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Mental Comorbidity and Quality of Diabetes Care Under Medicaid: A 50-State Analysis

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Abstract

Background—Patients with comorbid medical and mental conditions are at risk for poor quality of care. With the anticipated expansion of Medicaid under health reform, it is particularly important to develop national estimates of the magnitude and correlates of quality deficits related to mental comorbidity among Medicaid enrollees.

Methods—For all 657,628 fee-for-service Medicaid enrollees with Diabetes during 2003-4, the study compared HEDIS diabetes performance measures (Hemoglobin A1C, eye exams, LDL screening, and treatment for nephropathy), and admissions for ambulatory care-sensitive admissions (ACSCs) between persons with and without mental comorbidity. Nested hierarchical models included individual, county and state-level measures.

Results—A total of 17.8% of the diabetic sample had a comorbid mental condition. In adjusted models, presence of a mental condition was associated with a 0.83 (0.82 - 0.85) odds of obtaining 2 or more HEDIS indicators, and a 1.32 (1.29-1.34) increase in odds of one or more ACSC hospitalization Among those with diabetes and mental comorbidities, living in a county with a shortage of primary care physicians was associated with reduced performance on HEDIS measures; living in a state with higher Medicaid reimbursement fees and department of mental health expenses per client were associated both with higher quality on HEDIS measures and lower (better) rates of ACSC hospitalizations.

Dr. Druss had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Conclusions—Among persons with diabetes treated in the Medicaid system, mental comorbidity is an important risk factor for both underuse and overuse of medical care. Modifiable county and state-level factors may mitigate these quality deficits.

Introduction

Persons with comorbid chronic medical and mental conditions represent a priority population in US health care delivery, due to their high prevalence, costs, and potential deficits in quality of care.(1) Mental comorbidity is a particular concern among Medicaid recipients. Nearly half of disabled Medicaid recipients have one or more mental comorbid condition, and mental illness is the most prevalent group of comorbidities among high-cost enrollees.(2) With the anticipated Medicaid expansion under national health reform (3) it is a high priority to understand persons with mental comorbidity as a high-risk population within Medicaid.

Among chronic medical illnesses, diabetes is particularly important, both in and of itself, and as a tracer condition for understanding chronic care delivery more generally. (4, 5) In public sector samples, presence of comorbid mental disorders has been found to be a risk factor for reduced quality of diabetes care. (6-8) However, few data are available examining this relationship among Medicaid enrollees. Two studies of Medicaid enrollees in Massachusetts found that persons with a substance use diagnosis were significantly less likely to receive guideline-concordant care for diabetes (9) and have worse clinical outcomes (10) than other enrollees with diabetes. Two other studies examining subsets of persons with both diabetes and mental illnesses found low rates of performance for diabetes care within a California county (11) and among Maryland Medicaid enrollees. (12)

Because Medicaid is jointly operated by the states and the federal government, there is considerable variation in patterns of service use across states.(13) Given this heterogeneity, national samples are needed both to provide generalizable information and to understand regional variations in use.(2) However, until recently, multistate Medicaid analyses were not feasible due to high cost and lack of standardization of data across states. The recent release of standardized 50-state Medicaid Analytic Extract (MAX) Files makes it possible, for the first time, to study the relationship impact of mental comorbidity on quality of diabetes in a national sample of Medicaid enrollees.

Methods

Study Sample

The primary source of data for the study was 2003-4 Medicaid Analytic eXtract (MAX) files, a set of data files on Medicaid eligibility, service utilization, and payments. The MAX data are extracted from the Medicaid Statistical Information System (MSIS). Data were extracted for all fee-for-service claims for non dual eligible enrollees aged 65 and younger. Persons 65 and over and other persons dually eligible for Medicare were excluded because they commonly have missing data for services billed to Medicare, particularly inpatient hospitalizations. (14)

Because data from capitated managed care Medicaid claims are typically absent or incomplete, the study excluded these claims, as is typical of Medicaid analyses. (2, 15, 16) Nationally, in 2003-4, 66.8% Medicaid clients were enrolled in Fee for Service. (17) As compared with managed care enrollees, these fee- for-service enrollees were more likely to be older (47.8 versus 45.8), white (51.0% versus 43.3%) and to be eligible due to disability rather than low-income (79.6% versus 49.8%) (all p-values less than 0.001).

These data were merged with county-level data from the Area Resource File (ARF) (18) which aggregates publically available data from multiple sources about health facilities, health professions, measures of resource scarcity, health status, economic activity, health training programs, and socioeconomic and environmental characteristics. County FIPs codes were used to merge the ARF with MAX files.

State Medicaid characteristics were drawn from statistics aggregated by the Kaiser Family Foundation, (19, 20) the American Academy of Family Physicians (21) and a 2005 report prepared for Substance Abuse and Mental Health Services Administration about mental health benefits under Medicaid across states. (22) State-level variables were manually entered into a spreadsheet that was merged with the Medicaid data using state identifiers.

Case Selection

Case selection criteria for diabetes were drawn from NCQA for their Healthcare Effectiveness Data and Information Set (HEDIS) performance indicators.(23) This required continuous enrollment for at least one year, two or more encounters for diabetes in an outpatient setting, or one or more inpatient encounter with ICD-9 Codes 250, 357.2, 362.0, 366.41, or 648.0.

Independent variables

The primary independent variable was one or more claim with any mental disorder excluding organic conditions such as Dementia and Delirium (ICD-9 codes 295.00-315.99). The case finding strategy was used to optimize sensitivity for detecting mental disorders, while excluding organic disorders that could confound analyses.

Dependent variables

Healthcare Effectiveness Data and Information Set (HEDIS) Indicators were used to assess underuse, and Ambulatory Care Sensitive inpatient hospitalizations were used to measure overuse. HEDIS performance measures were calculated using standardized specifications by NCQA for use in Medicaid populations. (23) The four measures of diabetes performance include: HbA1c testing during the measurement year, Eye exam (retinal) performed; (23) LDL-C screening performed; and Medical attention for nephropathy: either a screening test during the past year or evidence of nephropathy. Better performance on HEDIS diabetes indicators are associated with improved diabetes outcomes in Medicare populations. (24) A composite variable reflecting receipt of 2 or more HEDIS measures, representing the median of the sample, was created to simplify presentation and interpretation of findings.

Inpatient Care for Ambulatory care-sensitive conditions (ACSC) was studied as an indicator of potential overuse of services. ACSCs are conditions for which good outpatient care can potentially prevent the need for hospitalization. (25) These have been used for assessing quality of care at the patient and community level. (26-29) The list of ACSCs was drawn from the 16 conditions developed by the UCSF-Stanford Evidence-based Practice Center (EPC) for AHRQ, based on an extensive literature review and empirical testing. (30)

Covariates

A series of individual, county, and state variables were included in multilevel models to isolate the effect of mental disorders on quality, and also to better understand the factors affecting quality of care in the subset of individuals with both diabetes and mental comorbidity.

At an individual level, covariates included demographic variables (age, sex, race), Medicaid eligibility category (disability versus poverty), and a count of conditions developed for the

Elixhauser comorbidity index, a validated approach for risk adjustment using claims data, (31, 32), using the following conditions: HIV/AIDS; cancer (lymphoma, metastatic CA, solid tumors); rheumatoid arthritis; coagulation deficiency; obesity; weight loss; fluid and electrolyte disorders; anemia (blood loss, deficiency); renal failure; liver disease; paralysis; COPD; hypothyroidism; hypertension (with/without heart failure) hypertensive renal disease (with/without renal failure); and peripheral vascular disease.

We hypothesized that a range of county-level predictors, in particular access to safety net providers, would be associated with higher quality of diabetes care. Variables drawn from the ARF included % urban population (continuous), median household income (continuous), primary care professional (PCP) shortage area (dichotomous),(33) mental health professional (MHP) shortage area (dichotomous)(34), presence of one or more federal qualified health center (FQHC, dichotomous), or presence of a CMS-certified community mental health center (CMHC, dichotomous).

At a state level, we hypothesized that policies affecting patient and provider delivery of care under Medicaid would influence quality of diabetes care. These characteristics included mental health managed care penetration (dichotomized at the median value of 60%), the Medicaid/Medicare fee index (a continuous indicator of payment generosity that measures each state's physician fees relative to Medicare fees)(35), annual Department of Mental Health (DMH) expenditures per client, (22) Medicaid enrollment as a percentage of the population, Federal Matching Medicaid rate (percentage), and presence of any patient copayments for Medicaid (dichotomous). (21)

Analyses

Within the study sample, subjects are nested within the counties and the counties are nested within states. Thus we estimate a generalized linear mixed model (GLMM) with the SAS GLIMMIX procedure using random effects to account for the within-cluster correlation at each level of the hierarchy and to explore the effects of the patient, county, and state characteristics. The probability of the outcome measure for eachdiabetic patient was estimated with a random-intercept and fixed-slope model conditional on the predictors and the random effects. In the GLIMMIX procedure, we used the RANDOM statement to identify group structure and used the Newton-Raphsonoptimization technique with ridging to help with the convergence of the procedure. The residual method was applied to adjust for denominator degree of freedom for tests of the fixed effects.

All tests of statistical significance were 2-tailed. Statistical analyses were performed with the Statistical Analysis System, version 9.2 (SAS Institute Inc, Cary, NC).

Results

Characteristics of Sample

A total of 657,628 individuals with diabetes were included in the sample (Table 1). Within this total population, a total of 118,190 individuals (17.8%) had a claim for a mental disorder. As compared with enrollees without a mental diagnosis, those with a mental diagnosis were older, more likely to be male, white, to be eligible due to disability rather than poverty, and had higher rates of medical comorbidity (all p values <0.001). Claimants with a mental diagnosis alsolived in counties with slightly higher incomes (p=0.0013), and in states with lower rates of mental health managed care penetration (p<0.0001) and without Medicaid copayments (p=0.0330) (Table 1).

Quality Indicators by Mental Illness Status

Rates of adherence with HEDIS measures were low both for persons with and without mental disorders (Table 2). With the exception of eye examinations, compliance with all measures was below 50%.

In adjusted models, having a mental diagnosis was associated with a lower odds of having a Hemoglobin A1C drawn (OR=0.88 (95% CI: 0.86, 0.89)), an eye examination (OR=0.73 (95% CI: 0.72, 0.74)), LDL screening (OR=0.88 (95% CI: 0.86, 0.89)), or test for nephropathy (OR=0.96 (95% CI: 0.94, 0.99)). . Overall, persons with mental disorders had 0.83 times the odds as those without comorbid mental conditions to have two or more HEDIS performance indicators (95% CI: 0.82, 0.85). (Table 2)

A total of 24.4% of persons with a mental diagnosis and 19.7% without a mental diagnosis had one or more inpatient hospitalization for an ambulatory sensitive condition (ACSC). In a multivariate model, presence of a comorbid mental disorder predicted a 1.32 times increase in odds of having an ACSC inpatient admission. (95% CI: 1.29-1.34). (Table 2)

The association between mental disorders and quality of care was similar regardless of whether enrollees obtained any medication treatment for their diabetes. Among those receiving medication for diabetes, claimants with a mental health diagnosis had 0.92 (95% CI: 0.89, 0.96) the odds of receiving 2 or more HEDIS indicators as compared with those without a mental health diagnosis; among those with no medication treatment, the odds ratio of treatment for these two groups was0.88 (95% CI: 0.85, 0.92). Similarly, among those receiving medication for diabetes, claimants with a mental health diagnosis had 1.29 (95% CI: 1.25, 1.34) times the odds of having an ACSC admission than those without a mental health diagnosis, whereas the odds ratio between these two groups was 1.34 (95% CI: 1.28, 1.40)among those not receiving medication . (Results not shown in the tables; available from the authors on request).

Across particular mental conditions, all mental disorders were associated with lower likelihood of receipt of two or more HEDIS indicators, with the strongest effects for substance use disorders (OR=0.63 (95% CI: 0.62, 0.65)). (Table 3) Schizophrenia, substance use, and other disorders were associated with higher rates of ACSC admissions, with the highest (worst) rates evident for substance use conditions (OR=1.94 (95% CI: 1.88, 2.00)) (Table 3). Effects for depression and bipolar disorder on ACSC admissions were not significant.

Predictors of Quality Among Persons with Mental Comorbidity

In analyses among persons with diabetes and mental comorbid conditions, a range of individual, county, and state variables predicted improved quality of diabetes care (Table 4). At an individual level, older (OR=1.04 (95% CI: 1.03, 1.06)), female (OR=1.16 (95% CI: 1.13, 1.20)), Hispanic (OR=1.14 (95% CI: 1.08, 1.20)), and persons with higher numbers of medical comorbidities (OR=1.03 (95% CI: 1.02, 1.03)) were more likely to obtain two or more HEDIS indicators. Lower (better) rates of ACSC hospitalizations were seen in younger enrollees (OR=0,89 (95% CI (1.03, 1.06)); women (OR=0.89 (95% CI: 0.87, 0.92)), Hispanics (OR=0.90 (95% CI: 0.85, 0.95)), those eligible for Medicaid due to poverty (OR=0.87 (95% CI: 0.83, 0.92)), and those with fewer medical comorbidities (OR=0.58 (95% CI: 0.58, 0.59)).

At the county level, enrollees living in urban settings (OR=0.84 (95% CI: 0.76, 0.94)) or PCP shortage areas (OR=0.87 (95% CI: 0.80, 0.95)) were less likely to receive 2 or more HEDIS indicators; those living in urban settings were also more likely to have one or more ACSC admission (OR=1.18 (95% CI: 1.08, 1.28)).

At the state level, better rates of concordance with HEDIS diabetes measures were seen in states with higher physician payment rates (OR=1.25 (95% CI: 1.16, 1.35)), higher DMH expenses per client (OR=1.23 (95% CI: 1.13, 1.33)), and higher federal matching rates for Medicaid (OR=1.50 (95% CI: 1.37, 1.65)). Lower (better) rates of inpatient ACSC admissions were seen in states with lower mental health managed care penetration (OR=0.87 (95% CI: 0.81, 0.95)), higher Medicaid state physician fees (OR=0.87 (95% CI: 0.81, 0.92)), DMH expenses higher than the median (OR=0.78 (95% CI: 073, 0.84)), states with a lower Federal Matching Rate (OR=0.89 (95% CI: 0.82, 0.96)), and states with a Medicaid copayment (OR=0.80 (95% CI: 0.75, 0.84)).

Discussion

This is the first in the literature to examine quality of diabetes care in a national sample of Medicaid enrollees, and the first to examine how quality in that sample differs between individuals with and without mental disorders. Several findings are notable. First, quality was low across the entire sample of enrollees. Second, mental comorbidity was associated with even lower compliance with HEDIS measures and elevated rates of hospitalization for Ambulatory Sensitive Conditions. Finally, among the population with comorbid mental and medical conditions, a number of county and state-level factors, many amenable to policy intervention, were associated with improved quality of care.

Across this national sample of Medicaid enrollees, rates of performance on the HEDIS diabetes measures was very low – considerably lower than in other insurers and populations. In the current study, rates of compliance with all HEDIS measures except having an eye exam, as well as the likelihood of being compliant with at least 2 measures, was below 50%. Both in commercial plans (36) and in Medicare (37), rates of compliance across the HEDIS diabetes measures are approximately twice as high as those seen in this Medicaid sample. High rates of ACSC hospitalizations are important cost drivers for diabetes. (38)

Quality of diabetes care for enrollees with mental comorbidities was even lower than quality in the general sample of Medicaid enrollees, both with regards to performance on HEDIS indicators and in likelihood of ACSC admission. A series of patient, provider, and system-level factors are likely responsible for these quality deficiencies among persons with mental disorders.(39) Poverty (40, 41) low health literacy(42, 43), and social factors (44, 45) may raise challenges to compliance with treatment for Medicaid populations in general and even worse care for those with mental disorders. For providers, competing demands for time and attention may limit their willingness and ability to care for comorbidities. (46, 47) Finally, at a system level, lack of coordination and delivery of care across multiple locations may lead to challenges in coordination and potential duplication of services.(1) Improving quality of care for persons with comorbid conditions within Medicaid will require attention to each of these patient, provider, and system-level issues.

The individual-level variables found to predict worse quality of care are generally not amenable to change, but nonetheless can help identify populations at risk for poor quality of care among persons with comorbid conditions. For instance, African Americans were at elevated risk both for lower performance on HEDIS measures and elevated rates of inpatient ACSC admissions. These subpopulations may be particularly important targets for quality improvement efforts designed to improve quality and efficiency of care for persons with comorbid conditions.

Several provider-level factors were associated with quality of diabetes care for individuals with comorbid conditions. Persons living in primary care shortage areas had worse performance on HEDIS diabetes quality measures. At a state-level, better Medicaid

reimbursement rates for physicians were associated with improved performance on both measures. Taken together, these findings suggest the potential importance of an adequate primary care workforce, as well as adequate reimbursement for those providers, in ensuring quality of diabetes among persons with comorbid medical and mental conditions. In addition to adequate funding, other studies have suggested that targeted financial incentives may also help reduce inequities in medical treatment.(48)

Enrollees in states with higher levels of mental health funding for mental health services had better performance on HEDIS measures and also reduced use of ambulatory care specific inpatient admissions. This finding was unexpected, given that mental health funding reimburses mental health rather than medical services, and largely is used to pay for services for uninsured clients. Given that the same providers and safety net facilities typically manage both uninsured and Medicaid recipients, it is possible that these added resources spill over to improve care for these clients. More research is needed to understand the link between mental health funding and outcomes in individuals with comorbid conditions.

The findings should be interpreted in the light of several limitations. First, the study did not include managed care claims or dually-eligible clients, and the findings should be extrapolated to other Medicaid populations, particularly those eligible due to low income, with caution. Second, as in any claims-based diagnosis, cases only represent those recognized and billed for under Medicaid. Given that mental disorders are commonly underdiagnosed and undertreated, the prevalence and population-based impact of mental disorders on diabetes care are likely substantially larger than those reported in the study.

These limitations notwithstanding, the findings suggest that mental disorders are important risk factors for poor quality of diabetes care in among Medicaid recipients in the United States. With the looming expansion of Medicaid under health reform, it will be important to track quality of care and develop clinical and policy-level strategies to improve quality of care in this vulnerable population.

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Table 1

Sample Characteristics (n=657,628)

Characteristics	Any Mental (n=118190)	No Mental (n=539438)	p value
Individual characteristics			
Mean age, years	48.2 (47.9 - 48.6)	47.7 (47.1 - 48.3)	0.0001
Male sex, %	36.3 (34.2 - 38.5)	31.8 (30.7 - 32.9)	<0.0001
Race, %			
White	56. 8 (49.2 - 64.4)	51.7 (46.5 - 56.8)	
Black	28.7 (24.0 - 33.4)	27.7 (24.4 – 31.1)	
Hispanic	10.6 (5.72 - 15.4)	15.5 (11.1 - 19.8)	0.0003
Other	3.9 (3.1 - 4.7)	5.1 (4.2 - 6.1)	
Medicaid eligibility due to disability, %	87.0 (84.9 - 89.1)	77.7 (75.1 - 80.4)	
Medicaid eligibility due to poverty, %	13.0 (10.9 - 15.1)	22.3 (19.6 - 24.9)	<0.0001
Number of Elixauer comborbid conditions [31, 32]	4.1 (4.0 - 4.3)	1.6 (1.6 - 1.7)	<0.0001
County characteristics			
Urban/rural, %	73.5 (67.9 - 79.1)	72.6 (67.9 - 77.3)	0.4940
Median Household Income, $	40163 (38726 - 41599)	39233 (37984 - 40482)	0.0013
PCP shortage area, %	84.4 (80.6 - 88.3)	84.7 (81.5 - 88.0)	0.7183
>=1 FQHC , %	69.4 (62.6 - 76.2)	70.8 (65.3 - 76.3)	0.4042
MHP shortage area, %	70.0 (63.0 - 76.9)	73.0 (67.7 - 78.4)	0.0584
>=1 CMHC , %	36.9 (26.8 - 47.0)	39.6 (30.2 - 49.0)	0.2743
State Characteristics			
Mental health managed care penetration >60%, %	26.4 (19.5 - 33.2)	37.6 (28.8 - 46.4)	<0.0001
Medicaid to Medicare Fee Index	1.00 (0.95 - 1.06)	1.01 (0.97 - 1.05)	0.4753
DMH expense per client, $	3650 (2978 - 4322)	3422 (2964 - 3880)	0.0670
Medicaid enrollment as a percent of population, %	15.0 (14.7 – 15.3)	15.2 (15.0 – 15.4)	0.0152
Federal Matching Medicaid Rate,%	60.9 (59.2 – 62.6)	61.4 (60.0 – 62.9)	0.1863
Presence of Medicaid copayment, %	53.6 (42.6 - 64.7)	57.9 (49.0 - 66.8)	0.0330

Values in parentheses are 95% CI.

Table 2

Diabetes Quality Indicators by Mental Illness Status

Outcome	Any Mental %	No Mental %	Adjusted OR	P value
HEDIS measures				
Hemoglobin A1C	43.8 (42.6 - 45.0)	47.0 (45.8 - 48.1)	0.88 (0.86 - 0.89)	< 0.0001
Eye exam	51.1 (50.0 - 52.3)	58.9 (57.9 - 59.9)	0.73 (0.72 - 0.74)	< 0.0001
LDL screening	24.4 (23.3 - 25.5)	26.9 (25.8 - 28.0)	0.88 (0.86 - 0.89)	< 0.0001
Medical attention for nephropathy	12.0 (11.4 - 12.6)	12.4 (11.8 - 13.0)	0.96 (0.94 - 0.99)	0.0023
At least two HEDIS indicators	38.4 (37.2 - 39.6)	42.8 (41.7 - 44.0)	0.83 (0.82 - 0.85)	< 0.0001
ACSC Inpatient Visit (OR)	24.4 (23.8 - 25.1)	19.7 (19.2 - 20.2)	0.88 (0.86 - 0.89)	< 0.0001

Table 3

Overall Quality by Mental Diagnosis

Diagnosis	At least two HEDIS indicators (OR)	ACSC Admission (OR)
Schizophrenia (n=22,859)	0.80 (0.78 - 0.83) †	1.26 (1.21 - 1.30) †
Bipolar d/o (n=8,852)	0.90 (0.86 - 0.95) †	1.03 (0.98 - 1.09)
Depression (n=44,241)	0.95 (0.93 - 0.97) †	1.02 (1.00 - 1.05)
Substance Use (n=33,352)	0.63 (0.62 - 0.65) †	1.94 (1.88 - 2.00) †
Other (n=6,886)	1.39 (1.31 - 1.48) †	1.24 (1.16 - 1.32) †
Test for difference across diagnoses (test statistic, p value)	F^{5}_{514000}=257.2, p < 0.0001	F^{5}_{514000}=407.5, p < 0.0001

Table 4

Predictors of Quality among Persons with Diabetes and Mental Illnesses (n=118,190)

Characteristics	At least two HEDIS indicators (OR)	ACSC Inpatient Admission (OR)
Individual characteristics		
Age, 10 years	1.04 (1.03 - 1.06) **	0.89 (0.87 – 0.90) **
Female sex	1.16 (1.13 - 1.20) **	0.89 (0.87 - 0.92) **
Race		
Black	0.83 (0.80 - 0.86) **	1.06 (1.02 - 1.10) *
Hispanic	1.14 (1.08 - 1.20) **	0.90 (0.85 - 0.95) *
Other	0.81 (0.75 - 0.88) **	0.77 (0.71 - 0.84) **
Medicaid eligibility due to disability	1.04 (0.94 - 1.15)	1.14 (1.09 – 1.20) **
Number of Comborbid medical conditions	1.03 (1.02 - 1.03) **	1.72 (1.71 - 1.74) **
County characteristics		
Urban/rural (≥84%)	0.84 (0.76 - 0.94) **	1.18 (1.08 - 1.28) **
Median Household Income (≥$39168)	1.07 (0.98 - 1.16)	1.01 (0.94 - 1.08)
PCP shortage area	0.87 (0.80 - 0.95) **	1.00 (0.93 - 1.08)
>=1 FQHC	0.98 (0.91 - 1.06)	0.91 (0.86 - 0.97)
MHP shortage area	0.95 (0.88 - 1.03)	1.01 (0.95 - 1.07)
>=1 CMHC	1.04 (0.94 - 1.15)	1.05 (0.97 - 1.13)
State Characteristics		
MH managed care penetration >60%	1.01 (0.92 - 1.12)	1.14 (1.06 – 1.24) **
Medicaid/Medicare fee index greater than median	1.25 (1.16 - 1.35) **	0.87 (0.81 - 0.92) **
DMH expense per client (≥$2997)	1.23 (1.13 - 1.33) **	0.78 (0.73 - 0.84) **
Medicaid enrollment as a % of population (≥0.15%)	1.08 (1.00 - 1.17)	0.97 (0.91 - 1.03)
Federal Matching Medicaid Rate (>62%)	1.50 (1.37 - 1.65) **	1.12 (1.04 - 1.21) *
Presence of Medicaid copayment	0.97 (0.91 - 1.05)	0.80 (0.75 - 0.84) **

* indicates p value <0.05,

** indicates p value <0.01,

† indicates p value <0.0001.

P values obtained using the Stepdown Bonferroni adjustment for each significant association