

Impact of the Collaborative Care Model on Medical Spending

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The collaborative care model (CoCM) integrates mental health care into primary care to effectively treat common mental health conditions.¹ Multiple randomized controlled trials have demonstrated the efficacy of CoCM, most notably for depression and anxiety.¹⁻³ CoCM is delivered by a team comprising a primary care provider (PCP), a behavioral health care manager (BHCM), and a psychiatric consultant. The care team uses evidence-based practices and measurement-based care and maintains a registry to track patients.

Data on the relationship between CoCM and total medical spending over time are limited.^{2,3} Previously, the lack of sustainable reimbursement for CoCM limited widespread uptake.⁴ In 2017, CMS created new billing codes to reimburse for time spent delivering CoCM (ie, 99492-99494)^{5,6} under the supervision of the PCP.

The CoCM codes have increasingly been adopted by commercial and state Medicaid plans, but there remain gaps in coverage.⁷ We measured the impact of a program supported by these billing codes on total medical spending in a commercially insured and managed Medicare sample.

METHODS

We analyzed data from the Penn Integrated Care (PIC) CoCM program⁸ in 8 primary care practices in the University of Pennsylvania Health System. The PIC program has been described in detail previously.⁸ Briefly, PCPs may refer patients with behavioral health needs to a centralized telephonic resource center for intake and triage. Intake coordinators assess the patient by telephone using standardized, validated measures. Patients are triaged to the most appropriate level of care, including CoCM or community settings, using an established algorithm.⁹ Generally, patients with mild to moderate depression, anxiety, or alcohol misuse are eligible for CoCM. PIC BHCMs carry a mean caseload of 56 patients per month (range, 47-79).

Using insurance claims data from a large health insurer in the Philadelphia region, we identified 825 patients during 2019 who had 6 months of continuous insurance enrollment prior to, and 12 months following, initiation of CoCM. We identified a pool

ABSTRACT

OBJECTIVES: The collaborative care model integrates mental health care into primary care. In 2017, CMS created new billing codes to reimburse collaborative care. We measured the impact of a program supported by these codes on medical spending.

STUDY DESIGN: Quasi-experimental.

METHODS: We identified a commercially insured and managed Medicare sample of 825 patients who received collaborative care services in 8 primary care practices. We used propensity score matching to match treated patients to potential controls, resulting in 569 patients per group. We performed a difference-in-differences regression analysis to evaluate the impact of collaborative care on total medical spending, including medical, psychiatric, and pharmaceutical claims.

RESULTS: Collaborative care patients' mean total medical cost began to fall after a patient's third month in the program and fell below the mean cost of control patients at month 7. Difference-in-differences regressions indicate a nonsignificant savings in total medical cost of \$29.35 per member per month for patients in collaborative care compared with matched controls [95% CI, -\$226.52 to \$167.82]. Treated members incurred \$34.11 (95% CI, \$31.95-\$36.27) higher primary care costs that were directly attributed to collaborative care, \$19.91 (95% CI, \$4.84-\$34.98) higher costs for other mental or behavioral health care, and a nonsignificant reduction of \$91.34 (95% CI, -\$319.32 to \$136.63) in inpatient costs.

CONCLUSIONS: Modest spending on collaborative care services to address the behavioral health needs of patients did not increase overall health care costs. This is the first economic study of a collaborative care program supported by the new billing codes.

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TAKEAWAY POINTS

- Modest spending on the collaborative care model is a worthwhile investment.
- ▶ Modest spending on collaborative care services to address the behavioral health needs of patients did not increase overall health care costs.
- ▶ The new collaborative care billing codes provide greater financial sustainability for the model.
- ▶ Coverage of the billing codes affords improved access to mental health care without increasing overall spending, which should reassure insurers.
- ▶ Investment in collaborative care is important because it allows psychiatric expertise to reach more patients than specialty mental health settings can accommodate and may be more convenient and less stigmatizing for patients.

TABLE 1. Descriptive Characteristics of PIC and Non-PIC Patients Before and After Propensity Score Matching*

Covariate	Prematching		After matching	
	Non-PIC (n=52,475)	PIC (n=825)	Non-PIC (n=569)	PIC (n=569)
Male gender, %	42	28	35	31
Age in years, mean	45.80	40.98	41.12	40.75
Medicare, %	8	4	2	2
PPO, %	61	51	54	53
Fully insured, %	46	32	27	31
Census variables (tract-level)				
Black, %	11.90	41.44	35.16	36.30
Asian, %	5.75	6.78	6.43	6.58
Other race, %	1.75	2.96	2.74	2.83
Median income	\$121,867	\$78,562	\$87,979	\$86,593
Unemployment rate, %	5.41	8.92	8.30	8.28
Bachelor's degree or higher, %	48.58	35.94	39.58	38.73
Lives in Philadelphia County, %	15	74	67	66
Community needs index score	2.24	3.50	3.24	3.26
Mean total medical cost				
Month 1	\$410	\$412	\$235	\$354
Month 2	\$403	\$556	\$292	\$254
Month 3	\$399	\$430	\$237	\$262
Month 4	\$395	\$543	\$235	\$238
Month 5	\$395	\$404	\$207	\$263
Month 6	\$396	\$342	\$214	\$228
Concurrent risk score, mean	2.96	3.23	1.85	1.80
Prospective risk score, mean	2.23	2.28	1.53	1.52
Anxiety, %	13	25	16	16
Depression, %	12	36	22	22
Chronic kidney disease, %	5	7	4	6
Chronic obstructive pulmonary disease, %	3	2	1	1
Congestive heart failure, %	1	1	0	1
Coronary artery disease, %	5	3	2	1
Diabetes, %	7	11	8	9
Hypertension, %	19	21	18	17
Had an inpatient visit, %	3	4	0	0
Had a behavioral health carve-out claim, %	6	7	6	6

PIC, Penn Integrated Care; PPO, preferred provider organization.
 *Significant ($P \leq .05$) differences are bolded.

of 52,475 members from comparison group primary care practices in the same health system who were used to match PIC members on health status and spending. Given that the program was initially offered at a small subset of Penn practices, we used the patients of the nonparticipating Penn practices as a comparison group and matched members participating to those at practices that did not offer the program during the study period but later adopted the model within their practice.

We used propensity score matching to match treated patients to potential controls, resulting in 569 patients per group (Table 1). Members were matched on demographics, Census variables, selected chronic conditions, total medical costs for each month leading up to the intervention, risk scores, inpatient utilization, insurance product type (ie, health maintenance organization or preferred provider organization), insurance contract type (ie, fully insured or self-funded plan), and whether they had any behavioral health carve-out claims. They were also exact matched on line of business (eg, commercial, Medicare Advantage, Affordable Care Act), preperiod inpatient costs, and indicators for anxiety and depression diagnoses.

The matching was conducted using a 1:1 ratio with a nearest neighbor match. The process was also iterative because the comparison group did not have a natural index date. For each member of the comparison group, multiple segments of 18 months (full study period) of continuous enrollment were constructed. This resulted in multiple segments, with distinct index dates, for each comparison group member. We then iterated through the index dates to match treated members at the index date level. Once a comparison group member was matched, their remaining segments were removed from the matching pool. The process continued until no additional matches could be made. This resulted in 569 matched pairs. Only those treated members with matches were included. Data from 256 unmatched members were discarded because there were no suitable control group segments to compare them with. In terms of preperiod characteristics, these unmatched members incurred substantially greater medical costs, were more clinically complex (eg, more chronic conditions, higher

risk scores), were nearly all female, and were from Census tracts that were more diverse and of lower socioeconomic status. Although these unmatched members were found to have high pretreatment costs, we observed a nonsignificant decrease in mean monthly cost of 7.5% after treatment.

We performed a difference-in-differences regression analysis to evaluate the impact of CoCM on total medical spending, including medical, psychiatric, and pharmaceutical claims. Costs were segmented by whether the servicing provider was attributed to a list of behavioral health carve-out providers. This was done for multiple types of costs, with the exception of inpatient costs, which were not segmented by behavioral health carve-out providers. PIC costs were calculated using the 994XX *Current Procedural Terminology* codes that were specially authorized by PIC-participating primary care practices.

The difference-in-differences model was specified as a 2 × 2 structure, with the group's period costs averaged to the per-member per-month (PMPM) level. The cost outcomes were regressed on period and group indicators as well as their interaction using generalized linear model estimation with a γ distribution and log link function. Preperiod parallel cost trends were ensured by matching on each of the monthly costs in the preperiod. Parallel trends were confirmed both visually and via regression analysis where there was no statistically significant deviation from the common trend ($P = .2654$). Covariate balance was also achieved in the matching process for all preperiod covariates as demonstrated in the descriptive Table 1 of the matched cohort.

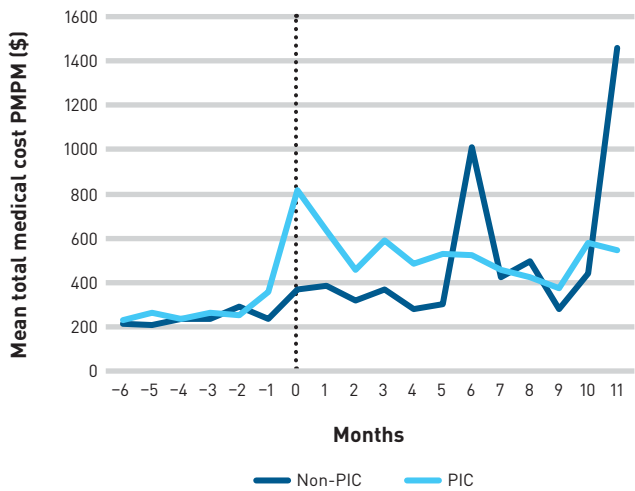
RESULTS

The **Figure** indicates relatively parallel trends in total medical cost in the 6 months prior to a patient engaging in CoCM relative to controls. Once engaged in CoCM, patients incurred higher mean total medical costs compared with control patients. CoCM patients' mean total medical cost began to fall after a patient's third month in the program and fell below the mean total medical cost of control patients at month 7.

Difference-in-differences regressions indicate a nonsignificant savings in total medical cost of \$29.35 PMPM for patients in CoCM compared with matched controls (95% CI, -\$226.52 to \$167.82). Treated members incurred \$34.11 PMPM (95% CI, \$31.95-\$36.27) higher primary care costs that were directly attributed to CoCM, and \$19.91 (95% CI, \$4.84-\$34.98) higher costs for other mental or behavioral health care. Treated members realized a nonsignificant reduction of \$91.34 PMPM (95% CI, -\$319.32 to \$136.63) in inpatient costs (**Table 2**).

Because we observed an increase in cost for the control group in the last month of the study period (month 11), we removed month 11, reestimated the model, and obtained a new point estimate of \$39.02. Although the sign of the estimate changed from a cost savings to a cost increase, the estimate is still nonsignificant. Additionally, the new point estimate is nearly identical to the \$34.11 point estimate on the cost of the PIC program. Further exploration

FIGURE. Mean Total Medical Costs PMPM From the 6 Months Prior to PIC Implementation Through 12 Months of PIC Implementation



PIC, Penn Integrated Care; PMPM, per member per month.

TABLE 2. Differences in Cost by Category^a

Outcome	Difference
Total medical cost	
Overall	-\$29.35
Behavioral health	\$19.91
Non-behavioral health	-\$72.46
PIC cost	\$34.11
Inpatient cost	-\$91.34
Emergency department	
Overall	\$7.44
Behavioral health	-\$0.36
Non-behavioral health	\$8.04
Urgent care center	\$0.46
Retail clinic	\$0.20
Primary care	
Overall	\$40.29
Behavioral health	\$0.00
Non-behavioral health	\$11.50
PIC cost	\$34.11

PIC, Penn Integrated Care.

^aSignificant ($P \leq .05$) differences are bolded.

of the data revealed that 1 member of the control group had a very costly COVID-19-related inpatient stay in month 11.

DISCUSSION

This is the first economic study of a CoCM program supported by the new billing codes, which make it more financially sustainable

for primary care practices and health systems to implement CoCM. The PIC CoCM program provided additional services to address the behavioral health needs of patients without significantly increasing overall health care costs. Although we did not see explicit evidence of cost savings, we observed that the PIC program did not lead to an increase in cost (ie, the program is cost neutral) despite the provision of mental health services. The finding that the program was cost neutral appears robust, even when excluding the last month of the study.

Limitations

Limitations include a relatively small sample size in a single health system. Our analysis includes data from continuously enrolled members from 1 commercial insurer that reimburses for CoCM services, which may limit generalizability. Exploratory post hoc analyses did not reveal any notable differences between members with and without continuous enrollment in the present sample. It is also worth noting that the study post period included the COVID-19 pandemic; future studies that examine the impact of the pandemic on CoCM implementation and costs are needed.

CONCLUSIONS

These study findings add to the evidence that CoCM is an efficient strategy for improving health outcomes. It also should reassure insurers that coverage of the new billing codes affords improved access to mental health care⁸ without increasing overall spending. Given limited access to specialty mental health care in the United States, CoCM allows psychiatric expertise to reach an exponentially larger group of patients,¹⁰ although some barriers to implementation of the CoCM codes still exist.¹¹ Additionally, services are based in primary care, which may be more convenient and less stigmatizing for patients. ■

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