a PC visit is associated with a 58% greater likelihood of follow up after hospitalization for mental illness within 7 days.
3gi	Providing a Palliative Care service is associated with a 94% greater likelihood of follow up after hospitalization for mental illness within 7 days.

Cardiovascular Disease Monitoring

Table 13: Regression Analysis

The following projects showed a positive statistical significance between project activities and Cardiovascular Disease Monitoring. However, regression analysis unlike causal effect analysis doesn't account for the timing of the project activity relative to metric.

Project	Statistical Association
3ai Model 1	Completing a Behavioral health screen in the context of a PC visit is associated with an 88% greater likelihood completing monitoring cardiovascular disease (Lipid panel, etc.) among Medicaid Members with a Schizophrenia diagnosis.
3ai Model 2	Providing a primary care service in the context of mental health visit is associated with 96% greater likelihood of monitoring cardiovascular disease (Lipid panel, etc.) among Medicaid Members with a Schizophrenia diagnosis.

3bi	Providing a CDSMP session or reviewing self-management goals with Medicaid patients is associated with an odd of 5.19 greater likelihood of monitoring cardiovascular disease (Lipid panel, etc.) among Medicaid Members.
3gi	Providing a Palliative Care service is associated with an odd of 2.60 greater likelihood of monitoring cardiovascular disease (Lipid panel, etc.) among Medicaid Members with a Schizophrenia diagnosis.

Diabetes Monitoring & Screening for People with Diabetes who are Using Antipsychotic Medication

Table 14: Regression Analysis

The following projects showed a positive statistical significance between project activities and Diabetes Monitoring & Screening for People with Diabetes who are Using Antipsychotic Medication. However, regression analysis unlike causal effect analysis doesn't account for the timing of the project activity relative to metric.

Project	Statistical Association
3ai Model 1	Completing a Behavioral health screen in the context of a PC visit is associated with a 42% greater likelihood of completing Diabetes screening/monitoring (HbA1C test) among Medicaid Members who have Antipsychotic medications.
3ai Model 2	Providing a primary care service in the context of mental health visit is associated with an odd of 2.75 greater likelihood of completing Diabetes screening/monitoring (HbA1C test) among Medicaid Members who have Antipsychotic medications.
3gi	Providing a Palliative Care service is associated with a 70% greater likelihood of completing Diabetes screening/monitoring (HbA1C test) among Medicaid Members who have Antipsychotic medications.

Statin Therapy for Patients with Cardiovascular Disease (Receive and Adhere)

Table 15: Regression Analysis

The following projects showed a positive statistical significance between project activities and Statin Therapy for Patients with Cardiovascular Disease (Receive and Adhere). However, regression analysis unlike causal effect analysis doesn't account for the timing of the project activity relative to metric.

Project	Statistical Association
2biv	Completing a Care Transitions service is associated 79% greater likelihood of receiving and adhering to Statin Therapy among patients with cardiovascular disease among Medicaid Members.
3ai Model 1	Completing a Behavioral health screen in the context of a PC visit is associated with an 58% greater likelihood of receiving and adhering for Statin Therapy among patients with cardiovascular disease among Medicaid Members.

3bi	Providing a CDSMP session or reviewing self-management goals with Medicaid patients is associated with an odd of 4.24 greater likelihood of receiving and adhering for Statin Therapy among patients with cardiovascular disease among Medicaid Members.
3gi	Providing a Palliative Care service is associated with an odd of 2.46 greater likelihood of receiving and adhering for Statin Therapy among patients with cardiovascular disease among Medicaid Members.

[Refer to the Appendix for Details on the Model Used, Odds Ratio and Proxy Measures used in Regression Analysis](#)

Table 16: Cost Effectiveness Analysis – PPV: Estimated for DY4 only

Net Savings per Project dollar is an estimate of the savings due to avoided utilization that resulted from the project, net of CCN project costs. Net Savings is expressed as a dollar figure per dollar spent on the project. The inputs into include estimated avoided utilization due the project (PPV, hospitalization, and primary care utilization), the system savings associated with that impact, DSRIP Year 4 project engagement, and DSRIP 4 project variable costs. Reflecting the results from the table, we estimate that the 4aiii project resulted in a net savings of \$.92 for every \$1 spent on the project by CCN. Not all projects' savings were positive. Negative net savings can result from either or both the change in PPV rates before and after project engagement as well as CCN's variable costs in implementing the projects.

Project	Project Engagement	PPV before Project Activity	PPV after Project Activity	Avoided Volume	Savings due to Avoided ED Visits	Variable Cost	Net Savings per \$ spent (VC)
2biv	12,799	7.5	4.8***	346	\$ 480,001	\$ 772,508	-\$0.38
2bvii	1,152	8.3	3.7	53	\$73,606	\$ 521,580	-\$0.86
2ci	46,163	5.4	3.7**	785	\$1,090,047	\$1,833,306	-\$0.41
3ai M1	28,515	5.3	4.0*	371	\$514,895	\$668,945	-\$0.23
3ai M2	1,247	6.4	7.4	-12	\$ (17,321)	\$25,220	-\$1.69
3aii	612	7.0	4.5	15	\$21,252	\$457,690	-\$0.95
3bi	3395	8.0	4.0	136	\$188,626	\$767,740	-\$0.75
3gi	1,736	7.8	4.7	54	\$74,750	\$194,760	-\$0.62
4aiii	10,688	9.0	5.6***	363	\$504,751	\$263,320	\$0.92
4bii	579	5.0	3.0	12	\$16,085	\$12,040	\$0.34

Table 17: Cost Effectiveness Analysis – Hospitalizations: Estimated for DY4 only

As described above, Net Savings per Project dollar summarizes the economic value of the projects. This measure encapsulates the savings generated by the project in terms of avoided hospital admissions, net of the project costs. Net Savings is expressed as a saving per project dollar to enable comparison across projects. Reflecting the results from the table, we estimate that the 4biii project resulted in a net savings of \$.25 for every \$1 spent on the project by CCN. Not all projects' savings were positive. Negative net savings can result from either or both the change in hospital admission rates before and after project engagement as well as CCN's variable costs in implementing the projects.

Project	Project Engagement	Hospital Admissions (%) before Project Activity	Hospital Admissions (%) after Project Activity	Avoided Volume	Savings due to Avoided hospitalizations	Variable Cost	Net Savings per project \$
2biv	12,799	3.4	1.20***	282	\$3,726,460	\$ 772,508	\$3.82
2bvii	1,152	6.5	1.60**	56	\$ 747,044	\$ 521,580	\$0.43
2ci	46,163	1.0	0.80**	92	\$1,221,861	\$1,833,306	\$(0.33)
3ai M1	28,515	0.97	0.95	6	\$ 75,475	\$668,945	\$(0.89)
3ai M2	1,247	1.4	1.26	1.5	\$ 19,804	\$25,220	\$(0.21)
3aii	612	1.9	2.30	-2	\$ (32,397)	\$457,690	\$(1.07)
3bi	3395	1.3	2.60	-44	\$ (584,091)	\$767,740	\$(1.76)
3gi	1,736	1.9	2.90	-17	\$ (229,746)	\$194,760	\$(2.18)
4aiii	10,688	1.6	1.30**	32	\$ 424,341	\$263,320	\$0.61
4bii	579	2.4	1.50	5	\$ 68,963	\$12,040	\$4.73

Explanation of Table 16 and 17 Calculations

- Project Engagement: Number of DY4 engaged unique members from July 2016 to June 2019
- PPV/Hospitalizations before Project Activity: Average of number of project services preceding PPV/Hospitalizations divided by the total project activity within 365 days for DY4 engaged members
- PPV/Hospitalizations after Project Activity: Average of number of project services succeeding PPV/Hospitalizations divided by the total project activity within 365 days for DY4 engaged members
- Avoided Volume: Projected avoided PPV/Hospitalizations based on Before – After difference and DY4 project engagement.
- Savings due to Avoided PPV/Hospitalizations: (Avoided Volume* Average cost of PPV/Hospitalizations in NY state)
- Variable Cost: CCN variable project costs.
- Net Savings per Project \$: (Savings due to Avoided PPV/Hospitalizations – Variable Cost)/Variable Cost

Table 18: Cost Effectiveness Analysis – PC Visits: Estimated for DY4 only

As described above, Net Savings per Project dollar summarizes the economic value of the projects. This measure encapsulates the savings generated by the project in terms of avoided hospital admissions, net of the project costs. Net Savings is expressed as a saving per project dollar to enable comparison across projects. Given that the objective is to increase primary care utilization, we estimate that the Care Transitions project supported a modest and statistically significant increase in primary care utilization. The extra primary care spending and project variable costs resulted in a negative net spending, which is desirable given that the objective is to encourage primary care utilization. For many projects, there was an overall decline in Net Savings Per Project dollar spent.

Project	DY4 Project Engagement	PC Visits before Project Activity	Project Activity after PC Visits	Avoided PC Expenses	Variable Cost	Total Savings (DY4)	Net Savings per \$ spent (VC) DY4
2biv	12,799	32	33.3*	\$ (12,978)	\$ 772,508	\$ (785,486)	\$(1.02)
2bvii							NA
2ci	46,163	45	42***	\$ 108,021	\$1,833,306	\$(1,725,284)	\$ (0.94)
3ai M1							NA
3ai M2	1,247	41	37	\$3,891	\$25,220	\$ (21,329)	\$ (0.85)
3aii	612	38	44	\$ (2,864)	\$457,690	\$ (460,554)	\$ (1.01)
3bi	3395	46	40	\$15,889	\$ 767,740	\$ (751,851)	\$ (0.98)
3gi	1,736	44	38	\$8,124	\$194,760	\$(186,636)	\$ (0.96)
4aiii	10,688	41	38***	\$25,010	\$263,320	\$(238,310)	\$ (0.91)
4bii	579	50	41	\$ 4,065	\$12,040	\$(7,975)	\$(0.66)

Explanation of Table 18 Calculations

- Project Engagement: Number of DY4 engaged unique members from July 2016 to June 2019
- PC Visits before Project Activity: Average of number of project services preceding PC Visits divided by the total project activity within 365 days for DY4 engaged members
- PC Visits after Project Activity: Average of number of project services succeeding PC Visits divided by the total project activity within 365 days for DY4 engaged members
- Estimated Increased PC Visits due to project, per 100 people: (PC Visits before Project Activity – PC Visits after Project Activity)
- Total Volume Based on Baseline: (PC Visits before Project Activity*Project Engagement)/100
- Total Volume under Program: (PC Visits after Project Activity*Project Engagement)/100
- Avoided PC Expenses: (Total Volume Based on Baseline – Total Volume under Program) * Average Cost of PC Visits
- Variable Cost: Obtained from Finance Team
- Total Savings: Avoided PC Expenses – Variable Cost
- Net Savings per \$ spent (VC): Total Savings/Variable Cost

Table 19: Break Even Analysis – ED Visits: Estimated for DY4 only

Project	Savings due to Avoided ED Visits	Variable Cost	Fixed Costs	Total Services Provided	Break Even Payment Rate
2biv	\$ 480,001	\$ 772,508	\$ 1,691,639	24,995	\$ (48.48)
2bvii	\$73,606	\$ 521,580	\$ 293,276	3110	\$ (70.63)
2ci	\$1,090,047	\$ 1,833,306	\$ 19,937,003	68,809	\$ (273.90)
3ai M1	\$514,895	\$ 668,945	\$ 959,800	46386	\$ (9.59)
3ai M2	\$ (17,321)	\$ 25,220	\$ 185,636	1367	\$(148.47)
3aii	\$21,252	\$ 457,690	\$ 252,889	1784	\$ (129.84)
3bi	\$188,626	\$ 767,740	\$ 257,296	8726	\$ (7.87)
3gi	\$74,750	\$ 194,760	\$ 445,914	2722	\$(136.36)
4aiii	\$504,751	\$ 263,320	\$ 101,202	16,285	\$24.78
4bii	\$16,085	\$ 12,040	\$ 22,329	1001	\$(6.24)

Explanation of Table 19 Calculations

- Break Even Payment Rate = (Savings due to avoided ED Visits – Fixed Costs)/ Total Services
- Meaning of Break-Even Payment Rate: Rate at which Net savings would be zero and Total Savings = Total Cost

Table 20: Break Even Analysis – Hospitalizations: Estimated for DY4 only

Project	Savings due to Avoided hospitalizations	Variable Cost	Fixed Costs	Total Services Provided	Break Even Payment Rate
2biv	\$3,726,460	\$ 772,508	\$ 1,691,639	24,995	\$ 81.41
2bvii	\$ 747,044	\$ 521,580	\$ 293,276	3110	\$ 145.91
2ci	\$1,221,861	\$ 1,833,306	\$ 19,937,003	68,809	\$ (271.99)
3ai M1	\$ 75,475	\$ 668,945	\$ 959,800	46386	\$ (19.06)
3ai M2	\$ 19,804	\$ 25,220	\$ 185,636	1367	\$ (121.31)
3aii	\$ (32,397)	\$ 457,690	\$ 252,889	1784	\$ (159.91)
3bi	\$ (584,091)	\$ 767,740	\$ 257,296	8726	\$ (96.42)
3gi	\$ (229,746)	\$ 194,760	\$ 445,914	2722	\$ (248.22)
4aiii	\$ 424,341	\$ 263,320	\$ 101,202	16,285	\$ 19.84
4bii	\$ 68,963	\$ 12,040	\$ 22,329	1001	\$ 46.59

Explanation of Table 20 Calculations

- Break Even Payment Rate = (Savings due to avoided Hospitalizations– Fixed Costs)/ Total Services
- Meaning of Break-Even Payment Rate: Rate at which Net savings would be zero and Total Savings = Total Cost

Appendix

Model used

Regression Analysis Basics:

- The regression equation describes the relationship between the dependent variable (y) and the independent variable (x).

$$y = bx + a$$

Example: Anti-Dep Rx Fill = b_1 (3ai BH screen) + b_i (Control vars_i) + a

- The intercept, or "a," is the value of y (dependent variable) if the value of x (independent variable) is zero, and is referred to as the 'constant.'
- The regression results report the coefficient b that represents how a unit increase in x affect the likelihood of y, holding all other factors constant
- P value is also reported in the regression results. It shows whether the coefficient has statistically significant impact on the dependent variable or not. If the p value is 0.05, we are 95% confident that the independent variable has some effect on the dependent variable.

Logistic regression

- Assumption: dependent variable is dichotomous and binary; in other words, coded as 0 and +1.
- We use the logit model that displays the odds ratio obtained by running the regression.
- The odds ratio is a way of comparing whether the probability of a certain event is the same for two groups.
- An odds ratio of 1 implies that the event is equally likely in both groups. An odds ratio greater than one implies that the event is more likely in the first group. An odds ratio less than one implies that the event is less likely in the first group.

Odds Ratio

We used logistic regression models to statistically relate the performance metric proxy variables to the project activities – care transition services. In this analysis, the data from July 2016 through June 2019 were pooled for cross-sectional analysis. We tested whether Medicaid members who received care transition services were less likely to also have one or more Potentially Preventable ED visits than their counterparts, less likely to have any type of hospital admission, and/or more likely to have at least one primary care visit. The logistic model yields an Odds Ratio, which is a measure of association between an “exposure” and an “outcome”. In this analysis, we consider receiving a service under the DSRIP project to be the “exposure”, while having a Potentially Preventable ED visits, hospital admission, and/or a primary care visit etc. serves as the “outcome”. In the analysis presented in this document, the Odds Ratio represents the odds that a Medicaid member will experience a PPV (for example) given the member also received a service under the defined project activity, compared to the odds of experiencing a PPV in the absence of any services, specific to the project activity.

Proxy Measures Used for Regression Analysis

Metric	Proxy Used for Regression Analysis
Adult Access to Preventive or Ambulatory Care	Primary Care Visits (defined by SIM) or Ambulatory Visits with E&M Codes (99912, etc.) in any setting among adults 18 and older
Antidepressant Medication Management	Pharmacy Fills for Antidepressants
Diabetes Monitoring for People with Diabetes and Schizophrenia	Hb-A1C test & combination of Dx for Diabetes and Schizophrenia
Cardiovascular Monitoring for People with Cardiovascular Disease and Schizophrenia	Lipid Panel test & combination of Dx for Diabetes and Schizophrenia
Follow-up after hospitalization for Mental Illness – within 7 days	Mental Health services visit volume
Adherence to Antipsychotic Medications for People with Schizophrenia	Pharmacy Fills for Antipsychotics
Initiation of Alcohol and Other Drug Dependence Treatment (Engagement Too)	Alcohol and Other Drug Dependence Treatment services (volume)
Statin Therapy for Patients with Cardiovascular Disease –Received Statin Therapy	Statin Therapy Fills
Potentially Preventable Emergency Room Visits ±	Constructed preventable ED visits (NYU definition)
PQI 90 – Composite of all measures ±	Use metric numerator results for PQI-90 (adults only)
PDI 90– Composite of all measures ±	Use metric numerator results for PDI-90 (children only)
Potentially Preventable Emergency Room Visits (for persons with BH diagnosis) ±	Constructed preventable ED visits (NYU definition) among those with any BH diagnosis