

The Effects of Acculturation on Asthma Burden in a Community Sample of Mexican American Schoolchildren

Molly A. Martin, MD, MAPP, Madeleine U. Shalowitz, MD, MBA, Tod Mijanovich, MPA, Elizabeth Clark-Kauffman, MHS, Elizabeth Perez, BA, and Carolyn A. Berry, PhD

Asthma prevalence and mortality rates are increasing among Mexican American children, making asthma a significant health problem for this population.^{1,2} Mexican American children have lower asthma prevalence rates than do non-Hispanic Whites and Blacks,^{1,3} despite disproportionate numbers of Mexican Americans living in poverty, having low education levels, and lacking health insurance.^{4,5} Many Mexican Americans are immigrants, with 40% reporting they were born in Mexico.⁶ The better relative health outcomes of newly immigrated Mexican Americans compared with other ethnic groups at equal social disadvantage is often called the "Hispanic paradox."⁷ This paradox is frequently attributed to the low acculturation of healthy immigrants; that is, people who have not yet adopted the mainstream attitudes and behaviors of US culture appear to have some protection from adverse health outcomes.⁷⁻¹¹ For infant mortality rates and child immunization status, this protection appears to continue across generations,¹²⁻¹⁵ and preliminary evidence suggests this may be true for children with asthma as well.¹⁶

Acculturation is defined as a process of culture learning and behavioral adaptation that takes place when individuals are exposed to a new culture.^{17,18} As part of this process, individuals may undergo changes in language use, cognitive style, personality, identity, attitude, and stress level.¹⁷ In the United States, low acculturation is often represented by the use of a language other than English, having been born outside the United States, or having lived a relatively short time in the United States. Low acculturation levels among US Hispanics with low socioeconomic status have been linked to lower infant mortality rates, better immunization status, higher life expectancy, lower mortality from cardiovascular disease and cancer, and less cigarette smoking and drug use.^{7,8,12-15} Some have challenged these outcomes, suggesting that

Objectives. We sought to determine whether low acculturation among Mexican American caregivers protects their children against asthma.

Methods. Data were obtained from an observational study of urban pediatric asthma. Dependent variables were children's diagnosed asthma and total (diagnosed plus possible) asthma. Regression models were controlled for caregivers' level of acculturation, education, marital status, depression, life stress, and social support and children's insurance.

Results. Caregivers' level of acculturation was associated with children's diagnosed asthma ($P=.025$) and total asthma ($P=.078$) in bivariate analyses. In multivariate models, protective effects of caregivers' level of acculturation were mediated by the other covariates. Independent predictors of increased diagnosed asthma included caregivers' life stress (odds ratio [OR]=1.12, $P=.005$) and children's insurance, both public (OR=4.71, $P=.009$) and private (OR=2.87, $P=.071$). Only caregiver's life stress predicted increased total asthma (OR=1.21, $P=.001$).

Conclusions. The protective effect of caregivers' level of acculturation on diagnosed and total asthma for Mexican American children was mediated by social factors, especially caregivers' life stress. Among acculturation measures, foreign birth was more predictive of disease status than was language use or years in country. Increased acculturation among immigrant groups does not appear to lead to greater asthma risk. (*Am J Public Health*. 2007;97:1290-1296. doi:10.2105/AJPH.2006.092239)

culture serves mainly as a proxy for access to care¹⁹ and that attributing health outcomes to acculturation risks cultural stereotyping and inaccuracy.²⁰

Preliminary studies of acculturation and asthma by Eldeirawi et al.²¹ and Holguin et al.²² showed that Mexican American adults and children born in Mexico had lower diagnosed asthma rates than those born in the United States. Using data from the Mexican American sample of the Social Factors and the Environment in Pediatric Asthma Study, we sought to determine whether low acculturation levels among caregivers protected their children against diagnosed asthma and total (diagnosed plus possible) asthma burden. We operationalized acculturation to include caregivers' preferred language for the interview, country of origin, and the number of years they had lived in the United States. We also tested whether caregivers' social support, life stress, and depression (all of which have been shown capable of individually contributing to

asthma prevalence in children)²³⁻³¹ mediated the relationship between caregivers' level of acculturation and asthma burden in children.

METHODS

Sample

The Social Factors and the Environment in Pediatric Asthma Study ascertained the prevalence of asthma and asthma symptoms in 15 public elementary schools in Chicago from 2002 through 2004 (total enrollment=14 171).³² These schools were selected because they served low-income populations (75% of the students met federal income guidelines for partial or full subsidy for school lunch) and were racially and ethnically diverse (no 1 race or ethnicity comprised more than two thirds of the school population). Students brought the survey home to be completed by their caregiver and then returned it to their teachers. A total of 12 699 children, or 90% of the school

enrollment, returned the surveys. Asthma prevalence within the screening sample was similar to prevalence reported in national data, with 8.7% of Whites, 18.6% of Blacks, and 10.1% of Hispanic children reported to have a professional diagnosis of asthma.³²

On the screening survey, 53% of caregivers indicated an interest in further contact regarding the research project. A subset of these caregivers was selected to participate in a longitudinal study of children with asthma—namely, (1) all caregivers with children aged 5 to 12 years who were Black or White or who had possible or previously diagnosed asthma and (2) a random sample of caregivers of Hispanic children aged 5 to 12 years who did not have a diagnosis or symptoms of asthma. The overall response rate was 64%. The resulting sample of 1244 primary caregivers participated in a 45- to 60-minute interview in English or Spanish conducted by a national survey firm.

We report findings from interviews with Mexican Americans in the sample. Of the 651 caregivers who said they were Latino or Hispanic, 196 were not asked about subethnicity and were dropped from our analysis. The remaining 455 caregivers reported their origins as Mexican, Puerto Rican, Cuban, or other Hispanic. All Puerto Ricans were excluded from this analysis ($n=70$) because they were technically born in the United States and because combining them with Mexican Americans would be inappropriate since asthma prevalence rates differ dramatically between the 2 groups. To maintain consistency in the final sample, only those who categorized themselves as Mexican only ($n=315$), Mexican/Cuban ($n=1$), Mexican/other Hispanic ($n=19$), or Mexican/Cuban/other Hispanic ($n=1$) were included in our analysis ($n=336$).

Measures

Asthma prevalence among children. Asthma prevalence among children was determined with the English and Spanish versions of the Brief Pediatric Asthma Screen Plus (BPAS+), a 5-question written instrument.^{33,34} Responses to the BPAS+ items were used to classify each child into 1 of 3 categories: (1) no asthma, (2) possible asthma (child showed signs warranting further evaluation

for asthma), and (3) diagnosed asthma. The English BPAS+ has 61% sensitivity and 83% specificity for Hispanics.³³ The Spanish BPAS+ has 74% sensitivity and 86% specificity.³⁴ For these analyses, asthma was categorized as “diagnosed asthma” and “total potential asthma burden.” When “diagnosed asthma” was the primary dependent variable, the comparison group included both children without asthma and children with possible asthma. The “total potential asthma burden” dependent variable combined diagnosed and possible asthma, with “no asthma” as the comparison group. Immigrant Mexican Americans are subject to immigration laws and fears that often limit their access to care, which may affect their ability to receive an asthma diagnosis; we therefore analyzed total potential asthma burden in addition to diagnosed asthma.

Caregivers' acculturation measures. Caregivers, who were given the option of answering questions in English or Spanish, were asked whether they were born in the United States and, if not, how long they had lived there. Owing to high collinearity, these variables were combined to yield the following categories: (1) caregiver was not born in the United States, chose Spanish, and had lived in the United States less than 10 years (recent-immigrant Spanish speaker); (2) caregiver was not born in the United States, chose Spanish, and had lived in the United States 10 years or more (long-term-immigrant Spanish speaker); (3) caregiver was not born in the United States, chose English, and had lived in the United States 10 years or more (immigrant English speaker); and (4) caregiver was born in the United States and chose English (US-born English speaker). Only 4 US-born caregivers chose to have the interview conducted in Spanish, and only 1 immigrant caregiver who had lived in the United States less than 10 years chose to have it conducted in English. These participants were dropped from the analysis.

Demographic measures. Caregivers' education categories were less than high school, high school graduate or general education diploma, and more than high school. Children's insurance categories were public (Medicaid or State Children's Health Insurance Program), private, or none. Caregivers also

were asked if they were married or had a partner in the home.

Other social measures. Caregivers' social support was measured with the Medical Outcomes Study Social Support Survey, which is a brief social support index developed for patients with chronic conditions.^{35,36} Only the emotional/informational support subscale was administered. A higher score (range=1–5) indicated more social support, and the subscale score was calculated by averaging the scores of the 8 survey items. This subscale had high internal consistency (Cronbach $\alpha=.96$) and high 1-year stability (Cronbach $\alpha=0.72$).^{35,36}

Caregivers' life stress was measured with the Crisis in Family Systems—Revised (CRISYS-R)^{37,38} and the Spanish CRISYS-R.³⁹ Caregivers indicated which of 63 stressors or incidents they had experienced in the 6 months prior to the interview. If they experienced the event, respondents rated the experience as positive, negative, or neutral; the outcome as resolved or ongoing; and the level of difficulty ascribed to having experienced the stressor or incident. We used total number of endorsed events, with a possible range of 0 to 63. Higher scores indicated a greater number of life stressors.

Caregivers were screened for possible depression with the Center for Epidemiological Studies—Depression Scale (CES-D).^{40–43} The CES-D^{40,41} is a widely used scale and is internally consistent, with a Cronbach α of 0.85 or higher among English speakers⁴⁰ and 0.89 for Spanish speakers.^{42,43} Because scores above 15 previously have been shown to reflect clinically significant symptoms of depression,⁴⁴ caregivers with such scores were categorized as having “possible depression.”

Analysis

We performed all analyses using weighted data in Stata SE 8 (StataCorp LP, College Station, Tex). Data were weighted to reflect the probability of a child being selected from a combination of 3 subgroups of the screened population: the child's school of attendance, the language in which the school screening tool was completed (English or Spanish), and the child's asthma status at screening (diagnosed, possible, or no asthma). Standard errors were corrected for intraclass correlation within schools.

Bivariate analysis. We performed analyses using the χ^2 test and adjusted Wald test to determine associations between acculturation categories and diagnosed asthma, total potential asthma burden, insurance status, social support, life stress, and possible depression.

Multivariate analysis. Logistic regression models were estimated to test the association between children's diagnosis of asthma and caregivers' level of acculturation. With children's diagnosis of asthma as the dependent variable, we first included only caregivers' level of acculturation (model 1). We then added caregivers' education, marital status, and children's insurance status (model 2). Finally we added caregivers' social support (model 3), life stress (model 4), and possible depression (model 5). We repeated these analyses using children's potential total asthma burden as the dependent variable.

RESULTS

Demographics

The demographics of our weighted sample are shown in Table 1. Fifty-two percent of the children were boys, and children's mean age was 8.7 years. Caregivers' education was low, with 45% having less than a high school education. More than one quarter of caregivers reported a yearly income below \$10 000, and 76% were married. The largest group of children was on public insurance (44%), but 23% had no insurance. Caregivers' mean social support score was 3.45 (SD=1.08), while the caregivers' mean life stress score was 4.84 (SD=4.32). Possible depression was noted for 37% of caregivers. Sixty-two percent of caregivers chose to have the interview conducted in Spanish, and 77% reported they had not been born in the United States. Eleven percent of children had diagnosed asthma, 71% had no asthma; the total potential asthma burden was 29%.

Bivariate Analyses

In the bivariate analyses, caregivers' level of acculturation was strongly associated with children's diagnosis of asthma ($P=.025$) and weakly associated with children's total potential asthma burden ($P=.078$). Table 2 shows that the largest percentage of diagnosed

TABLE 1—Demographic Characteristics of Mexican American Schoolchildren and Their Caregivers: Chicago, Ill, 2002–2004

Characteristic	% or Mean (SD)
Child's gender, % male	52
Child's age, y, mean	8.7
Caregiver's education, %	
Some high school or less	45
High school graduate or received GED	34
More than high school	22
Caregiver's income < \$10 000, %	28
Caregiver was married, %	76
Child's insurance status, %	
Public ^a	44
Private	33
None	23
Caregiver's social support score, ^b mean (SD)	3.45 (1.08)
Caregiver's life stress score, ^c mean (SD)	4.84 (4.32)
Caregiver had possible depression, %	37
Caregiver chose Spanish for interview, %	62
Caregiver not born in the US, %	77
Caregiver's acculturation status, ^d	
Recent immigrant Spanish speaker	24
Long-term immigrant Spanish speaker	37
Long-term immigrant English speaker	15
US-born English speaker	23
Child had diagnosed asthma, %	11
Child's total potential asthma burden, ^e %	29
Child had no diagnosis or symptoms of asthma, %	71

Note. GED = general education diploma. Unweighted N = 336. Data were weighted to reflect the probability of selection from the screened population.

^aMedicaid and State Children's Health Insurance Program.

^bCaregiver's social support was measured with the Medical Outcomes Study Social Support Survey. Scores ranged from 1 to 5, with higher scores indicating greater social support (see Methods section).

^cCaregiver's life stress was measured with the Crisis in Family Systems-Revised (CRISYS-R) and the Spanish CRISYS-R. Scores ranged from 0 to 63, with higher scores indicating a greater number of life stressors (see Methods section).

^dCaretaker's acculturation was determined according to whether caretaker was recent immigrant (<10 years in United States), long-term immigrant (≥ 10 years), or US-born, and whether caretaker chose to have the interview conducted in English or Spanish.

^ePercentage of children with diagnosed or possible asthma.

asthma was seen among children of US-born English speakers (18%), whereas the smallest percentage was among children of recent-immigrant Spanish speakers (7%). The greatest total potential asthma burden was among children of US-born English speakers (41%), and the smallest was among children of immigrant English speakers (21%). For the children of the 3 immigrant groups, considered apart from children of US-born caregivers, neither diagnosed asthma ($P=.431$) nor total potential asthma ($P=.667$) changed with increased level of acculturation.

Table 2 also displays the variations in children's insurance and caregivers' social variables between acculturation categories. Children's insurance varied significantly, with children of recent-immigrant Spanish speakers having the highest uninsured rate (58%). Social support scores were highest for immigrant English speakers (mean=3.90) and lowest for recent-immigrant Spanish speakers (mean=3.11), with immigrants showing increasing social support with more acculturation ($P=.007$). Life stress scores were highest for US-born English speakers (mean=5.87) and lowest for long-term-immigrant Spanish speakers (mean=4.10), and possible depression was highest for US-born English speakers (45%) and lowest for immigrant English speakers (22%).

Multivariate Analyses

Nested models for the multivariate analysis of children's diagnosed asthma are shown in Table 3. With caregivers' level of acculturation as the only independent variable (model 1), the odds of diagnosed asthma were significantly lower for children of all immigrants compared with those of US-born English speakers: recent-immigrant Spanish speakers (odds ratio [OR]=0.32; 95% confidence interval [CI]=0.13, 0.77), long-term-immigrant Spanish speakers (OR=0.51; 95% CI=0.26, 0.98), and immigrant English speakers (OR=0.39; 95% CI=0.12, 1.21). When caregivers' education level and marital status and children's insurance status were added (model 2), the odds of diagnosed asthma among the children of immigrants ceased to be significantly different on a statistical level from the odds of diagnosed asthma among the children of US-born

TABLE 2—Diagnosed Asthma, Total Potential Asthma, and Insurance Status Among Mexican American Children and Selected Social Variables of Their Caregivers, by Caregivers' Acculturation Status: Chicago, Ill, 2002–2004

	Caregiver's Acculturation Status				P
	Recent Immigrant (<10 y), Spanish Speaker	Long-Term Immigrant (≥10 y), Spanish Speaker	Long-Term Immigrant (≥10 y), English Speaker	US-born English Speaker	
Child had diagnosed asthma, %	7	10	8	18	.025
Child's total potential asthma, ^a %	27	25	21	41	.078
Child's insurance status, %					<.001
Public ^b	29	54	35	47	
Private	13	39	30	47	
None	58	7	35	6	
Caregiver's social support score, ^c mean	3.11	3.38	3.90	3.62	.007
Caregiver's life stress score, ^d mean	5.36	4.10	4.21	5.87	.094
Caregiver had possible depression, %	37	39	22	45	.207

Note. Unweighted N = 336. Data were weighted to reflect the probability of selection from the screened population. Statistical significance tests were conducted using the Pearson χ^2 test and the adjusted Wald test.

^aTotal potential asthma comprises diagnosed asthma and possible asthma.

^bDefined as enrollment in Medicaid or State Children's Health Insurance Program.

^cCaregiver's social support was measured with the Medical Outcomes Study Social Support Survey. Scores ranged from 1 to 5, with higher scores indicating greater social support (see Methods section).

^dCaregiver's life stress was measured with the Crisis in Family Systems-Revised (CRISYS-R) and the Spanish CRISYS-R. Scores ranged from 0 to 63, with higher scores indicating a greater number of life stressors (see Methods section).

English speakers, but the odds ratios of all 3 immigrant groups remained in the 0.5 to 0.6 range, and separate tests (not shown) found no statistically significant differences between these 3 coefficients in any of the models.

When we controlled for the other variables (models 2–5), children's public insurance status predicted higher odds of diagnosed asthma (e.g., in model 2, OR=4.34; 95% CI=1.60, 11.75). Caregivers' social support did not appreciably change other coefficient estimates and was not significantly associated with children's diagnosed asthma (model 3). When caregivers' life stress was added to the model (model 4), children's private insurance status became weakly predictive of children's diagnosed asthma (OR=2.83; 95% CI=0.88, 9.17) and caregivers' life stress independently predicted increased levels of children's diagnosed asthma (OR=1.11; 95% CI=1.05, 1.18). Finally, adding caregivers' possible depression did not appreciably change prior coefficient estimates and was not significantly associated with children's diagnosed asthma (model 5).

Nested multivariate models of total potential asthma burden also were estimated (not shown). Coefficient estimates, and coefficient changes between models, were very similar to those found in the nested models of diagnosed asthma just described. The only substantive difference was that children's insurance status ceased to be predictive of total asthma burden.

DISCUSSION

Data on Mexican American children from the third National Health and Nutrition Survey showed that being born in the United States was associated with increased risk of diagnosed asthma,²¹ and Simon et al. reported less diagnosed asthma among Hispanic children whose caregivers' preferred language was Spanish as opposed to English.⁴⁵ Similarly, our results showed an association between caregivers' level of acculturation and children's asthma burden, with less diagnosed asthma and total potential asthma burden seen among children whose caregivers were

less acculturated. This protective effect of caregivers' level of acculturation was mediated by children's insurance status and caregivers' education, marital status, social support, and life stress. These results expand on the current literature by using a broader definition of acculturation that includes place of birth, time lived in the United States, and language use and by assessing whether the protective effect of acculturation is transferred from caregivers to children. They also provide new evidence to explain this acculturation effect.

Although our results confirm that caregivers' level of acculturation provides a protective effect on children's asthma burden, our study also extends previous work on the health effects of acculturation. Although we found a "healthy immigrant effect" for the children of immigrants compared with those of US-born immigrants, we did not find this effect when we compared immigrant groups with one another. The healthy immigrant effect postulates that new immigrants (low acculturation) have better health outcomes than nonimmigrants and that with increased time in the United States (increased acculturation), the health outcomes of immigrants should deteriorate to more closely resemble those of US-born individuals.^{7,9} This effect is related to the theory that recent immigrants have high levels of social support and are relatively protected from depression and stress, which in turn protects them from adverse health outcomes.^{9,13,14,46–49}

We found, however, that whereas the children of Mexican American immigrants had less asthma overall than the children of US-born caregivers, the rates of diagnosed and total potential asthma among the children of immigrants did not increase with increasing acculturation, measured either by language use or by time in the United States. This finding, which suggests that place of birth could be a more health-relevant dimension of acculturation status than either language use or time in the United States, is deserving of more thorough investigation. Further, compared with immigrants with higher levels of acculturation, recent-immigrant caregivers did not appear to have either lower levels of life stress or possible depression or higher levels of social support; of these 3 potential

TABLE 3—Logistic Regression Models of Diagnosed Asthma Among Mexican American Schoolchildren, by Caregivers' Characteristics and Children's Insurance Status: Chicago, Ill, 2002–2004

	Model 1, OR (95% CI)	Model 2, OR (95% CI)	Model 3, OR (95% CI)	Model 4, OR (95% CI)	Model 5, OR (95% CI)
Caregiver's acculturation status ^a					
Recent immigrant (<10 y) Spanish speaker	0.32** (0.13, 0.77)	0.54 (0.18, 1.63)	0.58 (0.20, 1.65)	0.63 (0.21, 1.89)	0.63 (0.21, 1.90)
Long-term immigrant (≥10 y) Spanish speaker	0.51** (0.26, 0.98)	0.56 (0.24, 1.29)	0.59 (0.27, 1.29)	0.69 (0.30, 1.58)	0.69 (0.30, 1.59)
Long-term immigrant (≥10 y) English speaker	0.39* (0.12, 1.21)	0.52 (0.19, 1.47)	0.58 (0.21, 1.64)	0.67 (0.20, 2.25)	0.67 (0.20, 2.24)
US-born English speaker (Reference)	1.0	1.0	1.0	1.0	1.0
Caregiver's education					
Some high school or less (Reference)		1.0	1.0	1.0	1.0
High school graduate or received GED		1.26 (0.64, 2.47)	1.25 (0.64, 2.43)	1.24 (0.62, 2.49)	1.23 (0.62, 2.46)
More than high school		1.17 (0.51, 2.69)	1.04 (0.45, 2.44)	0.96 (0.42, 2.20)	0.95 (0.42, 2.15)
Caregiver was married		0.63 (0.20, 1.97)	0.66 (0.21, 2.12)	0.84 (0.26, 2.75)	0.84 (0.26, 2.70)
Child's insurance status					
None (Reference)		1.0	1.0	1.0	1.0
Public ^b	0	4.34*** (1.60, 11.75)	4.03** (1.48, 11.03)	4.63** (1.56, 13.80)	4.71*** (1.63, 13.58)
Private		2.43 (0.74, 7.95)	2.46 (0.77, 7.80)	2.83* (0.88, 9.17)	2.87* (0.90, 9.15)
Caregiver's social support			1.07 (0.87, 1.31)	1.09 (0.88, 1.37)	1.08 (0.86, 1.36)
Caregiver's life stress				1.11*** (1.05, 1.18)	1.12*** (1.04, 1.20)
Caregiver had possible depression					0.91 (0.41, 2.06)

Note. GED = general education diploma; OR = odds ratio; CI = confidence interval. Unweighted N = 336. Data were weighted to reflect the probability of selection from the screened population. For explanation of models, see last paragraph of the Methods section.

^aCaretaker's acculturation was determined according to whether caretaker was a recent immigrant (<10 years in United States), a long-term immigrant (≥10 years), or US-born and whether caretaker chose to have the interview conducted in English or Spanish.

^bDefined as enrollment in Medicaid or State Children's Health Insurance Program.

* $P < .10$; ** $P < .05$; *** $P < .01$.

correlates of asthma, only caregivers' life stress appeared to be independently associated with children's asthma.

Our finding that caregivers' higher life stress independently predicted children's increased diagnosed asthma and total potential asthma was consistent with other studies of stress and asthma and suggests that caregivers' life stress plays a significant role in asthma prevalence.^{23–26} Of note, the life stressors instrument we used includes many items that are associated with the immigrant experience, but it was not developed specifically to represent that experience. Thus, our measures of stress may not have captured all additional stress associated with immigration.

Strong associations were also seen between children's insurance status and both caregivers' level of acculturation and children's diagnosed asthma, suggesting that having a diagnosis of asthma may, at least in part, be a function of the greater access to care that having insurance can make possible. Further confirming this possibility was our finding

that children's insurance status did not predict increased total potential asthma burden. More than 90% of the children in this study were born in the United States and thus were eligible for public or private insurance. Poor rates of enrollment in insurance programs, however, are often seen among immigrant Hispanics^{50,51} and are thought to result from fear, confusion, and legal barriers regarding insurance enrollment.^{52,53} These barriers limit access to care for immigrants and subsequently affect the ability of their children to receive a diagnosis of asthma.

This analysis has several limitations. The BPAS+ allowed us to assess total potential asthma burden and to understand how access and social variables influence all children with asthma. However, because the BPAS+ is subject to responder bias, it is not a perfect predictor of diagnosed asthma. In addition, having possible asthma does not necessarily indicate having undiagnosed asthma, although it does flag a population in which many children will be diagnosed with

asthma upon further evaluation. Our measure of social support was professionally translated into Spanish, but it was not developed or formally validated in a Hispanic population. It therefore may not have appropriately captured the Mexican American experience of social support.

Although the asthma rates from our sample closely resembled those collected nationally, our data were not drawn from a population-based sample and thus our results cannot be generalized to the entire Mexican American population. Instead, our findings represent the associations between asthma and language, place of birth, and tenure in the United States among caregivers of children living and attending schools in a single urban setting that is a major receiver of Mexican immigrants. Our data were cross-sectional and therefore exploratory; the associations we observed may or may not be causal.

Our study suggests that caregivers' level of acculturation is an important factor in childhood asthma and that social factors such as

children's insurance status and caregivers' education, marital status, and life stress are important mediators of acculturation. It is likely that other social factors that we did not measure also contribute to the acculturation effect. A larger study that can further clarify the components of acculturation and their contribution to asthma is therefore still needed. Language, country of birth, and time lived in the United States serve only as proxies for more complex social and psychological realities that may partially determine the health of people who move to a country where their culture is not dominant. To better serve the health needs of Mexican American children, we must strive to better understand and address the caregiver characteristics associated with asthma prevalence among children. ■

About the Authors

Molly A. Martin is with the Departments of Preventive Medicine and Pediatrics, Rush University Medical Center, Chicago, Ill. Madeleine U. Shalowitz, Elizabeth Clark-Kauffman, and Elizabeth Perez are with the Department of Child and Family Health Studies, Evanston Northwestern Healthcare, Evanston, Ill. Tod Mijanovich and Carolyn A. Berry are with the Center for Health and Public Service Research, Robert F. Wagner Graduate School of Public Service, New York University, New York, NY.

Requests for reprints should be sent to Molly A. Martin, MD, MAPP, Rush University Medical Center, 1700 W Van Buren St, Suite 470, Chicago, IL 60612 (e-mail: molly_a_martin@rush.edu).

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Contributors

M.A. Martin originated the idea for this article and led the literature review, data analysis, and writing. M.U. Shalowitz and C.A. Berry assisted with preparing and writing the article. T. Mijanovich assisted with data analysis and writing the article. E. Perez and E. Clark-Kauffman assisted with data analysis and editing.

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