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RESEARCH ARTICLE

Racial differences in antipsychotic use: Claims database analysis of Medicaid-insured patients with schizophrenia

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BACKGROUND: Database analyses have indicated that medical treatment for schizophrenia varies among racial groups. This study assessed antipsychotic use and healthcare utilization across races in Medicaid-insured patients with schizophrenia.

METHODS: A Medicaid database of inpatient/outpatient medical claims and outpatient prescription claims for more than 28 million enrollees in 11 geographically diverse states was analyzed. The primary outcome, racial differences in antipsychotic use in 2012, was examined in 5 multivariable logistic regression models: (1) any antipsychotic, (2) first-generation (FG) long-acting injectables (LAIs), (3) FG oral antipsychotics, (4) second-generation (SG) LAIs, and (5) SG oral antipsychotics.

RESULTS: Odds ratios and adjusted predicted probabilities were comparable for any antipsychotic use between black and white patients. Black patients were less likely to receive SG oral antipsychotics ($P < .001$) and more likely to receive SG or FG LAIs ($P = .001$ and $P < .001$, respectively) and FG oral antipsychotics ($P = .003$) vs white patients. Further, black patients had a higher mean number of emergency room visits ($P < .001$) and a lower mean number of hospitalizations ($P < .05$) vs white patients; the mean number of physician visits was comparable.

CONCLUSIONS: Disparities in antipsychotic use and healthcare utilization across races in patients with schizophrenia warrant further investigation and elimination of these disparities should be a national goal.

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INTRODUCTION

Schizophrenia affects approximately 2.5 million adults in the United States,[1] and the high relapse rates among patients who discontinue pharmacotherapy after a first episode of psychosis[2] confirm the chronic nature of the disease, the need for maintenance treatment,[3,4] and the high estimated total cost of schizophrenia.[5] Rates of nonadherence to antipsychotic therapy remain high throughout the course of treatment.[6-8] Guidelines for managing schizophrenia and an expert consensus panel recommend long-acting injectable (LAI) antipsychotics as one option for improving treatment adherence and alleviating persistent symptoms in patients with schizophrenia and other serious mental illnesses.[3,9] However, recent reviews and database analyses suggest that patients from ethnic and racial minority groups might be less likely to receive newer pharmacologic treatments or the standard of care compared with white patients with serious mental illness or schizophrenia. For example, a systematic review and meta-analysis of ethnic and racial disparities in newer vs older antipsychotic use in outpatients with schizophrenia and other psychotic or comorbid disorders found that although overall use of any antipsychotic was comparable among ethnic and racial groups, U.S. black and Latino patients were less likely than other patients to receive newer atypical antipsychotics.[10] Another descriptive study of Medicaid claims for the use of depot antipsychotics in 2007 from patients with schizophrenia across 21 states and the District of Columbia found that in most states, a larger proportion of black patients received injectable antipsychotic therapy compared with white patients.[11] However, this study did not assess oral antipsychotic use across racial groups and, since 2007, more oral second-generation antipsychotics (SGAs) and LAI SGAs have been added to the schizophrenia treatment arsenal.

In considering the changing psychopharmacologic landscape, our objective was to update and expand on previous studies and assess recent antipsychotic prescriptions (oral and LAIs) and medical care utilization across races in Medicaid-insured patients with schizophrenia. Moreover, we used a longitudinal approach to provide a dynamic and directional view to the changing healthcare environment. Two null hypotheses specifically were tested: (1) there is no difference in LAI use between black patients and white patients and (2) there is no difference in the use of atypical antipsychotics between black patients and white patients. Based on documented healthcare disparities between these patient populations, we expected that use of first-generation antipsychotics (FGAs), which are less costly, would be more common among black patients.

METHODS

Data sources and study population

Data were extracted from Truven Health MarketScan Multi-State Medicaid Database from January 2009 through December 2012. This database contains inpatient and outpatient medical claims and outpatient prescription administrative claims data collected from a nonprobability sample of 15 U.S. states varying in size and sociodemographic composition. This convenience sample represented more than 28 million Medicaid enrollees but might not represent the entire U.S. Medicaid or national population. Our study used a retrospective longitudinal observational cohort design in which 4 separate calendar year–based samples were created (2009, 2010, 2011, and 2012). Cohorts were stratified by racial groups, as recorded in Medicaid enrollment files based on patient self-identification. Racial groups included self-identified black and white (includes individuals who self-identified as white race and who are non-Hispanic). Other racial and ethnic groups (eg, Hispanic) were excluded from the analysis because of low sample size inherent in the geographic distribution of the sample.

Patients who were age ≥18 and <65 at the time of their schizophrenia diagnosis and who were enrolled continuously with medical, pharmacy, and mental health coverage during the calendar year of interest were considered for study inclusion. Patients who had ≥1 inpatient facility claim or ≥2 non-diagnostic outpatient claims on different days that indicated an *International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM)* diagnostic code for schizophrenic disorders (295.00–295.35, 295.50–295.65, 295.80–295.95) were included in the analyses. Patients who were dually eligible for Medicare were excluded because prescriptions covered by Medicare Part D were not captured in the database.

The primary outcomes were racial differences in antipsychotic use in 2012: (1) any use, (2) oral FGA, (3) oral SGA, (4) LAI FGAs, and (5) LAI SGAs. FGAs included the oral antipsychotics haloperidol, fluphenazine hydrochloride, amitriptyline hydrochloride/perphenazine, and perphenazine, and the LAIs haloperidol and fluphenazine hydrochloride. SGAs included oral

FIGURE 1
Patient attrition

Patients in MarketScan Multi-State Medicaid database with continuous enrollment with medical, pharmacy, and mental health coverage throughout the calendar year, n (%)			
2,666,666 (100%)	3,037,170 (100%)	2,743,246 (100%)	2,753,860 (100%)
Patients with ≥1 inpatient or ≥2 nondiagnostic outpatient claims on different days with a diagnosis of schizophrenia[a] during the calendar year			
18,684 (0.70%)	20,365 (0.67%)	19,071 (0.70%)	19,080 (0.69%)
Patients age ≥18 and <65 at the time of schizophrenia diagnosis			
17,493 (0.66%)	19,191 (0.63%)	17,961 (0.65%)	18,008 (0.65%)
Patients not dually eligible for Medicare			
17,492 (0.66%)	19,190 (0.63%)	17,960 (0.65%)	18,008 (0.65%)
Patients identified as black or white			
Black: 8,813 (0.33%) White: 6,906 (0.26%) **2009**	Black: 9,321 (0.31%) White: 7,580 (0.25%) **2010**	Black: 9,325 (0.34%) White: 6,112 (0.22%) **2011**	Black: 9,304 (0.34%) White: 5,819 (0.21%) **2012**

[a]ICD-9-CM 295.00-295.35, 295.50-295.65, 295.80-295.95.

antipsychotics aripiprazole, asenapine, clozapine, iloperidone, lurasidone, olanzapine, paliperidone, quetiapine, risperidone, and ziprasidone, and the LAIs paliperidone palmitate and risperidone. Exploratory analyses also were conducted on racial differences in mental health-related claims, schizophrenia-related medical claims, hospitalizations, outpatient emergency room (ER) visits, and physician office visits. Bivariate analyses are reported for 2012 data; multivariable analyses are reported for all calendar years (2009 to 2012).

Statistical analyses

Antipsychotic use in each calendar year and schizophrenia-related and mental health-related healthcare utilization in 2012 were assessed in unadjusted bivariate analyses using chi-square tests for categorical variables and *t* tests for continuous variables. In addition, 5 multivariable logistic regression models (yes vs no) were fit for the 5 primary outcomes in 2012. For each multivariable model, 3 variants of specification were fit: (1) adjusting for Medicaid state and demographic characteristics (age, sex, education level [estimated via U.S. postal ZIP code], and income level [estimated via U.S. postal ZIP code]), (2) adjusting for Medicaid state, demographic characteristics, and comorbidities (Charlson Comorbidity Index [CCI][12] and the following common comorbid disorders that were identified with *ICD-9* codes: anxiety disorders, eating disorders, sleep disorders, sexual disorders, bipolar disorder, major depressive disorder, and chronic pain), and (3) adjusting for Medicaid state, demographic characteristics, comorbidities, and co-medications of interest.

A variance inflation factor was used to test for multicollinearity of the models' independent variables, and there was no evidence of problematic collinearity. However, the third model was not used because of potential concerns of endogeneity with inclusion of the co-medications. Thus, the second model (ie, adjusting for Medicaid state, demographic characteristics, and comorbidities) was used for multivariable analyses. Adjusted predicted probabilities were generated using the recycled prediction method. SAS version 9.4 (SAS Institute Inc., Cary, NC, USA) was used to build the data file, and Stata/MP 12 (StataCorp LP, College Station, TX, USA) was used to conduct the multivariable analyses.

RESULTS

Study sample characteristics

Of 2,753,860 patients in 2012 in the database who met the initial inclusion criteria, 19,080 had ≥1 inpatient claim or ≥2 non-diagnostic outpatient claims on different days with

TABLE 1
Baseline demographics and characteristics: 2009 and 2012

	2009			2012		
	Black n = 8,813	**White n = 6,906**	***P***	**Black n = 9,304**	**White n = 5,819**	***P***
Mean ± SD age, years	42.5 ± 12.2	43.0 ± 12.2	.015	42.8 ± 12.5	42.6 ± 12.6	.43
Age group, n (%)			.002			.011
18 to 35 years	2,666 (30.3%)	1,985 (28.7%)		2,984 (32.1%)	1,887 (32.4%)	
36 to 45 years	1,946 (22.1%)	1,578 (22.8%)		1,758 (18.9%)	1,193 (20.5%)	
46 to 55 years	2,849 (32.3%)	2,149 (31.1%)		2,937 (31.6%)	1,705 (29.3%)	
56 to 64 years	1,352 (15.3%)	1,194 (17.3%)		1,625 (17.5%)	1,034 (17.8%)	
Sex, n (%)			.85			.75
Male	4,731 (53.7%)	3,718 (53.8%)		5,234 (56.3%)	3,258 (56.0%)	
Female	4,082 (46.3%)	3,188 (46.2%)		4,070 (43.7%)	2,561 (44.0%)	
CCI group,[a] n (%)			<.001			<.001
0	4,878 (55.4%)	3,522 (51.0%)		5,191 (55.8%)	2,923 (50.2%)	
1 to 2	2,845 (32.3%)	2597 (37.6%)		2,939 (31.6%)	2,237 (38.4%)	
3 to 4	618 (7.0%)	552 (8.0%)		646 (6.9%)	440 (7.6%)	
≥5	472 (5.4%)	235 (3.4%)		528 (5.7%)	219 (3.8%)	
Mean ± SD Deyo-CCI[b]	1.0 ± 1.7	1.0 ± 1.5	.29	1.0 ± 1.7	1.0 ± 1.5	.70
Mean ± SD median household income, U.S. dollars[c]	32,508 ± 10,609	36,612 ± 11,042	<.001	38,143 ± 12,250	36,451 ± 11,380	<.001
Mean ± SD education level, proportion[d]						
Some college education	0.43 ± 0.13	0.44 ± 0.14	<.001	0.44 ± 0.14	0.45 ± 0.14	.22
College degree	0.17 ± 0.11	0.18 ± 0.11	.001	0.18 ± 0.11[e]	0.18 ± 0.11[f]	.003

[a]Possible scores range from 0 to 37, with higher scores indicating greater severity of comorbidities and increased risk of mortality.[12]
[b]Possible scores range from 0 to 37, with higher scores indicating greater severity of comorbidities and greater healthcare resource use.[37]
[c]Based on 2000 Census Division data linked at the 3-digit ZIP code level where the patient resides, which contains the median household income for each ZIP code. It is not the median household income of the patient.
[d]Based on 2000 Census Division data linked at the 3-digit ZIP code level of where the patient resides. Data represent the proportion of college graduates and those with some college education where the patient resides. It is not a measure of education level of the patient.
[e]Nonrounded mean ± SD, 0.1841948042 (0.1136494808).
[f]Nonrounded mean ± SD, 0.1786496323 (0.1088744657).

CCI: Charlson Comorbidity Index; SD: standard deviation.

a diagnosis of schizophrenia. In total, 18,008 patients satisfied all inclusion/exclusion criteria, 9,304 of whom were identified as black and 5,819 as white; 2,885 were of other races. Attrition data for all calendar years (2009 to 2012) demonstrated similar patterns (**FIGURE 1**). Baseline demographics and patient characteristics were comparable in all years studied (2009 and 2012 shown in **TABLE 1**; 2010 and 2011 data not shown).

In 2009, white patients were slightly older than black patients ($P = .015$), had higher median household incomes ($P < .001$), and had a greater proportion with some college education or a college degree ($P = .001$ for both comparisons). There also were statistically significant differences between white and black patients in age groups (overall $P = .002$) and CCI group (overall $P < .001$). In 2012, the slight age difference between white and black patients from 2009 was now comparable, and although a slightly greater proportion of white patients had a college degree ($P = .003$), the proportion of white and black patients with some college education was now comparable. All other aforementioned significant differences between white and black patients in 2009 remained statistically significant in 2012.

Comorbid conditions and co-medications

Prevalence rates were significantly higher for several comorbid conditions among white patients compared with black patients (**TABLE 2**). Of note, significantly higher proportions of white than black patients had psychiatric

TABLE 2
2012 Comorbid conditions and co-medications

	Black, n (%) n = 9,304	White, n (%) n = 5,819	*P*
Comorbid condition			
Major depressive disorder	3,362 (36.1%)	2,725 (46.8%)	<.001
Diabetes	2,452 (26.4%)	1,492 (25.6%)	.33
Bipolar disorder	2,265 (24.3%)	2,440 (41.9%)	<.001
Chronic pulmonary disease	2,029 (21.8%)	2,036 (35.0%)	<.001
Anxiety disorders	1,852 (19.9%)	2,481 (42.6%)	<.001
Chronic pain	1,718 (18.5%)	1,646 (28.3%)	<.001
Sleep disorders	893 (9.6%)	1,001 (17.2%)	<.001
Cerebrovascular disease	576 (6.2%)	376 (6.5%)	.50
Renal disease	506 (5.4%)	238 (4.1%)	<.001
Congestive heart failure	476 (5.1%)	333 (5.7%)	.11
Peripheral vascular disease	308 (3.3%)	280 (4.8%)	<.001
HIV	271 (2.9%)	44 (0.8%)	<.001
Cancer	197 (2.1%)	143 (2.5%)	.17
Myocardial infarction	193 (2.1%)	176 (3.0%)	<.001
Rheumatic disease	137 (1.5%)	81 (1.4%)	.69
Eating disorder	131 (1.4%)	103 (1.8%)	.08
Dementia	117 (1.3%)	112 (1.9%)	.001
Peptic ulcer disease	104 (1.1%)	103 (1.8%)	<.001
Liver disease	98 (1.1%)	129 (2.2%)	<.001
Hemiplegia or paraplegia	75 (0.8%)	51 (0.9%)	.64
Sexual disorder	59 (0.6%)	40 (0.7%)	.69
Co-medication			
Antidepressants	4,675 (50.2%)	4,114 (70.7%)	<.001
Hypotensive agents	4,286 (46.1%)	2,652 (45.6%)	.56
Anticholinergics	3,737 (40.2%)	2,070 (35.6%)	<.001
Opioid analgesics	3,154 (33.9%)	2,810 (48.3%)	<.001
Mood stabilizers	3,042 (32.7%)	2,909 (50.0%)	<.001
Anxiolytics	2,381 (25.6%)	3,167 (54.4%)	<.001
Antihyperlipidemic agents	2,063 (22.2%)	1,811 (31.1%)	<.001
Antidiabetic agents	1,765 (19.0%)	1,005 (17.3%)	.009
Sedatives/hypnotics	807 (8.7%)	1,070 (18.4%)	<.001

comorbidities recorded on claims, including dementia (1.9% vs 1.3%, respectively; $P = .001$), anxiety disorders (42.6% vs 19.9%; $P < .001$), sleep disorders (17.2% vs 9.6%; $P < .001$), bipolar disorder (41.9% vs 24.3%; $P < .001$), major depressive disorder (46.8% vs 36.1%; $P < .001$), and chronic pain (28.3% vs 18.5%; $P < .001$). Prevalence rates were higher among black patients compared with white patients for HIV (2.9% vs 0.8%; $P < .001$) and renal disease (5.4% vs 4.1%; $P < .001$).

Compared with white patients, a significantly higher proportion of black patients were treated with anticholinergic and antidiabetic therapies ($P < .001$ and $P = .009$, respectively, **TABLE 2**). Co-medication treatment rates were comparable between white and black patients for hypotensive agents; all other co-medications were used in a higher proportion of white patients ($P < .001$ for all comparisons).

Bivariate (unadjusted) analyses

The bivariate (unadjusted) analysis indicated that black and white patients were treated with any antipsychotic at comparable rates in 2012 (**TABLE 3**). However, compared with white patients, a higher proportion of black patients were treated with FGAs or LAIs ($P < .001$ for both comparisons), and a lower proportion of black patients were treated with SGAs or oral antipsychotics ($P < .001$ for both comparisons). Rates of oral FGA use were comparable for all years included in the bivariate analyses (2009 to 2012; **FIGURE 2**). Compared with white patients, however, a lower proportion of black patients were treated with oral SGAs for all years included in the bivariate analyses ($P < .001$ for all comparisons). In reviewing LAI use, a higher proportion of black patients were treated with LAI FGAs for all years included in the bivariate analyses ($P < .001$ for all comparisons, range of between-group differences: 10.0% to 11.1%), whereas rates of LAI SGA use were only significantly greater for black patients than white patients in 2009 and 2010 ($P < .05$ for both comparisons, between-group differences: 1.9% and 1.4% for 2009 and 2010, respectively) and were comparable thereafter.

In 2012, white patients had a significantly higher mean number of mental health-related hospitalizations and physician visits compared with black patients ($P < .001$ for both comparisons; **TABLE 3**), whereas the mean number of ER visits was comparable. However, black patients had a higher mean number of schizophrenia-related ER visits ($P < .001$) but a lower mean number of schizophrenia-related hospitalizations ($P = .04$) compared with white patients.

Multivariable analyses

The adjusted predicted probability of being prescribed any antipsychotic (ie, overall antipsychotic use) was lower in both racial groups in 2012 compared with 2009, and in both calendar years, black and white patients had compa-

rable probabilities of being prescribed any antipsychotic (FIGURE 3). Racial disparities were found when examining predicted probabilities and odds ratios for oral and LAI FGA and SGA prescription claims. In both 2009 and 2012, white patients were significantly more likely than black patients to be prescribed an oral SGA ($P < .001$ for both comparisons). The probability of being prescribed an oral FGA was significantly greater for black patients compared with white patients in 2009 and 2012 ($P = .001$ and $P = .003$, respectively). However, the difference in adjusted predicted probabilities for both calendar years was small (2.2 percentage points).

In 2009, black patients were more likely to be prescribed an LAI FGA compared with white patients ($P \leq .01$, FIGURE 3). Likewise, black patients also were more likely than white patients to receive an LAI SGA ($P < .001$, FIGURE 3). Similar results were noted in 2012—rates of LAI FGA and LAI SGA prescriptions were higher among black patients compared with white patients ($P \leq .01$, FIGURE 3). However, for the LAI SGAs, between-group differences in adjusted predicted probabilities were <3 percentage points in 2009 and 2012, whereas the between-group differences in LAI FGAs were almost 8 percentage points.

TABLE 3
2012 Antipsychotic use and mental health- and schizophrenia-related healthcare utilization

	Black n = 9,304	White n = 5,819	*P*
Antipsychotic use,[a] n (%)			
Any antipsychotic	7,869 (84.6%)	4,892 (84.1%)	.40
Any FGA	2,905 (31.2%)	1,349 (23.2%)	<.001
Any SGA	6,577 (70.7%)	4,516 (77.6%)	<.001
Any LAI	2,721 (29.2%)	1,095 (18.8%)	<.001
Any oral antipsychotic	6,865 (73.8%)	4,640 (79.7%)	<.001
Mean ± SD healthcare utilization per year			
Schizophrenia related			
Number of hospitalizations	0.55 ± 1.27	0.59 ± 1.02	.04
Number of ER visits	0.71 ± 2.75	0.47 ± 1.51	<.001
Number of physician visits	0.57 ± 1.49	0.59 ± 1.56	.52
Mental health-related			
Number of hospitalizations	0.78 ± 1.77	1.08 ± 1.98	<.001
Number of ER visits	1.43 ± 4.25	1.55 ± 3.70	.08
Number of physician visits	1.09 ± 2.05	1.54 ± 2.56	<.001

[a]Categories are not mutually exclusive.

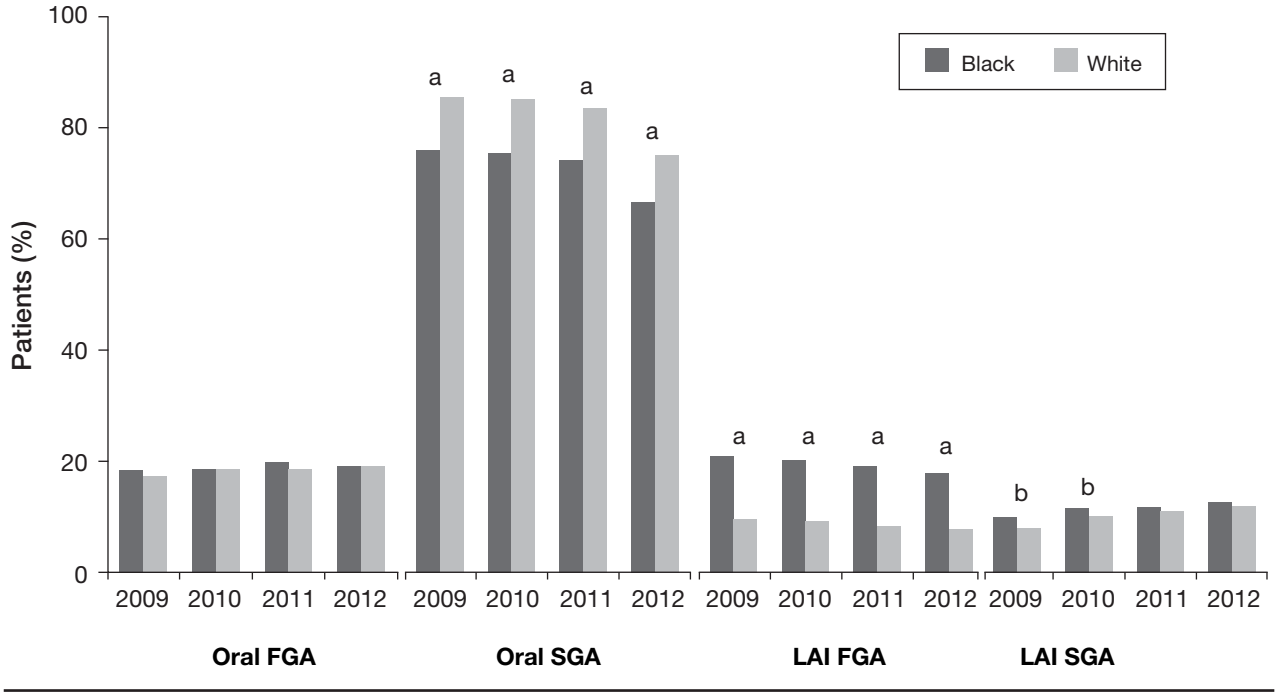
ER: emergency room; FGA: first-generation antipsychotic; LAI: long-acting injectable; SD: standard deviation; SGA: second-generation antipsychotic.

DISCUSSION

Our retrospective cohort study of racial disparities in antipsychotic use among patients included in a large Medicaid database found that black patients were less likely than white patients to receive oral SGAs, and were more likely to receive oral FGAs. Black patients were more likely to receive LAIs, and this was driven largely by a higher proportion of black patients treated with LAI FGAs compared with white patients. Multivariable findings were consistent for 2009 and 2012. Although the difference in adjusted predicted probabilities between black and white patients for being prescribed an oral FGA (2.2%) or an LAI SGA (<3%) was small in both calendar years, when extrapolated to estimates of the U.S. population of patients with schizophrenia, upwards of 35,000 more black patients than white patients received oral FGAs or LAI SGAs. Of note, the percentage of all patients who received any SGA was numerically lower in 2012 than in 2009. Despite safety concerns with FGAs (eg, extrapyramidal symptoms and prolactin elevation[3]), a smaller proportion of patients received prescriptions for LAI SGAs in 2012 compared with the older LAI FGAs in 2009. However, the requirement to obtain prior authorization for atypical antipsychotics by Medicaid programs in many states could reduce the number of prescriptions for atypical antipsychotics and for all antipsychotics.[13] Indeed, in our study, the reduction in SGAs from 2009 to 2012 was accompanied by a reduction in the proportion of patients who received any antipsychotic.

Notably, the database used in this study included data from patients in 11 geographically diverse states, a larger sample than was studied previously,[10,11] and allowed for longitudinal analyses. All patients must be treated with the best available standard of care; thus, these findings are important because they can alert practitioners and mental health system managers to unconscious biases that influence decision making and possible disparate, race-related tiers of standards of care and differences in healthcare access. To reduce ethnic disparities in healthcare, public health advocates and

FIGURE 2
First- and second-generation oral and LAI antipsychotic use: 2009 to 2012



[a]$P < .001$.
[b]$P < .05$.

FGA: first-generation antipsychotic; LAI: long-acting injectable; SGA: second-generation antipsychotic.

healthcare providers might need to review systematically patients' needs and match them with appropriate care at the community level; this also could aid in identifying gaps in community care and where additional resources are needed. For example, the higher mean number of schizophrenia-related ER visits in black compared with white patients in our study may reflect a need for more psychiatric care facilities in black communities. Likewise, to reduce ethnic disparities in LAI use, when choosing between oral and LAI antipsychotics, prescribers could review the potential benefits of LAI therapy (ie, improved adherence, reduced hospitalizations and ER visits when switching from oral to LAI antipsychotics, and potential cost savings[3,9,14-16]) and decide if patients would benefit from LAI antipsychotic therapy on a case-by-case basis.

Our findings that a higher proportion of black than white patients received oral and LAI FGAs are comparable with other analyses of racial disparities in antipsychotic use among patients with schizophrenia. For example, 2 analyses of statewide data indicated that white patients were more likely to receive an atypical antipsychotic[17,18] and black patients were more likely to receive an injectable antipsychotic.[17] Likewise, a recent systematic review and meta-analysis of ethnic and racial disparities in outpatients with schizophrenia and other psychotic or comorbid disorders found that use of any antipsychotic was comparable among ethnic and racial groups, but U.S. black and Latino patients were less likely to receive atypical antipsychotics than other patients.[10]

Our analyses adjusted for variables that often explain racial differences in outcomes, including income level, education level, and medical and psychiatric comorbidities; however, statistically significant racial differences emerged. Long-term metabolic and cardiovascular effects of some SGAs may influence physicians to prescribe oral and LAI FGAs to racial groups with higher rates of diabetes and hypertension.[10] However, in our analysis, rates for many co-medications and comorbid conditions (eg, peripheral vascular disease and myocardial infarction) were higher for white patients compared with black patients, and rates for diabetes, cerebrovascu-

lar disease, and congestive heart failure were comparable between racial groups. Higher rates of many comorbid conditions in white patients could reflect the true situation, more complete Medicaid records, or better access to healthcare and thus higher rates of diagnosis. More consistent access to healthcare among white patients may be inferred from our study, given that black patients had a higher mean number of schizophrenia-related ER visits, lower mean number of hospitalizations, and fewer mental health-related physician visits than white patients. However, it is possible that the lower hospitalization rate in black patients represents greater clinical stability, less access to medical care, or greater likelihood of being sent home from the ER without being admitted to the hospital. Another potential reason for this disparity could be that black patients have a greater mistrust of the healthcare system that precludes their involvement in mental health checks until an acute or emergent psychotic episode occurs.[19,20] The higher rate of overall LAI use in black patients with schizophrenia is consistent with a previous report from a large community mental health center noting higher rates in black and other minority groups compared with white patients with schizophrenia or schizoaffective disorder.[21] Guidelines for the maintenance treatment of schizophrenia recommend LAIs for patients with a history of nonadherence.[3] Factors that could contribute to higher rates of LAI use in black patients include perceived or actual higher rates of medication nonadherence[21,22] and use of LAIs in patients with a history of criminal arrest[23] or in prison settings wherein patients with schizophrenia and black individuals are at greater risk for incarceration.[24]

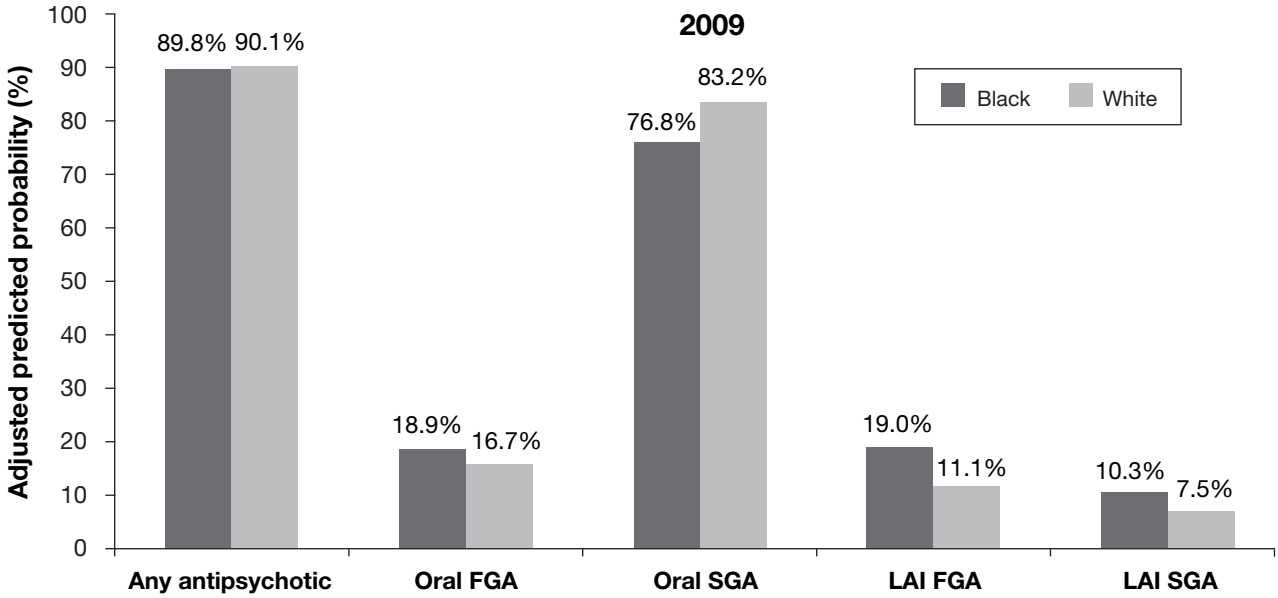
A potential explanation for fewer black patients receiving oral SGAs compared with white patients is the greater likelihood for black patients to experience metabolic changes with SGAs.[25] For example, a 12-week analysis in aggressive inpatients with schizophrenia who were treated with clozapine, olanzapine, or haloperidol found that, overall, black patients gained weight and had increased blood cholesterol levels, whereas white and Hispanic patients lost weight and had decreased blood cholesterol levels. Weight gain was highest among black patients treated with clozapine.[25] Moreover, a recent review concluded that metabolic syndrome is more likely with SGAs than FGAs in patients with schizophrenia, although rates of metabolic syndrome might be higher with clozapine and olanzapine compared with other antipsychotics, and the risk for several components of metabolic syndrome could be lower for some atypical antipsychotics (ie, ziprasidone and aripiprazole).[26] However, few studies have examined ethnic and racial differences in rates of metabolic syndrome with antipsychotic therapy in patients with schizophrenia, and results are conflicting because some studies found higher rates of metabolic syndrome in black and Hispanic patients compared with white patients, whereas other studies reported similar rates.[26]

It is possible that the stigma associated with use of LAI medications contributed to their lower overall use vs oral antipsychotics among all patients, although that stigma appears to be decreasing.[27] As observed in our analyses, a recent analysis of patients with schizophrenia from a Medicaid claims database found that a higher proportion of black than white patients received LAIs in 12 of the 16 states with available data by racial group.[11] However, the analysis did not distinguish between LAI FGAs and SGAs. A potential explanation for our finding that more black patients received LAIs is that black patients might be less likely to adhere to antipsychotic treatment than white patients. For example, in a Texas Medicaid claims analysis of adherence, ethnicity/race, and medication use in patients with schizophrenia or schizoaffective disorder, adherence was significantly lower in black patients than white patients.[28] Specifically, in multiple regression analyses controlling for sex, age, geographic region, psychiatric comorbidities, prior medication use, and resources, black patients had significantly fewer adherent days per year than white patients.[28] The authors indicated that potential reasons for lower adherence rates in ethnic or racial minority patients include fewer minority physicians, which may contribute to misinterpretation of symptom presentations, and ethnic and racial differences in access to healthcare services.[28] Indeed, in a Florida Medicaid database analysis, during the 2.5 years following U.S. approval of LAI risperidone (LAIR), the probability of LAIR use was significantly lower for Latino than for non-Latino patients with schizophrenia, but geographic regional differences accounted for the ethnic and racial disparities.[29]

Although strong evidence for a difference in effectiveness between FGAs and SGAs is lacking, available studies are few and heterogeneous.[30] This issue aside, there are various reasons that the observed differences in prescribing of FGAs and SGAs in black vs white patients is concerning. There is some evidence to suggest a higher frequency of tardive dyskinesia with FGAs.[30] FGAs are

FIGURE 3A

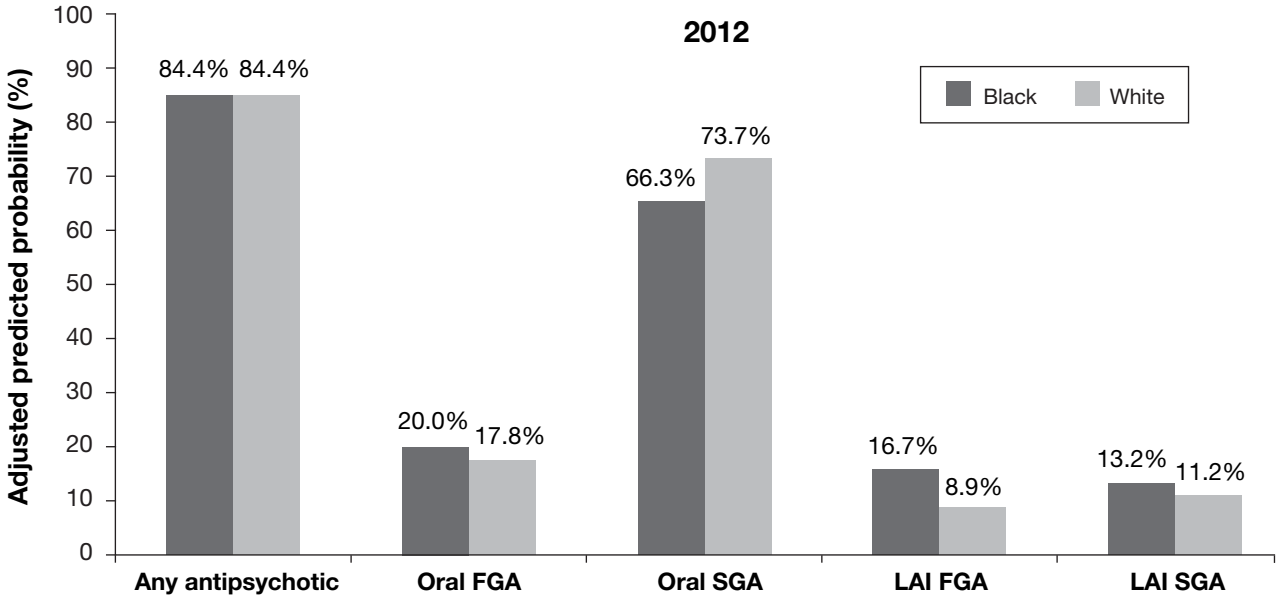
Adjusted predicted probabilities for antipsychotic prescriptions in 2009 and 2012



	Any antipsychotic	Oral FGA	Oral SGA	LAI FGA	LAI SGA
Odds ratio (95% CI)	1.12 (0.99–1.26)	0.86 (0.78–0.94)	1.51 (1.38–1.66)	0.52 (0.47–0.58)	0.70 (0.61–0.79)
P	.076	.001	<.001	<.001	<.001

FGA: first-generation antipsychotic; LAI: long-acting injectable; SGA: second-generation antipsychotic.

FIGURE 3B



	Any antipsychotic	Oral FGA	Oral SGA	LAI FGA	LAI SGA
Odds ratio[a] (95% CI)	1.00 (0.90–1.12)	0.87 (0.79–0.96)	1.43 (1.32–1.56)	0.47 (0.42–0.53)	0.83 (0.74–0.93)
P	.952	.003	<.001	<.001	.001

[a]Reference = black.

FGA: first-generation antipsychotic; LAI: long-acting injectable; SGA: second-generation antipsychotic.

more likely than SGAs to be co-prescribed with anticholinergics,[31] which are known to cause adverse effects such as dry mouth, blurred vision, constipation, and memory loss. Moreover, in some studies, FGAs have been shown to produce neuronal apoptosis, whereas SGAs have been shown to be neuroprotective.[32,33] As a class, SGAs improve cognitive function to a small extent that is nonetheless superior to FGAs, which may be associated with deterioration of cognitive function.[34] LAI antipsychotics also are the recommended treatment when seeking to overcome treatment nonadherence.[3] Although we refer to the differences between racial groups as disparities, it cannot be assumed with certainty that one group received less appropriate mental healthcare when taking into account individual patient-specific factors and clinical outcomes.

The current study included a large geographically diverse sample of the U.S. Medicaid patient population, and multivariable results reflect adjustments for multiple common comorbid conditions and co-medications. However, because this was a convenience sample (ie, a non-probability sampling technique that includes data that are not at random) and thus not representative of the entire U.S. Medicaid population, only a small number of Hispanic patients and other racial and ethnic groups was identified; therefore, this study was limited to focusing on a comparison of black vs white patients, as recorded in Medicaid files. The analyzed samples may not represent the national black and white patient populations. Some limitations should be noted when interpreting the current findings. Statistical analyses were not corrected for multiplicity, increasing the likelihood of type I errors. Of note, U.S. postal ZIP codes were used to infer education and income level data and thus, variations within ZIP codes were not captured. However, confounding due to these variables likely is small because Medicaid eligibility for many groups is calculated based on annual income compared with a percentage of the federal poverty level (FPL). Although income eligibility varies by state, in general, Medicaid beneficiaries have low incomes (eg, 2015 FPL is $24,250 for a family of 4).[35,36] Longitudinal patient-level data (eg, switching among different types of antipsychotics, measures of clinical outcomes) were not included in the database and may contribute to racial differences. The clinical implications of racial disparities in prescribing patterns for patients in the current study thus were not evaluated, but findings from the current study affirm the need for evaluation.

CONCLUSIONS

Among Medicaid-insured patients with schizophrenia, black patients were less likely than white patients to receive oral SGAs and more likely to receive LAI FGAs and SGAs and oral FGAs. Analyses were adjusted for variables that often explain racial differences in outcomes (eg, income level, education level, medical and psychiatric comorbidities). Racial differences in antipsychotic use and healthcare utilization among Medicaid-insured patients with schizophrenia warrant further investigation to determine drivers of these differences and the impact of treatment differences on clinical outcomes. Eliminating racial disparities in accessing newer treatments and healthcare resources should remain a national goal. ■

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