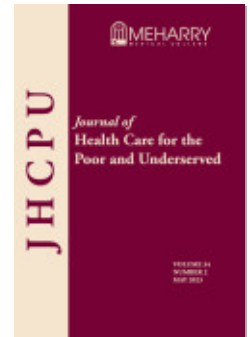# The Effectiveness of Collaborative Care in Publicly Insured Populations

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The Effectiveness of Collaborative Care in Publicly Insured Populations

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Abstract: The Centers for Medicare and Medicaid Services covers the cost of collaborative care for Medicare beneficiaries. However, only 24 states cover the costs of collaborative care in their Medicaid programs despite evidence indicating the cost-effectiveness of delivering behavioral health services in primary care. This study examines benchmark data from a behavioral health medical group embedded within primary care practices across the United States using a large dataset of patients treated in collaborative care. The study explores the effectiveness of collaborative care in reducing depression and anxiety symptoms by comparing Medicare, Medicaid, and privately insured populations, seeking to inform the importance of supporting advocacy for continued Medicaid fee adoption for collaborative care.

Key Words: Effectiveness of collaborative care, collaborative care, Medicaid, Medicare, depression, anxiety, PHQ-9, GAD-7, publicly insured populations, policy, reimbursement.

In 2017, the Centers for Medicaid and Medicare Services approved payment for collaborative care, an evidence-based behavioral health intervention, as a Medicare benefit. Since then, 24 states have added the collaborative care codes to their state Medicaid programs to support broader adoption of the model and expand access to evidence-based behavioral health services, particularly in underserved communities.[1]

With over 90 randomized trials and implementation studies, collaborative care has emerged as an evidence-based model providing access to behavioral health services for patients with depression and anxiety.[2–20] The team-based approach effectively and efficiently addresses population health needs.[3,4,5,20] Similar to a chronic illness model, collaborative care identifies the behavioral health condition through instrument use (PHQ-9; GAD-7), assessment and diagnosis of depression and/or anxiety, and utilization of a registry to ensure measurement-based care. Collaborative care behavioral health clinicians in primary care effectively address and monitor depressive and/or

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anxiety symptoms and symptom reduction and use psychiatric consultants to support psychotropic medication guidelines for primary care providers. This, therefore, allows collaborative care to address depressive and/or anxiety symptoms directly as collaborative care is inherently a treat-to-target model.[2,20]

Collaborative care's systemic approach for primary care practices allows for improvement in behavioral health conditions across a variety of settings and populations.[7,20] Collaborative care is effective across age groups and with diverse groups of individuals; significant empirical evidence concerning collaborative care supports decreases in depressive symptoms with an overall improvement in quality of life despite cultural or linguistic barriers.[11,12,20]

The effectiveness of collaborative care in publicly insured populations has not been widely studied. A 2020 cohort study[13] focused on effectiveness for patients with depression without considering the type of insurance, while other studies explored the effectiveness of collaborative care for Medicare and Medicaid populations. Most notable is Chwastiak et al.,[14] which focused on collaborative care for individuals with poorly controlled type 2 diabetes in urban safety-net primary care clinics, and Price-Haywood et al., which examined the impact of collaborative care on publicly insured populations within the context of medical homes.[15] This study examines the effectiveness of collaborative care for depression and anxiety according to type of insurance.

Methods

Participants and study design. The data collected in the provision of collaborative care are from Concert Health, a behavioral health medical group providing telehealth collaborative care across 12 states through primary care providers. Publicly insured populations constitute over half the patients cared for at this organization and thus, one of the largest datasets for analysis. This study has a longitudinal design based on secondary data, from April 21, 2017 to June 18, 2021 by Concert Health and stored in the company's comprehensive registry. This registry covers data from multiple providers across 12 states. The original Concert Health data include 10,147 unique individuals. There is no patient enrolled in collaborative care more than once in the study period. The inclusion criteria for the study participants were (1) adults aged 18 years or older; (2) having at least mild symptoms of depression or anxiety; (3) having PHQ-9 and GAD-7 measurements at baseline (t0) and end of treatment (t1); (4) less than 121 enrollment days in collaborative care. Participants were classified into two groups according to enrollment days in collaborative care: (1) within 90 enrollment days and (2) between 91 and 120 enrollment days. These cutoff dates are the treatment cutoff dates recommended by the AIMS Center.[17–21] Based on symptomology, clinical judgment was used to determine whether patients were administered the PHQ-9 or GAD-7. The data from 2017 to 2021 were pooled.

Measures. Outcome measures were achieved benchmarks related to depression and anxiety. Depressive symptoms were assessed using the PHQ-9, a nine-item scale with scores ranging from 0 to 27: 0–4 minimal depression, 5–9 mild depression, 10–14 moderate depression, and 15–27 severe depression.[16] Anxiety symptoms were measured using the GAD-7, a seven-item scale with the scores ranging from 0 to 21: 0–4 minimal

anxiety, 5–9 mild anxiety, 10–14 moderate anxiety, and over 15 severe anxiety.[22] The PHQ-9 and GAD-7 surveys are well-established and reliable measures of depression and anxiety symptoms, respectively.[16,17,22] Two types of benchmarks were used: score reduction (10 points or higher reduction in PHQ-9 or GAD-7 outcomes from t0 to t1) and percentage reduction (50% or higher reduction in PHQ-9 or GAD-7 outcomes from t0 to t1). This study operationalized the achieved benchmark cases as those that reached at least one of the benchmarks.

Covariates included age, enrollment days, number of provider contacts, type of insurance payer, and severity of initial symptoms. Age is measured in years as a continuous variable. Enrollment days is defined as the number of days enrolled in collaborative care in the health care setting. Provider contacts refer to interactions via phone or video conference with the collaborative care clinician that are five minutes or longer. Insurance payer types were indicated by a categorical variable that included Medicaid, Medicare, and commercial insurance, where Medicaid was used as the reference value. The severity of initial symptoms is measured as a categorical variable indicated by the patient's PHQ-9 or GAD-7 score at baseline, with mild severity used as the reference value.

Data analysis. Descriptive univariate statistics were performed with means and standard deviations (SD) for continuous variables and frequencies and percentages for categorical variables. Simple binary logistic regression analysis was used to examine bivariate associations between benchmark outcomes (dependent variables) and sample characteristics (covariate variables). Univariate/multivariate logistic regressions were used to explore the association between covariates and benchmark outcomes, after controlling for other variables. For t-test, chi-square test and logistic regression analysis, two-tailed tests were conducted, and level of statistical significance was set as a p-value less than .05. SPSS 28.0 was used to perform statistical analysis.[23]

Results

The sample for this analysis included four subsamples of adult patients who had both baseline and end of treatment scores for PHQ-9 and GAD-7 and up to 90 days of enrollment in collaborative care (n=1,289 and n=1,153, respectively) and between 91–120 days of enrollment in collaborative care (n=670 and n=595, respectively).[21,23] Table 1 shows the demographic and clinical information for the four sub-samples. The average age in the groups ranged from 43.0 to 46.9 years. Patients with up to 90 days of enrollment in collaborative care are slightly older than patients enrolled between 91 and 120 days. Among patients with up to 90 days of enrollment in collaborative care, the mean (SD) of number of days enrolled was 59.9 (20.3) for PHQ-9 analysis and 61.1 (19.9) days for GAD-7 analysis. Among those enrolled between 91 and 120 days, the mean (SD) of the number of days enrolled was 104.7 (8.8) for PHQ-9 and 104.3 (8.8) for GAD-7. The average number of contacts (more than five minutes with a collaborative care clinician) was about four sessions (3.9 in PHQ-9 and 4.0 in GAD-7) within 90 enrollment days and about six sessions (5.6 in PHQ-9 and 5.7 in GAD-7) between 91 and 120 enrollment days. A higher proportion of patients had commercial insurance (ranging from 42.1% to 52.5%) compared with Medicaid (from 32.3% to 33.5%) or Medicare (from 15.3% to 25.4%). The proportion of commercial insurance

Table 1.

DEMOGRAPHIC AND CLINICAL INFORMATION OF THE STUDY SUBJECTS

| | Freq. (valid %) or Mean (SD) | | | | (A)-(B) Comparison t-score / chi-square | |
| | Within 90 Days Cohort (A) | | 91–120 Days Cohort (B) | | | |
	PHQ-9 (Depression) n=1289	GAD-7 (Anxiety) n=1153	PHQ-9 (Depression) n=670	GAD-7 (Anxiety) n=595	PHQ-9 (Depression)	GAD-7 (Anxiety)
Age, years	46.9 (18.82)	44.1 (17.58)	45.0 (20.44)	43.0 (18.88)	2.05**	1.28
Enrollment Day, days	59.9 (20.30)	61.1 (19.90)	104.7 (8.84)	104.3 (8.75)	54.49***	53.56***
Number of Contacts, times	3.9 (2.50)	4.0 (2.50)	5.6 (3.60)	5.7 (3.68)	12.21***	12.07***
Types of Payers						
Medicaid	401 (33.5%)	349 (32.3%)	207 (32.5%)	188 (33.2%)	5.92	10.56***
Medicare	246 (20.6%)	165 (15.3%)	162 (25.4%)	119 (21.0%)		
Commercial Insurance	549 (45.9%)	567 (52.5%)	268 (42.1%)	259 (45.8%)		
Severity of Symptom						
Mild	340 (26.4%)	328 (28.4%)	194 (29.0%)	166 (27.9%)	2.52	.53
Moderate	436 (33.8%)	408 (35.4%)	205 (30.6%)	221 (37.1%)		
Severe	513 (39.8%)	417 (36.2%)	271 (40.4%)	208 (35.0%)		

Notes:
*p<.05.
**p<.01.
***p<.001

is slightly higher among the patients with up to 90 days of enrollment in collaborative care than among the patients enrolled between 91 and 120 days. More than 35% in each sample had severe depressive symptoms or severe anxiety at baseline, with the prevalence ranging from 35.0% to 40.4%.

Within 90 days of enrollment in collaborative care, more than one-third of the patients reached the PHQ-9 (37.5%) or GAD-7 (37.1%) benchmarks, as shown in Table 2. Participants enrolled between 91 and 120 days had higher benchmark achievement rates of PHQ-9 (45.1%) and GAD-7 (45.9%) compared with patients with up to 90 days of enrollment (Table 2). There was no significant difference between the patients with up to 90 days of enrollment in collaborative care and the patients enrolled between 91 and 120 days.

Within 90 days of enrollment, less than one-third of the patients with Medicaid insurance reached both PHQ-9 and GAD-7 benchmarks, as shown in Table 3. Over 40% of the participants with Medicare insurance reached both PHQ-9 and GAD-7 benchmarks. Participants with Medicare insurance had the highest benchmark achievement rates for PHQ-9 (46.3%) and GAD-7 (42.4%) within 90 enrollment days and for PHQ-9 (50.0%) and GAD-7 (57.1%) between 91–120 enrollment days (Table 3). There was no significant difference in the benchmark achievement rates by types of payers between the patients with up to 90 days of enrollment in collaborative care and the patients enrolled between 91 and 120 days.

Table 4 summarizes associations between achieved benchmarks in PHQ-9 and GAD-7 and covariate in the samples within 90 enrollment days. The simple binary logistic regression model shows that there is a statistically significant association between most variables, except for enrollment days and the benchmark achievements in PHQ-9 and GAD-7. In the group with depressive symptoms, age (p<.01) and number of contacts (p<.001) were positively associated with PHQ-9 benchmark outcome. Patients with mild depressive symptoms and Medicare insurance were more likely to achieve the PHQ-9 benchmark compared with those with severe symptoms (p<.05) and Medicaid insurance holders (p<.001), respectively. In the group with anxiety, age (p<.01) and number of contacts (p<.001) were also significantly associated with the GAD-7 outcome. Patients with mild anxiety and Medicare or commercial insurance were more likely to have better GAD-7 outcomes than those with moderate (p<.05) or severe symptoms (p<.01) and Medicaid holders (p<.05), respectively.

The multiple binary logistic regression model indicates that even after controlling for other covariates, severity of initial symptoms and number of contacts were statistically significant factors related to PHQ-9 and GAD-7 benchmark outcomes. Specifically, one contact increases the odds of achieving PHQ-9 and GAD-7 benchmarks by 13.9% and 9.7%, respectively, after controlling for other covariates. Medicaid holders were less likely to have better benchmark outcomes compared with Medicare holders (p<.05) in PHQ-9 and commercial insurance holders (p<.05) in GAD-7 after controlling for other covariates.

Table 5 presents the results of simple and multiple binary logistic regression to determine the predictors of PHQ-9 and GAD-7 benchmark outcomes in the subsample of patients who were enrolled between 91 and 120 days. The simple binary logistic regression model shows that types of payers (p<.05) and number of contacts

Table 2.

BENCHMARK OUTCOMES

| | Freq. (valid %) | | | | | | (A)–(B) Comparison chi-square | |
| | Within 90 Days Cohort (A) | | 91–120 Days Cohort (B) | | | | | |
	PHQ-9 (Depression) n=1289	GAD-7 (Anxiety) n=1153	PHQ-9 (Depression) n=670	GAD-7 (Anxiety) n=595				PHQ-9 (Depression)	GAD-7 (Anxiety)
Benchmark Outcomes									
Over 10-point Reduction (B1)	230 (17.8%)	176 (15.3%)	131 (19.6%)	130 (21.8%)					
Over 50% Reduction (B2)	472 (36.6%)	423 (36.7%)	300 (44.8%)	270 (45.4%)				.72	1.31
B1 or B2	483 (37.5%)	428 (37.1%)	302 (45.1%)	273 (45.9%)					

Notes:
*p<.05 **p<.01 ***p<.001

Table 3.

BENCHMARK ACHIEVEMENT RATE BY TYPES OF PAYERS

	Freq. (valid %)				(A)-(B) Comparison chi-square	
	Within 90 Days Cohort (A)		91–120 Days Cohort (B)			
	PHQ-9 (Depression) n=483	GAD-7 (Anxiety) n=428	PHQ-9 (Depression) n=670	GAD-7 (Anxiety) n=595	PHQ-9 (Depression)	GAD-7 (Anxiety)
Types of payers						
Medicaid	31.4%	31.2%	41.1%	43.6%		
Medicare	46.3%	42.4%	50.0%	57.1%	.57	.80
Commercial	37.5%	39.5%	45.8%	42.5%		

Notes:
*$p<.05$
**$p<.01$
***$p<.001$

($p<.01$) were statistically significant factors to relate to GAD-7 benchmark outcome. On the other hand, number of contacts ($p<.01$) was the only significant factor associated with the PHQ-9 benchmark outcome in the simple model. After controlling for other covariates, the number of contacts was still a significant factor to be associated with PHQ-9 and GAD-7 benchmark outcomes ($p<.01$). Specifically, an increase in the number of contacts enhances the likelihood of benchmark achievement by 6.2% for PHQ-9 ($p<.01$) and 7% for GAD-7 ($p<.01$). Patients with Medicare insurance between 91 and 120 enrollment days were more likely to achieve both PHQ-9 and GAD-7 benchmark outcomes compared with Medicaid insurance holders after controlling for other covariates ($p<.05$).

Discussion

Depression. Results of the multivariate regression indicate that within 90 enrollment days, patients with depressive symptoms who experienced more contacts, who were insured by Medicare (vs. Medicaid), and who had mild symptoms at baseline (vs. severe) were more likely to reach outcome benchmarks. Patients with depressive symptoms enrolled for a longer time (i.e., between 91–120 days) were also more likely to meet outcome benchmarks if they experienced more collaborative care clinician contacts and if they were insured by Medicare (vs. Medicaid). Whereas Medicaid beneficiaries are individuals around or below the national poverty line, around half of all Medicare beneficiaries are Medicaid eligible. Nevertheless, Medicaid patients may experience more systemic challenges associated with socioeconomic status that hinder wellness, symptom improvement in collaborative care, and access to collaborative care services.

Table 4.

BINARY LOGISTIC REGRESSIONS WITHIN 90 ENROLLMENT DAYS

	Dependent Variables							
	PHQ-9 (Depression) Benchmark Achievement[a]				GAD-7 (Anxiety) Benchmark Achievement[b]			
	Simple Model		Multiple Model		Simple Model		Multiple Model	
	Odds ratio	S.E.	Odds ratio	S.E.	Odds ratio	S.E.	Odds ratio	S.E.
Age, years	1.010	.003***	1.006	.004	1.012	.003***	1.009	.004*
Enrollment Day, days	1.003	.003	.998	.003	1.005	.003	1.005	.003
Number of Contacts, times	1.079	<.019***	1.139	<.026***	1.057	<.020**	1.097	<.027***
Types of Insurance Payers								
Medicaid	Ref.		Ref.		Ref.		Ref.	
Medicare	1.885	<.001***	1.598	.211*	1.507	.194*	1.293	.234
Commercial	1.352	.136	1.295	.142	1.354	.141*	1.415	.148*
Severity of Initial Symptom								
Mild	Ref.		Ref.		Ref.		Ref.	
Moderate	.834	.144	.813	.158	.746	.148*	.655	.160**
Severe	.678	.140**	.700	.156*	.623	.149**	.596	.163**

Notes:
*p<.05
**p<.01
***p<.001
[a]1: Achieved at least one of PHQ-9 benchmarks; 0: No
[b]1: Achieved at least one of GAD-7 benchmarks; 0: No

Table 5.

BINARY LOGISTIC REGRESSIONS BETWEEN 91 AND 120 ENROLLMENT DAYS

Dependent Variables

| | PHQ-9 (Depression) Benchmark Achievement[a] | | | | GAD-7 (Anxiety) Benchmark Achievement[b] | | | |
| | Simple Model | | Multiple Model | | Simple Model | | Multiple Model | |
	Odds ratio	S.E.	Odds ratio	S.E.	Odds ratio	S.E.	Odds ratio	S.E.
Age, years	1.003	.004	.993	.005	1.011	.005*	.998	.006
Enrollment Day, days	1.008	.009	1.003	.009	1.000	.010	.998	.010
Number of Contacts, times	1.052	.019**	1.062	.023**	1.059	.020**	1.070	.024**
Types of Insurance Payers								
Medicaid	Ref.		Ref.		Ref.		Ref.	
Medicare	1.660	.221	1.885	.289*	2.156	.246**	1.871	.312*
Commercial	1.261	.197	1.281	.192	1.128	.203	1.002	.197
Severity of Initial Symptom								
Mild	Ref.		Ref.		Ref.		Ref.	
Moderate	.919	.098	.798	.210	.881	.215	.767	.218
Severe	.864	.224	.755	.197	.766	.215	.775	.219

Notes:
*p<.05
**p<.01
***p<.001
[a] 1: Achieved at least one of PHQ-9 benchmarks; 0: No
[b] 1: Achieved at least one of GAD-7 benchmarks; 0: No

Patients with dual coverage were not taken into consideration for this study and presumably are under Medicare, which is likely the primary source of coverage.

Anxiety. Results focused on anxiety outcomes within 90 days of enrollment indicate patients were more likely to achieve benchmark outcomes as they had a higher number of collaborative care clinician contacts, were insured by a commercial provider, and had mild symptoms at baseline (vs. moderate and severe). With each one-year increase in age, the likelihood of achieving anxiety benchmark outcomes increased. Examining a longer timeframe (i.e. 91–120 days) indicates that number of contacts and having Medicare insurance (vs. Medicaid) were associated with a higher likelihood of reaching anxiety outcome benchmarks.

Number of contacts. This study indicates that having six to eight contacts with collaborative care clinicians, rather than one to five contacts, offers better outcomes related to depressive somatology. However, having more than eight contacts does not have any additional benefits. Of interest, anxiety symptoms appear to improve with an increasing number of contacts. These findings suggest that future studies may benefit from accounting for the effects of collaborative contacts on benchmark outcomes for depression and anxiety. These patterns are of interest because traditional psychotherapy models have shown that there is no association between the number of contacts and effect size on depression outcomes.[18,23,24]

Limitations. This study did not review outcomes by provider type, gender, or other demographic characteristics. While it might be assumed more contacts with patients through collaborative care can be effective in safety-net populations, more research should be conducted to differentiate the extent to which collaborative care clinicians should interact with patients with anxiety and/or depressive symptoms. It is important to note that data were collected during the height of the COVID pandemic and therefore, data and outcomes may be skewed in terms of depressive and/or anxiety survey scores. A future study may benefit from a sensitivity analysis to understand the validity of our findings in the face of the COVID-19 pandemic and its effects on patients' wellbeing. The impact on the severity of anxiety and depression survey scores during the pandemic period has been identified as an area for future exploration.[25] The study did not take into consideration those who had dual coverage and included individuals based on their primary coverage.

Implications for the field. The study findings demonstrate that insurance payor type is associated with significant differences in anxiety and depression outcomes within collaborative care. Despite these differences, collaborative care seems to affect depressive and anxiety symptomology as measured by the survey tools. While collaborative care codes have been adopted by 24 states, 26 states have yet to adopt the codes into their Medicaid fee schedules, thereby limiting adoption of collaborative care in safety-net organizations. There are often perceived barriers to the implementation of collaborative care and/or concerns that the presence of social determinants would hamper the effectiveness of outcomes for depression and anxiety.[24,25]

Moreover, whereas full coverage of collaborative care has occurred in practices implementing the model within this study, there exist some state restrictions for the number of months enrolled or time exceeding two hours a month. Many states that have adopted collaborative care codes have only accepted one code, thus restricting

the use of all collaborative care codes.[26] Despite these concerns, those restrictions were not applicable to and minimally affected the sites included in the study. A future study may benefit from explicitly examining the impact of state-level collaborative care policies on the implementation and delivery of collaborative care services, and outcomes for Medicaid patients.

Overall, this study demonstrates the effectiveness of collaborative care in a safety-net population, and these findings might affect a state legislature's decision to include the collaborative care codes in their Medicaid reimbursement schedules. However, our findings also demonstrate that collaborative care, while still effective, was least effective when compared with outcomes in Medicare and commercial insurance populations. This may be related to systemic determinants and socioeconomic conditions deeply affecting individuals' quality of life and ability to improve in treatment. For example, many of the providers and organizations that serve the Medicaid populations are in designated health shortage areas, so there may be difficulty finding providers to staff Collaborative Care services. However, the increased uptake of telehealth services is an opportunity to increase access and reduce the burden on individuals to find local behavioral health providers. Thus, the implementation of collaborative care services leveraging telehealth may dramatically increase access to care for populations of patients who will benefit the most. Moreover, these findings may encourage state Medicaid programs that have yet to adopt the collaborative care codes into their fee schedules, thereby streamlining the process by which CMS reimburses collaborative care services for Medicare and Medicaid populations.

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