Community Demographics and Access to Health Care among U.S. Hispanics

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Objective. To explore the influence of the communities in which Hispanics live on their access to health care.

Data. 1996–2002 Medical Expenditure Panel Survey data, linked to secondary data sources and including 14,504 observations from 8,371 Mexican American respondents living in metropolitan areas.

Study Design. We use multivariate probit regression models, stratified by individuals' insurance status, for analyses of four dependent variables measuring access to health care. We measure community characteristics at the zip code tabulation area level, and key independent variables of interest are the percentage of the population that speaks Spanish and percentage of the population that is immigrant Hispanic. Each of these measures is interacted with individual-level measures of nativity and length of U.S. residency.

Principal Findings. For Mexican American immigrants, living in an area populated by relatively more Spanish speakers or more Hispanic immigrants is associated with better access to care. The associations are generally stronger for more recent immigrants compared with those who are better established. Among U.S.-born Mexican Americans who are uninsured, living in areas more heavily populated with Spanish-speaking immigrants is negatively associated with access to care.

Conclusions. The results suggest that characteristics of the local population, including language and nativity, play an important role in access to health care among U.S. Hispanics, and point to the need for further study, including analyses of other racial and ethnic groups, using different geographic constructs for describing the local population, and, to the extent possible, more specific exploration of the mechanisms through which these characteristics may influence access to care.

Key Words. Access, insurance, immigrant, Hispanic, community

Across a range of measures of access to care, disparities between U.S. Hispanics and other racial/ethnic groups are substantial: Hispanics are less likely to have insurance coverage and a usual source of care compared with whites, have fewer ambulatory visits to physicians than whites, and are less likely than whites to receive screening for colon cancer, high cholesterol, and high blood

pressure (Stewart and Silverstein 2002; Sambamoorthi and McAlpine 2003; Lees, Wortley, and Coughlin 2005; Escarce 2007). Further, Hispanic women are less likely than white women to receive mammograms and Pap smears (Sambamoorthi and McAlpine 2003; Lees, Wortley, and Coughlin 2005; Ponce et al. 2006).

Hispanics face numerous financial and nonfinancial barriers to obtaining appropriate and timely health care, with acculturation and language among them. But disparities remain even after controlling for individual characteristics (Derose and Baker 2000; Zuvekas and Taliaferro 2003; Weinick et al. 2004; Kirby, Taliaferro, and Zuvekas 2006; Escarce 2007). Socio-demographic characteristics of neighborhoods may play a potentially important role in explaining racial and ethnic disparities in use of health care. Kirby, Taliaferro, and Zuvekas (2006) find that a substantial portion of disparities in use between whites and Hispanics is accounted for by neighborhood racial and ethnic composition, after controlling for individual characteristics as well as neighborhood socioeconomic status and health care supply. Further, for some measures of access, the racial and ethnic composition of neighborhoods account for as much of disparities as insurance status. In another study, Haas et al. (2004) show that the racial/ethnic composition of a neighborhood explains differences in access to care *within* racial/ethnic groups. The study reports that blacks and Latinos living in areas with a greater prevalence of blacks and Latinos, respectively, were less likely to experience difficulty or a delay in receiving needed care or not receiving care compared with blacks and Latinos living in areas with fewer individuals of the same race/ethnicity.

In both studies, the authors' goals are descriptive and the mechanisms through which the neighborhood race/ethnicity variables account for disparities are not specifically identified. However, the studies suggest that the effects of the local racial and ethnic composition of neighborhoods may reflect local area resources that affect individuals' ability to obtain care, including the supply of minority physicians and presence of local organizations that often develop in high-minority areas to mitigate against discrimination. In addition,

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the authors posit that cultural attributes such as values regarding health care, which Haas and colleagues label “social norms” regarding health care, may be at work. Finally, Kirby, Taliaferro, and Zuvekas (2006) note that the effects of neighborhood racial/ethnic composition could also reflect unmeasured individual characteristics.

This research explores the effects of community demographic characteristics on access to care among Hispanics and builds on the empirical and conceptual foundation developed in previous studies. We extend earlier empirical analyses by considering how the primary language and nativity of the local population is related to access. Recognizing the potential for differences in effects across subgroups of Hispanics (Kirby, Taliaferro, and Zuvekas 2006), we limit our analyses to Mexican Americans, the largest group of U.S. Hispanics. We develop a detailed conceptual foundation to allow for a more thorough understanding of the underlying causal pathways through which the composition of the local population—including its language and nativity—may be related to access to care.

CONCEPTUAL BACKGROUND

The analyses are based on the behavioral model of health care access and utilization developed by Andersen (1968) and Andersen and Newman (1973) and later extended to include contextual determinants such as characteristics of the social, economic, structural, and public policy environments, which may be especially important for low-income populations (Andersen 1995; Davidson et al. 2004).

Following the general structure of the behavioral model, our conceptual framework considers the effects of individual-level need, predisposing factors, enabling factors, and contextual characteristics on access/use/quality of care. Need factors refer to variables that capture medical need for care, that is, health status. Predisposing factors refer to variables that influence individuals’ preferences for health care or inclination to seek care, including sociodemographic characteristics such as age, gender, education, marital status, family size, nativity, and acculturation. Enabling factors refer to variables that facilitate or hinder individuals’ ability to obtain care, including family income, health insurance coverage, and language. Of course, some variables may fit into multiple categories.

Relevant contextual factors include the structure and capacity of the health care safety net, the availability of health care providers, the percentage

of the population that is uninsured, and the demographic characteristics of the local population. Investments in the health care safety net have helped to mitigate the problems of health care access among the uninsured generally (e.g., Cunningham and Hadley 2004; Hadley, Cunningham, and Hargraves 2006; Gresenz, Rogowski, and Escarce 2007a) and among Hispanics, specifically (Fremstad and Cox 2004). The local supply of physicians relative to the population may affect whether people can find primary care physicians to see them—especially for those who prefer physicians of a particular race or ethnicity or physicians who offer low-cost care (e.g., Komaromy et al. 1996; Saha et al. 1999; Cunningham et al. 2006). A high percentage of uninsured persons in the population may diminish access among uninsured individuals, presumably due to competition among the uninsured for a relatively fixed supply of free or low-cost care (Gresenz, Rogowski, and Escarce, 2007a).

In addition, the language and nativity of the local population are also likely to influence access to care. Empirically, these measures may capture the effects of correlated unmeasured dimensions of the local environment, including facets of city and county government-supported safety net infrastructure, the privately supported health care safety net (e.g., the amount of physician-provided charity care), and the presence of not-for-profit organizations that represent and support minority, immigrant or non-English-speaking populations. Because minority physicians are more likely to serve in areas with large minority populations, the local demographic characteristics may also capture the effects of (unmeasured) minority physician supply. The availability of a Spanish-speaking physician may be especially important to access to care among Spanish-speaking Hispanics.

These variables may directly affect access to care by determining the opportunities that individuals have to create social networks, defined as the contacts individuals have with other people in a group to which they belong. The well-established sociological principle of “homophily” suggests that contact between similar people occurs at a higher rate than among dissimilar people (Lazarsfeld and Merton 1954). Geographic proximity, race/ethnicity, and language are fundamental sources of homophily (Alba 1990; McPherson, Smith-Lovin, and Cook 2001). For example, geographic proximity is the single most important predictor of how often friends get together, homophily in race and ethnicity has been shown to influence marital bonds, friendships formed in school, and conversational exchanges, and individuals living in the United States who speak a non-English language at home have been found to interact mainly with others who speak that language (Verbrugge 1983;

Marsden 1987, 1988; Shrum, Cheek, and Hunter 1988; Alba 1990; Schneider et al. 1997; Kalmijn 1998).

Strong social networks are likely to facilitate the transmission of information about sources of culturally competent care, such as physicians or pharmacy clerks who are bilingual, or the availability of providers who offer low-cost or charity care. In addition, social networks may affect the development and transmission of norms about the appropriate use of care (Derose 2000; McPherson, Smith-Lovin, and Cook 2001; Gresenz, Rogowski, and Escarce 2007b). Several studies lend support to the social network hypothesis. Derose (2000) finds that the ability of Latino women to obtain care depends heavily on the connections that they establish with bilingual friends, who help them navigate the pathways to care, as well as with bilingual physicians, pharmacy clerks, and medical office administrative staff. In addition, Suarez et al. (1994) document greater Pap smear and mammogram rates among Mexican American women in Texas with larger social networks; likewise, Levy-Storms and Wallace (2003) show the probability of obtaining a mammogram increases with social network size among Samoan women in Los Angeles.

The effects of social networks may vary with the characteristics of an individual. For example, individuals who are U.S. born with a command of English and a lifetime of experience obtaining care in the United States may be less affected than immigrants by weak social networks, other things being equal; and, conversely, language barriers and lack of experience in navigating the U.S. health care system, which are most profound for recent immigrants, are likely to increase the importance of social networks to individuals' ability to access health care (Cunningham et al. 2006). Further, the effects of strong social networks may vary for uninsured compared with insured individuals. For example, information about providers who offer charity or low-cost care may be transmitted more through word of mouth compared with information about providers in an insurance plan, which is usually readily available in the plan's materials. Thus, strong social networks may exert more of a positive influence on access to care for the uninsured compared with the insured.

DATA SOURCES

We use 1996–2002 Medical Expenditure Panel Survey (MEPS) household component survey data linked to data from the 2000 U.S. Census, Area Resource File (ARF), Current Population Survey (CPS), Bureau of Primary

Health Care Uniform Data System (BPHC UDS), the Census of Governments, and the Census Bureau's Annual Survey of State and Local Government Finances. MEPS is a nationally representative survey with detailed information on health status and health services utilization. MEPS uses an overlapping panel design in which respondents are interviewed multiple times over a 30-month period to collect data spanning a 2-year period (Cohen et al. 1996/1997). Variables describing the local area were derived from the additional data sources listed and linked to MEPS based on respondents' residential zip code.¹

Our sample includes adult (aged 18–64) Hispanic respondents of Mexican descent (Mexican Americans). We limit the sample to a single national origin to remove potential heterogeneity in the effects of key variables across different subgroups of Hispanics. We chose Mexican Americans because they represent the largest fraction of Hispanics in the United States.

Each observation represents a 1-year observation period; individuals can contribute up to two observations in total because they are followed for 2 years in the MEPS. We exclude individuals who were ineligible for all or part of the calendar year, such as those who died or were institutionalized during the year. Given the small sample size of Hispanics living in nonmetropolitan areas, we limit our analysis to those residing in metropolitan statistical areas (MSAs), hereafter referred to as “urban” residents. In total, our data include 14,504 observations from 8,371 respondents.

METHODS

We use multivariate probit regression models for analyses of each of four dependent variables, described below. We control for a large number of individual and local area characteristics that may influence access to care. We stratify our analyses by insurance status (insured during the year versus uninsured for the entire year) to allow for potential differences in the effects of key variables across these two groups of individuals (as described in the “Conceptual Background”). All regressions are weighted and standard errors are adjusted for repeated observations on individuals and the clustering of individuals within areas (Cohen et al. 1996/1997; Cohen, DiGaetano, and Goksel 1999).

Dependent Variables

We estimate models for four dependent variables: (1) whether the person has a “usual source of care,” defined as a health care provider where the person

usually goes when sick or needing health advice; (2) whether the person has an office-based physician or nonphysician (e.g., nurse practitioner, podiatrist) visit during a year; (3) whether the individual has any prescription drug expenditures during the year; and (4) whether the individual has any medical expenditures or charges during the year. All are 0–1 dichotomous variables. The “any expenditure” variable is equal to 1 if an individual has any expenditures for inpatient or outpatient care, pharmaceuticals, durable medical equipment, or other types of care (e.g., home health); in addition, the variable is 1 if an individual had no expenditures but had positive charges, which indicates receipt of charity (free) care.

Local Area–Level Explanatory Variables

The key independent variables are measures of the language and nativity of the local population; specifically, the percentage of the population in the respondent’s zip code tabulation area (ZCTA) that is Spanish speaking (defined as the percentage of individuals who report speaking Spanish at home) and the percentage of the ZCTA population that is foreign born and Spanish speaking (designed to capture the immigrant Hispanic population).² The ZCTA is the lowest level of geography at which we were able to link local area measures to individuals.³ These two variables are each included individually in separate specifications. In sensitivity analyses, we also tested a measure of the ethnicity of the population—specifically, the percentage of the population that is Hispanic. However, this measure is very highly correlated with the percentage of the population that is Spanish speaking and the results using percent Hispanic were very similar to those using percent Spanish speaking.

We allow for variability in the effect of these local area demographic characteristics on access among Mexican Americans who are foreign or U.S. born and who have varying lengths of residency in the United States. As described in the “Conceptual Background,” the local Spanish-speaking or Hispanic immigrant population may more profoundly affect the formation of social networks than individuals who are less acculturated to the United States compared with others. Thus, we interact each of ZCTA-level demographic measures with an individual-level variable indicating whether the individual was born in the United States, is foreign born but has lived in the United States for more than 5 years, or is foreign born and a recent immigrant.

We also control for the racial composition of the non-Hispanic population in the local area with variables measuring the percentage of the population that is black (non-Hispanic) and the percentage that is of another racial

minority (non-Hispanic). As described in the “Conceptual Background,” we also include indicators of the percentage of individuals who are uninsured in each MSA, based on a 3-year moving average derived from CPS data, and measures of the local health care supply, including county-level measures of the number of primary care doctors (family practitioners, internists, and general practitioners) and the number of hospital beds per thousand people in the county, obtained from the ARF. To capture within-county variation in physician supply, we include ZCTA-level variables that measure sociodemographic characteristics that are likely to be correlated with physician location: percent educated at a high school level or beyond, median family income, population density, and percent of households with income less than the federal poverty line. We expect relatively high concentrations of low-income and less-educated populations to be associated with a smaller local physician supply.

Finally, we include two measures of the availability of safety net care for the uninsured. The first is based on BPHC UDS data and captures the number of federally funded migrant health centers, community health centers, or public housing primary care programs within a 5 mile radius from the population centroid of the respondent’s zip code. The second is the level of local expenditures for health and hospitals based on data from the Census of Governments and the Annual Survey of State and Local Government Finances as a measure of the financial status and general capacity of local safety net providers (Long and Marquis 1999; Marquis, Rogowski, and Escarce 2004). Expenditures were converted to 2000 dollars using the medical component of the consumer price index and scaled to the low-income population (within 200 percent of the poverty line) in the MSA using data from the March CPS.

Individual-Level Explanatory Variables

At the individual level, we control for sociodemographic characteristics, insurance status, and health status. Sociodemographic controls include education, household structure, gender, age, gender–age interactions, family income as a percent of the poverty line, language of interview (English or Spanish),⁴ and place of birth and years in the United States (U.S. born—omitted, foreign born, and lived in the United States for more than 5 years, and foreign born and lived in the United States for <5 years).⁵ We interpret language of interview as an indicator of an individual’s primary language.

We measure health status with a comprehensive set of variables spanning four domains: (1) functional, cognitive, and social limitations (a single

indicator for any such limitation); (2) vision/hearing problems (single indicator for any such problem, including blindness or deafness); (3) self-rated health, categorized as excellent, very good, good, fair, or poor (an indicator variable for each category); and (4) indicators for chronic conditions. We assessed the presence of 25 chronic conditions (e.g., diabetes, obesity, asthma) and included specific indicator variables for the most frequent conditions as well as a summary indicator for any of the remaining conditions.

For the regressions using the sample of insured individuals, we include an indicator for whether insurance was public or private. All models also included indicator variables for the year of the MEPS data.

RESULTS

Tables 1 and 2 provide descriptive statistics for the dependent and explanatory variables in the analyses. Tables 3 and 4 present partial regression results for insured and uninsured Mexican Americans, respectively. Each regression

Table 1: Dependent Variables and Community-Level Independent Variables: Descriptive Statistics

	<i>Mean</i>	<i>Standard Error</i>
<i>Dependent variables</i>		
Usual source of care	0.54	0.005
Any office-based physician visits	0.51	0.005
Any prescription drug expenditures	0.47	0.005
Any expenditures or charges	0.59	0.005
<i>Community-level independent variables</i>		
Percent of the population that speaks Spanish	0.37	0.003
Percent of the population that is foreign born and speaks Spanish	0.19	0.001
Population density (thousand people per square mile)	5.20	0.064
Percent of the population with no insurance	0.24	0.001
Percent of the population that is black	0.08	0.001
Percent of the population that is another racial minority	0.30	0.002
Median family income (in US\$10,000s)	4.35	0.016
Physicians per 1,000 in the county	0.56	0.002
Percent of the population with high school or more education	0.67	0.002
Percent of the population with family income < FPL	0.16	0.001
Hospital beds per 1,000 in the county	2.40	0.012
Number of federally funded safety net providers w/in 5 miles	2.46	0.055
Local health/hospital spending per low-income population (in US\$100s)	3.25	0.009

FPL, federal poverty line.

Table 2: Individual-Level Independent Variables: Descriptive Statistics

<i>Characteristic</i>	<i>Mean</i>	<i>Standard Error</i>	<i>Characteristic</i>	<i>Mean</i>	<i>Standard Error</i>
Age 18–24 years	0.19	0.004	Good self-rated health	0.31	0.005
Age 25–34 years	0.33	0.005	Fair self-rated health	0.11	0.003
Age 35–44 years	0.25	0.004	Poor self-rated health	0.03	0.001
Age 45–64 years	0.15	0.003	Excellent self-rated mental health	0.37	0.005
Age 55–64 years	0.08	0.003	Very good self-rated mental health	0.30	0.005
Less than high school	0.47	0.005	Good self-rated mental health	0.28	0.005
High school graduate or GED	0.30	0.005	Fair or poor self-rated mental health	0.06	0.002
Some college	0.15	0.004	Vision problem/blindness	0.04	0.002
College graduate	0.08	0.003	Hearing problem/deafness	0.03	0.002
Female	0.48	0.005	Cognitive limitation	0.02	0.001
Married	0.57	0.005	Social limitation	0.02	0.001
Divorced/separated	0.10	0.003	Functional limitation	0.04	0.002
Widowed	0.02	0.001	Anxiety	0.02	0.001
Never married	0.31	0.005	Arthropathies	0.04	0.002
Family size	3.94	0.020	Asthma	0.02	0.001
Uninsured	0.37	0.005	Depression	0.05	0.002
Public insurance	0.11	0.003	Diabetes	0.05	0.002
Income < 1 × FPL	0.20	0.004	Disease of lipid metabolism	0.03	0.002
Income 1–2 × FPL	0.30	0.005	Hypertension	0.06	0.002
Income 2–4 × FPL	0.33	0.005	Migraine	0.02	0.002
Income > 4 × FPL	0.16	0.004	Other chronic condition	0.03	0.002
Interview in Spanish	0.44	0.005	1996	0.12	0.003
U.S. born	0.46	0.005	1997	0.12	0.003
Foreign born, lived in the United States > 5 years	0.33	0.005	1998	0.13	0.004
Foreign born, lived in the United States < 5 years	0.06	0.002	1999	0.14	0.004
Foreign born, missing years in the United States	0.10	0.003	2000	0.15	0.004
Missing foreign born	0.05	0.003	2001	0.17	0.004
Excellent self-rated health	0.25	0.005	2002	0.17	0.004
Very good self-rated health	0.30	0.005			

FPL, federal poverty line.

Table 3: Language and Nativity of the Local Population and Access to Care among Insured Mexican Americans

	Dependent Variable: Usual Source of Care		Dependent Variable: Any Office Visit		Dependent Variable: Any Rx Expenditure		Dependent Variable: Any Medical Expenditure	
	dF/dx	Standard Error	dF/dx	Standard Error	dF/dx	Standard Error	dF/dx	Standard Error
<i>Specification 1: Percentage of the community population that is Spanish speaking</i>								
Lived in the United States <5 years	-0.218	0.091**	-0.127	0.069*	-0.096	0.073	-0.125	0.062**
Lived in the United States >5 years	-0.099	0.035***	-0.013	0.032	-0.021	0.031	0.009	0.024
U.S. born (reference group)	—	—	—	—	—	—	—	—
Lived in the United States <5 × (percent Spanish speaking)	0.216	0.172	0.180	0.136 ^b	0.264	0.154*	0.189	0.106*
Lived in the United States >5 × (percent Spanish speaking)	0.148	0.080* ^b	0.064	0.067 ^b	0.183	0.071***	0.076	0.054
U.S. born × (percent Spanish speaking)	-0.003	0.072 ^b	-0.072	0.062 ^b	0.085	0.065	0.030	0.049
<i>Specification 2: Percentage of the community population that is foreign born and Spanish speaking</i>								
Lived in the United States <5 years	-0.221	0.084***	-0.110	0.062*	-0.091	0.068	-0.126	0.056**
Lived in the United States >5 years	-0.097	0.032***	0.001	0.029	-0.017	0.029	0.019	0.021
U.S. born (reference group)	—	—	—	—	—	—	—	—
Lived in the United States <5 × (percent foreign born and Spanish speaking)	0.238	0.269	0.339	0.215 ^c	0.380	0.242	0.292	0.170* ^c
Lived in the United States >5 × (percent foreign born and Spanish speaking)	0.123	0.127 ^b	0.164	0.122	0.259	0.126**	0.052	0.097
U.S. born × (percent foreign born and Spanish speaking)	-0.174	0.125 ^b	-0.021	0.122 ^c	0.110	0.132	0.021	0.100 ^c

Notes: Each regression model includes the full set of individual-level explanatory variables listed in Table 2.

This table reports the change in the probability of the dependent variable for a marginal change in the explanatory variable.

Standard errors are in parentheses.

Asterisks indicate statistical difference of coefficient from zero; letters indicate statistical difference between coefficients.

***Significance at the .01 level.

**Significance at the .05 level.

*Significance at the .10 level.

Letters are included next to each element of the comparison pair, with “a” indicating a difference at the .01 level, “b” indicating significantly different at the .05 level, and “c” indicating significantly different at the .10 level.

^bThese coefficients are different from U.S. born × percent Spanish but not from each other.

Table 4: Language and Nativity of the Local Population and Access to Care among Uninsured Mexican Americans

	Dependent Variable: Usual Source of Care		Dependent Variable: Any Office Visit		Dependent Variable: Any Rx Expenditure		Dependent Variable: Any Medical Expenditure	
	dF/dx	Standard Error	dF/dx	Standard Error	dF/dx	Standard Error	dF/dx	Standard Error
<i>Specification 1: Percentage of the community population that is Spanish speaking</i>								
Lived in the United States < 5 years	−0.057	0.067	−0.089	0.052	−0.024	0.058	−0.111	0.057 ^a
Lived in the United States > 5 years	0.049	0.052	−0.046	0.043	0.035	0.042	−0.032	0.044
U.S. born (reference group)	—	—	—	—	—	—	—	—
Lived in the United States < 5 × (percent Spanish speaking)	−0.006	0.141	0.140	0.121 ^a	0.132	0.123 ^b	0.247	0.133 ^{aaa}
Lived in the United States > 5 × (percent Spanish speaking)	−0.043	0.086	−0.006	0.074 ^b	−0.054	0.078	0.044	0.085 ^b
U.S. born × (percent Spanish speaking)	0.015	0.092	−0.210	0.086 ^{aaa,b}	−0.094	0.076 ^b	−0.129	0.089 ^{a,b}
<i>Specification 2: Percentage of the community population that is foreign born and Spanish speaking</i>								
Lived in the United States < 5 years	−0.042	0.063	−0.046	0.054	−0.005	0.057	−0.092	0.056
Lived in the United States > 5 years	0.060	0.046	−0.016	0.040	0.039	0.038	−0.030	0.041
U.S. born (reference group)	—	—	—	—	—	—	—	—
Lived in the United States < 5 × (percent foreign born and Spanish speaking)	−0.337	0.225	0.169	0.183 ^{b†}	0.184	0.190 ^c	0.221	0.199 ^a
Lived in the United States > 5 × (percent foreign born and Spanish speaking)	−0.366	0.140 ^{***}	0.012	0.124 ^{b†}	−0.066	0.122	−0.022	0.132 ^b
U.S. born × (percent foreign born and Spanish speaking)	−0.223	0.165	−0.296	0.157 ^{ab}	−0.149	0.150 ^c	−0.407	0.166 ^{aaa,b}

Notes: Each regression model includes the full set of individual-level explanatory variables listed in Table 2. This table reports the change in the probability of the dependent variable for a marginal change in the explanatory variable. Standard errors are in parentheses.

Asterisks indicate statistical difference of coefficient from zero; letters indicate statistical difference between coefficients.

***Significance at the .01 level.

**Significance at the .05 level.

*Significance at the .10 level.

Letters are included next to each element of the comparison pair, with “a,” indicating a difference at the .01 level, “b,” indicating significantly different at the .05 level, and “c,” indicating significantly different at the .10 level.

†These coefficients are different from U.S. born × percent Spanish but not from each other.

model includes the full set of individual-level explanatory variables listed in Table 2. However, Tables 3 and 4 show results only for the individual-level variables measuring nativity and years in the United States and their interaction with the key variables of interest: percent Spanish speaking (Specification 1, top panel) and percent foreign born and Spanish speaking (Specification 2, lower panel). We report the change in the probability of the dependent variable for a marginal change in the explanatory variable.⁶ We begin with discussion of results for Mexican Americans with insurance (Table 3) and then turn to the uninsured (Table 4).⁷

Access to Care among Insured Mexican Americans (Table 3)

Consistent with previous studies, we find that foreign-born Mexican Americans, and particularly those who have lived in the United States for a short period of time, are less likely to have a usual source of care, an office visit, and any medical expenditures compared with U.S.-born Mexican Americans. In Specification 1 (top panel), we observe a significant positive effect of the percentage of the population that speaks Spanish on access to care among both recent and established immigrants, with a higher probability of having any medical expenditures or any prescription drug expenditures among the former and a higher probability of having a usual source of care or any prescription drug expenditures among the latter. The effect of living in an area with more Spanish speakers is statistically greater for immigrants compared with nonimmigrants for both the probability of having a usual source of care ($\chi^2 = 4.7$) and the probability of having an office-based visit ($\chi^2 = 4.6$ for U.S. natives versus recent immigrants; $\chi^2 = 3.9$ for U.S.-born versus established immigrants). In addition, the point estimate of the magnitude of the effect on access of living in an area with a relatively large number of Spanish speakers is consistently larger for newer compared with less recent immigrants.

We further find that a higher percentage of the local population that is foreign born and Spanish speaking (Specification 2) increases the probability of having any medical expenditures among recent immigrants and any prescription expenditures among established immigrants. We find no statistically significant effects of percent immigrant Hispanic on U.S.-born Hispanics. The difference in the effects of percent immigrant Hispanic on U.S.- versus foreign-born Hispanics is statistically significant for the probabilities of having a usual source of care ($\chi^2 = 6.4$), any office visit ($\chi^2 = 3.2$), and any medical expenditure ($\chi^2 = 2.8$).

In sensitivity analyses, we tested for a main effect of each of the three key local area demographic measures, without interacting it with the variables measuring individual-level place of birth and years in the United States. We found positive and statistically significant effects of each of the three measures. The percentage of the population that is Spanish speaking positively affects the probability of having any prescription expenditures and any medical expenditures. The percentage of the population that is foreign born and Spanish speaking positively affects the probability of any prescription expenditures.

Access to Care among Uninsured Mexican Americans (Table 4)

As with the insured, the uninsured who are more recent immigrants have more limited access to care compared with U.S.-born Mexican Americans. Among the uninsured, living in areas populated by relatively more Spanish speakers or Hispanic immigrants has a deleterious effect on access to care among U.S.-born Mexican Americans. More specifically, we find that for the U.S. born, living in an area with a relatively greater population of Spanish speakers or Hispanic immigrants has a negative effect on the probability of having an office visit, and the percentage of the population that is Hispanic immigrant is also negatively associated with having any medical expenditures.

Similar to the findings for insured Mexican American immigrants, we find a positive effect of living in an area with more Spanish speakers on the probability of having any medical expenditures among recent immigrants who are uninsured. We find the percentage of the population that is immigrant Hispanic reduces the probability of having a usual source of care among immigrants who have lived in the country for more than 5 years.

In a sensitivity analysis, we excluded the interactions between the local demographic characteristics and the individual-level place of birth and years in the U.S. variables. We found negative and statistically significant effects of each of the measures (percentage of the population that is Spanish speaking and percent that is immigrant Hispanic) on the probability of having a usual source of care.

DISCUSSION

Our study finds that local demographic characteristics significantly influence access to care among insured and uninsured Mexican American immigrants. For these individuals, living in an area populated by relatively more Hispanic

immigrants or more Spanish speakers increases access to care. The effects are generally stronger for more recent immigrants compared with those who are better established. We further find that among U.S.-born Mexican Americans, the effects of local demographic characteristics vary with insurance. The percentages of the population that are immigrant Hispanic or Spanish speaking are negatively associated with access to care for uninsured U.S.-born Mexican Americans, but do not appear to be associated with access among insured U.S.-born Mexican Americans.

One explanation for the findings for foreign-born Mexican Americans is that the local demographic characteristics are capturing the effects of unmeasured, correlated factors such as the presence of local organizations dedicated to assisting minorities or immigrants, or the availability of physicians who are Hispanic or, perhaps more importantly, Spanish speaking. It is also possible that the effects of these characteristics are related to unmeasured individual attributes. For example, our measures of health status may not completely capture individuals' health attributes and healthier immigrants may be more apt to live in nontraditional destinations with fewer immigrants or Spanish speakers, using less care because they require less care.

Another possible explanation for the observed effects of local demographic characteristics on access to care among immigrants is that living in an area with individuals of a similar ethnic background, similar nativity status and length of time in the United States, or common language may aid in the formation of social networks among individuals. These social networks, in turn, may facilitate access by providing channels along which information about the availability of care and how to navigate the health care system can be transmitted.

The observation of more limited access to care among U.S.-born Mexican Americans in high-immigrant areas provides further support for the social networks hypothesis. To the extent that U.S.-born Mexican Americans bond with other native-born individuals, a greater percentage of immigrants in an area may limit the formation of social networks. Likewise, we find a negative association between the percentage of the population that is Spanish speaking and access to care among uninsured U.S.-born Mexican Americans. Rather than promoting social network development, these characteristics may actually inhibit their formation among the U.S. born, who more strongly affiliate with non-Hispanics or non-Spanish speakers, by virtue of having lived in the United States their entire lives. For these individuals, social networks may be more strongly related to other characteristics (such as occupation or religious participation).

We find no associations between the percentage of the population that is Spanish speaking and access to care among the U.S. born who are insured. The differences in the findings for the insured and the uninsured U.S. born (i.e., that the population demographics are not associated with access for the insured but are among the uninsured) suggest that the effects of social networks may be more important for the uninsured compared with the insured, possibly because of the importance of word-of-mouth communication about providers who will accommodate those with limited ability to pay.⁸

As with all studies, our study has certain limitations. Challenges to estimating the effects of neighborhood characteristics with observational data are by now well known (e.g., Diez Roux 2004; Oakes 2004; Subramanian 2004) and include defining the appropriate spatial area over which to measure contextual variables, the possibility that correlation between individual-level characteristics and aggregate neighborhood characteristics will make it difficult to separate individual from contextual effects, and that individuals may self-select into neighborhoods based on unmeasured attributes. Given concerns about selection, our estimates must be interpreted as conditional associations under certain assumptions, although we use the word “effects” throughout this article as a shorthand. Our analytic approach is to control for as many characteristics of individuals and neighborhoods as possible that may potentially confound estimation of the effects of the contextual characteristics of interest. Also, we measure key independent variables at the ZCTA level, but the effects of local demographic characteristics may be different when measured for more refined geographical constructs.

The findings from this research provide evidence that the demographic characteristics of the local population bear importantly on access to care among Mexican Americans. These effects may reflect the effects of unmeasured correlated factors such as the availability of Hispanic or Spanish-speaking physicians or the presence of local organizations dedicated to serving immigrant or minority populations. The demographic characteristics of the local population may also contribute to the formation and sustenance of social networks. A substantial body of research extending back decades has confronted the estimation of social network effects in a variety of contexts, but the study of social networks has not permeated health services research to the same degree (Montgomery 1991; Vogt et al. 1992; Borjas 1995; Kawachi et al. 1996; Glass et al. 1997; Bertrand, Luttmer, and Mullainathan 2000; Kawachi and Berkman 2001; Moffitt 2001; Malat 2006). The results suggest that characteristics of the local population, including language and nativity, play an important role in access to health care among U.S. Hispanics and point to the

need for further study, including analyses of other racial and ethnic groups, using different geographic constructs for describing the local population, and, to the extent possible, more specific exploration of the mechanisms through which these characteristics may influence access to care. To the extent that the social networks explanation underlies the findings, policy makers should be attentive to immigrants living in less traditional destinations in the United States where social networks may be more difficult to form, and thus where access to health care may be negatively affected.

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NOTES

1. No geographic identifiers other than region and MSA are available on the public use MEPS. Social and Scientific Systems, operating through a contract with the Agency for Healthcare Research and Quality (AHRQ), linked local area characteristics to individual respondents and the resulting data file, stripped of geographic identifiers, was available for our use onsite at the AHRQ Data Center.
2. Ideally, we would be able to capture the percentage of the population that is of Mexican origin, but this measure was unavailable. In addition, information on number of immigrants by country of origin was unavailable.
3. ZCTAs were developed by the U.S. Census Bureau for the Census 2000. They are generalized area representations of U.S. Postal Service ZIP Code service areas. In many cases, ZCTA and zip code are the same.
4. The only variable that is consistently available for measuring individual-level language is language in which the MEPS interview was completed. We create a variable that is zero if the MEPS interview was completely in English and positive if the interview was wholly or partly in Spanish. A limitation is that this measure does not allow us to distinguish bilingual from monolingual individuals.
5. We include dummy variables for observations missing either years in the United States or nativity.

6. The estimates represent the change in the probability for an infinitesimal change in each continuous variable and for a discrete change (from 0 to 1) in each of the dichotomous variables.
7. Chi-squared tests indicate that each of the reported models provide more explanatory power compared with the null model.
8. Although we find more positive and statistically significant findings for insured immigrants compared with uninsured immigrants, power is more of an issue for the uninsured because the sample size is considerably smaller.

REFERENCES

- Alba, R. D. 1990. *Ethnic Identity: The Transformation of White America*. New Haven, CT: Yale University Press.
- Andersen, R. M. 1968. *A Behavioral Model of Families' Use of Health Services. Research Series No. 25*. Chicago: Center for Health Administration Studies, University of Chicago.
- . 1995. "Revisiting the Behavioral Model and Access to Medical Care: Does It Matter?" *Journal of Health and Social Behavior* 36 (1): 1–10.
- Andersen, R. M., and J. F. Newman. 1973. "Societal and Individual Determinants of Medical Care Utilization in the United States." *Milbank Memorial Fund Quarterly: Health and Society* 51 (1): 95–124.
- Bertrand, M., E. F. P. Luttmer, and S. Mullainathan. 2000. "Network Effects and Welfare Cultures." *Quarterly Journal of Economics* 115 (3): 1019–55.
- Borjas, G. J. 1995. "Ethnicity, Neighborhoods, and Human-Capital Externalities." *American Economic Review* 85 (3): 365–90.
- Cohen, J. W., A. C. Monheit, K. M. Beauregard, S. B. Cohen, D. C. Lefkowitz, D. E. B. Potter, and R. H. Arnett. 1996/1997. "The Medical Expenditure Panel Survey: A National Health Information Resource." *Inquiry* 33: 373–89.
- Cohen, S. B., R. DiGaetano, and H. Goksel. 1999. *Estimation Procedures in the 1996 MEPS Household Component (MEPS Methodology Report No. 5. AHCPR PUB. No. 99-0027)*. Rockville, MD: Agency for Health Care Policy and Research.
- Cunningham, P., M. Banker, S. Artiga, and J. Tolbert. 2006. *Health Coverage and Access to Care for Hispanics in "New Growth Communities" and "Major Hispanic Centers"*. Manlo Park, CA: The Henry J. Kaiser Family Foundation.
- Cunningham, P., and J. Hadley. 2004. "Expanding Care Versus Expanding Coverage: How to Improve Access to Care." *Health Affairs* 23 (4): 234–44.
- Davidson, N., S. Skull, D. Burgner, P. Kelly, S. Raman, D. Silove, Z. Steel, R. Vora, and M. Smith. 2004. "An Issue of Access: Delivering Equitable Health Care for Newly Arrived Refugee Children in Australia." *Journal of Pediatrics and Child Health* 40 (9–10): 569–75.
- Derosé, K. P. 2000. "Networks of Care: How Latina Immigrants Find Their Way to and through a County Hospital." *Journal of Immigrant Health* 2 (2): 79–87.
- Derosé, K. P., and D. W. Baker. 2000. "Limited English Proficiency and Latinos' Use of Physician Services." *Medical Care Research and Review* 57 (1): 76–91.

- Diez Roux, A. V. 2004. "Estimating Neighborhood Health Effects: The Challenges of Causal Inference in a Complex World." *Social Science and Medicine* 58: 1953–60.
- Escarce, J. J. 2007. *Racial and Ethnic Disparities in Access to and Quality of Health Care. Research Synthesis Report No. 12*. Princeton, NJ: Robert Wood Johnson Foundation: The Synthesis Project.
- Fremstad, S., and L. Cox. 2004. *Covering New Americans: A Review of Federal and State Policies Related to Immigrants' Eligibility and Access to Publicly Funded Health Insurance*. Manlo Park, CA: The Henry J. Kaiser Family Foundation: Kaiser Commission on Medicaid and the Uninsured.
- Glass, T. A., C. F. Mendes de Leon, T. E. Seeman, and L. F. Berkman. 1997. "Beyond Single Indicators of Social Networks: A LISREL Analysis of Social Ties among the Elderly." *Social Science and Medicine* 44 (10): 1503–17.
- Gresenz, C. R., J. Rogowski, and J. J. Escarce. 2007a. "Health Care Markets, the Safety Net, and Utilization of Care among the Uninsured." *Health Services Research* 42 (1, part 1): 239–64.
- . 2007b. *Social Networks and Access to Health Care among Mexican-Americans*. NBER Working Paper No. W13460. Cambridge, MA: National Bureau of Economic Research Inc.
- Haas, J. S., K. A. Phillips, D. Sonneborn, C. E. MucCulloch, L. C. Baker, C. P. Kaplan, E. J. Perez-Stable, and S. Liang. 2004. "Variation in Access to Health Care for Different Racial/Ethnic Groups by the Racial/Ethnic Composition of an Individual's County of Residence." *Medical Care* 42 (7): 707–14.
- Hadley, J., P. Cunningham, and J. L. Hargraves. 2006. "Would Safety-Net Expansions Offset Reduced Access Resulting from Lost Insurance Coverage? Race/Ethnicity Differences." *Health Affairs* 25 (6): 1679–87.
- Kalmijn, M. 1998. "Intermarriage and Homogamy: Causes, Patterns, Trends." *Annual Review of Sociology* 24: 395–421.
- Kawachi, I., and L. F. Berkman. 2001. "Social Ties and Mental Health." *Journal of Urban Health* 78 (3): 458–67.
- Kawachi, I., G. A. Colditz, A. Ascherio, E. B. Rimm, E. Giovannucci, M. J. Stampfer, and W. C. Willett. 1996. "A Prospective Study of Social Networks in Relation to Total Mortality and Cardiovascular Disease in Men in the USA." *Journal of Epidemiology and Community Health* 50 (3): 245–51.
- Kirby, J. B., G. Taliaferro, and S. H. Zuvekas. 2006. "Explaining Racial and Ethnic Disparities in Health Care." *Medical Care* 44 (5, suppl): 64–72.
- Komaromy, M., K. Grumbach, M. Drake, K. Vranizan, N. Lurie, D. Keane, and A. B. Bindman. 1996. "The Role of Black and Hispanic Physicians in Providing Health Care for Underserved Populations." *New England Journal of Medicine* 334 (20): 1305–10.
- Lazarsfeld, P. F., and R. K. Merton. 1954. "Friendship as Social Process: A Substantive and Methodological Analysis." In *Freedom and Control in Modern Society*, edited by M. Berger, T. Abel, and C. H. Page, pp. 18–66. New York: Van Nostrand.
- Lees, K. A., P. M. Wortley, and S. S. Coughlin. 2005. "Comparison of Racial/Ethnic Disparities in Adult Immunization and Cancer Screening." *American Journal of Preventive Medicine* 29 (5): 404–11.

- Levy-Storms, L., and S. P. Wallace. 2003. "Use of Mammography Screening among Older Somoan Women in Los Angeles County: A Diffusion Network Approach." *Social Science and Medicine* 57: 987–1000.
- Long, S. H., and M. S. Marquis. 1999. "Geographic Variation in Physician Visits for Uninsured Children: The Role of the Safety Net." *Journal of the American Medical Association* 281: 2035–40.
- Malat, J. 2006. "Expanding Research on the Racial Disparity in Medical Treatment with Ideas from Sociology." *Health* 10 (3): 303–21.
- Marquis, M. S., J. A. Rogowski, and J. J. Escarce. 2004. "Recent Trends and Geographic Variation in the Safety Net." *Medical Care* 42 (5): 408–15.
- Marsden, P. V. 1987. "Core Discussion Networks of Americans." *American Sociological Review* 52: 122–313.
- . 1988. "Homogeneity in Confiding Relations." *Social Networks* 10: 57–76.
- McPherson, M., L. Smith-Lovin, and J. M. Cook. 2001. "Birds of a Feather: Homophily in Social Networks." *Annual Review of Sociology* 27: 415–44.
- Moffitt, R. A. 2001. "Policy Interventions, Low-Level Equilibria, and Social Interactions." In *Social Dynamics*, edited by S. N. Durlauf and H. P. Young, pp. 45–82. Washington, DC: MIT Press and Brookings Institution Press.
- Montgomery, J. D. 1991. "Social Networks and Labor-Market Outcomes: Toward an Economic Analysis." *American Economic Review* 81 (5): 1408–18.
- Oakes, J. M. 2004. "The (Mis)Estimation of Neighborhood Effects: Causal Inference for a Practicable Social Epidemiology." *Social Science and Medicine* 10: 1929–52.
- Ponce, N. A., N. Chawla, S. H. Babey, M. S. Gatchell, D. A. Etzioni, B. A. Spencer, E. R. Brown, and N. Breen. 2006. "Is There a Language Divide in Pap Test Use?" *Medical Care* 44 (11): 998–1004.
- Saha, S., M. Komaromy, T. D. Koepsell, and A. B. Bindman. 1999. "Patient-Physician Racial Concordance and the Perceived Quality and Use of Health Care." *Archives of Internal Medicine* 159 (9): 997–1004.
- Sambamoorthi, U., and D. D. McAlpine. 2003. "Racial, Ethnic, Socioeconomic, and Access Disparities in the Use of Preventive Services among Women." *Preventive Medicine* 37 (5): 475–84.
- Schneider, M., P. Teske, C. Roch, and C. Marschall. 1997. "Networks to Nowhere: Segregation and Stratification in Networks of Information about Schools." *American Political Science Review* 41: 1201–23.
- Shrum, W., N. H. Jr. Cheek, and S. M. Hunter. 1988. "Friendship in School: Gender and Racial Homophily." *Social Education* 61: 227–39.
- Stewart, S. H., and M. D. Silverstein. 2002. "Racial and Ethnic Disparity in Blood Pressure and Cholesterol Measurement." *Journal of General Internal Medicine* 17 (6): 405–11.
- Suarez, L., L. Lloyd, N. Weiss, T. Rainbolt, and L. Pulley. 1994. "Effect of Social Networks on Cancer-Screening Behavior of Older Mexican-American Women." *Journal of the National Cancer Institute* 86 (10): 775–9.
- Subramanian, S. V. 2004. "The Relevance of Multilevel Statistical Methods for Identifying Causal Neighborhood Effects." *Social Science and Medicine* 58: 1961–7.

- Verbrugge, L. M. 1983. "A Research Note on Adult Friendship Contact: A Dyadic Perspective." *Social Forces* 62: 78–83.
- Vogt, T. M., J. P. Mullooly, D. Ernst, C. R. Pope, and J. F. Hollis. 1992. "Social Networks as Predictors of Ischemic Heart Disease, Cancer, Stroke and Hypertension: Incidence, Survival and Mortality." *Journal of Clinical Epidemiology* 45 (6): 659–66.
- Weinick, R. M., E. A. Jacobs, L. C. Stone, A. N. Ortega, and H. Burstin. 2004. "Hispanic Healthcare Disparities: Challenging the Myth of a Monolithic Hispanic Population." *Medical Care* 42 (4): 313–20.
- Zuvekas, S. H., and G. S. Taliaferro. 2003. "Pathways to Access: Health Insurance, the Health Care Delivery System, and Racial/Ethnic Disparities, 1996–1999." *Health Affairs* 22 (2): 139–53.

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Appendix SA1: Author Matrix.

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