Published in final edited form as:
Soc Sci Med. 2013 May ; 84: 102–109. doi:10.1016/j.socscimed.2013.02.006.

The role of provider supply and organization in reducing racial/ethnic disparities in mental health care in the U.S

Benjamin Lê Cook[a,*], **Teresa Doksum**[b], **Chih-nan Chen**[c], **Adam Carle**[d], and **Margarita Alegría**[a]

[a]Department of Psychiatry, Harvard Medical School, Center for Multicultural Mental Health Research, Somerville 02478, MA, USA

[b]Abt Associates, Cambridge, MA, USA

[c]Department of Economics, National Taipei University, Taiwan

[d]Department of Pediatrics, University of Cincinnati School of Medicine, Division of Health Policy and Clinical Effectiveness, Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA

Abstract

Racial and ethnic disparities in mental health care access in the United States are well documented. Prior studies highlight the importance of individual and community factors such as health insurance coverage, language and cultural barriers, and socioeconomic differences, though these factors fail to explain the extent of measured disparities. A critical factor in mental health care access is a local area's organization and supply of mental health care providers. However, it is unclear how geographic differences in provider organization and supply impact racial/ethnic disparities. The present study is the first analysis of a nationally representative U.S. sample to identify contextual factors (county-level provider organization and supply, as well as socioeconomic characteristics) associated with use of mental health care services and how these factors differ across racial/ethnic groups. Hierarchical logistic models were used to examine racial/ethnic differences in the association of county-level provider organization (health maintenance organization (HMO) penetration) and supply (density of specialty mental health providers and existence of a community mental health center) with any use of mental health services and specialty mental health services. Models controlled for individual- and county-level socio-demographic and mental health characteristics. Increased county-level supply of mental health care providers was significantly associated with greater use of any mental health services and any specialty care, and these positive associations were greater for Latinos and African-Americans compared to non-Latino Whites. Expanding the mental health care workforce holds promise for reducing racial/ethnic disparities in mental health care access. Policymakers should consider that increasing the management of mental health care may not only decrease expenditures, but also provide a potential lever for reducing mental health care disparities between social groups.

Keywords

Racial/ethnic disparities in mental health; care in the United States; Social and contextual factors; Availability of mental health care providers; HMO penetration

*Corresponding author. Tel.: +1 617 503 8449; fax: +1 617 503 8430. bcook@charesearch.org (B.L. Cook).

Introduction

In the United States, policy attention has been focused on racial/ethnic disparities in access to mental health services and prior studies have found these disparities to impose a significant burden on racial and ethnic minorities (IOM, 2002; U.S. Department of Health and Human Services, 2001). Recent U.S.-based studies document disparities for Latinos, African-Americans and Asian-Americans in utilization of mental health services (Alegría et al., 2002; Chow, Jaffee, & Snowden, 2003; Cook, McGuire, & Miranda, 2007; Dobalian & Rivers, 2007) as well as in quality of treatment (Alegria et al., 2008; Fortuna, Alegria, & Gao, 2010). Individual-level determinants such as insurance coverage, income and socioeconomic status have been considered as a means to explain disparities (Dobalian & Rivers, 2007; Kirby, Taliaferro, & Zuvekas, 2006; Weinick & Krauss, 2000), though disparities persist even when controlling for these factors (Kirby et al., 2006; Padgett, Patrick, Burns, & Schlesinger, 1994; Weinick, Zuvekas, & Cohen, 2000). The current study and prior literature assessing racial/ethnic disparities in the U.S. complements a broader international discussion of health care inequality, which includes an assessment of the contributing factors to the inequality of allocation of health care resources across social groups (e.g., van Doorslaer & Van Ourti, 2011; Wagstaff & Van Doorslaer, 2000) and identifying which of these factors are amenable to change by policymakers and individuals (Fleurbaey & Schokkaert, 2012).

U.S. health care delivery characteristics and the provision of mental health care services to racial/ethnic minorities

The context within which health care delivery occurs is an important determinant of access to care. The behavioral model of utilization proposed by Andersen and Aday is a frequently used framework for analyzing factors associated with patient utilization of health services. According to an adaptation of this model focused on environmental factors (Phillips, Morrison, Andersen, & Aday, 1998), contextual variables can be grouped into three major categories: 1) health care delivery system characteristics (e.g., the market share of health maintenance organizations (HMOs)); 2) “community-level enabling variables” (e.g., supply of providers in the community); and 3) external environmental factors (e.g., socioeconomic conditions in the county).

A few recent studies have examined the effects of contextual variables on access to mental health services, confirming that supply side barriers to access may support or reinforce individual-level disparities (Chow et al., 2003; McCarthy et al., 2007; Stockdale, Tang, Zhang, Belin, & Wells, 2007; Wei, Sambamoorthi, Olfson, Walkup, & Crystal, 2005). Neighborhood racial and ethnic composition likewise account for some racial and ethnic disparities in access, possibly reflecting the impact of language, cultural or attitudinal factors, and service system barriers (Kirby et al., 2006; Padgett et al., 1994). Neighborhood income composition also plays an important role in mental health service disparities (Chow et al., 2003; Gresenz, Stockdale, & Wells, 2000). Individuals living in ethnically dense areas may have poorer access to care because of economic disadvantage and fewer health care resources. Physicians treating minority patients in these areas are less likely than other physicians to be board-certified, to practice evidence-based medicine, to have access to important clinical resources, and to refer to specialty care (Bach, Pham, Schrag, Tate, & Hargraves, 2004; Blanco, Carvalho, Olfson, Finnerty, & Pincus, 1999).

HMO penetration

While many U.S. health insurance organizations have tightened management of health care since the 1980s in response to spiraling health care spending (Levit et al., 2000), large variation continues to exist in the market share of managed care organizations. Health

maintenance organizations (HMOs) are one type of managed care plan that brings together networks of medical providers and hospitals to provide care for their members. In exchange for a steady stream of patients, providers agree to abide by guidelines and restrictions and to receive set payments pre-determined by the HMO. The market share, or *penetration*, of HMOs in U.S. states is as low as 0.1% and as high as 54.1% (Kaiser Family Foundation, 2011). HMOs have the ability to control mental health care costs by increasing demand-side purchasing power through selective contracting, reimbursement incentives and prior authorization management, and consolidating mental health service providers (Miller & Luft, 1994), developing special contracts with outside vendors to manage patients with need for behavioral health care (carve outs), and other strategies to control inpatient behavioral health costs and to set limits on coverage (Frank & Garfield, 2007).

Greater HMO penetration is likely to be correlated with greater capitation of mental health expenditures and caps on number of mental health visits, and these measures have been shown to limit access to specialtymental health care providers (Goldman, McColluch, & Sturm, 1998; Weissman, Pettigrew, Sotsky, & Regier, 2000). Conversely, the negative effects of cost containment may be tempered by the emphasis on facilitating access to general medical providers (Gresenz et al., 2000), which can in turn increase recognition and referral to mental health care. In addition, managed care plans that carve out mental health carewere shown to increase access to mental health services compared to fee for service programs (Goldman et al., 1998). For example, Stockdale et al. (2007) identified positive effects of greater HMOpenetration onmental health service use among those with insurance. No prior studies have assessed the relationship between HMO penetration and disparities in mental health service use.

Provider supply

Geographic differences in the supply of mental health professionals have been well-established (Duffy, Wilk, & West, 2006; Ellis, Konrad, Thomas, & Morrissey, 2009; Goldsmith, Wagenfeld, Manderscheid, & Stiles, 1997), within both rural (Baldwin et al., 2006; Merwin, 2003) and urban areas (Ronzio, Guagliardo, & Persaud, 2006). These geographic variations in the supply of providers have in turn been linked with utilization of outpatient and inpatient mental health services and long-term continuity of care (McCarthy et al., 2007; Wei et al., 2005).

Density of psychiatrists in the county is positively associated with use and quality of specialty mental health care (Horgan, 1986; Wei et al., 2005). Similarly, greater distance needed to travel for mental health care negatively affects utilization in both rural (Fortney, Rost, & Zhang, 1999), and urban areas (Allard, Tolman, & Rosen, 2003). Other studies have shown contradictory evidence, finding that density of psychiatrists was weakly related with use of specialty mental health/alcohol/drug services (Stockdale et al., 2007) and density of psychologists or physicians was not linked with use of any health or behavioral health services (Gresenz et al., 2000).

It is unclear how geographic differences in provider supply impact racial/ethnic disparities in the United States. Disparities may be driven by racial and ethnic minorities being more likely to live in areas with poorer access to health care providers (Weinick et al., 2000) and financial and insurance barriers preventingminorities fromaccessing services that provide high quality care (Galea & Vlahov, 2005). On the other hand, Baiker et al. (2005) observe that the wide variation in racial disparities across geographic lines and absence of consistent pattern of disparities in types of services suggest regional disparities, as opposed to racial disparities, should remain the target of policymakers. We investigate two aspects of provider supply, the density of specialist mental health care providers and the existence of a

community mental health center, and investigate their relationship with racial/ethnic disparities in mental health care.

The purpose of the present study is to determine how geographic differences in health care supply characteristics may impact disparities in access to mental health care services. We build upon previous studies of the effects of contextual variables on mental health care access using the Collaborative Psychiatric Epidemiology Surveys (CPES) (Colpe, Merikangas, Cuthbert, & Bourdon, 2004). This comprehensive dataset of a diverse, nationally-representative sample provides an opportunity to simultaneously investigate individual and community-level correlates (e.g., health care delivery system characteristics, supply of providers, socioeconomic conditions) of access to mental health services when combined with contextual data from publicly available databases.

We expect that greater HMO penetration and mental health care provider supply will be positively associated with use of mental health services even after adjustment for individual- and county-level socioeconomic factors. Our main hypothesis is that HMO penetration and supply variables are especially beneficial for racial/ethnic minorities compared to Whites.

Methods

Sample

We obtained individual-level data from 12,241 respondents in the CPES. The CPES, developed under the sponsorship of the National Institute of Mental Health (NIMH), is unique in its ability to provide a large representative sample of diverse ethnic and racial minority groups in the United States (Colpe et al., 2004), uniform assessment of psychiatric diagnosis based on standardized measures, and the inclusion of relevant sociocultural factors. This includes the National Latino and Asian-American Study (NLAAS) dataset for Latinos (n = 2554; response rate = 75.5%) and Asians (n = 2095; response rate = 65.6%), the National Comorbidity Survey Replication (NCS-R) dataset for Whites (n = 4180; response rate = 70.9%), and the National Survey of American Life (NSAL) dataset for African Americans (n = 3412; response rate = 70.9%). All surveys were sampled based on the same sampling frames and sample selection procedures, and include the same diagnostic battery on mental disorders and service use assessments so that data can be combined into one nationally-representative study. Data were collected via in-person house-hold interviews or telephone, if requested, from early 2001 through the end of 2003. Respondents were at least 18 years old, non-institutionalized, and lived in civilian housing in the continental United States. Race and Latino ethnicity were ascertained using questions from the 2000 Census. The Internal Review Board Committees of Cambridge Health Alliance, the University of Washington, Harvard Medical School, and the University of Michigan approved all CPES recruitment, consent, and interviewing procedures.

County-level variables were obtained from the 2002 Area Resource File (ARF). We obtained geographic identifier codes of the CPES respondents from the University of Michigan to link individual respondents with county-level variables. Respondents resided in 249 counties, 52 metropolitan statistical areas (MSAs) and 36 states.

Measures

The two dependent variable measures of mental health service use are 1) past year use of specialty mental health services (whether a respondent reported receiving services from a psychiatrist, psychologist, counselor in a mental health setting, or social worker in a mental health setting); and, 2) past year use of *any* mental health services (whether a respondent received services for a mental health problem from a general practitioner, other medical

doctor, nurse, occupational therapist, other health professional, or a specialty mental health care provider).

County-level supply variables—Presence in a county of a community mental health center, specialty mental health provider density (psychiatrists, psychologists and social workers per 10,000), and health maintenance organization (HMO) penetration (the percentage of individuals in the county that received insurance in an HMO plan) were determined using the 2002 ARF.

County-level socioeconomic characteristics were 1) percent of the county population below poverty (2000), a measure that has been found to be more robust compared to other measures such as median household income (Krieger, Chen, Waterman, Rehkopf, & Subramanian, 2003), 2) the county unemployment rate (for 2002), and 3) the ethnic density in the county (percent of residents in the county that were Latino, Asian and African-American in 2000). Indicators of urban/rural setting were partitioned into living in a county metropolitan area with population of 1 million or more, 250,000–1 million, and less than 250,000. We also controlled for need for mental health services in the county, using Bayesian methods (Meng, Alegria, Chen, & Liu, 2004) to estimate last year prevalence of any mental disorder in each county. The Bayesian approach accounts for small sample sizes in some counties and extreme skewness in the weighted distributions of the county prevalence of mental health disorder.

Individual-level variables—We controlled for individual-level demographic characteristics previously found to be associated with the outcomes and to differ by race/ethnicity (Alegria et al., 2008): age, gender, marital status, education, type of insurance, poverty status, and employment status. Mental health status was adjusted for using past year presence of any mental disorder, evaluated via the World Health Organization (WHO) Composite International Diagnostic Interview (Kessler, 2004). Health status was adjusted for using the respondents' self-reported number of chronic conditions (lifetime presence of arthritis or rheumatism, ulcer, cancer, high blood pressure, diabetes, heart attack, stroke, asthma, tuberculosis, any other chronic lung disease, or HIV infection/AIDS). Functional impairment was measured by the World Health Organization Psychiatric Disability Assessment Schedule (WHO-DAS) (Rehm et al., 1999) as the number of days (0–30) in the past 30 when health- or mental health-related problems restricted their ability to carry out tasks. Respondents were asked a number of items related to the WHO-DAS domains of cognition, mobility, self-care, and social functioning and responses were scored and standardized to a scale from 0 (no disability) to 100 (full disability).

Analytic strategies

To better describe racial/ethnic differences in covariates in our sample, we first compared age- and gender-adjusted differences in individual-level and county-level covariates in the CPES sample. Chi-square tests and *t*-tests were used to test for significant differences by racial/ethnic group.

Our data has a multilevel structure with individuals at level 1 nested within 249 counties in level 2. Multilevel or hierarchical models (Raudenbush & Bryk, 1992) enable analysis of both county-level and individual-level correlates, while accounting for the non-independence of individuals living in the same geographic area. To construct multi-level models, we first explored the most appropriate geographic level(s) to include in our models by examining mean outcomes by level (county, metropolitan area, state) for Latinos, Asians, African Americans and Whites and by estimating null multi-level models (with no covariates). We chose to use county as our second level after finding considerable variability

by county and more variance in the outcome variables explained by the null county-level models than models that included other area levels. We also modeled at the county level for conceptual reasons – individuals living within counties were expected to have similar mental health outcomes because of the importance of county-level provider and socioeconomic characteristics (Hurlburt et al., 2004; Stockdale et al., 2007).

All individual-level and county-level variables were centered on the grand or overall group mean. Centering in this manner allows the race/ethnicity by supply variable interaction coefficients to be directly interpretable as the independent effect of the interaction on mental health care access given the average individual-level characteristics, and average racial/ethnic makeup and county-level characteristics of the U.S.

For our main analysis, we first fit a null random intercepts model without covariates to assess unadjusted variation in the outcome variable by county. In four subsequent models, we added covariates to the null random intercepts model, assessing how much of the variance between counties was explained by these additional variables and the changes in the significance of coefficients for the interactions between race/ethnicity and county-level supply variables after adjustment for individual and county-level variables. The models are: 1) a random intercepts model containing racial/ethnic group indicators, county-level supply variables, county-level urban/rural indicator, and interaction terms between race/ethnicity and supply variables – supply variables were entered one-by-one in separate models to decrease the number of interactions and prevent over-specification of the model; 2) model (*1*) plus individual-level covariates; 3) model (*1*) plus county-level covariates; and 4) model (*1*) plus individual- and county-level covariates. Comparisons across models evaluate the influence of adjustment for individual and county-level variables on the relationship between health care supply and organization variables and mental health care use and how these associations differ by race/ethnicity. We consider model (4) results to represent the best estimates of these associations because it includes all relevant individual- and county-level covariates. All models were estimated using predictive quasi-likelihood procedures with the MLwiN software package (Rasbash, Charlton, Browne, Healy, & Cameron, 2009). We verified the assumption that individual- and countylevel residuals were normally distributed using plots of the distribution of the residuals.

In order to simplify model estimation, and because we were interested in the influence of county-level supply variables, we let intercepts vary by county in each model but held fixed the effects of all individual-level covariates. This random intercepts modeling strategy accounts for variation in unmeasured county-level effects, but differs from random effects models in that it assumes that the effect, or return, of measured individual-level predictors is similar across counties. We followed recommendations from Carle (2009) to fit multilevel models accounting for the complex sample design of the CPES using MLwiN software. Because the nesting of the sampling design of the CPES was not conducted by county, we were unable to separate out level 1 (individual) and level 2 (county) weights from the sampling weights and cluster variables available in the CPES dataset (as is required to accurately assess estimates and standard errors from the multi-level models). Instead, we followed Kovacevic and Rai (2003) and Pfeffermann, Skinner, Holmes, Goldstein, & Rasbash (1998) in making pseudo-weights at each of the levels, re-constructing weights by normalizing final CPES weights to the individual and county levels using 2000 U.S. Census county population data.

Results

We first describe the sample, comparing age- and gender-adjusted rates of mental health care, and county-level and individual-level predictors of mental health care by race/

ethnicity. Racial/ethnic minorities were less likely than non-Latino Whites to have any last year mental health care and any specialist mental health care (Table 1). Whites and racial/ethnic minorities differed on nearly all socio-demographic categories (marital status, education, insurance, income, poverty status, and employment status). Racial/ethnic minorities reported lower rates of last year mental health disorder than non-Latino Whites, Asians reported less disability and African-Americans reported greater disability on multiple measures of the WHO-DAS disability scale. Regarding county characteristics, African-Americans and Asians were more likely than Whites to live in counties with a community health center, all racial/ethnic minority groups lived in counties with greater density of specialty providers, and Latinos and Asians lived in counties with greater health maintenance organization (HMO) penetration. Racial/ethnic minorities were more likely to live in urban counties, Latinos lived in counties with greater poverty and unemployment, and African-Americans lived in counties with higher rates of poverty compared to Whites.

We next identify the influence of county-level supply variables on mental health care. Comparisons between the null model and subsequent models with county- and individual-level covariates showed that county-level variables accounted for approximately 25% of the variance in the two dependent variables (any mental health care and any specialty mental health care) across the population. In subsequent models of any mental health care, we found that a large percentage of this within-county variance was diminished by the inclusion of county-level supply variables (10/25 percent in any use of mental health care and 5/25 percent in specialty mental health care). Additional individual-level covariates reduced the amount of within-county variance even further. The between-county variance was reduced to zero when models additionally included county-level sociodemographic variables.

We tested our main hypothesis by assessing the significance of interactions between race/ethnicity and county-level supply variables and their association with any mental health care and any specialty mental health care using stepped models that sequentially added individual- and county-level covariates. The interpretation of a significant positive race by supply interaction coefficient is that the benefits of increased mental health provider supply (community mental health center and provider density) and HMO penetration is especially beneficial for racial/ethnic minority mental health care use compared to whites. We found significant positive interactions between the African-American race indicator and all supply variables in Model 1 (Table 2). These significant positive interactions remained significant with the addition of individual-level variables (Model 2), except for having a community mental health center in the county, which was only significant at the $p < .10$ level. Model 3 with county covariates found the African-American by supply variable interaction was significant for all combinations of supply and dependent variables with the exception of HMO penetration for any specialty mental health treatment ($p < .10$). Adding county- and individual-level variables in Model 4 caused the interactions to become insignificant for all analyses except density of specialist mental health care providers and HMO penetration for any mental health care use. There were significant positive interactions between Latino ethnicity and the existence of a community mental health center for any mental health care and any specialist mental health care in Model 3.

In Table 3, we present more detail on the individual-level and county-level variable coefficients (Model 4) for the dependent variable any mental health care service use in order to identify additional significant individual- and county-level correlates of mental health care access. For each supply variable tested, we identified significant Latino and African-American disparities in mental health care use, even after adjustment for individual- and county-level characteristics and accounting for the hierarchical nature of the data. In general, respondents ages 35–64, with insurance (compared to uninsured), higher number of comorbidities, past 12 month mental health disorder, and increased impairment (as measured

by the days out of role or lack of cognition) were positively associated with past year use of any mental health service, while increased mobility and ability to care for self scales were negatively associated with any mental health service use. County-level characteristics were not significant when both individual- and county-level characteristics were entered into the model with the exception that individuals living in an urban county with less than 1 million people were less likely to access mental health care services than those in larger urban areas. Two county-level sociodemographic characteristics (percentage with a college education and county rates of mental health disorder) were positively associated with rates of any use of specialty mental health care and percentage of African-Americans living in the county was negatively associated with any specialty mental health care use.

Discussion

This is the first analysis of a nationally representative U.S. sample that identifies contextual health care supply factors associated with use of mental health care services and how these factors differ across racial/ethnic groups. We identified significant racial/ethnic disparities in use of any and specialty mental health care even after accounting for geographic variation, providing contrary evidence to other studies of quality of medical care that suggest that racial/ethnic disparities may be “explained away” by regional variation (Baicker, Chandra, & Skinner, 2005; Onega, Duell, Shi, Demidenko, & Goodman, 2010). This study supports calls to better elucidate the intersection of place and health care disparities (White, Haas, & Williams, 2012; Zaslavsky & Ayanian, 2005). We also build upon recent studies that find increased racial/ethnic residential segregation associated with shortages of psychiatrists for Latinos (Dinwiddie, Gaskin, Chan, Norrington, & McCleary, 2013) and shortages of medical specialists for African-Americans (Gaskin, Dinwiddie, Chan, & McCleary, 2012). These authors recommend targeted policies that increase specialists in dense ethnic minority areas. We provide evidence that these policies would indeed likely increase access to mental health care, and would be especially beneficial for African-American communities. The generalizability of these findings to other national health care systems may be limited given different payment structures and provider organizations outside of the U.S. and a tradition of greater policy concern for socioeconomic inequality in European countries (Fleurbaey & Schokkaert, 2012). We encourage the continued use of multi-level methods to investigate the role of health care supply variables on inequality in these other settings.

As hypothesized, health care delivery system characteristics, and community-level enabling factors were significantly associated with access to mental health services and these associations differed by race/ethnicity and type of services used, even after adjustment for individual-level and county-level socio-demographic and mental health status characteristics.

First, related to the health care delivery system, we identified that counties with greater HMO penetration facilitated access to mental health care and were especially beneficial for African-Americans. Our findings mirror previous national studies finding increased HMO penetration alleviates disparities in access to general medical care (Balsa, Cao, & McGuire, 2007; Cook, 2007). We were limited in our ability to understand how HMOs in different counties manage behavioral health services. We also were unable to identify whether differences by ethnicity were due to ethnic differences in type of insurance, which has been found to interact with HMO penetration and use of mental health services (Stockdale et al., 2007). However, the results provide preliminary evidence that increased HMO penetration reduces African-American-White mental health care access disparities. This may be due in part to the positive effect of increased HMO penetration on reducing African-American-White disparities in having a usual source of care (Cook, 2007). Our study adds to the mixed prior literature assessing the impact of the maturation of the managed care industry and the

use of behavioral health carve outs on access and quality of mental health care (Frank & Garfield, 2007). Policymakers adapting the management of mental health care to stem the continued increase in mental health care expenditures should consider that increasing area-level HMO penetration might also help to overturn the persistence of mental health care access disparities.

Second, community-level enabling factors were found to be of importance to accessing mental health care and were more advantageous for minority populations in some cases. Past year use of any mental health services was higher in counties with a community mental health center and this positive association was greater for African-Americans and Latinos compared to Whites. This finding could be due to the effectiveness of community mental health centers in reaching diverse communities and providing culturally sensitive care or that the presence of a community mental health center is an indicator of availability of a community's safety net providers and institutions for underserved populations. One potential concern is that while these service locations may facilitate access for minorities, the continuity and intensity of care at these locations has been shown to be worse than in the private sector (Swartz et al., 1998).

The density of specialty mental health providers within a county is another community-level enabling factor associated with greater mental health care and was especially beneficial for improving access for African-Americans. This finding may relate to African Americans' marked preferences for counseling and therapy treatments that require specialty providers (Olfson & Marcus, 2009). Given the centrality of provider resources in mental health treatment and because distances to a provider as short as 4 or 5 miles have been shown to adversely effect initiation of mental health treatment (Lindrooth, Lo Sasso, & Lurie, 2006), distribution of providers needs to be equitable across counties. To ensure access to quality mental health care from specialists, health care delivery systems need to ensure a sufficient workforce of mental health care specialists and diverse providers. Given the differences in costs of care and intensity of care depending on whether the provider is a generalist or mental health specialist (Ettner, Hermann, & Tang, 1999), more research is needed to determine differences in the quality of care received by diverse populations in various geographic locations with differing density of providers.

No significant findings were identified to help explain Asian-White disparities in mental health care access, though significantly lower rates of private insurance, greater rates of uninsurance and families living in poverty were likely contributors to these disparities. Lin et al. (unpublished manuscript) identified that Asians report psychiatric symptoms at a threshold of higher severity than other racial/ethnic groups, suggesting that differences in access to care may be due to differences between Asians and Whites in problem recognition. Other previously identified barriers to mental health care for Asians include stigma and cultural differences that do not highly value the individual orientation of psychotherapy (Leong & Lau, 2001).

Our analysis has several limitations thatmay temper the findings. The main limitation is that we cannot make determinations about causality with a cross-sectional survey. Another limitation is in the use of geographic areas such as counties with artificial boundaries that may not approximate a health service system (Baicker et al., 2005). As an example, residents may cross county lines to obtain mental health services. Also, there may be unmeasured county characteristics such as the industrial makeup of a county that are more directly relevant to mental health care access. While we will pick up on some of these effects using the random effects models, future studies should consider expanding the investigation of arealevel socioeconomic variables. Finally, multilevel analyses that consider provider-level characteristics such as gender, training, or race/ethnicity in addition to

individual and community-level characteristics may be more informative (Phillips et al., 1998). Despite these limitations, we provide evidence using county-level and individual-level data from a U.S. sample that increasing HMO penetration and the supply of mental health specialists in a county, and opening and supporting community mental health centers, have potential to reduce mental health care access disparities.

Acknowledgments

The CPES data used in this analysis was provided by the Center for Multicultural Mental Health Research at the Cambridge Health Alliance. The project was supported by the United States National Institutes of Health NIMH Grants R01 MH091042 and U01 MH62209, and NIMHD Grant P60 MD002261. The authors would like to thank Geoffrey Ferris Wayne for assistance with the preparation of this manuscript.

References

Alegría M, Canino G, Rios R, Vera M, Calderon J, Rusch D, et al. Inequalities in use of specialty mental health services among Latinos, African Americans, and Non-Latino Whites. Psychiatric Services. 2002; 53:1547–1555. [PubMed: 12461214]

Alegria M, Chatterji P, Wells K, Cao Z, Chen C, Takeuchi D, et al. Disparity in depression treatment among racial and ethnic minority populations in the United States. Psychiatric Services. 2008; 59(11):1264–1272. [PubMed: 18971402]

Allard S, Tolman R, Rosen D. Proximity to service providers and service utilization among welfare recipients: the interaction of place and race. Journal of Policy Analysis and Management. 2003; 22(4):599–613. [PubMed: 14577416]

Bach P, Pham H, Schrag D, Tate R, Hargraves JL. Primary care physicians who treat blacks and whites. New England Journal of Medicine. 2004; 351(6):575–584. [PubMed: 15295050]

Baicker K, Chandra A, Skinner J. Geographic variation in health care and the problem of measuring racial disparities. Perspectives in Biology and Medicine. 2005; 48(1 Suppl):S42–S53. [PubMed: 15842086]

Baldwin L-M, Patanian M, Larson E, Lishnew D, Mauksch L, Katon W, et al. Modeling the mental health workforce in Washington state: using state licensing data to examine provider supply in rural and urban areas. The Journal of Rural Health. 2006; 22(1):50–58. [PubMed: 16441336]

Balsa A, Cao Z, McGuire T. Does managed health care reduce unfair differences in health care use between minorities and Whites? Journal of Health Economics. 2007; 26(1):101–121. [PubMed: 16893581]

Blanco C, Carvalho C, Olfson M, Finnerty M, Pincus HA. Practice patterns of international and US medical graduate psychiatrists. American Journal of Psychiatry. 1999; 156(3):445–450. [PubMed: 10080562]

Carle AC. Fitting multilevel models in complex survey data with design weights: recommendations. BMC Medical Research Methodology. 2009; 9(1):49. [PubMed: 19602263]

Chow J, Jaffee K, Snowden L. Racial/ethnic disparities in the use of mental health services in poverty areas. American Journal of Public Health. 2003; 93:792–797. [PubMed: 12721146]

Colpe L, Merikangas K, Cuthbert B, Bourdon K. Guest editorial. International Journal of Methods in Psychiatric Research. 2004; 13(4):193–194.

Cook B. Effect of medicaid managed care on racial disparities in health care access. Health Services Research. 2007; 42(1):124–145. [PubMed: 17355585]

Cook B, McGuire T, Miranda J. Measuring trends in mental health care disparities, 2000–2004. Psychiatric Services. 2007; 58(12):1533–1539. [PubMed: 18048553]

Dinwiddie GY, Gaskin DJ, Chan KS, Norrington J, McCleary R. Residential segregation, geographic proximity and type of services used: evidence for racial/ethnic disparities in mental health. Social Science & Medicine. 2013; 80:67–75. [PubMed: 23312305]

Dobalian A, Rivers P. Racial and ethnic disparities in the use of mental health services. The Journal of Behavioral Health Services and Research. 2007; 35(2):128–141.

van Doorslaer, E.; Van Ourti, T. Measuring inequality and inequity in health and health care. In: Glied, S.; Smith, P., editors. Oxford handbook of health economics. Vol. 1. Oxford: Oxford University; 2011. p. 837-869.

Duffy, FF.; Wilk, J.; West, JC. Mental health practitioners and trainees. In: Manderscheid, RW.; BJT, editors. Mental health, United States, 2004. Vol. 06-4195. Rockville, MD: Substance Abuse and Mental Health Services Administration, Center for Mental Health Services; 2006.

Ellis AR, Konrad TR, Thomas KC, Morrissey JP. County-level estimates of mental health professional supply in the United States. Psychiatric Services. 2009; 60(10):1315–1322. [PubMed: 19797370]

Ettner S, Hermann R, Tang H. Differences between generalists and mental health specialists in the psychiatric treatment of medicare beneficiaries. Health Services Research. 1999; 34(3):737–760. [PubMed: 10445900]

Fleurbaey, M.; Schokkaert, E. Handbook of health economics. Vol. 2. Amsterdam: North Holland; 2012. Equity in health and health care.

Fortney J, Rost K, Zhang M. The impact of geographic accessibility on the intensity and quality of depression treatment. Medical Care. 1999; 37:884–893. [PubMed: 10493467]

Fortuna LR, Alegria M, Gao S. Retention in depression treatment among ethnic and racial minority groups in the United States. Depression and Anxiety. 2010; 27(5):485–494. [PubMed: 20336808]

Frank RG, Garfield RL. Managed behavioral health care carve-outs: past performance and future prospects. Annual Review of Public Health. 2007; 28:303–320.

Galea S, Vlahov D. Urban health: evidence, challenges, and directions. Annual Review of Public Health. 2005; 26(1):341–365.

Gaskin DJ, Dinwiddie GY, Chan K, McCleary R. Residential segregation and disparities in health care services utilization. Medical Care Research and Review. 2012; 69(2):158–175. [PubMed: 21976416]

Goldman W, McColluch J, Sturm R. Cost and use of mental health services before and after managed care. Health Affairs. 1998; 17(2):40–52. [PubMed: 9558784]

Goldsmith H, Wagenfeld M, Manderscheid R, Stiles D. Specialty mental health services in metropolitan and nonmetropolitan areas: 1983–1990. Administration and Policy in Mental Health. 1997; 24(6):475–488. [PubMed: 9385712]

Gresenz C, Stockdale S, Wells K. Community effects on access to behavioral health care. Health Services Research. 2000; 35(1 Pt. 2):293–306. [PubMed: 10778816]

Horgan C. The demand for ambulatory mental health services from specialty providers. Health Services Research. 1986; 21(2):291–319. [PubMed: 3721874]

Hurlburt MS, Leslie LK, Landsverk J, Barth RP, Burns BJ, Gibbons RD, et al. Contextual predictors of mental health service use among children open to child welfare. Archives of General Psychiatry. 2004; 61(12):1217. [PubMed: 15583113]

IOM. Unequal treatment: Confronting racial and ethnic disparities in health care. Washington, DC: National Academies Press; 2002.

Kaiser Family Foundation. State HMO penetration rate, July 2010. 2011. Retrieved 14.03.12 from. http://www.statehealthfacts.org/comparemaptable.jsp?cat=7&ind=349

Kessler R, Ustun T. The World mental health (WMH) survey initiative version of the World health organization (WHO) Composite international diagnostic interview (CIDI). The International Journal of Methods in Psychiatric Research. 2004; 13(2):93.

Kirby JB, Taliaferro G, Zuvekas SH. Explaining racial and ethnic disparities in health care. Med Care. 2006; 44(5 Suppl):I64–I72. [PubMed: 16625066]

Kovacevic MS, Rai SN. A pseudo maximum likelihood approach to multilevel modelling of survey data. Communications in Statistics-Theory and Methods. 2003; 32(1):103–121.

Krieger N, Chen J, Waterman D, Rehkopf D, Subramanian S. Race/ethnicity, gender and monitoring socioeconomic gradients in health: a comparison of area-based socioeconomic measures–The Public Health Disparities Geocoding Project. American Journal of Public Health. 2003; 93(10): 1655–1671. [PubMed: 14534218]

Leong F, Lau A. Barriers to providing effective mental health services to Asian Americans. Mental Health Services Research. 2001; 3(4):201–214. [PubMed: 11859966]

Levit K, Cowan C, Lazenby H, Sensenig A, McDonnell P, Stiller J, et al. Health spending in 1998: signals of change. Health Affairs. 2000; 19(1):124–132. [PubMed: 10645078]

Lindrooth R, Lo Sasso A, Lurie I. The effect of distance to provider on employee response to changes in mental health benefits. Health Economics. 2006; 15:1133–1141. [PubMed: 16565942]

McCarthy J, Blow F, Valenstein M, Fischer E, Owen R, Barry K, et al. Veterans affairs health system and mental health treatment retention among patients with serious mental illness: evaluating accessibility and availability barriers. Health Services Research. 2007; 42(3):1042–1060. [PubMed: 17489903]

Meng, XL.; Alegria, M.; Chen, C.; Liu, J. A nonlinear hierarchical model for estimating prevalence rates with small samples. Paper presented at the ASA Proceedings of the Joint statistical Meetings; 2004.

Merwin E. Shortages of rural mental health professionals. Archives of Psychiatric Nursing. 2003; 17(1):42–51. [PubMed: 12642887]

Miller RH, Luft HS. Managed care plans: characteristics, growth, and premium performance. Annual Review of Public Health. 1994; 15(1):437–459.

Olfson M, Marcus SC. National patterns in antidepressant medication treatment. Archives of General Psychiatry. 2009; 66(8):848. [PubMed: 19652124]

Onega T, Duell EJ, Shi X, Demidenko E, Goodman DC. Race versus place of service in mortality among medicare beneficiaries with cancer. Cancer. 2010; 116(11):2698–2706. [PubMed: 20309847]

Padgett D, Patrick C, Burns B, Schlesinger H. Ethnicity and the use of outpatient mental health services in a national insured population. American Journal of Public Health. 1994; 84(2):222–226. [PubMed: 8296944]

Pfeffermann D, Skinner CJ, Holmes DJ, Goldstein H, Rasbash J. Weighting for unequal selection probabilities. Journal of the Royal Statistical Society Series B (Statistical Methodology). 1998; 60(1):23–40.

Phillips K, Morrison K, Andersen R, Aday L. Understanding the context of healthcare utilization: assessing environmental and provider-related variables in the behavioral model of utilization. Health Services Research. 1998; 33(3):571–596. [PubMed: 9685123]

Rasbash, J.; Charlton, C.; Browne, WJ.; Healy, M.; Cameron, B. MLwiN Version 2.1. Centre for Multilevel Modelling, University of Bristol; 2009.

Raudenbush, SW.; Bryk, AS. Hierarchical linear models: Applications and data analysis methods. 2. London: Sage Publications; 1992.

Rehm J, Ustun T, Saxena S, Nelson C, Chatterji S, Ivis F, et al. On the development and psychometric testing of the WHO screening instrument to assess disablement in the general population. International Journal of Methods in Psychiatric Research. 1999; 8:110–123.

Ronzio C, Guagliardo M, Persaud N. Disparity in location of urban mental service providers. American Journal of Orthopsychiatry. 2006; 76(1):37–43. [PubMed: 16569125]

Stockdale S, Tang L, Zhang L, Belin T, Wells K. The effects of health sector market factors and vulnerable group membership on access to alcohol, drug, and mental health care. Health Services Research. 2007; 42(3):1020–1041. [PubMed: 17489902]

Swartz MS, Wagner HR, Swanson JW, Burns BJ, George LK, Padgett DK. Administrative update: utilization of services I. Comparing use of public and private mental health services: the enduring barriers of race and age. Community Mental Health Journal. 1998; 34(2):133–144. [PubMed: 9620158]

U.S. Department of Health and Human Services. A supplement to mental health: A report of the surgeon general. Rockville, Maryland: USDHHS, SAMSHA, CMHS; 2001. Mental health: culture, race and ethnicity.

Wagstaff A, Van Doorslaer E. Income inequality and health: what does the literature tell us? Annual Review of Public Health. 2000; 21(1):543–567.

Weinick RM, Krauss NA. Racial/ethnic differences in children's access to care. American Journal of Public Health. 2000; 90(11):1771–1774. [PubMed: 11076248]

Weinick R, Zuvekas S, Cohen J. Racial and ethnic differences in access to and use of health care services, 1977 to 1996. Medical Care Research and Review. 2000; 57(Suppl 1):36–54. [PubMed: 11092157]

Wei W, Sambamoorthi U, Olfson M, Walkup JT, Crystal S. Use of psychotherapy for depression in older adults. American Journal of Psychiatry. 2005; 162(4):711–717. [PubMed: 15800143]

Weissman E, Pettigrew K, Sotsky S, Regier DA. The cost of access to mental health services in managed care. Psychiatric Services. 2000; 51(5):664. [PubMed: 10783188]

White K, Haas JS, Williams D. Elucidating the role of place in health care disparities: the example of racial/ethnic residential segregation. Health Services Research. 2012; 47(3pt2):1278–1299. [PubMed: 22515933]

Zaslavsky AM, Ayanian JZ. Integrating research on racial and ethnic disparities in health care over place and time. Medical Care. 2005; 43(4):303–307. [PubMed: 15778633]

Table 1

Descriptive statistics of individual-level variables, by race/ethnicity (weighted age- and gender-adjusted).

	White	Latinos	Asians	African Amer.
Sample size	**4180**	**2554**	**2095**	**3412**
Dependent Variables				
Any Last Year MH Tx	14.6%	9.6%***	6.1%***	7.7%***
Any Last Year Specialist MH Tx	8.6%	5.5%**	2.9%***	5.3%***
Individual-Level Covariates				
Socio-demographic				
Married	59.2%	64.5%**	70.8%***	41.9%***
College Graduate	26.4%	10.4%***	40.8%***	14.3%***
Family Income < FPL	9.2%	27.7%***	18.2%***	23.2%***
Unemployed	4.6%	6.0%	5.8%	9.4%***
Insurance Status				
Uninsured	10.3%	30.3%***	12.3%	17.1%***
Private Insurance	65.8%	39.0%***	62.1%	54.6%***
Public	24.0%	30.7%***	25.6%	28.3%**
Health Status				
Past 12 month MH Disorder	20.9%	16.1%***	9.4%***	15.3%***
Any Chronic Physical Condition	53.1%	46.0%***	43.8%***	55.6%
WHO-DAS Disability Items				
Days Out of Role	0.3	0.3	0.1*	0.7***
Cognitive Function	1.0	0.8	0.6	1.4**
Mobility Score	4.8	3.9	1.4***	4.8
Care Score	1.0	1.1	0.4**	1.0
Social Function	0.6	0.5	0.4	0.9*
Out of Role Score	10.1	9.4	6.1***	18.7***
County-level Covariates				
County-Level Supply Variables				
County with Community MH Center	40.9%	55.0%	61.7%*	56.7%*
Density of Specialty MH Providers Per 10k	19.9	29.5***	30.6***	28.6***
HMO Peneration %	25.1%	34.4%*	44.6%***	25.4%
County-Level Socio-Demographic Characteristics				
Urban County with >1 million persons	39.1%	63.3%***	79.5%***	65.8%***
Percent Persons 25 + w/4 + Yrs College	24.4%	23.8%	28.9%*	23.8%
Percent Persons with Family Income < FPL	10.8%	15.8%***	11.2%	13.7%***
Unemployment Rate, 16+	5.5%	7.9%***	6.3%	6.2%

	White	Latinos	Asians	African Amer.
Sample size	**4180**	**2554**	**2095**	**3412**
Percent Hispanic/Latino Pop	8.7%	35.2%***	22.8%***	10.6%
Percent Asian Population	2.7%	5.3%***	15.1%***	3.4%*
Percent Black/African Am Pop	9.7%	11.6%	10.5%	28.7%***

* $p < .05$

** $p < .01$

*** $p < .001$.

Data Source: 2002–3 Collaborative Psychiatric Epidemiological Survey (CPES).

Table 2

Random intercepts multi-level logistic regression models of mental health care reporting coefficients of interactions between community-level supply variables and race/ethnicity.

	Null model	Model 1	Model 2	Model 3	Model 4
Past 12 month Any Formal Mental Health Treatment					
Community Mental Health Center in County					
Interaction with Latino Ethnicity		0.83 +	0.67	0.99 *	0.65
Interaction with Asian Race		0.69	0.55	0.70	0.56
Interaction with Black Race		1.24 **	0.90 +	1.20 **	0.84 +
Between County Variance	0.24	0.15	0.08	0.00	0.00
Density of Specialty MH Providers Per 10k					
Interaction with Latino Ethnicity		0.02 +	0.02	0.01	0.01
Interaction with Asian Race		0.01	−0.01	0.00	−0.01
Interaction with Black Race		0.04 **	0.03 *	0.03 **	0.03 *
Between County Variance	0.24	0.15	0.08	0.01	0.00
HMO Penetration %					
Interaction with Latino Ethnicity		0.84	0.64	0.20	−0.14
Interaction with Asian Race		−1.35	−2.92	−2.36	−3.48
Interaction with Black Race		3.76 **	3.27 *	2.79 *	2.76 *
Between County Variance	0.24	0.15	0.07	0.00	0.00
Past 12 Month Specialist Treatment					
Community Mental Health Center in County					
Interaction with Latino Ethnicity		0.76	0.56	1.03 *	0.63
Interaction with Asian Race		−0.04	−0.33	0.19	0.03
Interaction with Black Race		1.82 ***	1.32 *	1.50 **	1.03 +
Between County Variance	0.25	0.20	0.05	0.00	0.00
Density of Specialty MH Providers Per 10k					
Interaction with Latino Ethnicity		0.01	0.01	0.01	0.00
Interaction with Asian Race		−0.01	−0.02	−0.01	−0.02
Interaction with Black Race		0.04 ***	0.03 *	0.03 *	0.02

	Null model	Model 1	Model 2	Model 3	Model 4
Between County Variance	0.25	0.20	0.04	0.00	0.00
HMO Penetration %					
Interaction with Latino Ethnicity		0.22	−0.26	−0.26	−0.86
Interaction with Asian Race		0.35	−0.49	−0.94	−1.38
Interaction with Black Race		4.42**	3.70*	2.60+	2.02
Between County Variance	0.25	0.19	0.04	0.00	0.00

+ $p < .1$,

* $p < .05$

** $p < .01$

*** $p < .001$.

Model 1 includes indicator of urban/rural county, and race/ethnicity and community-level supply variable main effects.
Model 2 includes covariates from Model 1 plus individual-level covariates.
Model 3 includes covariates from Model 1 plus county-level covariates.
Model 4 includes covariates from Model 1 plus county- and individual-level covariates.
Race/ethnicity indicator variables, individual-level covariates and county-level covariates are centered around the grand mean.
Coefficient estimates and standard errors were calculated using MLWin software with level 1 and level 2 weights created and scaled to make sample nationally representative according to Kovacevic and Rai (2003). Data Source: 2002–3 Collaborative Psychiatric Epidemiological Survey (CPES).

Table 3

Random intercepts multi-level logistic regression models of past 12 Month any mental health treatment including different county-level supply variables.

	Coeff.	SE	Coeff.	SE	Coeff.	SE
Race/Ethnicity						
Latinos	−0.78	0.27**	−0.86	0.27**	−0.96	0.26***
Asians	−0.95	0.61	−0.84	0.60	−0.48	0.65
Blacks	−1.49	0.27***	−1.35	0.27***	−1.08	0.34**
County-Level Supply Variables						
Community Mental Health Center in County	0.32	0.25				
interaction with Latino Ethnicity	0.65	0.48				
interaction with Asian Race	0.56	1.05				
interaction with Black Race	0.84	0.47+				
Density of MH Specialists per 10K			0.01	0.01		
interaction with Latino Ethnicity			0.01	0.01		
interaction with Asian Race			−0.01	0.04		
interaction with Black Race			0.03	0.01*		
HMO Penetration %					0.68	0.84
interaction with Latino Ethnicity					−0.14	1.12
interaction with Asian Race					−3.48	3.54
interaction with Black Race					2.76	1.31*
Individual-Level Covariates						
Socio-demographic						
Age	−0.02	0.00***	−0.02	0.00***	−0.02	0.00***
Female	0.32	0.07***	0.32	0.07***	0.32	0.07***
Marital Status (Married referent)						
Wid/sep/div/Never marrid	0.35	0.07***	0.35	0.07***	0.36	0.07***
College Graduate	0.18	0.08*	0.18	0.08*	0.18	0.08*
Family Income < FPL	0.44	0.09***	0.44	0.09***	0.44	0.09***
Unemployment	−0.48	0.17**	−0.49	0.17**	−0.50	0.17**
Insurance Status (Uninsured referent)						

	Coeff.	SE	Coeff.	SE	Coeff.	SE
Non Insurance	−0.26	0.10**	−0.26	0.10*	−0.25	0.10*
Public	0.75	0.09***	0.75	0.09***	0.76	0.09***
Health Status						
Past 12 month MH Disorder	1.70	0.07***	1.70	0.07***	1.70	0.07***
Number of Chronic Conditions (0 referent) Any	0.49	0.07***	0.49	0.07***	0.49	0.07***
WHO-DAS Disability Items						
Days Out of Role	0.05	0.02**	0.04	0.02**	0.05	0.02**
Cognitive Function	0.04	0.01***	0.04	0.01***	0.04	0.01***
Mobility Score	0.00	0.00	0.00	0.00	0.00	0.00
Care Score	−0.03	0.01***	−0.03	0.01***	−0.03	0.01***
Social Function	0.00	0.01	0.00	0.01	0.00	0.01
Out of Role Score	0.004	0.002*	0.00	0.00*	0.00	0.00*
County-level Covariates						
County Sociodemographics						
Urbanicity/Size of County (1 million+ (ref))<1 million	−0.53	0.23*	−0.50	0.24*	−0.43	0.24+
Percent Persons 25 + w/4 + Yrs College	0.00	0.01	0.00	0.01	0.00	0.01
Percent Persons with Family Income < FPL	0.03	0.02	0.04	0.02+	0.04	0.02+
Unemployment Rate, 16+	0.06	0.04	0.04	0.04	0.04	0.04
Percent Hispanic/Latino Pop	−0.01	0.01	−0.01	0.01	−0.01	0.01
Percent Asian Population	0.02	0.02	0.02	0.02	0.01	0.02
Percent Black/African Am Pop	−0.01	0.01	−0.01	0.01	−0.01	0.01
Bayesian Mental Health Disorder Rate	0.03	0.03	0.03	0.02	0.03	0.02
Constant	−2.70	0.13***	−2.66	0.13***	−2.53	0.15***

+ $p < .1$,

* $p < .05$

** $p < .01$

*** $p < .001$.

Coefficient estimates and standard errors were calculated using MLWin software with level 1 and level 2 weights created and scaled to make sample nationally representative according to Kovacevic and Rai (2003). Data Source: 2002–3 Collaborative Psychiatric Epidemiological Survey (CPES).