

Retrospective Analysis of Diabetes Care in California Medicaid Patients with Mental Illness

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BACKGROUND: Serious mental illness often is associated with an increased risk of diabetes and sub-optimal diabetes care.

OBJECTIVE: To examine diabetes prevalence and care among Medicaid patients from one county mental health system.

DESIGN: Retrospective cohort study combining county records and 12 months of state Medicaid claims.

SUBJECTS: Patients ages 18 to 59 receiving mental health services between November 1 and 14, 2004.

MEASUREMENTS: Dependent variables were glycosylated hemoglobin A1C (HbA1c) testing, lipid testing, and eye examinations. Psychiatric status was assessed by second generation antipsychotic prescription (SGA) and low Global Assessment of Functioning (GAF) score.

RESULTS: Among psychiatric patients, 482 (11.8%) had diabetes. Among those with diabetes, 47.3% received annual HbA1c testing, 56.0% lipid testing, and 31.7% eye examinations. Low GAF scores were associated with lower likelihood of lipid testing (OR 0.43). SGA prescription reduced the likelihood of HbA1c testing (OR 0.58) but increased the likelihood of eye examinations (OR 2.02). Primary care visits were positively associated with HbA1c and lipid testing (ORs 5.01 and 2.21, respectively). Patients seen by a fee-for-service psychiatrist were more likely to have lipid testing (OR 2.35) and eye examinations (OR 2.03).

CONCLUSION: Among Medicaid psychiatric patients, worse diabetes care was associated with SGA prescription, more serious psychiatric symptoms, and receiving psychiatric care only in public mental health clinics. Diabetes care improved when patients were seen by fee-

for-service psychiatrists or primary care physicians. Further study is needed to identify methods for improving diabetes care of public mental health patients.

KEY WORDS: diabetes; Medicaid; mental health; health services research; quality assessment.

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BACKGROUND

Medicaid enrollees with serious and persistent mental illness are a population with special health needs,¹ with public mental patients dying as many as 25 years younger than others in the general population.² Lifestyle factors such as higher smoking rates, greater use of alcohol and other drugs, and less physical activity among those with mental illness may partially explain this mortality difference.³

Medical comorbidity is common, with increased co-occurrence of diabetes observed among individuals with schizophrenia,⁴ bipolar disorder,⁵ and major depression.⁶ One complication in patient management is that newer medications for the treatment of serious mental illness—second generation or atypical antipsychotic (SGA) medications—are associated with a higher diabetes risk among individuals with schizophrenia⁷ and bipolar disorder;⁸ thus, additional glucose or lipid testing is recommended with SGA treatment.⁹

The co-occurrence of two or more chronic conditions, such as mental illness and diabetes, often results in worse diabetes-related care and outcomes.¹⁰ Some studies within the Department of Veterans Affairs (VA)^{11,12} and commercial health maintenance organizations¹³ found that mental illness was associated with lower quality diabetes-specific care; however, other studies within the VA¹⁴ and the British National Health System¹⁵ did not find worse care.

Although the VA is the single largest provider of public mental health care,¹⁶ most Americans with serious mental illness are treated within state or county systems. Regardless of mental illness, a California study found that county patients with diabetes reported greater barriers to diabetes treatment than similar VA patients.¹⁷ There have been few studies, however, examining the intersection of serious mental illness and quality of diabetes care within Medicaid populations. In

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one study (data from Alabama, Georgia, New Jersey, and Wisconsin), diabetes was associated with worse mental health treatment.¹⁸ Another study (claims data from California, Oregon, Tennessee, and Utah), reported not only low rates of glucose and lipid testing among psychiatric patients, but substantial variation in diabetes care among the states.⁹

OBJECTIVE

Because mental illness may be associated with an increased risk of diabetes and sub-optimal diabetes care, this study seeks to (a) describe the prevalence of diabetes among Medicaid psychiatric patients in a Southern California county mental health program, (b) examine the receipt of recommended diabetes care (glycolated hemoglobin A1C (HbA1c) testing, lipid testing, and eye examination), and (c) determine whether mental health factors (e.g., psychiatric diagnosis, Global Assessment of Functioning, and SGA treatment) or context factors (e.g., sources of health care utilization) influence diabetes care.

Our goal was to identify modifiable and non-modifiable factors associated with diabetes care in the mentally ill, which could inform provider, organization, and policy decision makers and guide possible interventions.

METHOD

Design

This was a retrospective cohort study using data extracted from a county billing and tracking system and state Medicaid claims. The Behavioral Model of Health Services Utilization¹⁹ provided the conceptual framework for examining variation in the quality of diabetes care. This model is useful for identifying mutable and non-mutable characteristics associated with variations in healthcare utilization (in this case diabetes care). These characteristics include contextual factors (environment and the health care system) and individual factors (predisposing, enabling, and need), and has been expanded to include a vulnerable domain to better study disadvantaged populations.²⁰ Mental illness generally is considered to be a personal predisposing factor in this expanded model, which has been used in VA mental health research.^{16,21}

San Bernardino County (California) covers 20,000 square miles, primarily desert, although most of its 1.7 million inhabitants live in a handful of urban areas. The County Department of Behavioral Health provides or funds residential, inpatient, and outpatient services. During FY 2004–2005, it served 34,844 individuals (33% children or youth, 63% adult, and 4% elderly).²² Approximately 66% of adults were Medicaid-eligible for at least part of that fiscal year.²² The study population was adults (18 to 59 years of age) receiving mental health services between November 1 and 14, 2004. Following Institutional Review Board approvals, the county extracted patient demographic and utilization data for 5,302 adults and securely transmitted personal identifiers to the California Department of Health Services. Twelve months of paid claims (May 2004 to April 2005) were extracted for all inpatient, outpatient, medical, and prescription services provided to adults eligible for Medicaid funding. Self-pay or indigent

county mental health patients were dropped from the analysis due to lack of Medicaid claims data. Because one-third of the county's adult psychiatric patients were not covered by Med-Cal;²² we were not able to examine quality of care among another population of concern, uninsured persons with serious mental illness.²³

MEASURES

Demographics (Predisposing Personal Characteristics)

County data were examined to determine the personal predisposing factors of age (18–39, 40–49, and 50–59 years), gender, race/ethnicity (non-Hispanic white, Hispanic, other), and birth location (outside/inside of the United States). Marital status (married or other) typically is considered a predisposing enabling variable.

Mental Health Characteristics (Predisposing Vulnerability Domain)

All patients were placed into non-exclusive psychiatric diagnostic categories based on having at least two claims with the following *International Classification of Diseases, Ninth Revision* (ICD-9) codes: schizophrenia (295), bi-polar disorder (296.0, 296.1, 296.4, 296.5, 296.6, 296.7, 296.8, and 296.9), and depression (296.2, 296.3, 300.4, or 311). Claims data were searched for a documented prescription of a second generation anti-psychotic (SGA) medication (aripiprazole, olanzapine, risperidone, quetiapine, or ziprasidone).⁹ Clinical acuity was approximated by noting whether county staff had entered a Global Assessment of Functioning (GAF) score of 1 to 30. The GAF is a scale with scores ranging from 1 to 100, and it is an integral part of the standard multi-axial psychiatric diagnostic system.²⁴ Patients with score between 1 and 30 may be expected to have serious impairments in communication and judgment or be a danger to themselves or others and potentially less likely to receive routine health screening. Roughly 8% of patients had missing GAF scores. Although substance abuse may negatively influence diabetes care²⁵ and may be thought of as a psychiatric condition, it was not included because different rules and funding streams regarding mental health and substance abuse services in California result in county mental health staff under-coding substance abuse.

Physical Health Characteristics (Individual Need)

Diabetes was defined by ICD-9 diagnosis codes of 250, 357.2, 362.0, and 366.41. There are several methods for assessing health status in relationship to diabetes care.^{26,25} We used the Meduru et al.,²⁵ method (see their appendix A) to examine ICD-9 codes to identify four classes of non-diabetes chronic conditions (cancer, gastrointestinal, musculoskeletal, and pulmonary) and three diabetes-related complications. The complications were macrovascular complications (coronary artery disease, congestive heart failure, arrhythmia, stroke, or peripheral vascular disease), microvascular complications (including chronic renal pathophysiology, diabetic nephropathy, acute renal failure, end stage renal disease, diabetic retinopathy, and ulcer), and meta-

bolic decompensation (uncontrolled diabetes and short-term complications of diabetes).²⁵

Healthcare Utilization (context of care received)

Claims data were examined to determine whether there had been visits to a primary care physician (general practice, family practice, or internal medicine), a psychiatric or non-psychiatric hospitalization, or a claim from an optical lab or dispensing optician. Subjects were categorized as a fee-for-service (FFS) psychiatric client if they had had at least one outpatient visit to a FFS psychiatric provider (typically a private-practice psychiatrist contracted with the county). Most Medicaid-funded outpatient specialty mental health care is provided at public clinics.

Dependent Variables—Diabetes Process of Care Measures

Quality of care during the study year was assessed by searching claims data for *Current Procedural Terminology* (CPT) codes indicating HbA1c testing, lipid testing, and eye examinations as per a large VA study.¹² The CPT code for HbA1c testing was 83036; for lipid testing, 80061, 83721, 83718, 82465, or 84478; and for eye examinations, 92002, 92004, 92012, 92014, 92225, 92226, 92235, or 92250. These three process of care measures were selected from six annual preventive care indicators listed in Healthy People 2010.²⁷ The American Diabetes Association and the National Committee for Quality Assurance have recommended providing additional clinical screenings and patient education,²⁸ and routine monitoring is associated with better outcomes.²⁹ The best clinical care may involve HbA1c and lipid testing more than once a year.^{9,30}

ANALYSIS

Chi-squared tests for categorical variables were used to examine patient characteristics by receipt of each of the three diabetes-related tests. Limited collinearity was noted among independent variables, with the highest correlations being roughly 0.3 among primary care, comorbid conditions, and non-psychiatric hospitalizations. Multivariable logistic regression models were run with receipt of the three diabetes-related tests as dependent variables. The Hosmer–Lemeshow test was used to assess goodness of fit. Regression results are shown only for the vulnerable and contextual domain measures. Stata/SE 9.2 for Windows (StataCorp LP, College Station, TX) was used for the statistical analyses.

RESULTS

Characteristics for the Medicaid patients are shown in Table 1. Socio-demographic percentages were similar to those of all 23,220 adult patients seen by the County Department of Behavioral Health during FY 2004–2005 (data not shown).²² Diabetes was observed in 482 patients (11.8% of the psychiatric patients). Those with diabetes were more likely than those without diabetes to have schizophrenia and to have received a second generation antipsychotic prescription. Although there was little difference in mental health care, psychiatric patients

Table 1. Characteristics of San Bernardino County, California, Adult Medicaid Psychiatric Patients Receiving Services from November 1 to 14, 2004

	No Diabetes (N=3,589)	Diabetes (N=482)
	n (%)	n (%)
Demographic		
Sex, female	2,187 (61)	330 (68)
Age, years		
18 to 39	1,781 (50)	142 (29)
40 to 49	1,219 (34)	173 (36)
50 to 59	589 (16)	167 (35)
Race/Ethnicity		
White	1,869 (52)	221 (46)
Hispanic	847 (24)	119 (25)
Other	873 (16)	142 (29)
Married	556 (15)	96 (20)
Born outside of US	228 (6)	50 (10)
Mental Health		
Psychiatric diagnoses		
Schizophrenia	1,266 (35)	210 (44)
Bipolar disorder	785 (22)	113 (23)
Depression	1,515 (42)	234 (49)
Use of Second Generation Antipsychotics*	2,240 (62)	352 (73)
Low GAF score of 1 to 30†	208 (6)	38 (8)
Physical Health		
Non-Diabetes related conditions		
Cancer	83 (2)	30 (6)
Gastrointestinal	239 (7)	74 (15)
Musculoskeletal	626 (17)	191 (40)
Pulmonary	483 (13)	144 (30)
Diabetes related complications		
Macrovascular	140 (4)	108 (22)
Microvascular	81 (2)	55 (11)
Metabolic decompensation‡	0 (0)	117 (24)
Healthcare Utilizations§		
Fee-for-Service psychiatric visit	618 (17)	90 (19)
Primary care visit	1,513 (42)	383 (79)
Optometric visit (eye glasses)	881 (25)	180 (37)
Psychiatric hospitalization	769 (21)	105 (22)
Non-psychiatric hospitalization	347 (10)	122 (25)

* Second generation antipsychotics were aripiprazole, olanzapine, risperidone, quetiapine, and ziprasidone

† GAF: Global Assessment of Functioning. A score of 1 to 30 represents serious impairments in communication and judgment

‡ Metabolic decompensation was defined as uncontrolled diabetes or short-term complications of diabetes

§ Based on claims data May 2004–April 2005

with diabetes had more medical conditions and greater contact with physical health care providers than those without diabetes.

Table 2 presents the bivariate comparisons of patient characteristics by type of recommended care. During the year, 228 (47.3%) of diabetic individuals were given HbA1c testing, 270 (56.0%) received lipid testing, and 153 (31.7%) had eye examinations. Individuals with low GAF scores had lower rates of HbA1c and lipid testing. Three of the four contextual measures were associated with higher rates for at least one diabetes quality of care measure, whereas psychiatric hospitalization was associated with a lower rate of lipid testing.

Table 3 presents the multivariable logistic regression results for the three recommended care measures. Low GAF scores were associated with a lower likelihood of lipid testing (OR 0.43). SGA prescriptions were linked to decreased likelihood of HbA1c testing (OR 0.58) and increased likelihood of eye examinations (OR 2.02). Other health services had a strong influence on diabetes care. Individuals with a primary care

Table 2. Characteristics Associated with Receipt of Recommended Preventive Care Services Among Adult Medicaid Psychiatric Patients with Diabetes, May 2004—April 2005 (N=482)

	Glycolated Hemoglobin A1C Testing (N=228)	Lipid Testing (N=270)	Eye Examinations (N=153)
	n (%)	n (%)	n (%)
Demographic			
Age, years			
18 to 39	69 (48.6)	82 (57.8)	34 (23.9)
40 to 49	81 (46.8)	93 (53.8)	58 (33.5)
50 to 59	78 (46.7)	95 (56.9)	51 (36.5)
Sex			
Male	67 (44.1)	73 (48.0)	42 (27.6)
Female	161 (48.8)	197 (59.7)*	111 (33.6)
Race/Ethnicity			
White	94 (42.5)	116 (52.5)	78 (35.3)
Hispanic	63 (52.9)	69 (58.0)	24 (20.2)
Other	71 (50.0)	85 (59.9)	51 (35.9)†
Married			
Yes	50 (52.1)	62 (64.6)	40 (41.7)
No	178 (46.1)	208 (53.9)	113 (29.3)*
Born outside of US			
Yes	33 (66.0)	35 (70.0)	17 (34.0)
No	195 (45.1)†	235 (54.4)*	136 (31.5)
Mental Health			
Schizophrenia			
Yes	103 (49.1)	115 (54.8)	66 (31.4)
No	125 (46.0)	155 (57.0)	87 (32.0)
Bipolar			
Yes	48 (42.5)	56 (49.6)	34 (30.1)
No	180 (48.8)	214 (58.0)	119 (32.3)
Depression			
Yes	110 (47.0)	132 (56.4)	82 (35.0)
No	118 (47.6)	138 (55.7)	71 (28.6)
Use of Second Generation Antipsychotics §			
Yes	158 (44.9)	189 (53.7)	118 (33.5)
No	70 (53.9)	81 (62.3)	35 (26.9)
Low GAF score of 1 to 30			
Yes	12 (31.6)	12 (31.6)	9 (23.7)
No	216 (48.7)*	258 (58.1)†	144 (32.4)
Physical Health			
Number of non-diabetes related conditions			
None	81 (43.3)	90 (48.1)	42 (22.5)
1	89 (50.6)	100 (56.8)	61 (34.7)
2 or more	58 (48.7)	80 (67.2)†	50 (42.0)†
Diabetes-related complication¶			
Yes	114 (52.8)	126 (58.3)	81 (37.5)
No	114 (42.9)*	144 (54.1)	72 (27.1)*
Healthcare Utilization			
Fee-for-Service psychiatric visit			
Yes	48 (53.3)	67 (74.4)	38 (42.2)
No	180 (45.9)	203 (51.8)‡	115 (29.3)*
Primary care visit			
Yes	208 (54.3)	232 (60.6)	128 (33.4)
No	20 (20.2)‡	38 (38.4)‡	25 (25.3)
Optometric visit (eye glasses)			
Yes	77 (42.8)	103 (57.2)	120 (66.7)
No	151 (50.0)	167 (55.3)	33 (10.9)‡
Non-psychiatric hospitalization			
Yes	57 (46.7)	68 (55.7)	45 (36.9)
No	171 (47.5)	202 (56.1)	108 (30.0)
Psychiatric hospitalization			
Yes	44 (41.9)	45 (42.9)	27 (25.7)
No	184 (48.8)	225 (59.7)†	126 (33.4)

* P<0.05

† P<0.01

‡ P<0.001

§ Second generation antipsychotics were aripiprazole, olanzapine, risperidone, quetiapine, and ziprasidone

|| GAF: Global Assessment of Functioning. A score of 1 to 30 represents serious impairments in communication and judgment

¶ Includes macrovascular complications, microvascular complications, and metabolic decompensation

Table 3. Adjusted Likelihood of Receiving Recommended Preventive Care Services among Adult Medicaid Psychiatric Patients with Diabetes, May 2004–April 2005 (n=482)

	Likelihood of Receiving Diabetes Preventive Care Services, Odds Ratio (95% CI)*		
	Glycolated Hemoglobin A1C Testing	Lipid Testing	Eye Examinations
Mental Health †			
Schizophrenia	1.36 (0.80, 2.33)	1.23 (0.72, 2.10)	1.67 (0.82 - 3.38)
Bipolar	0.97 (0.58, 1.64)	0.90 (0.54, 1.52)	1.15 (0.59 - 2.24)
Depression	0.85 (0.52, 1.39)	0.79 (0.48, 1.29)	1.43 (0.75 - 2.73)
Use of Second Generation Antipsychotics ‡	0.58 (0.36, 0.94)	0.76 (0.47, 1.23)	2.02 (1.06 - 3.84)
Low GAF score of 1 to 30§	0.54 (0.24, 1.19)	0.43 (0.20, 0.95)	1.06 (0.38 - 2.96)
Healthcare Utilization†			
Fee-for-Service psychiatric visit	1.24 (0.74, 2.06)	2.35 (1.35, 4.08)¶	2.03 (1.07 - 3.86)
Primary care visit	5.01 (2.84, 8.83)#	2.21 (1.34, 3.64)¶	0.91 (0.46 - 1.80)
Optometric visit (eye glasses)	0.65 (0.43, 0.97)	0.90 (0.60, 1.36)	19.36 (11.36 - 32.97)#
Non-psychiatric hospitalization	0.74 (0.45, 1.21)	0.78 (0.48, 1.28)	1.08 (0.57 - 2.04)
Psychiatric hospitalization	0.78 (0.42, 1.43)	0.56 (0.30, 1.03)	0.65 (0.29 - 1.49)

* Each of the three multivariable logistic regression models included all characteristics shown in the left column and also adjusted for age, race/ethnicity, gender, marital status, place of birth, presence of diabetes complications, and number of non-diabetes related conditions as listed in Table 2
 † Reference category for each variable is "no"

‡ Second generation antipsychotics were aripiprazole, olanzapine, risperidone, quetiapine, and ziprasidone

§ GAF: Global Assessment of Functioning. A score of 1 to 30 represents serious impairments in communication and judgment

|| P<0.05

¶ P<0.01

P<0.001

visit were more likely to have HbA1c (OR 5.01) and lipid testing (OR 2.21). Those receiving new eyeglasses were more likely to have recommended eye examinations (OR 19.36); but less likely to have HbA1c testing (OR 0.65). FFS psychiatric patients were more likely to have had lipid testing (OR 2.35) and eye examinations (OR 2.03). Hospitalization during the study period was not associated with the likelihood of receiving HbA1c testing, lipid testing, or an eye examination.

DISCUSSION

The prevalence of diabetes is high in this mentally ill Medicaid population (11.8%), compared to the national prevalence of diagnosed diabetes (7.8%) estimated by the Centers for Disease Control and Prevention.³¹ Diabetes quality of care did not meet recommended standards. We found that 47% of psychiatric Medicaid patients with diabetes were given annual HbA1c testing, 56% received lipid testing, and 32% had eye examinations. In contrast, a recent VA study found that approximately 65% of all patients with diabetes had HbA1c measured in the last year.¹⁴ National self-report surveys from the early part of this decade suggest that among 18- to 75-year-olds with diabetes, 84.6% had an annual lipid profile and 67.7% had a dilated eye examination.²⁹

Using the Behavioral Model of Health Services Utilization as our quality of care framework, we found that predisposing mental health (vulnerability) measures (low GAF and being prescribed SGA medication) were negatively associated with some diabetes quality of care indicators. Furthermore, some of the contextual measures, including receiving mental health services from a FFS psychiatrist, visiting a primary care physician, or having eye glass services, were positively associated with some quality of care indicators.

It may not be surprising that diabetes screening is less common among the handful of patients determined by mental health clinicians to have serious impairments in communication and judgment. It is disturbing that the use of SGA medication

was significantly associated with a reduced likelihood of HbA1c testing, particularly given calls for increased metabolic screening among such patients.⁹ Indeed, psychiatrists have been encouraged to do their own primary care monitoring, including fasting glucose and lipid profiles, for patients with serious mental illness who are unable to secure such testing through traditional primary care mechanisms.³⁰

Contextual factors, as measured by type of service or type of provider, did influence diabetes quality of care. It is not clear why patients who see a FFS psychiatrist are more likely to have diabetes preventive screenings. The FFS psychiatrists could have ordered the screenings or been more assertive in encouraging the preventive care. Alternatively, FFS psychiatric patients may be a self-selected group with better transportation or less severe psychiatric pathology.

Clearly, interventions to improve diabetes care for socially disadvantaged populations should be directed to health providers and the health system as well as to patients.³² Indeed, systems or contextual factors commonly associated with poor physical care of those with serious mental illness include different funding streams, different location of physical and mental treatment sites, and organizational difficulties in communication.³³ Poor medical management of psychiatric patients in California was documented years ago.³⁴ In fiscal year 2000–2001 alone, California county mental health programs served more than 197,000 adults with a serious mental illness³⁵ in a system that is carved-out from physical health care. Consistent with experiences in other states,³⁶ as California's Medicaid managed care (for both physical and mental health care) was implemented in the 1990s, Memorandums of Understanding were signed between the physical and mental health plans, which clarified who pays for what (such as medications) but did not organize meaningful service integration.

Regardless of carve-out financing, physician organizations providing primary care services are more likely to use organized care management processes (case management, physician feedback, disease registries, clinical practice guidelines,

and programs for teaching self-management skills) for chronic diseases if there are substantial external financial incentives, such as contracts, and adequate clinical information technology capacity.³⁷ A recent survey found that many physician and provider organizations heavily involved in California's Medicaid program are extensively engaged in preventive and chronic care management programs.³⁸ In fact, a southern California study involving Medicaid patients found that a diabetes case management program was successful in improving glycemic control.³⁹ Medicaid psychiatric patients receiving SGA prescriptions in California were more likely to have lipid testing than patients in several other states.⁹

Other states have tried aggressive approaches to overcoming the legal, financial, and organizational barriers of behavioral health carve-outs. In Michigan's Washtenaw County, the state, the county, a university, and a Medicaid managed care plan collaborated to create a new entity to provide coordinated care.⁴⁰ In Oregon, a Medicaid-only plan experimented with two different models of implementing the Robert Wood Johnson Foundation's "Depression in Primary care" initiative.³⁶ Unfortunately, there are not published data showing improvement in diabetes care.

Further study within this county using more detailed data could examine geographical access issues, such as physical co-location of mental and primary care services, because there are more than 20 county-operated and contracted outpatient clinics spread across 30 cities and towns, with some in urban centers and others in more remote desert or mountain communities. It is possible that psychiatric FFS providers may have been located closer to other health care providers than were mental health clinics.

This study has the basic limits of administrative data, which include lack of clinical specificity, possible miscoding, and possible incomplete coding.⁴¹ The prevalence of diabetes was likely undercounted given its reliance on *International Classification of Diseases, Ninth Revision* diagnosis codes in claims data. Other studies have considered the presence of antidiabetic drug prescriptions⁹ and other clinical laboratory values.¹² The observed diabetes prevalence of 11.8% in this sample is lower than the 15.2% reported in Medicaid patients from Ohio;⁴² however, it is comparable to a similar study that identified diabetes in 9% of psychiatric Medicaid patients in California⁹ and a study that found diabetes claims for 11.1% of beneficiaries in a southern state.⁴

Although chart reviews often are used to assess quality of care,¹¹ such an approach was not feasible given the organizational barriers between medical and mental care providers. Furthermore, unlike researchers in the VA¹² or private managed care organizations,¹³ we were unable to examine laboratory values to determine whether screening examinations had occurred.²⁹ FFS Medi-Cal claims are fairly complete and accurate, however, because the data are linked to payment.⁴¹ Although managed care organizations do not submit all medical/outpatient encounter data, data quality is roughly comparable between managed care and FFS.⁴¹

Some researchers have suggested that GAF scores are of limited value, particularly for predicting mental health related outcomes.⁴³ It is not possible to assess the GAF score's validity in this dataset; however, the fact that low scores were associated with lower quality of care does suggest that the score may have relevance for non-mental health outcomes. Finally, there may be limited generalizability of findings

because results are from one county in California. Nonetheless, there are many similarities, such as patient characteristics and benefits structure, in Medicaid-funded mental health systems within California and across all 50 states.⁴⁴

In summary, retrospective analysis of California Medicaid claims for one county suggests that compliance with standard diabetes screening measures was lower among psychiatric patients who received care in public mental health clinics. Predictors of worse diabetes care were poor psychological and social functioning and anti-psychotic medication usually reserved for refractory schizophrenia and bipolar illness. Diabetes care was improved when patients were seen by primary care physicians or eye specialists. Further study is needed to better understand why patients who received specialty mental health services through private-practice FFS psychiatrists received better diabetes care than those patients receiving specialty mental health care only in county mental health clinics, and to identify realistic methods for reducing those disparities.

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