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School of Public Health

**FAMILY ACCULTURATION AND ASTHMA OUTCOMES
IN LATINO CHILDREN**

By

Tania M. Barreno, MPH

A Dissertation in Partial Fulfillment of the Requirements for the
Degree of Doctor of Public Health in Health Education

June 2013

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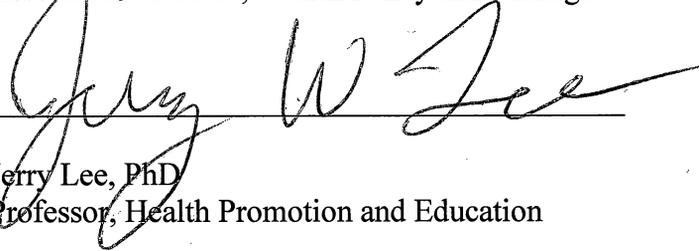
Each person whose signature appears below certifies that this dissertation, in his/her opinion, is adequate in the scope and quality as a dissertation for the degree of Doctor of Public Health.



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ABSTRACT OF THE DISSERTATION

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Naomi Modeste, DrPH, Chair

Background: Asthma is the primary chronic disease diagnosed in children.

California has had some of the highest asthma prevalence rates within the nation. The literature indicates that there is a poor understanding of asthma outcome and management. However, studies exploring the role of acculturation on such outcomes are limited. Thus, the goal of this research was to conduct a secondary analysis of the Child Questionnaire from the California Health Interview Survey (CHIS) 2007 and 2009 cross-sectional data to explore the determinants of asthma outcomes as it relates to family acculturation.

Methodology: The quantitative data were analyzed using Stata. Descriptive statistics, univariate analyses, multivariable logistic regression analyses were used to evaluate whether family acculturation is associated with asthma outcomes, after adjusting for age (child and parent), gender (child and parent), socioeconomic status (family) and access to healthcare (child).

Results: An annual population estimate of 237,802 children reported having an asthma diagnosis by a doctor and among such a population, 98,908 had an asthma attack in the past 12 months. Among those diagnosed with asthma, an annual population estimate of 99,013 children reported lacking asthma management resource. Low family acculturation was associated with children's diagnosis of asthma ($p < .005$) but not asthma attack ($p > .05$) in bivariate analyses. In multivariate logistic regression models, low acculturation was associated with lower odds of asthma diagnosis (OR = 0.41, 95% CI: 0.21, 0.79), and asthma attack in the last 12 months (OR = 0.40, 95% CI: 0.15, 1.08), though the latter did not reach statistical significance. Low family acculturation was associated with families having asthma management plan ($p < .005$) in bivariate analyses. In multivariate logistic regression models, low acculturation (speaking only Spanish at home) was associated with lower odds of having asthma management plan from doctor (unadjusted OR = 0.33), though it did not reach statistical significance upon adjusting for covariates. Additional outcomes could not be explored due to limited sample size or non-significant associations based on bivariate analyses. Though the latter did not reach statistical significance, low family acculturation was associated with families having asthma management plan ($p < .005$).

Conclusion: Latinos are consistently reported to have lower asthma rates in California and the nation and yet little is known about the reasons for such outcomes. Moreover, asthma management is key to lower the burden of asthma and little research exists on factors associated with asthma management. Results from this study showed that low family acculturation was associated with lower odds of asthma diagnosis among children and lower odds of having an asthma management plan. Such results should

further help health education specialists promote traditional values that are protective against asthma while improve patient-physician communication to ensure at-risk populations gain access to necessary asthma management plans.

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I praise God, for providing me with the opportunities and the capability to proceed successfully.

CHAPTER 1

INTRODUCTION

A. Statement of the Problem

Asthma, resulting from swelling and narrowing of the respiratory airways (“CDC - Asthma,” 2012), is the leading chronic disease among children. Although there are no known causes of asthma, several triggers have been shown to increase asthma attacks. Such triggers include exposure to environmental tobacco smoke, dust mites, pollens, mold, air pollution, and pets (CDC, 2012; NCBI, 2011). While symptoms of asthma attacks can differ among individuals, the most common ones include coughing, wheezing, shortness of breath, and difficulty breathing. Such continued uncontrolled asthma symptoms can also lead to serious complications ranging from sleep disturbance to death (NCBI, 2011).

Asthma is considered one of the most common chronic illnesses among children, affecting 14% of children in the United States (CDC, 2012). There is a widening gap between the technology that is available to treat asthma and what is actually being achieved in the care of children. The advances in clinical methods to treat respiratory health issues have not generated the expected improvements of asthma among children within the nation’s population (Beasley, 2002). This fact is evident in two decades of prevalence data specifying the decline in national respiratory health (Mannino, Homa, Akinbami, Moorman, Gwynn, & Redd, 2002).

Awareness in identifying and managing respiratory health, such as asthma, is ongoing because the majority of respiratory health complications occur at home and in the community; where caregivers are at the frontline of asthma management (Koenig,

2007). The literature indicates that caregivers of low-income backgrounds find asthma symptoms frightening and confusing (Koenig, 2007) and such respiratory health issues take a toll on minority children and families living in inner city communities (Randolph & Fraser, 1998). Education in respiratory health management has received an intense amount of national attention to help communities; nonetheless the number of visits and hospitalizations has not decreased (Mannino et al., 2002). Additionally, improving adherence to recommended management of respiratory health, especially asthma, involves various approaches because no single method appears to be effective (Burkhart & Dunbar-Jacob, 2002; Peterson, Takiya, & Finley, 2003; Roter et al., 1998). Therefore, understanding the plethora of determinants such respiratory health outcomes (management, hospitalization, medication, etc.), especially in regards to asthma, can further aid in creating targeted interventions, especially among minority populations.

Latinos are the fastest growing minority population in the United States, and they are also considered the poorest. For example, Latinos are more likely to work in jobs that are low paying, physically demanding, and thus often live at or below the poverty level. Surveillance data demonstrates that 21% of Latinos, compared to 12.5% of the nation's population, live below the poverty level. Latinos are also less likely to be educated as 25% have less than ninth grade education and only 12% have reportedly finished a bachelor's degree or higher. Comparatively, only 7% of the nation's population have education less than ninth-grade and at least 26% have completed bachelor's degree or higher (American Lung Association, 2011). Thus, understanding the various determinants of health among such a population, especially Latino children, is imperative in improving the nation's health.

Children are particularly susceptible to poor health after exposure to air pollution and other stressors because their immune systems and lungs are still in the development phase (Byrd & Joad, 2006). Research indicates that asthma management, like other chronic illnesses management, necessitates support as well as involvement from individuals that are around the child at school and at home (National Heart, Lung, and Blood Institute, 2002). Existing asthma education guidelines advocate self-management (and parental management for those too young to self-manage) as notably asthma has no cure, but it can be managed avoiding costly emergency room visits and continued decreases in quality of life. A team approach is highly suggested to help children manage their respiratory health (National Heart, Lung, and Blood Institute, 2002). The majority of parental asthma education research is based on pilot studies, which lack a sound conceptual framework (Berg, Tichacek, & Theodorakis, 2004). Moreover, such studies are primarily focused on changes in individual factors, such as knowledge and attitude, but little research has elucidated other determinants of such outcomes, especially in the context of family characteristics.

In addition, despite several task force and federal asthma management recommendations, Latinos may be overlooked during interventions and policy implementations. A major contributing factor has been the current asthma prevalence data that show Latinos to have overall lower rates than non-Hispanic Whites. Reports, however, strongly suggest that often such numbers are misleading as the barriers faced by Latinos to access adequate care are complex, including linguistic and cultural barriers (American Lung Association, 2011). For example, “wheeze” is a commonly used English terminology to define asthma. However, the word lacks a Spanish equivalent and thus

can serve as a tremendous barrier in communicating asthma symptoms with the monolingual Latino population. This in turn shows the importance of addressing family characteristics, such as English language proficiency often considered a proxy measure of acculturation, in influencing asthma outcomes.

The earliest formulated definition of acculturation was rendered by anthropologists Redfield, Linton, and Herskovits (1936):

“Acculturation comprehends those phenomena which result when groups of individuals having different cultures come into continuous first-hand contact, with subsequent changes in the original culture patterns of either or both groups (p.149).

Today, several studies have explored the role of acculturation and health outcomes, with some assessing asthma as well. Eldeirawi & Persky (2006) reported that acculturation was associated with higher prevalence of asthma compared to those less acculturated. Similarly, Martin et al. (2007) showed that caregiver acculturation was associated with asthma diagnosis among their children. Another study reported that acculturation, measured as parental place of birth, was shown to be associated with emergency department use of children's asthma outcomes. Specifically, parents being born outside the U.S. had higher rates of emergency room visits due to their child's asthma (Koinis-Mitchell et al. 2011).

Similarly, studies have shown that perceived barrier to communication with physicians and trust in the healthcare system has further disproportionately affected the Latino population. While reports have shown that Hispanics prefer a culturally and linguistically appropriate medical staff, the current low levels of Latino clinicians have

further served as a limiting factor for meeting such needs. Additionally, health literacy has been a concern among monolingual Latinos. Compared to English-speaking Latinos, non-English speaking Latinos are less likely to understand the severity of asthma as a chronic disease and more likely to have fears when using asthma medications (American Lung Association, 2011). Researchers have also stated that language barriers can predict Latino preventive care utilization, and thus serve as a barrier to healthy behaviors (Solis, Marks, Garcia, & Shelton, 1990; Timmins, 2002). These barriers can further lead to inadequate care of asthmatic children by their caregivers and demonstrate an imperative need of mitigation.

Insurance status and access to healthcare has also been shown to affect asthma outcomes. For example, 25% of all Latinos and 49% of Latino immigrants lack insurance. Such lack of regular access to healthcare further disproportionately affects Latino children. Studies have further shown that Latino asthmatic children are less likely, compared to non-Hispanic white asthmatic children, to have regular source of healthcare with the lowest rates observed in immigrant and Spanish-speaking families (American Lung Association, 2011).

In recent years the importance of social stress as a cumulative burden on health and quality of life has emerged in the literature. Studies show that prolonged stress due to social stressors, such as, poverty, crime, etc., can lead to a permanent state of inflammation. For many Latinos, especially Mexican-Americans, their immigration status has been suggested to cause chronic stress. In turn, this can lower their internal defense mechanism and along with decreased use of needed healthcare services can lead to undiagnosed chronic conditions, such as asthma. This is further evident from the fact that

75% of Mexican-Americans who are United States citizens have a regular source of healthcare compared to 50% of those who are non-citizens (American Lung Association, 2011).

B. Purpose of Study

The purpose of this study was to explore how family acculturation is associated with the asthma outcomes of Latino children. I conducted secondary data analyses of the 2007 and 2009 Child Questionnaire of the California Health Interview Survey to better understand child asthma management needs along the following research questions:

C. Research Questions

Asthma outcomes in this study are defined as asthma clinical outcomes and asthma management.

- 1) How does family acculturation influence asthma clinical outcomes of Latino children?
- 2) How does family acculturation influence caregiver asthma management of Latino children?

D. Theoretical Mechanisms

The theoretical foundation for this study stems from the concept of acculturation. Acculturation is a multifaceted process where individuals who migrate: “adopt attitudes, values, customs, beliefs, and behaviors of a new culture” (Ghaddar, Brown, Pagan, and Diaz, 2010, p. 190). Ghaddar et al. (2010) state that acculturation is an important variable in adopting or rejecting healthy lifestyle practices and should be taken into consideration when creating health education programs which seek to improve health behaviors and outcomes.

Latinos face many barriers to healthcare, including culturally associated barriers such as unfamiliarity with navigating the U.S. healthcare system. Limited use of the English language not only influences obtaining medical care, but affects medical adherence as well (Roncancio, Ward, & Berenson, 2011). Thus, understanding cultural factors and barriers associated with asthma outcomes is key to improving health outcomes of Latino children. Populations that have migrated to the United States provide a unique junction of culture and environmental risk factors associated with asthma (Johnson, Nriagu, Hammad, Savoie, and Jamil, 2005). Johnson et al. (2005) found a significant relationship between asthma and acculturation.

The current literature shows that there are two main formulations for acculturation: unidimensional and bidimensional. The key difference between the two is the relation of the individuals' culture that they were born into/raised in with the major culture environment they are surrounded by. The unidimensional method implies that as immigrants encounter a new culture, they begin to adopt the new norms, values, beliefs, and such a process occurs over time in a linear manner. Whereas the bidimensional method implies that the individuals' culture of origin and the major culture environment are independent from one another, so that an individual may take on characteristics of the major culture environment without losing the culture they were born/raised in (Ryder, Alden, & Paulhus, 2000). Acculturation may not have a consistent form of measure or an unvarying conceptualization from the literature reviewed but the fundamental assumption is that immigrants incorporate behaviors and beliefs of the community that they are hosted in (Pourat et al., 2010). Despite advances in research understanding the role of

acculturation on health behaviors, current literature suggests that no one model of acculturation is ideal for the Latino population (Zane & Mak, 2003).

Studies also show that acculturation has differing influence on various health behaviors based on the behavior being evaluated and even gender. For example, acculturated Latinos are more likely to have higher rates of unhealthy diet and substance abuse, (LaVeist & Isaac, 2012) while the likelihood of cervical cancer screening was reported to be higher among women who are more acculturated (Diaz, 2002). A recent theoretical proposal highlighted that none of the current models of acculturation explain why some behaviors are positively affected by acculturation while others are not and thus the operant model of acculturation was proposed by Landrine and Klonoff (2004). This operant model is applicable to any immigrant population and any behavior. According to the authors, if a behavior is low among traditional population then it will increase among acculturated and vice versa. If a behavior is present at moderate levels in the traditional group then it will stay the same or may increase in the acculturated group. The authors tested this model among Mexican-Americans and defined traditional as those speaking Spanish only and being born outside the U.S. Acculturated individuals were defined as those speaking English only and being born in the U.S. In testing the model, those speaking both Spanish and English were excluded (Corral & Landrine, 2008). This poses a significant problem in testing as the potential role of biculturalism on health outcomes and behaviors remain unexplored. As such, given that the literature suggests that no one specific model is superior to another (Zane & Mak, 2003), this study utilized the unidimensional model, especially since previous studies utilizing CHIS data were based

on such a model as well (Johnson-Kozlow, 2010; Mikolajczyk, Bredehorst, Khelaifat, Maier, & Maxwell, 2007).

E. Significance to Health Education

The concept of acculturation is a major strategic research event, which has been gaining focus as an explanatory variable in studies involving ethnic minorities. However, much of the advances pertaining to this cross-cultural event are being hindered by various issues pertaining to measurement and conceptualization (Beck, 2006). Acculturation can cause both negative and positive influences, the interaction of which can lead to various unpredictable behavioral and medical risks (Beck, 2006). It is important to study the influence of acculturation on asthma management because there are many protective effects, as well as negative, to be considered among Latinos. Currently, there are few studies that integrate acculturation and other family characteristics, such as healthcare access, socioeconomic status, etc. to investigate the determinants of asthma management outcomes among Latino children in California. Understanding and differentiating the process of culture change is fundamental to carrying out culturally pertinent health education programs for Latinos (Coronado et al., 2005). As such, the results from this study show the importance of addressing such a concept among Latinos and thus facilitate preventive measures aimed at creating culturally-tailored programs.

Health educators are to facilitate asthma management by promoting and educating community members on prevention methods and treatment. Healthy People 2020's goal relating to respiratory disease is to promote respiratory health by improving prevention, treatment, and education efforts. Therefore, this study can provide the Health Education

arena with the necessary knowledge to educate and provide management skills to Latino's who have children with respiratory problems or at risk for breathing difficulties.

Our results have further shown the importance of acculturation in addressing asthma outcomes of Latino children. Based on the results from this study, low acculturation seems to be protective against asthma diagnosis for Latinos. However, the question remains, is such an association due to lack of adequate healthcare utilization, understanding of asthma diagnosis, symptoms, etc. or are there cultural practices that promote better respiratory health. Future studies should address such key issues pertinent to acculturation. Our study also showed the importance of having an asthma management plan. Based on bivariate analysis, being less accultured (speaking only Spanish) families were less likely to report a doctor ever giving them an asthma management plan. Such results show that potential language barriers, or other cultural factors, may posit a significant barrier for immigrant Latinos to obtain adequate care. Thus, future studies should further address the patient-physician community and whether acculturation plays a significant role in such a relationship.

CHAPTER 2

REVIEW OF LITERATURE

A. Overview

The goal of this literature review is to highlight the trends in asthma epidemiology, current efforts in mitigating the burden of asthma among children along with a discussion on recommended management strategies. The literature review also discusses studies on acculturation and health among Latinos with emphasis on asthma. Since the proposed dissertation also aims to evaluate whether other family characteristics, such as socioeconomic status, access to healthcare, influence asthma outcomes in children, the literature review also discusses the current evidence of such factors and their role in outcomes related to asthma. The literature review was conducted using Pubmed and GoogleScholar using the terms asthma AND acculturation OR socioeconomic status OR health insurance OR access to care. The search for existing literature was also specific to English language, ideally studies conducted in the United States.

B. Asthma Epidemiology

In the United States, 7.0 million children (9.4% of population) have asthma (“CDC - Asthma - Data and Surveillance,” 2012), resulting in an estimated 8 million days restricted to bed on an annual basis. As such, asthma has become the primary chronic cause of annual school absenteeism and attributable to 14 million missed school days (Akinbami, Moorman, & Liu, 2011). Moreover, since 1980, asthma mortality has increased over 80% among children less than 19 years of age. Reports indicate that currently asthma is the third leading cause of hospitalization among children under 15 years of age with 30% of all hospital discharges and nearly 50% of all emergency

department visits attributable to pediatric asthma. Cumulatively, the direct and indirect healthcare costs of pediatric asthma have been estimated to be between \$2.0 and \$3.2 billion annually. In California, lifetime prevalence of asthma among children is estimated to be 11.5 percent (“CDC - Asthma - Data and Surveillance,” 2012), with 11.9% reporting having symptoms at least weekly (Milet et al., 2007). Additionally, 27.8% of asthmatic children with frequent symptoms lack of adequate medications and only 38.4% reported receiving asthma management plans from their healthcare providers (Milet et al., 2007).

C. Effects of Childhood Asthma

Children with respiratory health issues are faced with not only health setbacks, but also by a high rate of absenteeism from school, meager academic performances, as well as feelings of vulnerability and depression (Hannaway, 2002). Asthma is the primary cause of school absenteeism, accounting for 20% of absences in elementary and high school settings; moreover absences can be correlated to other allergic or associated problems, such as allergies, ear problems, and skin allergies (Bener, Kamal, & Shanks, 2007). In 2003, children between the ages of 5-17 years in the U.S. accounted for 12.8 million days of school absences due to respiratory health issues (Akinbami, 2006). Factors such as indoor and outdoor air quality have also influenced school attendance, children’s health, and academic performance (Shendell, Prill, Fisk, Apte, Blake, & Faulkner, 2004). These included absences due to respiratory health illnesses (Gilliland, Berhane, Rappaport, Thomas, Avol, Gauderman, London, Margolis, McConnell, Islam, & Peters, 2001). The collective costs to the families cannot be underrated: absenteeism

from school, missed work by the caregivers, medical visits, all of which notably impact the child and their families (Mizan, Shendell, & Rhoads, 2011).

One particular study examined the academic performance of children with respiratory health issues: “The Relationship Between School Absence, Academic Performance, and Asthma Status” by Moonie, Sterling, Figgs, and Castro (2008). The study included 3,812 students who took an academic standardized test; the results indicated there was a significant inverse relationship between absences and the outcome of the standardized tests. Based on the results, students with constant asthma or asthmatic attacks did more poorly on their standardized tests and had more academic absences.

The impact of asthma on elementary school children was also researched by Rietveld and Colland (1999). They tested whether children with asthma difficulties scored lower in memory, concentration, and academic performance compared to children without asthma. Independent t-tests were produced on dependent variables linking students with and without asthma; using a significance level of $p < .05$. The results showed no significant difference in memory, concentration, and academic performance between children with and those without asthma. Though the research on school performance is inconclusive, students who have school absences due to their respiratory health may fall behind academically but in addition may be affected emotionally.

D. Managing Respiratory Health

Asthma has no cure; nevertheless with appropriate management it can be controlled (Center for Disease Control and Prevention 2012). The skill in properly managing the respiratory health of school children can be developed by assessing how caregivers currently manage the respiratory health of their children; and in turn create

asthma education programs that meet the community's needs. The bulk of research has focused on prevention and interventions.

The National Heart, Lung and Blood Institute issued asthma management guidelines; emphasizing asthma triggers and strategies for controlling them (Washington, Yeatts, Sleath, Ayala, Gilette, Williams, Davis, & Tudor, 2012). Triggers such as allergens, tobacco smoke, pets, outdoor air pollution, cockroach allergen, molds, dust mites may increase asthma symptoms and attacks (Washington, et al., 2012, Centers for Disease Control Prevention 2012). Regrettably, many asthma triggers are found in schools. Many classrooms are carpeted, a place where mites exist. Indoor allergens in combination with poor ventilation may increase the possibility of aggravating asthma in children who are at risk for respiratory health issues (Epstien, 2001). Children may also encounter asthma triggers outside of classroom, triggers such as: grass, pollens, molds, and cockroaches making it difficult for them to play outside.

Latino children have poor asthma conditions and have a lower use of preventive respiratory health medications than their white counterparts within the same medically managed communities (Aligne, Auinger, Byrd, & Weitzman, 2000). Promoting the use of preventive methods is a focal point in reducing ethnic asthma disparities (Lieu, Lozano, Finkelstein, Chi, & Quesenberry, 2002).

The literature cites the positive effect of asthma education programs led by peers; focusing on respiratory health knowledge and attitudes (Gibson, Shah, & Mamoon, 1998). Bruzzese et al. (2008) sought to combine asthma education with parental training. Self-management behaviors for adolescents were examined in focus groups (Ayala,

Miller, Zagami, & Riddle, 2006; Van Es, le Coq, Brouwer, Mesters, Nagelkerke, & Colland, 1998); some of these are briefly described below:

Shaw et al. (2005) used a non-equivalent control group design to investigate the effects of a theory based education program; to study knowledge concerning asthma symptoms, triggers, attitudes, self-efficacy, and respiratory health management at two high schools. Data were collected a week prior to the education program/intervention. Positive attitudes towards the tolerance of individuals with asthma were present in the baseline for both high schools. There was a statistically significant improvement in self-efficacy from the baseline data to the first follow up for the non-control high school. After the education program/intervention, the data showed significant improvements in knowledge and self-efficacy for respiratory health management. Limitations such as selection bias within this study are to be considered. The participants may have more knowledge than the general population on respiratory health management.

Gibson et al. (1998) evaluated the outcomes of a peer led respiratory health education program on knowledge and attitudes. Two all- female high schools were part of the controlled trial, one received the peer led program and the other served as the control. The baseline data indicated a statistically significant difference in knowledge between both schools. The program provided workshops, lessons, and prompted the formulation of respiratory health messages that students could use. Post the intervention, there was a statically significant improvement in respiratory health knowledge for the school that received the education program (mean=14.38, SD=4.01, $p<0.0001$), but not for the school that served as the control (mean= 12.30, SD=4.1, $p<0.05$). The differences in baseline data should be noted. The intervention school had approximately 91% of the participants

complete the pre-survey prior to the intervention, while the control group completed 77% of the pre-surveys. There was difficulty with attrition rates; participants who dropped out of the study may have been healthier and more knowledgeable on asthma management. Statistical significance may have been affected, due to the low statistical power.

Bruzzese et al. (2008) found that the participants took more preventative measures, indicating there were positive short term changes to respiratory health management and health status. At baseline, caregivers rated themselves to be responsible for their child's asthma management. However, post the intervention both the caregivers and children indicated the child was significantly more responsible for self management. The limitation of a small sample size and lack of control group should be noted. Ayala et al. (2006) conducted 42 focus groups among middle school students; whose main barriers to improving management included how they were perceived by peers and their future in society. The study took into consideration adolescents' developmental changes. A limitation to consider is the small sample size. Van Es et al. (1998) conducted a focus group among 14 adolescents to examine management behaviors. Key issues identified by the participants were that of respiratory health management, prevention, respiratory attack management, and social skills. The participants indicated they were fine with being open with others about their asthma. In sum, positive outcomes on self-efficacy were found in several of the studies reviewed. A number of the studies contained methodological flaws, such as participant attrition and low statistical power biases.

Few studies focused on caregivers' managing a child's respiratory health; some relevant ones are described below:

Authors for a preliminary study evaluated an asthma education program for caregivers (Li-Fen, Li-Chi, Kai-Chung, Wei-Fen, & Lin-Shen, 2010). Li-Fen and associates (2010) evaluated the effectiveness of an asthma education program aimed at caregiver management of children with moderate to severe asthma. The results indicated an improvement in caregiver management, with reference to home environmental control, among caregivers in the asthma education program as opposed to caregivers in the control group ($p < 0.05$).

Two pilot studies examined asthma management for caregivers at baseline and at post intervention (Horner, 2004; McCarthy, Herbert & Brimacombe, 2002). Horner (2004) conducted a pilot study to examine the effectiveness of an intervention which included home based respiratory health education for caregivers and school based education for children. The study included 44 low-income families. Respiratory health management in the intervention group was lower than in the control group at baseline; improvements were significant post the intervention. The significance of improvement in asthma management within the low income families in the intervention group should be noted, ($p = .003$). Conversely, limitations within the study such as the small sample size and attrition rate should be considered. McCarthy et al. (2002), pilot tested an asthma management program for caregivers. Knowledge, sense of control, decision making skills, and ability to manage care were examined. The post intervention surveys indicated a significant increase in knowledge. A limitation to consider is the small sample size of the study, providing a low statistical power.

Focus groups were performed among caregivers who have children with asthma, youth with respiratory health issues, school staff, and health care professionals; to further

understand community beliefs on the management of childhood asthma (Cane, Pao, & McKenzie, 2001; Peterson & Dobie, 2005). Peterson & Dobie (2005) conducted ten focus groups to obtain suggestions for possible education programs and interventions to improve their children's respiratory health. The focus groups provided insight on core beliefs concerning asthma care and desired interventions to improve the health of their children. Cane et al. (2001) conducted focus groups with sixty-six mothers from different backgrounds to further explain and compare the understandings of respiratory health and its management. The results indicated that mother's knowledge on asthma was substantial, however the expectations of a child's quality of life varied. Results also showed that the mother's perceptions on asthma may be highly influenced by their health care provider. However, it is inconclusive as to whether addressing knowledge, self-efficacy, and attitudes actually lead to long-term changes in asthma management or do individual characteristics such as acculturation, socioeconomic status, or healthcare access play a stronger determinant role.

E. Acculturation and Health in Latinos

Researchers have always perceived that acculturation to the western norm would lead to improved medication and healthcare utilization and in turn improve the health outcomes of immigrants. Due to increased utilization of healthcare services, specialized medications, treatments, etc. it has been long thought that immigrations from developing or under-developed nations, particularly Latinos, would benefit from services of early screenings, and educational interventions. The literature has supported such a notion in regards to cancer screening, immunization, and diabetes, but only partly (Clark 2002; Diaz 2002). Cervical cancer, third most common cancer in Latino women residing the

United States, and the likelihood of PAP smears have been shown to be associated with higher degrees of acculturation (Diaz, 2002). Clark (2002) also reported that immigrant mothers faced difficulties in accessing care for their children, including finding clinics, inability to speak English, and cost of co-pays. Such studies highlight the benefits of acculturation.

On the other hand, the literature has also given rise to the healthy-immigrant paradox and that increased acculturation can lower health and reduce positive health outcomes (Diaz 2002; Jenista, 2001; LaVeist & Isaac, 2012). There is some research showing the negative health effects of smoking and how smoking has been shown to be the leading cause of death among ethnic minorities in the United States (Perez-Stable, 1998). Another study reported that age-adjusted smoking was higher among less acculturated men and more acculturated women. Higher acculturation was also associated with number of cigarettes per day in both genders (Marin et al., 1989). Studies also show that more acculturated Latinos are likely to engage in substance abuse, unhealthy dietary habits, and worse birth outcomes (LaVeist & Isaac, 2012). In evaluating the use of crack cocaine, a study noted a strong inverse relationship between degree of acculturation and crack smoking among Mexican immigrants to the United States (Wagner-Echeagaray et al., 1994). Bethel and Schenker (2005) conducted a review on acculturation and smoking among Latinos. The authors reported a positive relationship between increased acculturation and smoking among Latino women, but not men.

The role of acculturation on obesity was also evaluated by Hazuda et al. (1988). The authors showed that increased acculturation was associated with decreased obesity and diabetes among Mexican-American men. Interestingly socioeconomic status did not

have any significant association with such outcomes. Among women, increased acculturation and socioeconomic status were both associated with decreased obesity and diabetes. Using the data from Hispanic Health and Nutrition Examination Survey, another study showed that acculturation and age were both strongly associated with hypertension among Mexican-Americans, but poverty was not. Among the elderly, aged 55 to 64 years, acculturation was a stronger factor (Espino et al. 1990). These studies together show the importance of acculturation in immigrant, especially Latino, health outcomes.

F. Acculturation and Asthma Management for Latino Children

Acculturation was originally used by researchers as a construct to help explain the Westernization process that various ethnic groups underwent in the 19th century.

Recently, acculturation has become an instrument to help understand the experiences of various cultures on health outcomes (Marin, Organista, & Chun, 2002). As discussed previously, acculturation has an effect on Latinos and their health outcomes.

Acculturation encompasses ideas about the causes of disease, treatments for illnesses, access to ethnic health care practitioners, traditional practices, preferred foods, religious practices that link to medical care, the understanding and rendition of medical care, and the various expectations of the healthcare system (Jenista, 2001). Thus, understanding how acculturation is associated with asthma outcomes in Latino children is critical in providing tailored health education initiatives. Today, there are a limited number of studies evaluating parental/caregiver acculturation and asthma outcomes in children.

Eldeirawi & Persky (2006) evaluated the role of acculturation on asthma outcomes on Mexican American youths. Results showed that adolescents born in the

United States who had high acculturation levels reported higher prevalence of asthma compared to their less acculturated counterparts. Thus, the authors concluded that various factors associated with immigration and acculturation could in turn influence asthma outcomes and future studies should assess such potential associations.

Martin et al. (2007) studied 336 Mexican American caregivers' to assess whether acculturation protected their children against asthma. The participants were provided a questionnaire that covered topics such as education, acculturation, stress, insurance, and social support. The results indicated that acculturation was associated with the child's diagnosed asthma ($p=.025$). Such a study, while providing insight into the role of acculturation on health outcomes, is limited by sample selection bias and thus lacks generalizability. Such studies show the importance of understanding how acculturation is associated with asthma outcomes in children. While the majority of these studies evaluated children's or youth's acculturation and outcomes, it is important to address the role of family acculturation in asthma outcomes given that often the parental role in healthcare utilization and management are critical determinants in children's health outcomes (Koenig, 2007).

Foster, Read, and Bethell (2009) examined the role of acculturation on medication adherence among Latino children. The authors utilized 2004 Medical Expenditure Panel Survey. Results showed that Latino, Spanish-interviewed children were less likely to have a usual source of care than their more acculturated counterparts. Moreover, acculturation was a contributing factor to medication use.

Wisnivesky et al. (2009) further evaluated 318 adults with asthma who were divided into three groups based on English proficiency: native English speakers (non-

Hispanics), Hispanics proficient in English, and Hispanics with limited English proficiency. Results showed that low English proficiency was associated with poorer outcomes including asthma control. While this study was conducted among adults and included non-Hispanics, it does add to the limited body of literature on the role of acculturation on asthma management outcomes.

Koinis-Mitchell et al. (2011) reported on studies evaluating various acculturation-related factors and asthma outcomes. Results showed that low acculturation was associated with higher emergency department utilization due to asthma. However, in this study acculturation was measured as country of birth and future studies should consider language proficiency. While studies on the role of parental acculturation on asthma outcomes among Latino children are limited, the studies in this discussion do provide a foundation for future research targeted at examining such an association. Moreover, some studies in recent years have addressed the importance of other characteristics, such as access to healthcare, socioeconomic status, in asthma management.

G. Other Determinants of Health Outcomes in Latinos

Healthcare access may be a daunting concept for immigrants when considering the different forms of health care system they were accustomed to in their place of origin (Pourat et al., 2010). Deciding on which health insurance to obtain can be a barrier for an immigrant due to barriers of language and lack of knowledge. Access to healthcare has many challenges for immigrants, such as: filling out forms, communicating with healthcare staff, and transportation. Negative experiences with the affairs of healthcare can deter an immigrant from further pursuing healthcare access (Pourat et al., 2010).

Healthcare access has an influence on healthcare outcomes (Lara, Morgenstern, Duan, & Brook, 1999). Lack of access can deter an individual from seeking healthcare. The literature cites that lack of access is a major reason as to why Latino families delay utilizing healthcare (Cachelin, Rebeck, Veisel, & Striegel-Moore, 2001); this being a major factor which contributes to the poor health outcomes among Latino children with asthma (Berg, et al., 2004). Having health insurance is strongly correlated with an increase in access to healthcare and the use of healthcare services among children (Halfon, 1997).

In the United States, insurance status, often a barrier or path to accessing healthcare has been shown to influence healthcare outcomes (Lara, et al., 1999). Several studies have shown that lack of such insurance can deter patients, especially ethnic minorities such Latinos, from healthcare utilization (Cachelin, et al., 2000; Berg, et al., 2004). In fact, a study reported that lack of health insurance can lead to poor asthma outcomes among Latino children (Berg et al., 2004) and having health insurance has been shown to increase access to healthcare services among children (Halfon, 1997).

Family socioeconomic status has also been shown to influence asthma outcomes in children. Studies show that Latinos have the highest dropout rate in the nation (Flores, 2002) and Latino mothers are more likely to lack high school graduation and employment. This in turn has been shown to influence understanding and navigation of the healthcare system and making informed decisions about treatments of their children's illness (Flores, 2002; Flores, 2004; Hunninghake et al.; 2006). Income has also been associated with asthma outcomes. A study sampled low-income Latinos and reported that Latino mothers with high school degrees were more likely to use hospitals and other

healthcare services for their children's asthma, as compared to mothers without a high school degree (Berg, et al., 2004).

Halfon and Newacheck (1993) used the National Health Interview Survey on Child Health and showed that poor children were more likely to report to the emergency department when sick as a usual source of care, thus indicating lower accessibility to outpatient healthcare services. Claudio et al. (2005) evaluated whether asthma prevalence and hospitalization among children was associated with various socio-demographic characteristics. The results showed that children living in low socioeconomic status had a 70% greater risk of asthma. Together, such studies show the importance of socioeconomic status in asthma outcomes; though no studies have addressed whether a potential association between acculturation and asthma outcomes could differ by healthcare access or socioeconomic status.

H. Conclusion

Asthma remains a prominent public health burden disproportionately affecting minority and low-income children. In certain sectors of the nation's populations, such as Hispanics, asthma prevalence have been reported to be lower than average. Yet, studies demonstrate that often such low numbers are indicative of an underlying greater burden faced by the population, including limited access to health care, linguistic and cultural barriers, social stressors, and the built environment, cumulatively leading to under-diagnosis. As such, public health efforts aimed at mitigating the current unmet asthma preventive and management care needs of Hispanic children must address such key areas. For example, delivery of health literacy interventions for caregivers of asthmatic children through culturally and linguistically appropriate clinicians could be of value. However,

due to the low proportions of Hispanic clinicians (6.3% of physicians, 8.9% of nurses, and 10.8% of respiratory therapists), such efforts have been minimal.

The literature has confirmed that Latino children with respiratory health issues are a vulnerable population. Culturally sensitive healthcare advocates, may counteract the effect of barriers that Latinos' face in healthcare by communicating efficiently and providing the needed information. To date, there are limited studies in the literature that try to better understand determinants of asthma management, in the context of acculturation, especially utilizing a population-based survey.

CHAPTER 3

METHODS

A. Overview

I conducted a secondary data analysis of the California Health Interview Survey (CHIS) 2007 and 2009 Child Questionnaire cross-sectional data to evaluate whether family acculturation predicted asthma outcomes among Latino children. Additionally, the role of potential covariates, such as family socioeconomic status and access to healthcare were analyzed. Analyses for this study also entailed descriptive statistics and multivariable logistic regression analyses.

The CHIS is considered to be the largest state health survey in the nation. It is a biennial population-based survey conducted since 2001 and has since become a continual survey model collaboratively facilitated by University of California, Los Angeles Center for Health Policy Research and other local agencies. It is conducted in languages, such as English, Spanish, Cantonese, Mandarin, Korean, and Vietnamese.

CHIS used a random-digit-dial sample, including telephone numbers linked to landlines and cell phones. The landline sample was segregated into 56 geographic sampling strata. From each stratum, residential telephone numbers were selected to interview an adult. Child weights were created for the completed child interviews to fabricate population estimates. Weights were first created by the product of the household weight and inverse probabilities of the adult selected in the household from the adults available. The weight was then utilized to figure household sampling, non-responses, and extended interviews. The weights were then raked, a method used to estimate, so that the estimates would be consistent with California finance estimates (CHIS, 2011).

CHIS used random allocation and hot-deck imputation to fill missing responses. Random allocations were figured from observed distributions, a method used when the missing rate was small. Hot-deck would provide a value for a nonresponse by a response of a participant who was comparable to the former. The participant whose response was used would then no longer be available in the donor pool for nonresponses. Participants for the child survey included a randomly selected adult, who was at least 18 years of age, to serve as a proxy adult for the child. Only an adult most knowledgeable regarding the child's health status was chosen to complete the child survey.

In 2007, 2938 participants in the child survey reported as Mexicans, 75 were Salvadoran, 54 were Guatemalan, 33 were Central American, 47 were Puerto Rican, 62 were Latino European, 88 were South American and another 56 were identified as other Latino. The 2009 CHIS child survey included 8,945 participants, of which 3,319 were Latino. The sample size consisted of 2,718 Mexicans, 63 Salvadoran, 70 South American, 63 Guatemalan, 32 European Hispanic, 89 Other Latino, and 284 more than one Latino ethnic group (CHIS, 2011).

B. Exclusion and Inclusion Criteria

Only data from children who reported as Latino or Hispanic and between the ages of 5-11 years were included in the proposed study. Those self-reported as any other racial group or two or more races (including Latino and other) were excluded.

C. Variables

1. Independent Variable

The independent variable for the study was acculturation. The use of language has been identified in the literature as a rational proxy for acculturation

(Epstein, Botvin, Dusenbury, & Diaz, 1996) among Latinos and prominent in acculturation measures and scales among other groups as well (Gim Chung, Kim, & Abreu, 2004). Language spoken in the child's home was assigned scores of 0, 1, or 2. Where 0 indicates the language spoken in the child's home is a non-English language, 1 indicates the language spoken is English and another language and 2 indicates that only English is spoken in the home. The scores ranged 0 for the least acculturated and 2 for the most acculturated leading to an ordinal summated scale.

2. *Covariates*

Covariates for this proposed study included age (of parent and child), gender (of parent and child), socioeconomic status for family, and healthcare access of child. Age was kept as a continuous though linearity assumption of logistic regression was assessed during each model building. Gender was kept as a dichotomous variable (male and female). Socioeconomic status measured through education level and poverty level using CHIS variables of: a) adult education attainment categorized as a nominal scale and b) poverty level (ordinal scale). Healthcare access measures included: a) has usual place to go when sick or need health advice (dichotomous) and b) any insurance in the last 12 months (nominal).

3. *Dependent Variables*

The dependent variable for this study was defined as asthma outcome divided in two categories: a) asthma clinical outcomes and b) asthma management. Asthma clinical outcomes were measured using proxy measures of doctor ever told your child has asthma (dichotomous), b) had asthma attack in the past 12 months (dichotomous), c) frequency of asthma symptoms in the past 12 months (ordinal), and d)

ER/urgent care visit for asthma in past 12 months (dichotomous). Asthma management was measured using the following variables: a) doctor ever given asthma management plan for child (dichotomous), b) have written copy of plan (dichotomous), c) confidence can control asthma (ordinal), c) currently taking daily prescription medication to control asthma (dichotomous), and e) days missed school due to asthma in past 12 months (continuous). However, not all outcomes had adequate sample size and thus not included for independent logistic regression models.

D. Data Analyses

Data analysis began with running descriptives followed by univariate analysis to assess the distribution of the abovementioned dependent variables, independent variables, and covariates. Next, each model building was specific to outcomes as follows.

To analyze the association between family acculturation and asthma diagnosis and asthma attacks in past 12 months, multivariable logistic regression was conducted and a jackknife approach was used to obtain confidence intervals. Moreover, based on distribution patterns, covariates were further collapsed into dichotomous outcomes for regression analyses.

E. Power Analysis

Sample size was calculated using G*Power 3.1.2 software for multivariable logistic regression. With a power of 80%, $\alpha=0.05$, and odds ratio effect size of 1.5, the calculated sample size is 308.

F. Strengths and Limitations

The CHIS study was designed specifically to assess the health of Californians. This study focused on the determinants of asthma management outcomes in children with

relation to acculturation. Such a study is critical as to-date, a limited number of studies have been conducted such an assessment among the Latino population, but none were found among the low-income population in California. As previously discussed, few studies utilized a conceptual framework in evaluating determinants of asthma outcomes. Thus, this study may provide the foundation for future studies to incorporate health education theories, including that of acculturation, in support of efficient assessments and interventions for the Latino population. This study also adds to the literature as it uses a population-based survey and as a result can be applicable to the Latino immigrant population in the state of California. Due to random digital dial system, this study further lacks selection bias.

The main limitation of the study stems from its cross-sectional design. Such study designs do not provide insight into causation and therefore relative risks of outcomes cannot be evaluated. This is also self-reported data, which is limited in the fact that it can seldom be independently verified. The self-reported data has to be taken for face value not knowing whether it is precisely the truth. Furthermore, Latinos could be using alternative practices to manage asthma that is not addressed in the CHIS questionnaire.

G. Research Ethics

Approval for this study was obtained from Loma Linda University's Institutional Review Board. No identifying information was provided in the CHIS 2007 and 2009 child questionnaire data. Access to this data is open to the public.

The purpose and importance of the study, as well as means to protect confidentiality was explained to the participants prior to conducting the research. They were also explained that participation was voluntary; they had the right to skip any

questions in addition to ending the survey at any given time. Participants were asked if they would like to proceed with the survey. All participants provided consent.

CHAPTER 4

FIRST PUBLISHABLE PAPER

Does Family Acculturation Predict Asthma Outcomes among Latino Children: Results
from a Population-Based Survey in California.

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Abstract

Objectives. We aimed to determine if family acculturation was associated with asthma outcomes among Latino children.

Methods. Children's data from the 2007 and 2009 California Health Interview Survey were analyzed. Dependent variables were children's diagnosis of asthma and having an asthma attack in the last 12 months. Regression models were controlled for child's age, gender, insurance status, caregivers' level of acculturation, and sociodemographic characteristics.

Results.

An annual population estimate of 237,802 children reported having an asthma diagnosis by a doctor and among such a population, 98,908 had an asthma attack in the past 12 months. Low family acculturation was associated with children's diagnosis of asthma ($p < .005$) but not asthma attack ($p > .05$) in bivariate analyses. In multivariate logistic regression models, low acculturation was associated with lower odds of asthma diagnosis (OR = 0.41, 95% CI: 0.21, 0.79), and asthma attack in the last 12 months (OR = 0.40, 95% CI: 0.15, 1.08), though the latter did not reach statistical significance. Low family acculturation was associated with families having asthma management plan ($p < .005$) in bivariate analyses. In multivariate logistic regression models, low acculturation (speaking only Spanish at home) was associated with lower odds of having asthma management plan from doctor (unadjusted OR = 0.33), though it did not reach statistical significance upon adjusting for covariates.

Conclusions. These findings imply that low acculturation could have a protective effect

against asthma. Our findings also show that low acculturation may be associated with lacking adequate asthma management resources. While our study is limited due to small sample size, these findings imply that the role of acculturation should be further explored among immigrant minority children. However, given that low acculturation was measured through proxy variable of language spoken at home, it is possible that less acculturated immigrant families are less likely to understand their physician or monitor symptoms. Future research should address what key components associated with low acculturation could be protective against asthma. Moreover, given that low acculturated was also indicative of lower asthma attacks (though it did not reach significance), understanding asthma management behaviors and their association with acculturation should be further explored.

Background

Asthma, resulting from swelling and narrowing of the respiratory airways, is the leading chronic disease among children and currently affects at least 14% of children in the United States (CDC, 2012). Though the causes of asthma are unknown, several triggers have been shown to increase asthma attacks. Such triggers include exposure to environmental tobacco smoke, dust mites, pollens, mold, air pollution, and pets (CDC, 2012; NCBI, 2011). While symptoms of asthma attacks can differ among individuals, the most common ones include coughing, wheezing, shortness of breath, and difficulty breathing. Such continued uncontrolled asthma symptoms can also lead to serious complications ranging from sleep disturbance to death (NCBI, 2011), and thus addressing the determinants of asthma burden among children is imperative.

In recent years, several studies have highlighted the importance of acculturation on health outcomes. The earliest formulated definition of acculturation was rendered by anthropologists Redfield, Linton, and Herskovits (1936): “Acculturation comprehends those phenomena which result when groups of individuals having different cultures come into continuous first-hand contact, with subsequent changes in the original culture patterns of either or both groups (Redfield, Linton, & Herskovits, 1936).” Today, several studies have evaluated the role of acculturation and health outcomes, with some assessing asthma as well. For example, a study reported that high acculturated youth were more likely to have high prevalence of asthma and wheezing as compared to their lower acculturated counterparts (Eldeirawi & Persky, 2006). Similarly, another study (Martin et al., 2007) assessed the association between caregiver asthma and children's asthma prevalence and symptoms among a Mexican-American sample in Chicago. While the

study demonstrated a protective effect of caregiver's level of acculturation on asthma outcomes, it is limited by lack of generalizability and reflects a need for studies utilizing population-based surveys. Moreover, it is important to address the role of family acculturation in asthma outcomes given that often the parental role in healthcare utilization and management is a critical determinant in children's health outcomes (Koenig, 2007). Thus, the goal of this study was to analyze how family acculturation predicts asthma outcomes among Latino children in California. Understanding the role of acculturation in influencing asthma diagnosis among children can further help clinicians and public health practitioners create culturally tailored programs for screening and prevention of asthma among the Latino population.

Methods

A secondary analysis of the California Health Interview Survey (CHIS) 2007 and 2009 Child Questionnaire cross-sectional data was conducted to evaluate whether family acculturation can predict asthma outcomes among Latino children. Additionally, the role of potential covariates, such as sociodemographic characteristics and access to healthcare was analyzed.

California Health Interview Survey

The CHIS is considered to be the largest state health survey in the nation (CHIS, 2008). It is a biennial population-based survey conducted since 2001 and has since become a continual survey model collaboratively facilitated by University of California, Los Angeles Center for Health Policy Research and other state agencies. It is conducted in languages such as English, Spanish, Cantonese, Mandarin, Korean, and Vietnamese.

The CHIS used a random-digit-dial sample; telephone numbers linked to landlines and cell phones were used. The landline sample was segregated into 56 geographic sampling strata. From each stratum, residential telephone numbers were selected to interview an adult. Child weights were created for the completed child interviews to construct population estimates. Weights were first created by the product of the household weight and inverse probabilities of the adult selected in the household from the other adults available. The weight was then utilized to figure household sampling, non-responses, and extended interviews. The weights were then raked, so that the estimates would be consistent with California finance estimates (CHIS, 2008).

Study Exclusion and Inclusion Criteria

Only data from children who reported as Latino or Hispanic and between the ages of 5-11 years were included in this study. Those self-reported as any other racial group or two or more races (including Latino and other) was excluded.

Measures

The dependent variables were reports by parents of doctor-diagnosed asthma as a dichotomous outcome (yes/no) and having asthma attack in the past 12 months as a dichotomous outcome (yes/no). The primary independent variable for study was acculturation. The use of language has been identified in the literature as a rational proxy for acculturation for Latinos (Epstein, Botvin, Dusenbury, Diaz, & Kerner, 1996). Language spoken in the child's home was assigned scores of 0, 1, or 2; where 0 indicates the language spoken in the child's home is a non-English language, 1 indicates the language spoken is English and another language and 2 indicates that only English is

spoken in the home. Thus, the scores ranged from 0 for the least acculturated to 2 for the most acculturated leading to an ordinal scale.

Covariates included age (of child and proxy adult), gender (of child and proxy adult), socioeconomic status for family, and healthcare access of child. Age in number of years was used as a continuous variable for logistic regression analyses and gender was dichotomous (male and female). Socioeconomic status was assessed based on education level and poverty level using CHIS variables of: (a) adult education attainment categorized as an ordinal scale and (b) poverty level (ordinal scale). Healthcare access measures include: (a) has usual place to go when sick or need health advice (dichotomous) and (b) any insurance in the last 12 months (nominal as provided by CHIS database).

Data Analysis

All data analyses were conducted using Stata 12 software. Descriptive analysis was conducted to obtain frequencies (adjusted for survey design and combination of multiple years of data) for all variables. The Pearson test, using design-based F values, for categorical variables and regression analysis for continuous variable of age was used to determine statistical significant differences between each category (Tables 1, 2).

To analyze the association between family acculturation and asthma diagnosis and asthma attacks in past 12 months, multivariable logistic regression was conducted and a jackknife approach was used to obtain confidence intervals (Tables 3, 4). Moreover, based on distribution patterns, covariates were further collapsed into dichotomous outcomes for regression analyses.

Results

As displayed in Table 1, a total of 631 children with mean age of 8.1 years (SE = 0.14) were reported as being diagnosed with asthma. This is equivalent to 237,802 annual population estimate of children with doctor diagnosed asthma compared to nearly 1.5 million who did not report asthma. Of them, majority were males (60.9%). Nearly all (97.7%) reported having a usual source of care and another 90% reported having insurance in the past 12 months. Over half of families reporting a child's asthma diagnosis were below 200% federal poverty level (FPL) and lacked college education. Proxy adults were predominantly females and aged 30 to 49 years of age. A significant percent of population spoke Spanish only at home. Among children diagnosed with asthma, the majority were in families speaking Spanish only (56.9%), followed by English only speaking homes at 28.7%. The biggest difference between asthma reporters and those reporting no asthma was regarding being in bilingual homes with bilingual homes being less common among those with asthma.

(Table 1 about here)

Table 2 shows differences in demographic characteristics comparing those children with reported asthma attacks in the last 12 months and those children without reported attacks in that same period. An estimate annual population estimate of 98,908 children reported having an asthma attack in the last 12 months. Among those reporting having an asthma attack, the mean age was 8 years (SE = 0.27) and majority were males (59.4%). There were no significant differences in any sociodemographic characteristics of children or proxy adult for children reporting having asthma attack in the past 12 months versus those reporting no attacks.

(Table 2 about here)

Results from logistic regression analyses predicting a doctor diagnosis of asthma (table 3) demonstrated that speaking Spanish only, considered a proxy for being less acculturated, was associated with lower odds of asthma diagnosis (unadjusted odds ratio (OR) = 0.38, 95% confidence interval (CI): 0.21, 0.68). Upon adjusting for potential covariates, the association remained significant (adjusted OR = 0.41, 95% CI: 0.21, 0.79). Additionally, being female was significantly associated with lower odds of asthma (OR: 0.60, 95% CI: 0.42, 0.85), while having insurance all of the past 12 months was significantly associated with greater odds of being diagnosed with asthma (OR: 2.06, 95% CI: 1.02, 4.15).

(Table 3 about here)

Table 4 shows analyses for children with a current asthma diagnosis predicting report of an asthma attack in the last 12 months. While speaking Spanish only was associated with lower odds of having an asthma attack, it did not reach statistical significance after adjustment for covariates (adjusted OR = 0.40, 95% CI: 0.15, 1.08). No other variables in the adjusted model significantly predicted an asthma attack.

(Table 4 about here)

Discussion

Data from CHIS 2007 and 2009 children's survey showed that Latino children residing in low acculturated families had lower odds of asthma diagnosis and asthma attacks, though the latter did not reach statistical significance. This protective role of low family acculturation on asthma diagnosis remained significant after adjusting for various sociodemographic characteristics and children's access to care and health insurance.

These findings further contribute to the current literature that acculturation is a protective factor for immigrants and their health outcomes.

Although our findings confirm other studies that acculturation can be protective against negative health outcomes, several other factors could have contributed to this protective effect. Despite several task force and federal asthma management recommendations, Latinos may often be overlooked during interventions and policy implementations. A major contributing factor has been the current asthma prevalence data that show Latinos to have overall lower rates than non-Hispanic Whites. Reports, however, strongly suggest that often such numbers are misleading as the barriers faced by Latinos to access adequate care are complex, including linguistic and cultural barriers (American Lung Association, 2011). For example, “wheeze” is a commonly used English terminology to define asthma. However, the word lacks a Spanish equivalent and thus can serve as a tremendous barrier in communicating asthma symptoms with monolingual Latinos population (American Lung Association, 2011). This in turn shows the importance of addressing family characteristics, such as English language proficiency, often considered a proxy measure of acculturation, in influencing asthma outcomes. In such a case, it is possible that low acculturation is not protective against asthma but that immigrants with little English proficiency are less likely to understanding their physician or asthma symptoms, and thus report lower diagnosis rates. In turn, this can over look a critically underserved population, thus highlighting the need for culturally and linguistically tailored preventive measures.

Our study also showed that 19% of the children had asthma diagnosis. There are several reasons for such outcomes. First, this study was limited to Latinos only even

though nationally they are reported to have low prevalence of asthma. Such results show that better assessment and screening of asthma at the national level are necessary. Given that over 90% of our population has health insurance, this could be the primary reason for higher diagnosis rate. However, California, due to its SCHIP (State Children's Health Insurance Plan) primarily targeted towards immigrant minorities could be the reason for better diagnosis. Other states with large Latino population, including Texas, Arizona, and Florida have stricter SCHIP laws targeted at immigrants, thus reducing the overall prevalence rates of asthma among Latinos (American Lung Association, 2011).

The primary limitation of the study stems from its cross-sectional self-reported design. Such study designs do not provide insight into causation and therefore relative risks of outcomes cannot be evaluated. Moreover, self-reported data is prone to recall bias. Given that the study conducted a secondary analysis of CHIS data, the results are not generalizable to Latinos outside of California or to other immigrant populations. Despite such limitations, our findings have several strengths. The CHIS study was designed specifically to assess the health of Californians. This study focused on the determinants of asthma outcomes in children with relation to acculturation.

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Table 1

Sociodemographic and other characteristics (weighted percentages) of Latino children told by a doctor to have asthma

Variables	Was told by a doctor child has asthma		p value
	Yes	No	
Sample size	631	3271	
Population estimate (annual)	237,802	1,496,663	
Mean (standard error) age of child	8.1 (0.14)	7.9 (0.05)	p>0.05
Gender of child			p<0.005
Male	60.9%	50.1%	
Female	39.08%	49.88%	
Has usual place to go when sick or need health advice			p<0.005
Yes	97.7%	95.0%	
No	2.3%	5.00%	
Any insurance in the last 12 months			p<0.10
Currently uninsured	3.8%	7.8%	
Uninsured, any past 12 months	5.7%	5.1%	
Insured all past 12 months	90.6%	87.1%	
Adult educational attainment			p>0.05
Less than high school	30.7%	36.5%	
High school or equivalent	24.8%	25.1%	
Some college	14.2%	13.5%	
Vocational	5.1%	3.4%	
AA/AS	8.1%	6.0%	
Bachelors or higher	17.2%	15.5%	
Poverty level			p>0.05
0-99% of FPL	31.7%	34.6%	
100-199% FPL	26.6%	28.4%	
200-299% FPL	15.0%	13.7%	
300+ % FPL	26.7%	23.3%	
Age group of proxy adult			p>0.05
Adult/household info not collected	0.1%	0.1%	
< 30 years	14.2%	14.3%	
30-39 years	45.2%	49.4%	
40-49 years	33.5%	28.6%	
50-59 years	6.0%	6.2%	
60+ years	1.1%	1.5%	
Gender of proxy adult			p>0.05
Adult/household info not collected	0.1%	0.1%	
Male	35.6%	34.8%	
Female	64.3%	65.2%	
Family acculturation (spoken language at home)			p<0.005
English only	28.7%	22.7%	
Both English and Spanish	14.5%	23.9%	
Spanish only	56.9%	53.5%	

FPL: federal poverty level

Table 2

Sociodemographic and other characteristics (weighted percentages) of Latino children reporting asthma attack in the past 12 months among those who reported the child having asthma.

Variables	Had asthma attack in the past 12 months		p value
	Yes	No	
Sample size	244	387	
Population estimate (annual)	98,908	138,894	
Mean (standard error) age of child	8.0 (0.27)	8.3 (0.17)	p>0.05
Gender of child			p>0.05
Male	59.4%	62.0%	
Female	40.6%	38.0%	
Has usual place to go when sick or need health advice			p>0.05
Yes	98.6%	97.1%	
No	1.4%	2.9%	
Any insurance in the last 12 months			p>0.05
Currently uninsured	3.2%	4.2%	
Uninsured, any past 12 months	4.0%	6.9%	
Insured all past 12 months	92.9%	88.9%	
Adult educational attainment			p>0.05
Less than high school	23.6%	35.8%	
High school or GED	25.5%	24.3%	
Some college	13.9%	14.3%	
Vocational	7.9%	3.1%	
AA/AS	11.3%	5.8%	
Bachelors or higher	17.9%	16.7%	
Poverty level			p>0.05
0-99% of FPL	26.9%	35.2%	
100-199% FPL	28.4%	25.2%	
200-299% FPL	14.5%	15.4%	
300+ % FPL	30.2%	24.3%	
Age group of proxy adult			p>0.05
Adult/household info not collected	0.04%	0.2%	
< 30 years	15.9%	13.0%	
30-39 years	40.1%	48.9%	
40-49 years	38.5%	29.9%	
50-59 years	4.1%	7.3%	
60+ years	1.4%	0.8%	
Gender of proxy adult			p>0.05
Adult/household info not collected	0.0%	0.2%	
Male	36.7%	34.8%	
Female	63.3%	65.0%	
Family acculturation (spoken language at home)			p>0.05
English only	34.7%	24.4%	
Both English and Spanish	10.2%	17.6%	
Spanish only	55.1%	58.1%	

Table 3*Logistic regression odds ratio (and 95% CI) of doctor diagnosis of asthma among Latino children*

	Unadjusted	Adjusted
Family acculturation (spoken language at home)		
English only (reference)	1.00	1.00
Both English and Spanish	0.72 (0.48, 1.09)	0.77 (0.49, 1.21)
Spanish only	0.38 (0.21, 0.68)	0.41 (0.21, 0.79)
Age of child		0.97 (0.88, 1.08)
Gender of child		
Male (reference)		1.00
Female		0.60 (0.42, 0.85)
Has usual place to go when sick or need health advice		
Yes (reference)		1.00
No		0.48 (0.12, 2.01)
Any insurance in the last 12 months		
Currently uninsured (reference)		1.00
Uninsured, any past 12 months		1.22 (0.40, 3.71)
Insured all past 12 months		2.06 (1.02, 4.15)
Adult educational attainment		
High school or less (reference)		1.00
At least some college		1.27 (0.75, 2.16)
Poverty level		
Less than 200% of FPL (reference)		1.00
200% FPL or higher		0.85 (0.54, 1.35)
Age group of proxy adult		
< 40 years (reference)		1.00
40 years or more		1.13 (0.78, 1.63)
Gender of proxy adult		
Male (reference)		1.00
Female		0.87 (0.58, 1.31)

Table 4

Logistic regression odds ratio (and 95% CI) of Latino children with current asthma reporting an asthma attack in the past 12 months

	Unadjusted	Adjusted
Family acculturation (spoken language at home)		
English only (reference)	1.00	1.00
Both English and Spanish	0.67 (0.36, 1.24)	0.67 (0.33, 1.34)
Spanish only	0.41 (0.17, 0.98)	0.40 (0.15, 1.08)
Age of child		0.92 (0.78, 1.09)
Gender of child		
Male (reference)		1.00
Female		1.09 (0.62, 1.92)
Has usual place to go when sick or need health advice		
Yes (reference)		1.00
No		0.52 (0.09, 2.97)
Any insurance in the last 12 months		
Currently uninsured (reference)		1.00
Uninsured, any past 12 months		0.66 (0.12, 3.66)
Insured all past 12 months		1.12 (0.34, 3.70)
Adult educational attainment		
High school or less (reference)		1.00
At least some college		1.44 (0.68, 3.06)
Poverty level		
Less than 200% of FPL(reference)		1.00
200% FPL or higher		0.78 (0.40, 1.55)
Age group of proxy adult		
< 40 years (reference)		1.00
40 years or more		1.39 (0.80, 2.43)
Gender of proxy adult		
Male (reference)		1.00
Female		0.94 (0.50, 1.75)

CHAPTER 5

SECOND PUBLISHABLE PAPER

Do Less Accultured Latino Families Lack Adequate Resources for Asthma Management:

Results from a Population-Based Survey

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Abstract

Background: Asthma remains a significant problem among immigrant minority populations, especially among children. Little research exists on the role of acculturation and asthma management resources. This study aimed to evaluate whether family acculturation predicted whether a doctor gave adequate asthma management plan for asthmatic children.

Methods: A secondary data analysis of Child Questionnaire of California Health Interview Data from 2007 and 2009 were used. Both univariate and multivariable analyses were conducted using Stata 12 software.

Results: An annual population estimate of 99,013 children reported lacking asthma management resource. Low family acculturation was associated with families having asthma management plan ($p < .005$) in bivariate analyses. In multivariate logistic regression models, low acculturation (speaking only Spanish at home) was associated with lower odds of having asthma management plan from doctor (unadjusted OR = 0.33), though it did not reach statistical significance upon adjusting for covariates.

Conclusion: Results from this study showed that low family acculturation was associated lower odds of having an asthma management plan. Such results show the importance of improving patient-physician communication to ensure at-risk populations gain access to necessary asthma management plans.

Background

Asthma is one of the leading chronic disease for children (CDC, 2012; NCBI, 2011), and currently affects over 9 million children in the United States (“CDC - Asthma - Data and Surveillance,” 2012). In California, at least 11% of the children have asthma while in specific areas of the state the prevalence can be significantly higher (“CDC - Asthma - Data and Surveillance,” 2012). Undoubtedly, asthma is a tremendous public health threat and there is an imperative need for interventions to mitigate the burden. However, little empirical evidence exists on what determines asthma management and whether key factors are associated with limited resources among immigrant minority populations. Moreover, there is no cure for asthma and thus, management is key. Often, asthma management includes medication such as inhaled corticosteroids, use of quick-relief drugs, and in-home asthma prevention strategies. Studies have demonstrated that by utilizing self-management skills to avoid key triggers accompanied by proper use of medications; asthma attacks can be significantly reduced (CDC, 2012).

Research has suggested that often lack of access to healthcare, immigration status, acculturation, and lack of knowledge of asthma as a respiratory disease can lead to under diagnosis and development of the chronic state (Akinbami, Rhodes, & Lara, 2005; Freeman, Schneider, & McGarvey, 2003; Ortega et al., 2002; Wood, Hidalgo, Prihoda, & Kromer, 1993). However, whether acculturation affects asthma management resources, such as an asthma management plan, has not been explored in the literature. To date, having an asthma management plan is one of the best-known ways of self-management and mitigating the burden of asthma among children (Bateman et al., 2008). Thus,

evaluating such an association could help public health practitioners create culturally tailored programs to improve patient-physician communication.

Acculturation was originally used by researchers as a construct to help explain the Westernization process that various ethnic groups underwent in the 19th century. Recently, acculturation has become an instrument to help understand the experiences of various cultures on health outcomes (Marin, Organista, & Chun, 2002). Acculturation encompasses ideas about the causes of disease, treatments for illnesses, access to ethnic health care practitioners, traditional practices, preferred foods, religious practices that link to medical care, the understanding and rendition of medical care, and the various expectations of the healthcare system (Jenista, 2001). Thus, understanding how acculturation is associated with asthma outcomes in Latino children is critical in providing tailored health education initiatives. Today, the majority of researchers have examined only the association of children's or youth's acculturation with asthma outcomes (Eldeirawi & Persky, 2006; Martin et al., 2007), with only limited attempts to understand the relationship of low acculturation with limited resources among Latino families with asthmatic children. It is important to address the role of family acculturation in asthma outcomes given that often the parental role in healthcare utilization and management is a critical determinant of children's health outcomes (Koenig, 2007). Thus, the goal of this study was to evaluate whether for Latino families, low family acculturation was a predictor of having limited asthma management resources.

Methods

A secondary analysis of the child questionnaire from the California Health Interview Survey 2007 and 2009 was conducted using Stata 12 software. The CHIS is

considered the largest state health survey and is administered every two years to all of California in multiple languages, including Spanish (CHIS, 2008). The CHIS also uses random-digit-dial system and thus provides an ideal population-based survey for understanding the health and health behaviors of immigrant populations.

A total of 631 children reported to have doctor-diagnosed asthma were included in the study. The outcome variable for this study was having a doctor give an asthma management plan while the independent variable was acculturation measured as language spoken at home (English only, English and Spanish, Spanish only). Covariates for this study also included age (of child and parent), gender (child and parent), usual source of care and health insurance for child, family acculturation, and family socioeconomic status assessed as poverty level and highest education level of parent.

First step was to conduct univariate analyses using Pearson's test, using design based F values. Multivariable analyses were then conducted using a jackknife approach to obtain confidence intervals, as in previous studies. Covariates were dichotomized as needed based on distribution patterns.

Results

Table 1 shows the sociodemographic characteristics of the sample. A total of 296 out of 631 asthmatic children's families reported receiving an asthma management plan from a doctor, indicating a population estimate of 99,013 who did not have the needed resource. Of those receiving such a plan, majority were males, reported having a usual source of care, and had insurance all past month. Interestingly, a higher percentage of children reporting not receiving a plan from their doctor were either currently uninsured or lacked insurance at some point in the past 12 months; though the difference was not

statistically significant. Children lacking a plan also were more likely to have a parent with high school or less education while of children having an asthma management plan, parents were more likely to have a Bachelor's degree or higher ($p < .05$). Children without a plan were also more likely to come from families residing below the 200% federal poverty level ($p < .05$). Adult's age and gender were not significantly different between the two groups. Among children reporting having an asthma management plan, families were more likely to speak English only while more children in Spanish only homes or bilingual homes were likely to lack a plan ($p < .05$).

(Table 1 about here)

Table 2 shows the results from the multivariable logistic regression analysis. The odds of having a doctor provide an asthma action plan was associated with speaking Spanish only. However, after adjusting for potential covariates, their association did not reach significance; though this could be due to our limited sample size. This could be due to poverty and education level being significant confounders; as such variables were shown to be significantly associated with asthma resource in bivariate analysis.

(Table 2 about here)

Discussion

Asthma remains a prominent public health burden disproportionately affecting minority and low-income children. In certain sectors of the nation's populations, such as Latinos, asthma prevalence have been reported to be lower than average (American Lung Association, 2011). Yet, studies demonstrate that often such low numbers are indicative of an underlying greater burden faced by the Latino population, including limited access to health care, linguistic and cultural barriers, social stressors, and the built environment,

cumulatively leading to under-diagnosis (American Lung Association, 2011). As such, public health efforts aimed at mitigating the current unmet asthma preventive and management care needs of Latinos children must address such key areas. For example, delivery of health literacy interventions for caregivers of asthmatic children through culturally and linguistically appropriate clinicians could be of value. However, due to the low prevalence of Latino clinicians (6.3% of physicians, 8.9% of nurses, and 10.8% of respiratory therapists), such efforts have been minimal (American Lung Association, 2011). Such limited culturally appropriate clinicians further indicate potential patient-physician communication issues. This has been shown in our univariate and unadjusted odds ratio as well. Families speaking English were more likely to have a doctor given them an asthma action plan compared to Spanish only speaking families.

Our study was limited due to low sample size, 631 total asthma diagnosed children and due to being a cross-sectional design. This limited causality exploration and thus future longitudinal studies are necessary. Moreover, our study does not explore various other dimensions of acculturation as we are limited to variables in the CHIS. Despite such limitations, this study adds to the body of literature in addressing the role of acculturation in various health outcomes and associated factors. Moreover, given that univariate analyses did demonstrate a potential association between being low acculturated and lacking an asthma management plan, the importance of culturally adequate clinicians and healthcare provides cannot be understated.

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Table 1
Sociodemographic characteristics of children to whom doctor ever gave asthma management plan

Variables	Doctor ever given asthma management plan for child		p value
	Yes	No	
Sample size	335	296	
Population estimate (annual)	138,790	99,013	
Mean (standard error) age of child	8.27 (0.21)	7.96 (0.19)	0.19
Gender of child			0.49
Male	62.61%	58.56%	
Female	37.39%	41.44%	
Has usual place to go when sick or need health advice			0.96
Yes	97.78%	97.65%	
No	2.22%	2.35%	
Any insurance in the last 12 months			0.10
Currently uninsured	2.78%	5.17%	
Uninsured, any past 12 months	3.58%	8.59%	
Insured all past 12 months	93.64%	86.24%	
Adult educational attainment			<0.05
Less than high school	24.59%	39.28%	
High school or GED	22.87%	27.53%	
Some college	15.54%	12.24%	
Vocational	5.17%	4.89%	
AA/AS	10.10%	5.25%	
Bachelors or higher	21.74%	10.81%	
Poverty level			<0.05
0-99% of FPL	29.93%	34.21%	
100-199% FPL	21.23%	33.99%	
200-299% FPL	17.33%	11.73%	
300+ % FPL	31.51%	20.07%	
Age group of proxy adult			0.75
Adult/household info not collected	0.00%	0.27%	
< 30 years	15.01%	12.99%	
30-39 years	42.86%	48.56%	
40-49 years	34.48%	32.07%	
50-59 years	6.60%	5.07%	
60+ years	1.05%	1.05%	
Gender of proxy adult			0.70
Adult/household info not collected	0.00%	0.27%	
Male	34.59%	37.02%	
Female	65.41%	62.71%	
Family acculturation (spoken language at home)			<0.05
English only	33.42%	21.97%	
Both English and Spanish	10.27%	20.44%	
Spanish only	56.32%	57.59%	

FPL = federal poverty level

Table 2

Logistic regression odds ratio (and 95% CI) of Latino children with current asthma who reported having a doctor give an asthma management plan

	Unadjusted	Adjusted
Family acculturation (spoken language at home)		
English only (reference)	1.00	1.00
Both English and Spanish	0.64 (0.37, 1.13)	0.75 (0.37, 1.53)
Spanish only	0.33 (0.16, 0.70)	0.52 (0.21, 1.31)
Age of child		1.07 (0.94, 1.23)
Gender of child		
Male (reference)		1.00
Female		0.79 (0.46, 1.37)
Has usual place to go when sick or need health advice		
Yes (reference)		1.00
No		1.10 (0.10, 12.24)
Any insurance in the last 12 months		
Currently uninsured		1.00
Uninsured, any past 12 months		0.70 (0.12, 3.93)
Insured all past 12 months		1.60 (0.44, 5.78)
Adult educational attainment		
High school or less		1.00
At least some college		1.81 (0.99, 3.28)
Poverty level		
Less than 200% of FPL		1.00
200% FPL or higher		1.36 (0.73, 2.57)
Age group of proxy adult		
< 40 years		1.00
40 years or more		1.00 (0.59, 1.72)
Gender of proxy adult		
Male		1.00
Female (reference)		1.16 (0.63, 2.15)

CHAPTER 6

CONCLUSION AND FUTURE STUDIES

A. Conclusion

Data from CHIS 2007 and 2009 children's survey showed that Latino children residing in low acculturation families had lower odds of asthma diagnosis and asthma attacks, though the latter did not reach statistical significance. This protective role of low acculturation on asthma diagnosis remained significant after adjusting for covariates. These findings further contribute to the current literature that acculturation is a protective factor for immigrants and their health outcomes.

Our findings confirm other studies that acculturation can be protective against negative health outcomes. This is critical because current asthma prevalence data show Latinos to have overall lower rates than non-Hispanic Whites. Moreover, based on univariate and unadjusted odds ratio, families speaking Spanish only were less likely to report having a doctor provide them with an asthma action plan. While it did not reach significance, potentially due to our limited sample size, it does provide the foundation for future research to address such the importance of patient-physician communication among immigrant minority populations.

Asthma remains a prominent public health burden disproportionately affecting minority and low-income children. In certain sectors of the nation's populations, such as Latinos, asthma prevalence have been reported to be lower than average. Reports show that asthma is more prevalent in children of low-income families who are also more likely to have more severe asthma attacks, hospitalizations, and death. For example, while Latinos are the fastest growing minority population in the United States, they are

also considered the poorest. Latinos are more likely to work in jobs that are low paying, physically demanding, and thus often live at or below the poverty level. Surveillance data demonstrates that 21% of Latinos, compared to 12.5% of the nation's population, live below the poverty level. Latinos are also less likely to be educated as 25% of the population have less than ninth grade education and only 12% have reportedly finished bachelor's degree or higher. Comparatively, only 7% of the nation's population have education less than ninth-grade and at least 26% have completed bachelor's degree or higher. Cumulatively, these have disproportionately effected the Latinos population in regards to asthma (American Lung Association, 2011).

As such, public health efforts aimed at mitigating the current unmet asthma preventive and management care needs of Latinos children must address such key areas. For example, delivery of health literacy interventions for caregivers of asthmatic children through culturally and linguistically appropriate clinicians could be of value. However, due to the low prevalence of Latino clinicians (6.3% of physicians, 8.9% of nurses, and 10.8% of respiratory therapists), such efforts have been minimal (American Lung Association, 2011). Such limited culturally appropriate clinicians further indicate potential patient-physician communication issues. This has been shown in our study as well. Families speaking English were more likely to have a doctor given them an asthma action plan compared to Spanish only and bilingual families.

B. Future Directions

Given the current burden of asthma, here in lies an opportunity to expand the role of community health workers (CHWs), in addressing the health needs among Latinos. Traditionally, CHWs are public health workers in the frontline who have trusted

members of the service community. Their understanding of the culture, language, resources, and needs of the community make them ideal to historically serve as bridges between the community and the healthcare system. Today, however, their roles are expanding to meet the growing needs of a diverse population with significant health disparities. In the Latino community CHWs are referred to as *promotores* and can often serve to build community capacity by improve knowledge, attitude, behavior, and appropriate resource-utilization through various outreach, education, and advocacy activities. Studies have elucidated several foundational cultural aspects in the Latino population that can be addressed by incorporating *promotores* in delivering healthcare versus traditional clinicians. For example, the notion of *personalismo* (formal friendliness) entails that the relationship between patients and healthcare providers be personal including, shaking hands, inquiring about family, reducing physical distance during interactions. Similarly, *familismo* (importance of family) is a critical component of Latino culture. Often, family, even extended family, obligations can take precedence over own health and when key healthcare decisions are to be made, inclusion of family is dominant. As such, *promotores*, familiar with such cultural aspects can better address and meet the needs of the community. Given that *promotores* are trusted members of the community itself, health literacy interventions delivered through such CHWs can gain stronger community buy-in and compliance and in turn lead to a higher potential for success. Furthermore, by addressing the aforementioned barriers, such as language, access to healthcare, perceived severity of asthma, fears of medication use, etc., health literacy interventions can further aid today's public health efforts in asthma prevention and management among the largest growing minority population in the United States.

In addition to the role of CHWs, there is also a critical aspect of disease outcome and management that has been severely overlooked in the literature: health literacy. The Institute of Medicine defines health literacy as "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions." In addition to reading, health literacy requires a complex set of skills including listening, analytical, and decision-making. The National Assessment of Adult Literacy (NAAL), conducted in 2003, is currently the most comprehensive health literacy analysis at the national level, and yet it is now a decade old with more current data severely lacking. The report specifically noted that only 12% of American adults were proficient in health literacy. Moreover, the annual cost of low health literacy to the U.S. economy is estimated to be between \$106 billion to \$238 billion (Schillinger, 2002). A plethora of research has also demonstrated that certain variables are indicative of populations who may be at risk of low health literacy and often such populations include immigrant minorities. Thus, future research should not only further explore the role of various dimensions of acculturation but also the role of health literacy in determining asthma outcomes among Latino children.

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APPENDIX A



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Notice of Determination of Human Subject Research

IRB# 5130066

To: **Modeste, Naomi N**
Department: **Health Promotion & Education**
Protocol: **Family acculturation and asthma outcomes in Latino children**

The IRB has determined that this activity **DOES NOT** meet the definitions of human subject research (see below).

Reason(s):

- Not a systematic investigation.
- Not designed to develop or contribute to generalizable knowledge.
- Not about living individuals.
- Not obtaining or receiving private individually identifiable information.
- Data or specimens were not collected specifically for this study.
- Coded data or specimens are used, but the researcher does not have access to the key to the code.
- No direct intervention or interaction.

This study does not require IRB review or approval. If this activity is used in conjunction with any other human experimentation or if it is modified in any way, it must be re-reviewed by IRB staff. Your cooperation in LLU's shared responsibility for the ethical conduct of research is appreciated.

The IRB has determined that this activity **DOES** meet the definitions of human subject research and requires further review.
Submit to:

- Exempt/Expedited Review
- Convened Board

See <http://www.llu.edu/research-affairs/forms-and-online-tools.page?> for further details.

Sincerely,

Linda G. Halstead, MA
IRB Administrator

Definitions (45 CFR 46.102):

Research: a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge.

Human Subject: a living individual about whom an investigator conducting research obtains (1) data through intervention or interaction with the individual, or (2) identifiable private information

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