ORIGINAL ARTICLE

Outpatient Prescriptions for Atypical Antipsychotics for African Americans, Hispanics, and Whites in the United States

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Background: New antipsychotic medications introduced during the past decade—clozapine (1990), risperidone (1994), olanzapine (1996), and quetiapine fumarate (1997)—offer a decrease in serious adverse effects compared with traditional antipsychotic medications, but at up to 10 times the cost. We examined whether ethnic minorities achieve access to these new advanced treatments.

Methods: Using national data on physician office and hospital outpatient department visits from the National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey from 1992 through 2000, we selected all patient visits at which an antipsychotic medication (atypical or traditional) was prescribed or continued and the patient was aged between 18 and 69 years. We performed a series of cross-sectional logistic regression analyses to determine the association of ethnic group and receipt of an atypical antipsychotic prescription over time, adjusted for potential confounders such as age, diagnosis, and health insurance type.

Results: Antipsychotic medication was prescribed or continued in 5032 visits; 33% of overall visits involved an atypical antipsychotic prescription. During 1992 to 1994, the adjusted relative odds of receipt of an atypical antipsychotic prescription for African Americans was 0.50 (95% confidence interval [CI], 0.26-0.96) and for Hispanics was 0.43 (95% CI, 0.16-1.18) compared with whites. During 1995 to 1997, the odds of receipt of a prescription for atypical antipsychotics increased for African Americans (odds ratio [OR], 0.69; 95% CI, 0.54-0.85) and for Hispanics (OR, 0.84; 95% CI, 0.65-1.07) compared with whites; and during 1998 to 2000, the relative odds continued to increase for African Americans (OR, 0.88; 95% CI, 0.78-0.97) and for Hispanics (OR, 1.05; 95% CI, 0.92-1.16) compared with whites. For visits specified for psychotic disorders, receipt of atypical antipsychotics was still lower for African Americans by 1998 to 2000 (adjusted OR, 0.74; 95% CI, 0.61-0.89) compared with whites, while for Hispanics the relative odds was equivalent (adjusted OR, 1.05; 95% CI, 0.87-1.19).

Conclusion: Early gaps between ethnic groups in receipt of atypical antipsychotic prescriptions decreased throughout the 1990s but persisted for African Americans with psychotic disorders.

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THE INTRODUCTION of the atypical antipsychotic medications clozapine (1990), risperidone (1994), olanzapine (1996), and quetiapine fumarate (1997) in the 1990s has greatly advanced the care of patients with severe and persistent mental illness. These medications are at least as efficacious for control of positive symptoms of psychosis as traditional antipsychotic medications and may be more effective for negative symptoms and symptoms related to cognition.[1,2] They also confer a much lower risk of extrapyramidal symptoms and tardive dyskinesia than the traditional antipsychotic medications.[1,3,4] Patient reports describe improved attitude toward treatment and higher quality of life with use of the atypical antipsychotic drugs compared with traditional medications.[5,6] However, certain atypical antipsychotic drugs are associated with significant weight gain and development of diabetes mellitus.[7-9] The atypical antipsychotic drugs are also expensive, costing up to 10 times more than traditional antipsychotic medications.[10]

Much evidence shows that ethnic minorities are less likely to receive many effective, new, or high-cost health technologies, including pharmacotherapies, for a range of medical disorders and depression.[11-19] Although there is national interest in identifying and eliminating ethnic disparities in mental health treatment, less information is available on the relation between ethnicity and access to new therapies for psychosis.[20] A study[21] from the American Psychiatric Association Practice Research Network suggests that Afri-

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can American patients may have been less likely to receive atypical antipsychotic medications in 1997 than whites, but the sample size was limited. Another study[22] examining one state's Medicaid recipients in 1995 found that African Americans were less likely to receive clozapine or risperidone than whites. A report from a clinical study[23] on schizophrenia also found that African Americans received fewer atypical antipsychotic agents in 1997 than whites. Using a US national sample including different practice settings and payment types, we examined whether there were ethnic disparities in receiving prescriptions for atypical antipsychotic drugs and whether any disparities by ethnic group changed during the 1990s.

METHODS

STUDY DESIGN AND POPULATION

We conducted a series of cross-sectional analyses of outpatient physician visits from 1992 through 2000 at which antipsychotic medications were prescribed. To be eligible, patients had to receive care in a physician's office or hospital outpatient department and have an atypical or traditional antipsychotic prescribed or continued at the visit. We included visits for patients aged 18 through 69 years who were white, African American, or Hispanic.

DATA SOURCES

Data were obtained from the National Ambulatory Medical Care Survey (NAMCS) and the National Hospital Ambulatory Medical Care Survey (NHAMCS) conducted by the National Center for Health Statistics. These are ongoing, annual surveys[24-39] of randomly selected US office-based physicians and hospital outpatient departments. Physicians and hospital outpatient departments are randomly selected each year, such that offices selected in one year are not related to offices selected in other years.

The combined surveys include visits to private offices, freestanding clinics, community health centers, local government clinics, health maintenance organizations, and hospital outpatient departments, and exclude visits to federally employed physicians and institutional settings, such as the Veterans Health Administration. Response rates ranged from 68% to 73% for the NAMCS and 88% to 96% for the NHAMCS for the study period.[24-39]

For the NAMCS, physicians record visit information for their patient encounters during 1 randomly assigned week of the year; in the NHAMCS protocol, visits are sampled for 4 weeks. Basic patient sociodemographic characteristics and diagnosis and treatment information are collected.[40-55] We used information on patient age, sex, payment source (private fee-for-service insurance, health maintenance organization, Medicaid, Medicare, or self-pay or no charge), geographic region (Northeast, South, Midwest, or West), urban vs rural practice location (within a standard metropolitan statistical area), physician practice setting (traditional office or hospital outpatient department), and psychiatric diagnosis as independent variables. Physicians could record up to 3 diagnoses by *International Classification of Diseases, Ninth Revision, Clinical Modification ICD-9-CM*[56] codes on the visit form. We documented evidence of psychotic disorders (codes 295 and 297-299) and affective disorders (code 296). If both psychotic and affective disorders were mentioned, we classified the visit as for a psychotic disorder. We included Medicaid and Medicare health maintenance organizations in the health maintenance organization category of payment type.

PRESCRIPTION OF ANTIPSYCHOTIC MEDICATION

Our outcome of interest was physician visits at which an atypical antipsychotic medication was prescribed. The study medications included clozapine, risperidone, olanzapine, and quetiapine. Physicians or staff could record up to 6 medications on the record form and were instructed to include new prescriptions and continuing medications. If a visit included mention of both an atypical and a traditional antipsychotic medication, the visit was counted as involving an atypical antipsychotic.

STATISTICAL ANALYSES

We performed bivariate analyses and χ^2 tests to investigate differences in visit characteristics with respect to ethnicity and the outcome of prescription of an atypical antipsychotic medication. We then examined whether receipt of an atypical antipsychotic medication varied during the study.

To test the hypothesis that minority ethnic groups may be less likely to receive prescriptions for atypical antipsychotic medications, we developed logistic regression models to ascertain whether prescription of an atypical antipsychotic medication varied over time by ethnic group, while controlling for patient and physician practice characteristics. In the multivariate models, we adjusted for patient age, sex, payment source, geographic region, urban vs rural practice location, physician practice setting, and psychiatric diagnosis. We then conducted separate analyses to examine how prescription of an atypical antipsychotic medication varied by ethnic group for different psychiatric disorders. Because of the high prevalence of the outcome of prescription of an atypical antipsychotic in the mid to late 1990s, we corrected our reported odds ratios (ORs) to more accurately estimate the true relative risk.[57]

The NAMCS and NHAMCS are based on complex multistage sampling designs; however, for confidentiality reasons, the National Center for Health Statistics[40-55] does not release the primary sampling units for these surveys for most years in the study. Because this analysis tested a hypothesis of an association, we report results with unweighted data.[58] However, we performed sensitivity analyses to approximate the complex survey designs by using the survey weights in the analysis and the strata of geographic region and urban or rural designation as a proxy for primary sampling units. These results were essentially similar to those of logistic regression models using unweighted data. The analyses were performed using SAS version 6.12 (SAS Institute, Cary, NC) and Stata version 6 (Stata Corp, College Station, Tex).

RESULTS

PATIENT CHARACTERISTICS OF VISITS WITH ANTIPSYCHOTIC MEDICATION PRESCRIBED

From 1992 to 2000, there were 5032 visits to physician offices or hospital outpatient departments at which antipsychotic medication was prescribed; white patients comprised 68.9%, African American patients comprised 20.6%, and Hispanic Americans comprised 10.5% of the visits (**Table 1**). Most of the visits were for patients aged between 31 and 50 years, and about half of the visits were for women. Reflecting the distribution of ethnic groups in the United States, the Midwest accounted for the smallest percentage of Hispanic visits, and the West had the smallest percentage of visits for African American patients. Most visits involved offices within a metropoli-

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Table 1. Patient and Practice Setting Characteristics in Visits at Which Antipsychotic Drugs Were Prescribed From 1992-2000*

Characteristic	White (n = 3468 Visits)	African American (n = 1038 Visits)	Hispanic (n = 526 Visits)
Age, y			
18-30	16.2	14.9	18.3
31-50	56.8	58.9	56.7
≥51	27.0	26.3	25.1
Female sex	56.2	56.0	50.8
Geographic region†			
Northeast	35.5	39.6	45.8
South	18.8	28.3	37.1
Midwest	23.8	17.6	4.2
West	21.9	14.5	12.9
Metropolitan area†	83.5	88.1	95.1
Outpatient department†	51.5	73.3	68.8
Payment source			
Private fee-for-service†	27.1	10.6	9.9
Health maintenance organization	11.6	11.8	8.8
Medicaid†	28.4	51.1	49.6
Medicare‡	18.9	17.3	16.5
Self-pay or no charge	14.0	11.2	15.2
Psychiatric diagnosis			
Psychotic disorders†	41.2	51.8	47.3
Affective disorders			
Bipolar†	18.4	11.0	7.8
Depression§	15.6	12.7	16.4
Other	24.8	24.5	28.5

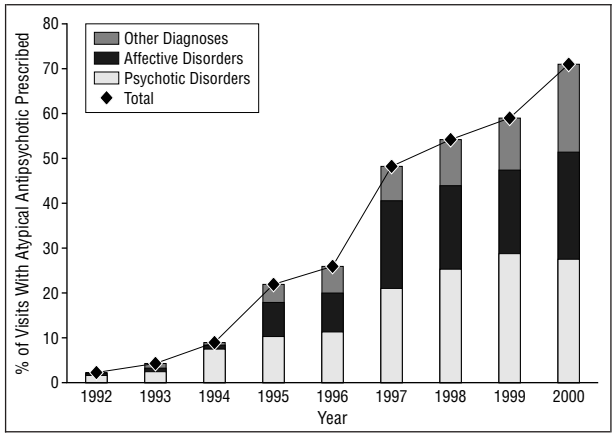
*Data are given as percentages. Some percentages do not sum to 100 because of rounding.
†$P<.001$.
‡$P<.02$.
§$P = .048$.

tan statistical area; whites were more likely to be in a rural area than other ethnic groups. A substantial proportion of all visits was covered by Medicaid or Medicare insurance; about half of the visits for African American and Hispanic patients were covered by Medicaid.

The most common psychiatric diagnoses for the visits were the psychotic disorders; African Americans and Hispanics had a higher percentage of their visits in this category than whites. Of the 1263 visits (25.1%) that did not have a psychotic disorder or an affective disorder coded, 530 (42.0%) had another psychiatric diagnosis coded, the most common being anxiety disorders, conduct disorders, adjustment disorders, personality disorders, and organic psychoses. Although proportions of antipsychotic visits at which diagnoses other than psychotic or affective disorders were recorded did not vary across ethnic groups, visits for a diagnosis other than psychotic or affective disorder were more common in hospital outpatient departments than in physician private offices or clinics (data not shown).

PRESCRIPTION OF ATYPICAL ANTIPSYCHOTIC MEDICATION

Prescriptions of 11 traditional antipsychotic medications were documented in patient visits from 1992 to 2000: chlorpromazine (4.9% of total visits with antipsychotic medication prescribed), fluphenazine (10.7%), perphenazine (9.3%), thioridazine hydrochloride (11.2%), thiothixene (7.8%), loxapine (2.3%), haloperidol (18.9%), pimozide (0.1%), molindone hydrochloride (0.6%), trifluoperazine hydrochloride (5.5%), and mesoridazine (0.9%). Four were atypical: clozapine (4.7%), risperidone (16.3%), olanzapine (10.9%), and quetiapine (2.1%).



Percentage of visits with atypical antipsychotic medication prescribed from 1992 through 2000. "Total" reflects the total number of visits at which an atypical antipsychotic medication was prescribed. Stacked bars represent the relative contribution of groups of psychiatric diagnoses. "Other Diagnoses" include psychiatric and somatic diagnoses.

Overall, 33% of visits had 1 of the 4 atypical antipsychotic medications prescribed; the percentage of visits with an atypical medication prescribed increased dramatically during the study, with the largest increases probably reflecting the release and subsequent adoption of use of risperidone in 1994 and olanzapine in 1996 (**Figure**). The percentage of visits with prescription of an atypical antipsychotic increased steadily for psychotic disorders through 1999. Beginning in 1995, a substantial proportion of the prescriptions for atypical antipsychotic medications was associated with affective disorder diagnoses.

ETHNICITY AND ATYPICAL ANTIPSYCHOTIC PRESCRIPTIONS

From 1992 to 1994, atypical antipsychotic medications were prescribed in approximately 5% of visits for whites, 4% of visits for African Americans, and 3% of visits for Hispanics (**Table 2**). Compared with whites, the adjusted relative odds for receipt of an atypical antipsychotic medication vs a traditional antipsychotic medication from 1992 to 1994 for African American and for Hispanic patients was 0.50 (95% CI, 0.26-0.96) and 0.43 (95% CI, 0.16-1.18), respectively. From 1995 onward, the percentage of visits with an atypical antipsychotic prescription increased across all ethnic groups. The relative odds of receiving atypical antipsychotic prescriptions for African Americans compared with whites increased during 1995 to 1997 (adjusted OR, 0.69) and during 1998 to 2000 (adjusted OR, 0.88). For Hispanics, the point estimate for the relative odds increased over time as well and reached 1.05 by 1998 to 2000, although there was not enough precision for the results to be statistically significant in each time period. These results are adjusted for characteristics that could potentially confound the relation between ethnicity and re-

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Table 2. Percentage of Visits With Atypical Antipsychotic Medication at Which Any Antipsychotic Was Prescribed and Adjusted Relative Odds of Receiving Atypical Antipsychotic Prescription by Ethnicity and Psychiatric Diagnosis*

	1992-1994			1995-1997			1998-2000		
	Visits, No.	% With Atypical Antipsychotic	OR (95% CI)	Visits, No.	% With Atypical Antipsychotic	OR (95% CI)	Visits, No.	% With Atypical Antipsychotic	OR (95% CI)
All diagnoses									
White	1235	5.3	1.00 (Reference)	1162	33.9	1.00 (Reference)	1082	64.7	1.00 (Reference)
African American	305	3.9	0.50 (0.26-0.96)	330	24.6	0.69 (0.54-0.85)	411	54.3	0.88 (0.78-0.97)
Hispanic	144	2.8	0.43 (0.16-1.18)	196	31.6	0.84 (0.65-1.07)	187	63.4	1.05 (0.92-1.16)
Psychotic disorders									
White	541	9.4	1.00 (Reference)	446	38.6	1.00 (Reference)	441	67.4	1.00 (Reference)
African American	191	5.8	0.50 (0.26-0.97)	149	30.2	0.74 (0.53-0.98)	198	48.0	0.74 (0.61-0.89)
Hispanic	62	3.2	0.28 (0.07-1.10)	87	28.7	0.68 (0.44-0.98)	100	66.0	1.05 (0.87-1.19)
Affective disorders									
White	. . .	. . .	. . .	406	36.2	1.00 (Reference)	366	67.5	1.00 (Reference)
African American or Hispanic	. . .	. . .	. . .	144	31.9	0.89 (0.64-1.19)	146	64.4	1.03 (0.88-1.16)
Other diagnoses									
White	. . .	. . .	. . .	310	24.2	1.00 (Reference)	264	56.4	1.00 (Reference)
African American or Hispanic	. . .	. . .	. . .	146	18.5	0.65 (0.41-1.01)	145	56.6	0.99 (0.79-1.18)

Abbreviation: OR (95% CI) indicates adjusted odds ratio (95% confidence interval).
*Relative odds adjusted for age, sex, geographic region, metropolitan vs rural location, physician office type, and payment source. Relative odds for category of all diagnoses also adjusted for psychiatric diagnosis. Ellipses indicate sample size insufficient for analysis.

ceipt of a prescription for an atypical antipsychotic medication.

In 1992 to 1994, virtually all atypical antipsychotic medications were prescribed at visits at which a psychotic disorder was recorded. For these visits, African Americans received atypical antipsychotic prescriptions at a little more than half the rate of whites, 5.8% vs 9.4% of visits, and Hispanics received atypical antipsychotic prescriptions at approximately one third the rate of whites. In visits for psychotic disorders, the adjusted relative odds for African Americans receiving an atypical antipsychotic prescription compared with whites increased to 0.74 by 1995 to 1997, and then remained the same in 1998 to 2000. In contrast, for Hispanics' visits for psychotic disorders, the 1998 to 2000 adjusted relative odds for receiving an atypical antipsychotic prescription was equivalent to that of whites. For visits associated with affective disorders in 1995 to 1997, the adjusted relative odds for receiving an atypical antipsychotic prescription was 0.89 for African Americans and Hispanics compared with whites, and the odds increased to 1.03 in 1998 to 2000. In a subsample including only African Americans and whites, the relative odds for receiving an atypical antipsychotic in 1998 to 2000 in visits at which affective disorders were recorded was similar to that of the minority groups combined, with an adjusted OR of 0.96 (95% CI, 0.79-1.11) for African Americans compared with whites. In a subsample including only African Americans and whites, for visits associated with diagnoses other than psychotic or affective disorders, the adjusted relative odds for receiving an atypical antipsychotic in 1998 to 2000 was 1.10 (95% CI, 0.88-1.30) for African Americans compared with whites. Analysis for Hispanics alone compared with whites was limited because of sample size.

For the NAMCS part of the sample in which physician specialty could be determined, psychiatrists were the predominant type of physician prescribing antipsychotics (85% of physicians). There was no difference in prevalence of psychiatry visits by ethnic group (data not shown). Although psychiatry visits were more likely overall to include prescriptions for atypical antipsychotics compared with visits to primary care physicians, the prevalences of receiving an atypical antipsychotic by ethnic group were similar between psychiatrist and other physician visits.

In 3.2% of overall visits involving antipsychotic prescriptions, patients received a typical and an atypical medication. The percentage of visits at which both types of antipsychotic drugs were received was 5.9% for Hispanics, 3.0% for whites, and 2.2% for African Americans ($P<.01$).

COVARIATES AND ATYPICAL ANTIPSYCHOTIC PRESCRIPTIONS

Certain patient and practice setting characteristics were associated with receipt of an atypical antipsychotic prescription (**Table 3**). Younger age was significantly associated with prescriptions for atypical antipsychotic medications in 1995 to 1997 and in 1998 to 2000. Visits for women were associated with a lower rate of atypical antipsychotic prescriptions than visits for men in 1992 to 1994, although this difference was not present later. In 1995 to 1997, the highest percentages of visits associated with atypical antipsychotic prescriptions were observed in practice locations in the South, and in the West in 1998 to 2000. Whereas in 1992 to 1994, public insurance programs accounted for the highest percentage of payment sources for visits associated with atypical anti-

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Table 3. Relation Between Patient and Practice Setting Characteristics and Atypical Antipsychotic Prescriptions in Visits at Which Any Antipsychotic Was Prescribed*

	1992-1994		1995-1997		1998-2000	
Characteristic	**%**	**OR (95% CI)**	**%**	**OR (95% CI)**	**%**	**OR (95% CI)**
Age, y						
18-30	7.9	1.00 (Reference)	38.3	1.00 (Reference)	72.8	1.00 (Reference)
31-50	4.6	0.78 (0.47-1.29)	32.5	0.91 (0.74-1.10)	64.1	0.88 (0.79-0.97)
≥51	4.4	0.76 (0.39-1.41)	28.0	0.78 (0.62-0.97)	50.9	0.70 (0.59-0.81)
P value	.08		.03		.001	
Men	6.6	1.00 (Reference)	32.6	1.00 (Reference)	62.4	1.00 (Reference)
Women	3.5	0.70 (0.45-1.08)	31.2	0.97 (0.84-1.10)	61.8	1.01 (0.93-1.09)
P value	.01		.56		.80	
Geographic region						
Northeast	5.5	1.00 (Reference)	29.8	1.00 (Reference)	55.0	1.00 (Reference)
South	5.4	0.90 (0.51-1.56)	37.4	1.27 (1.05-1.50)	59.4	1.02 (0.89-1.17)
Midwest	4.0	0.58 (0.31-1.09)	33.6	1.06 (0.87-1.28)	69.0	1.17 (1.02-1.03)
West	4.1	0.66 (0.31-1.40)	25.7	0.77 (0.59-0.99)	70.1	1.15 (1.00-1.29)
P value	.61		.01		.001	
Metropolitan area	5.2	1.00 (Reference)	31.5	1.00 (Reference)	59.7	1.00 (Reference)
Rural area	2.7	0.52 (0.21-1.31)	37.9	1.12 (0.44-0.88)	69.6	1.18 (1.08-1.26)
P value	.14		.12		.001	
Physician office	5.1	1.00 (Reference)	32.3	1.00 (Reference)	61.1	1.00 (Reference)
Outpatient department	4.7	0.74 (0.44-1.22)	31.3	1.11 (0.96-1.18)	62.6	1.07 (0.97-1.15)
P value	.73		.73		.52	
Payment source						
Private fee-for-service	3.0	1.00 (Reference)	36.8	1.00 (Reference)	70.2	1.00 (Reference)
Health maintenance organization	. . .	. . .	27.9	0.75 (0.57-0.96)	62.2	0.90 (0.76-1.02)
Medicaid	5.4	2.04 (1.05-3.67)	30.9	0.86 (0.70-1.05)	55.9	0.81 (0.69-0.93)
Medicare	6.4	1.87 (0.90-3.73)	27.2	0.71 (0.53-0.92)	64.4	0.95 (0.83-1.06)
Self-pay or no charge	6.6†	2.05 (0.98-4.12)	35.0	0.88 (0.69-1.10)	63.4	0.92 (0.78-1.05)
P value	.05		.02		.01	
Psychiatric diagnosis						
Psychotic disorders	8.1	. . .	35.5	1.00 (Reference)	62.0	1.00 (Reference)
Affective disorders						
Bipolar	. . .	. . .	32.6	0.85 (0.67-1.04)	62.0	0.95 (0.82-1.06)
Depression	. . .	. . .	37.6	1.03 (0.83-1.24)	70.8	1.15 (1.10-1.25)
Other	. . .	. . .	22.4	0.61 (0.49-0.75)	56.5	0.88 (0.78-0.98)
P value			.001		.01	

Abbreviations: OR, odds ratio; CI, confidence interval.

*Percentages reflect visits at which an atypical antipsychotic was prescribed; *P* values denote comparisons between these percentages. Relative odds are adjusted for all variables in the table and for ethnicity. Ellipses indicate sample size insufficient for analysis.

†The patient did not receive a charge (bill) for the visit or, the patient paid for the visit without having health insurance.

psychotic prescriptions, in 1995 to 1997 and in 1998 to 2000, most of these visits were covered by private fee-for-service insurance compared with other payment sources. In 1998 to 2000, although prescriptions for atypical antipsychotics increased over time for all payment types, visits covered by Medicaid insurance had a lower percentage of visits associated with atypical antipsychotics prescribed compared with other types of payment.

COMMENT

We examined the prescription of atypical antipsychotic medications from 1992 through 2000 by ethnicity in a random sample of outpatient physician visits in the United States. A strength of the NAMCS and NHAMCS data is the ability to examine repeated cross-sectional samples over time so that, unlike a cohort study with a fixed entry point, visits for new-onset psychiatric diagnoses and younger patients can be included. This creates a snapshot of visits for these important health technologies at different time points in the decade. Our analysis documents that African Americans had one half the odds of receiving an atypical antipsychotic and Hispanics had 40% of the odds, compared with whites during the early use in the 1990s. As the prevalence of use of these therapies increased during the decade, the disparity in overall atypical antipsychotic prescriptions for African Americans became smaller and the adjusted relative odds approached that of whites. In visits for affective disorders and other nonpsychotic diagnoses, African Americans' use of atypical antipsychotic drugs was equal to that of whites by the end of the decade. However, in visits for psychotic disorders, the adjusted odds of receiving atypical antipsychotic medications was still 25% lower for African Americans compared with whites by 1998 to 2000. The use of atypical antipsychotics at the end of the decade for Hispanics was equivalent to that of whites across psychiatric diagnoses. The fact that some disparities persisted at the end of the decade for African Americans is concerning, yet the improvements for African Americans and Hispanics since 1992 to 1994 are encouraging.

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During 1992 to 1994, virtually all prescriptions for atypical antipsychotic medications were for clozapine. Because of the risk of agranulocytosis, use of clozapine requires laboratory monitoring and intensive follow-up. It is possible that because of lower baseline white blood cell counts, African Americans may have been subjected to more frequent laboratory testing than whites taking clozapine, adversely affecting patient compliance.[59,60] It is also possible that, because of perceptions of concomitant substance abuse disorders or a history of noncompliance, physicians may have been less likely to prescribe this medication to African Americans and Hispanics.[59] Two studies[59,60] reported that African Americans were more likely to discontinue clozapine therapy than whites, but whether changes in therapy were initiated by the patient or physician was not measured.

From 1995 onward, ethnic disparities in receipt of atypical antipsychotic prescriptions narrowed and were largely eliminated in outpatient visits measured in 1998 to 2000. Olanzapine and quetiapine became available during this period, and risperidone was more widely used; these agents have a superior overall safety profile compared with clozapine. The increase in visits associated with atypical antipsychotic prescriptions during the mid 1990s is consistent with physicians' changing their prescribing behavior to take advantage of the benefits of these new agents. Availability of sample atypical antipsychotic medications may have affected physician prescribing behavior, especially for low-income patients; however, the NAMCS and NHAMCS do not provide information on whether medications are given as samples.[61] The degree to which patient preferences affect receipt of the atypical antipsychotic agents is also not known. Patient preferences, health beliefs, and provider communication vary by ethnicity, although studies are lacking in populations with severe mental illness.[62] Perhaps some minority patients were more likely to prefer changing to a new medication only after their clinical condition necessitated a switch in therapy. If true, this could have contributed to the gap in atypical antipsychotic prescriptions that remained between African American and white patients in 1995 to 1997.

If physicians perceived minority patients to be less compliant with oral medications, they may have been more likely to give them depot antipsychotics. At least 2 studies[63,64] reported that African American patients more frequently received depot antipsychotics than white patients. This may be an important factor contributing to the disparity in atypical antipsychotic use between African Americans and whites that persisted through 1998 to 2000 for psychotic disorders. The surveys do not provide information about medication route; thus, we cannot quantify the degree to which depot administration of traditional antipsychotic drugs may have been used in this population. It is encouraging to note that, when atypical antipsychotic drugs gained substantial use for affective disorders as mood stabilizers in the mid 1990s, there was no difference in prevalence of use of atypical compared with traditional antipsychotic medications by ethnic group. The NAMCS and NHAMCS data provide the ability to look at medications involved in cross-sectional visits, yet studies[65,66] show that between 16% and 30% of medical chart diagnoses of schizophrenia and bipolar disorder may change during the course of an illness. African Americans are also more likely to receive the diagnosis of schizophrenia than whites in clinical settings.[67-70] Therefore, although it is interesting to examine the receipt of atypical antipsychotic prescriptions by psychiatric diagnosis, it remains important to look at overall prescriptions for atypical antipsychotics.

The type of health insurance that patients possess can affect access to pharmacotherapies and other expensive new medical technologies.[71-75] Medicaid programs may use formulary restrictions for certain expensive medications, including atypical antipsychotic medications. Our results confirm that a high proportion of visits at which antipsychotic drugs are prescribed is covered by Medicaid and accounts for half of the visits for African Americans and Hispanics receiving antipsychotic prescriptions. Visits covered by Medicaid involved a smaller percentage of atypical antipsychotic drugs prescribed in 1998 to 2000 compared with other payment types, although we found no interaction of ethnicity, atypical antipsychotic prescription, or Medicaid insurance coverage.

This study has limitations. The results reported herein are dependent on physicians' recognizing the need for an antipsychotic and choosing a medication. In NAMCS and NHAMCS data for visits involving psychiatric disorders, 44% of white patients had no antipsychotics prescribed, compared with 36% of African American patients and 35% of Hispanic patients; thus, it appears that ethnic minorities were not less likely to receive prescriptions for any antipsychotic if they saw a physician ($P<.001$, data not shown). However, we cannot comment on ethnic differences in care for patients with severe and persistent mental illness who may benefit from these medications but did not make visits to a provider.

Furthermore, this analysis does not allow us to judge the appropriateness of receiving a particular pharmacotherapy; indeed, definitive guidelines for the use of the newer atypical antipsychotic medications have not been established. Much discussion has centered around whether benefits of the new medications justify the higher costs.[1-3] Studies[76-79] report that atypical antipsychotic agents are more cost-effective than the traditional medications; however, most of these have focused on clozapine. Clinical effects of antipsychotic agents could differ by ethnic group.[80-82] Evidence suggests that African Americans may be more susceptible to tardive dyskinesia than whites, which could imply that they may especially benefit from the atypical antipsychotic agents; however, some work also shows that African Americans may be more likely than whites to gain weight while taking these drugs.[64,83,84] Less information has been available about Hispanics and particular adverse effects of these medications.[80] Future work in ethnopharmacology to elucidate these issues will be important.

In summary, similar to disparities seen with the introduction of many medical technologies, ethnic differences were prominent in the early adoption of the atypical antipsychotic medications. As use of the atypical antipsychotic drugs became more prevalent throughout the 1990s, these disparities disappeared for Hispanics and improved for African Americans com-

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pared with whites. The progress made is encouraging, but continued monitoring of receipt of atypical antipsychotic drugs is needed, especially for African Americans with psychotic diagnoses. A better understanding of factors affecting patient and provider decision making about pharmacotherapy will be instrumental as we focus nationally on eliminating ethnic disparities in treatments for severe and persistent mental illnesses.

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