

MI Care Team Demonstration Evaluation Report

January 23, 2020

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Table of Contents

Executive Summary	3
Methods.....	3
Results.....	3
Limitations	3
Conclusions and Implications.....	4
Introduction.....	5
Methods.....	5
Study population	5
Data sources.....	6
Time period of study	6
Measures	6
Analysis.....	7
Results.....	8
Demographic characteristics of the study population	8
Timeline of program enrollment	9
Health care utilization, overall.....	10
Changes in health care utilization	11
Change in costs.....	15
Change in costs minus MI Care Team program costs	16
Cost efficiency/sub-group and sensitivity analyses.....	16
Limitations	18
Conclusions and Implications.....	19
Appendix A: Identification of MI Care Team Qualifying Diagnoses from Medicaid Claims.....	21
Appendix B: MI Care Team Participating Federally Qualified Health Centers and Comparison Federally Qualified Health Centers	24
Appendix C: Overview of Final Implementation Survey Findings	25
Appendix D: Identification of Health Care Utilization and Cost Measures from Medicaid Claims	31
Appendix E: Specification of Analytic Models.....	34
Propensity score weighting	34
Model development.....	34
Subpopulation analysis.....	35
Appendix F: Cost Efficiency/Sub-group Analyses	36
Appendix G: Sensitivity Analyses: Alternative Specification of Pre/Post Date and associated Cost Efficiency/Sub-group Analyses	44

Executive Summary

On July 1, 2016, the State of Michigan launched MI Care Team, a primary care health homes demonstration program for Medicaid beneficiaries with both mental and physical health diagnoses, created in accordance with Section 2703 of the Affordable Care Act. MI Care Team includes care coordination and comprehensive care management and is provided through ten participating Federally Qualified Health Centers (FQHCs) around the state. The University of Michigan Institute for Healthcare Policy & Innovation evaluated this program for the Michigan Department of Health and Human Services.

Methods

We used Medicaid claims data to compare trends in health care utilization and costs between MI Care Team enrollees and a group of comparison individuals, adult Medicaid beneficiaries with similar qualifying diagnoses who received care at comparison FQHCs in Michigan. We adjusted for baseline differences to determine changes in health care utilization attributable to MI Care Team. Individuals in the MI Care Team and comparison groups had at least 6 months of Medicaid enrollment before and 6 months of Medicaid enrollment after the MI Care Team program launch on July 1, 2016. The post-implementation period was defined as the first 18 months of MI Care team implementation (July 1, 2016-December 31, 2017) in the main analyses. We also examined differential changes between MI Care Team enrollees and the comparison group for sub-groups with different durations of MI Care Team enrollment; and performed a separate analysis assessing pre/post changes among MI Care Team enrollees alone, based on enrollees' individual MI Care Team enrollment date.

Results

After implementation of the demonstration, MI Care Team enrollees had increased rates of outpatient visits, including behavioral health visits, and decreased rates of emergency department visits and inpatient admissions. When compared to the comparison group, MI Care Team enrollees had differential increases in outpatient visits and behavioral health visits, but no differential changes in emergency department visits and inpatient admissions. There was a marginal increase in per member per quarter costs compared to comparison individuals, however, when MI Care Team program costs were subtracted from total costs, there was a trend towards a differential decrease in per member per quarter costs among enrollees compared to comparison individuals. Enrollees with longer enrollment in MI Care Team did not have significant increases in costs; There was a trend toward decreased costs, compared to comparison individuals.

Limitations

Limitations of the evaluation include the availability of only 18 months of post-implementation data at the time of the evaluation, potential heterogeneity of program implementation across FQHC sites, and the potential for utilization or health outcomes not captured in Medicaid data. Limitations of the main analysis include the possibility that some "post"-period months include times when beneficiaries were not enrolled in MI Care Team, while limitations of the pre/post

analysis include the potential for regression to the mean and the lack of a comparison group to control for economic or health care trends not attributable to MI Care Team.

Conclusions and Implications

Implementation of MI Care Team was associated with increased outpatient and behavioral health visits in addition to care coordination. The use of outpatient services is important for individuals with comorbid conditions as it facilitates management of chronic diseases and improvement in health outcomes. While MI Care Team enrollees had decreasing emergency department visits, there was no differential reduction in emergency department visits and inpatient admissions when comparing results to the comparison group. There was a modest statistically significant increase in per member per quarter costs for enrollees that may be attributable to MI Care Team payments for completion of the Health Action Plan and ongoing care coordination, since analysis of costs minus these payments showed no significant increase. The trend suggests that longer periods of MI Care Team enrollment could ultimately lead to declines in total health care costs. This finding is important as MI Care Team enrollees had increased access to outpatient services including engagement with behavioral health services, which is important for the management of their chronic conditions, and occurred without an increase in non-program related costs.

Introduction

On July 1, 2016, the State of Michigan launched MI Care Team, a primary care health homes program created in accordance with Section 2703 of the Affordable Care Act.¹ MI Care Team is a method of delivering care coordination and comprehensive care management in an integrated health care environment at participating Federally Qualified Health Centers (FQHCs) to improve health outcomes for enrollees in the program.² Medicaid beneficiaries eligible to enroll are those with depression or anxiety and either diabetes, hypertension, heart disease, chronic obstructive pulmonary disease or asthma, as evidenced in claims or through physician identification. The University of Michigan Institute for Healthcare Policy & Innovation evaluated this program for the Michigan Department of Health and Human Services.

Two key components of the MI Care Team care model are: 1) behavioral health integration; and 2) addressing social determinants of health. Half of the FQHCs reported increasing the degree of behavioral health integration at their organizations and more than half reported high levels of co-located or integrated behavioral health care services (Appendix C). Regarding social determinants of health, all participating FQHCs reported connecting MI Care Team enrollees with food, housing and transportation assistance, and many also connected enrollees to other social service resources (Appendix C).

Methods

Study population

Eligible/target population

The eligible population for this analysis included all Medicaid beneficiaries age 19-64 who were enrolled in MI Care Team at participating FQHCs for at least 6 months by December 31, 2017 and had at least 6 months of Medicaid enrollment in the pre-implementation period between July 1, 2014 and June 30, 2016, and at least 6 months of post-implementation Medicaid enrollment between July 1, 2016 and December 31, 2017. The number of minimum pre- or post-implementation Medicaid enrollment months for inclusion was cumulative and did not need to be continuous, so some “post”-period months include times when beneficiaries were not enrolled in MI Care Team.

In total, 4,737 people enrolled in MI Care Team by December 31, 2017; 4,357 were age 19-64 during the entire evaluation period. Of these, 2,694 enrollees (57%) had at least 6 months of Medicaid enrollment before and 6 months of Medicaid enrollment after July 1, 2016.

¹ MI Care Team. (n.d.) Retrieved from https://www.michigan.gov/mdhhs/0,5885,7-339-71547_4860_75161---.00.html

² Prokop, J., LaPres, M., Barron, B., & Villasurda, J. (2017). Implementing a Health Home: Michigan's Experience. *Policy, Politics, & Nursing Practice*, 18(3), 149-157.

Comparison group

The primary comparison group was comprised of Medicaid beneficiaries with similar characteristics, including having diagnoses consistent with MI Care Team eligibility (either depression or anxiety plus one of the eligible physical health conditions, e.g., diabetes, hypertension, heart disease, chronic obstructive pulmonary disease or asthma; see list of qualifying diagnosis codes in Appendix A), who received care and/or had a primary care provider (PCP) at nearby FQHCs that were not participating in the MI Care Team demonstration (see details of matching of FQHCs by region in Appendix B). Comparison individuals had to have at least 6 months of Medicaid enrollment in the period between July 1, 2014 and June 30, 2016 and at least 6 months of Medicaid enrollment between July 1, 2016 and December 31, 2017. As with the MI Care Team enrollees, these months did not need to be continuous. Those who also received care at MI Care Team participating FQHC sites during the evaluation period were excluded from the comparison group.

Data sources

The data source for information on Medicaid beneficiary enrollment, demographics, health care utilization and costs was the Michigan Department of Health and Human Services (MDHHS) Data Warehouse. Individual-level data for Medicaid beneficiaries was extracted through a secure portal from the Data Warehouse, including enrollment, demographic characteristics, and health care utilization. Data were stored in encrypted files on a secure network with multiple layers of password protection and was only accessed by authorized study team members.

We also compiled and summarized MI Care Team monthly enrollment data provided by MDHHS during the implementation period.

Time period of study

Claims and encounter data with dates of service (professional records) or discharge dates (institutional records) between July 1, 2014 and December 31, 2017 were included in the analysis. The pre-implementation period was defined as the two years before MI Care Team implementation (July 1, 2014 – June 30, 2016); the post-implementation period was the first 18 months of MI Care Team implementation (July 1, 2016 – December 31, 2017). These dates were used to define the pre-period and post-period for the main analyses, regardless of individual beneficiaries MI Care Team enrollment date, in order to have a comparable timeline across MI Care Team and comparison groups. Although enrollment and participation in the demonstration continued, claims records assessing utilization and costs for 2018 were incomplete at the time this evaluation was conducted.

Measures

Health care utilization

For each month of Medicaid enrollment, we assessed outpatient visits, including behavioral health visits, emergency department visits (excluding those that resulted in inpatient hospital

admission), inpatient hospital admissions, and skilled nursing facility admissions (see Appendix D for details of identification of these measures from claims). Behavioral health visits included those in claims from Medicaid managed care organizations and prepaid inpatient health plans (PIHPs). We considered the monthly and quarterly counts for these utilization measures in the analysis. When assessing per member quarterly counts, we estimated an average across all available months in the quarter; most quarters had at least 2 months of available data.

Costs

We assessed paid amounts per-member-per-month (PMPM) for MI Care Team enrollees and comparison group individuals over the evaluation period. Monthly PMPM total costs included outpatient and inpatient medical, pharmaceutical, and additional services (see Appendix D).

We also estimated costs minus MI Care Team program costs. For this estimate, we multiplied the cost of each MI Care Team encounter (\$148.05 for S0280, the initial program enrollment including Health Action Plan completion; \$59.50 for S0281, the monthly ongoing care coordination) by the number of each type of encounter.

Analysis

Propensity score weights

Given observable differences between the MI Care Team enrollees and those in the comparison group (see unweighted data in Table 1), we utilized a weighting approach by generating a propensity score that predicted MI Care Team participation. Variables included in the propensity score model were: age, race/ethnicity, geographic region (4 groupings of prosperity regions, see Appendix E or Table 1), baseline pre-program diagnoses (including depression, anxiety, diabetes, hypertension, heart disease, chronic obstructive pulmonary disease and asthma), baseline pre-program PMPM utilization (including outpatient visits, emergency department visits, inpatient admissions, and skilled nursing facility admissions), and a log of baseline costs (this variable was log transformed due to its skewed distribution). After applying the weights, characteristics of the MI Care Team enrollees and comparison individuals were more similar (see weighted data in Table 1).

Analytic approaches

Our main analytic approach was a difference-in-differences analysis with time trends (also known as comparative interrupted time series analysis) to compare changes in health care utilization and costs for MI Care Team enrollees with changes in these measures for similar Medicaid beneficiaries in the comparison group. Under this model, we compared each MI Care Team enrollee's health care utilization and costs to their own experience prior to enrollment in MI Care Team. We included the comparison group of individuals not enrolled in MI Care Team to account for any overall trends in health care utilization and costs not related to MI Care Team. Applying the propensity score weights to individuals in the MI Care Team and comparison groups accounted for observable differences between the groups on baseline

characteristics and health care utilization. We performed a weighted regression analysis to account for individual beneficiary effects in both the MI Care Team and comparison groups, additionally adjusting for gender, race/ethnicity, geographic region, each of the MI Care Team qualifying health conditions at baseline, and quarter of observation. Overall, this difference-in-difference analysis allowed us to assess any differential changes in utilization and costs for MI Care team enrollees compared to the comparison group.

The cost models were developed to estimate the differential change in total quarterly costs for MI Care Team enrollees and comparison individuals before and after implementation of the program. The key predictor in these models is the interaction between enrollment in MI Care Team and time period (pre vs. post implementation).

We also explored alternative analytic approaches, including:

- A. Difference-in-difference analysis by length of MI Care Team enrollment: As it was hypothesized that any changes in utilization and costs would be greatest for those enrolled in the program for the longest time, we repeated the difference-in-difference analysis for sub-groups of enrollees to assess differential changes by length of enrollment from July 2016 (6-9 months, 10-12 months, 13-15 months, and 16-18 months), when compared to the comparison group.
- B. Pre/post analysis of MI Care Team enrollees: We also assessed changes in utilization and costs among MI Care Team enrollees, based on their specific date of enrollment. This analysis assessed pre/post changes among MI Care Team enrollees alone and did not include a comparison group.

Results

Demographic characteristics of the study population

There were N=2,694 individuals in the MI Care Team group and N=20,936 individuals in the comparison group. MI Care Team enrollees had a mean age of 46.6 years (Table 1, unweighted data). Two-thirds (66.4%) were female, about half (55.5%) were White/non-Hispanic, and, as expected, they had many MI Care Team qualifying diagnoses prior to implementation of the program (unweighted data). MI Care Team enrollees had a baseline mean of 2.3 outpatient visits per month and \$982 mean costs per month (unweighted data). MI Care Team enrollees with longer durations of enrollment appeared to have greater prevalence of MI Care Team-eligible diagnoses (e.g., depression, anxiety, hypertension, diabetes), compared with enrollees who had shorter durations of enrollment (Appendix Table F6).

Table 1. Baseline Characteristics of MI Care Team Enrollees and Comparison Group

Characteristics	MI Care Team Enrollees (N=2,694)		Comparison Group (N=20,936)	
	<i>Unweighted</i>	<i>Weighted*</i>	<i>Unweighted</i>	<i>Weighted*</i>
Age, mean years	46.6	45.0	44.7	44.9
Female, n (%)	1,789 (66.4)	68.1	14,073 (67.2)	67.1
Race/Ethnicity, n (%)				
White, non-Hispanic	1,496 (55.5)	65.5	14,104 (67.4)	66.1
Black, non-Hispanic	884 (32.8)	25.7	4,951 (23.7)	24.6
Hispanic	117 (4.3)	3.0	632 (3.0)	3.1
Other	197 (7.3)	5.8	1,249 (5.9)	6.1
Geographic region, n (%)				
Upper Peninsula/Northwest/ Northeast	463 (17.2)	16.5	3,204 (15.3)	15.5
West/East/Central	1,222 (45.4)	35.8	7,154 (34.2)	35.4
South Central/Southwest/ Southeast	620 (23.0)	34.2	7,504 (35.8)	34.5
Metro Detroit	389 (14.4)	13.5	3,074 (14.7)	14.7
Diagnoses prior to MI Care Team, n (%)				
Depression	2,339 (86.8)	88.4	18,159 (86.7)	86.8
Anxiety	1,809 (67.2)	70.8	14,903 (71.2)	70.8
Asthma	1,327 (49.3)	53.4	11,420 (54.6)	54.1
COPD	795 (29.5)	26.4	5,425 (25.9)	26.3
Hypertension	2,155 (80.0)	74.4	15,277 (73.0)	73.7
Diabetes	1,071 (39.8)	34.1	6,997 (33.4)	34.0
Heart disease	988 (36.7)	34.8	7,711 (36.8)	36.9
Utilization prior to MI Care Team, mean per member per month				
Outpatient visits	2.34	2.15	2.16	2.18
Emergency department visits	0.32	0.32	0.34	0.34
Inpatient admissions	0.032	0.034	0.041	0.040
Skilled nursing facility admissions	0.0035	0.0033	0.0055	0.0053
Costs prior to MI Care Team, mean per member per month	\$982	\$1,030	\$1,147	\$1,128

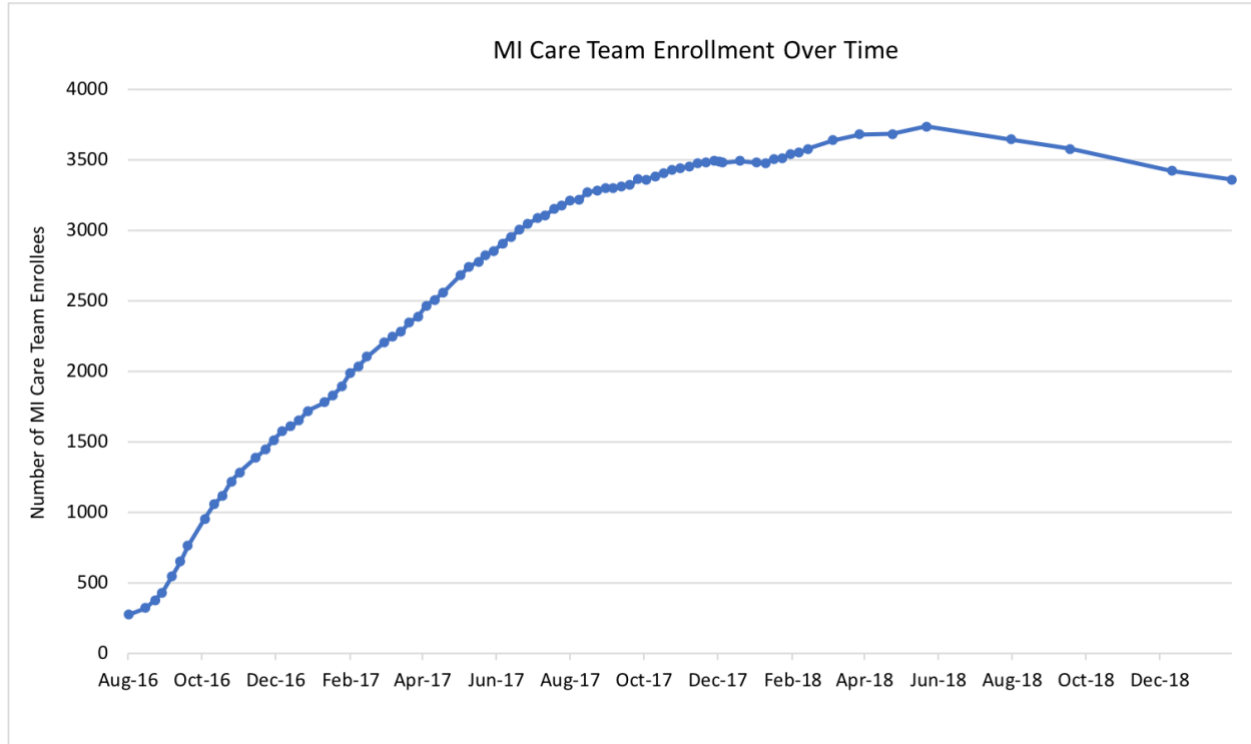
*Indicates propensity score weights applied. The goal for propensity score weights is to balance pre-implementation characteristics between the MI Care Team and comparison groups. Measures prior to MI Care Team implementation were obtained from the MDHHS Data Warehouse in the period July 1, 2014 – June 30, 2016.

Timeline of program enrollment

We reviewed MI Care Team monthly enrollment data provided by MDHHS. Enrollment in MI Care Team grew steadily in the first year after program implementation and plateaued by early

2018 (Figure 1). The average number of months of enrollment in MI Care Team among enrollees at the time of this analysis was 12.3 (out of 18 possible months). 55.7% had ≥ 12 months of enrollment in MI Care Team.

Figure 1. MI Care Team Enrollment Over Time



Health care utilization, overall

We first described overall proportion of any health care utilization for MI Care Team enrollees during the evaluation period, both before (24 months) and after (18 months) MI Care Team implementation (Table 2). As these are descriptive overall proportions, they do not indicate a change in the number of visits.

Table 2. Proportion of MI Care Team Enrollees with Any Health Care Utilization

Utilization outcomes	MI Care Team Enrollees with Utilization (%)	
	July 2014 - June 2016	July 2016 - December 2017
Outpatient visits, all	98.8	100.0
Behavioral health visits	77.9	91.9
Emergency department visits	78.4	73.7
Inpatient admissions	33.2	29.1
Skilled nursing facility admissions	2.2	2.6

Note: These are unweighted descriptive statistics for MI Care Team enrollees with ≥ 6 months of Medicaid enrollment data July 1, 2014 - June 30, 2016, and ≥ 6 months of Medicaid enrollment data July 1, 2016 - December 31, 2017 only.

Changes in health care utilization

Table 3a. Difference-in-Differences Analysis of Changes in Quarterly Health Care Utilization and Costs Before and After MI Care Team Implementation

Outcomes	MI Care Team Enrollees (N=2,694)			Comparison Group (N=20,936)			Adjusted DID (95% CI)	p value
	Pre	Post	Δ	Pre	Post	Δ		
Outpatient visits, all	5.69	7.59	+1.9	5.84	6.16	+0.32	+1.58 (1.30, 1.86)	<0.001
Behavioral health visits	2.39	3.33	+0.94	2.48	2.68	+0.2	+0.75 (0.47, 1.02)	<0.001
Emergency department visits ¹	0.84	0.82	-0.02	0.88	0.88	+0	-0.019 (-0.072, 0.033)	0.472
Inpatient admissions	0.086	0.088	+0.002	0.097	0.106	+0.009	-0.0061 (-0.015, 0.0025)	0.166
Skilled nursing facility admissions	0.009	0.011	+0.002	0.014	0.021	+0.007	-0.0054 (-0.010, -0.00076)	0.023
Costs ² (\$)	3,172	3,756	+584	3202	3,625	+423	+161 (0.045) ⁴	0.026
Costs minus MI Care Team Costs ³	3,195	3,625	+430	3,252	3,803	+551	-121 (-0.030) ⁵	0.184

Δ = the difference between pre- (July 1, 2014-June 30, 2016) and post-implementation (July 1, 2016-December 31, 2017) estimates within each group. DID = Difference-in-differences, which compares the Δs between the MI Care Team Group and the Comparison Group. Outcomes are adjusted per member quarterly averages, with propensity score weights applied.

¹ Negative binomial regression to account for high proportion of 0s and many outliers.

² The cost model used a gamma distribution and log link to account for highly skewed cost data.

³ Costs minus MI Care Team program costs subtracts program costs, including initial program enrollment and ongoing care coordination.

⁴ Predicted change in costs (model coefficient = 0.045).

⁵ Predicted change in costs (model coefficient = -0.030).

Outpatient care, including physical and behavioral health visits

After implementation of the program in July 2016, outpatient visits increased among MI Care Team enrollees (Table 3a, and time trends in Figure 2). When assessed against the comparison group, this was an increase of 1.58 outpatient visits per member per quarter (difference-in-differences [DID] column of Table 3a above).

MI Care Team enrollees also had increases in behavioral health visits after implementation of the MI Care Team demonstration (Figure 3), with an increase of 0.75 visit per member per quarter when assessed against the comparison group (Table 3a).

Figure 2. Trends in Outpatient Visits, Weighted* Per Member Per Quarter

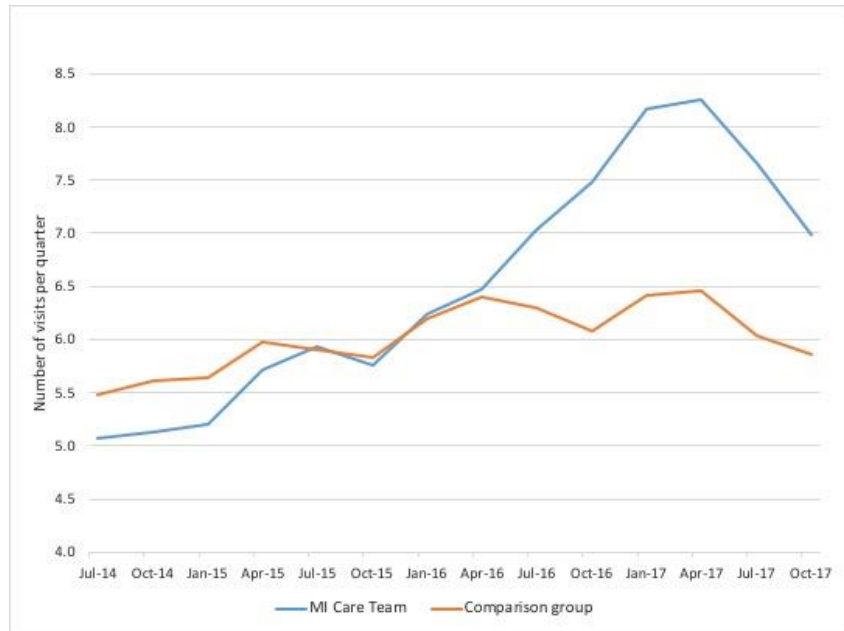
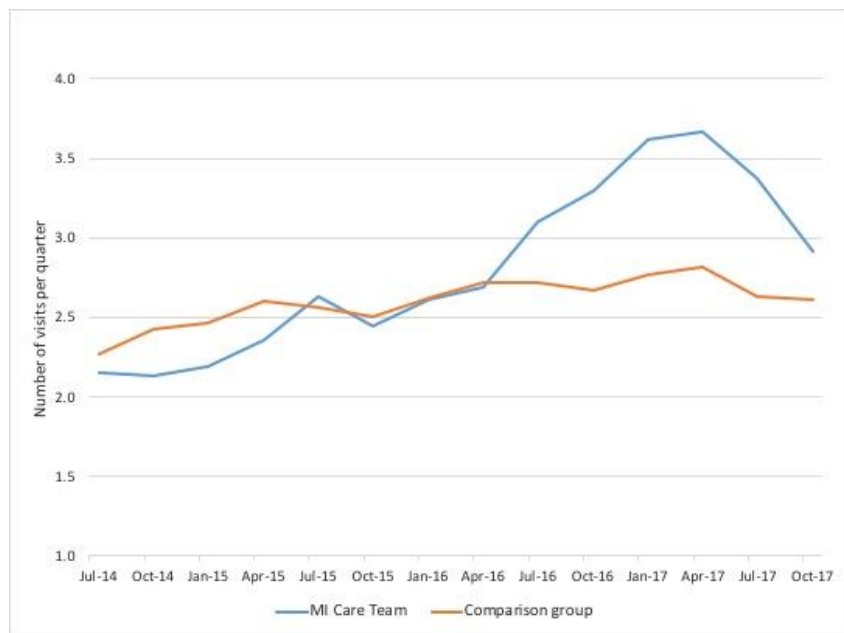


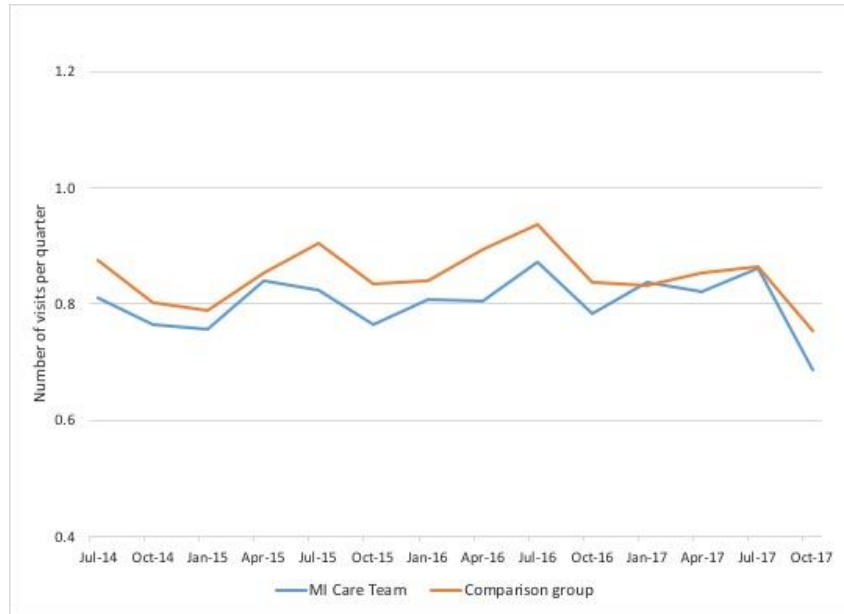
Figure 3. Trends in Behavioral Health Visits, Weighted* Per Member Per Quarter



Emergency department visits

Compared to trends in the comparison group, MI Care Team enrollees demonstrated no significant change in emergency department visits after program implementation (Figure 4, Table 3a).

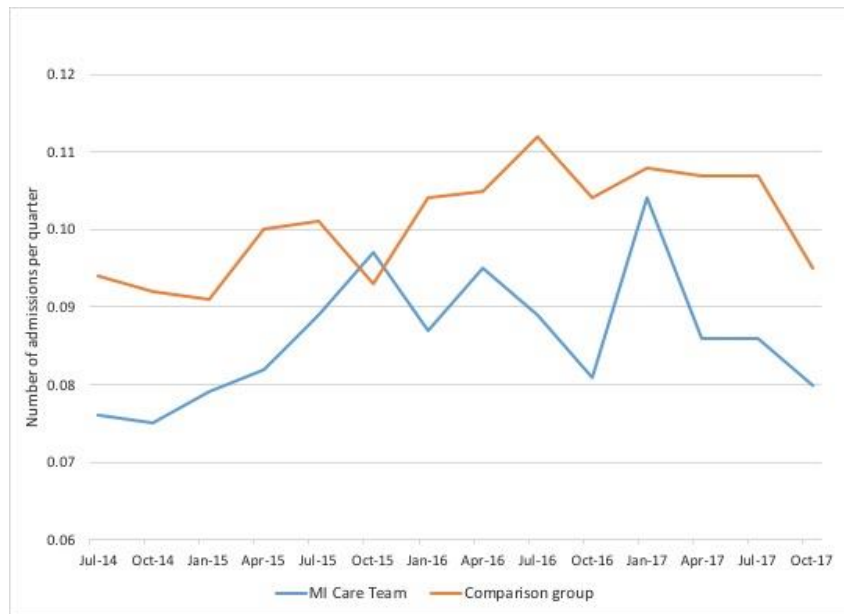
Figure 4. Trends in Emergency Department Visits, Weighted* Per Member Per Quarter



Inpatient hospital admissions

There was no significant change in hospital admissions after MI Care Team implementation (Figure 5, Table 3a).

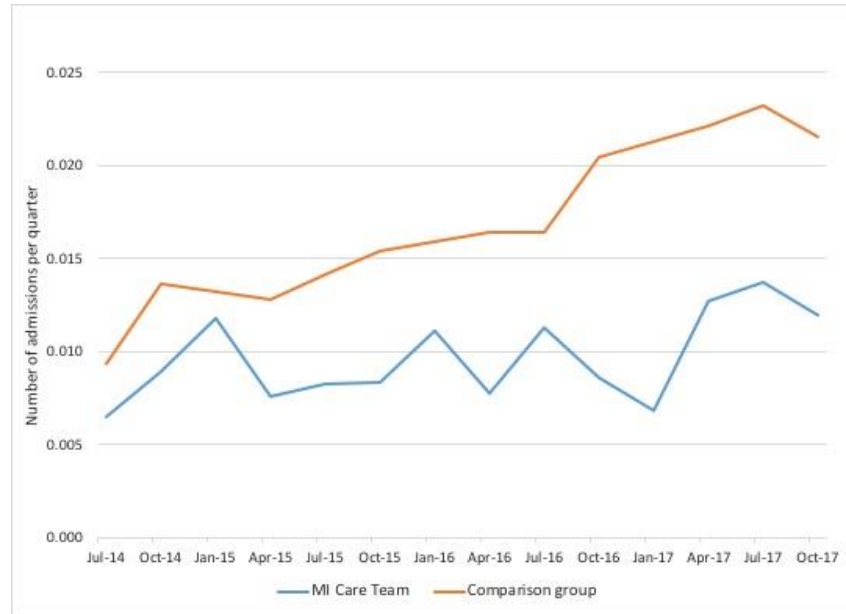
Figure 5. Trends in Inpatient Hospital Admissions, Weighted* Per Member Per Quarter



Skilled nursing facility admissions

There was a slight decrease of 0.0054 skilled nursing facility admissions after MI Care Team implementation, when assessed against the comparison group (Figure 6, Table 3a).

Figure 6. Trends in Skilled Nursing Facility Admissions, Weighted* Per Member Per Quarter



Change in costs

Both MI Care Team enrollees and comparison individuals exhibited increased per member per quarter total costs during the evaluation period, with an overall greater increase in the MI Care Team group (Figure 7, Table 3a). Note that the cost models estimate differential change in total quarterly costs for MI Care Team enrollees and comparison individuals but do not represent the mean values of either group.

Figure 7. Trends in Total Costs, Weighted* Per Member Per Quarter



Change in costs minus MI Care Team program costs

To assess whether some of this cost differential between MI Care Team enrollees and comparison group individuals could be explained by the payments associated with MI Care Team participation, we developed a separate analytic model subtracting out MI Care Team costs. We found that the per member per quarter costs minus MI Care Team program costs showed a trend towards a decrease, when assessed against the comparison group (Table 3a).

Figure 8. Trends in Costs minus MI Care Team Program Costs, Weighted* Per Member Per Quarter



Cost efficiency/sub-group and sensitivity analyses

We examined whether there was heterogeneity in the change in costs and selected utilization outcomes by selected sub-groups of MI Care Team enrollees, including enrollees who had: 1) the highest quartile of baseline emergency department utilization; 2) ≥ 5 emergency department visits per year at baseline; 3) the highest quartile of baseline costs; 4) the highest quartile of comorbidities (represented as a count of chronic conditions); 5) ≥ 12 months of participation in MI Care Team; and 6) different durations of enrollment in MI Care Team (6-9 months, 10-12 months, 13-15 months, and 16-18 months of enrollment). Results did not differ appreciably in direction of trends between sub-groups and the overall MI Care Team enrollee population (see Appendix F).

Analysis by duration of enrollment

When using alternative analytic approach A, MI Care Team enrollees with longer duration of enrollment (13-15 months and 16-18 months) did not have statistically significant increases in costs during the evaluation period (Appendix Table F12). When considering costs minus MI

Care Team program costs, there was a trend toward decreasing costs for those with the longest enrollment (16-18 months) in MI Care Team (Appendix Table F13).

Analyses assessing differential changes for MI Care Team enrollees with the longest duration of enrollment (16-18 months) compared to the comparison group are also summarized in Table 3b (which aggregates data from Appendix Tables F7-F13).

Table 3b. Difference-in-Differences Analysis of Changes in Quarterly Health Care Utilization and Costs Before and After MI Care Team Implementation, limited to MI Care Team enrollees with 16-18 months of enrollment

Outcomes	MI Care Team Enrollees (N=657)			Comparison Group (N=20,936)			Adjusted DID (95% CI)	p value
	Pre	Post	Δ	Pre	Post	Δ		
Outpatient visits, all	6.14	8.25	+2.11	5.84	6.16	+0.32	+1.79 (1.28, 2.30)	<0.001
Behavioral health visits	2.42	3.24	+0.81	2.48	2.68	+0.2	+0.61 (0.14, 1.09)	0.011
Emergency department visits ¹	0.77	0.76	-0.01	0.88	0.88	+0	-0.013 (-0.13, 0.10)	0.823
Inpatient admissions	0.09	0.08	-0.002	0.097	0.106	+0.009	-0.011 (-0.026, 0.0053)	0.191
Skilled nursing facility admissions	0.008	0.012	+0.004	0.014	0.021	+0.007	-0.0036 (-0.015, 0.0072)	0.512
Costs ² (\$)	3,476	4,306	+830	3202	3,625	+423	+407 (0.057) ⁴	0.148
Costs minus MI Care Team Costs ³	3,627	3,917	+290	3,249	3,801	+552	-262 (-0.080) ⁵	0.058

Δ = the difference between pre- (July 1, 2014-June 30, 2016) and post-implementation (July 1, 2016-December 31, 2017) estimates within each group. DID = Difference-in-differences, which compares the Δs between the MI Care Team Group and the Comparison Group. Outcomes are adjusted per member quarterly averages, with propensity score weights applied.

Demographic characteristics of MI Care Team enrollees with 16-18 months of enrollment can be found in Appendix Table F6.

¹ Negative binomial regression to account for high proportion of 0s and many outliers.

² The cost model used a gamma distribution and log link to account for highly skewed cost data.

³ Costs minus MI Care Team program costs subtracts program costs, including initial program enrollment and ongoing care coordination.

⁴ Predicted change in costs (model coefficient = 0.057).

⁵ Predicted change in costs (model coefficient = -0.080).

Pre/post analysis among MI Care Team enrollees

We also conducted analyses using MI Care Team enrollees' actual date of enrollment to determine the pre/post time periods, rather than the program implementation date of July 1, 2016 (alternative analytic approach B). We focused these analyses on the outcomes of emergency department visits, inpatient visits, and costs, and report trends in means of these outcomes for MI Care Team enrollees. Note that these analyses did not include a comparison group and did not use the propensity score weighted method used in the main analyses above. They are also not adjusted for any covariates. Overall, there was a decrease in the mean number of emergency department visits at each post-period (Appendix Table G1). There was also an initial decrease in mean inpatient admissions and costs at 7-12 months post-enrollment, though these differences were not statistically significant by 13-18 months post-enrollment (Appendix Table G1).

When considering duration of enrollment in MI Care Team, enrollees with shorter durations of enrollment had significantly decreased mean costs, but enrollees with longer durations of enrollment did not have significant changes in mean costs (Appendix Tables G2-G3). Given the different methods used for these analyses, it is possible that differences in the characteristics of enrollees that enrolled at different times (more or less comorbidities, lower/higher baseline costs) may account for some of the differences in these trends compared to the main analyses included in this report.

Sensitivity analysis: considering individuals with other sources of coverage

We conducted sensitivity analyses, removing those who had Medicaid only as a secondary payer from the analytic sample, to see if results differed when excluding those individuals (MI Care Team n = 393, comparison group n = 3,889). Findings for health care utilization and cost measures were similar to the main analyses.

Sensitivity analysis: different models for cost analysis

An additional sensitivity analysis looked at total costs with a 2-part model and found almost identical results.

Limitations

The evaluation is based on Medicaid claims data on health care utilization and costs available up to 18 months after implementation of MI Care Team. Implementation of MI Care Team was time intensive; it took over a year to enroll the majority of MI Care Team enrollees. Some participating FQHCs enrolled eligible individuals more quickly than others. Given the short duration of post-implementation data available for this evaluation, many MI Care Team enrollees had fewer than the maximum 18 months of MI Care Team participation.

We did not compare changes in utilization and costs for enrollees across MI Care Team sites. As evidenced by the results of the implementation survey, there was heterogeneity in the implementation of MI Care Team across sites, including differing baseline levels of behavioral health integration at each site and variation in the use of MI Care Team resources for

recruitment, enrollment, and care coordination. It is possible that some participating FQHCs made greater strides in integrating services, which may have had a larger impact on enrollees' utilization and costs.

Health care utilization may not be fully captured in Medicaid claims for beneficiaries who have other sources of insurance coverage; however, sensitivity analyses excluding this group did not differ from the main evaluation analyses. In addition, claims data do not capture other outcomes that may be impacted by MI Care Team participation, such as changes in health outcomes and health behaviors. Thus, we are unable to comment on whether MI Care Team improved enrollee's health.

Regarding analytic approaches, each approach has strengths and limitations. For the main difference-in-difference analysis, strengths include the ability to comment on differential changes experienced by MI Care Team enrollees when compared to similar individuals in the comparison group. Limitations include the specification of the pre/post date around the date of program implementation (July 2016) rather than the date of each enrollee's individual enrollment in MI Care Team; this, and the additional specification that the minimum number of months enrolled in MI Care Team did not need to be continuous, indicates that some "post"-period months included in this analysis include times when beneficiaries were not enrolled in MI Care Team. However, since 55.7% of MI Care Team enrollees in the analysis had at least 12 months of enrollment during the eighteen months of post-implementation data, most "post"-period months represented program enrollment.

For additional analyses limiting the difference-in-difference analysis to sub-groups of enrollees with different durations of enrollment (alternative analytic approach A), strengths included the ability to assess differential changes among enrollees with the longest experience with MI Care Team. Limitations include smaller numbers of individuals in the analysis compared with the main analysis. For pre/post analysis of MI Care Team enrollees, strengths include specification of the post-period by individuals' date of enrollment (alternative analytic approach B), which should reduce the number of "post"-period months when beneficiaries were not enrolled in MI Care Team. Limitations include that not all program participation was continuous, so some "post"-period months may still include times without program participation. In addition, the lack of a comparison group means that changes observed only among MI Care Team enrollees may represent regression to the mean or may be the result of other economic or health care trends not attributable to MI Care Team.

Conclusions and Implications

Overall, after implementation of the demonstration, MI Care Team enrollees appeared to have increased rates of outpatient visits, including behavioral health visits, and a slight increase in skilled nursing facility admissions, while they appeared to have decreased rates of emergency department visits and inpatient admissions. When assessed against the comparison group, MI Care Team enrollees had differential increases in outpatient visits and behavioral health visits, but no differential changes in emergency department visits, inpatient admissions or skilled nursing facility admissions. The use of outpatient services is important for individuals with

comorbid physical and mental health conditions, as it facilitates management of chronic diseases and improvement in health outcomes.

In addition, there was a modest statistically significant increase in per member per quarter costs that may be attributable to MI Care Team payments for completion of the Health Action Plan and ongoing care coordination, since analysis of costs minus these payments showed no significant increase. Monthly care coordination is an important component of MI Care Team, so it is not surprising to see an increase in utilization and associated costs associated for MI Care Team enrollees. While it is possible that the resources provided through this enhanced care coordination would assist enrollees in improving their health outcomes and ultimately lead to reduced utilization, it is expected that at least early in enrollment in a demonstration of this nature, utilization (and therefore costs) will increase. It is possible that further changes in utilization and costs may have occurred after 18 months, but we did not have complete claims data available for later time periods.

These findings show some similarities and some differences from findings of Health Homes demonstration evaluations in other states. In Missouri, evaluators noted reductions in emergency department visits and inpatient admissions, with associated cost savings.¹ In Iowa, there was a reduction in emergency department visits and per member per month spending; evaluators also noted that the greatest cost savings were among enrollees in the program longer than one year.² Studies of models similar to MI Care Team, such as collaborative care programs for behavioral or physical health conditions, have found that such programs may not result in cost reductions but may be cost-effective for improving health outcomes.^{3,4,5}

For enrollees with the longest duration of enrollment, costs minus MI Care Team costs appeared to be trending down while outpatient visits including behavioral health visits increased, when compared to the comparison group. This finding is important as MI Care Team enrollees had increased use of important outpatient services including behavioral health services without changes to non-program related costs. It is possible that further changes in health care utilization and costs may occur after longer periods of program enrollment in MI Care Team, as continued management of chronic conditions occurs through increased outpatient visits and enhanced care coordination.

¹ MO HealthNet. (2013). Missouri primary care health homes: Interim evaluation review summary. Retrieved from https://www.health.ny.gov/health_care/medicaid/program/medicaid_health_homes/assessment_quality_measures/docs/mo_healthnet_primary_care_hh_interim_evaluation_report_summary.pdf

² Shane, D. M., Nguyen-Hoang, P., Bentler, S. E., Damiano, P., & Momany, E. T. (2016). Medicaid health home reducing costs and reliance on emergency department: Evidence from Iowa. *Medical Care*, 54(8), 752-757.

³ Simon, G. E., Katon, W. J., Lin, E. H. B., Rutter, C., Manning, W. G., Von Korff, M., ... Young, B. A. (2007). Cost-effectiveness of systematic depression treatment among people with diabetes mellitus. *Archives of General Psychiatry*, 64(1), 65-72.

⁴ van Steenbergen-Weijnenburg, K. M., van der Feltz-Cornelis, C. M., Horn, E. K., van Marwijk, H. W., Beekman, A. T., Rutten, F. F., & Hakkaart-van Roijen, L. (2010). Cost-effectiveness of collaborative care for the treatment of major depressive disorder in primary care. A systematic review. *BMC Health Services Research*, 10(1).

⁵ Katon, W., Russo, J., Schmittdiel, J., Ciechanowski, P., Ludman, E., Peterson, D., ... Von Korff, M. (2012). Cost-effectiveness of a multicondition collaborative care intervention: a randomized controlled trial. *Archives of General Psychiatry*, 69(5), 506-14.

Appendix A: Identification of MI Care Team Qualifying Diagnoses from Medicaid Claims

Depression, ICD-9 and ICD-10 diagnosis codes

296, 296.0, 296.1, 296.2, 296.3, 296.4, 296.5, 296.6, 296.7, 296.8, 296.9, 296.00, 296.01, 296.02, 296.03, 296.04, 296.05, 296.06, 296.10, 296.11, 296.12, 296.13, 296.14, 296.15, 296.16, 296.20, 296.21, 296.22, 296.23, 296.24, 296.25, 296.26, 296.30, 296.31, 296.32, 296.33, 296.34, 296.35, 296.36, 296.40, 296.41, 296.42, 296.43, 296.44, 296.45, 296.46, 296.50, 296.51, 296.52, 296.53, 296.54, 296.55, 296.56, 296.60, 296.61, 296.62, 296.63, 296.64, 296.65, 296.66, 296.80, 296.81, 296.82, 296.89, 296.90, 296.99, F32.0, F32.1, F32.2, F32.3, F32.4, F32.8, F32.9, F33.0, F33.1, F33.2, F33.3, F33.40, F33.41, F33.42, F33.8, F33.9, F34.1, F34.8, F34.9, F43.21, F43.23

Anxiety, ICD-9 and ICD-10 diagnosis codes

300.0, 300.00, 300.01, 300.02, 300.09, F40.00, F40.01, F40.02, F40.10, F40.11, F40.210, F40.218, F40.220, F40.228, F40.230, F40.231, F40.232, F40.233, F40.240, F40.241, F40.242, F40.243, F40.248, F40.290, F40.291, F40.298, F40.8, F40.9, F41.0, F41.1, F41.3, F41.8, F41.9

Diabetes, ICD-9 and ICD-10 diagnosis codes

250, 250.0, 250.1, 250.2, 250.3, 250.4, 250.5, 250.6, 250.7, 250.8, 250.9, 249.00, 249.01, 249.10, 249.11, 249.20, 249.21, 249.30, 249.31, 249.40, 249.41, 249.50, 249.51, 249.60, 249.61, 249.70, 249.71, 249.80, 249.81, 249.90, 249.91, 250.00, 250.01, 250.02, 250.03, 250.10, 250.11, 250.12, 250.13, 250.20, 250.21, 250.22, 250.23, 250.30, 250.31, 250.32, 250.33, 250.40, 250.41, 250.42, 250.43, 250.50, 250.51, 250.52, 250.53, 250.60, 250.61, 250.62, 250.63, 250.70, 250.71, 250.72, 250.73, 250.80, 250.81, 250.82, 250.83, 250.90, 250.91, 250.92, 250.93, E08.00, E08.01, E08.10, E08.11, E08.21, E08.22, E08.29, E08.311, E08.319, E08.321, E08.329, E08.331, E08.339, E08.341, E08.349, E08.351, E08.359, E08.36, E08.39, E08.40, E08.41, E08.42, E08.43, E08.44, E08.49, E08.51, E08.52, E08.59, E08.610, E08.618, E08.620, E08.621, E08.622, E08.628, E08.630, E08.638, E08.641, E08.649, E08.65, E08.69, E08.8, E08.9, E09.00, E09.01, E09.10, E09.11, E09.21, E09.22, E09.29, E09.311, E09.319, E09.321, E09.329, E09.331, E09.339, E09.341, E09.349, E09.351, E09.359, E09.36, E09.39, E09.40, E09.41, E09.42, E09.43, E09.44, E09.49, E09.51, E09.52, E09.59, E09.610, E09.618, E09.620, E09.621, E09.622, E09.628, E09.630, E09.638, E09.641, E09.649, E09.65, E09.69, E09.8, E09.9, E10.10, E10.11, E10.21, E10.22, E10.29, E10.311, E10.319, E10.321, E10.329, E10.331, E10.339, E10.341, E10.349, E10.351, E10.359, E10.36, E10.39, E10.40, E10.41, E10.42, E10.43, E10.44, E10.49, E10.51, E10.52, E10.59, E10.610, E10.618, E10.620, E10.621, E10.622, E10.628, E10.630, E10.638, E10.641, E10.649, E10.65, E10.69, E10.8, E10.9, E11.00, E11.01, E11.21, E11.22, E11.29, E11.311, E11.319, E11.321, E11.329, E11.331, E11.339, E11.341, E11.349, E11.351, E11.359, E11.36, E11.39, E11.40, E11.41, E11.42, E11.43, E11.44, E11.49, E11.51, E11.52, E11.59, E11.610, E11.618, E11.620, E11.621, E11.622, E11.628, E11.630, E11.638, E11.641, E11.649, E11.65, E11.69, E11.8, E11.9, E13.00, E13.01, E13.10, E13.11, E13.21, E13.22, E13.29, E13.311, E13.319, E13.321, E13.329, E13.331, E13.339, E13.341, E13.349, E13.351, E13.359, E13.36, E13.39, E13.40, E13.41, E13.42, E13.43, E13.44, E13.49, E13.51, E13.52, E13.59, E13.610, E13.618, E13.620, E13.621, E13.622, E13.628, E13.630, E13.638, E13.641, E13.649, E13.65, E13.69, E13.8, E13.9

Hypertension, ICD-9 and ICD-10 diagnosis codes

401, 402, 403, 404, 405, 401.0, 401.1, 401.9, 402.0, 402.1, 402.9, 403.0, 403.1, 403.9, 404.0, 404.1, 404.9, 405.0, 405.1, 405.9, 402.00, 402.01, 402.10, 402.11, 402.90, 402.91, 403.00, 403.01, 403.10, 403.11, 403.90, 403.91, 404.00, 404.01, 404.02, 404.03, 404.10, 404.11, 404.12, 404.13, 404.90, 404.91, 404.92, 404.93, 405.01, 405.09, 405.11, 405.19, 405.91, 405.99,
I1.0, I1.10, I1.19, I1.20, I1.29, I1.30, I1.310, I1.311, I1.50, I1.51, I1.52, I1.58, I1.59, I3.2, I5.01, I5.020, I5.021, I5.022, I5.023, I5.030, I5.031, I5.032, I5.033, I5.040, I5.041, I5.042, I5.043, I5.09

Heart disease, ICD-9 and ICD-10 diagnosis codes

411, 412, 413, 414, 415, 416, 417, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 410.0, 410.1, 410.2, 410.3, 410.4, 410.5, 410.6, 410.7, 410.8, 410.9, 411.0, 411.1, 411.8, 413.0, 413.1, 413.9, 414.0, 414.1, 414.2, 414.3, 414.4, 414.8, 414.9, 415.0, 415.1, 416.0, 416.1, 416.2, 416.8, 416.9, 417.0, 417.1, 417.8, 417.9, 420.0, 420.9, 421.0, 421.1, 421.9, 422.0, 422.9, 423.0, 423.1, 423.2, 423.3, 423.8, 423.9, 424.0, 424.1, 424.2, 424.3, 424.9, 425.0, 425.1, 425.2, 425.3, 425.4, 425.5, 425.7, 425.8, 425.9, 426.0, 426.1, 426.2, 426.3, 426.4, 426.5, 426.6, 426.7, 426.8, 426.9, 427.0, 427.1, 427.2, 427.3, 427.4, 427.5, 427.6, 427.8, 427.9, 428.0, 428.1, 428.2, 428.3, 428.4, 428.9, 429.0, 429.1, 429.2, 429.3, 429.4, 429.5, 429.6, 429.7, 429.8, 429.9, 410.00, 410.01, 410.02, 410.10, 410.11, 410.12, 410.20, 410.21, 410.22, 410.30, 410.31, 410.32, 410.40, 410.41, 410.42, 410.50, 410.51, 410.52, 410.60, 410.61, 410.62, 410.70, 410.71, 410.72, 410.80, 410.81, 410.82, 410.90, 410.91, 410.92, 411.81, 411.89, 414.00, 414.01, 414.02, 414.03, 414.04, 414.05, 414.06, 414.07, 414.10, 414.11, 414.12, 414.19, 415.11, 415.12, 415.13, 415.19, 420.90, 420.91, 420.99, 422.90, 422.91, 422.92, 422.93, 422.99, 424.90, 424.91, 424.99, 425.11, 425.18, 426.10, 426.11, 426.12, 426.13, 426.50, 426.51, 426.52, 426.53, 426.54, 426.81, 426.82, 426.89, 427.31, 427.32, 427.41, 427.42, 427.60, 427.61, 427.69, 427.81, 427.89, 428.20, 428.21, 428.22, 428.23, 428.30, 428.31, 428.32, 428.33, 428.40, 428.41, 428.42, 428.43, 429.71, 429.79, 429.81, 429.82, 429.83, 429.89,
I2.00, I2.01, I2.08, I2.09, I2.101, I2.102, I2.109, I2.111, I2.119, I2.121, I2.129, I2.13, I2.14, I2.20, I2.21, I2.22, I2.28, I2.29, I2.30, I2.31, I2.32, I2.33, I2.34, I2.35, I2.36, I2.37, I2.38, I2.510, I2.5110, I2.5111, I2.5118, I2.5119, I2.52, I2.53, I2.541, I2.542, I2.55, I2.56, I2.5700, I2.5701, I2.5708, I2.5709, I2.5710, I2.5711, I2.5718, I2.5719, I2.5720, I2.5721, I2.5728, I2.5729, I2.5730, I2.5731, I2.5738, I2.5739, I2.5750, I2.5751, I2.5758, I2.5759, I2.5760, I2.5761, I2.5768, I2.5769, I2.5790, I2.5791, I2.5798, I2.5799, I2.5810, I2.5811, I2.5812, I2.582, I2.583, I2.584, I2.589, I2.59, I2.70, I2.71, I2.72, I2.781, I2.782, I2.789, I2.79, I3.00, I3.01, I3.08, I3.09, I3.10, I3.11, I3.12, I3.13, I3.14, I3.18, I3.19, I3.2, I3.30, I3.39, I3.40, I3.41, I3.42, I3.48, I3.49, I3.50, I3.51, I3.52, I3.58, I3.59, I3.60, I3.61, I3.62, I3.68, I3.69, I3.70, I3.71, I3.72, I3.78, I3.79, I3.8, I3.9, I4.00, I4.01, I4.08, I4.09, I4.20, I4.21, I4.22, I4.23, I4.24, I4.25, I4.26, I4.27, I4.28, I4.29, I4.3, I4.40, I4.41, I4.42, I4.430, I4.439, I4.44, I4.45, I4.460, I4.469, I4.47, I4.50, I4.510, I4.519, I4.52, I4.53, I4.54, I4.55, I4.56, I4.581, I4.589, I4.59, I4.70, I4.71, I4.72, I4.79, I4.80, I4.81, I4.82, I4.83, I4.84, I4.901, I4.902, I4.91, I4.92, I4.93, I4.940, I4.949, I4.95, I4.98, I4.99

Chronic Obstructive Pulmonary Disease, ICD-9 and ICD-10 diagnosis codes

I3.2, J4.30, J4.31, J4.32, J4.38, J4.39, J4.40, J4.41, J4.49

Asthma, ICD-9 and ICD-10 diagnosis codes

490, 491, 493, 496, 491.0, 491.1, 491.2, 491.8, 491.9, 492.0, 492.8, 493.0, 493.1, 493.2, 493.9, 494.0, 494.1, 491.20, 491.21, 491.22, 493.00, 493.01, 493.02, 493.10, 493.11, 493.12, 493.20, 493.21, 493.22, 493.81, 493.82, 493.90, 493.91, 493.92,

J4.520, J4.521, J4.522, J4.530, J4.531, J4.532, J4.540, J4.541, J4.542, J4.550, J4.551, J4.552, J4.5901, J4.5902, J4.5909, J4.5990, J4.5991, J4.5998, J4.70, J4.71, J4.79

Appendix B: MI Care Team Participating Federally Qualified Health Centers and Comparison Federally Qualified Health Centers

Region	Health Homes Participating Organizations	Non-Health Homes Participating Organizations
1	<ul style="list-style-type: none"> Thunder Bay Community Health Service (Hillman) Upper Great Lakes Family Health Center (Hancock) 	<ul style="list-style-type: none"> East Jordan Family Health Center (East Jordan) Northwest Michigan Health Services, Inc. (Traverse City) MidMichigan Community Health Services (Houghton Lake) Traverse Health Clinic (Traverse City) Bay Mills Health Center (Brimley) Alcona Health Centers (Lincoln)
2	<ul style="list-style-type: none"> Genesee Community Health Center (Flint) Health Delivery, Inc. (Saginaw) Cherry Health (Grand Rapids) 	<ul style="list-style-type: none"> Hamilton Community Health Network (Flint) Mercy Health-Saint Mary's Community Health Centers (Grand Rapids) Isabella Citizens for Health, Inc. (Mt. Pleasant) Muskegon Family Care (Muskegon Heights) Hackley Community Care Center (Muskegon) Downriver Community Services, Inc. (Algonac) Sterling Area Health Center (Sterling) Baldwin Family Health Care (Baldwin)
3	<ul style="list-style-type: none"> Family Medical Center of Michigan (Temperance) Family Health Center (Kalamazoo) 	<ul style="list-style-type: none"> Packard Health, Inc. (Ann Arbor) Center for Family Health (Jackson) Cassopolis Family Clinic Network (Cassopolis) Ingham Community Health Centers (Lansing) InterCare Community Health Network (Bangor) Grace Health (Battle Creek) St. Joseph County Health Center (Centreville)
4	<ul style="list-style-type: none"> Advantage Health Centers (Detroit) Covenant Community Care (Detroit) The Wellness Plan Medical Centers (Detroit) 	<ul style="list-style-type: none"> Community Health & Social Services (CHASS) Center (Detroit) Detroit Central City (Detroit) Detroit Community Health Connection (Detroit) Wayne County Healthy Communities Health Center (Hamtramck) Western Wayne Family Health Centers (Inkster) Oakland Integrated Healthcare Network (Pontiac) Oakland Primary Health Services (Pontiac) MyCare Health Center (Center Line)

The table includes the 39 Health Center Program grantees (based on the MPCA Directory 2015-16). Regions are defined as: 1) Upper Peninsula/North West/North East; 2) West/East Central/East; 3) South Central/South West/South East; and 4) Detroit

Appendix C: Overview of Final Implementation Survey Findings

Implementation Survey

- Results presented here are from the third and final implementation survey conducted July 18, 2018 - September 26, 2018. The second survey was conducted March 2, 2017 - March 20, 2017. The first survey was conducted September 19, 2016 - October 10, 2016.
- Responses are from the 10 health centers participating in the MI Care Team demonstration.
- Among the 10 respondents of the final survey:
 - 6 completed the first survey
 - 7 completed the second survey
 - 3 did not complete the first or second survey
- Among the 10 respondents of the final survey:
 - 7 identified as Health Homes Coordinators
 - 1 identified as a Nurse Care Manager
 - 2 identified as other and described their positions as “LPN” and “Manager”

Referrals to Community Resources: What’s Happening and What Remains Challenging

What types of community-based or social service organizations do members of your MI Care Team work with regularly to provide resources or referrals to patients? Check all that apply.

Which community-based or social services are most difficult for your patients to access? Check all that apply.

	# of FQHCs reporting they regularly connect MI Care Team enrollees with these resources	# of FQHCs reporting it is difficult for MI Care Team enrollees to connect with these resources
Food assistance	10	1
Housing assistance	10	8
Transportation assistance	10	8
Community centers or other public spaces for community activities/exercise	5	0
Veterans Service Organizations (VSOs)	5	0
Childcare assistance	4	2
Job or vocational training programs	4	0
GED or other community education assistance programs	4	1
Intimate partner violence/domestic violence/child abuse resources	4	0
Resources for seniors/individuals with disabilities	4	1
Resources for non-English speakers (e.g., translation ESL)	3	2

Communication with Local Hospitals or Emergency Rooms

Thinking about the last month, how do members of the MI Care Team communicate with local hospitals or emergency rooms? Check all that apply.

- FQHCs participating in MI Care Team report communicating with local hospitals and emergency rooms most often in the following ways:
 - Messaging via the electronic health record (EHR) about admission/discharge/transfer (5)
 - Messaging via fax about admission/discharge/transfer (5)

How often are you or other members of the care team notified when patients enrolled in MI Care Team receive the following types of care?

	Always/ Usually	About half the time	Rarely	Total
After receiving care in an emergency department	6	2	2	10
Upon hospital admission	5	2	3	10
Upon hospital discharge	7	1	2	10

Level of Behavioral Health Integration

Thinking about the last month, how would you rate the level of integration among the MI Care Team members (primary care provider, behavioral health consultant, nurse care manager, community health worker, health homes coordinator, and psychologist or psychiatrist) at your health center? Pick a whole number from 1 to 6 using the scale below as a guide.

COORDINATED Key Element: Communication		CO-LOCATED Key Element: Physical Proximity		INTEGRATED Key Element: Practice Change	
LEVEL 1 Minimal Collaboration	LEVEL 2 Basic Collaboration at a Distance	LEVEL 3 Basic Collaboration Onsite	LEVEL 4 Close Collaboration Onsite with Some Systems Integration	LEVEL 5 Close Collaboration Approaching an Integrated Practice	LEVEL 6 Full Collaboration in a Transformed / Merged Integrated Practice
Behavioral health, primary care and other healthcare providers work:					
In separate facilities, where they:	In separate facilities, where they:	In same facility not necessarily same offices, where they:	In same space with the same facility, where they:	In same space within the same facility (some shared space), where they:	In same space within the same facility, sharing all practice space, where they:
<ul style="list-style-type: none"> • Have separate systems • Communicate about cases only rarely and under compelling circumstances • Communicate, driven by provider need • May never meet in person • Have limited understanding of each other's roles 	<ul style="list-style-type: none"> • Have separate systems • Communicate periodically about shared patients • Communicate, driven by specific patient issues • May meet as part of larger community • Appreciate each other's roles as resources 	<ul style="list-style-type: none"> • Have separate systems • Communicate regularly about shared patients, by phone or e-mail • Collaborate, driven by need for each other's services and more reliable referral • Meet occasionally to discuss cases due to close proximity • Feel part of a larger yet non-formal team 	<ul style="list-style-type: none"> • Share some systems, like scheduling or medical records • Communicate in person as needed • Collaborate, driven by need for consultation and coordinated plans for difficult patients • Have regular face-to-face interactions about some patients • Have a basic understanding of roles and culture 	<ul style="list-style-type: none"> • Actively seek system solutions together or develop work-arounds • Communicate frequently in person • Collaborate, driven by desire to be a member of the care team • Have regular team meetings to discuss overall patient care and specific patient issues • Have an in-depth understanding of roles and culture 	<ul style="list-style-type: none"> • Have resolved most or all system issues, functioning as one integrated system • Communicate consistently at the system, team, and individual level • Collaborate, driven by shared concept of team care • Have formal and informal meetings to support integrated model of care • Have roles and cultures that blur or blend

Level of Behavioral Health Integration	Number of FQHCs			
	Before MI Care Team	Sept-Oct 2016	March 2017	July-Sept 2018
Level 1	0	0	0	1
Level 2	1	0	0	0
Level 3	5	2	1	3
Level 4	2	7	4	2
Level 5	0	0	4	4
Level 6	1	1	1	0
Total	9	10	10	10

- More than half of MI Care Team organizations report that they are a Level 4 or 5 on the integration scale (Co-located or Integrated) at the time of the final survey.

Is there variation in the level of integration across delivery sites participating in MI Care Team at your health center? If so, please describe.

- Some health centers reported variation in the level of integration across delivery sites participating in MI Care Team.
 - *“Our smaller sites have better systems and communications among the team and coordination of care. Our larger sites struggle more and have a lot of missed opportunities, mostly due to communication issues, but this is something we are working on.”*

Reported Level of Behavioral Health Integration Change Over Time

	Before MI Care Team	Sept-Oct 2016	March 2017	July-Sept 2018	Difference**
Advantage Health Centers	-	4	5	5	-
Cherry Health*	3	4	5	5	+2
Covenant Community Care	4	4	4	3	-1
Family Health Center	3	3	3	4	+1
Family Medical Center of Michigan	3	4	4	5	+2
Genesee Community Health Center*	6	6	6	3	-3
Health Delivery, Inc./Great Lakes Bay Health Center	4	4	5	4	No change
Thunder Bay Community Health Service	3	4	4	5	+2
Upper Great Lakes Family Health Center	2	3	5	3	+1
The Wellness Plan Medical Centers*	3	4	4	1	-2

*Respondent did not complete the first or second survey.

**Difference is from the level reported before MI Care Team to the level reported on the final survey (July-Sept 2018).

- Half of MI Care Team organizations (5) report moving up at least one level in behavioral health integration compared to before MI Care Team implementation.

Experiences with MI Care Team Enrollment

What have been your challenges in recruiting patients to enroll in MI Care Team, if any?

Have you used the Waiver Support Application (WSA)? If yes, how have you used the Waiver Support Application (WSA) in determining eligibility of your patients for MI Care Team?

What other types of health information technology have you used to assist in enrollment or identify your eligible patients for MI Care Team?

- Several reported using their own electronic medical record to assist in enrollment or identify their eligible patients
- Some reported difficulty recruiting/enrolling patients due to various factors
 - Some patients are not interested in the program, are not comfortable with monthly contacts, or miss appointments to complete enrollment
 - Staff turnover
- Experience with Waiver Support Application (WSA)
 - Most MI Care Team FQHCs (8) have used the WSA, some use it regularly
 - Some noted infrequent use or suggested that they rely more on claims/diagnosis data from their own EHR which they felt was more accurate
 - One person reported having significant challenges using the WSA

Experiences with CareConnect 360

Do you use CareConnect 360? If yes, how do you use CareConnect 360 to assess MI Care Team enrollees' health care utilization?

- More than half of MI Care Team FQHCs (6) use CareConnect 360
- Used to view demographics, diagnosis, and claims data including patient use of the ER
- Used to track/monitor certain patient subgroups (e.g. "high utilizers")

Impact of MI Care Team on "High Utilizer" Enrollees

How have "high utilizer" or "super utilizer" enrollees specifically been impacted by MI Care Team, if at all?

Please share any specific stories about the impact of MI Care Team on emergency department utilization that stick out for you.

- Some noted the difficulty of getting "high utilizers" enrolled
- One person reported that "high utilizer" enrollees receive more education on their conditions
- One person described how the process of enrolling in MI Care Team and identifying goals helps enrollees recognize that change is needed
- One person noted a decline in ER use among some "high utilizer" enrollees
 - *"Since enrolling her [patient] ER use has decreased by 50% in the last 18 months....She originally had 108 ER visits when she started in MI Care Team. She has now only gone 16 times for 2018."*

Impact of MI Care Team on Enrollees' Health and Health Care Utilization

For the average enrollee, how has emergency department utilization changed, if at all?

Please share any specific stories about the impact of MI Care Team on emergency department utilization that stick out for you.

Regarding the impact of MI Care Team on enrollees' health: How has MI Care Team participation impacted patients' health, if at all? Please share any stories that stick out for you.

Please share any additional MI Care Team success stories that come to mind.

- Some reported that MI Care Team participation has positively impacted enrollees' health
 - Identification of acute health problems, improved health behaviors, increased medication compliance
- Several reported that emergency department utilization had decreased for the average enrollee
- Several reported other positive impacts of MI Care Team participation on enrollees
 - Increased engagement with their health care
 - Increased receipt of health education
 - Increased access to resources targeting social determinants of health

Impact of MI Care Team on Enrollees' Health

- *"We have a lot of patients that have a goal of weight loss. We have started a walking club and a collaboration with local YMCA for discounted rates for MI Care Team patients. As of June our patients have lost a little more than 4,600 pounds!"*
- *"MI Care team has allowed the Health Center to spend more time teaching patients how to cut and prepare food, how to read and [use] recipes rather than just telling them to eat healthier. We have been able to teach patients low-impact exercise rather than tell them to be more physically active. We have had the time to address socioeconomic concerns that usually outweigh concern for health. One of the greatest outcome of the program has been the sense of community. Our patients have come to know each other through participation in health behavior programs and have made friendships. This is invaluable in a population that suffers from mental illness and can at times feel very 'alone'."*
- *"We have been able to help a patient obtain a new powered chair, and get fuel oil for his home as he had no heat. We have worked with Salvation Army to help patients receive their medication."*

Impact of MI Care Team on Participating FQHCs

- *"Education is something that we continue to talk with patients about and encourage them to not go the ER for acute issues. We are also doing more education for our after hour providers."*
- *"MI Care Team has helped us to maintain more consistent follow up with our patients."*
- *"Patients with MI Care are also more likely to receive an intentional touch-base following an emergency department visit. Our goal organizationally is to create a consistent structure for how all emergency department follow ups are completed so all patients receive high quality follow-up regardless of payer or program."*

Note about survey administration: We administered the survey via an online platform (Qualtrics) and obtained responses from Health Homes coordinators at all MI Care Team organizations at three time points (Fall 2016, Spring 2017, and Summer 2018). This informed our understanding of the implementation of the program within the participating FQHCs.

Appendix D: Identification of Health Care Utilization and Cost Measures from Medicaid Claims

OUTPATIENT VISITS

Outpatient (OP) visits were identified by satisfying one or both of the following criteria:

- 1) Claim Type indicating setting is in the following list:
 - Clinic
 - Family Planning Clinic
 - Federally Qualified Health Center
 - Indian Health Center
 - Local Health Department
 - Outpatient OPPS (unless revenue code='045x' indicating ED)
 - Rural Health Center
 - School Based Services

- 2) Professional records (Invoice Type='P') with Place of Service indicating setting is in the following list:
 - Ambulatory Surgical Center
 - Birthing Center
 - Community Mental Health Center
 - Comprehensive Outpatient Rehabilitation Facility
 - End-Stage Renal Disease Treatment Facility
 - Federally Qualified Health Center
 - Independent Clinic
 - Indian Health Service Provider-based Facility
 - Intermediate Care Facility/Individuals with Intellectual Disabilities
 - Mass Immunization Center
 - Mobile Unit
 - Non-Residential Substance Abuse Treatment Facility
 - Office
 - Psychiatric Facility Partial Hospitalization
 - Public Health Clinic
 - Rural Health Clinic
 - School
 - Tribal 638 Free-standing Facility
 - Urgent Care Facility
 - Walk-in Retail Health Clinic

Dental claims/encounters (Invoice Type='D') were excluded from visit counts.

Behavioral Health (BH) visits were defined as those with a principal mental/behavioral health diagnosis (HEDIS 2016 Mental and Behavioral Disorders Value Set) and/or having the claim submitted by a CMH/PIHP (Member ID Type=88 or 89 on the claim record).

Outpatient visit were classified in one of four ways:

- Non-BH OP in the attributed site (based on Billing NPI)
- Non-BH OP in any other location
- BH OP in the attributed site (based on Billing NPI)
- BH OP in any other location

EMERGENCY DEPARTMENT and/or OBSERVATION CARE VISITS (not resulting in admission)

Emergency department (ED) visits were identified with Institutional records (Invoice Type='I') with Claim Type indicating setting is 'Outpatient OPPTS' and revenue code='045x' or '0981'. Observation visits had revenue code '0762'.

For costs (discussed below), professional records (Invoice Type='P') with Place of Service indicating setting is 'Emergency Room - Hospital' and/or procedure codes for ED or observation care were also included. For this measure, we only counted professional records for ED/observation visits that did not result in an admission.

INPATIENT HOSPITAL ADMISSIONS

Inpatient stays were identified by Institutional records (Invoice Type='I') with Claim Type indicating setting is 'Inpatient' or 'State Psych Facilities'.

For costs (discussed below), professional records (Invoice Type='P') with Place of Service indicating setting is 'Inpatient Hospital', 'Inpatient Psychiatric Hospital', 'Psychiatric Residential Treatment Center', or 'Residential Substance Abuse Treatment Facility', 'Comprehensive Inpatient Rehabilitation Facility' were also included.

SKILLED NURSING FACILITY ADMISSIONS

Nursing facility stays were identified by Institutional records (Invoice Type='I') with Claim Type indicating setting is 'Nursing Facility'.

For costs (discussed below), professional records (Invoice Type='P') with Place of Service indicating setting is 'Nursing Facility' or 'Skilled Nursing Facility' were also included.

HEALTH HOMES COMPREHENSIVE CARE COORDINATION

We noted two variables: one for the number of visits with procedure code='S0280', and one for the number of visits with procedure code='S0281'.

COSTS (PAID AMOUNT)

Monthly paid amounts were extracted for each of the following groups:

As discussed above:

- Outpatient - medical
- Outpatient - behavioral health
- ED/Observation not resulting in admission
- Inpatient
- Skilled Nursing Facility

- Pharmacy

Plus: All Other

Which Includes Claim Type for

- Ambulance
- Dental
- Gross Adjustments
- Hearing Aid Dealer
- Hearing and Speech Centers
- Home Health
- Hospice
- Laboratory
- Med Supplies/DME
- Optometry
- PDN/PDN Home Health
- Pharmacy
- Vision Contractor

or Claim Type=Professional, and Place of Service in:

- Ambulance - Air or Water
- Ambulance - Land
- Assisted Living Facility
- Comprehensive Inpatient Rehabilitation Facility
- Custodial Care Facility
- Group Home
- Home
- Homeless Shelter
- Hospice
- Independent Laboratory
- Military Treatment Facility
- Other Place of Service (includes case management, transportation, home or community support services, etc.)
- Pharmacy
- Place of Employment-Worksite
- Prison Correctional Facility
- Temporary Lodging
- Unknown

Appendix E: Specification of Analytic Models

Propensity score weighting

For both the weighted trend analyses and the difference-in-differences (DID) analyses, we used propensity score models to account for the observable differences between MI Care Team enrollees and the comparison group. The scores were estimated based on the probability of the patient being enrolled in MI Care Team, conditional on demographic covariates, pre-July 2016 diagnoses, and pre-July 2016 utilization and costs. Scores were calculated using the Toolkit for Weighting and Analysis of Nonequivalent Groups (twang) using the twang package in Stata statistical software. We created weights based on the average treatment effect on the population (ATE). We assessed the fit of the weights by reviewing graphical and tabular diagnostic statistics, checking for convergence, balance, and overlap of the resulting weights for the MI Care Team and comparison groups.

Model development

We chose a mixed effects generalized linear model (GLM, or “meglm” in Stata) for our DID analyses, which allowed us to account for multiple time points of data per individual. The main outcome of interest was the interaction term between a group variable (MI Care Team vs. comparison group) and a dummy variable representing dates before and after July 1, 2016, the date of MI Care Team’s program launch.

We created variables representing per member per quarter outcomes, defined as the sum of per member per month visits (or costs) over each of 14 quarters, 8 prior to July 1, 2016, and 6 after that date.

Emergency Department visits

We used a negative binomial distribution to model emergency department visits over time, due to the skewed distribution of this variable with many zeros. This distribution produces estimates of counts, while adjusting for over-dispersion of observations.

Outpatient visits, Behavioral Health visits, Inpatient admissions, Skilled Nursing Facility admissions

For the remainder of the utilization outcomes, we used a Gaussian (normal) distribution in our models. Sensitivity analysis using negative binomial distributions did not produce different results for these outcomes.

Costs

In order to estimate the impact of the program on overall costs, we used a GLM model with a gamma distribution and log link to estimate total cost per quarter for MI Care Team enrollees and comparison individuals. We chose this model based on the skewedness of the cost data, including outliers.

Subpopulation analysis

We conducted cost efficiency analyses by examining sub-groups of the overall evaluation population to assess if there were any baseline characteristics associated with larger changes in utilization and cost. We defined the subpopulations as follows:

1. Baseline highest quartile of emergency department visits: We calculated the top quartile of baseline emergency department visits per month for MI Care Team enrollees (0.345 per member per month visits) and applied this cut point to both groups (MI Care Team and comparison).
2. Baseline ≥ 5 ED visits per year: We created a dummy variable for five or more ED visits per year by extrapolating the per member per month count of ED visits to a 12-month period. We picked this method to avoid undercounting those with fewer than 12 months of data prior to July 1, 2016. We applied this cut point to both the MI Care Team enrollees and the comparison groups.
3. Baseline highest quartile of costs: We calculated the top quartile of baseline per member per month costs for MI Care Team enrollees (\$1,324 per member per month costs) and applied this cut point to both groups (MI Care Team and comparison).
4. Baseline highest quartile count of chronic conditions: We calculated the top quartile of the count of chronic conditions at baseline (including depression, anxiety, diabetes, hypertension, heart disease, chronic obstructive pulmonary disease, and asthma). Individuals with 5 or more of these diagnoses were considered the top quartile, and this cut point was applied to both MI Care Team and comparison groups.
5. ≥ 12 months of enrollment for the MI Care Team group: We limited the study group to those MI Care Team enrollees who had 12 or more months of enrollment between July 1, 2016 and December 31, 2017. We did not limit the comparison group for this analysis.
6. Quartiles of duration of enrollment in MI Care Team: We categorized MI Care Team enrollees into approximate quartiles of enrollment duration, with categories of 6-9 months, 10-12 months, 13-15 months, and 16-18 months of enrollment, excluding those individuals with less than 6 months of enrollment who would not have been included in the main evaluation analyses.

Appendix F: Cost Efficiency/Sub-group Analyses

Table F1. Cost Efficiency/Sub-group Analysis of Changes in Quarterly Health Care Utilization and Costs: Enrollees with Highest Quartile of Baseline Emergency Department Utilization

Outcomes	MI Care Team Enrollees (n = 780)			Comparison Group (n = 6,594)			Adjusted DID (95% CI)	p value
	Pre	Post	Δ	Pre	Post	Δ		
Outpatient visits, all	6.42	7.68	+1.26	6.62	6.97	+0.35	+0.91 (0.31, 1.50)	0.003
Behavioral health visits	2.76	3.32	+0.56	2.79	3.05	+0.26	+0.30 (-0.28, 0.88)	0.310
Emergency department visits	2.10	2.09	-0.01	2.08	2.07	-0.01	-0.0008 (-0.76, 0.074)	0.984
Inpatient admissions	0.16	0.20	+0.04	0.20	0.22	+0.02	+0.016 (-0.011, 0.044)	0.234
Skilled nursing facility admissions	0.025	0.027	+0.002	0.023	0.035	+0.012	-0.010 (-0.021, 0.001)	0.083
Costs (\$)	4,321	5,505	+1,184	4,499	5,235	+736	+448	0.025

Δ = the difference between pre- (July 1, 2014-June 30, 2016) and post-implementation (July 1, 2016-December 31, 2017) estimates within each group. DID = Difference-in-differences, which compares the Δs between MI Care Team enrollees and the comparison group. Outcomes are all pooled per member quarterly averages, with propensity score weights applied.

Table F2. Cost Efficiency/Sub-group Analysis of Changes in Quarterly Health Care Utilization and Costs: Enrollees with Baseline ≥5 Emergency Department Visits Per Year

Outcomes	MI Care Team Enrollees (n = 667)			Comparison Group (n = 5,579)			Adjusted DID (95% CI)	p value
	Pre	Post	Δ	Pre	Post	Δ		
Outpatient visits, all	6.61	7.92	+1.31	6.68	6.97	+0.29	+1.02 (0.32, 1.72)	0.004
Behavioral health visits	2.95	3.54	+0.59	2.83	3.02	+0.19	+0.40 (-0.27, 1.08)	0.24
Emergency department visits	2.30	2.34	+0.04	2.34	2.33	-0.003	+0.019 (-0.062, 0.101)	0.639
Inpatient admissions	0.18	0.23	+0.04	0.22	0.23	+0.02	+0.024 (-0.008, 0.057)	0.144
Skilled nursing facility admissions	0.029	0.032	+0.003	0.025	0.036	+0.011	-0.008 (-0.021, 0.005)	0.222

Costs (\$)	4,561	5,909	+1,349	4,799	5,584	+785	+563	0.017
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Δ = the difference between pre- (July 1, 2014-June 30, 2016) and post-implementation (July 1, 2016-December 31, 2017) estimates within each group. DID = Difference-in-differences, which compares the Δ s between MI Care Team enrollees and the comparison group. Outcomes are all pooled per member quarterly averages, with propensity score weights applied.

Table F3. Cost Efficiency/Sub-group Analysis of Changes in Quarterly Health Care Utilization and Costs: Enrollees with Highest Quartile of Baseline Costs

Outcomes	MI Care Team Enrollees (n = 581)			Comparison Group (n = 4,814)			Adjusted DID (95% CI)	p value
	Pre	Post	Δ	Pre	Post	Δ		
Outpatient visits, all	8.19	9.80	+1.61	9.03	9.30	+0.27	+1.33 (0.59, 2.08)	<0.001
Behavioral health visits	4.08	4.73	+0.65	4.50	4.57	+0.07	+0.58 (-0.15, 1.31)	0.122
Emergency department visits	1.47	1.51	+0.04	1.56	1.58	+0.02	+0.014 (-0.087, 0.115)	0.788
Inpatient admissions	0.23	0.26	+0.03	0.26	0.28	+0.02	+0.009 (-0.026, 0.045)	0.601
Skilled nursing facility admissions	0.026	0.040	+0.014	0.030	0.041	+0.011	-0.012 (-0.034, 0.010)	0.27
Costs (\$)	7,009	8,997	+1,988	7,705	9,427	+1,722	+266	0.391

Δ = the difference between pre- (July 1, 2014-June 30, 2016) and post-implementation (July 1, 2016-December 31, 2017) estimates within each group. DID = Difference-in-differences, which compares the Δ s between MI Care Team enrollees and the comparison group. Outcomes are all pooled per member quarterly averages, with propensity score weights applied.

Table F4. Cost Efficiency/Sub-group Analysis of Changes in Quarterly Health Care Utilization and Costs: Enrollees with Highest Quartile of Baseline Comorbidities (Count of Chronic Conditions)

Outcomes	MI Care Team Enrollees (n = 871)			Comparison Group (n = 5,862)			Adjusted DID (95% CI)	p value
	Pre	Post	Δ	Pre	Post	Δ		
Outpatient visits, all	6.70	8.10	+1.40	7.45	7.41	-0.04	+1.44 (0.96, 1.92)	<0.001
Behavioral health visits	2.58	3.09	+0.52	2.77	2.83	+0.06	+0.46 (0.004, 0.910)	0.048
Emergency department visits	1.23	1.20	-0.02	1.28	1.17	-0.12	+0.074 (-0.007, 0.156)	0.074

Inpatient admissions	0.16	0.17	+0.02	0.18	0.17	-0.01	+0.026 (0.001, 0.051)	0.039
Skilled nursing facility admissions	0.026	0.040	+0.014	0.030	0.041	+0.011	+0.003 (-0.010, 0.016)	0.651
Costs (\$)	5,004	6,178	+1,174	5,440	5,639	199	+975	<0.001

Δ = the difference between pre- (July 1, 2014-June 30, 2016) and post-implementation (July 1, 2016-December 31, 2017) estimates within each group. DID = Difference-in-differences, which compares the Δ s between MI Care Team enrollees and the comparison group. Outcomes are all pooled per member quarterly averages, with propensity score weights applied.

Table F5. Cost Efficiency/Sub-group Analysis of Changes in Quarterly Health Care Utilization and Costs: Enrollees with ≥ 12 Months Participation in MI Care Team

Outcomes	MI Care Team Enrollees (n = 1,477)			Comparison Group (n = 20,936)			Adjusted DID (95% CI)	p value
	Pre	Post	Δ	Pre	Post	Δ		
Outpatient visits, all	5.77	7.33	+1.56	6.27	6.52	+0.25	+1.31 (1.00, 1.62)	<0.001
Behavioral health visits	2.24	2.87	+0.63	2.66	2.84	+0.18	+0.46 (0.17, 0.75)	0.002
Emergency department visits	0.87	0.83	-0.04	0.93	0.91	-0.02	-0.0 (-0.10, 0.04)	0.432
Inpatient admissions	0.09	0.11	+0.02	0.10	0.11	+0.01	+0.005 (-0.009, 0.019)	0.468
Skilled nursing facility admissions	0.010	0.013	+0.003	0.015	0.021	+0.006	-0.003 (-0.010, 0.004)	0.369
Costs (\$)	3,386	4,087	+701	3,333	3,768	+435	+266	0.034

Δ = the difference between pre- (July 1, 2014-June 30, 2016) and post-implementation (July 1, 2016-December 31, 2017) estimates within each group. DID = Difference-in-differences, which compares the Δ s between MI Care Team enrollees and the comparison group. Outcomes are all pooled per member quarterly averages, with propensity score weights applied.

Table F6. Baseline Characteristics of MI Care Team Enrollees by Length of Enrollment in MI Care Team and Comparison Group

Characteristics	MI Care Team Enrollees, By Length of Enrollment				Comparison Group (N=20,936)
	6-9 months (N=741)	10-12 months (N=682)	13-15 months (N=614)	16-18 months (N=657)	
Age, mean years	45.4	46.1	47.6	47.4	44.7
Female, n (%)	495 (66.8)	428 (62.8)	417 (67.9)	449 (68.3)	14,073 (67.2)
Race/Ethnicity, n (%)					

White, non-Hispanic	414 (55.8)	401 (58.8)	357 (58.1)	324 (49.3)	14,104 (67.4)
Black, non-Hispanic	234 (31.6)	205 (30.1)	186 (30.3)	259 (39.4)	4,951 (23.7)
Hispanic	34 (4.6)	27 (4.0)	22 (3.6)	34 (5.2)	632 (3.0)
Other	59 (8.0)	49 (7.2)	49 (8.0)	40 (6.1)	1,249 (6.0)
Geographic region, n (%)					
Upper Peninsula/Northwest/Northeast	115 (15.5)	151 (22.1)	114 (18.6)	83 (12.6)	3,204 (15.3)
West/East/Central	387 (52.2)	261 (38.3)	241 (39.3)	333 (50.7)	7,154 (34.2)
South Central/Southwest/Southeast	143 (19.3)	184 (27.0)	153 (24.9)	140 (21.3)	7,504 (35.8)
Metro Detroit	96 (13.0)	86 (12.6)	106 (17.3)	101 (15.4)	3,074 (14.7)
Diagnoses prior to MI Care Team, n (%)					
Depression	637 (86.0)	571 (83.7)	544 (88.6)	587 (89.4)	18,159 (86.7)
Anxiety	467 (63.0)	465 (68.2)	411 (66.9)	466 (70.9)	14,903 (71.2)
Asthma	361 (48.7)	321 (47.1)	291 (47.4)	354 (53.9)	11,420 (54.6)
COPD	244 (32.9)	185 (27.1)	165 (26.9)	201 (30.6)	5,425 (25.9)
Hypertension	563 (76.0)	533 (78.2)	507 (82.6)	552 (84.0)	15,277 (73.0)
Diabetes	270 (36.4)	267 (39.2)	258 (42.0)	276 (42.0)	6,997 (33.4)
Heart disease	262 (35.4)	265 (38.9)	220 (35.8)	241 (36.7)	7,711 (36.8)
Utilization prior to MI Care Team, mean per member per month					
Outpatient visits	2.39	2.20	2.47	2.49	2.16
Emergency department visits	0.35	0.34	0.30	0.28	0.34
Inpatient admissions	0.031	0.033	0.033	0.033	0.041
Skilled nursing facility admissions	0.0036	0.0040	0.0038	0.0027	0.0055
Costs prior to MI Care Team, mean per member per month	\$917	\$1,059	\$954	\$1,002	\$1,147
MI Care Team Visits, mean	7.0	10.0	13.3	16.2	N/A

Measures prior to MI Care Team implementation were obtained from the MDHHS Data Warehouse in the period July 1, 2014 - June 30, 2016.

Table F7. Cost Efficiency/Sub-group Analysis of Changes in Quarterly Outpatient Visits (all) by Length of Enrollment in MI Care Team

MI Care Team Length of Enrollment	MI Care Team Enrollees			Comparison Group (n = 20,936)			Adjusted DID (95% CI)	p value
	Pre	Post	Δ	Pre	Post	Δ		
6-9 months (n = 741)	5.36	7.46	+2.10	5.84	6.16	+0.32	+1.78 (1.17, 2.38)	<0.001

10-12 months (n = 682)	5.52	6.96	+1.44				+1.12 (0.64, 1.60)	<0.001
13-15 months (n = 614)	5.81	7.79	+1.99				+1.66 (1.11, 2.22)	<0.001
16-18 months (n = 657)	6.14	8.25	+2.11				+1.79 (1.28, 2.30)	<0.001

Δ = the difference between pre- (July 1, 2014-June 30, 2016) and post-implementation (July 1, 2016-December 31, 2017) estimates within each group. DID = Difference-in-differences, which compares the Δ s between the MI Care Team Group and the Comparison Group. Outcomes are all pooled per member quarterly averages, with propensity score weights applied.

Table F8. Cost Efficiency/Sub-group Analysis of Changes in Quarterly Behavioral Health Visits by Length of Enrollment in MI Care Team

MI Care Team Length of Enrollment	MI Care Team Enrollees			Comparison Group (n = 20,936)			Adjusted DID (95% CI)	p value
	Pre	Post	Δ	Pre	Post	Δ		
6-9 months (n = 741)	2.37	3.79	+1.42	2.48	2.68	+0.2	+1.22 (0.63, 1.82)	<0.001
10-12 months (n = 682)	2.31	2.99	+0.68				+0.48 (0.03, 0.94)	0.036
13-15 months (n = 614)	2.46	3.30	+0.84				+0.64 (0.10, 1.19)	0.02
16-18 months (n = 657)	2.42	3.24	+0.81				+0.61 (0.14, 1.09)	0.011

Δ = the difference between pre- (July 1, 2014-June 30, 2016) and post-implementation (July 1, 2016-December 31, 2017) estimates within each group. DID = Difference-in-differences, which compares the Δ s between the MI Care Team Group and the Comparison Group. Outcomes are all pooled per member quarterly averages, with propensity score weights applied.

Table F9. Cost Efficiency/Sub-group Analysis of Changes in Quarterly Emergency Department Visits¹ by Length of Enrollment in MI Care Team

MI Care Team Length of Enrollment	MI Care Team Enrollees			Comparison Group (n = 20,936)			Adjusted DID (95% CI)	p value
	Pre	Post	Δ	Pre	Post	Δ		
6-9 months (n = 741)	0.90	0.84	-0.06	0.88	0.88	+0	-0.069 (-0.17, 0.034)	0.188
10-12 months (n = 682)	0.84	0.87	+0.02				+0.028 (-0.065, 0.12)	0.551
13-15 months (n = 614)	0.83	0.81	-0.02				-0.025 (-0.12, 0.070)	0.608
16-18 months	0.77	0.76	-0.01				-0.013	0.823

(n = 657)								(-0.13, 0.10)	
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Δ = the difference between pre- (July 1, 2014-June 30, 2016) and post-implementation (July 1, 2016-December 31, 2017) estimates within each group. DID = Difference-in-differences, which compares the Δs between the MI Care Team Group and the Comparison Group. Outcomes are all pooled per member quarterly averages, with propensity score weights applied.

¹Negative binomial regression to account for high proportion of 0s and many outliers.

Table F10. Cost Efficiency/Sub-group Analysis of Changes in Quarterly Inpatient Admissions by Length of Enrollment in MI Care Team

MI Care Team Length of Enrollment	MI Care Team Enrollees			Comparison Group (n = 20,936)			Adjusted DID (95% CI)	p value
	Pre	Post	Δ	Pre	Post	Δ		
6-9 months (n = 741)	0.09	0.09	+0.002	0.097	0.106	+0.009	-0.0064 (-0.023, 0.010)	0.453
10-12 months (n = 682)	0.08	0.08	+0.001				-0.0068 (-0.022, 0.0084)	0.380
13-15 months (n = 614)	0.09	0.10	+0.008				-0.00054 (-0.019, 0.018)	0.953
16-18 months (n = 657)	0.09	0.08	-0.002				-0.011 (-0.026, 0.0053)	0.191

Δ = the difference between pre- (July 1, 2014-June 30, 2016) and post-implementation (July 1, 2016-December 31, 2017) estimates within each group. DID = Difference-in-differences, which compares the Δs between the MI Care Team Group and the Comparison Group. Outcomes are all pooled per member quarterly averages, with propensity score weights applied.

Table F11. Cost Efficiency/Sub-group Analysis of Changes in Quarterly Skilled Nursing Facility Admissions by Length of Enrollment in MI Care Team

MI Care Team Length of Enrollment	MI Care Team Enrollees			Comparison Group (n = 20,936)			Adjusted DID (95% CI)	p value
	Pre	Post	Δ	Pre	Post	Δ		
6-9 months (n = 741)	0.014	0.007	-0.007	0.014	0.021	+0.007	-0.014 (-0.023, -0.0054)	0.001
10-12 months (n = 682)	0.007	0.013	+0.006				-0.0011 (-0.0085, 0.0066)	0.782
13-15 months (n = 614)	0.008	0.012	+0.005				-0.0025 (-0.01, 0.0049)	0.502
16-18 months (n = 657)	0.008	0.012	+0.004				-0.0036 (-0.015, 0.0072)	0.512

Δ = the difference between pre- (July 1, 2014-June 30, 2016) and post-implementation (July 1, 2016-December 31, 2017) estimates within each group. DID = Difference-in-differences, which

compares the Δ s between the MI Care Team Group and the Comparison Group. Outcomes are all pooled per member quarterly averages, with propensity score weights applied.

Table F12. Cost Efficiency/Sub-group Analysis of Changes in Quarterly Costs¹ (\$) by Length of Enrollment in MI Care Team

MI Care Team Length of Enrollment	MI Care Team Enrollees			Comparison Group (n = 20,936)			Adjusted DID (Model Coef*)	p value
	Pre	Post	Δ	Pre	Post	Δ		
6-9 months (n = 741)	2,888	3,847	+959	3,202	3,625	+423	+535 (0.13)	0.003
10-12 months (n = 682)	2,883	3,676	+793				+370 (0.086)	0.034
13-15 months (n = 614)	3,086	3,889	+803				+379 (0.074)	0.091
16-18 months (n = 657)	3,476	4,306	+830				+407 (0.057)	0.148

Δ = the difference between pre- (July 1, 2014-June 30, 2016) and post-implementation (July 1, 2016-December 31, 2017) estimates within each group. DID = Difference-in-differences, which compares the Δ s between the MI Care Team Group and the Comparison Group. Outcomes are all pooled per member quarterly averages, with propensity score weights applied.

¹ The cost model used a gamma distribution and log link to account for highly skewed cost data
 * Coefficient represents the multiplicative effect of enrollment in MI Care Team on total quarterly cost (e.g. 0.13 = 13% higher increase in cost for those in MI Care Team compared to those not in MI Care Team).

Table F13. Cost Efficiency/Sub-group Analysis of Changes in Quarterly Costs Minus MI Care Team Program Costs^{1,2} (\$) by Length of Enrollment in MI Care Team

MI Care Team Length of Enrollment	MI Care Team Enrollees			Comparison Group (n = 20,936)			Adjusted DID (Model Coef*)	p value
	Pre	Post	Δ	Pre	Post	Δ		
6-9 months (n = 741)	3,008	3,716	+708	3,249	3,801	+552	+156 (0.055)	0.222
10-12 months (n = 682)	2,997	3,372	+375				-177 (-0.039)	0.360
13-15 months (n = 614)	3,219	3,536	+317				-235 (-0.063)	0.182
16-18 months (n = 657)	3,627	3,917	+290				-262 (-0.080)	0.058

Δ = the difference between pre- (July 1, 2014-June 30, 2016) and post-implementation (July 1, 2016-December 31, 2017) estimates within each group. DID = Difference-in-differences, which

compares the Δ s between the MI Care Team Group and the Comparison Group. Outcomes are all pooled per member quarterly averages, with propensity score weights applied.

¹ Costs represent total costs minus MI Care Team program costs, which include initial program enrollment and ongoing care coordination.

² The cost model used a gamma distribution and log link to account for highly skewed cost data.

* Coefficient represents the multiplicative effect of enrollment in MI Care Team on total quarterly cost (e.g. 0.055 = 5.5% higher increase in cost for those in MI Care Team compared to those not in MI Care Team).

Appendix G: Sensitivity Analyses: Alternative Specification of Pre/Post Date and associated Cost Efficiency/Sub-group Analyses

Table G1. Changes in Acute Health Care Utilization and Costs for MI Care Team Enrollees Before and After Enrollment in MI Care Team

Outcomes	Means						
	Pre	6 months post enrollment	<i>p</i> value	7-12 months post enrollment	<i>p</i> value	13-18 months post enrollment	<i>p</i> value
Emergency department visits ¹ (mean/month)	0.32	0.27	<0.001	0.27	<0.001	0.25	<0.001
Inpatient admissions (mean/month)	0.036	0.030	0.011	0.029	0.003	0.033	0.236
Costs ² (\$/month)	1,137	1,109	0.610	1,029	0.030	1,123	0.497
Costs ^{2,3} (minus MI Care Team program costs, \$/month)	1,136	1,034	0.036	978	0.001	1,079	0.159

¹ Negative binomial regression to account for high proportion of 0s and many outliers.

² The cost model used a gamma distribution and log link to account for highly skewed cost data.

³ Costs represent total costs minus MI Care Team program costs, which include initial program enrollment and ongoing care coordination.

Table G2. Cost Efficiency/Sub-group Analysis of Changes in Costs¹ (\$) by Length of Enrollment in MI Care Team

MI Care Team Length of Enrollment	Means						
	Pre	6 months post enrollment	<i>p</i> value	7-12 months post enrollment	<i>p</i> value	13-18 months post enrollment	<i>p</i> value
6-9 months	1,245	1,040	0.006	860	<0.001	802*	0.040
10-12 months	1,097	1,105	0.824	1,014	0.221	1,049**	0.008
13-15 months	1,063	1,163	0.480	1,112	0.728	1,216	0.294
16-18 months	1,122	1,145	0.660	1,157	0.546	1,084	0.620

¹ The cost model used a gamma distribution and log link to account for highly skewed cost data.

*Estimates based on 93 observations (11.5% of total in the 6-9 month group)

**Estimates based on 70 observations (9.6% of total in the 10-12 month group)

Table G3. Cost Efficiency/Sub-group Analysis of Changes in Costs minus MI Care Team Program Costs^{1,2} (\$) by Length of Enrollment in MI Care Team

MI Care Team Length of Enrollment	Means						
	Pre	6 months post enrollment	<i>p</i> value	7-12 months post enrollment	<i>p</i> value	13-18 months post enrollment	<i>p</i> value
6-9 months	1,244	968	<0.001	818	<0.001	801*	0.036
10-12 months	1,096	1,029	0.351	965	0.050	1,039**	0.006
13-15 months	1,063	1,086	0.859	1,056	0.974	1,171	0.459
16-18 months	1,120	1,071	0.530	1,096	0.791	1,032	0.219

¹ Costs represent total costs minus MI Care Team program costs, which include initial program enrollment and ongoing care coordination.

² The cost model used a gamma distribution and log link to account for highly skewed cost data.

*Estimates based on 93 observations (11.5% of total in the 6-9 month group)

**Estimates based on 70 observations (9.6% of total in the 10-12 month group)