ORIGINAL ARTICLE

Variation in Asthma Beliefs and Practices Among Mainland Puerto Ricans, Mexican-Americans, Mexicans, and Guatemalans

Lee M. Pachter, D.O.,[1,*] Susan C. Weller, Ph.D.,[2]
Roberta D. Baer, Ph.D.,[3] Javier E. Garcia de
Alba Garcia, M.D., Ph.D.,[4] Robert T. Trotter II, Ph.D.,[5]
Mark Glazer, Ph.D.,[6] and Robert Klein, Ph.D.[7]

[1]Departments of Pediatrics and Anthropology, University of
Connecticut School of Medicine and St. Francis Hospital and
Medical Center, Hartford, Connecticut
[2]Department of Preventive Medicine and Community Health,
University of Texas Medical Branch, Galveston, Texas
[3]Department of Anthropology, University of South Florida,
Tampa, Florida
[4]Department of Social Epidemiology, IMSS Hospital,
 Guadalajara, Mexico
[5]Department of Anthropology, Northern Arizona University,
Flagstaff, Arizona
[6]University of Texas Pan American, Edinburg, Texas
[7]Medical Entomology Research Training Unit,
Guatemala City, Guatemala

ABSTRACT

*This study reports on community surveys of 160 representative Latino adults in
Hartford, CT; Edinburg, TX; Guadalajara, Mexico; and in rural Guatemala. A
142-item questionnaire covered asthma beliefs and practices (e.g., causes, symp-
toms, and treatments). The cultural consensus model was used to analyze the
agreement among respondents within each sample and to describe beliefs. Beliefs
were then compared across the four samples. Analysis of the questionnaire data*

*Corresponding author. Lee M. Pachter, D.O., Center for Children's Health and Development, St. Francis Hospital and
Medical Center, 114 Woodland St., Hartford, CT 06105. Fax: 860-714-8054; E-mail: lpachter@stfranciscare.org

shows that there was overall consistency or consensus regarding beliefs and practices among individuals at each site (intraculturally) and to a lesser extent across respondents of all four different Latino cultural groups (i.e., interculturally). This pattern of response is indicative of a shared belief system among the four groups with regard to asthma. Within this shared belief system though, there is systematic variation between groups in causes, symptoms, and treatments for asthma. The most widely recognized and shared beliefs concerned causes of asthma. Notable differences were present between samples in terms of differences in beliefs about symptoms and treatments. The biomedical model is shown to be a part of the explanatory model at all sites; in addition to the biomedical model, ethnocultural beliefs such as the humoral ("hot/cold") aspects and the importance of balance are also evident. The Connecticut Puerto Ricans had a greater degree of shared beliefs about asthma than did the other three samples (p < 0.00005). It was concluded that the four Latino groups studied share an overall belief system regarding asthma, including many aspects of the biomedical model of asthma. In addition, traditional Latino ethnomedical beliefs are present, especially concerning the importance of balance in health and illness. Many beliefs and practices are site-specific, and caution should be used when using inclusive terms such as "Hispanic" or "Latino," since there is variation as well as commonality among different ethnic groups with regard to health beliefs and practices.

Key Words: *Asthma; Hispanic/Latino; Health beliefs; Health practices*

INTRODUCTION

Asthma is one of the most common chronic illnesses in the United States. Although it is highly prevalent in the general population, asthma disproportionately affects individuals of lower socioeconomic status and of racial and ethnic minority groups. In the United States, the prevalence of asthma in poor children under six years of age is 4.2% as compared to 3.1% in nonpoor children (1). Reasons for this discrepancy are many, and include issues relating to access to care, health education, higher household density (causing a greater likelihood of respiratory infections), and greater exposure to environmental allergens (such as cockroach and dust mite antigens) (2).

Asthma is the most common chronic illness affecting Latino children in the United States (3). The national U.S. Hispanic HANES data show that Puerto Rican children have the highest prevalence of asthma in the country (20.1% lifetime, 11.2% point prevalence), almost double that of the second highest group, the non-Hispanic Blacks (9.1% lifetime, 5.9% point) (4). Intermediate prevalence rates occur in Cuban-American children (8.8% lifetime, 5.2% point) and non-Hispanic white children (6.4% lifetime, 3.3% point), with the lowest rate among first generation Mexican-American children (4.5% lifetime, 2.7% point) (4,5). Vital statistics for the United States indicate that the asthma mortality rates for these populations show the same relative ordering of groups (6). Puerto Ricans have a higher risk of asthma than non-Hispanic Blacks and other Hispanic groups (Dominicans) even when they live in the same neighborhood (7).

Hypotheses proposed to explain this wide range of prevalence rates within the United States include possible genetic (8) or biological differences (such as larger airways in Mexican-Americans, accounting for better pulmonary functioning (9)), environmental issues (such as higher smoking rates among Puerto Rican women of reproductive age as compared to Mexican-American or Cuban-Americans (10)), and the confounding of race and ethnicity with socioeconomic differences (11–13), and access to health care (3). A study done in California suggests that Mexican-American children may actually have much higher rates of asthma, specifically with undiagnosed disease, due to a lack of health care insurance (14). There are also generational and

acculturative effects seen in the Mexican-American population, with higher reported asthma rates seen in second and third generation children of Mexican-American parents as compared to first generation (5).

Often the terms "Hispanic," "non-Hispanic black," and "non-Hispanic white" are used to classify individuals, especially in official U.S. federal data collection projects and policy documents. Unfortunately these categories do not represent socioculturally nor biologically homogeneous groups. For example, the subgroups of "Hispanics" or "Latinos" (Mexican-Americans, Puerto Ricans, and Cubans) exhibit notable differences in their overall patterns of morbidity and mortality (15). Children of these groups differ in health status measures as well (16–20). While biological and/or lifestyle risk factors can cause such differences, sociocultural factors also influence how patients conceptualize illness: its cause, pathophysiology, symptomatology, risk, and therapy (their explanatory model of the illness (21)). The sociocultural context within which illness occurs, in turn, affects illness management in many ways, including preventive practices, illness identification, social meaning of the illness, symptom expression, the effectiveness of the doctor–patient communication, and treatment strategies (22,23).

Ethnic groups worldwide see good health as the result of a balance between opposing forces. This is sometimes expressed as yin and yang, and sometimes as the belief that health is a state of balance between hot and cold elements. When this balance is disrupted, illness can occur (24). It is important to put these beliefs into perspective; humoral (hot–cold) beliefs are not specific to Latino cultures but are noted in many diverse cultural groups. These beliefs may exist side-by-side with more conventional biomedical beliefs and practices; and some humoral beliefs are concordant to some extent with the biomedical model (25–28). The overall importance of balance and harmony extends to emotions as well, since excessive emotions also are seen as potential causes of somatic illness and are often identified as part of traditional Latino ethnomedical beliefs (24).

Because patients' beliefs and practices play a role in understanding, defining, and responding to illness, it is important to understand that such beliefs may vary in systematic ways between ethnic groups (21). Individuals often combine both biomedical and alternative medical beliefs and practices in their approach to illness, and clinicians should be aware of community beliefs and practices in order to optimize health education and clinical management. The aim of this study is to identify community beliefs and practices regarding asthma causes, symptoms, and treatments in different Latino populations. The focus is on community beliefs and practices, since recognition and management of disease take place within that setting. Beliefs and practices regarding asthma are described and compared across different Latino populations. Comparisons are also made between Latino and biomedical models for asthma.

METHODS

Study Sites

Four very diverse populations were chosen for study to represent the range of diversity among Latinos. Samples were chosen at two U.S. and two international sites. The two U.S. samples offer a comparison between the two largest U.S. Latino groups (Puerto Ricans and Mexican-Americans). Puerto Ricans were interviewed in Hartford, Connecticut, and Mexican-Americans were interviewed in Edinburg, Texas. Hartford (pop. 130,000) is a mid-sized industrial city in the northeastern United States. The Latino population of Hartford constitutes 39% of the total city population, and almost half (47%) of the students enrolled in the Hartford public school system are Latino/Hispanic. Edinburg (pop. 29,885) is located in the Lower Rio Grande Valley of Texas, within 15 miles of the U.S.–Mexico border. It is a mixed urban and agricultural area and a majority (80%) of the inhabitants are Mexican-American.

International samples were selected in urban Mexico and in rural Guatemala. A Mexican sample was chosen to compare beliefs and practices of groups from a similar ancestral heritage (Mexican and Mexican-Americans), but who differ with regard to other factors. In Mexico, interviews were conducted in Guadalajara (pop. ~ 2 million), a large, industrial city and agricultural center. It is the second largest city in Mexico and residents come from both urban and rural backgrounds. An additional sample was chosen in Guatemala for its distinction from the other groups with regard to poverty, a lower educational level, lack of access to health care, and because migrant workers in the United States often come from such backgrounds.

In Guatemala, interviews were conducted in rural communities (pop. 500 each) on the Pacific Coastal Plain, in the Department of Esquintla, approximately 30 km from the nearest city. Such rural communities are typical of conditions for many rural Guatemalans; where individuals live in houses with dirt floors and no indoor plumbing, and work on sugar cane and cotton plantations.

Questionnaire Development

A structured questionnaire was developed from open-ended interviews conducted at each site and from materials in the literature. Initially, descriptive, open-ended interviews were conducted with approximately 20 people at each site ($n = 80$). The purpose of the interviews was to obtain culturally relevant descriptions of asthma, including possible folk etiologies and treatments. Individuals were asked about causes, susceptibility, symptoms, and treatments for asthma (explanatory models). Responses from those interviews (mentioned by at least 10% of people at each site), a comprehensive coverage of possible symptoms (from the Cornell Medical Index (29)), and a few additional items from the anthropological literature concerning folk concepts of causality (*susto*/fright, evil eye, and witchcraft) and healing (massages, teas) were incorporated into a structured questionnaire. The final questionnaire consisted of 142 yes/no questions regarding asthma beliefs and practices, in three sections: causes and susceptibility (52 items); symptoms (48 items); and treatments and sequelae (42 items). The questionnaire was independently translated into Spanish at each site to account for local colloquialisms and difference in Spanish usage (the questionnaire can be obtained from the authors, L.M.P. or S.C.W.).

Procedure

After the structured interview materials were developed, a representative sample was interviewed at each of the four sites. A multistage random sampling strategy was used at each of the urban sites. In Hartford, five of the census tracts with the highest proportion of Puerto Ricans were selected, then streets, blocks, and households were sampled proportionately. In Edinburg, census tracts, blocks, and then households were selected. In

Guadalajara, a neighborhood sampling strategy was chosen, similar to that of Stern et al. (30). Three neighborhoods were sampled proportionately to represent socioeconomic variation in Guadalajara (middle-, working-, and lower-class), then blocks, and households were sampled within each. In Guatemala, four rural villages were chosen and an equal number of households were selected from each village.

In order to be interviewed, respondents had to be adult Latinos. In Hartford, individuals had to self-identify as being of Puerto Rican heritage and in Edinburg they had to self-identify as being of Mexican heritage. Women were the preferred respondent for a household, as it was assumed that they had primary responsibility for family health care. Interviews were conducted by local interviewers at each site in the local dialect of Spanish. In Hartford and Edinburg, interviews were conducted in Spanish or English according to the respondent's preference. The project was approved by the Institutional Review Board of the University of Texas Medical Branch.

Analysis

In order to identify cultural beliefs and practices regarding asthma in the four Latino groups, a data analytic technique called *cultural consensus analysis* (31–33) was used. A consensus analysis is used to estimate answers to a series of related questions when the answers are unknown. The method estimates both the answers to the questions and each respondent's knowledge ("cultural competency") concerning the questions. The method was developed in the social sciences and is known as the Condorcet or jury problem in political science (34), grading without an answer key in psychology (32), the cultural consensus model in anthropology (31), and as assessing rater accuracy without a "gold standard" in medical decision making (33). Consensus analysis has been used to study accuracy in interpreting pediatric x-rays (33) and to describe beliefs about diseases (diabetes (35), AIDS (36–37), malaria (38), cervical and breast cancer (39–40), the common cold (41), and pediatric respiratory symptoms (42)).

The cultural consensus model is based upon the assumption that agreement between a pair of respondents is a function of the degree to which

each knows the correct answer. Individual competency scores are estimated from the pattern of agreement between all pairs of respondents. The "cultural competency" scores indicate how well each individual knows the group's beliefs; e.g., how well the responses of each individual match the "normative" responses of the group. (In this sense, "cultural competency" is defined as shared knowledge among study respondents and is different from the more popular use of the term as meaning something similar to "cultural sensitivity.") The respondent agreement matrix is "factored," much like a factor analysis of *people* instead of *items*. A single factor solution indicates that a single pattern or theme is present in the responses across individuals; e.g., there is a single group of respondents with a single set of answers for the set of questions. If a single factor structure is present, each individual's responses are weighted by their cultural competency score and pooled across individuals to estimate the answers to the questions. Using each individual's competency score and the pattern of responses across individuals, prior probabilities are adjusted and a Bayesian posterior probability is calculated for each answer.

Consensus analysis parallels a maximum-likelihood latent class analysis in evaluating the pattern in response data to predict answers to the questions and to estimate rater accuracy, but it does not require a large sample size because fewer parameters are estimated (32,33). As with all sample-size requirements, sample-size determination is a function of variation and willingness to make judgment errors. *Variation* in responses is represented by the agreement level or the average competency level. The likelihood of a classification error is represented by the desired confidence level for the Bayesian posterior probability for classifying items as "true" or "false" and the proportion of questions to be *correctly* classified. A conservative sample size can be estimated from low agreement (average cultural competency of 0.50, comparable to an average Pearson correlation coefficient of 0.25 among respondents (43)), a high confidence level (a Bayesian posterior probability level at 0.99 and beyond for classifying answers), and a large proportion of answers to be correctly classified (0.95 correct). With these estimates, a minimum of 23 respondents per group are required to obtain reliable and valid results (31,32).

For this study, agreement between pairs of respondents' dichotomous responses was measured with covariance (because it is less sensitive to response bias (33)) and the proportion of positive responses was assumed to be 50%. Also, a conservative Bayesian classification rule was used; and only answers classified at the $p \geq 0.999$ confidence level were considered classified. A target sample size of 40 was selected for each site to ensure that the sample size was sufficient for describing beliefs for each sample and making some comparisons within samples. The consensus analysis was run with Anthropac software (44). Demographic variables were compared to cultural knowledge (competency) scores with Pearson correlation coefficients for interval-scaled variables (age, educational level, household size); and with ANOVA and the mathematically equivalent correlation, eta, for categorical variables (gender, acquaintance with someone with asthma, having asthma, language of interview) (45).

RESULTS

There were 161 completed interviews. For individuals meeting the study inclusion criteria, the response rate was 83% overall, but was 90% in rural Guatemala; 90% in Hartford, Connecticut; 87% in Guadalajara, Mexico; and 65% in Edinburg, Texas. One respondent was dropped from the Connecticut sample, because more than 10% of answers were missing. The final sample, then, consisted of 39 Puerto Ricans, 41 Mexican-Americans, 40 Mexicans, and 40 Guatemalans.

Most of the respondents were women approximately 40 years of age (Table 1). Demographic information varied significantly across samples, but was concordant with descriptions of those regions. Household size varied across the samples with the largest households in Mexico and the smallest in Connecticut. Educational level varied from a low of 2.1 years in Guatemala to a high of 12.5 years in Texas. In Connecticut, 18% of the respondents were born in mainland United States; and in Texas, 95% were born in the United States. Questions regarding personal experience with asthma indicated that the majority of respondents knew someone with asthma (95% in Connecticut, 80% in Texas, 65% in Mexico, and 83% in Guatemala). Each sample also included some individuals with asthma: 28%

Table 1

Sample Characteristics

	Females (%)	Age in Years (SD)	Household Size	No. of Children (SD)	Education (SD)	Knows Someone with Asthma (%)	Asthma in Family (%)	Has Asthma (%)
Connecticut ($n = 39$)	74	37.8 (14.0)	3.4 (1.6)	2.5 (2.2)	9.8 (3.6)	95	77	28
Texas ($n = 41$)	100	40.3 (12.8)	3.9 (1.3)	2.6 (2.1)	12.5 (2.9)	80	44	5
Mexico ($n = 40$)	100	39.3 (15.8)	5.3 (2.5)	4.4 (3.3)	5.7 (3.4)	65	41	8
Guatemala ($n = 40$)	90	42.5 (16.5)	5.2 (2.7)	2.3 (2.1)	2.1 (2.1)	83	43	13

Table 2

Proportion of Shared Beliefs by Sample and Type of Question[a]

	Causes	Symptoms	Treatments	Overall
Connecticut	0.75 ± 0.14	0.58 ± 0.15	0.57 ± 0.10	0.67 ± 0.10
Texas	0.61 ± 0.14	0.39 ± 0.16	0.49 ± 0.16	0.52 ± 0.11
Mexico	0.57 ± 0.17	0.44 ± 0.15	0.52 ± 0.15	0.52 ± 0.12
Guatemala	0.59 ± 0.17	0.42 ± 0.20	0.52 ± 0.14	0.52 ± 0.12
Overall	0.48 ± 0.25	0.30 ± 0.27	0.43 ± 0.17	0.49 ± 0.13

[a]Average proportion of shared beliefs (cultural competency) and one standard deviation.

in Connecticut, 5% in Texas, 8% in Mexico, and 13% in Guatemala.

A single, shared set of beliefs about asthma existed within each sample. Results of the consensus analysis on the 142 questions about asthma indicated that there was a single "factor" structure among the respondents; e.g., there was a single pattern or theme in the responses. The eigenvalue ratio between the first and second factors exceeded the recommended 3:1 ratio (6:1 in Texas, 7:1 in Mexico, 7:1 in Guatemala, and 12:1 in Connecticut), indicating a good fit between the data and the consensus model.

The results show that there was consistency of beliefs regarding causes, symptoms, and treatments at all sites, with the highest level occurring within the Connecticut Puerto Rican sample (Table 2; 0.67 ± 0.10). Individual cultural knowledge or "cultural competency" scores can range from zero to one and can be interpreted as the proportion of shared beliefs within a sample. Approximately 67% of beliefs or answers to the questions about asthma were shared in the Connecticut Puerto Rican community. The overall level of shared beliefs was much lower in the other three samples: 0.52 (± 0.11)

in Texas sample, 0.52 (± 0.12) in Mexico; and 0.52 (± 0.12) in Guatemala. In each sample, agreement was highest for questions about causes of asthma and lowest for symptoms.

To see if there was interpretable variation within each sample, demographic variables (age, educational level, household size, acquaintance with someone with asthma, etc.) were compared to individual cultural knowledge scores. In Connecticut, younger respondents ($r = -0.52$, $p < 0.001$) with fewer children ($r = -0.47$, $p < 0.01$) knew more of the cultural beliefs about asthma. In Mexico, those who reported a family member with asthma (eta $= +0.31$, $p < 0.05$) knew more about asthma. In Texas and Guatemala, no demographic variables were associated with cultural knowledge. In Connecticut and Texas, none of the variables that might indicate acculturation, such as preferred language of the interview, birthplace, and length of residence in the United States, was associated with greater knowledge of asthma.

Analysis of all four sites together indicated a consistent pattern of asthma beliefs among the four samples as well as within each sample. Together, all four samples met the goodness-of-fit criteria for the

consensus model (eigenvalue ratio 5:1), but with a relatively low level of shared beliefs across samples. Only 49% (±0.13) of beliefs were shared across all four samples. An ANOVA showed that the level of sharing (cultural competency scores) was significantly different across the four samples ($p < 0.00005$) with the strongest or most highly shared beliefs in the Puerto Rican sample (Scheffe's test, $p < 0.05$).

For the 52 questions about causes and susceptibility to asthma, three or more sites reported environmental allergens (air pollution/dirty air, smoking cigarettes, breathing smoke, allergies, animal hairs, and dust/dirt), innate factors (weak lungs, inherited), and humoral etiologies (exposure to hot or cold elements). (Table 3 shows items where at least one sample believed the item was a cause.) Imbalances in hot and cold elements, particularly exposure to cold, were believed to cause asthma. While the Mexican and Guatemalan samples reported many more hot/cold causes ("taking a bath while having a cold or flu," "drinking icy drinks when one is sweating," "walking on cold floor without shoes," or "getting wet while sweating"); the Connecticut, Mexican, and Guatemalan samples all reported that exposure to cold can cause asthma

Table 3

Causes of Asthma[a]

Causes	Response			
	CT	TX	M	G
1. Weak lungs	Y	Y	Y	Y
2. Air pollution/dirty air	Y	Y	Y	Y
3. Smoking cigarettes	Y	Y	Y	Y
4. Untreated cold/flu	Y	N	Y	Y
5. Breathing smoke	Y	—	Y	Y
6. Inherited	Y	Y	N	Y
7. Allergies	Y	Y	Y	N
8. Animal hairs	Y	N	Y	Y
9. Dust/dirt	Y	—	Y	Y
10. Exposure to drafts/winds	Y	—	Y	Y
11. Change in the weather	Y	N	Y	Y
12. Cold weather	Y	N	Y	Y
13. Not being properly clothed in cold weather	Y	N	Y	Y
14. Virus	N	N	Y	Y
15. Taking a bath while having a cold or flu	N	N	Y	Y
16. Drinking icy drinks when one is sweating	N	N	Y	Y
17. Walking on cold floor without shoes	N	N	Y	Y
18. Getting wet while sweating	N	N	Y	Y
19. Being overweight/obese/fat	Y	N	—	Y
20. Overexertion	Y	—	N	Y
21. Nerves	Y	N	—	N
22. Strong emotions	Y	N	—	N
23. Warm, hot weather	Y	N	N	N
24. Living in an unclean house	Y	N	—	—
25. Anemia	N	N	—	Y
26. Lack of vitamins	N	N	N	Y
27. Bathing a lot	N	N	N	Y

[a]"Y" refers to a positive response for the item, "N" refers to a negative response, "—" refers to a lack of consensus on the response to the item; CT = Connecticut/mainland Puerto Rican, TX = Texas/Mexican-American, M = Mexican, G = Guatemalan.

("exposure to drafts/winds," "change in the weather," "cold weather," "not being properly clothed in cold weather"). Respondents also felt that an untreated cold/flu can cause asthma, as could a virus. A few causes were unique to specific sites (in Connecticut: overweight, overexertion, nerves, strong emotions, warm weather, and a dirty house; in Guatemala: anemia, lack of vitamins, and bathing too much). None of the samples reported that asthma is caused by: parasites; fright (*susto*); witchcraft; a hard, envious stare; food stuck in the stomach; drinking hot liquids; eating too much; eating spoiled food; sleeping late in the day; eating dry food; lying; drinking unboiled water; eating certain foods; eating too much; being near a person with asthma; using things that were used by someone with asthma; an unbalanced diet.

Differences between samples were the most evident for symptoms. For the 48 questions about the signs and symptoms of asthma, all groups agreed on the major respiratory signs (wheezing, cough, chest noise, fast or difficult breathing). The Texas sample reported only those symptoms and "choking." The other three samples additionally reported chest pain, decreased activity, and an increase in blood pressure. The Connecticut sample included those symptoms and chest congestion, fast heartbeat, tired/dark eyes, difficulty sleeping, weakness, paleness, visible ribs when breathing, difficulty talking, and red eyes. The Mexican sample reported hoarseness, pneumonia, thirst, fever/chills, and agitation. The Guatemalan sample reported most of the above symptoms as well as many that are more generally associated with an upper respiratory infection. (Table 4 shows symptoms reported by one or more samples.) No samples reported the symptoms of a swollen, bloated stomach; coughing up blood; sneezing; stomach ache; constipation; skin turning yellow; runny nose; diarrhea; vomiting; earache; flushed/red face; crying.

Of the 42 questions that covered treatments, sources for treatment, and sequelae, all four samples reported relaxing/keeping calm, taking medicines prescribed by a doctor, and going to a hospital (Table 5). All samples also reported that if asthma is not treated, it can turn into bronchitis and/or one can die from it. All samples, except Mexico, reported that breathing exercises would help asthma. Mexico and Connecticut added "avoiding getting upset"; and Mexico and Guatemala reported vitamins, drinking liquids, eucalyptus tea, honey,

and praying as treatments. Some treatments were site specific, for example, Mexico reported antibiotics and sedatives and Guatemala advocated herbal teas (chamomile, orange/lemon, bitter, spearmint), garlic, eucalyptus balm, aloe vera or cactus juice, alcohol rub, and applying hot water to the chest. Neither of the U.S. samples believed that many of the herbal or folk therapies were appropriate asthma treatments, whereas the Guatemalan sample responded positively to many of the questions regarding the use of these therapies as well as seeking care from an herbalist. None of the samples reported the following treatments: aspirin or Tylenol, exercise or not exercising; Milk of Magnesia/Pepto Bismol, cod liver oil or shark oil, marijuana tea, a few drops of gasoline in tea, burning prayer candles, going to a folk healer such as a *santiguadora/sobadora*, *curandero* or *espiritista*, massage, placing holy water in the shape of a cross on the body, drinking milk, *maguey* syrup, or herbal syrup (*siete jarabes*).

DISCUSSION

The results of this study show the uniformity and variability in beliefs and practices regarding asthma in four distinct Latino groups. Analysis of the questionnaire data shows that there was overall consistency or consensus regarding beliefs and practices among individuals at each site (*intra*culturally) and to a lesser extent across respondents of all four different Latino cultural groups (i.e., *inter*culturally). This pattern of response is indicative of a shared belief system among the four groups with regard to asthma. Within this shared belief system though, there is systematic variation between groups in causes, symptoms, and treatments for asthma.

With regard to beliefs concerning causes of asthma, the biomedical model is shown to be a part of the explanatory model at all sites, as can be seen by the affirmative responses to items such as breathing smoke, smoking cigarettes, animal hair, allergies, air pollution, dust and dirt causes asthma. In addition to the biomedical model, belief in humoral ("hot/cold") aspects of health and illness is evident, with positive responses to items such as cold weather, exposure to drafts and winds, changes in the weather, not being properly clothed in cold weather. Other aspects pertaining to the importance of balance in health and illness are evident as

Table 4

Symptoms of Asthma[a]

Symptoms	Response[b]			
	CT	TX	M	G
1. Wheezing/whistling sound	Y	Y	Y	Y
2. Cough	Y	Y	Y	Y
3. Noise in the chest	Y	Y	Y	Y
4. Breathing fast	Y	Y	Y	Y
5. Breathing difficulty	Y	Y	Y	Y
6. Choking	—	Y	Y	Y
7. Chest pain	Y	—	Y	Y
8. Decreased activity/lack of animation	Y	—	Y	Y
9. Decreased activity	Y	—	Y	Y
10. Blood pressure goes up	Y	—	Y	Y
11. Chest congestion	Y	N	N	Y
12. Hoarseness	N	N	Y	Y
13. Can one get pneumonia from asthma	N	N	Y	Y
14. Mucus/phlegm	Y	N	—	Y
15. Fast heartbeat	Y	—	—	Y
16. Excessive thirst	N	N	Y	Y
17. Fever and chills	N	N	Y	Y
18. Tired looking eyes/dark circles under eyes	Y	N	N	Y
19. Agitation	Y	—	Y	—
20. Not being able to sleep	Y	N	N	Y
21. Weakness	Y	—	N	Y
22. Paleness	Y	—	—	Y
23. See one's ribs while breathing	Y	N	N	—
24. Sore throat	N	N	—	Y
25. Itchy throat	N	N	—	Y
26. Difficulty swallowing	N	N	—	Y
27. Unable to talk	Y	N	N	—
28. Nausea	N	N	N	Y
29. Fever	N	N	—	Y
30. Muscle and body aches/pain	—	N	N	Y
31. Red, inflamed eyes	Y	N	N	N
32. Headache	N	N	—	Y
33. Lack of appetite	N	N	N	Y
34. Watery eyes	N	N	N	Y
35. Night sweats	—	N	—	Y
36. Crankiness/irritability	N	N	N	Y

[a]"Y" refers to a positive response for the item, "N" refers to a negative response, "—" refers to a lack of consensus on the response to the item.
[b]"CT" = Connecticut; "TX" = Texas; "M" = Mexico; "G" = Guatemala.

well: "weak lungs," overexertion, and—in the Puerto Rican sample—nerves and strong emotions. These findings indicate that concepts of hot–cold and balance are important aspects of the model of asthma shared by these ethnic groups.

In a similar study, Baer et al. (41) studied the beliefs of the same Latino populations with regard to the common cold. Since many of the questions in this study and the present one are similar, a direct comparison can be made in beliefs regarding both illnesses. Air pollution/dirty air is believed to cause both, and the influence of an imbalance between hot and cold elements was much more widespread for a cold than for asthma. All four

Table 5

Treatments for Asthma[a]

Treatments	Response[b]			
	CT	TX	M	G
1. Medicines given by the doctor	Y	Y	Y	Y
2. Going to the hospital	Y	Y	Y	Y
3. Try to relax/keep calm	Y	Y	Y	Y
4. Breathing exercises	Y	Y	—	Y
5. Vitamins	N	N	Y	Y
6. Drinking liquids	N	N	Y	Y
7. Avoid getting upset	Y	N	Y	—
8. Eucalyptus tea	N	N	Y	Y
9. Honey	N	N	Y	Y
10. Praying	N	N	Y	Y
11. Antibiotics	N	—	Y	—
12. Sedatives/calmatives	—	N	Y	—
13. Chamomile tea	N	N	N	Y
14. Orange or lemon tea	N	N	N	Y
15. Bitter tea	N	N	N	Y
16. Spearmint tea	N	N	N	Y
17. Garlic	N	N	N	Y
18. Eucalyptus balm	N	N	N	Y
19. Aloe vera or cactus juice	N	N	N	Y
20. Rubbing the back and chest with alcohol	N	N	N	Y
21. Going to an herbalist	N	N	—	Y
22. Putting hot water on the chest	N	—	—	Y
23. If not treated, can asthma turn into bronchitis?	Y	Y	Y	Y
24. If not treated, can one die?	Y	Y	Y	Y
25. If not treated, can asthma turn into pneumonia?	N	—	Y	Y
26. If not treated, will asthma get better by itself?	N	N	N	N

[a]"Y" refers to a positive response for the item, "N" refers to a negative response, "—" refers to a lack of consensus on the response to the item.
[b]"CT" = Connecticut; "TX" = Texas; "M" = Mexico; "G" = Guatemala.

populations believed in a hot–cold etiology for the common cold. For asthma, Mexico and Guatemala applied similar etiologies, the Connecticut sample emphasized the effect of exposure to cold elements, and the Texas sample did not report hot–cold causes.

Epidemiological research notes the overlap in symptoms between upper respiratory infections and asthma, but lay beliefs about these illnesses show a distinct pattern for each. Both have symptoms of coughing, difficulty breathing, chest pain, and decreased activity. Red watery eyes, chest congestion, hoarseness, phlegm, fever and/or chills, and sore itchy throat are noted for the common cold. In contrast, asthma is distinguished by symptoms of wheezing/whistling, fast breathing, choking, and increased blood pressure. Treatment for the common cold focuses on taking vitamins, drinking liquids, drinking herbal teas, and use of eucalyptus balm. For asthma, relaxing/keeping calm and breathing exercises are recommended, as well as physician-prescribed medications. Asthma is considered to be much more serious and, if not treated, can be fatal.

Beliefs regarding asthma are distinct from other illnesses—both biomedical and folk. For example, negative responses were obtained for questions that were related to causes of such folk illnesses as *susto* (fright) and *mal de ojo* (evil eye). Analyzing both positive *and negative* responses gives a more inclusive picture of asthma beliefs and practices, which is

crucial so as not to overemphasize the importance of nonbiomedical beliefs and practices. Our data show that nonbiomedical ("folk") beliefs are found coexistent with biomedical beliefs; additionally, these nonbiomedical beliefs are chosen in a logical and consistent manner that relate to an underlying conceptual framework (e.g., humoral beliefs and balance). Other folk beliefs were not mentioned with regard to asthma (such as those pertaining to witchcraft, evil eye, and fright). This observation highlights the fact that the individuals discriminate with regard to ethnomedical beliefs and practices for specific illnesses. As with the use of biomedicine, certain beliefs and practices are associated with some illnesses, while others pertain to different ones. In addition, it was clear that all of these populations could discriminate between asthma and the common cold. Although some causes, symptoms, and treatments were common to both illnesses, a clear pattern of distinct differences emerges. The greater seriousness of asthma is also clearly recognized.

All groups correctly identified the major respiratory signs and symptoms that are associated with an asthma exacerbation. In addition, nonrespiratory symptoms such as decreased activity level and chest pain were also salient. It is of interest to note that of the three areas of questioning (causes, symptoms, and treatments), there was least agreement among individuals at each site regarding the symptoms (Table 2). This may be due to the fact that our study samples were drawn from the community, and not all respondents had personal experience with asthma. The fact that there was most agreement regarding symptoms in Connecticut—where the sample had the greatest percentage of personal experience with asthma—lends credence to this hypothesis.

The results from the questions concerning treatments reflect the general belief that biomedical therapies are the appropriate choices for treatment. Additional site-specific treatments include herbal teas, oils, syrups, vitamins, prayer, and behavioral techniques (e.g., avoidance of getting upset). Folk healers such as *curanderos*, *espiritistas*, *sobadoras*, and *santiguadoras* are not believed to be the best option for treating asthma, although the Guatemalan sample responded affirmatively to the use of herbalists. The pattern of responses shows that the Guatemalan sample utilize more herbal and folk remedies, which may be due to less

accessibility of the local biomedical health care system at that site.

This study used a combination of qualitative and quantitative methods to obtain a relatively unbiased description of cultural beliefs about asthma. Reliance on either an unstructured/open-ended approach or a close-ended survey can result in bias (43). Open-ended interviews contain response bias due to respondent style (some provide more information and others less) and memory bias. It is more difficult to recall information in an open-ended task than it is to respond to information in a close-ended task since in an open-ended format individuals may simply forget to mention some items. Because of this, it cannot be assumed that since someone does not mention an item, the item is not recognized or is not important to that respondent. Thus, a simple tabulation of the frequencies of responses is confounded with response bias due to differences in individual reporting styles (some respondents are "counted" more than others because they provided more information) and recall vs. recognition memory bias.

Similarly, close-ended interviews can also contain bias. When questions and content are not first validated for the population in which they are to be used, the results can be biased. Typically, the bias will be toward the beliefs and expectations of the researcher. Use of knowledge tests can also be problematic. Knowledge tests evaluate the degree to which someone knows the biomedical model for a disease. Such tests are used for autoimmune deficiency syndrome (AIDS), diabetes, and asthma. Errors made in such tests, however, indicate that someone did not know the correct biomedical answer or forgot it, but it does not necessarily indicate the presence of different cultural beliefs (36).

In this study, we used a combination of two-staged, open-ended and closed approaches. Open-ended interviews were conducted with almost two dozen individuals in each of the four populations to obtain descriptions, themes, and concepts that were relevant to each group. Those items were then incorporated into a lengthy, standardized interview for use with all four groups. The latter step is necessary in order to systematically evaluate the relative importance of the information gathered during the first phase of interviews.

These results need to be interpreted with some caution. Our study samples were not clinical, but

instead were community based. Because of this, most of the respondents in our sample do not have asthma (although the majority knew someone with the illness). The results are best viewed as a reflection of *community* knowledge and beliefs regarding asthma, and should be interpreted as such. Nevertheless, the results of an earlier study based upon a clinical sample of Puerto Rican families in Hartford with an asthmatic child, described similar causes and treatments (26). Because that study reported low-frequency items (less than 25% of the sample) as well as high-frequency items, a broader and more variable array of folk treatments was evident. It is important to note the difference between individual beliefs and behaviors, and the more broadly held beliefs or norms of a group. Differences between the present study and the earlier one are also based on sampling, i.e., a community-based sample responding to questions about general asthma beliefs and practices versus a clinically based sample responding to questions specific to the care of asthma in children.

The limitation of using a community sample is that not all respondents had similar amounts of interaction with the biomedical care system, and as a result may not have the same degree of knowledge of biomedical concepts concerning asthma. It is possible that a clinically based sample might be more likely to contain concepts such as "bronchioles," "inflammation," or "bronchospasm." A recent study that sampled both community members and families with someone with asthma, found that most could report symptoms but that fewer reported "triggers" or causes (46). While the content of the open-ended interview results from that study matches those reported on in this study (with the exception of mention of concepts like "bronchioles"), a more systematic coverage of specific causes and symptoms in this study found that causes of asthma were more highly recognized *and agreed upon* in all four populations. Latino populations seem to have less information about the symptoms (beyond wheezing, noise in the chest, and difficult and fast breathing) and treatments for asthma, than they do about causes. Educational efforts have, most likely, placed an emphasis upon the causes in order to reduce the risk of exacerbating asthma.

This study is also limited to only those populations that were interviewed. It is not clear how these results might compare to other Latino groups and nationalities, like Cuban-Americans, Latinos

from the Dominican Republic, and South Americans. The study also did not contain data on non-Latino groups, so it is not known the degree to which these beliefs are distinctive of Latinos. Similar comparisons of beliefs regarding AIDS (37) and the common cold (41) have found that Latinos and Anglos ("white non-Hispanics") do not have meaningfully different beliefs about either disease. The samples in this study may also be limited by a preponderance of female respondents. However, since the four samples shared beliefs in spite of striking differences in demographics, it is unlikely that men and women would have meaningfully different beliefs, especially at a single locale.

Despite these limitations, the results of this study provide insights into the perceptions and practices regarding asthma in four different Latino groups. We conclude that there is a shared belief system for this illness among the groups, and it is in many ways concordant with the biomedical explanatory model. Intermixed with the biomedical model are beliefs and practices that exemplify common cultural values, such as the importance of balance and the hot–cold aspects of health and illness. Within this overall pattern of consensus, or consistency in beliefs, one sees variability regarding specific ideas and practices among the four different Latino communities.

CLINICAL IMPLICATIONS

Results such as these should be taken into consideration when designing clinical and public health interventions regarding asthma. Our study shows that members of these communities are aware of and believe in the biomedical model for asthma. They combine this knowledge and practice with locally salient traditional beliefs and practices. Educational interventions that reinforce the biomedical model and combine it whenever possible with these locally salient beliefs and practices would likely be more effective than interventions that assume that there are two conflicting belief systems that are mutually exclusive. Perhaps a greater emphasis should be placed upon symptoms and treatments, since most variability was seen in these categories, as well as on the causes of asthma. Many of the folk beliefs can fit into the general medical model as easily as other popular conceptions of sickness and illness that are propagated by

Table 6

Health Beliefs History[a]

What do you think is wrong?
Why do you think you have this illness?
What do you think caused it?
Why do you think it started when it did?
What do you think happens inside your body when you have an asthma attack?
What are the symptoms that make you know that your going to have an asthma problem?
What are you most worried about with asthma?
What problems does it cause you?
How long do you expect it to last?
How do you treat it?
What will happen if it is not treated?
What do you expect from the therapies?

[a]Adapted from Kleinman (49).

Table 7

Asking About Folk and Alternative Therapies (Progress from General and Depersonal Questions to Specific Ones)[a]

1. People have told me that there are ways of treating asthma that doctors don't know about, but that people in the neighborhood, especially older people, know. And some people think that they may really be effective. Have you heard of any of these treatments for asthma?
2. What are they?
3. Do you think they work?
4. Have you ever tried them? Did they work?
5. Are you using them now?
6. Are they helping your asthma?

[a]Adapted from Pachter (47).

the popular media and pharmaceutical advertising. Areas of discordance between the local traditional and biomedical models should be addressed, and attempts should be made to replace discordant or harmful beliefs and practices with biomedically acceptable alternatives that in some way fit within the traditional belief system (26).

One model for bridging the gap between ethnomedicine and biomedicine is the "Awareness–Assessment–Negotiation" technique (22,47,48). Health care practitioners and educators should first become aware of the commonly held beliefs and practices of the community in which they serve. Common approaches to asthma prevention, identification, and management will become evident through patient contact, informal discussion, experience, and the limited data available in the literature. Clinicians should feel comfortable asking patients about alternative health care practices. When approached in an open and nonpejorative manner, most patients will not be hesitant in discussing their general beliefs and practices.

This information should be regarded as general background information. The next step is to assess whether a particular patient may act upon specific culturally oriented beliefs during a particular illness episode. This step guards against stereotyping all members of a particular group as acting the same way during an illness. There is usually as much variability within groups as between groups, as was exemplified in the present study. Obtaining a

patient's explanatory model of the illness will allow the clinician to gain insight into the patient's perspective and approach to asthma. A health beliefs history is one approach to obtaining this information (Table 6). Utilize the information given by the patient during health education and illness management.

Asking about alternative and folk remedies can be best accomplished by asking questions in a manner that progresses from general to specific information. Table 7 provides an example of one such approach.

Once the patient's explanatory model and approach to asthma problems are elicited, attempts should be made to negotiate or combine concordant aspects of the personal/cultural model with biomedical practice. Instead of replacing patient beliefs and practices, combine them with biomedical care. Recommending a combination of nonharmful folk therapies and prescribed asthma medications may help increase compliance with biomedical therapies. Acknowledging and working with patient-held beliefs and practices opens up communication between patient and clinician and creates a better therapeutic environment for successful asthma care and management.

CONCLUSION

Results of this study demonstrate both the overall general consistency as well as the individual and subgroup variability of asthma beliefs and

practices in four Latino communities. Because of the specific variations in beliefs found in this study, we recommend caution when using inclusive ethnic descriptors like "Hispanic" or "Latino." Although our results point to an underlying shared belief system among mainland Puerto Ricans, Mexican-Americans, Mexicans, and Guatemalans regarding asthma, variation *within* Latino ethnic groups is also evident and is a reason for the researcher and practitioner to utilize data such as this only as a guide to illness-coping strategies that are commonly known in these cultural groups. Any particular individual within a group may or may not subscribe to these beliefs and practices. This approach will guard against stereotyping and allow for the understanding of the richness and breadth of traditional ways of dealing with, and responding to illness.

REFERENCES

1. Halfon, N.; Newacheck, P.W. Childhood Asthma and Poverty: Differential Impact and Utilization of Health Services. Pediatrics **1993**, *91*, 56–61.
2. Call R.S.S., T.F.; Morris, E.; Chapman, M.D.; Platt-Mills, T.A.E. Risk Factors for Asthma in Inner City Children. J. Pediatr. **1992**, *121*, 862–866.
3. Lara, M.; Morgenstern, H.; Duan, N.; Brook, R.H. Elevated Asthma Morbidity in Puerto Rican Children: A Review of Possible Risk and Prognostic Factors. Western J. Med. **1999**, *170*, 75–84.
4. Carter-Pokras, O.D.; Gergen, P.J. Reported Asthma Among Puerto Rican, Mexican-American, and Cuban Children: 1982 Through 1984. Am. J. Public Health **1993**, *83*, 580–582.
5. Mendoza, F.S. Health Risk Profiles and Race, Culture, and Socioeconomic Status. In *Child Health in the Multicultural Environment. Report of the Thirty-First Ross Roundtable on Critical Approaches to Common Pediatric Problems*; Pachter, L.M., Ed.; Columbus, OH: Ross Products Division, Abbott Laboratories, 2000, 5–18.
6. Homa, D.M.; Mannino, D.M.; Lara, M. Asthma Mortality in U.S. Hispanics of Mexican, Puerto Rican, and Cuban Heritage. Am. J. Respir. Crit. Care Med. **2000**, *161*, 504–509.
7. Ledogar, R.J.; Penchaszadeh, A.; Iglesias Garden, C.C.; Garden Acosta, L. Asthma and Latino Cultures: Different Prevalence Reported Among Groups Sharing the Same Environment. Am. J. Public Health **2000**, *90*, 929–935.
8. Colp, C.; Pappas, J.; Moran, D.; Lieberman, J. Variants of Alpha-1-antitrypsin in Puerto Rican Children with Asthma. Chest **1993**, *103*, 812–815.
9. Dodge, R. A Comparison of the Respiratory Health of Mexican-American and non Mexican American White Children. Chest **1983**, *84*, 587–592.
10. Pletsch, P.K. Prevalence of Cigarette Smoking in Hispanic Women of Childbearing Age. Nursing Res. **1991**, *40*, 103–106.
11. Crain, E.F.; Weiss, K.B.; Bijur, P.E.; Hersch, M.; Westbrook, L.; Stein, R.E. An Estimate of the Prevalence of Asthma and Wheezing Among Inner-City Children. Pediatrics **1994**, *94*, 356–362.
12. Litonjua, A.A.; Carey, V.J.; Weiss, S.T.; Gold, D.R. Race, Socioeconomic Factors, and Area of Residence are Associated with Asthma Prevalence. Pediatr. Pulmonol. **1999**, *28*, 394–401.
13. Beckett, W.S.; Belanger, K.; Gent, J.F.; Holford, T.R.; Leaderer, B.P. Asthma Among Puerto Rican Hispanics: A Multi-ethnic Comparison Study of Risk Factors. Am. J. Respir. Crit. Care Med. **1996**, *154*, 894–899.
14. Christiansen, S.C.; Martin, S.B.; Schleicher, N.C.; Koziol, J.A.; Mathews, K.P.; Zuraw, B.L. Current Prevalence of Asthma-Related Symptoms in San Diego's Predominately Hispanic Inner-City Children. J. Asthma **1996**, *33*, 17–26.
15. Vega, W.A.; Amaro, H. Latino Outlook: Good Health, Uncertain Progress. Annu. Revi. Public Health **1994**, *15*, 39–67.
16. Mendoza, F.S.; Ventura, S.J.; Valdez, R.B. Selected Measures of Health Status for Mexican-American, Mainland Puerto Rican, and Cuban-American Children. JAMA **1991**, *265*, 227–232.
17. Guendelman, S.; Schwalbe, J. Medical Care Utilization by Hispanic Children: How Does It Differ from Black and White Peers? Med. Care **1986**, *24*, 925–940.
18. Flores, G.; Bauchner, H.; Feinstein, A.R.; Nguyen, U.D.T. The Impact of Ethnicity, Family Income, and Parental Education on Children's Health and Use of Health Services. Am. J. Public Health **1999**, *89*, 1066–1071.
19. Sokol-Katz, J.S.; Ulbrich, P.M. Family Structure and Adolescent Risk-Taking Behavior: A Comparison of

Mexican, Cuban, and Puerto Rican Americans. Int. J. Addict. **1992**, *27*, 1197–1209.

20. Garwick, A.W.; Kohrman, C.; Wolman, C.; Blum, R.W. Families' Recommendations for Improving Services for Children with Chronic Conditions. Arch. Pediatr. Adolesc. Med. **1998**, *152*, 440–448.

21. Kleinman, A.; Eisenberg, L.; Good, B. Culture, Illness, and Care: Clinical Lessons from Anthropologic and Cross-Cultural Research. Ann. Intern. Med. **1978**, *88*, 251–258.

22. Pachter, L.M. Culture and Clinical Care: Folk Illness Beliefs and Behaviors and Their Implications for Health Care Delivery. JAMA **1994**, *271*, 690–694.

23. Guarnaccia, P.J.; Pelto, P.J.; Schensul, S.L. Family Health Culture, Ethnicity, and Asthma: Coping with Illness. Med. Anthropol. **1985**, *9*, 203–224.

24. Foster, F.M.; Anderson, B.G. *Medical Anthropology*. New York: John Wiley & Sons, 1978.

25. Pachter, L.M.; Sumner, T.; Fontan, A.; Sneed, M.; Bernstein, B.A. Home-Based Therapies for the Common Cold Among European American and Ethnic Minority Families. Arch. Pediatrics Adolesc. Med. **1998**, *152*, 1083–1088.

26. Pachter, L.M.; Cloutier, M.M.; Bernstein, B.A. Ethnomedical (Folk) Remedies for Childhood Asthma in a Mainland Puerto Rican Community. Arch. Pediatr. Adolesc. Med. **1995**, *149*, 982–988.

27. Harwood, A. The Hot–Cold Theory of Disease: Implications for Treatment of Puerto Rican Patients. JAMA **1971**, *216*, 1153–1158.

28. Schreiber, J.M.; Homiak, J.P. Mexican Americans. In *Ethnicity and Medical Care*; Harwood, A., Ed.; Harvard University Press: Cambridge, MA, 1981, 264–336.

29. Brodman, K.; Erdmann, A.J.J.; Wolff, H.G. *Cornell Medical Index Health Questionnaire Manual*. Cornell University: New York, 1949.

30. Stern, M.P.; Rosenthal, M.; Haffner, S.M.; Hazuda, H.P.; Franco, L.J. Sex Differences in the Effects of Sociocultural Status on Diabetes and Cardiovascular Risk Factors in Mexican Americans: The San Antonio Heart Study. Am. J. Epidemiol. **1984**, *120*, 834–851.

31. Romney, A.K.; Weller, S.C.; Batchelder, W. Culture as Consensus: A Theory of Culture and Informant Accuracy. Am. Anthropol. **1986**, *88*, 313–338.

32. Batchelder, W.; Romney, A.K. Test Theory Without an Answer Key. Psychometrika **1988**, *53*, 71–92.

33. Weller, S.; Mann, N.C. Assessing Rater Performance Without a "Gold Standard" Using Consensus Theory. Med. Decis. Making **1997**, *17*, 71–79.

34. Batchelder, W.H.; Romney, A.K. The Statistical Analysis of a General Condorcet Model for Dichotomous Choice Situations. In *Information Pooling and Group Decision Making*; Grofman, G.,

Owen, G., Eds.; JAI Press: Greenwich, CT, 1986, 103–112.

35. Weller, S.C.; Baer, R.D.; Pachter, L.M.; Trotter, R.T.; Glazer, M.; de Alba Garcia, J.E.G.; Klein, R.E. Latino Beliefs About Diabetes. Diabetes Care **1999**, *22*, 722–728.

36. Trotter, R.T.; Weller, S.C.; Baer, R.D.; Pachter, L.M.; Glazer, M.; de Alba Garcia, J.E.G.; Klein, R.E. Consensus Theory Model of AIDS/SIDA Beliefs in Four Latino Populations. AIDS Educ. Prevent. **1999**, *11* (s), 414–426.

37. Baer, R.D.; Weller, S.C.; Pachter, L.M.; Trotter, R.T.; de Alba Garcia, J.G.; Glazer, M.; Klein, R. et al. Beliefs About AIDS in Five Latin and Anglo-American Populations: The Role of the Biomedical Model. Anthropol. Med. **1999**, *6*, 13–29.

38. Ruebush, T.K.; Weller, S.C.; Klein, R.E. Knowledge and Beliefs About Malaria on the Pacific Coastal Plain of Guatemala. Am. J. Trop. Med. Hyg. **1992**, *46*, 451–459.

39. Chavez, L.R.H., F.A.; McMullin, J.M.; Martinez, R.G.; Mishra, S.I. Structure and Meaning in Models of Breast and Cervical Cancer Risk Factors: A Comparison of Perceptions Among Latinas, Anglo Women and Physicians. Med. Anthropol. Quart. **1995**, *9*, 40–74.

40. Chavez, L.R.; Hubbell, F.A.; McMullin, J.M.; Martinez, R.G.; Mishra, S.I. Understanding Knowledge and Attitudes About Breast Cancer: A Cultural Analysis. Arch. Family Med. **1995**, *4*, 145–152.

41. Baer, R.D.; Weller, S.C.; Pachter, L.; Trotter, R.; de Alba Garcia, J.G.; Glazer, M.; Klein, R. et al. Cross-Cultural Perspectives on the Common Cold: Data from Five Populations. Human Org. **1999**, *58*, 251–260.

42. Pachter, L.M.; Niego, S.; Pelto, P.J. Differences and Similarities Between Health Care Providers and Parents Regarding Symptom Lists for Childhood Respiratory Illness. Ambulat. Child Health **1996**, 196–204.

43. Weller, S.C.; Romney, A.K. *Systematic Data Collection*. Sage Qualitative Research Methods Series, Vol. 10. Sage: Newbury Park, CA, 1987.

44. Borgatti, S. *Anthropac*. Analytic Technologies: Columbia, 1990.

45. Norusis, M.J. *SPSS/PC*. SPSS, Inc: Chicago, IL, 1990.

46. Zayas, L.E.; Jaén, C.R.; Kane, M. Exploring Lay Definitions of Asthma and Interpersonal Barriers to Care in a Predominantly Puerto Rican, Inner-City Community. J. Asthma **1999**, *36*, 527–537.

47. Pachter, L.M. Ethnic and Cultural Influences on Child Health and Child Health Services. In *Ambulatory Pediatrics*; Green, M., Haggerty, R.J.,

Weitzman, M., Eds.; W.B. Saunders: Philadelphia, 1999, 105–109.

48. Pachter, L.M. Working with Patients' Health Beliefs and Behaviors: The Awareness-Assessment-Negotiation Model in Clinical Care. In *Child Health in the Multicultural Environment. Report of the* *Thirty-First Ross Roundtable on Critical Approaches to Common Pediatric Problems*; Pachter, L.M., Ed.; Ross Products Division, Abbott Laboratories: Columbus, OH, 2000, 36–43.

49. Kleinman, A. *Patients and Healers in the Context of Culture*. University of California Press: Berkeley, 1980.