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Certified Community Behavioral Health Clinic Demonstration Impact on Health Care Utilization Among Non-Medicaid Patients with Severe Mental Illnesses

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Abstract

In 2017, the Certified Community Behavioral Health Clinic (CCBHC) demonstration was implemented in New York State to redesign care delivery and financing for behavioral health services. Although CCBHC primarily targeted Medicaid patients, it was hypothesized that the clinic-level benefits of CCBHC were expected to impact even non-Medicaid patients treated in CCBHCs. To test this hypothesis, this study conducted a health insurance claims data analysis of non-Medicaid (ie, commercial and Medicare) patients with severe mental illnesses, comparing a cohort of CCBHC-treated patients with a propensity score-matched comparison cohort of patients treated by non-CCBHC clinics on rates of mental health service utilization, hospitalization, and emergency department (ED) visits. The data suggested CCBHC was associated with more than 10% increase in outpatient mental health service utilization by the patients' second year of CCBHC exposure, accompanied by similarly significant reductions in the rates of all-cause ED visits and non-psychiatric hospitalization. These findings suggest that for behavioral health clinics that serve a sufficiently large population of Medicaid, the impact of innovative clinical redesign attributable to CCBHC is likely to extend to all patients treated by them.

Keywords: Certified Community Behavioral Health Clinic, emergency department, hospitalization, utilization, Medicaid, severe mental illnesses

Introduction

Improving access to care and providing treatment to promote the recovery for those who suffer severe mental illnesses (SMI) and substance use disorder has been widely recognized as a critical need for health care systems. This has become even more of a priority in recent years, exacerbated by global stress imposed by COVID-19 and the ongoing opioid epidemic.[1–3] Beginning in 2017, the Certified Community Behavioral Health Clinic (CCBHC) model has been implemented to address the need to improve existing behavioral health care through comprehensive, integrated mental and physical health, and substance use treatment.[4,5] Nationally, the number of CCBHCs has grown dramatically since 2017, with the mounting evidence that CCBHC initiations have led to increased outpatient clinic utilization, expansion of the community-based mental health (MH) and substance use disorder workforce, greater access to medications for opioid use disorder, increased referrals and coordination with primary care, and collaborations with hospitals and emergency departments (EDs).[6] By 2023, there have been over 500 CCBHCs operating in 46 states.[4]

Following a planning grant from the Substance Abuse and Mental Health Administration and the Centers for Medicare and Medicaid Services, New York State was selected as one of several states to begin CCBHC demonstration programs and the University of Rochester Medical Center (URMC) as one of the state's 13 program providers in 2017.[7,8] Notably, URMC is the only academic medical center in New York State (NY) with a CCBHC program. Located in Monroe County, the URMC service area includes 11 neighboring counties (primarily rural) in Western NY. The URMC CCBHC has adhered closely to the demonstration eligibility and requirement

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standards for service provision, including specified criteria for staffing, accessibility and scope of services, care coordination, data collection, reporting, and tracking. The URMC CCBHC integrates and co-locates programs for adult substance use disorders, including opiate addiction, MH crises, outpatient treatment, and primary care. The URMC CCBHC has also expanded tele-MH services, child and adolescent substance use screening and intervention programs, as well as mobile crisis response teams.

Per the rules of CCBHC certification, CCBHCs are mandated to provide a prespecified range of services, consisting of comprehensive behavioral health and substance use care integrated with medical and social services, including targeted case management, screening, treatment planning, and 24-hour crisis services.[9] Leveraging and encouraging service delivery partnerships and collaboration with community programs, CCBHCs follow a patient-centered, trauma-informed model focused on care coordination and patient recovery. One of the goals of the CCBHC model is to increase access to outpatient care for vulnerable patients and reduce reliance on acute hospital care.[10,11]

Although the reimbursement scheme for CCBHCs, which in NY consists of a prospective payment system with per-patient daily rates established by Medicaid that covers a predefined list of eligible procedure codes (see Supplementary Table AS1), was designed specifically to incentivize providers for provision of high-quality care for Medicaid beneficiaries,[12] CCBHC impacts are not limited to Medicaid patients alone. This is because CCBHC is a clinic-level intervention — rather than a patient-level intervention — that impacts all patients treated by the CCBHC. That is, the clinic-level workflow changes as well as the operational innovations associated with CCBHCs are expected to impact all patients treated at the CCBHC regardless of patients' payer types. This implies that any impact of the CCBHC innovations would also be observed among non-Medicaid beneficiaries, such as those with commercial or Medicare health insurance.

Therefore, in this analysis, the following hypotheses are tested: Among the patients who had non-Medicaid insurance, those who received URMC CCBHC services incurred higher rates of MH service utilization (measured by frequency of MH provider visits and CCBHC-eligible procedure codes) as well as lower rates of all-cause ED visits and hospital inpatient utilization (both psychiatric and nonpsychiatric) compared with those who did not.

Data

This study has been reviewed and approved by the University of Rochester's Research Subjects Review Board (study#: 8088). This study relies on deidentified health plan claims data obtained from a regional community health organization, Common Ground Health (CGH). CGH is a health research and planning organization serving the Finger Lakes counties near and around Rochester, New York. To this end, CGH collects and maintains an extensive collection of health and health care data.

CGH receives detailed member-level health plan claims data from two of the region's major managed care organizations, which provide the full range of health plans, including commercial, managed care Medicaid, and Medicare Advantage plans. The claims dataset includes all-cause medical claims from January 1, 2016 through December 31, 2021. It contains information on the date, type, and location of the care received by the members, up to 16 International Classification of Diseases, Tenth Revision (ICD10) diagnosis codes along with procedure codes (Healthcare Common Procedure Coding System [HCPCS] codes) and national provider identifiers (NPI) of billing and service providers. NY has prespecified the list of HCPCS codes that would be covered under the CCBHC prospective payment arrangement, which were used to identify "CCBHC-eligible" services for the purposes of this study. The complete list of the HCPCS codes can be found in New York State Certified Community Behavioral Health Clinic Managed Care Organization Operations Manual[13] (and reproduced in Supplementary Table AS1).

Methods

The final sample was defined by applying the following inclusion/exclusion criteria: those who had one or more ICD10 diagnosis codes for schizophrenia (F20), nonaffective psychosis (F22–F29), bipolar disorder (F30 and F31), or major depression (F32 and F33) at any period during the study period (from January 1, 2016 through December 31, 2021) were included. Moreover, those who were enrolled in Medicaid at any point during the study period were excluded from the final sample. No age restriction was applied, because the CCBHC demonstration was applicable to all age groups.

The non-Medicaid CCBHC (NM-CCBHC) study group consisted of those non-Medicaid plan members who, on or after July 2017 (ie, CCBHC launch date for URMC CCBHC), had received any of the CCBHC-eligible services and were treated by URMC CCBHC (NPI = 1346285657 or 1821152588). The non-Medicaid comparison group (NM-Others) was defined as those non-Medicaid plan members who were never treated by URMC CCBHC after July 2017 but did receive CCBHC-eligible services from other behavioral health care providers in the region during the study period. Also, the index period was defined as the first calendar month since June 2017 during which the member received any of the CCBHC-eligible services.

For the purposes of this analysis, the following set of dependent variables were considered: frequencies of outpatient MH provider visits, frequencies of CCBHC-eligible outpatient procedure codes, all-cause outpatient ED visits, all-cause nonpsychiatric inpatient admissions, and psychiatric inpatient days (to account for the fact that psychiatric inpatient stays are reimbursed on a per diem basis rather than by diagnosis-related group as nonpsychiatric hospital admissions are).

To ensure that the patients in the NM-CCBHC and NM-Others cohorts share comparable baseline characteristics, a propensity score matching was conducted via a nearest neighbor method using the available 1-year preindex data. Propensity scores were calculated via logistic regression model (see Supplementary Table AS2) within common support. The cohorts were matched based on the following patient-level covariates: quarterly per-member-per-month (PMPM) rates of the aforementioned dependent variables (ie, the preindex 1-year period was broken into four 3-month intervals, and the corresponding PMPM rate for each of the 3-month interval was calculated for each of the health care utilization variables); Charlson–Quan comorbidity index[14];

Table 1. Comparison of Propensity Score Matched Baseline Characteristics

Covariate	*NM-Others* (n = *18,221*) Mean / %	*NM-Others* SD	*NM-CCBHC* (n = *45,298*) Mean / %	*NM-CCBHC* SD	$\|d\|$[a]
Emergency department visits: Pre-index (per 1000 per month)					
10–12 months prior	54.6	211.6	50.7	223.0	0.018
7–9 months prior	56.9	244.1	51.3	265.8	0.022
4–6 months prior	58.6	235.9	55.5	266.3	0.012
1–3 months prior	62.0	286.7	61.2	311.2	0.002
Inpatient psychiatric hospital days: Pre-index (per 1000 per month)					
10–12 months prior	1.9	75.7	1.7	106.4	0.002
7–9 months prior	1.7	82.8	2.0	96.9	0.003
4–6 months prior	1.6	69.5	1.9	91.3	0.003
1–3 months prior	2.3	105.2	2.3	176.8	0.000
Inpatient nonpsychiatric hospital admits: Pre-index (per 1000 per month)					
10–12 months prior	12.6	75.2	12.5	68.3	0.002
7–9 months prior	13.7	95.0	12.4	74.6	0.015
4–6 months prior	14.2	92.0	14.0	78.7	0.003
1–3 months prior	15.9	118.6	15.9	101.2	0.000
Mental health provider visits: Pre-index (per 1000 per month)					
10–12 months prior	152.7	577.3	209.1	636.0	0.093
7–9 months prior	153.2	562.5	214.4	670.9	0.099
4–6 months prior	151.6	539.0	210.0	658.1	0.097
1–3 months prior	160.2	624.3	224.0	759.1	0.092
CCBHC-eligible services: Pre-index (per 1000 per month)					
10–12 months prior	809.2	998.1	894.5	1063.9	0.083
7–9 months prior	800.9	1036.0	888.4	1120.6	0.081
4–6 months prior	753.6	1044.3	845.3	1104.5	0.085
1–3 months prior	653.9	1173.3	765.5	1272.4	0.091
Primary care utilization (per 1000 per month)					
Primary care provider visits	400.7	514.2	405.5	603.4	0.008
Chronic conditions (Charlson–Quan)					
Index value (range: 0–14)	0.9	1.4	0.8	1.4	0.022
Patient demographic					
% Female (vs. male)	68.3%		68.9%		0.012
% Medicare (vs. commercial)	29.8%		26.0%		0.085
% Age: 18–34 (vs. <18)	17.1%		17.3%		0.006
% Age: 35–64 (vs. <18)	45.9%		49.1%		0.065
% Age: 65+ (vs. <18)	31.2%		27.2%		0.089
SMI prevalence					
% Schizophrenia	0.5%		0.4%		0.010
% Non-affective psychosis	1.5%		1.4%		0.008
% Bipolar disorder	4.8%		4.8%		0.001
% Major depression	57.8%		57.0%		0.015
Clinic characteristics					
# MH patients treated per month	2349	3750	4240	6611	0.352
# CCBHC-eligible services (per 1000 per month)	20.7	53.2	18.3	46.0	0.048

[a]Standardized difference ($|d| > 0.1$) indicates a significant difference between the two cohorts.

CCBHC, Certified Community Behavioral Health Clinic; NM-CCBHC, non-Medicaid CCBHC; NM-Others, non-Medicaid comparison group; SD, standard deviation; SMI, severe mental illness.

patient demographics (age, gender, payer type [commercial vs. Medicare]); and SMI prevalence rates. In addition, the following clinic characteristics as of the index period were also considered: average count of behavioral health patients (defined as having any ICD10 codes with F-prefix) treated by clinic per month and average count of CCBHC-eligible services rendered per 1000 behavioral health patients per month. The former captured each clinic's behavioral health patient volume, while the latter captured each clinic's intensity of behavioral health service provision. Clinics were defined by the unique billing provider NPIs available in the claims data.

To estimate the CCBHC effect on the dependent variables, a difference-in-difference (DD) method was used. The DD method explicitly accounted for any baseline differences between the NM-CCBHC and the MH-Others cohorts in terms of the respective dependent variables of interest by subtracting the baseline differences from the post-intervention differences. The DD method was implemented via a set of multivariable linear regression models with patient fixed

effects. In this context, the multivariable linear regression models with fixed effects offered a distinct advantage over other plausible models such as Poisson model or negative binomial because it sweeps away any time-invariant patient characteristics—whether observed or unobserved—that might have led to biases in the CCBHC treatment effect estimates by exploiting within-patient variation in the dependent variable over time. This was important because even with the propensity score matching, there might still be unobserved confounders that bias the estimates.

Therefore, the multivariable linear regression models with patient fixed effects could only include time-variant covariates because all time-invariant covariates (eg, gender, race/ethnicity, comorbid chronic conditions) were perfectly collinear with the patient fixed effects and thus dropped out of the regression models. The main coefficients of interest were therefore a set of interaction effects between the binary indicator variable for NM-CCBHC versus NM-Others cohort (dropped out of the regression models due to time invariance) and the set of indicators for the periods since the index period (ie, 1-year pre-CCBHC baseline, 1-year post-CCBHC, 2-year post-CCBHC). These interaction effects represented the DD estimates of the CCBHC treatment effects. Other time-variant covariates included in the regression models were plan type (commercial vs. Medicare), age and age–gender interaction terms (to account for age-gender specific events such as pregnancy), frequency of primary care provider visits in each month (to account for any changes in health status and availability of usual source of care over time), and calendar month and year indicators to account for seasonality and secular trends (refer to Supplementary Table AS3 for the full regression model output).

The DD method relied on the parallel trends assumption that both the NM-CCBHC and the NM-Others groups had shared similar trends in terms of the dependent variables during the pre-CCBHC baseline period. Although the propensity score matching ensured that the patients in both cohorts had similar unadjusted quarterly trends during the preindex period, the parallel assumption was still tested by focusing only on the 1-year pre-CCBHC period and running the same multivariable linear regression models with patient fixed effects as described above. Any significant divergence, as indicated by statistically significant ($P < 0.05$) coefficient estimates on the interaction terms between the NM-CCBHC versus NM-Other cohort indicator and the period indicator variables prior to the index period (coded as 3-month

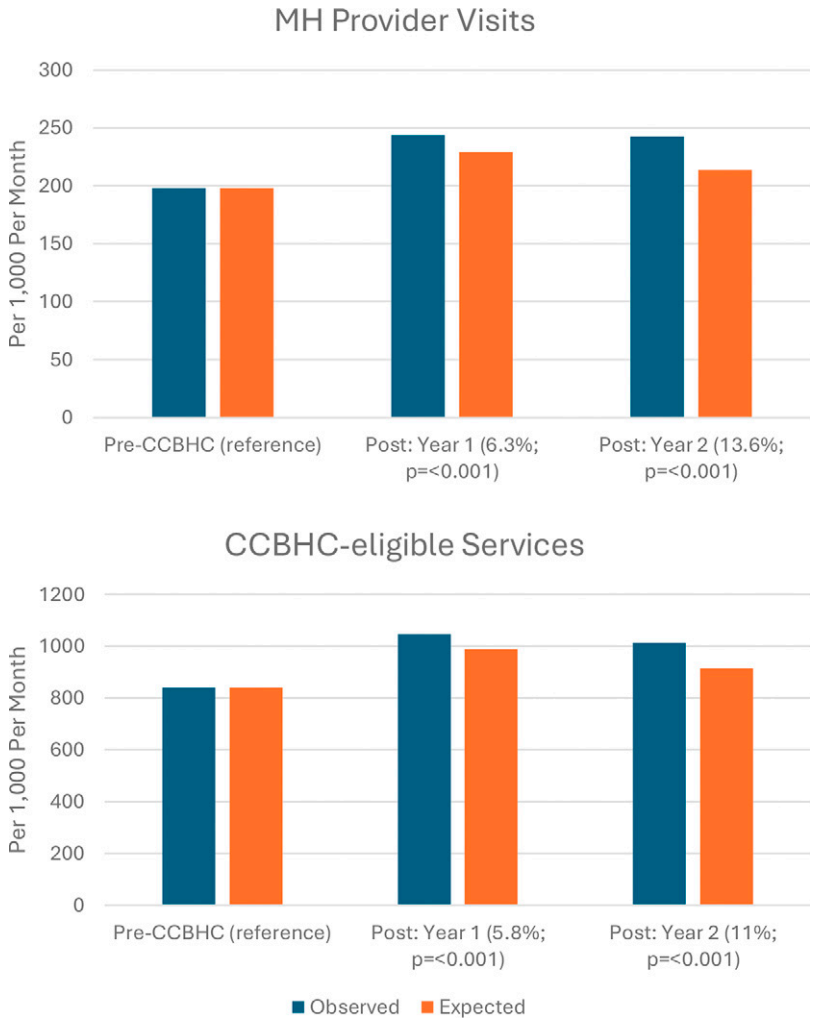

FIG. 1. Regression-adjusted CCBHC impact on mental health service utilization rates among non-Medicaid patients. CCBHC, Certified Community Behavioral Health Clinic.

intervals as described above), would indicate that the parallel trends assumption was not met. As shown in Supplementary Table AS4, the parallel trends assumption appears to be valid.

The magnitudes of the impact were represented in terms of differences between "observed" and "expected" post-intervention dependent variable values. "Observed" represented the regression-adjusted dependent variable values as observed in the data, whereas "expected" represented the regression-adjusted dependent variable values obtained by setting the NM-CCBHC and time period indicator interaction effects to zero (ie, no intervention impact).

Results

Table 1 shows that the propensity score matched final sample included 45,298 and 18,221 patients in the NM-CCBHC and NM-Others cohorts, respectively. Table 1 summarizes the 1-year baseline comparisons between them. To facilitate these comparisons, standardized differences instead of *P* values are reported to assess the magnitudes of the differences, because *P* values are sensitive to sample sizes for such purposes. A standardized difference of <0.1 is an indication of a balanced covariate.[15] As shown in Table 1, the two cohorts are comparable with each other in terms of patient-level characteristics. They do, however, significantly differ in terms of the clinic-level characteristics, particularly the patient volume; the NM-CCBHC cohort appears to be associated with receiving treatment at much larger volume clinics than the NM-Others cohort. As discussed below, this is likely reflective of the fact that URMC CCBHC is by far the largest behavioral health care provider in the region, and it is therefore difficult to find matched comparisons that share similar clinic-level characteristics among the NM-Others cohort.

Figure 1 indicates that NM-CCHBC was associated with significantly higher rates of MH provider visits and provision of CCBHC-eligible services: During the first year of CCBHC exposure, NM-CCBHC was associated with 6.3% and 5.8% increases ($P < 0.001$), and during the second year, it was associated with 13.6% and 11.0% increases ($P < 0.001$), respectively. Figure 2 indicates that over the same period, all-cause ED visits and nonpsychiatric hospital admission rates were reduced by 5.0% ($P = 0.009$) and 30.9% ($P < 0.001$) during the first year of CCBHC exposure, respectively. During the second year, the corresponding reductions were 9.7% ($P < 0.001$) and 34.6% ($P < 0.001$). On the contrary, Figure 3

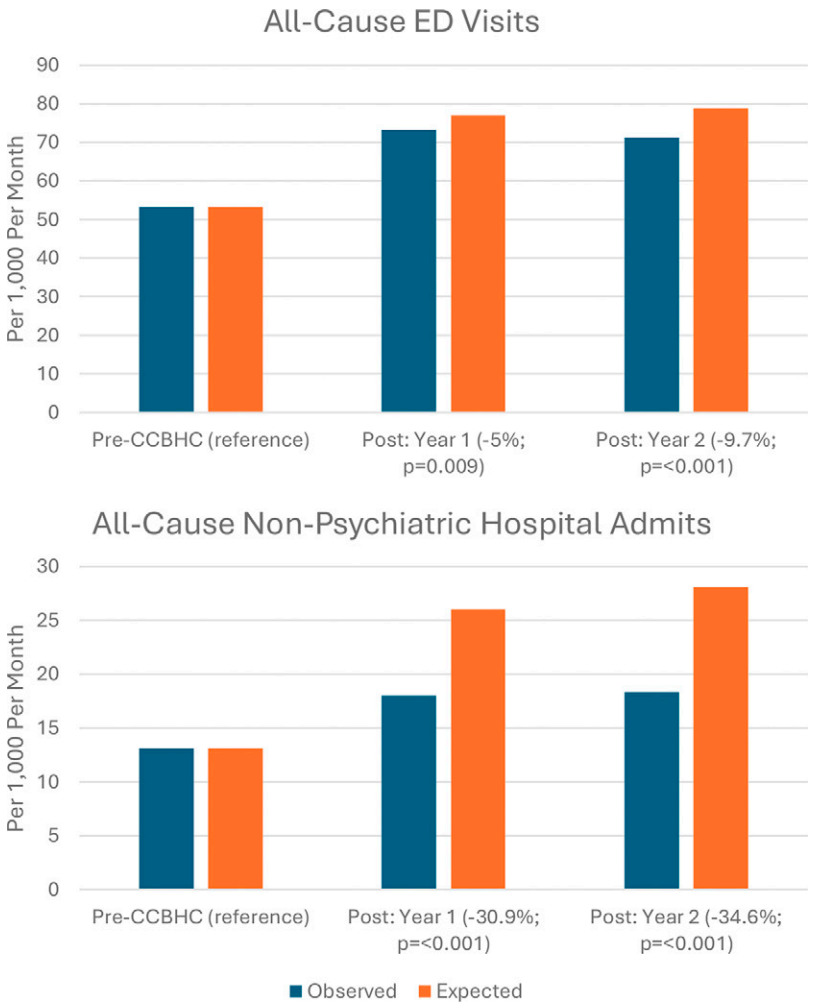

FIG. 2. Regression-adjusted CCBHC impact on all-cause non-psychiatric acute care utilization rate among non-Medicaid patients. CCBHC, Certified Community Behavioral Health Clinic.

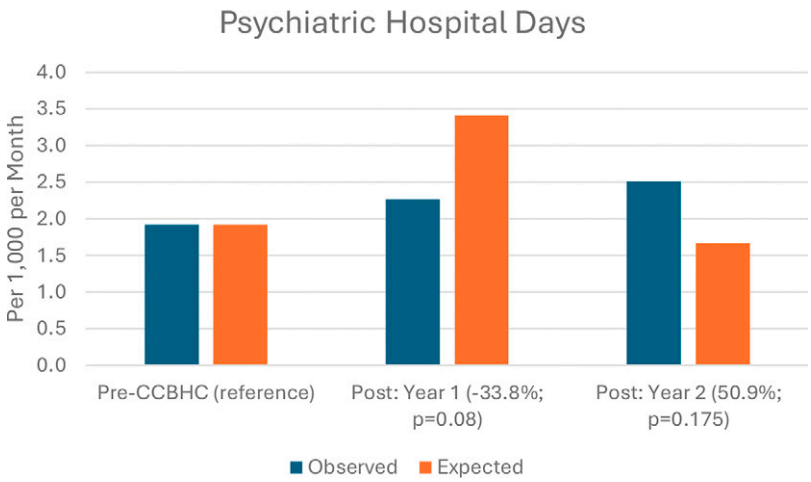

FIG. 3. Regression-adjusted CCBHC impact on inpatient psychiatric care utilization among non-Medicaid patients. CCBHC, Certified Community Behavioral Health Clinic.

indicates no statistically significant association between CCBHC and inpatient psychiatric days.

Discussion

The findings from this study are consistent with the hypothesis that CCBHC impact extends to all patients treated at CCBHC including those with Medicare and commercial payers who were not specifically targeted by CCBHC. Moreover, the results of this study are broadly consistent with the previous findings that statistically significant reductions in all-cause ED visits and hospitalizations associated with CCBHC were observed among Medicaid enrollees in certain states. At the same time, the previous findings also indicate that CCBHC was associated with statistically significant reduction in the average number of behavioral health ED visits in certain states,[11] which contrasts with the results of this study that did not appear to be a statistically significant impact in terms of inpatient psychiatric hospital days. In the current study, it was not possible to separately identify behavioral health ED visits.

There are two possible explanations for these results: First, the chronic shortage of inpatient psychiatric hospital beds[16,17] suggests that the variation in inpatient psychiatric hospital days is likely to be reflective of variation in market-level bed availability that is not subject to the CCBHC intervention. Second, it is also likely that patients with SMI often present themselves in nonbehavioral health settings and receive treatments as medical patients rather than as behavioral health patients.[18,19] Consequently, it may be that the downstream impacts of CCBHC are detectable only in non-psychiatric all-cause acute care utilization patterns. If true, the results of this study have important implications, in that enhanced treatment of behavioral health conditions may lead to significant downstream impacts in terms of nonpsychiatric medical care utilization. Thus, measuring the value of CCBHC interventions necessarily requires examining their impacts on nonbehavioral health care utilization rather than on behavioral health care utilization patterns. This is consistent with recent findings suggesting that the effective integration of behavioral and medical services creates a significant opportunity for cost savings on the medical side. An actuarial study published in 2018 has reported that projected potential national health care cost savings in the United States attributable to integrated medical–behavioral health care increased by $11.3 to $19.5 billion, or an annualized increase of 7% since 2014.[20] The same report also concludes that opportunities for cost savings will continue to increase as medical costs increase and integrated medical and behavioral programs such as the CCBHC become more effective.

An important policy implication of this study is that CCBHC may serve as a model for a broader health care payment and delivery model. CCBHC is characterized not only by a switch away from the traditional fee-for-service payment model to a bundled payment model but also by systematic changes in how care is delivered in outpatient clinic settings. It is important to note that for the non-Medicaid patients included in the study sample, reimbursement for these patients still largely has remained in the traditional fee-for-service model. Yet, the results of this analysis suggest that despite this lack of change in how the providers were reimbursed for treating these patients, the intended impacts of the Medicaid-driven CCBHC innovation extended to even non-Medicaid patients. This implies that merely changing the reimbursement schemes for certain patient subpopulations is unlikely to be sufficient to induce meaningful changes in how providers behave and deliver care.

It is also important to note that benefits of CCBHC likely extend well beyond reductions in ED visits and hospitalizations. There may be other benefits from CCBHC in terms of improving morbidity and mortality, chronic disease management (diabetes, hypertension, congestive heart failure, etc.), daily functioning, and improved quality of life. These potential benefits have not been addressed in this study but nevertheless deserve attention in future research particularly from the patient's — rather than the payer's — perspective.

This study is subject to several limitations. First, because of the observational nature of the study relying on administratively collected secondary data, it is difficult to infer causality. Although the use of propensity score matching and DD with multivariable regression methods reduces potential confounding in the results, making causal interpretations of the results warrants caution. One potentially important confounder is the fact that the NM-CCBHC cohort received care

from significantly higher volume providers. As noted above, this is due to URMC CCBHC being the largest behavioral health provider in the region, and thus, it is difficult to find comparison between patients from similarly large providers. To the extent that larger volume providers may be able to provide more comprehensive care and thus result in better health outcomes, this is a potential source of bias. Nevertheless, the use of the patient fixed effects model and additional covariates that were otherwise well balanced after propensity score matching mitigate this concern. Second, because identification of patients in the study versus comparison groups relied on an algorithm rather than direct observation and attribution of the patients, the results may be subject to measurement errors that would have resulted in higher uncertainty around the estimates.

The study is also limited by the fact that the claims dataset originated from two major managed care organizations in the region, which implies that the dataset is systematically missing those not enrolled in these plans. Furthermore, under the CCBHC "carve out" reimbursement arrangement, CCBHCs submit separate claims for CCBHC-eligible services directly to New York State Medicaid instead of managed care Medicaid plans. This implies that, for the Medicaid patients receiving treatment from CCBHCs, all their claims related to CCBHC-eligible services are not captured in the dataset. As such, it is not feasible to examine CCBHC impact directly among the Medicaid patients, which is reflected in the parameters of the study sample.

Conclusion

The intended beneficial impacts of CCBHC — a demonstration project that targeted primarily Medicaid enrollees — appear to have extended to non-Medicaid patients who were treated by same CCBHC. Future study is necessary to understand the mechanism of CCBHC impact and to identify the key drivers of its success

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Authors' Contributions

D.M., G.N., and H.B.L. contributed to study conceptualization. D.M. and P.W. contributed to methodology and formal analysis. G.N. and H.B.L. contributed to resources needed for the study. D.M. and P.W. contributed to writing the original manuscript draft. G.N. and H.B.L. contributed to review and editing of the manuscript draft.

Author Disclosure Statement

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Supplementary Material

Supplementary Appendix AS1
Supplementary Appendix AS2
Supplementary Appendix AS3
Supplementary Appendix AS4

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