

# Psychotropic Medication Nonadherence Among United States Latinos: A Comprehensive Literature Review

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**Objective:** Psychotropic medication nonadherence is a major public health problem, but few studies have focused on Latinos. The authors systematically reviewed the literature on rates of and factors influencing antipsychotic, antidepressant, and mood stabilizer nonadherence among U.S. Latinos. **Methods:** MEDLINE and PsycINFO were searched by using the keywords adherence, compliance, Latino, Hispanic, psychotropic, and related terms; bibliographies from relevant reviews and studies were also searched. Twenty-one studies met inclusion criteria: published since 1980 in English or Spanish and measured psychotropic medication nonadherence rates among U.S. Latino adults. Information was extracted about study design and objective, location, population, medication type, participant demographic characteristics, adherence measures, adherence rates, and factors related to adherence. **Results:** In the 17 studies that included Latinos and other minority groups, mean nonadherence rates were 41%, 31%, and 43%, respectively, among Latinos, Euro-Americans, and African Americans, with an overall effect size of .64 between Latinos and Euro-Americans. In the four studies that included only Latinos, the mean nonadherence rate was 44%. Ten of 16 studies found that Latinos had significantly lower adherence rates than Euro-Americans. Risk factors for nonadherence included being a monolingual Spanish speaker, lacking health insurance, experiencing access barriers to high-quality care, and having lower socioeconomic status. Protective factors included family support and psychotherapy. **Conclusions:** Rates of nonadherence to psychotropic medications were found to be higher for Latinos than for Euro-Americans. Further investigation is needed to understand the potentially modifiable individual and society-level mechanisms of this discrepancy. Clinical and research interventions to improve adherence should be culturally appropriate and incorporate identified factors. (*Psychiatric Services* 60:157–174, 2009)

Medication nonadherence among patients with psychiatric disorders, such as schizophrenia, bipolar disorder, and depression, is a major barrier to favorable treatment outcomes. Suboptimal adherence to psychotropic medications for these disorders has been associated with relapse, significantly more psychiatric hospitalizations and emergency room visits, poorer mental functioning, lower life satisfaction, more disability-related absences from work, greater substance use, increased suicidal behavior, poorer adherence to medications for comorbid medical conditions, and higher health care costs (1–16).

Unfortunately, nonadherence to antipsychotics, antidepressants, and mood stabilizers is common; previous literature reviews have noted rates ranging from 10% to 77%, with mean rates of 35%–60% (17–20). Previous studies have established risk factors for nonadherence, including limited insight, a negative attitude or subjective response toward medication, a shorter duration of illness, comorbid substance abuse, a poor therapeutic alliance, living alone, more self-reported side effects, and limited family support (18–20). However, many previous studies were significantly limited because they were conducted with predominantly Euro-American populations. Ethnic and racial disparities in adherence have been noted; nonwhite patients have been found to be more likely to have lower adherence (3,21–23).

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Latinos are the largest and most rapidly growing minority group in the United States, constituting just over 13% of the population (24). More than 40% are foreign-born, and 75% are immigrants or children of immigrants (25). Acculturation, “the process by which individuals adopt the attitudes, values, customs, beliefs, and behaviors of another culture” (26), has been found to have mixed health effects for Latinos, including mental health effects (27–29). Prevalence rates of psychiatric disorders are lower among Latinos who are less acculturated, but those who have a disorder are less likely to receive mental health treatment (30,31). Given these health and acculturation relationships, acculturation could potentially affect adherence via, for example, physician-patient communication or health literacy. Ethnic differences have been previously noted for Latinos in the number and use of prescriptions for psychotropics (32,33), psychotropic dosing needs (34), response to psychotropics (35), and their tolerability for Latinos (36,37).

However, to our knowledge, there has not yet been a comprehensive review of the literature examining psychotropic adherence among Latinos living in the United States that includes the frequency of nonadherence, factors associated with it, and influences of language and acculturation on nonadherence. Our objectives were to assess the rate of nonadherence to psychotropic medications among Latinos living in the United States, compare the rate with those for other ethnic minority groups and Euro-Americans, and identify any culturally relevant factors that influence adherence among Latinos.

## Methods

### *Data sources*

We searched MEDLINE and PsycINFO databases using combinations of the following keywords: antipsychotic, mood stabilizer, antidepressant, lithium, neuroleptic, psychotropic, schizophrenia, bipolar disorder, depression, adherence, compliance, Latino, Hispanic, ethnicity, Spanish language, and acculturation. We searched for articles published since 1980 that reported studies that

measured prevalence of adherence to antipsychotics, antidepressants, or mood stabilizers among Latino adults in the United States. Reference lists from recent reviews (18–20,38,39) were also examined, as were bibliographies from all potentially relevant articles.

### *Study selection*

We identified 518 papers in the searches. One of the authors (NML) then read every title and identified 214 potentially relevant articles. During this screening, broad inclusion criteria were used, but we excluded studies that examined adherence among patients who had only nonpsychiatric illnesses or that focused on nonpsychiatric medications only (for example, adherence to highly active antiretroviral therapy in HIV-AIDS). Also excluded were articles not in English or Spanish and articles that reported studies of pediatric populations only or studies conducted outside the United States. A search of the Spanish-language literature revealed no potentially relevant studies because all were conducted with populations outside the United States.

The 214 potentially relevant articles were read in detail by one of the authors. To be included, studies had to be of U.S. populations (including people living in Puerto Rico, although no studies of psychotropic medication adherence included this population), had to be in English or Spanish (no studies were in Spanish), had to include Latinos, and had to measure adherence and nonadherence (including self-report and medication discontinuation rates) to antidepressants, antipsychotics, or mood stabilizers prescribed for depression, schizophrenia, schizoaffective disorder, or bipolar disorder (even if adherence was not the primary focus of the study). Studies also had to examine ethnicity as a variable related to adherence or report adherence rates of all ethnic groups in the studies (so that we could determine whether there were significant differences between ethnic groups), or for studies that included only Latino participants, the studies had to examine adherence and factors influencing adherence.

We excluded studies if they did not measure separate adherence rates for Latinos; included only children and adolescents; examined medication adherence only for medications that were not antidepressants, antipsychotics, or mood stabilizers; and examined adherence to antidepressants, antipsychotics, or mood stabilizers that were prescribed for diseases other than those listed above (for example, we excluded studies of anxiety and dementia). Studies were also excluded if only study dropout rates were reported, rather than medication discontinuation or adherence rates, because many factors that cause study dropout do not necessarily cause nonadherence. This criterion led to our exclusion of a widely cited study that found that Latinos were more likely than Euro-Americans to drop out of a clinical trial and that identified the reasons for study discontinuation (36).

### *Data extraction*

Of the 214 initially identified articles, 193 were excluded and 21 were included in our final analysis (1,6, 40–60). The results from one study were reported in two different articles (52,53), and we counted the articles as one study. One included study (44) examined adherence-related factors in a subset of a sample in another study (43), and we counted these as one study and used the nonadherence rate reported for the larger sample (43) in our calculation of the mean nonadherence rate for studies including only Latinos. For each of the 21 studies, two authors (NML and DPF) examined the study design and objectives, the location and patient population, medications studied, participant characteristics (including preferred language of participants and providers, if reported), measures of adherence, rates of adherence overall and by race-ethnicity, associations between race-ethnicity and adherence (including statistical measures), and any other adherence-relevant factors identified. For consistency, we use the terms “adherence” and “nonadherence” throughout this review, replacing the terms “compliance” and “noncompliance,” which were used in some studies.

### *Calculation of nonadherence rates*

For standardization, if studies reported adherence rates, we calculated nonadherence rates and report those. Most studies examined only adherence and nonadherence. Therefore, for studies that provided information on additional categories of adherence, such as for persons who were partially adherent or those who were excess fillers (those who filled prescriptions more frequently than expected) (6,40,58–60), we report all the rates that were provided (Table 1); however, for mean nonadherence rate calculations, we used the summed partial adherence, nonadherence, and excess filler rates as the nonadherence rate. One article (40) reported separate adherence rates by ethnicity and diagnosis, and for this article, we give the separate rates (Table 1); however, for calculating mean nonadherence rates, we averaged the nonadherence rates of the patients with different diagnoses within each ethnic group.

Although no measure of medication adherence is ideal, some measures have demonstrated more reliability than others. Patient and caregiver reports and physician reports of adherence have been shown to underestimate adherence (61,62), whereas adherence calculated by use of medication event monitoring system (MEMS) caps (electronic bottle caps) and from pharmacy fill records (for example, medication possession ratios [MPRs] and cumulative possession ratios [CPRs]) have been shown to be generally more objective measures (3,62). Therefore, we also separately analyzed the 11 articles that reported studies that used these typically more objective measures (1,6,46,48,51,52,54,56,58–60).

### *Data analysis and statistics*

For studies in which comparison data were available but the investigators did not compare adherence rates of separate racial or ethnic groups, we used chi square tests to test the significance of differences in adherence rates by group. We performed such secondary calculations for 11 studies: nonadherence percentage calculations for three studies (51,55,56), chi square tests for two studies (50,57),

and both percentage calculations and chi square tests for six studies (1,40,47,49,58,60). For the two studies in which the unadjusted and adjusted nonadherence rates yielded conflicting results (55,56), we included both findings but used the results of the multivariate analysis when comparing rates between racial or ethnic groups.

We used two methods to compare nonadherence rates between racial or ethnic groups. First, we examined the mean nonadherence rates across studies, which included calculating an effect size of the difference between the rates for Latinos and Euro-Americans. Second, we counted the number of studies that compared rates among groups, and we report how many of the studies did and did not find significant differences. To calculate the effect size, we used SPSS version 12.0.1 to pool the nonweighted nonadherence means and standard deviations across the studies and then used an online effect size calculator ([web.uccs.edu/lbecker/Psy590/escalc3.htm](http://web.uccs.edu/lbecker/Psy590/escalc3.htm)). We used online chi square calculators ([www.graphpad.com](http://www.graphpad.com) and [www.quantpsy.org](http://www.quantpsy.org)) for chi square calculations, and we used SPSS version 12.0.1 for descriptive statistics.

### *Racial and ethnic group terminology*

The terminology for racial and ethnic groups in the literature is highly varied. For the purposes of this review, the term “U.S. Latino” includes anyone residing in the United States, including Puerto Rico, who has Mexican, Central American, South American, Puerto Rican, or Cuban ancestry. We use the terms “African American” to refer to U.S. residents who trace their ancestry to Africa and “Euro-American” for U.S. residents with European ancestry. For studies that used “Hispanic,” “black,” or “Caucasian,” we have replaced these terms with “Latino,” “African American,” and “Euro-American,” respectively, for standardization. If country of origin of the participants was specified in a study, we include that information. We understand that these definitions have limitations in that they group people from highly diverse backgrounds. Very few studies reported separate adherence rates for

Asian Americans or other racial or ethnic groups, and the number of Asian-American patients or patients from other groups in those studies was typically very small, so we were unable to compare nonadherence rates or risk factors for Latinos and those groups.

## **Results**

### *Description of studies and prevalence of nonadherence*

The 21 studies (Tables 1 and 2) that met inclusion criteria (1,6,40–60) showed great heterogeneity in terms of study design and objectives and of population studied. Table 1 shows the four investigations that had only Latino participants, and Table 2 shows the 17 studies that included Latinos and other ethnic groups.

In terms of study design, 13 studies were prospective and eight retrospective. Study objectives varied; some studies focused specifically on adherence (1,6,41,44–47,49,51–60), and others addressed different questions but measured adherence as part of their procedures. Eight studies were based in California (6,42,43,47,48,50,54,55), two in Texas (41, 51), one in New Mexico (52), one in New York (49), one in Connecticut (56), and one in Ohio (40). Four studies were from National Registries of the Veteran’s Health Administration (46,58–60), and three were national studies (1,45,57).

Twelve studies investigated nonadherence to antipsychotics (1,6,41–43, 46,49–51,54,58,59), five examined antidepressants (45,47,52,55,57), two examined mood stabilizers (48,60), and two examined a combination of these medications (40,56). Ten studies focused on schizophrenia or schizoaffective disorder (1,6,41–43, 49–51,59), five focused on depression (45,47,52,55,57), three focused on bipolar disorder (48,58,60), and three involved a combination of these diagnoses (40,54,56).

The total sample size in the 21 studies ranged from 40 to 44,637 (mean±SD=6,024±13,268). Of the 17 studies that included both Latinos and other racial or ethnic groups, the percentage of Latino participants ranged from 2.9% to 56% (mean=20.3%±19.5%). Of the seven studies that reported preferred language, the

**Table 1**

Studies of medication nonadherence in which the sample included U.S. Latinos only

Study	Design and objective	Location and population	Medication	Sample <sup>a</sup>	Adherence measure	Adherence rates	Nonadherence-related findings
Karno et al., 1987 (43)	Prospective, longitudinal, observational; examined family influences on the course of schizophrenia among Mexican Americans	Southern California; Mexican Americans ages 18–50 with schizophrenia living with family; followed for 9 months after hospitalization for acute psychotic episode	Anti-psychotics	43 patients; mean age 26.1±7.2; 57% male; country of origin or heritage, Mexico; mean acculturation scores: for patients, 2.36±.95; for family, 1.84±.85 <sup>b</sup>	Taking medication at least 75% of the time, no interval of discontinued use ≥4 weeks. Data sources: chart review, patient interview, and monthly family phone contact; all done by psychologists	Nonadherent: 44% (N=19); adherent, 56% (N=24); measured over 9 months	Outcomes associated with nonadherence: sustained psychosis and psychotic relapse; patients in homes with low expressed emotion (EE) who had regular adherence had the best clinical outcome (88% achieved sustained remission); no confounding effects of EE and adherence were noted
Ramirez et al., 2006 (44)	Studied subgroup of Karno et al. (43) sample; family factors related to anti-psychotic adherence	Same as for Karno et al. (43)	Anti-psychotics	30 patients; 30 primary family caregivers; mean age 25.7±7.6; 52% of patients and 68% of caregivers born in Mexico; 39% of patients and 68% of caregivers monolingual Spanish speaking	Same as for Karno et al. (44)	Nonadherent, 57% (N=17); adherent, 43% (N=13); measured over 9 months	Protective factors (associated with higher adherence): more instrumental support from family (number of “task-oriented” assistance statements in audiotaped family interactions). Instrumental support also predicted drug abstinence, but adherence and drug abstinence were not significantly related. Factors unrelated to adherence: emotional support, criticism, emotional overinvolvement, warmth, years of illness, drug abstinence, and positive symptoms
Hosch et al., 1995 (41)	Retrospective chart review; examined factors predicting medication adherence among Latinos	El Paso County, Texas; Mexican Americans with schizophrenia treated for a minimum of 10 sessions between 6/30/1986 and 6/30/1993	All psychiatric medications prescribed by a psychiatrist	193 patients; median age 38; 52% male; country of origin or heritage, Mexico; acculturation measured on 0–4 scale; 43 participants were at the Anglo end of the scale and 28 were at the extreme Latino end; bicultural participants toward the Anglo end were most common (N=79); language: 35% preferred English, 43% bilingual, and 23% monolingual Spanish speaking	“Indexed on a 5-point scale at monthly intervals and averaged”; cutoffs for nonadherence were not specified. Data source: physicians’ statements in progress notes	55% non-adherent; measured over 1 year	Risk factors (associated with lower adherence): seeing a Spanish-speaking therapist. Protective factors: more “motivation” (kept appointments, requested refills when due, picked up medications at center, asked for medication changes if medications were perceived not to be working well), older age, greater family financial support, higher socioeconomic status, seeing a Latino therapist. Factors unrelated to adherence: acculturation, treatment variables (number of medications, years in treatment, and number of treatments other than medications received), total lifetime number of therapists, gender, family members with mental illness, living setting, and financial support from outside the family (self-supporting, disability benefits, or support from others outside the family)



**Table 1***continued from previous page*

Study	Design and objective	Location and population	Medication	Sample <sup>a</sup>	Adherence measure	Adherence rates	Nonadherence-related findings
Telles et al., 1995 (42)	Prospective; compared behavioral management and standard case management in preventing relapse	Public-sector psychiatric facilities in Los Angeles; Spanish-speaking patients ages 18–55 with schizophrenia; families were recruited after inpatient admission	Intramuscular haloperidol or fluphenazine decanoate	40 patients; mean age 30; 64% male; country of origin or heritage, Mexico, Guatemala, and El Salvador; 88% of patients and 99% of relatives were 1st generation; mean acculturation scores: <sup>b</sup> participants, 1.99; families, 1.63; 100% monolingual Spanish speaking	Monthly ratings on a 5-point scale, averaged after 12 months; cutoffs for nonadherence were not specified. Data source: not specified	Actual adherence rates were not reported; measured over 1 year	Outcomes: nonadherence predicted illness exacerbation; intervention type did not. Risk factor: less acculturation. Factors unrelated to adherence: study treatment group assignment
Hodgkin et al., 2007 (45)	Prospective, cross-sectional; examined rates and factors related to discontinuation of antidepressant medication among Latino respondents (N=2,554) in the National Latino and Asian American Study (NLAAS) Interviews, 2002–2003	Latino NLAAS respondents who reported using at least 1 antidepressant in the past 12 months	Antidepressants	180 respondents; 28% age 18–34; 53% age 35–54; 19% age 55 and older; 29% male; country of origin or heritage not specified (national sample included Puerto Ricans, Cubans, Mexicans, and other Latinos); English proficiency: 40% poor or fair; 60% good or excellent	Nonadherence measured as discontinuation (used an antidepressant in the past 12 months and discontinued)	Discontinuation rate: 33% (N=60); 57% (N=34) of these (19% of total N) discontinued without prior medical input; measured over previous year	Risk factors: drug abuse, medication, barriers to high-quality care. Protective factors: older than 35, married, has public or private insurance, greater number of depressive symptoms, taking a selective serotonin reuptake inhibitor (significant only for patients discontinuing), ≥8 visits to a nonmedical therapist (significant only for patients discontinuing without prior input), good or excellent English proficiency (significant only for patients discontinuing). Factors unrelated to adherence: education, gender, problems with role functioning, recognition of the presence of a problem, antidepressant prescribed by a psychiatrist

<sup>a</sup> The standard deviations were not reported for the mean age in some studies.<sup>b</sup> Acculturation was measured on the 5-point Acculturation Rating Scale for Mexican Americans (1, “wholly Mexican” and 5, “wholly Anglo-American”) (as referenced in Telles et al. [42]).

proportion of Spanish-speaking participants ranged from none to 100% (mean=45.7%±35.0%). For seven studies, country of origin or ancestry of Latino participants was reported, which was primarily Mexico in four studies (41,43,50,51), primarily Puerto Rico in two (40,56), and a mix of Mexico, Guatemala, and El Salvador in one (42).

Studies used a range of adherence measures, including patient report (50,55), chart review or physician re-

port (41), a combination of patient and family report and chart review (43,49), medication discontinuation (by patient report) (45,47,57), pill counts of returned pills (46), MEMS caps (56), calculations from pharmacy records (including cumulative mean gap ratio [CMGR], MPR, and CPR) (1,6,48,51,52,58–60), and urine testing for metabolites (54). Two studies did not describe the adherence measure (40,42). Nineteen studies reported the time period during which ad-

herence was examined, which ranged from one week to 48 months (mean=10.2±10.3 months).

### **Nonadherence rates**

Three of the four studies that included only Latinos (41,43,45) (Table 1) reported nonadherence rates, which ranged from 33.0% to 55.0% (mean=44.0%±11.0%). The fourth (42) explored risk factors for nonadherence among Latinos but did not detail rates, and it is discussed below. Of the

**Table 2**Studies of medication nonadherence in which the sample included U.S. Latinos and other U.S. ethnic groups<sup>a</sup>

Study	Design and objective	Location and population	Medication	Sample	Adherence measure	Adherence rates	Nonadherence-related findings
Jenkins, 1997 (40)	Prospective, naturalistic; used ethnographic interviews and observations to cross-culturally examine the subjective experience of long-term psychiatric patients	Northeastern Ohio; Latino and Euro-American outpatients with schizophrenia and depression ages 20–55 living with or in regular weekly contact with one or more family members	Psychotropics	80 patients; mean age 38.6±8.7; 46% male; 50% Latino (95% Puerto Rican [80% born in Puerto Rico], 1 Cuban, and 1 Honduran); 73% monolingual Spanish speaking; mean acculturation score, 1.95 <sup>b</sup> ; 50% Euro-American (most were Americans in U.S. for many generations and all spoke English as their primary language)	Adherence, measured as “regular, somewhat regular, very irregular, or not applicable” (no recent medication); definition of adherence groups was not specified. Data source: not specified	Latinos with schizophrenia: 15% somewhat irregular, 80% regular, 5% not applicable. Euro-Americans with schizophrenia: 5% very irregular, 15% somewhat irregular, 80% regular. Latinos with depression: 5% very irregular, 20% somewhat irregular, 65% regular, 10% not applicable. Euro-Americans with depression: 5% very irregular, 95% regular; adherence to “recent medication” was measured; exact period was not specified	No difference in adherence rates between Latinos and Euro-Americans with schizophrenia; trend ( $p=.055$ ) toward Latinos with depression having higher rates of nonadherence than Euro-Americans; <sup>c</sup> no adherence-related outcomes or factors were examined. Other findings: Latinos were significantly less likely than Euro-Americans to characterize their life situation in terms of mental illness.
Rosenheck et al., 2000 (46)	Prospective, randomized, double-blind; compared medication continuation and adherence for haloperidol and clozapine	15 VA medical centers; treatment-refractory patients with schizophrenia who all had a history of high inpatient use (30–364 inpatient days in the previous year)	Haloperidol or clozapine	423 patients; mean age 43.6±8.0; 98% male; 4% Latino, 66% Euro-American, 30% African American; .2% other	Adherence assessed by both medication nonadherence (ratio of number of returned pills to number of prescribed pills × 100 at the end of each week) and by medication continuation (number of weeks of participation in double-blind treatment with the randomly assigned study drug). Data source: pill counts	Overall nonadherence: 20% in 1st 6 weeks; 15% 6 weeks to 3 months; 12% 3–6 months; mean continuation, 31.2±20.0 weeks (out of 52 maximum); rates by ethnicity were not reported, and data were not available for calculations	Latino ethnicity was not significantly related to the likelihood of discontinuation; African Americans were significantly more likely to discontinue than Euro-Americans. <sup>d</sup>
Bull et al., 2002 (47)	Prospective, cross-sectional; telephone interviews with patients and surveys of physicians to examine the relationship between patient-physician communication about SSRIs and SSRI discontinuation	Northern California Kaiser Permanente Medical Care Program; patients ages 18–75 who had recently begun an SSRI for a depressive disorder between 12/15/1999 and 5/31/2000	SSRIs	401 patients; mean age 45.8±15.0; 29% male; 10% Latino, 67% Euro-American, 9% African American, 4% Asian, 10% other	Nonadherence measured as discontinuation. Data source: patient report	Overall discontinuation rate, 20% (79 of 401); Latinos, 36% (15 of 42); Euro-Americans, 16% (43 of 267); African Americans, 25% (9 of 36); Asians, 20% (3 of 15); measured over 3 months after initiation of an SSRI	Latinos had significantly higher discontinuation rates than Euro-Americans; all other differences in discontinuation rates by ethnicity were not significant. <sup>e</sup>

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Study	Design and objective	Location and population	Medication	Sample	Adherence measure	Adherence rates	Nonadherence-related findings
Li et al., 2002 (48)	Retrospective, cross-sectional; examined cost of treating bipolar disorder	California; Medi-Cal paid claims, 4/1994–1/1999, for patients with at least one diagnosis of bipolar disorder in the 1st year of treatment	Mood stabilizers	3,349 patients; mean age 41.5; 36% male; 8% Latino, 62% Euro-American, 11% African American, 19% other	Adherence measured as MPR $\geq 90\%$ . Data source: Medi-Cal drug claims	Actual adherence rates were not reported	No significant differences by race or ethnicity in the likelihood of use or of adherence <sup>d</sup>
Robinson et al., 2002 (49)	Prospective, longitudinal; examined predictors of medication discontinuation among patients with 1st episode schizophrenia and schizoaffective disorder (parent study was long-term study of 1st-episode schizophrenia and schizoaffective disorder)	New York; Long Island Jewish Medical Center; 1st-episode patients with schizophrenia and schizoaffective disorder in inpatient, outpatient, day, and partial hospital programs	Antipsychotics; prescribed via study algorithm (sequence: fluphenazine, haloperidol, haloperidol plus lithium, either molindone or loxapine, clozapine)	112 patients; mean age 25.0 $\pm$ 6.5; 53% male; 12% Latino, 40% Euro-American, 38% African American, 7% Asian, 3% mixed racial background	Nonadherence measured as discontinuation (failure to take medication for 1 week or longer). Data source: patient, family member, and clinician reports	Overall nonadherence, 26%; Latinos, 21% (3 of 14); Euro-Americans, 13% (6 of 45); African Americans, 41% (17 of 42); Asians, 25% (2 of 8); <sup>e</sup> measured over 1 year	Differences in rates between Latinos and other groups were not significant; African Americans were significantly more likely than Euro-Americans to be nonadherent. <sup>e</sup>
Barrio et al., 2003 (50)	Prospective, naturalistic, longitudinal; used PANSS to examine symptom expression by ethnicity among patients with schizophrenia	San Diego County public mental health services; random sample of English-speaking adults ages 18–78	Antipsychotics	351 patients; mean age 41 $\pm$ 11; 61% male; 19% Latino (100% English-speaking; majority Mexican American; “fairly well acculturated”); 56% Euro-American; 25% African American	Adherence measured on a 5-point scale (from always take to stopped taking); sample divided into totally adherent and nonadherent (latter included partially adherent). Data source: patient report	Overall nonadherence, 25% (88 of 351); Latinos, 37% (23 of 65); Euro-Americans, 23% (45 of 198); African Americans, 23% (20 of 88); measured at study entry (time period not specified)	Latino nonadherence rate was significantly higher than Euro-American rate; other differences in rates between groups were not significant (nonsignificant trend toward higher rate among Latinos compared with African Americans). <sup>c</sup>
Opolka et al., 2003 (51)	Retrospective, cross-sectional; examined ethnicity as a predictor of adherence	Texas; Medicaid patients with schizophrenia and schizoaffective disorder started on 1 of 3 antipsychotics, 1/1997–8/1998	Olanzapine, risperidone, haloperidol	3,583 patients; ages 21–65 (mean not reported); % male not reported; 16% Latino (all Mexican American); 45% Euro-American; 39% African American	Adherence measured as number of days adherent in 1 year (number of days medication was received divided by 365). Data source: pharmacy claims	Overall nonadherence, 52%; Latinos, 55%; Euro-Americans, 48%; African Americans, 54%; <sup>f</sup> measured over 1 year after initiation of treatment	Nonadherence rates among Latinos and African Americans were significantly higher than among Euro-Americans.
Sleath et al., 2003 (52), and Sleath et al., 2003 (53)	Prospective, cross-sectional; used audiotaped physician-patient interviews to examine how Latino ethnicity influenced their	University of New Mexico’s primary care clinics; patients prescribed antidepressants	Antidepressants	73 patients with adherence data; mean age 48 (range 23–83); 29% male; 56% Latino, 44% Euro-American	Adherence measured as percentage of adherence during 100 days after the interview (number of days of	Overall nonadherence, 34%; Latinos, 41%; Euro-Americans, 25%; measured over 100 days	Latino ethnicity predicted nonadherence (52); Latinos were significantly less likely than Euro-Americans to receive antidepressant information from and give antidepressant informa-

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Study	Design and objective	Location and population	Medication	Sample	Adherence measure	Adherence rates	Nonadherence-related findings
	communication about antidepressants and antidepressant adherence				medication dispensed divided by number of days in all refill intervals) $\times$ 100. Data source: prescription refill records		tion to their physicians (53); they were also significantly less likely to express complaints about their medication to physicians (53); no significant differences were found in physicians' response to patients' complaints about medication or expression of adherence problems (53).
Farabee et al., 2004 (54)	Prospective, longitudinal; examined program-level predictors of antipsychotic adherence	California; parolees in psychiatric outpatient clinics with schizophrenia, schizoaffective disorder, or bipolar disorder	Olanzapine, haloperidol, risperidone, quetiapine, thioridazine, thiothixene, trifluoperazine, fluphenazine	150 patients; mean age 41.1 $\pm$ 7.7; 77% male; 10% Latino, 14% Euro-American; 71% African American; 4% other	Adherence measured as positive urinalysis for antipsychotic prescribed Data source: urine testing for metabolites (detects "recent ingestion")	Overall nonadherence, 29%; rates by ethnicity were not reported (data were not available to calculate rates); measured at baseline (detection of "recent ingestion")	Nonadherence rate was significantly higher among African Americans than among Euro-Americans, Latinos, and other group. <sup>d</sup>
Gilmer et al., 2004 (6)	Retrospective, cross-sectional; examined antipsychotic adherence and health care costs among Medi-Cal enrollees with schizophrenia	San Diego; Medi-Cal claims database (1998–2000); adults with schizophrenia	Oral antipsychotics	2,801 person-years; mean age 42 $\pm$ 11; 56% male; 19% Latino, 54% Euro-American; 18% African American, 6% Asian, 4% other	Adherence measured by cumulative possession ratio <sup>g</sup> (nonadherent, 0–.49; partially adherent, .5–.79; adherent, .8–1.1; excess fillers, >1.1) Data source: pharmacy records	Overall rates: 24% nonadherent; 16% partially adherent, 19% excess fillers, 41% adherent Nonadherence: Latinos, 63%; Euro-Americans, 57%; African Americans, 65%; Asians, 57%; other, 54%; <sup>h</sup> measured over 1 year	Nonadherence rates were significantly higher among Latinos and African Americans than among Euro-Americans.
Ayalon et al., 2005 (55)	Retrospective, cross-sectional; used telephone surveys to determine factors related to nonadherence to antidepressants among older African-American and Latino patients	University of California, San Francisco; Latino and African-American patients with a diagnosis of major depression over age 55 prescribed antidepressants in the previous 12 months	Antidepressants	101 patients; mean age 64.6 $\pm$ 7.3 for African Americans and 71.1 $\pm$ 8.5 for Latinos; 14% male; 51% Latino, 49% African American	Nonadherence measured as nonadherent "at least some of the time." Data source: patient report using a measure that assessed unintentional nonadherence on a 6-point scale and intentional nonadherence on a 5-point scale	Nonadherence <sup>i</sup> Latinos, 65%; African Americans, 53%; intentional nonadherence: Latinos, 29%; African Americans, 35%; unintentional nonadherence: Latinos, 36%; African Americans, 18%; measured over the previous year	Latinos reported significantly more unintentional nonadherence (by chi square test), but when other predictors were entered into the multivariate model, ethnicity was not a significant predictor.
Diaz et al., 2005 (56)	Prospective; examined effects of ethnicity on psychotropic adherence	New Haven, Connecticut, urban community mental health clinic; patients with any psychiatric disorder	Any oral psychotropic except clozapine (33% antipsychotics, 55% antidepressants, 12% mood	122 patients; mean age 45.0 $\pm$ 9.6; 49% male; 36% monolingual Spanish-speaking Latino (mostly Puerto Rican), 20% bilingual Latino	Adherence measured as number of bottle openings divided by number of prescribed openings in 1 month (taking	Nonadherence: monolingual Latinos, 23%; bilingual Latinos, 24%; Euro-Americans, 10%; African Americans, 32%; measured over 1 month after the initial	After analyses controlled for covariates, nonadherence rates were significantly higher among monolingual Latinos and African Americans than among Euro-Americans, and no significant difference was found



**Table 2***continued from previous page*

Study	Design and objective	Location and population	Medication	Sample	Adherence measure	Adherence rates	Nonadherence-related findings
			stabilizers or another drug	(mostly Puerto Rican), 28% Euro-American, 16% African American	into account openings for pharmacy refills) Data source: MEMS pill bottle caps	interview	between bilingual Latinos and Euro-Americans. Protective factors (associated with higher adherence): for monolingual Latinos, older age; for Euro-Americans, more years of treatment, fewer depressive symptoms. No variables predicted nonadherence among bilingual Latinos or African Americans after analyses controlled for covariates. Other findings: acculturative stress was greater for monolingual Latinos than for bilingual Latinos.
Ascher-Svanum et al., 2006 (1)	Prospective, longitudinal; examined relationship between adherence and long-term functional outcomes (much worse for non-adherent patients)	U.S. Schizophrenia Care and Assessment Program (large, naturalistic, prospective, multi-site study, 1997–2003); included patients treated for schizophrenia spectrum disorders	Any anti-psychotic	1,906 patients; mean age 41.2±11.1; 61% male; 5% Latino, 49% Euro-American, 37% African American, 9% other	Nonadherence measured as an MPR <85% Data source: prescription data from patient medical records was used to calculate MPRs	Overall nonadherence, 20%; Latinos, 17%; Euro-Americans, 16%; African Americans, 22%; other, 27%; measured over 6 months	Nonadherence rates did not differ significantly between Latinos and any group; African Americans and patients from the “other” group were significantly more likely than Euro-Americans to be nonadherent. <sup>c</sup>
Olfson et al., 2006 (57)	Prospective, longitudinal; used telephone interviews to examine antidepressant discontinuation	Household component of the MEPS, 1996–2001 (national probability sample of noninstitutionalized persons); adults age 18 and older who started a new episode of antidepressant treatment for depression during the household component	Antidepressants	829 persons; 47% age 18–44; 35% age 45–64; 18% age 65 and older; 27% male; 17% Latino, 74% Euro-American, 7% African American, 2% other (including American Indian, Alaska Native, and Asian or Pacific Islander)	Nonadherence measured as discontinuation (gap of >30 days) Data source: patient report using structured interviews	Overall discontinuation, 42% (over 1st 30 days of treatment); of those continuing after 30 days, 52% discontinued during the next 60 days; only 28% continued for more than 90 days Latino discontinuation, 54%; non-Latino, 41%; Euro-American, 41%; African American, 47%; other, 51%; measured over the 1st 30 days	Likelihood of discontinuing was significantly higher among Latinos than among non-Latinos, even after the analyses controlled for age, gender, race, and pre-treatment mental health status; discontinuation was significantly higher among Latinos than among Euro-Americans; difference between Latino and African-American rates was not significant. <sup>c</sup>
Sajatovic et al., 2006 (58)	Retrospective, cross-sectional; examined anti-psychotic adherence among patients with bipolar disorder	VA National Psychosis Registry, 10/1/2002–9/30/2003; patients with bipolar disorder prescribed anti-psychotics	Oral anti-psychotics prescribed while patients were out-patients	32,993 patients; mean age 51.2±11.9; 88% male; 66% Euro-American, 12% African American, .4% American Indian, .2% Asian, 18% unknown	Adherence measured with MPRs (fully adherent, ≥.08; partially, >.5 and <.8; nonadherent, ≤.5) Data source: pharmacy data from VA Pharmacy Benefits	Overall rates: non-adherent, 27%; partially, 21%; fully, 52%; Latinos: <sup>c</sup> non-adherent, 28%; partially, 22%; fully, 50%; Euro-Americans: <sup>c</sup> nonadherent, 24%; partially, 21%; fully, 55%; African Americans: <sup>c</sup> nonadherent, 37%;	Non-Euro-Americans were significantly more likely to be nonadherent after analyses controlled for covariates; Latinos had significantly higher nonadherence rates than Euro-Americans and significantly lower nonadherence rates than African Americans; African Americans had

*Continues on next page*

**Table 2***continued from previous page*

Study	Design and objective	Location and population	Medication	Sample	Adherence measure	Adherence rates	Nonadherence-related findings
					Management Strategic Healthcare Group were used to calculate MPRs	partially, 25%; fully, 38%; measured over 1 year	significantly higher nonadherence rates than Euro-Americans and Latinos. <sup>e</sup>
Valenstein et al., 2006 (59)	Retrospective, longitudinal; examined anti-psychotic adherence over time	VA National Psychosis Registry, 1999–2003; patients with schizophrenia prescribed antipsychotics	Anti-psychotics	34,128 patients; mean age 51.2 ± 11.2; 96% male; 8% Latino, 56% Euro-American, 26% African American, 1% other, 9% unknown	Adherence measured with MPRs (consistently good adherence, ≥.8 in all 4 years; consistently poor, <.8 in all 4 years; inconsistent, ≥.8 in some years but not all) Data source: pharmacy data from VA Pharmacy Benefits Management Strategic Healthcare Group were used to calculate MPRs	Overall rates: consistently poor, 18%; inconsistent, 43%; consistently good, 39%; rates by race-ethnicity were not reported (data were not available to calculate rates); measured over 4 years	Latinos and African Americans were significantly more likely than Euro-Americans to have consistently poor adherence. <sup>d</sup>
Sajatovic et al., 2007 (60)	Retrospective, cross-sectional; examined adherence to mood stabilizers among patients with bipolar disorder	VA National Psychosis Registry, federal fiscal year 2003; patients with bipolar disorder prescribed lithium or an anti-convulsant	Lithium and anti-convulsants	44,637 patients; mean age 51.8 ± 12.2; 89% male; 3% Latino, 65% Euro-American, 10% African American, .3% American Indian, .2% Asian, 21% unknown	Adherence measured with MPRs (fully adherent, ≥.8; partially, >.5 and <.8; non-adherent, ≤.5). Data source: pharmacy data from VA Pharmacy Benefits Management Strategic Healthcare Group were used to calculate MPRs	Overall rates: non-adherent, 21%; partially, 25%; adherent, 54%; Latinos: <sup>e</sup> nonadherent, 26%; partially, 28%; adherent, 46%; Euro-Americans: <sup>e</sup> non-adherent, 19%; partially, 24%; adherent, 57%; African Americans: <sup>e</sup> nonadherent, 33%; partially, 28%; adherent, 39%; measured over 1 year	Non-Euro-Americans were significantly more likely to be nonadherent; Latinos had significantly higher nonadherence rates than Euro-Americans and significantly lower rates than African Americans. <sup>e</sup>

<sup>a</sup> Abbreviations: VA, Department of Veterans Affairs; SSRI, selective serotonin reuptake inhibitor; MPR, medication possession ratio (number of days' supply of medication divided by the number of days' supply needed for continuous use); PANSS, Positive and Negative Syndrome Scale; MEPS, Medical Expenditure Panel Survey; MEMS, medication event monitoring system. The standard deviation was not reported for the mean age in some studies.

<sup>b</sup> Acculturation was measured on the 5-point Acculturation Rating Scale for Mexican Americans (1, "wholly Mexican" and 5, "wholly Anglo-American") (as referenced in Telles et al. [42]).

<sup>c</sup> Chi square tests of significance were calculated by using the raw reported data and an online chi square calculator ([www.quantpsy.org](http://www.quantpsy.org)).

<sup>d</sup> Compared nonadherence rates by ethnicity and reported those results but did not report the actual rates

<sup>e</sup> Percentages of nonadherence and chi square tests of significance were calculated by using the raw reported data and an online chi square calculator ([www.quantpsy.org](http://www.quantpsy.org)).

<sup>f</sup> Percentages of nonadherence were calculated by using the raw reported data.

<sup>g</sup> Cumulative possession ratio: the number of days that medications were available for consumption divided by the number of days that patients were eligible for Medi-Cal

<sup>h</sup> For consistency with other studies, summary nonadherence rates are presented (nonadherent, partially adherent, and excess fillers) by race and ethnicity. Rates for each adherence category by race and ethnicity were not reported.

<sup>i</sup> Calculated by adding intentional and unintentional nonadherence rates

17 studies that included Latinos and other racial or ethnic groups (Table 2), 12 (1,6,40,47,49–52,56–58,60) provided data allowing comparison of nonadherence rates between Latinos and Euro-Americans. The mean nonadherence rates for Latinos and Euro-Americans were  $39.4\% \pm 15.7\%$  and  $29.2\% \pm 16.5\%$ , respectively, yielding an overall effect size of .64.

Ten of these studies also had data available for African Americans (1,6,47,49–51,56–58,60), and nonadherence rates in those studies were as follows: Latinos, range of 17.2%–63.1%, (mean= $41.0\% \pm 16.3\%$ ); Euro-Americans, range of 10.0%–57.2% (mean= $31.3\% \pm 17.2\%$ ), and African Americans, range of 22.7%–65.1% (mean= $43.2\% \pm 16.9\%$ ). Only one study reported separate rates by ethnicity and diagnosis (40); it showed no difference between nonadherence rates for Latinos with schizophrenia compared with Euro-Americans with schizophrenia and a nonsignificant trend ( $p=.055$ ) toward higher nonadherence rates among Latinos compared with Euro-Americans for patients with depression.

#### *Comparison of rates for racial or ethnic groups*

Sixteen studies evaluated differences in nonadherence rates between Latinos and Euro-Americans. (In addition to the 12 studies that reported nonadherence rates for Latinos and Euro-Americans, four studies measured and compared nonadherence rates in the two groups but did not provide details.) Of these 16 studies, six found no statistically significant differences (1,40,46,48,49,54), nine found that Latino patients had significantly higher nonadherence rates (6,47,50–52,57–60), and one found that monolingual Spanish-speaking patients, but not bilingual patients, were more likely to be nonadherent than Euro-American patients (56). In ten of 14 studies, African Americans had significantly greater nonadherence rates than Euro-Americans (1,6,46,49,51,54, 56,58–60), whereas four found no difference (47,48,50, 57). Seven of the ten studies that compared rates between Latinos and African Americans found no difference (1,47,49–51), and three found

that Latinos had lower nonadherence rates (54,58,60).

#### *More objective measures of adherence*

Eleven studies (1,6,46,48,51,52,54,56, 58–60) used MEMS caps, calculations from pharmacy data (including MPRs, CPRs, and CMGRs), or urine testing. None of the studies that included only Latinos used these methods. Six of the 11 studies reported rates by group (1,6,51,56,58, 60). In these studies the mean nonadherence rate was  $43.7\% \pm 18.7\%$  for Latinos,  $36.5\% \pm 18.9\%$  for Euro-Americans, and  $49.5\% \pm 17.7\%$  for African Americans.

#### *Outcomes and factors related to Latino nonadherence*

Five of the 21 studies (41–45,56) included a majority of Latino participants and examined outcomes of and risk and protective factors for nonadherence specifically for Latinos (Table 3).

Only one study (56) made cross-cultural comparisons of risk factors, investigating the most significant factors for each group. Thus we were unable to answer the question of the relative importance of these identified factors for Latinos compared with other groups, except through comparisons with previously published reviews. Also, there was little overlap between the reports in terms of factors examined. Therefore, direct comparisons of the relative importance of the identified factors were not possible. The one study that made cross-cultural comparisons identified older age among monolingual Spanish-speaking Latinos and more years of previous treatment and fewer depressive symptoms among Euro-Americans as predictors of higher adherence (56). Nonadherence was found to predict a worse illness course in the two studies that examined the health-related outcomes of nonadherence (42,43).

#### *Language, acculturation, and nonadherence*

Only two studies explored the relationship between patients' preferred language and nonadherence, and both found that monolingual Spanish speakers were significantly more like-

ly to be nonadherent (45,56), even after controlling for important cofactors, such as age and number of symptoms. In the two studies that evaluated the interaction between acculturation and nonadherence, one found that acculturation was not related to adherence (41) and one found that less acculturated patients were significantly less adherent (42). If language is used as a proxy for acculturation (63–66), then three (42,45,56) of four studies (41,42,45, 56) found higher nonadherence in less acculturated Latinos. Because socioeconomic status is likely a particularly important potential cofactor in the relationship between nonadherence and language or acculturation, we examined whether each of these studies controlled for socioeconomic status. Of the studies that found that monolingual Spanish speakers were more likely to be nonadherent, one study controlled for socioeconomic status by controlling for education and health insurance status (45), and in the other study all patients had similar socioeconomic status and access to services (56). In the studies that examined acculturation, one controlled for socioeconomic status (41) and found that socioeconomic status, but not acculturation, was significantly associated with nonadherence. The other did not control for socioeconomic status, but a majority of participants were from similarly lower socioeconomic groups (42).

#### *Providers' language and ethnicity and nonadherence*

One study that assessed the effect of providers' language found that Latino patients who saw a Spanish-speaking non-Latino therapist were less likely to adhere to medication treatment; however, the study also found that Latino patients who were treated by a Latino therapist were more likely to adhere (41). The authors found this surprising and hypothesized that the difference may have resulted from the ubiquitous interpretation and translation services that were available at the study clinic. It may be that ethnic concordance with the provider, not language alone, may lead to better adherence among Latino patients.

**Table 3**

Factors potentially related to psychotropic medication adherence among U.S. Latinos and reference numbers of the studies that investigated them

Factor	Association between factor and adherence		
	Better adherence	Worse adherence	No association
Patient demographic factor			
Older age	41,45,56		
Gender			41,45
Education level			45
Higher socioeconomic status	41		
Living situation			41
Married	45		
Has health insurance	45		
Good or excellent English proficiency	45,56		
Less acculturation		42	41
Financial support from outside the family			41
Patient clinical factor			
Years ill			44
Comorbid substance abuse		45	44
Severity of positive symptoms			44
Greater number of depressive symptoms	45		
More insight			45
Problems with role functioning			45
More "motivation"	41		
Treatment-related factor			
Barriers to high-quality care		45	
Antidepressant prescribed by a psychiatrist			45
Taking a selective serotonin reuptake inhibitor	45		
≥8 past-year visits to a nonmedical therapist	45		
Seeing a Spanish-speaking therapist		41	
Seeing a Latino therapist	41		
All treatment variables in one study (years in treatment, number of medications)			41
Total number of therapists in lifetime			41
Family-related factor			
Family financial support	41		
Family instrumental ("task-oriented") support	44		
Family emotional support			44
Criticism			44
Emotional overinvolvement			44
Warmth			44
Family member with mental illness			41

### ***Socioeconomic and insurance status and quality of care***

Only one study examined the relationship between socioeconomic status and nonadherence (41). It found that higher socioeconomic status was associated with lower nonadherence. Having health insurance, either public or private, was associated with lower nonadherence in the one study that examined this relationship (45). That study also reported that barriers to accessing high-quality care led to a greater likelihood of nonadherence.

### ***Other nonadherence risk factors***

In the studies that examined age, two found that younger age predicted higher nonadherence for all Latino respondents (41,45), whereas in a third study, this relationship was found only for monolingual Spanish-speaking participants (56). One study identified problems with drug abuse (45) as a risk factor for nonadherence; however, another study found that abstinence from street drugs (marijuana was excluded from the definition) was not significantly related to adherence (44).

### ***Other nonadherence***

#### ***protective factors***

Factors associated with better adherence in individual studies included greater family instrumental support (task-oriented or hands-on assistance) (44), greater financial support from family (41), more "motivation" (as assessed by patients' keeping appointments, requesting refills when due, and asking for medication changes if they felt that their medications were not working) (41), being married (45), having a greater number of depressive symptoms (45), taking a selective serotonin reuptake inhibitor as opposed to another type of antidepressant (45), and having made eight or more visits to a nonmedical therapist in the past year (45).

#### ***Other culturally relevant findings***

Sleath and colleagues (52,53) reported that in addition to having higher nonadherence rates, Latino patients were significantly less likely than Euro-Americans to receive information about antidepressants from their physicians and to share information about antidepressant use with their physicians and were also less likely to express complaints about their antidepressants. A study of patients with schizophrenia or depression found that Latinos were significantly less likely than Euro-Americans to characterize their life situation in terms of mental illness (40).

### ***Discussion***

We reviewed the literature to examine rates of nonadherence to antipsychotics, antidepressants, and mood stabilizers among Latinos living in the United States, as well as risk factors for and influences of language and acculturation on nonadherence. We found that the mean rate of psychotropic nonadherence among Latinos was 44% in studies that included only Latinos. In studies that included multiple racial and ethnic groups, the rate among Latinos was approximately 40%, which was higher than the mean nonadherence rate of roughly 30% among Euro-Americans and comparable to the rate of roughly 40% among African Americans.

The effect size of the difference between rates for Latinos and Euro-



Americans was .64, suggesting a medium to large difference. We purposely compared rates among racial and ethnic groups by using only studies that had rates available for all groups, so the higher nonadherence rates among Latinos and African Americans compared with Euro-Americans are not the result of differences in study design or adherence measure. A majority of studies found that Latinos had significantly higher rates of nonadherence than Euro-Americans. Remarkably, none found that Latinos had lower nonadherence, even in bilingual, culturally tailored settings (56), suggesting that Latinos experience additional barriers to adherence beyond language and cultural barriers.

Consistent with findings of previous studies, nonadherence predicted a worse illness course in studies that investigated outcomes. Some risk factors for nonadherence that were identified among Latinos are similar to those found in the wider adherence literature; they included substance abuse, barriers to access to high-quality care, lack of health insurance, and limited family support. Two studies identified monolingual Spanish status as a nonadherence risk factor. If poor English proficiency is considered to be a proxy for less acculturation (63–66), then three of four studies found that less acculturation was predictive of nonadherence. Protective factors for Latinos included receiving greater family instrumental and financial support, having higher socioeconomic status, being older, being married, being more proactive in one's care, having public or private insurance, and having made eight or more visits to a therapist in the past year.

Previous reviews have noted great variability in psychotropic nonadherence rates (10%–77%), with mean rates of 35%–60% (17–20). The mean rates for Latinos and African Americans found in our review are within that mean range, but the rate for Euro-Americans is slightly lower (30%). In studies that used pharmacy data, MEMS caps, or urine testing as a measure, the nonadherence rates in all groups were higher than in the studies using other measures—44% for Latinos, 49% for African Ameri-

cans, and 37% for Euro-Americans, which is within the mean range found in previous reviews for Euro-Americans. Studies that rely on patient or provider report tend to underestimate nonadherence rates. All studies reviewed here that included only Latinos used patient, family, or provider report to measure adherence, but surprisingly they found a higher mean nonadherence rate (44%) than studies that used more objective measures (40%). This difference may result from the use of a combination of patient and family reports and chart review to assess adherence in some of the studies (43,44). The higher rates could also result from differences in study design or patient population. Cultural factors might lead to greater reliability of patient and provider reports in Latino populations compared with non-Latino populations.

Family likely has a particularly important role in the care and health outcomes of Latino patients with mental illness compared with other groups (24,38,67). Two studies investigated which specific types of family assistance were most predictive of adherence and found that greater financial support from family (41) and more family instrumental support (“task-oriented” assistance) (44) predicted better adherence.

### *Limitations*

Our review has several limitations. Although we conducted a comprehensive search, it is possible we missed a relevant study. This is a comprehensive review of summary data, not a meta-analysis. Included studies were heterogeneous with respect to study objectives and design, diagnoses studied, sample size, and proportion of Latino participants. Many of the larger studies were limited by small percentages of Latino patients. In addition, there was extensive variability in the measure of adherence, the period for which adherence was measured (one week to one year), and even the definition of adherence, with some studies using dichotomous measures and others measuring partial adherence in addition to nonadherence and adherence. This heterogeneity, particularly the variability in

the time for which adherence was measured, likely led to the wide range in nonadherence rates in the studies reviewed, even among studies that used more objective adherence measures, because adherence is known to decrease over time (59). Although this variability could affect the reliability of absolute nonadherence rates, it likely did not affect our ability to compare relative rates between racial or ethnic groups because we included only studies in which data on rates were available for all three groups. Therefore, we know that any differences in rates between groups did not result from differences in adherence measure or study design. Also, we separately examined studies that used only adherence measures regarded to be more objective and found somewhat higher nonadherence rates among all groups, but the pattern of relative rates between groups was similar to that in the analysis that included all the studies.

Another limitation of the literature was that none of the reports examined every risk or protective factor identified—in fact, many risk and protective factors were investigated only by one or a few studies—which makes it impossible to draw conclusions about the relative importance of each factor. Only one study conducted cross-cultural comparisons of risk and protective factors. Similarly, we could not compare nonadherence rates or factors most relevant by diagnosis and race-ethnicity because most studies included participants with only one diagnosis. In addition, a number of factors that are likely to significantly influence adherence among Latinos were not investigated, such as cultural attitudes and beliefs about mental illness and treatments, health literacy, stigma (68), insight, efficacy and tolerability of medications, side effects, use of alternative treatments, and dietary and genetic effects on medication metabolism. Only a few studies examined factors unique to Latinos, such as language and acculturation. Similarly, potentially modifiable mechanisms that influence adherence, such as socioeconomic status, health insurance, and barriers to high-quality care, were examined only in single reports. We

were able to compare rates only between Latinos, Euro-Americans, and African Americans because of the literature's general lack of adherence investigations in other groups. The U.S. Latino population is quite heterogeneous both culturally and in important indicators of population health (24,28). Many of these studies were conducted with Mexican Americans and veteran populations, and thus the results are likely not applicable to all Latino communities living in the United States.

It is important to note that the summary mean nonadherence rates were generally unadjusted for potentially important cofactors, such as socioeconomic status. Therefore, these cofactors must be considered possible contributors to the lower nonadherence rates seen among Latinos and African Americans compared with Euro-Americans. Similarly, cofactors such as access to health care or socioeconomic status must be considered as possible explanations for the relationships between risk and protective factors and nonadherence. For example, the relationship between less acculturation and nonadherence noted by three of four studies could be mediated by a variety of factors, including socioeconomic status. This remains an open question. Two of the four studies examining acculturation directly controlled for socioeconomic status—one continued to find an association between nonadherence and less acculturation (45) and the other found no association (41). Other ways in which a lower degree of acculturation could lead to nonadherence include impaired patient-physician communication because of language barriers (45) and difficulty navigating the U.S. health care system.

Despite these limitations, our results clearly suggest that Latinos are at higher risk of psychotropic medication nonadherence than Euro-Americans. Remarkably, this risk was observed across various study designs, diagnostic categories, medication types, clinical settings, and Latino subgroups. The higher rates of nonadherence seen among Latinos were comparable to the rates among African Americans, another disadvantaged racial-ethnic minority group.

Although the existing literature limited our ability to answer the question of which risk factors are most relevant for Latinos, we have summarized all the influences on adherence among Latinos that have been investigated to date and have identified factors that are particularly relevant for Latinos.

### *Research recommendations*

As previously recommended (17,18, 69), a standard definition and measure of adherence would greatly improve interpretation of the broader adherence literature. Because people are less than optimally adherent to medications in different ways and for different reasons, quantifying adherence into more categories than adherent or nonadherent would be helpful in better understanding adherence and developing interventions to improve it. Additional categories have been used in more recent studies (6,58–60), and one found that patients who filled prescriptions more often than expected incurred the highest health care costs of all nonadherent patients (6).

In terms of recommendations for studying adherence rates specifically among Latinos, we first encourage future studies to include more adequate numbers of Latinos. This is consistent with the National Institute of Mental Health (NIMH) initiative to increase representation of participants from racial-ethnic minority groups in research studies (70). Because of the great heterogeneity of U.S. Latino populations (71), we recommend including Latinos from all the diverse cultural and socioeconomic backgrounds that make up the larger U.S. Latino population as well as specifying the degree of acculturation, country of origin or cultural background, socioeconomic situation, and preferred language, which was done in many of the studies included in this review. This heterogeneity also gives added weight to previous recommendations for local, community-based, participatory research (38,72) to develop optimally relevant and lasting interventions to improve adherence. In addition, we recommend cross-cultural comparisons that investigate the relative importance of risk and protective factors for different racial

and ethnic groups, including Asian Americans and American Indians, who we noted were rarely included in meaningful numbers in adherence investigations.

Although adherence measures that rely on pharmacy records are typically considered more reliable than other measures, such as patient report, pharmacy records may underestimate adherence among patients in lower socioeconomic groups, who, for example, may rely on free samples from physicians (which would not be displayed in pharmacy records) to bridge gaps in insurance coverage or reduce prescription costs. Pharmacy records also do not include herbal and over-the-counter medications, which could affect adherence. Therefore, future investigators may want to consider supplementing pharmacy or MEMS caps data with other sources of adherence data, such as patient and family report combined with chart review (44), or conducting detailed structured patient interviews (55) to provide a comprehensive examination of nonadherence and its causes.

Ultimately, research needs to identify mechanisms whereby suboptimal adherence occurs among Latinos and racial-ethnic minority groups in general. Hypothesis-driven research characterizing the role of moderators and mediators of adherence is needed. Mechanisms thus identified would be the basis for more effective interventions. Our review gives additional support to the recommendation of the NIMH-sponsored expert consensus meeting of Latino mental health services researchers to investigate the effects on adherence of language, acculturation, family support, health insurance, poverty, and access to high-quality care, including therapy (38). Given the findings that socioeconomic and health insurance status and barriers to high-quality care were related to adherence, these factors should be included as potential cofactors in future analyses of adherence. Particular attention should be paid to including these factors when comparing racial-ethnic groups, because group differences in adherence have been found to disappear when, for example, income is accounted for (73).

As previously noted, preferred language may be a better predictor of health patterns than ethnicity (56,65). It is essential to include adequate numbers of Spanish-speaking as well as bilingual and English-speaking patients and clinicians in future research to better understand these relationships. In addition to further explorations of the influence of factors noted in this review, we hope that future studies will investigate other likely influences on adherence. One such recently identified factor is stigma, which ranked second only to side effects in concerns about antidepressant use identified by Latino focus groups (68). Another is the role of culture in shaping the experience and interpretation of mental illness.

One study noted that although Latinos with depression were more likely to be nonadherent than Euro-Americans with depression, no difference was found for schizophrenia (40). This finding deserves focused attention in future investigations. We recommend that researchers examine nonadherence rates by both ethnicity and diagnosis. Also, cross-cultural explorations of which factors are most important for which diagnostic groups and whether mechanisms of nonadherence differ between diagnostic and racial-ethnic groups would be a significant new contribution to the literature.

### *Clinical recommendations*

Because of the limitations of the literature, we cannot offer specific clinical recommendations at this time. However, the data provide some general clinical guidelines. Currently, there are no evidence-based interventions specifically to improve psychotropic medication adherence among Latinos. However, potentially applicable are findings from broader quality improvement interventions (74), adherence interventions in predominantly non-Latino populations (75,76), adherence interventions for nonpsychiatric diseases that have been tested among Latinos (77–79), and broader mental health interventions for Latinos (80,81), as well as from clinical experience (82) and policy recommendations (39).

Because most patients are likely to

have adherence problems at some point (59), reassessing adherence regularly and repeatedly is important. Incorporating pharmacy records (3) in addition to patient and family report will increase the likelihood of detecting adherence difficulties. The finding that Latino patients were less likely than Euro-Americans to discuss their medications with their physician (52,53) suggests that physicians should be particularly mindful of encouraging medication discussions with their Latino patients. Physicians' proactive role in these discussions is particularly important because a common practice in many Latino cultures is to show deference toward physicians (83). Information about medication should be in Spanish and use simple terms enhanced with visual aids, where appropriate, depending on the language preference and educational attainment of the patient population served. Similarly, the prominence of stigma and culturally influenced negative associations in regard to antidepressants that were found in recent focus groups with Latinos who were prescribed antidepressants (68) indicates that inquiring about and addressing these issues could be useful for improving adherence.

Because of the high prevalence of nonadherence in all populations and because the reasons for nonadherence are likely to differ across patients, we strongly recommend assessing adherence and barriers to and mechanisms of adherence individually for every patient. Although some factors identified in our review, such as young age, cannot be modified, other contributors to nonadherence could be addressed in clinical settings. The findings by two studies in this review—that greater family financial and instrumental support were predictive of better adherence—suggest that involving family members in these specific ways whenever possible might be particularly beneficial for Latino patients. In addition, the higher antidepressant adherence among Latinos who had eight or more visits to a nonmedical therapist (45) is consistent with findings from predominantly Euro-American samples (57,84) and with a posi-

tion paper calling for culturally appropriate, practice-initiated quality improvement interventions, including psychoeducational and psychotherapeutic components (39). The finding that Latinos were more likely than Euro-Americans to want counseling and less likely to want antidepressants (85) suggests that therapy may be an especially important adherence enhancer for Latinos.

Latinos are least likely of all U.S. racial-ethnic groups to have public or private health insurance; the uninsured rate is 35.7%, compared with 12.6% for Euro-Americans (86). This disparity lends added significance to the finding that having public or private health insurance predicted better adherence among Latinos (45). Because lower socioeconomic status was associated with lower adherence (41), and Latinos are disproportionately represented in lower socioeconomic strata (24,86), clinicians should pay particular attention to ensuring that their patients can afford the psychotropic medications that they prescribe. Because barriers to high-quality care were associated with worse adherence, clinicians can likely improve adherence simply by ensuring that they are providing high-quality care. These findings also suggest that society-level interventions that increase access to health insurance, medications, and high-quality care would improve adherence.

Culturally and linguistically tailored care is likely important for establishing good clinician-patient relationships, which are associated with improved adherence (7,18,19,87,88). Clinicians should attend to cultural contexts that shape how their patients interpret and experience mental illness, because these likely affect adherence. As previously noted by several authors (82,89,90) and suggested by the findings of two studies in this review (41,56), even clinics with primarily bilingual, bicultural staff can have cultural divides with their patients because of differences in socioeconomic status and health models and beliefs. Recognizing those divides and working collaboratively with patients can help overcome these barriers and improve adherence (82,91).



## Conclusions

U.S. Latinos who receive mental health treatment appear to be at increased risk of psychotropic medication nonadherence compared with Euro-Americans. Our findings suggest that as clinicians and researchers examine ways to improve adherence to psychotropic medications among Latino patients, important considerations include prescribing treatment regimens that patients can afford; overcoming barriers to high-quality care, including language, socioeconomic, and cultural barriers; recognizing family involvement and psychotherapy as potentially important adherence enhancers; and ensuring that interventions to improve adherence are culturally appropriate.

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## References

- Ascher-Svanum H, Faries DE, Zhu B, et al: Medication adherence and long-term functional outcomes in the treatment of schizophrenia in usual care. *Journal of Clinical Psychiatry* 67:453–460, 2006
- Weiden PJ, Olfson M: Cost of relapse in schizophrenia. *Schizophrenia Bulletin* 21: 419–429, 1995
- Valenstein M, Copeland LA, Blow FC, et al: Pharmacy data identify poorly adherent patients with schizophrenia at increased risk for admission. *Medical Care* 40:630–639, 2002
- Terkelsen KG, Menikoff A: Measuring the costs of schizophrenia. Implications for the post-institutional era in the US. *Pharmacoeconomics* 8:199–222, 1995
- Gilbert PL, Harris MJ, McAdams LA, et al: Neuroleptic withdrawal in schizophrenic patients: a review of the literature. *Archives of General Psychiatry* 52:173–188, 1995
- Gilmer TP, Dolder CR, Lacro JP, et al: Adherence to treatment with antipsychotic medication and health care costs among Medicaid beneficiaries with schizophrenia. *American Journal of Psychiatry* 161:692–699, 2004
- Fenton WS, Blyler CR, Heinssen RK: Determinants of medication compliance in schizophrenia: empirical and clinical findings. *Schizophrenia Bulletin* 23:637–651, 1997
- Goodwin GM: Prophylaxis of bipolar disorder: how and who should we treat in the long term? *European Neuropsychopharmacology* 9(suppl 4):S125–S129, 1999
- Mander AJ, Loudon JB: Rapid recurrence of mania following abrupt discontinuation of lithium. *Lancet* 2:15–17, 1988
- Keck PE Jr, McElroy SL, Strakowski SM, et al: Factors associated with pharmacologic noncompliance in patients with mania. *Journal of Clinical Psychiatry* 57:292–297, 1996
- Tondo L, Jamison KR, Baldessarini RJ: Effect of lithium maintenance on suicidal behavior in major mood disorders. *Annals of the New York Academy of Sciences* 836:339–351, 1997
- Johnson RE, McFarland BH: Lithium use and discontinuation in a health maintenance organization. *American Journal of Psychiatry* 153:993–1000, 1996
- Burton WN, Chen CY, Conti DJ, et al: The association of antidepressant medication adherence with employee disability absences. *American Journal of Managed Care* 13:105–112, 2007
- Geddes JR, Carney SM, Davies C, et al: Relapse prevention with antidepressant drug treatment in depressive disorders: a systematic review. *Lancet* 361:653–661, 2003
- Gopinath S, Katon WJ, Russo JE, et al: Clinical factors associated with relapse in primary care patients with chronic or recurrent depression. *Journal of Affective Disorders* 101:57–63, 2007
- Katon W, Cantrell CR, Sokol MC, et al: Impact of antidepressant drug adherence on comorbid medication use and resource utilization. *Archives of Internal Medicine* 165:2497–2503, 2005
- Cramer JA, Rosenheck R: Compliance with medication regimens for mental and physical disorders. *Psychiatric Services* 49:196–201, 1998
- Lacro JP, Dunn LB, Dolder CR, et al: Prevalence of and risk factors for medication nonadherence in patients with schizophrenia: a comprehensive review of recent literature. *Journal of Clinical Psychiatry* 63:892–909, 2002
- Lingam R, Scott J: Treatment non-adherence in affective disorders. *Acta Psychiatrica Scandinavica* 105:164–172, 2002
- Perlick DA, Rosenheck RA, Kaczynski R, et al: Medication non-adherence in bipolar disorder: a patient-centered review of research findings. *Clinical Approaches in Bipolar Disorders* 3:56–64, 2004
- Becker MA, Young MS, Ochshorn E, et al: The relationship of antipsychotic medication class and adherence with treatment outcomes and costs for Florida Medicaid beneficiaries with schizophrenia. *Administration and Policy in Mental Health* 34:307–314, 2007
- Valenstein M, Blow FC, Copeland LA, et al: Poor antipsychotic adherence among patients with schizophrenia: medication and patient factors. *Schizophrenia Bulletin* 30:255–264, 2004
- Sajatovic M, Elhaj O, Youngstrom EA, et al: Treatment adherence in individuals with rapid cycling bipolar disorder: results from a clinical-trial setting. *Journal of Clinical Psychopharmacology* 27:412–414, 2007
- Ramirez RR, de la Cruz PG: The Hispanic Population in the United States, March 2002. Washington, DC, US Census Bureau, June 2003. Available at [www.census.gov/prod/2003pubs/p20-545.pdf](http://www.census.gov/prod/2003pubs/p20-545.pdf)
- Rumbaut RG: Ages, life stages, and generational cohorts: decomposing the immigrants' first and second generations in the United States. *International Migration Review* 38:1160–1205, 2004
- Abraido-Lanza AF, Armbrister AN, Florez KR, et al: Toward a theory-driven model of acculturation in public health research. *American Journal of Public Health* 96:1342–1346, 2006
- Wells KB, Golding JM, Hough RL, et al: Acculturation and the probability of use of health services by Mexican Americans. *Health Services Research* 24:237–257, 1989
- Lara M, Gamboa C, Kahramanian MI, et al: Acculturation and Latino health in the United States: a review of the literature and its sociopolitical context. *Annual Review of Public Health* 26:367–397, 2005
- Balls Organista P, Organista KC, Kurasaki K: Relationship between acculturation and ethnic minority mental health, in *Acculturation: Advances in Theory, Measurement, and Applied Research*, vol 1. Edited by Chun KM, Organista PB, Marin G. Washington, DC, American Psychological Association, 2003
- Vega WA, Kolody B, Aguilar-Gaxiola S, et al: Gaps in service utilization by Mexican Americans with mental health problems. *American Journal of Psychiatry* 156:928–934, 1999
- Grant BF, Stinson FS, Hasin DS, et al: Immigration and lifetime prevalence of DSM-IV psychiatric disorders among Mexican Americans and non-Hispanic whites in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Archives of General Psychiatry* 61:1226–1233, 2004
- Virnig B, Huang Z, Lurie N, et al: Does Medicare managed care provide equal treatment for mental illness across races? *Archives of General Psychiatry* 61:201–205, 2004
- Vitiello B, Burnam MA, Bing EG, et al: Use of psychotropic medications among HIV-infected patients in the United States. *American Journal of Psychiatry* 160:547–554, 2003
- Ruiz P, Varner RV, Small DR, et al: Ethnic differences in the neuroleptic treatment of schizophrenia. *Psychiatric Quarterly* 70: 163–172, 1999
- Wagner GJ, Maguen S, Rabkin JG: Ethnic differences in response to fluoxetine in a controlled trial with depressed HIV-positive patients. *Psychiatric Services* 49:239–240, 1998



36. Sanchez-Lacay JA, Lewis-Fernandez R, Goetz D, et al: Open trial of nefazodone among Hispanics with major depression: efficacy, tolerability, and adherence issues. *Depression and Anxiety* 13:118–124, 2001
37. Marcos LR, Cancro R: Pharmacotherapy of Hispanic depressed patients: clinical observations. *American Journal of Psychotherapy* 36:505–512, 1982
38. Vega WA, Karno M, Alegria M, et al: Research issues for improving treatment of US Hispanics with persistent mental disorders. *Psychiatric Services* 58:385–394, 2007
39. Lewis-Fernandez R, Das AK, Alfonso C, et al: Depression in US Hispanics: diagnostic and management considerations in family practice. *Journal of the American Board of Family Practice* 18:282–296, 2005
40. Jenkins JH: Subjective experience of persistent schizophrenia and depression among US Latinos and Euro-Americans. *British Journal of Psychiatry* 171:20–25, 1997
41. Hosch HM, Barrientos GA, Fierro C, et al: Predicting adherence to medications by Hispanics with schizophrenia. *Hispanic Journal of Behavioral Sciences* 17:320–333, 1995
42. Telles C, Karno M, Mintz J, et al: Immigrant families coping with schizophrenia: behavioral family intervention v case management with a low-income Spanish-speaking population. *British Journal of Psychiatry* 167:473–479, 1995
43. Karno M, Jenkins JH, de la SA, et al: Expressed emotion and schizophrenic outcome among Mexican-American families. *Journal of Nervous and Mental Disease* 175:143–151, 1987
44. Ramirez Garcia JJ, Chang CL, Young JS, et al: Family support predicts psychiatric medication usage among Mexican American individuals with schizophrenia. *Social Psychiatry and Psychiatric Epidemiology* 41:624–631, 2006
45. Hodgkin D, Volpe-Vartanian J, Alegria M: Discontinuation of antidepressant medication among Latinos in the USA. *Journal of Behavioral Health Services and Research* 34:329–342, 2007
46. Rosenheck R, Chang S, Choe Y, et al: Medication continuation and compliance: a comparison of patients treated with clozapine and haloperidol. *Journal of Clinical Psychiatry* 61:382–386, 2000
47. Bull SA, Hu XH, Hunkeler EM, et al: Discontinuation of use and switching of antidepressants: influence of patient-physician communication. *JAMA* 288:1403–1409, 2002
48. Li J, McCombs JS, Stimmel GL: Cost of treating bipolar disorder in the California Medicaid (Medi-Cal) program. *Journal of Affective Disorders* 71:131–139, 2002
49. Robinson DG, Woerner MG, Alvir JM, et al: Predictors of medication discontinuation by patients with first-episode schizophrenia and schizoaffective disorder. *Schizophrenia Research* 57:209–219, 2002
50. Barrio C, Yamada AM, Atuel H, et al: A tri-ethnic examination of symptom expression on the Positive and Negative Syndrome Scale in schizophrenia spectrum disorders. *Schizophrenia Research* 60:259–269, 2003
51. Opolka JL, Rascati KL, Brown CM, et al: Role of ethnicity in predicting antipsychotic medication adherence. *Annals of Pharmacotherapy* 37:625–630, 2003
52. Sleath B, Rubin RH, Huston SA: Hispanic ethnicity, physician-patient communication, and antidepressant adherence. *Comprehensive Psychiatry* 44:198–204, 2003
53. Sleath B, Rubin RH, Wurst K: The influence of Hispanic ethnicity on patients' expression of complaints about and problems with adherence to antidepressant therapy. *Clinical Therapeutics* 25:1739–1749, 2003
54. Farabee D, Shen H, Sanchez S: Program-level predictors of antipsychotic medication adherence among parolees. *International Journal of Offender Therapy and Comparative Criminology* 48:561–571, 2004
55. Ayalon L, Areal PA, Alvidrez J: Adherence to antidepressant medications in black and Latino elderly patients. *American Journal of Geriatric Psychiatry* 13:572–580, 2005
56. Diaz E, Woods SW, Rosenheck RA: Effects of ethnicity on psychotropic medications adherence. *Community Mental Health Journal* 41:521–537, 2005
57. Olfson M, Marcus SC, Tedeschi M, et al: Continuity of antidepressant treatment for adults with depression in the United States. *American Journal of Psychiatry* 163:101–108, 2006
58. Sajatovic M, Valenstein M, Blow FC, et al: Treatment adherence with antipsychotic medications in bipolar disorder. *Bipolar Disorders* 8:232–241, 2006
59. Valenstein M, Ganoczy D, McCarthy JF, et al: Antipsychotic adherence over time among patients receiving treatment for schizophrenia: a retrospective review. *Journal of Clinical Psychiatry* 67:1542–1550, 2006
60. Sajatovic M, Valenstein M, Blow F, et al: Treatment adherence with lithium and anticonvulsant medications among patients with bipolar disorder. *Psychiatric Services* 58:855–863, 2007
61. Velligan DI, Wang M, Diamond P, et al: Relationships among subjective and objective measures of adherence to oral antipsychotic medications. *Psychiatric Services* 58:1187–1192, 2007
62. Grymonpre RE, Didur CD, Montgomery PR, et al: Pill count, self-report, and pharmacy claims data to measure medication adherence in the elderly. *Annals of Pharmacotherapy* 32:749–754, 1998
63. Jeste ND, Moore DJ, Goldman SR, et al: Predictors of everyday functioning among older Mexican Americans vs Anglo-Americans with schizophrenia. *Journal of Clinical Psychiatry* 66:1304–1311, 2005
64. Franzini L, Fernandez-Esquer ME: Socioeconomic, cultural, and personal influences on health outcomes in low income Mexican-origin individuals in Texas. *Social Science and Medicine* 59:1629–1646, 2004
65. Folsom DP, Gilmer T, Barrio C, et al: A longitudinal study of the use of mental health services by persons with serious mental illness: do Spanish-speaking Latinos differ from English-speaking Latinos and Caucasians? *American Journal of Psychiatry* 164:1173–1180, 2007
66. Vega WA, Sribney WM, Achara-Abrahams I: Co-occurring alcohol, drug, and other psychiatric disorders among Mexican-origin people in the United States. *American Journal of Public Health* 93:1057–1064, 2003
67. Guarnaccia PJ, Parra P: Ethnicity, social status, and families' experiences of caring for a mentally ill family member. *Community Mental Health Journal* 32:243–260, 1996
68. Interian A, Martinez IE, Guarnaccia PJ, et al: A qualitative analysis of the perception of stigma among Latinos receiving antidepressants. *Psychiatric Services* 58:1591–1594, 2007
69. Velligan DI, Lam YW, Glahn DC, et al: Defining and assessing adherence to oral antipsychotics: a review of the literature. *Schizophrenia Bulletin* 32:724–742, 2006
70. NIMH Five-Year Strategic Plan for Reducing Health Disparities. Rockville, Md, National Institute of Mental Health, Nov 16, 2001. Available at <http://www.nimh.nih.gov/about/strategic-planning-reports>
71. Alegria M, Canino G, Shrout PE, et al: Prevalence of mental illness in immigrant and non-immigrant US Latino groups. *American Journal of Psychiatry* 165:359–369, 2008
72. Wells K, Miranda J, Bruce ML, et al: Bridging community intervention and mental health services research. *American Journal of Psychiatry* 161:955–963, 2004
73. Gellad WF, Haas JS, Safran DG: Race/ethnicity and nonadherence to prescription medications among seniors: results of a national study. *Journal of General Internal Medicine* 22:1572–1578, 2007
74. Miranda J, Duan N, Sherbourne C, et al: Improving care for minorities: can quality improvement interventions improve care and outcomes for depressed minorities? Results of a randomized, controlled trial. *Health Services Research* 38:613–630, 2003
75. Zygmunt A, Olfson M, Boyer CA, et al: Interventions to improve medication adherence in schizophrenia. *American Journal of Psychiatry* 159:1653–1664, 2002
76. Dolder CR, Lacro JP, Leckband S, et al: Interventions to improve antipsychotic medication adherence: review of recent literature. *Journal of Clinical Psychopharmacology* 23:389–399, 2003
77. Betancourt JR, Carrillo JE, Green AR: Hypertension in multicultural and minority populations: linking communication to compliance. *Current Hypertension Reports* 1:482–488, 1999

78. Van Servellen G, Carpio F, Lopez M, et al: Program to enhance health literacy and treatment adherence in low-income HIV-infected Latino men and women. *AIDS Patient Care and STDs* 17:581–594, 2003
79. Bonner S, Zimmerman BJ, Evans D, et al: An individualized intervention to improve asthma management among urban Latino and African-American families. *Journal of Asthma* 39:167–179, 2002
80. Kopelowicz A, Zarate R, Gonzalez SV, et al: Disease management in Latinos with schizophrenia: a family-assisted, skills training approach. *Schizophrenia Bulletin* 29:211–227, 2003
81. Patterson TL, Bucardo J, McKibbin CL, et al: Development and pilot testing of a new psychosocial intervention for older Latinos with chronic psychosis. *Schizophrenia Bulletin* 31:922–930, 2005
82. Opler LA, Ramirez PM, Dominguez LM, et al: Rethinking medication prescribing practices in an inner-city Hispanic mental health clinic. *Journal of Psychiatric Practice* 10:134–140, 2004
83. Erzinger S: Communication between Spanish-speaking patients and their doctors in medical encounters. *Culture, Medicine and Psychiatry* 15:91–110, 1991
84. Jamison KR, Gerner RH, Goodwin FK: Patient and physician attitudes toward lithium: relationship to compliance. *Archives of General Psychiatry* 36:866–869, 1979
85. Cooper LA, Gonzales JJ, Gallo JJ, et al: The acceptability of treatment for depression among African-American, Hispanic, and white primary care patients. *Medical Care* 41:479–489, 2003
86. The Uninsured: A Primer. Menlo Park, Calif, Kaiser Family Foundation, Oct 2008. Available at [www.kff.org/uninsured/7451.cfm](http://www.kff.org/uninsured/7451.cfm)
87. Cochran SD, Gitlin MJ: Attitudinal correlates of lithium compliance in bipolar affective disorders. *Journal of Nervous and Mental Disease* 176:457–464, 1988
88. Van Servellen G, Lombardi E: Supportive relationships and medication adherence in HIV-infected, low-income Latinos. *Western Journal of Nursing Research* 27:1023–1039, 2005
89. Ruiz P, Ruiz PP: Treatment compliance among Hispanics. *Journal of Operational Psychiatry* 14:112–114, 1983
90. Lorion RP: Patient and therapist variables in the treatment of low-income patients. *Psychological Bulletin* 81:344–354, 1974
91. Sajatovic M, Davies M, Bauer MS, et al: Attitudes regarding the collaborative practice model and treatment adherence among individuals with bipolar disorder. *Comprehensive Psychiatry* 46:272–277, 2005

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