BACKGROUND

The relative advantage of Foreign-born Latinos with respect to health has been observed across age groups, outcomes, and, in some cases, country of origin (Abraido-Lanza et al., 1999; Elo et al., 2004; Markides & Coreil, 1986). The explanation of this paradox has remained elusive. We examine the extent to which the Latino paradox exists for asthma prevalence. We then explore the role of neighborhood social context in understanding any observed Latino advantage.

The Latino, Hispanic, or what is sometimes described as the Epidemiologic Paradox is meant to refer to the relatively good health and longer life span of Foreign-born Latinos, when expectations (in most analyses, based primarily on socioeconomic status) point to a morbidity or mortality experience far below that observed. The paradox has been documented for a number of health outcomes, including all-cause mortality, infant mortality, and functional status (Cobas et al., 1996; Markides & Coreil, 1986; Patel et al., 2004). Recent work indicates that the mortality paradox may be due to return migration effects, at least for those of Mexican origin (Palloni & Arias, 2004). Evidence related to morbidity, however, continues to indicate a health advantage for Foreign-born Latinos as compared to their U.S.-born counterparts (Morales et al., 2002).

To date, our knowledge of asthma prevalence in the Latino population is limited (Homa, Mannino, & Lara, 2000), as is our understanding of the role of community context in shaping asthma rates. Previous research indicates that neighborhood-level characteristics contribute to asthma prevalence, beyond individual-level risk factors (Cagney & Browning, 2004). In addition to data artifact and migration effects, social and cultural capital explanations (Palloni & Arias, 2004) have been offered as hypotheses for the beneficial health trajectories of Latino immigrants—these are viewed as mechanisms by which health and lifestyle behaviors are influenced (LeClere, Rogers, & Peters, 1997). The potential of a community to encourage positive health habits or sanction negative ones is salient, but it does not speak to larger forces operating at the neighborhood level such as the availability of social support or the accessibility of public parks—this form of neighborhood-level influence might have an independent effect on asthma. Moreover, these community characteristics may condition the Latino advantage—foreign-born Latinos may benefit from embeddedness in immigrant-dominated and potentially more supportive contexts. In contrast, foreign-born Latinos living in communities without a strong immigrant presence may then be at a comparative *dis*advantage.

THEORETICAL APPROACH

We employ theories of social organization and collective efficacy (Shaw & McKay, 1969; Sampson, Raudenbush, & Earls, 1997) and immigrant adaptation and the urban ethnic enclave (Portes & Truelove, 1987; Sanders & Nee, 1987; Waters & Eschbach, 1995) to explore differences in asthma prevalence by Latino foreign-born status and to understand the unique contribution of community context. Social organization and collective efficacy theories enable us to draw out components of community life that could be important both to the prevalence of asthma and to the social organizational features of the ethnic enclave. Residential stability, ethnic heterogeneity, and economic status, as structural characteristics of the neighborhood, may set the stage for neighborhood social processes to take root. The social processes of collective efficacy and social networks/exchange, in turn, may have independent effects on health status. Collective efficacy, for instance, captures the level of trust and attachment characterizing community residents and their capacity for mutually beneficial action. Network interaction and exchange processes capture the breadth of potentially health-protective social support within a community. Our aim in utilizing these frameworks is to introduce a conceptualization of the enclave

experience that is congruent with previous work but adds a neighborhood-level dimension; the density of social networks and reciprocated exchange within enclave communities have been discussed, but this approach adds a set of structural factors and social processes that operate solely *at the neighborhood level*.

METHODS

Data and Measures

To address our hypotheses we need data sources that provide individual-level outcomes nested in neighborhoods, along with measures that capture individual- and neighborhood-level phenomena. To that end, we combine three data sources from the 1990s: 1) the Metropolitan Chicago Information Center Metro Survey (MCIC-MS); 2) the Decennial Census; and 3) the Project on Human Development in Chicago Neighborhoods Community Survey (PHDCN-CS).

MCIC-MS. The MCIC-MS is a serial cross-section of adults ages 18 and older who reside in the six county metropolitan Chicago area (on average, 3,000 respondents per wave). To create the individual-level component of our final analytic data set we pooled the 1995, 1997, and 1999 waves of the MCIC-MS (n = 2803). ***Measures*** The outcome measure and individual-level covariates come from the MCIC-MS. The outcome is a dichotomous measure derived from the question "*Has a doctor ever told you that you have asthma, bronchitis, emphysema or other breathing problems*?" While this question does not measure the presence of asthma alone, the high prevalence of asthma in Chicago suggests that the vast majority of these cases are asthma (Naureckas et al., 1999). This form of self-reported health status question has been found to be both reliable and valid (Patrick & Erickson, 1993). The individual-level covariates include *gender, age, race/ethnicity, education, income, home ownership, marital status, current smoking behavior, physician-indicated weight problem, and insurance status.*

Decennial Census. Census data allow us to construct measures of neighborhood socioeconomic structure and composition. ***Measures*** Three of the five neighborhood-level measures come from these data. The first is a *concentrated disadvantage factor* score that includes percent below the poverty line, receiving public assistance, unemployed, in female-headed households, under age 18 (concentration of children), and African American. The second is a *residential stability* factor score that includes the percentage living in the same house since 1985 and the percentage of owner occupied dwellings. The third is the *percent foreign born* in the neighborhood.

PHDCN-CS. The sampling design of the PHDCN-CS relied on 1990 U.S. Census data for Chicago to identify 343 neighborhood clusters ("NCs")—groups of 2-3 census tracts that contain approximately 8,000 people. Major geographic boundaries (e.g., railroad tracks, parks, freeways), knowledge of Chicago's local neighborhoods, and cluster analyses of Census data guided the construction of NCs so that they are relatively homogeneous with respect to racial/ethnic mix, socioeconomic status, housing density, and family structure. ***Measures*** Two measures of neighborhood social context come from these data. *Collective efficacy* was operationalized through combining measures of social cohesion and informal social control. Social cohesion was constructed from a cluster of conceptually related items from the PHDCN-CS measuring the respondent's level of agreement (on a five-point scale) with the following statements: 1) People around here are willing to help their neighbors; 2) This is a close-knit neighborhood; 3) People in this neighborhood can be trusted; and 4) People in this neighborhood generally don't get along with each other. Health-related informal social control was tapped through items measuring the respondent's level of agreement with the following: 1) If I were sick I could count on my neighbors to shop for groceries for me; and 2) You can count on adults

in this neighborhood to watch out that children are safe and don't get in trouble. An additional informal social control item asked respondents how likely it is that people in their neighborhood would intervene if a fight broke out in front of their house. The informal social control items tap expectations for beneficial health-related action as well as neighborhood supervision of potentially hazardous conditions or violent situations. The seven items were combined to form a single scale of health-related collective efficacy. The *Social Interaction/Exchange* scale measures the frequency of interaction and network-mediated exchange among neighbors. In contrast to the generalized assessments of trust, solidarity, and shared expectations for informal social control included in the measure of collective efficacy, the network interaction/exchange scale is designed to capture *actual ties* between neighborhood residents, consistent with Portes's (1998) conceptualization. Respondents were asked how often do you and people in this neighborhood: (1) Have parties or other get-togethers where other people in the neighborhood are invited; (2) Visit in each others homes or on the street; (3) Ask each other advice about personal things such as child rearing or job openings; and (4) Do favors for each other?

Analysis

The clustering of respondents within Chicago's neighborhoods renders standard OLS techniques inappropriate due to the likely underestimation of standard errors. Our analysis strategy employs Hierarchical Modeling (HM) techniques to investigate the prevalence of asthma/breathing problems across neighborhoods and to allow us to examine interactions between individual-level foreign-born status and neighborhood-level factors. This approach has several advantages. First, the technique adjusts standard errors for the effects of clustering within neighborhoods. Second, HM provides a method for estimating the percentage of the total variance in any given outcome that can be attributed to neighborhood-level factors. In order to correct independent neighborhood-level measures of collective efficacy and network interaction/exchange for missing data and measurement error, we use empirical Bayes residuals from a three-level item-response model of the component items of these scales (Raudenbush & Bryk, 2002).

We begin with means and standard deviations that describe our study population, the individual-level component of our analysis (Table 1). The main feature of our analysis is a series of nine nested hierarchical logit models (Table 2) that combine individual and neighborhood-level covariates. A "yes" response to the asthma/breathing problems question forms the outcome. The two-level HM logit coefficients in Table 2 are log odds ratios. Positive coefficients are associated with having asthma/breathing problems. We begin with individual-level factors, then sequentially introduce residential stability, concentrated disadvantage, collective efficacy, percent foreign born, and social interaction/exchange. Interview year is included as a control variable across models. We illustrate our model as follows:

$$\log(\varphi_{ij} \big/ 1-\varphi_{ij}) = \beta_{00j} + \beta_{01j}(Yr_{ij}) + \beta_{02j}(Age_{ij}) + \beta_{03j}(Female_{ij}) + \beta_{04j}(Black_{ij}) + \beta_{05j}(Lat.FB_{ij}) + \beta_{06j}(Lat.NFB_{ij}) + ... + \beta_{015j}(NoIns_{ij})$$

$$\beta_{00j} = \gamma_{00} + \gamma_{10}(R.Stability_j) + \gamma_{20}(ConDis_j) + \gamma_{30}(CollEff_j) + \gamma_{40}(PForBorn_j) + \gamma_{50}(SocIntEx_j) + \tau_{00j}$$

$$\beta_{05j} = \gamma_{05} + \gamma_{15}(CollEff_j) + \gamma_{25}(PForBorn_j) + \gamma_{35}(SocIntEx_j) + \tau_{05j}$$

$$\beta_{06j} = \gamma_{06} + \gamma_{16}(CollEff_j) + \gamma_{26}(PForBorn_j) + \gamma_{36}(SocIntEx_j) + \tau_{06j}$$

Finally, we show a graphical representation of the predicted probabilities of asthma/breathing problems by race/ethnicity at selected levels of the percent foreign born present in the community (Figure 1).

RESULTS

Descriptive statistics can be found in Table 1. Preliminary multilevel results (Table 2) indicate that individual-level factors such as female gender and Latino Foreign-born status are protective against asthma/other breathing problems. Smoking, a physician-indicated weight problem and either no insurance or Medicaid (as compared to private insurance) are predictive of asthma/other breathing problems.

At the neighborhood level, collective efficacy is protective, even after percent foreign-born and social interaction/exchange are considered in the model. When we employ a cross-level interaction—between Latino foreign-born status and the neighborhood-level factors of percent foreign-born status, collective efficacy and social interaction/exchange—we learn that a neighborhood where the percent foreign-born is greater confers an additional protective advantage for Latinos born outside the U.S. Social interaction/exchange also provides a protective effect for Foreign-born Latinos. Figure 1 illustrates graphically—with predicted probabilities from the models we just described—the relationships among race/ethnicity, asthma/other breathing problems, and the percent foreign-born in the neighborhood. The level of asthma does not vary for Blacks and Whites by the presence of foreign-born persons in the community. U.S.-born Latinos appear to benefit from a higher percentage of foreign-born persons, but these results are not significant. Foreign-born Latinos, however, do experience much lower rates of asthma when they live in a neighborhood with a high percentage of foreign-born others ($p<.05$). Indeed, they have the lowest rates of asthma/other breathing problems overall. Conversely, their counterparts who live in neighborhoods with a low percentage of foreign-born others experience the highest rates of asthma/other breathing problems across all groups.

DISCUSSION

We find a distinctly graded effect for asthma prevalence among Foreign-born Latinos, depending upon the composition of the community. That is, when Foreign-born Latinos are embedded in a neighborhood where the presence of other Foreign-born residents is high their asthma risk is abated. The divergent experience of the Latino Foreign-born is particularly noteworthy. Those who live in communities with a low percentage of foreign-born residents have the highest asthma rates overall. Thus the Latino advantage with respect to asthma only accrues when it is socially leveraged.

Much like the early work of Shaw and McKay (1969), ethnic homogeneity may increase information exchange through a common language. Factors noted in other work, such as a shared culture or lifestyle behaviors may also be at play (Sorlie et al. 1993). Importantly, however, we find divergent experiences by neighborhood context after the introduction of individual-level behavioral factors associated with asthma (e.g., smoking, weight problem). Thus the role of community and cultural supports may not only influence individual-level behaviors, but may have an impact on health in their own right.

Future analyses will explore differences by country of origin, particularly since selection effects are an issue. For instance, Latinos who reside in low foreign-born communities may be more vulnerable to asthma (e.g., Puerto Ricans). Latino residents in Chicago are primarily Mexican so an extension of this work will focus upon the asthma experience among Mexicans. Preliminary analyses indicate that results from the Mexican subsample are consistent with those for all Latinos. Additional analyses also will incorporate alternative assessments of community, including constructs aimed at assessing ethnic enclaves.

The Latino population is the fastest growing and largest population subgroup in the United States (Grieco & Cassidy, 2001). Attention to the context in which Latinos reside could provide important insights into trajectories of acute and chronic conditions.

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Table 1: Summary Statistics

Variables	Mean	Standard Deviation
Outcome		
Asthma/Breathing Problems	0.19	0.39
Control Variables		
Female	0.41	0.49
Age	42.39	15.67
Race/Ethnicity		
White	0.43	0.50
Black	0.37	0.48
Latino Foreign Born	0.12	0.33
Latino Not Foreign Born	0.09	0.28
Education		
4th Grade Or Less	0.01	0.12
5th-8th Grade	0.05	0.22
9-12th Grade, No Diploma	0.11	0.31
High School Graduate	0.16	0.37
Trade Or Vocational	0.08	0.27
Some College	0.26	0.44
College Graduate	0.16	0.37
Some Graduate Study	0.03	0.18
Graduate Degree	0.12	0.32
Income		
Less then 10,000	0.10	0.30
> 10,000	0.08	0.27
> 15,000 to 20,000	0.07	0.26
> 20,000 to 25,000	0.08	0.27
> 25,000 to 30,000	0.10	0.30
> 30,000 to 40,000	0.16	0.36
> 40,000 to 50,000	0.13	0.33
> 50,000 to 70,000	0.11	0.32
> 70,000 to 90,000	0.08	0.27
> 90,000	0.09	0.29
Home Ownership	0.42	0.49
Married	0.38	0.49
Smoking	0.29	0.45
Weight Problem	0.20	0.40
Insurance		
Private Insurance	0.68	0.47
Medicare	0.09	0.29
Medicaid	0.07	0.25
No Insurance	0.16	0.37

n = 2308

TABLE 2: Hierarchical Ordered Logit Models of Asthma/Breathing Models

	1		2		3		4		5		6		7		8		9	
	C	SE	C	SE	C	SE	C	SE	C	SE	C	SE	C	SE	C	SE	C	SE
Individual Level																		
Interview Year	-0.009	(0.032)	-0.008	(0.033)	-0.007	(0.033)	-0.007	(0.033)	-0.004	(0.032)	-0.004	(0.032)	-0.004	(0.032)	-0.004	(0.032)	-0.003	(0.031)
Age	-0.003	(0.003)	-0.003	(0.004)	-0.003	(0.004)	-0.003	(0.004)	-0.003	(0.004)	-0.003	(0.004)	-0.003	(0.004)	-0.003	(0.004)	-0.004	(0.004)
Female	-0.355 ***	(0.096)	-0.369 ***	(0.103)	-0.368 ***	(0.103)	-0.368 ***	(0.102)	-0.362 ***	(0.099)	-0.360 ***	(0.099)	-0.358 ***	(0.099)	-0.358 ***	(0.099)	-0.345 ***	(0.097)
Race/Ethnicity																		
Black	0.000	(0.113)	-0.087	(0.143)	-0.130	(0.160)	-0.132	(0.159)	-0.074	(0.155)	-0.062	(0.157)	-0.062	(0.157)	-0.061	(0.157)	-0.023	(0.160)
Latino Foreign Born	-0.571 **	(0.180)	-0.923 ***	(0.242)	-0.885 ***	(0.246)	-0.885 ***	(0.245)	-0.333	(0.229)	-0.413 +	(0.229)	-0.516 *	(0.235)	-0.511 *	(0.232)	-0.410 *	(0.203)
Latino Not Foreign Born	-0.211	(0.176)	-0.287	(0.183)	-0.269	(0.183)	-0.269	(0.183)	-0.301 +	(0.183)	-0.296	(0.183)	-0.300	(0.183)	-0.300	(0.183)	-0.223	(0.200)
Education	0.005	(0.026)	0.021	(0.028)	0.019	(0.028)	0.019	(0.028)	0.014	(0.027)	0.013	(0.027)	0.011	(0.027)	0.011	(0.027)	0.008	(0.027)
Income	0.030	(0.022)	0.037	(0.024)	0.036	(0.024)	0.036	(0.024)	0.036	(0.023)	0.036	(0.023)	0.037	(0.023)	0.037	(0.023)	0.036	(0.023)
Home Ownership	-0.028	(0.115)	-0.090	(0.129)	-0.094	(0.129)	-0.094	(0.129)	-0.095	(0.124)	-0.095	(0.124)	-0.097	(0.124)	-0.097	(0.124)	-0.094	(0.122)
Married	0.022	(0.099)	0.018	(0.107)	0.024	(0.107)	0.024	(0.107)	0.022	(0.103)	0.022	(0.102)	0.025	(0.102)	0.025	(0.102)	0.022	(0.099)
Smoking	0.246 *	(0.096)	0.245 *	(0.099)	0.246 *	(0.099)	0.247 *	(0.099)	0.240 *	(0.097)	0.239 *	(0.097)	0.234 *	(0.097)	0.234 *	(0.097)	0.232 *	(0.095)
Weight Problem	0.527 ***	(0.107)	0.506 ***	(0.112)	0.504 ***	(0.112)	0.504 ***	(0.112)	0.512 ***	(0.109)	0.512 ***	(0.109)	0.511 ***	(0.109)	0.511 ***	(0.109)	0.509 ***	(0.108)
Insurance																		
Medicaid	0.422 *	(0.199)	0.422 *	(0.213)	0.428 *	(0.213)	0.429 *	(0.213)	0.411 *	(0.208)	0.408 *	(0.208)	0.408 *	(0.209)	0.408 *	(0.209)	0.423 *	(0.204)
Medicare	-0.010	(0.200)	0.019	(0.206)	0.023	(0.206)	0.022	(0.206)	0.011	(0.203)	0.011	(0.203)	0.014	(0.203)	0.014	(0.203)	0.014	(0.200)
No Insurance	0.326 *	(0.136)	0.317 *	(0.146)	0.324 *	(0.147)	0.324 *	(0.147)	0.326 *	(0.140)	0.323 *	(0.140)	0.334 *	(0.140)	0.334 *	(0.140)	0.323 *	(0.136)
Neighborhood Level																		
Constant																		
Residential Stability	-	-	0.109 +	(0.059)	0.095	(0.060)	0.094	(0.062)	0.099	(0.061)	0.096	(0.061)	0.100	(0.061)	0.100	(0.061)	0.097	(0.060)
Concentrated Disadvantage	-	-	-0.047	(0.423)	-0.134	(0.428)	-0.116	(0.416)	-0.095	(0.414)	-0.102	(0.412)	-0.117	(0.416)	-0.117	(0.416)	-0.147	(0.403)
Collective Efficacy	-	-	-0.153 **	(0.058)	-0.162 **	(0.060)	-0.153 *	(0.075)	-0.156 *	(0.072)	-0.185 *	(0.073)	-0.160 *	(0.073)	-0.161 +	(0.074)	-0.163 *	(0.071)
Percent Foreign Born	-	-	-	-	-0.395	(0.561)	-0.405	(0.567)	-0.344	(0.510)	-0.353	(0.508)	-0.300	(0.512)	-0.296	(0.511)	-0.192	(0.495)
Social Interaction/Exchange	-	-	-	-	-	-	-0.014	(0.071)	0.009	(0.068)	0.012	(0.067)	-0.017	(0.068)	-0.017	(0.068)	-0.005	(0.066)
Latino Foreign Born Effect																		
Collective Efficacy	-	-	-	-	-	-	-	-	-	-	-0.315	(0.204)	-	-	-0.009	(0.237)	-0.030	(0.205)
Percent Foreign Born	-	-	-	-	-	-	-	-	-3.375 **	(1.045)	-3.682 **	(1.141)	-3.369 **	(1.101)	-3.341 **	(1.181)	-3.112 **	(1.062)
Social Interaction/Exchange	-	-	-	-	-	-	-	-	-	-	-	-	-0.437 **	(0.224)	-0.432 +	(0.255)	-0.363	(0.226)
Latino Not Foreign Born Effect																		
Collective Efficacy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-0.240	(0.203)
Percent Foreign Born	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-1.156	(1.067)
Social Interaction/Exchange	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.242	(0.188)
Intercept	-1.461 ***	(0.051)	-1.485 ***	(0.057)	-1.493 ***	(0.057)	0.099 ***	(0.057)	-1.409 ***	(0.057)	-1.418 ***	(0.060)	-1.430 ***	(0.061)	-1.430 ***	(0.057)	-1.407 ***	(0.055)
Variance Component for Intercept	0.131		0.276 *		0.081 *		0.083 *		0.099		0.088		0.091		0.092		0.082	

N = 2803
N = 335
Æ p < 0.10
* p < 0.05
** p < 0.01
*** p < 0.001

Figure 1: Predicted Probability of Asthma/Breathing Problems by Race and Percent Foreign Born in Neighborhoods