PARENTAL PERCEPTIONS OF BARRIERS TO IMMUNIZATION AMONG THE HMONG COMMUNITY IN CENTRAL CALIFORNIA

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ABSTRACT

Objectives. The Hmong community in the United States experience health inequities related to vaccine-preventable serious infectious diseases and cancers. The purpose of this study was to explore the perception of barriers to immunization among the Hmong community in Central California.

Methods. In partnership with the Hmong community, a community-based participatory research study was conducted using the standardized, community-based instrument, Searching for Hardships and Obstacles to Shots. Data collection occurred in naturalistic settings. Quantitative methods including multiple regression was used to determine predictors of the perceptions of barriers to immunization.

Findings. There was a total of 443 surveys used in the analysis. Ninety-three percent (93%) of the participants reported at least some barriers to immunization; 95% reported having health insurance. Four primary contributors to perceived barriers were identified: (a) selection of the Hmong language version to complete the survey, (b) income of $50,000 or less per year, and (c) use of traditional healthcare (inclusion of shamans either alone or in combination with Western healthcare), and (d) walking as the method to access healthcare.

Conclusions. Negative health outcomes related to vaccine-preventable diseases persist in the Hmong community. Perceptions of barriers to immunization among the Hmong community in Central California endure, even with high rates of health insurance. Interventions aimed at reducing immunization inequities need to consider distinct socio-cultural factors that impact immunization rates in this vulnerable population.
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Immunization is ranked the number one public health achievement of the 20th century by the Centers for Disease Control and Prevention (Centers for Disease Control and Prevention [CDC], 1999). However, despite recent success in reducing health inequities in immunization (IZ) rates in young children (CDC, 2006a), in certain communities IZ rates remain below desired levels and immunization rate inequity persists. Desired rates of immunizations have not yet reached all communities and ethnic groups in the United States (Smith & Stevenson, 2008; Wooten, Luman, & Barker, 2007).

One of two major goals for the national health agenda, Healthy People 2010 (Healthy People 2010 [HP2010], n.d.), is elimination of health disparities. One core area of Healthy People 2010 is eliminating disparities in IZ rates whether the disparity occurs by race/ethnicity, income, geographic, or other factors (HP2010, 14-1; 14-2; 12-22). Healthy People 2010 also has goals to eliminate health disparities and deaths from cervical cancer (HP2010, 3-4) and to eliminate chronic hepatitis B infection that can lead to liver cancer (HP2010, 14-3). The incidence of both these cancers can be significantly lowered through immunization (Byran, 2007; Lavanchy, 2004).

The Hmong in California face rates of liver and cervical cancer three to four times higher than those of other Asian and Pacific Islander American (A&PIA) groups (Yang, Mills, & Riordan, 2004). In addition, the Hmong are much less likely than other ethnic groups in California to have their cancers diagnosed at an early, treatable stage, making prevention a key to reducing cancer burden in the population (UCDMC, 2004). Up to
60% of liver cancer and nearly 100% of cervical cancer can be prevented by adequate immunization (Smith, Cokkinides, & Eyre, 2006). The Hmong represent the least likely among Asian Pacific Island Americans to have obtained cancer-preventable immunizations for their children (Butler, Mills, Yang, & Chen, 2005).

One long-term goal identified by key informants for the Hmong community in Central California is to use a community-based participatory approach to understand and ultimately create policy, advocacy, and service interventions to improve IZ rates (May Ying Ly, personal communication, August 2007). However, there is currently little or no information available to identify specific barriers to IZ among A&PIA subgroups, including the Hmong. While multiple researchers have identified multiple barriers to specific IZs in general populations, these studies were not based on standardized psychometric instruments (Buelow & Van Hook, 2008; Gust et al., 2004; Taylor et al., 2002; Zimmerman et al., 2001). The Searching for Hardships and Obstacles to Shots (SHOTS) instrument, developed in 2007 by Dr. Victoria Niederhauser, is a community-based valid and reliable tool that measures perceptions of parental barriers to childhood immunizations that has been rigorously tested (Niederhauser, 2009). The SHOTS instrument, a self-reporting instrument with 23 questions on a 0-4 Likert scale, has been validated in both English and Hmong (Baker, 2008). The SHOTS instrument is one tool the Hmong community may use to understand parental perceptions of barriers to obtaining immunizations for their children.

This study reports the results of a community based participatory research partnership that utilized the SHOTS instrument to identify Hmong parent and caregivers’ perception of the barriers to childhood immunization. The study also explored factors that
may be used to provide specific segmented health marketing communication regarding immunization for various groups within the Hmong community aimed at reduction of serious infection and cancer burden (Atkin & Freimuth, 2001; Bryant et al., 2007; CDC, 2006a).

Specific Aims

The specific aims of this research were to:

1. Determine the parental perceptions of barriers to immunization among the Hmong community.

2. Identify the demographic and socio-ecological factors associated with parental perception of barriers to immunization.

The Hmong and Health Inequity

*Health Disparities vs. Health Inequities*

Health inequities continue to endure albeit advancement in the health promotion and prevention campaigns specifically targeting minority populations over the last 50 years (Garcia, 2006; Patrick et al., 2006). Even more troubling are indications that many of these inequities have grown during this time period (Griffith, Moy, Reischl, & Dayton, 2006; Williams & Jackson, 2005). Despite identification of elimination of health disparities as a major objective of the Healthy People 2010, there continues to be little consensus on the use of the term disparities and how to exactly measure these disparities (Braveman, 2006). The term health inequity has recently emerged in the public health literature to describe these disparities. *Health disparity* is a primary term that epidemiologists and scientists use to describe differences in health, while *health inequities* refer to measurable differences in health status and health outcomes (Kawachi,
Health inequity is now a common part of the European public health lexicon that underscores not only the disparities but also how social hierarchy exacerbates them. The term inequity has a stronger moral and social connotation than health disparity. Braveman (2006) describes it this way:

[Health inequity] is a difference in which disadvantaged social groups—such as the poor, racial/ethnic minorities, women, or other groups who have persistently experienced social disadvantage or discrimination—systematically experience worse health or greater health risks than more advantaged social groups. A health inequity is a particular type of difference in health or in the most important influences on health that could potentially be shaped by policies; it is a difference in which disadvantaged social groups, systematically experience worse health or greater risk than a more advantaged group. (p. 184)

Although health disparity is a more common term used in the United States and the one used by governmental agencies, the term health inequity more accurately reflects the social determinants of health and its inherent link to social justice. The term inequity will be used to denote the above definition that more carefully aligns with a social justice perspective that is reflected in community-based participatory research approaches. The term health disparity will be used when describing Healthy People 2010 goals.

According to Braveman and Gruskin (2003), health inequities must be systematically associated with social disadvantage in a way that puts an already disadvantaged group at further disadvantage. The Hmong in America are a socially disadvantaged group as evidenced by their income levels, educational attainment, citizenship status, English language proficiency, health insurance rates, and rates of
chronic disease. Hmong women experience further inequity regarding cancer screening and cancer care (Asian and Pacific Islander American Health Forum, 2006; Hein, 2006; Ward et al., 2004).

The Hmong and Inequities

Asian and Pacific Islander Americans (A&PIA) are affected by health inequities. Liver disease and cancer are among the most significant health inequities that exist between A&PIAs and non-Hispanic Whites; with 60% of liver cancer in A&PIAs associated with chronic hepatitis infection (Babey et al., 2003; Parkin, 2006). Chen (2005) reported that, “Asian Americans experience the highest rates of any racial/ethnic group for several forms of cancers, particularly those of infectious origins, such as cancer of the liver, uterine cervix . . .” (p. 2).

Two types of cancer, liver and cervical cancer, can be prevented through vaccination (Lin, Chang, & So, 2007). Of the A&PIA subgroups, the Hmong experience significant inequities related to cancer (Yang, Mills, & Dodge, 2006). For example, the Hmong in California face rates of cervical and liver cancer that are up to 16 times higher than those of non-Hispanic whites and three times higher than those of the A&PIA group overall. In addition, the Hmong are much less likely than other ethnic groups in California to have their cancers diagnosed at an early, treatable stage, indicating the need for more focus on preventive efforts (UCDMC, 2004).
There is a lack of information on what the Hmong community views as barriers to immunization. This study used the SHOTS, validated in both Hmong and English, as a culturally responsive and linguistically appropriate measure to examine barriers to immunization among the Hmong community; the long-term goal is to develop and implement interventions to improve IZ rates.

Conceptual Framework

*Social Justice and Health Inequities*

Examination of inequities in health rests on the principles of social justice. Social justice means fairness and is grounded in distributive justice. It is an ethical concept (Braveman & Gruskin, 2003). According to Levy and Sidel (2006), “Social justice is inextricably linked to public health. It is the philosophy behind public health” (p. 9). In 1999, the Tavistock group created an ethical framework for healthcare practice that reinforced the concept that health is a basic human right. With health as a basic human right, health inequities became an ethical issue (Smith, Hiatt, & Berwick, 1999). Farmer (2005) goes further to describe health inequities and their interplay with social justice as a form of violence created by power holders within societal structures. Farmer argues that, “human rights violations are not accidents; they are not random in distribution or effect. Rights violations are, rather, symptoms of deeper pathologies of power....” (p. xiii). Health inequities become part of the fractal structures that reinforce power differences. Social justice is not just the absence of socially unjust or unfair health inequities but also denotes an obligation to provide for health equity.

Social injustices lead to increased rates of disease, injury, disability, and premature death due to social determinants of health such as social isolation,
neighborhood poverty, decreased access to health insurance, and healthcare. The American Cancer Society recognized the effect of socio-ecological factors on cancer deaths and declared that *poverty was a carcinogen* (Ward et al., 2004). They responded by creating widespread community-based outreach to mitigate the effects of poverty on cancer survivability (Ward et al.). Recognition of the importance of social justice and ethical perspectives are reflected in the creation of Racial and Ethnic Approaches to Community Health (REACH 2010). REACH 2010 is a community-based effort promoted by the Centers for Disease Control to address health inequities by breaking down existing societal power relationships through community-academic-governmental partnerships (Fouad et al., 2006).

Working with communities in Alabama, Fouad et al. (2006) used the empowerment model proposed by Friere (Minkler & Wallerstein, 2003, p. 41-45) to build trust and enable communities to develop their own experiences and inquiries to reduce health inequities. As healthcare providers and others concerned with inequities have experienced limited results, it has become clear that complex health and social problems have “proved ill-suited to traditional outside expert approaches... and the often disappointing community interventions they have spawned” (Minkler & Wallerstein, p. 3). Communities are finally speaking out about inequities, and their concerns demand approaches that examine the social determinants of health that are grounded in the ethics and principals of social justice. Community-based participatory research (CBPR) is grounded in these paradigms and research demonstrates CBPR’s effectiveness in reducing health inequities.
Community-based Participatory Research (CBPR)

Community-based participatory research (CBPR) is an approach to research that emphasizes working with rather than in communities (Minkler & Wallerstein, 2003). Community-based participatory research, with social change as a desired outcome, presents a paradigm shift in the traditional approach to positivist research. It is a socio-ecological approach to research with a concentration on the social, environmental, and behavioral determinants of health. In addition, with its heart grounded in reduction of health inequities and social justice, CBPR is often carried out in vulnerable, underserved communities. Because of its potential to influence public policy, address healthcare inequities, and facilitate improvements in community-level health, CBPR has experienced a significant increase in attention and resources from both public and private research efforts (Khanlou & Peter, 2005; Wallerstein & Duran, 2006; Washington, 2004). It has matured in status from merely acceptable to a highly desirable approach to research; in addition, CBPR has been utilized across an increasing number of diverse community settings.

Defining Community-based Participatory Research

Community-based participatory research is a growing field and while multiple definitions are employed across various disciplines, there is not yet a clear consensus on a pragmatic definition. Neither are there evaluative standards defining acceptable CBPR approaches to research (Viswanathan et al., 2004). Challenges facing researchers applying CBPR approaches include the inconsistent use of descriptors to convey the meaning of the work. Participatory or collaborative socio-ecological approaches to research have been called action research, participatory action research, participatory
community research, community-based participatory research, collaborative action research, feminist action research, and emancipatory praxis, among other terms. Chen, Jones, and Gelberg (2006) added an additional term, community-academic partnered participatory research (CAPPR), to the growing lexicon describing CBPR.

Despite the lack of clarity in definition, CBPR has a wide-ranging body of literature describing its effectiveness and outlining its ability to address healthcare inequities at the local level (Baker, Metzler, & Galea, 2005; Chung & Lounsbury, 2006; Green & Kreuter, 2002; Leung, Yen, & Minkler, 2004; Minkler, 2005). Consistent with the 2004 Agency for Healthcare Research and Quality report on CBPR, this study will use the following definition of CBPR: “one that involves participatory direct contact with community-level recipients and involves them in substantial ways in the research project for the mutual benefits of all parties” (Viswanathan et al., 2004, p.7-10).

It is vital to understand that beyond definitions, CBPR means much more than just community-based or community-placed research. Community-based participatory research draws from a rich history steeped in social justice, human liberation, critical consciousness, and emancipatory reason. Community-based participatory research attempts to remove a culture of silence and develop praxis of ongoing reflection and action through community empowerment (Minkler & Wallerstein, 2003).

*Community-based Participatory Research and the Asian and Pacific Islander American (A&PIA) Community*

Kagawa-Singer et al. (2006) designed a health survey with and for A&PIA women. They found CBPR to be ideally suited to provide access and support for the hard to reach and hardly reached non or limited English speaking A&PIA women. Their
CBPR study demonstrates that is possible to bring the best from the academic and community traditions to support A&PIA women’s health. Respect for all partners involved in the research, flexibility, and establishment of trust were key elements for success of their CBPR project. The CBPR process requires knowledge of the community and time to build trust as essential components. The process itself, therefore, becomes part of CBPR.

There are several studies demonstrating the effectiveness of CBPR with A&PIA communities and communities experiencing barriers due to recent immigration or English language proficiencies challenges (Chung et al., 2005; Isalm, Kwon, Senie, & Kathuria, 2006; Kagawa-Singer et al., 2006; Krieger et al., 2002; Nguyen et al., 2006). There is one study that has successfully applied CBPR approaches among the Hmong community to understand Hmong women’s behaviors regard cervical cancer screening (Fang, 2008). Studies to date using CBPR in the A&PIA communities have notable and encouraging outcomes that can also inform work with the Hmong community.

Components of Community-based Participatory Research

According to Israel, Eng, Schulz, and Parker (2005) there are nine components to consider when using a CBPR approach:

CBPR (1) acknowledges the community as a unit of identity, (2) builds on strengths and resources within the community, (3) facilitates a collaborative, equitable partnership in all phases from developing research through action, (4) is a co-learning process, (5) is cooperative, engaging community members and researchers in a joint process in which both contribute equally, (6) focuses on local relevance of public health problems and on ecological perspective that
attend to the multiple determinants of health, (7) involves system development and local community capacity building in a cyclical and iterative process, (8) disseminates results to all partners, and (9) is an empowering process through which participants can increase control over their lives. (p. 9).

The CBPR approach may encompass each of these components; however, they are all rarely implemented at the same time. The researcher and the community slowly build trust over time as research and action intertwine to address issues of concern to the community.

Nursing Research, Cultural Responsiveness, and Community-based Participatory Research

In 1996 Meleis published a seminal article imploring nursing researchers to critically explore the issues of cultural responsiveness as they carried out their research. She presented eight criteria to ensure rigor and credibility in nursing cross-cultural scholarship. Jacobson, Chu, Pascucci, and Gaskins (2005) evaluated nursing research with Meleis's framework and established that nursing research could be authentically evaluated for cultural responsiveness. Im, Page, Lin, Tsai, and Cheng (2004) refined various evaluation criteria for rigor in cross-cultural research and developed five key principles for evaluation. Community-based participatory research, due to its pragmatic functionality and substantial involvement with community, aligns with the principles outlined by Im et al. for rigor in cross-cultural research: (a) cultural relevance, (b) conceptuality, (c) appropriateness, (d) mutual respect, and (e) flexibility. According to Im et al., "Cross-cultural research should have research questions relevant to a specific cultural group that the researchers aim at; consider contextual factors influencing nursing
phenomenon; use appropriate verbal and/or non-verbal communication styles and instruments; be aware of power differentials and conduct studies based on mutual respect; and use more flexible approaches toward participants" (p. 898). The emphasis on mutual respect, awareness of power relationships, and flexibility ally this approach with CBPR practices.

According to Young (2006), nursing researchers are also embracing CBPR with its capacity to catalyze social change and are poised to play an important role in refining and clarifying strategies and methodologies related to CBPR. In addition, nursing has called for increased attention and rigor in all types of cross-cultural research methodologies with CBPR ideally suited to address some of the ethical issues presented (Harper, 2006; Jacobson et al., 2005; Papadopoulos & Lees, 2002). Therefore nursing is positioned to provide influential leadership in moving CBPR forward as an approach to research.

One of the hallmarks of CBPR is that it takes time and commitment on both the researcher’s and the community’s part. This study was built on over 15 years of nursing service by the doctoral student with and in the Hmong communities in both Stockton and Sacramento, California. The prerequisite trust necessary to using a CBPR approach was built slowly over time by developing partnerships and friendships during this time.
SHOTS Instrument’s Theoretical Framework: 
Triandis Model of the Theory of Reasoned Action

The SHOTS instrument was based on the Triandis model of the theory of reasoned action (TM-TRA) that provides the foundation for understanding the results of the SHOTS instrument (Montano, 1986; Niederhauser, 2009). The TM-TRA posits that people generally have the intention to behave in ways that provide favorable results for their actions and that meet expectations others have of them (Ajzen & Fishbein, 1980). The TM-TRA model is based on health promotion while also considering the social determinants of health such as facilitating conditions that influence health choices (Mejia et al., 2008). Community-based participatory research is also grounded in social ecology within the social determinants of health model; therefore, there is strong alliance between use of the TM-TRA and CBPR approaches to research.

Components of the TM-TRA

The theory of reasoned action is intention-based and states that a person’s subjective norms, attitudes toward the behavior, and perceived control affect the intention to act (see Figure 1). The intention to act is the most powerful predictor of health behaviors, with attitude and subjective norms acting as forceful influencers of the intent to act (Ross, Kohler, Grimley, & Anderson-Lewis, 2007). Subjective norms are a combination of perceived expectations from influential individuals or groups along with intentions to comply with these expectations. In other words, the person’s perception that most people who are important to him or her think that the behavior should or should not performed (e.g., how important immunizations are to health) (Ajzen, Albarracin, & Hornik, 2007). The intention to act is influenced by perceived behavioral control (e.g., ability to drive to a health appointment; getting time off work) and actual behavior
control (e.g., affordability and availability of immunizations in the community); ultimately behavior is a confluence of these factors. The Triandis addition to this model also places emphasis on the development of habits reinforced through social supports (Ross et al.). Within the Hmong community subjective norms may play a critical role due to the strong family and clan influence and the collectivistic aspect of the Hmong culture (Cha, 2003; Hein, 2006; Triandis, 2001).

**TM-TRA and Social Determinants of Health**

Since the original testing of the TM-TRA model, modifications were made to account for social determinants of health behavior and prior experience with the behavior (e.g., the habit of getting shots for your child) (Ajzen, 1991; Triandis, 1999). The social determinants of health theory gains its theoretical underpinnings from sociology and social epidemiology. The model describes a process of social stratification whereby individuals are divided into subgroups based on criteria considered important to a society. Attributes such as race, income, sex, education, language usage, ethnic/culture group membership, and religion are used to stratify individuals into social status order. Once the status order is established, individuals with higher social status receive more favorable rewards in society-generated institutions and socially driven interactions. This resultant scaffolding functions to formalize inequities such as unequal access to healthcare, information, education, housing, etc. (Patrick et al., 2006).

The social determinants of health theory also draws on ecosocial theory. Ecosocial theorists utilize a fractal metaphor drawn from metaphysic theory to explain how stratification is reinforced. Fractals are recursively-constructed structures that repeat and interact with one another and appear the same at every level. Ecosociologists use this
metaphor to describe how society uses fractal processes at both the micro and macro level to reinforce and strengthen social scaffolding behaviors (Krieger, 2001; Patrick et al., 2006). Fractal functioning in society creates inequities in healthcare through reinforcement of social patterning at both the micro and macro levels. By examining how social determinants of health interface with this disparate scaffolding, the opportunity exists to understand health inequities.

Triandis grounded his expansion of the theory of reasoned action to reflect decades of cross-cultural research and understanding of collectivistic societies. The direct link between his theory and the social determinants of health is built on understanding the social influences and cultural context of human behavior and decision-making (Triandis, 2001; Triandis & Suh, 2002). The Triandis’ model includes the complex interplay of socio-ecology factors such as socioeconomic position, discrimination, community structure and services, social support and social capital as facilitating conditions. These factors are essential considerations in determining behavior. In addition, social determinants interact with biological and personal determinants to collectively shape factors that promote or hinder an individual’s health. For example, issues such as the availability of resources interface with the behavioral control components of the TM-TRA, and available social supports interface with the TM-TRA’s person’s subjective norms and attitudes toward health behaviors. Because the Hmong culture is deeply rooted in collectivism and the Hmong maintain strong family ties that influence individual decision-making (Hein, 2006), the updated model of the TM-TRA that includes influences from the social determinants of health theory provides an appropriate theory to elucidate health care decisions for this study.
Theory of Reasoned Action, Immunization, and the Hmong

The Triandis model of the theory of reasoned action has been noted for its effectiveness in explaining complex behaviors that are influenced by both the social and physical environment (Valois, Desharnais, & Godin, 1988). In addition, the TM-TRA was found to be one of the best models to determine decision-making specifically regarding immunizations (Lin et al. 2006; Montano, 1986; Nowalk et al., 2007; Zimmerman et al., 2001). In addition, the social determinant components of the TM-TRA acknowledge the influence of socio-ecological factors such as poverty, transportation, and access to healthcare. Based on 2004 Census track data, the Hmong are the most impoverished group nationally compared with other A&PIA groups with approximately 40% living below federal poverty level, and approximately 46% having less than a high school education (Asian and Pacific Islander Health Forum, 2006).

Pinzon-Perez (2006) recommended consideration of how the theory of reasoned action may be used to discuss health beliefs with Hmong individuals/groups and to understand their reasons for healthcare choices. The theory of reasoned action could be used to explain how the Hmong look for treatment for symptomatic and acute illness as opposed to chronic conditions. The strong sense of community among the Hmong influences their subjective norms regarding healthcare. Healthcare providers can use health behavior models within the context of the culture to explore behavioral choices with an emphasis on prevention. Wong, Mouanoutoua, Meng-Jinn, Gray, and Tseng (2005) recommend that health belief models such as the TM-TRA be used to design interventions with the Hmong to improve medication adherence and health promotion practices.
The theory of reasoned action was studied in several A&PIA cross-cultural studies and found to be an effective model to explain health behaviors (Godin et al., 1996; Jo, Lee, Ock, & Jung, 2003; Park, 2000). After completing an in-depth study to explore knowledge of nasopharyngeal carcinoma among the Hmong populations in central California, Vang and Pinzon-Perez (2006) recommended that health care researchers concentrate on models such as the theory of reasoned action to help explain why the Hmong seek health care later than other populations, and how socio-ecological factors such as health literacy and educational level influence health promotion practices. In considering the underpinnings guiding the TM-TRA, the link with the social determinants of health, and the alignment with CBPR; the TM-TRA and CBPR approach to research were selected as appropriate conceptual frameworks for this study.
Figure 1: Triandis Adaption of the Theory of Reasoned Action (TM-TRA)
TRA Model Reprinted with permission from Icek Aizen
http://people.umass.edu/aizen/tpb.diag.html
Summary

Immunization is a basic health right both for the individual’s and the public’s health. Inequities that persist for any one group in society impact not only the health of the group but also have potential negative impact for the public’s health. The Hmong experience health inequities related to vaccine-preventable serious infection and vaccine-preventable cancers. Principles of social justice require that reasons for inequities be explored and resolved. This study examined the perception of barriers to immunization in the Hmong in Central California. Information provided by this study may be used by the Hmong community to improve immunization rates thereby reducing sequelae from serious infectious and infectious disease related cancers.

A review of related health literature pertaining to the Hmong population, background information on the SHOTS instrument, and translation of the instrument into Hmong are provided in chapter two. Methodology for this study is described in chapter three, followed by results in chapter four. The implications for the study and suggestions for future research are laid out in chapter five.
CHAPTER 2
REVIEW OF LITERATURE

This chapter provides an explanation of the Hmong history and culture and the health inequities that they experience in the U.S. The Hmong, from the highland plains of Laos in Southeast Asia, are among one of several groups that continue to experience health inequities despite their arrival in the U.S. over 30 years ago. Health inequities experienced by the Hmong include low immunization rates and a high incidence of vaccine-preventable cancers. Although multiple social determinants contribute to health inequities, this chapter focuses on the health-related aspects.

An overview of the history of the Hmong, their health beliefs, and healthcare practices are presented to place this study in context and to assist in developing understanding and sensitivity based on cultural perspectives. Hmong experience significant health inequities in both IZ rates and rates of certain cancers; therefore, the relationship between immunization, serious infectious disease, and persistent infection-related cancers are discussed.

Recognizing that diseases related to the lack of IZ has resulted in serious disease among the Hmong, the SHOTS instrument was translated into Hmong to determine perception of barriers to immunization. The goal of the SHOTS translation into Hmong was to ensure that a culturally responsive and linguistically appropriate version of the SHOTS instrument was available regardless of whether the survey was completed in English or Hmong by a member of the Hmong community.
The Hmong Diaspora: Health and Healthcare in the United States

Like seeds scattered in the wind, the Hmong people have joined the increasingly diverse society of the U.S. The National Center on Minority Health and Health Disparities projects that by 2010 the U.S. will reach, for the first time, a true plurality of persons of all backgrounds (Beck, 2006; Myers & Rodriguez, 2003). Immigrants and refugees from several continents continue to resettle in the U.S. and many of them are retaining their cultural identity, languages, and healthcare practices. Unfortunately, immigrants and refugees may experience significant health inequities that persist even with several generations of offspring born in the U.S. (Abraido-Lanza, Armbrister, Florez, & Aguirre, 2006). One group continuing to experience inequities in health outcomes is the Hmong (Cha, 2003).

After the Vietnam War ended in 1975 refugees from Laos were resettled in diaspora across several nations with the majority coming to the U.S. The Hmong represented the largest of these groups with over 46,892 living in California in the 1990s. This initial surge in the U.S. Hmong population has continued with an ongoing arrival of refugees. By 2000 the number of Hmong in California had grown to over 65,000, making California home to the largest population of Hmong in the U.S. Within California, the highest concentrations of Hmong are located in Sacramento and Fresno counties (U.S. Census Bureau, 2005). In 2004, California experienced another significant surge when the U.S. government reclassified the status of Hmong held in the Wat Tham Krabok refugee camp in Thailand and permitted them entry to the U.S. under refugee status (Asian and Pacific Islander American Health Forum, 2006). Influxes of Hmong refugees
over the last 30 years, along with the recent arrival of refugees from camps in Thailand, provide both opportunities and challenges for healthcare providers (HCP).

One of the challenges faced by the Hmong is persistent health inequity, especially in the areas of immunization status, vaccine-preventable cancers, and chronic diseases (Cha, 2003). Recognition of health inequities experienced by the Hmong population, however, is not sufficient to improve their health outcomes. Culturally responsive understanding is an essential step to assist HCPs in their care for Hmong clients and the Hmong community. Regardless of the model for culturally responsive care a HCP may select for their practice, each model requires that the HCP gain cultural knowledge and responsiveness about the population they serve (Betancourt, 2006; Hobgood, Sawning, Bowen, & Savage, 2006). Accordingly, it is essential that HCPs appreciate the background, cultural practices, and current health issues of their Hmong clients to provide culturally responsive care.

History of the Hmong

Having originated from China, the Hmong in Laos were also known as Meo or Miao, although the Hmong consider these alternative terms derogatory (Cha & Dunnigan, 2003; Westermeyer & Nugent, 1994). The Hmong, who first moved into Laos during a mass immigration from Southern China in the 19th century, were swidden farmers who cut and burn the forest to produce crops. Eventually, the Hmong were engaged in the poppy seed development and the opium trade (Tapp, 2005; Cha & Dunnigan). As the French moved into Southeast Asia, they promoted some groups of Hmong over others as preferred opium traders thereby creating a rift among the clans in Laos.
During the Vietnam War, Laos became the most bombed country in U.S. military history (Quincy, 1995). In addition, the U.S. Central Intelligence Agency provided training and arms to select groups of Hmong and created dependency through food drops and technology support. Educated Hmong males who typically read and wrote both English and Hmong were given high ranking military positions and other advantages creating further distinction and tension among the Hmong clans (Quincy, 1995; Culhane-Pera, Cha, & Kunstadter, 2004). This distinction between white (Hmoob Dawb) and blue or green (Hmoob Ntsuab) Hmong persists today. The groups often maintain varied cultural practices. Awareness of these cultural and language distinctions is important in providing improved healthcare for the Hmong.

Hmong Refugee Experience

When the Hmong arrived in the U.S. after the Vietnam War, they were less similar to Western culture than previous refugee groups (Cha & Dunnigan, 2003). Their human losses during the Vietnam War were ten times greater than U.S. losses with an almost complete disruption of their homeland (Smith, 1997). One-half of the male Hmong population was lost either during the war or in its aftermath (Quincy, 1995). Hmong culture was described in U.S. newsprint and government papers during the first waves of refugees in 1975-1985 as rural, preliterate, patriarchal, and traditional (Quincy). These cultural differences were captured in the classic book, Spirit Catches You, You Fall Down, by Anne Fadiman (1997) that describes a cultural clash between the medical and Hmong community in Merced, California.
It is important to note that the book was researched during the 1980s; subsequently recent waves of Hmong refugees have had substantial contact with Western culture prior to their arrival and may vary from that time (Barnes & Plotnikiff, 2001).

Initially the Hmong were dispersed among sponsoring families all across the U.S. However, over time the strong family clan value has reunited families with the majority of the Hmong population living in the Minnesota, Wisconsin, and the California central valley corridors (Helsel, Mochel, & Bauer, 2004). Nevertheless the Hmong maintain a substantial presence in many states across the U.S. Hmong clans and subclans maintain overall governance and cultural structure for members despite geographic location. It is important for the HCP to consider a client’s refugee story and generational status. In addition, awareness of clan and subclan structure may be important especially in health-related ethical situations.

Historical Hmong Health Beliefs

Historical Hmong health beliefs include multiple explanations for illness including soul loss, ancestral anger, supernatural spirits, natural causes, magical causes such as spell casting, or life’s time is up (Culhane-Pera, Vawter, Xiong, Babbitt, & Solberg, 2003; Thao, 1986). For thousands of years, the Hmong have incorporated protective health practices into their everyday lives. These included the use of medicinal herbs, practices to promote emotional and spiritual well-being, consulting healthcare healers, and careful attention to diet (Cha, 2003; Culhune-Pera et al.). These health promoting practices are based on an animist belief system (i.e. attributing souls to humans, animals, plants, and other entities). However, belief systems and medical practices began to change in Laos about five decades ago with the introduction of
Buddhism, Roman Catholicism, and Evangelical Protestantism (Westermeyer & Nugent, 1994). These religions and some Western health practices were incorporated into more traditional Hmong practices. Consequently, by the time the Hmong arrived in the U.S., contacting Western biomedicine was considered as a possible adjunct to care in addition to use of Hmong healthcare practitioners. The Hmong’s strong tradition of constructive interest in health and well-being will be of benefit for HCPs planning care with Hmong clients.

*Use of Traditional Hmong Healthcare Healers*

Historically the Hmong employed several types of traditional healers who continue to influence their health practices. Each type of traditional Hmong healer and their specific skill may be considered by the individual and family prior to making a decision about care for his/her illness (Hickman, 2007). Possible choices for healthcare include a shaman, an herbalist, a magical healer, and/or a lay healer (Cha, 2003).

*Shaman (tus txiv neeb)*

Historically the Hmong’s first source of care for healing from significant illness has been the shaman whose priority is restoring health and balance to their body and soul. In Hmong belief systems, spirits reside in the sky, and the shaman can climb a ladder to the heavens on his magical horse and contact the spirits in heaven (Cooper, Tapp, & Lee, 1996). The shaman is called on to search for lost souls, as the Hmong believe that the human body is connected to several souls that should be together in harmony to promote wellness. When one is missing, the imbalance, or lost soul, may cause illness (Cha, 2003). Shamans are usually men; however, some female shamans are utilized and respected in the Hmong community. There are two types of shamans, covered face (muag
and uncovered face (*muag dawb*). The covered face shamans are selected by the spirit world and go into a trance while covered with a red or black cloth and enter the spirit world to do direct battle with an offended spirit thought to be at the source of the illness. Uncovered face shamans are not selected by spirits, do not cover their face, and heal through ceremonies and maybe accompanied by physical care such as application of a splint.

Shamans perform healing rituals that may include preventive rituals, calling for health at the New Year, diagnostic rituals, or healing, therapeutic rituals. Often a string tying ritual (*hu khi tes*) to ward off bad spirits accompanies healing and preventive ceremonies. The ultimate power (*hwj huam*) of the shaman comes from their ability to call spirits and provide blessings. This power works better if the shaman’s power is stronger than that of the patient. Occasionally the shaman may call for an animal sacrifice (*ua neeb khu*) to trade for the person’s health (Culhane-Pera et al., 2004).

Pinzon-Perez, Moua, and Perez (2005) investigated satisfaction of the Hmong community in Fresno, California with shaman’s care. They found that the majority of the Hmong would not consult a shaman for a known physical illness, but rather rely on them to increase emotional and psychological well-being to fight off illness. The shamans’ clients cited that the openness, caring, and listening skills of the shaman were as important as their healing powers in increasing well-being. Shamans are also the healers that have the potential to restore balance. It is this spiritual healing presence that led the California Endowment to sponsor a Hmong Health Project with its first goal to establish a recognized, viable presence of the Hmong shaman as part of a hospital’s clergy team (California Endowment, 2004). One example of this concern is the Hmong attribution of
the increasing incidence of diabetes as related to the refugee experience of being out of balance; therefore a spiritual remedy is necessary to help cure the disease (Culhane-Pera, Her, & Her, 2007).

**Herbalists (kws tshuaj)**

The local community typically consults herbalists based on the reputation of the herbalist. Herbalists are usually women who acquire the knowledge from their elders. Herbalists diagnose and treat illness by reaching out to helping spirits (*dab tshuaj*). They may burn herbs or incense at an altar and request that family members also burn spirit paper money. Many Hmong homes include herb gardens with botanicals grown for both culinary and medicinal purposes. Herbs may be blended with animal parts such as dried rhinoceros or cow gallbladder obtained from Chinese herbal stores (Nuttall & Flores, 1997).

Corlett, Dean, and Grivetti (2003) report locating 76 different plant specimens in Hmong gardens around the Sacramento region. Of these, about one-half were grown specifically for medicinal purposes. Herb use was specific and designed to treat ailments such as stomach problems, pulled muscles, headaches, bruising, swollen tongue, arthritis, cold sores, and general weakness. In addition, herbs were grown to hasten childbirth and for required postpartum diets. Some herbs were used as general tonics to promote health and well-being. The most commonly grown herb was eupatorium lindleyana (*hemp agrimony*). It is used to relieve weakness in the arm and legs when rubbed on; it can also be chopped and ingested with an egg to relieve cough.

The Hmong people and herbalists use fresh familiar produce and often use community urban gardens as a resource. In a study by Wong et al. (2005), 80% of
Hmong elders with hypertension tended to blame Western pesticide contaminates in their food supply as the source of their hypertension. Corlett et al. (2003) did test the food and herb sources for pesticides, heavy metals, and other toxins found in urban environments and in this case did not detect unhealthy levels. Healthcare providers may consider the potential for contamination based on the location of the garden, and inquire if their client is concerned about possible contamination.

The Hmong garden and herbalists tradition are strongly associated with health and symptom relief and most Hmong families maintain some type of garden. For common illness, the herbalist is often the first choice for treatment. The common use of herbs by the Hmong and their interaction with Western medicine justifies a thorough history including specific inquiry about the use of home grown herbs or herbs obtained from an herbalist. If the precise question is not asked, the client may not understand the importance of the information. Therefore, they may not share information about herb use when asked generally about complementary and alternative medicines. As many herbs interact with traditional Western medications, a thorough history and investigation is warranted prior to prescribing any additional treatments.

*Magic healers (kws khawv koob)*

Magic healers are typically men who learn their trade from elder magic healers. They use magic spells to both diagnose and treat illness. Their powers are known to vary widely and they are sought out based on reputation. They specialize in treating illnesses associated with wild or evil spirits; symptoms such as the constant crying of an infant or bleeding may be thought of as being related to a wild or evil spirit and treatment may be sought from a magic healer (Cooper, Tapp, & Lee, 1996).
Other healers (tus hu plig)

Everyday healers are ordinary men and women who have learned how to return souls, use herbs, and divine the presence of the spirit without being a specialized shaman or herbalist. They often assist with ceremonies and perform basic chants. They may use basic knowledge and a variety of methods causing dermabrasion such as piercing the skin with a needle to release illness (zaws hmo), rubbing or coining (kav), or they may apply suction cups (ngus). Massage, pressure points, and procedures similar to acupuncture may also be used by these healers. The healers vary in skill and reputation and most of their knowledge is acquired from other everyday healers (Cooper et al., 1996).

As part of a thorough assessment, it is important for healthcare providers to inquire as to which type of healers a client has used, or is currently using, and what types of treatments have been tried. If the provider only asks about the use of a shaman, for example, other remedies and types of healers used by their clients may be missed.

Use of Western Healthcare by the Hmong

In both Laos and the U.S., Western healthcare was often used as a last resort because balance to the body and soul have priority for the Hmong (Johnson, 2002; Plotnikoff, Numrich, Wu, Yang, & Xiong, 2002). This trend may be changing as 42% of younger (18-44 years) Hmong preferred to see a Western provider when a known illness was suspected (Pinzon-Perez et al., 2005). In addition, approximately 40% of Hmong have converted to a Western Christian religion and may consider use of a spiritual shaman a significant contradiction to their religious beliefs (Capps, 1999; Detjen, 2008; Hein, 2006). As a result, there is individual variation in the combined use of both Western healthcare and traditional Hmong healers. The Hmong may discontinue
medication when symptoms subside due to the perception that medications should work quickly, and may seek out Western healthcare when consultation with a shaman has not met their needs (Yang et al., 2004). Detjen (2008) found in focus groups that health beliefs and attitudes varied significantly by age group. The younger age group (18-29 years) used Western medicine more and had greater trust in Western medicine that the 30 or older age group. Cultural attitudes, values, age, and behaviors influence when, where, why and with whom a Hmong person will use Western medicine, including prevention services (Cha, 2003; Detjen).

**Health Insurance Status and Access to Western Medicine**

The majority of non-U.S. born Hmong entered the U.S. under political persecution refugee status and was therefore eligible for California MediCal public health insurance until financial stability occurs and insurance can be purchased or is provided by private employers (California Immigrant Policy Center, 2008). Recent surveys in the Sacramento Region found that 88.2% of Hmong reported that they are insured under either MediCaid/MediCal (68.8%) or private insurance (20%), or were unsure of their health insurance status (9.8%), and only 2% reported no availability of health insurance (Fang, 2008). The lack of health insurance is known to be a barrier to access for many immigrant groups (Choi, 2006); however, availability of health insurance for the majority of the Hmong (>88%) is currently not a structural barrier to care (California Immigrant Policy Center; Luman, 2004). Other factors such as comfort, English language-usage, clinic hours, and transportation may influence choice of healthcare for the Hmong, and these may be influenced by the type of healthcare provider (public vs. private) (Cha, 2003; Luman, 2004).
The Hmong's View of Western Healthcare and Concerns about Care

Barrett, Shaddick, Schilling, Spencer, del Rosario, et al. (1998) conducted unstructured, open-ended in-depth interviews with representatives of the Hmong population in Wisconsin. They uncovered several important themes regarding the Hmong's view of Western healthcare. These include: (a) health belief barriers; (b) language barriers; (c) importance of kindness; (d) Hmong culture is changing; (e) Hmong are not all the same; (f) importance of family; (g) privacy concerns; (h) mental health issues; (i) small talk is important; and (j) other themes such as price and value of Western medicine, dissatisfaction with long lines, and access to care.

For example, Hmong clients (in general) did not want to hear about negative health or outcomes. Hearing about death or illness may be viewed as deterministic or hexing (Barrett et al., 1998). In addition, the authors also found that Hmong clients did not find it necessary or were unwilling to treat asymptomatic conditions such as hypertension or diabetes. Therefore, HCP may consider these examples when planning care for chronic conditions and/or when discussing long-term risk or serious consequences of disease.

The Hmong in that study expressed concern that Hmong not become a label and that individualization of care remains foremost for providers. The participants in that study reported that acculturation and succeeding generations are changing, adapting, and may have new and different healthcare preferences. Setting aside sufficient time to explore a Hmong client’s individual preferences will assist the HCP in meeting the needs of a specific client.
Members of the Hmong communities may hold beliefs about Western healthcare practices that are inaccurate. For example, some Hmong women associate the use of birth control with the need for hysterectomy and the occurrence of cancer. Women may think the diagnosis of cancer is associated with the use of birth control pills thus creating a stigma (personal communication, May Ying Ly, Nov. 9, 2006). These observations along with Barrett et al.'s findings may provide at least a partial explanation as to why Hmong women are often diagnosed with late-stage cervical cancer and why up to 51% of Hmong women with cervical cancer select not to seek care (Yang et al., 2006).

Complementary use of traditional Hmong medicine and Western medicine has significant potential to improve health outcomes. However, there are also certain instances when serious consequences may result from combining treatments. Understanding the processes and influences impacting prevention and healthcare decisions of Hmong clients is critical to reducing the continued health inequities experienced by the Hmong in the U.S.

Hmong Health Status and Inequities in the U.S.

As adaptation to Western life styles has occurred within the Hmong community, new patterns of post-immigration illness have emerged similar to those observed with other groups (Abradio-Lanza et al., 2006; Detjen, 2008; Gans, 2007; Helsel et al., 2004). Health issues of significance among the Hmong include vaccine preventable infectious diseases, vaccine preventable cancer such as cervical and liver cancers, tuberculosis, sudden unexpected death syndrome, substance use and abuse, agricultural injury, cardiovascular disease, and diabetes (Cha, 2003; Detjen, 2008; Pinzon-Perez, 2006). Mental health issues are of great importance to the Hmong with post-traumatic stress
syndrome and depression as major concerns. Sudden unexpected nocturnal death remains unexplained but is associated by the Hmong community with post-traumatic and post emigration stress (Yang, 2003). More recently suicide has also become a community concern (Xiong & Jesilow, 2008).

After decades in the U.S., health inequities for the Hmong persist due, in part, to the myth of the *Asian model minority* (Chen, 2005). The *model minority myth* emerged from the Asian cohort as a whole showing high educational and health status. The term *Asian* is a U.S. census category for residents indicating ancestry from the Far East, Southeast Asia, or Indian subcontinent that includes over 35 different groups (Barnes & Bennett, 2002). This single category labeled Asian is used in U.S. demographic and healthcare reporting. By using a single category health conditions and health inequities may be masked.

For example, Daniels et al. (2008) found significant differences in disaggregated Asia subgroups as compared to white Americans, Vietnamese Americans had demonstrated higher rates of influenza vaccination (61%) than the total Asian American group (45%); and lower rates of pneumococcal vaccinations (41% vs. 56%). The researchers concluded that subgroup analyses of preventative care measures should be part of assessment in the A&PIA population. Using the national immunization survey conducted between 2002-2004, Shaw, Santibanez, and Chu (2008) found differences in childhood vaccination rates among the A&PIA subgroups with Pacific Islanders demonstrating lower rates than other groups. Variation in overall IZ status among A&PIA subgroups, as well as differences in specific immunization status, demonstrates
the need to measure subgroup level data. Unfortunately very little disaggregated data of vaccination rates or vaccine-preventable diseases is available in the literature.

While Asian and Pacific Islander Americans (A&PIA) as a group boast some of the healthiest statistical data related to overall IZ status and health concerns such as heart disease and diabetes, a closer look reveals that inequities are present. For example, when Yang et al., (2004) disaggregated A&PIA by ethnic group they found differences in cervical cancer rates and screening practices. Although Hmong women experience almost 3 times the rate of cervical cancer incidence and mortality than other A&PIA subgroups (38.7/100,000 Hmong; 13.1/1000,000 for other API women); they also self-report low levels of screenings for cervical cancer compared to non-Hispanics whites (28% vs. 98%) (Yang et al., 2006).

Furthermore, rates of vaccine-preventable liver cancer among A&PIA males are 1.7 to 11.3 times higher than among white Americans (Parker, Cho, & Hummer, 2001). Hmong males experience liver cancer as their leading cause of cancer death (Barrett et al., 1998). These conditions meet the Health and Human Services Cancer Inequality Progress Review Group definition of inequality as differences in the incidence, prevalence, mortality, and burden of cancer and related adverse health conditions that exist among specific populations (HHS, n.d.). Thus, the Hmong are experiencing some significant health inequities.

The health inequities experienced by the Hmong go beyond chronic conditions and cancer. A study completed in the central valley of California from 1989 to 1997 documented that Hmong children experienced perforated appendix at a significantly higher rate even when time to seek treatment was controlled ($p < .008$). In addition a
larger number of Hmong underwent the riskier procedure of open abdominal 
appendectomy (\( p < .001 \)). This and other studies provide evidence that social and cultural 
barriers remain despite years of cultural responsiveness training for health providers in 
local communities where the Hmong population lives (Hu, 2001).

The Hmong for centuries have paid \textit{careful attention} to their health; HCPs 
working with Hmong individuals, groups, traditional healers, and communities can seek 
ways to support protective health practices and modify others to assist in improving the 
health outcomes and reducing the inequities experienced by the Hmong in the U.S.

Immunization and Prevention of Serious Disease and Cancer

Americans of Asian Pacific Islander background are the only racial/ethnic group 
in America to experience infectious disease (i.e., hepatitis B and human papillomavirus) 
related cancer as their leading cause of death (Chang & So, 2007; Chen et al., 2006). 
However, past IZ trends in the A&PIA population in California demonstrate one of the 
lowest vaccination rates for hepatitis B when compared to other racial/ethnic groups (Wu, 
Lin, So, & Chang, 2007). When parents who are A&PIA were compared to other ethnic 
groups, they were less inclined to immunize their daughters against high-risk types of 
human papillomavirus (HPV), the primary infectious source for development of cervical 
cancer (odds ratio White .82/ Asian .44) (Constantine & Jerman, 2007; Ma et al., 2007).
Inequities and Infectious Disease

Chronic hepatitis B infection creates significant risk for developing liver cancer, with 10-20% of chronically infected A&PIA individuals, including the Hmong, developing liver cancer (Lavanchy, 2004). With liver cancer having a 5-year survival rate of less than 10%, prevention is the key to reducing mortality. Vaccination against hepatitis B infection is 95% effective in preventing chronic infection, and was the first vaccine against a major human cancer (Lavanchy). Asian and Pacific Islander Americans have the highest rates of chronic hepatitis B compared to other racial/ethnic groups and hepatitis B-related liver cancer is the greatest health disparity between A&PIAs and Caucasian Americans (Asian Liver Center, 2007; Li-Ng, Tropp, Danoff, & Bini, 2007). Wu et al., (2007) reported that A&PIAs with at least a college education exhibited low knowledge levels regarding HBV transmission, prevention, symptoms, risks, and occurrence. Fewer than 60% reported having been tested for HBV; only 31% reported having been vaccinated against HBV; and only 44% reported having had their children vaccinated. The rates were even lower as educational levels decreased.

Inequities and Human Papillomavirus related Cervical Cancer

Cervical cancer is the third most common cancer in women and a leading cause of cancer death worldwide. Epidemiologic and laboratory evidence have implicated virulent types of human papillomavirus (HPV) as the causative agent of cervical cancer (Pitts & Clarke, 2002; Taira, Neukermans, & Sanders, 2004). Human papilloma virus is the most common sexually transmitted infection (STI) with prevalence rates of over 50% in sexually active women.
It is estimated that 50 to 80% of sexually active adults will be exposed to the virus during their lifetime, with a prevalence rate (i.e. currently infected) in the United States of more than 20 million infections (Centers for Disease Control and Prevention, 2006b).

The worldwide public health concern with cervical cancer has led to the development of a new vaccine to prevent infections of HPV types 6, 11, 16 and 18 for women. Types 16 and 18 are high risk types associated with 70% cervical cancer while types 6 and 11 are associated with cervical warts (Riedesel et al., 2005). In June 2006, the Federal Food and Drug Administration announced approval of Merck’s Gardasil, a quadrivalent HPV vaccine, for females ages 9 to 26. Clinical trials demonstrate 100% effectiveness in preventing infection of HPV types 6, 11, 16 and 18, provided the 3 vaccine series is administered prior to first sexual contact. The vaccine has a very low complication profile with soreness at the injection site as the only significant side effect (Bryan, 2007; Mao et al., 2006).

The Hmong are affected by significant inequities in cervical cancer incidence and mortality as noted above. The Advisory Committee on IZ Practices (ACIP), a Department of Health and Human and Services federally selected committee of 15 experts, reported that a healthcare inequity exists regarding early prevention and treatment of cervical cancer in the A&PIA populations (Yang et al., 2004). In addition, the ACIP recommends that research and policies be created to avoid the potential for continued healthcare inequities related to access and acceptance of the new HPV vaccine among A&PIA women (National Asian Pacific American Women’s Forum, 2006). It is not yet known what the acceptance will be for this vaccine for any racial/ethnic group; however the potential for disparity in the A&PIA population has been documented by Constantine and
Jerman (2007) who found that Asian-American parents were the racial/ethnic group in California least likely to accept HPV vaccination for their daughters (odds ratio .44; 95% CI .22-.88, $p = .017$).

### Inequities in Immunization Rates

In a 1998 survey of six U.S. cities targeted for immunization intervention programs, it was noted that A&PIA children had lower vaccination rates (25-80%) for the first hepatitis B shot and even lower rates (14-67%) for completion of the 3-dose series. In cities without targeted intervention, only one in ten A&PIA children, ages 15-19, have received the entire recommended 3-dose series (Asian Liver Center, 2007). Past 12 trends in the A&PIA population in California demonstrate one of the lowest vaccination rates for hepatitis B when compared to other racial/ethnic groups (Ma et al., 2007). Even with national recommendation and school entry requirements for immunization, many children are not fully vaccinated. California adopted immunization laws requiring 3 doses of hepatitis B for school entry in 1997 (AB381) (Averhoff et al., 2004). However, even after this law passed, evaluation of IZ rate data among Los Angeles County second and fourth graders by Pulido, Alvarado, Berger, Nelson, and Todoroff (2001) found persistent inequities with 49% of A&PIA children missing at least one dose of hepatitis B vaccine. Rates varied from 38% to 69% depending on the A&PIA subgroup.
Hmong youth are among the least vaccinated populations for hepatitis B, with rates as low as 12% reported in Fresno, California, a community with one of the most concentrated areas of Hmong in the U.S. (Butler, Mills, Yang, & Chen, 2005; U.S. Census, 2005). Butler et al. stated “the Hmong are perhaps the least acculturated (of A&PIA subgroups)...making this population less likely to receive education about liver cancer risk factors and the need for HBV vaccination in campaigns aimed at the general population” (p.403).

In 1990 a measles epidemic emerged across the United States; in both California and Minnesota, the outbreak contained a disproportionate number of Hmong children. In Minnesota measles occurred in 147 Hmong children out of the total number of 320 cases; the remaining cases were spread among black and white families. Fifty-three Hmong children were hospitalized, and three died from measles-related complications. In California the outbreak spread to the Fresno, San Joaquin County region, with 80% of the cases involving Hmong children; 30% were admitted to the hospital, and 13 died (3.6%). The disproportionate rates in the Hmong community were directly related to under immunization. The reasons for the higher rates than expected of hospitalization and death were not investigated (Dales et al., 1993; Henry, 1999). Rebecca Henry was commissioned by the St. Paul Division of Public Health to explore the reason for the high rates of morbidity and mortality in the St. Paul community. She completed interviews with Hmong families and healers. She found that Hmong parents in general did not remember or receive explanations about the immunization and that they did not understand the specificity of each immunizations and that “shots using a needle” were a type of treatment that protected against all diseases (Henry, 1999, p. 46). She
recommended that healthcare providers take time to explain the biomedical way
immunizations work using culturally responsive communication that is meaningful for
the Hmong community. Certain groups, such as new immigrants and refugees, are
especially at risk for incomplete immunization series and require a comprehensive
approach to ensure full vaccination.

New Refugees and Immunization Status

After the Vietnam War the Hmong fled from Laos, fearing persecution; they
formed refugee camps in Thailand. The Hmong refugees were never granted legal status
in Thailand and therefore had no legal grounds to work or receive social services.
Beginning in the 1990’s the Thai government starting closing the refugee camps. The
Hmong, still fearing persecution, sought refuge in a Buddhist monastery in central
Thailand, Wat Tham Krabok (i.e., the Wat). After more than two decades of living in
conditions without running water, schools, or access to healthcare, a Hmong advocacy
group in the U.S. arranged for the immigration of refugees from the Wat. The arrival of
over 15,000 Hmong refugees began in 2004 (California Endowment, 2006). This group
has unique health needs related to their long internment in the refugee camp; among the
special health needs are immunizations. The refugees were under immunized in the Wat
Tham Krabok camp and upon entrance to the U.S. were provided with “one dose [first
dose] of multiple dose vaccinations” (California Commission on Asian and Pacific
Islander American Affairs, 2004, §5). Immunizations require more than one dose given at
specific sequences to be fully effective (Luman, 2004). Due to the one time
administration of immunization at the time of admittance to the U.S., more immunization
and follow-up is indicated for this high-risk group (California Commission on Asian and Pacific Islander American Affairs).

Since 2004, smaller waves of refugees from Thailand continue to arrive. After initial arrival of the Hmong in Thailand in 1976, the Thai government has been clear that the Hmong would not be allowed to resettle permanently in Thailand. The Thai government has acted several times to repatriate the Hmong back to Laos. In February 2009, the Thai government announced again that it no longer welcomed the Hmong, even within the refugee camps, and would act to deport them to Laos or other countries. It is unknown how many may make their way to the U.S. (Doctors without Borders, 2008; Hmong Nation, 2009). This international crisis for the Hmong also has significant public health implications. It is important to understand culturally-responsive care to support the health of the new Hmong refugees, including immunization status.

The Hmong’s Belief Systems and Immunization Practices

A 2008 study completed in Sacramento, California found that among Hmong adults given a checklist of self-care health prevention behaviors, only 32% selected immunization for themselves as an activity that they regularly participate in or maintain. This is compared to 61% for blood pressure checks and 43% for dental health check-ups. The adults in this study were not asked about immunization for children (Vang, 2008).

Disease prevention is valued and health promotion practices are encouraged by traditional Hmong healthcare practitioners. Cha (2003) reports that Hmong herbalists (kws tshuaj) and spirit catchers (tus hu plig) may administer prophylactics such as boiled herbs to prevent chicken pox (i.e. varicella zoster infection), influenza, and other infectious diseases. They may recommend against immunization for their clients and their
family members. If an infectious disease does occur, they may consult a *tus hu plig* for a soul calling. Cha further states, “Vaccination and cholesterol screening are new concepts, only introduced to most Hmong in the last two or three decades; enhanced efforts will be required to familiarize them with these…” (p. 79).

After a case study analysis, Culhune-Pera and Thao (2003) observed that some Hmong may accept vaccination but will carefully “weigh the benefits against risks of injecting dead or weakened germs into their children” (p. 124). Parents receive information through community story telling about Hmong children who have received immunization. These stories include high fevers, severe sickness, paralysis, and even death after vaccination. Culhune-Pera and Thao assert that the Hmong may protect their most vulnerable children (i.e. too skinny, too heavy-boned, infants in general) out of love (*hlub*) and may delay or avoid vaccination. Given these findings from previous studies that describe both low immunization rates and a high incidence of vaccine-preventable diseases, further exploration of the Hmong’s perception of barriers to immunization would be helpful in planning further immunization efforts.

The Searching for Hardships and Obstacles to Shots (SHOTS) Instrument and its use with the Hmong Community

The SHOTS instrument was designed to explore reasons for low immunization rates among children in Hawai‘i and to fulfill a need for a psychometric community-based measure of barriers to immunization. Dr. Victoria Niederhauser at the University of Hawai‘i at Mānoa developed and tested the SHOTS instrument in English. The SHOTS instrument is a self-reporting instrument, with 23 questions on a 0-4 Likert scale. The instrument was purposely designed to be a community-based tool which evaluates
perception of barriers to immunization and, therefore, does not give specific parameters that determine either high or low barriers based on a range of scores or percentage. The Likert scale ranges from 0 as “Not Being a Problem” to 4 as being “Very Big Problem”. A higher score on the questionnaire reflects a perception of more barriers to IZ. The instrument was tested with 655 participants and found to be a reliable and valid tool (test-retest stability Pearson’s r .851; internal reliability Cronbach’s alpha .929) to measure parental perceptions of barriers to IZs among diverse ethnic groups including A&PIAs (59% of the sample) (Niederhauser, 2009) (See Appendix B for the SHOTS instrument).

An earlier CBPR study conducted in the Hmong community was focused on the development of a reliable version of the SHOTS survey in the Hmong language (Baker, 2008). The goal of constructing a Hmong version was to provide a culturally responsive and linguistically appropriate SHOTS instrument that could be understood and completed by members of the Hmong community that included all generations of Hmong and those that prefer to read either Hmong and/or English. The translation process is described below. (See Appendix B for the Hmong version of the SHOTS instrument).

The Universalist Approach to Translation

The most commonly used method of translations for health surveys is the translation-back translation method recommended by Brislin and other cross-cultural researchers (Brislin, 1980; Salyers, Hunter, & McGuire, 2006; Van de Vijver & Leung, 1997; Warnecke et al., 1997). However, even with Brislin’s translation method of decentering the forward and back translations, key constructs of health and semantic meaning may be misinterpreted or misconstrued leading to invalid results and misplaced interventions (Cha, Kim, & Erlen, 2007; Kamler & Threadgold, 2003; Maneesriwongul
Therefore, Herdman, Fox-Rushby, and Badia (1998) and others (Guillemin, 1993; Harkness, Van de Vijver, & Mohler, 2003; Schaffer & Riordan, 2003) recommend a more universalist approach that explores conceptual, semantic, and operational equivalence of the survey items' functions across cultures.

The universalist approach does not make prior assumptions about constructs and meaning across cultures nor does it recommend any specific type or style of translation procedure. It is process focused. It aims to “elicit those aspects of a concept which are genuinely universal across cultures and to use only those...” (Herdman et al. p323). The universal approach requires that the community be involved in the translation process either through key informants and/or lay community members. Involvement of the community aligns this process with community-based participatory approaches. Herdman et al. purposed a six-step approach to ensure an effective and culturally responsive translation process: (a) conceptual equivalence, (b) item equivalence, (c) semantic equivalence, (d) operational equivalence, (e) measurement equivalency, and (f) functional equivalence.

During a previous CBPR study, each step of the universalist method was undertaken in the SHOTS translation process (Baker, 2008). Results from the translation study indicate that the Hmong version satisfies all 6 criteria for valid and reliable translation. The SHOTS instrument was reviewed for conceptual equivalency and item equivalency. A content validity index of 0.9 indicated a strong translatable factor with satisfactory cultural relevance (Norwood, 2000). The Jones, Lee, Phillips, Zhang, and Jaceldo (2001) modification of Brislin’s translation method (1980) along with cognitive interviewing was used to translate the instrument.
Two data sets were collected to test the Hmong version; a bilingual group divided into those taking the survey in English (BLE, n=72) and those taking the survey in Hmong (BLH n=72), and a Hmong only group (H, n=58). The two bilingual groups were statistically compared with each other, as there should be little to no difference in their experience with barriers to immunization. The Hmong only group was also given the survey to ensure ease of administration and to determine Cronbach's alpha reliability coefficient.

Cronbach's alpha reliability coefficient demonstrated excellent internal consistency for each group (BLE and BLH = .956 each data set; H = .914) (Aday & Cornelius, 2006; Cronbach & Meehl, 1955; DeVon, et al., 2007). Both normality and analysis of variance were violated for the majority of item responses. Therefore, a nonparametric equivalent to the Analysis of Variance test, the Two-sample Kolmogorov-Smirnov test (KS), was chosen to compare BLH with BLE groups. The two-sample KS test was selected because it is sensitive to differences in cumulative distributive function and does not require parametric data or large sample sizes (Field, 2005; Pett, 1997). No items demonstrated any significant difference at the .05 level or below indicating no difference between the two groups. The two-sample Kolmogorov-Smirnov test validated the appropriateness of the survey translation with no differences between bilingual respondents whether they took the survey in English or Hmong (two sample K-S D range from .084 to 1.171; p range (asym, 2-tailed) from .129 to 1.00). Review of operational procedures with key informants indicated acceptable ease of administration with the recommendation that a bilingual Hmong representative be present to answer questions during administration of the instrument.
The translation process of the SHOTS instrument into Hmong used an integrated CBPR approach combining iterative communication in a community-based partnership with the Herdman et al. (1998) universalist approach to health survey translation. By using such approaches, the Hmong translation of the SHOTS instrument provides a strong and reliable tool that the Hmong community may use to plan for future interventions related to improving immunization rates that can potentially reduce the burden of serious infections and vaccine-preventable cancer.

Summary

The Hmong community faces significant health inequities related to barriers to immunization. Their historical health beliefs and current patterns of health care usage influence their perceptions of immunization. The SHOTS community-based instrument is one tool that can assist the community in understanding parental perceptions of barriers to immunization and therefore provide accurate information to develop future research, social marketing campaigns, new health policies, and health advocacy regarding immunizations. Translation of the instrument into Hmong during a previous study allowed a valid and reliable version of the instrument to be available for use in this study.
CHAPTER 3
METHOD

This study utilized a CBPR approach among the Hmong communities in the central valley of California. The CBPR partnership, established in 2006, included the principle investigator and members of Hmong Women’s Heritage Association, a community-based organization that serves the Hmong community. The CBPR partnership selected the research topic, designed the study and specific methodology, and collaborated in data interpretation. The group set reduction of health inequities related to vaccine-preventable serious infectious and persistent-infection related cancers as their overarching goal. This research reports the community assessment of perceived barriers to immunization as an initial step in meeting this goal. The methodology utilized for the research is described in this chapter.

Specific Aims

The specific aims of this research were to:

1. Determine the parental perceptions of barriers to immunization among the Hmong community.
2. Identify the demographic and socio-ecological factors associated with parental perception of barriers to immunization.

Design

This exploratory study utilized a CBPR approach among the Hmong communities in the central valley of California. Descriptive data regarding the perception of barriers to childhood immunization among the Hmong community were obtained with the SHOTS instrument; demographic and socio-ecological factors were obtained with a demographic
questionnaire. This study used a cross sectional survey with a convenience sample of Hmong community members who are parents or guardians of at least one child age 8 or younger in the central California valley (i.e. Sacramento to San Joaquin Valleys). Participants completed either the Hmong version or English version of the SHOTS instrument depending on their stated preference.

Community-based Participatory Research (CBPR) Approach

The CBPR partnership selected the research topic, designed the study, and collaborated in data interpretation. Four members of the team have prior experience with CBPR approaches and this strengthens the capacity of the group. Possible methods to assess barriers to immunization were considered. The research partnership strongly preferred use of a survey tool that would result in quantitative data. They stated that in their experience quantitative data provided more powerful support when applying for grants and in evaluation of community advocacy projects. This study was the community assessment of parental perception of barriers to immunization as an initial step in meeting the partnership’s long term goal.

Hmong Women’s Heritage Association

The Hmong Women’s Heritage Association (HWHA) was the community-based organization (CBO) link for this study. This CBO was established over 15 years ago and has received national awards for its contributions to the Hmong community. In addition, HWHA is an active participant in the Asian American Network for Cancer Awareness, Research and Training (AANCART). The AANCART organization is funded by the National Cancer Institute and has over 15 CBPR research projects in progress across the nation (Chen et al., 2006). The CBO also provides a leadership role with the California
Hmong Health Initiative sponsored by The California Endowment. Members of the research team included social workers, a registered nurse, and community advocates. The principle investigator for this research is a doctoral student who has worked with the Hmong community and HWHA association on several projects including establishment of family resource centers and community assessments. The doctoral student met with the HWHA staff every two weeks during survey administration to monitor the process.

Training of the Research Associates

The research partnership designed the training for the bilingual research associates to assist with recruitment and administration of the surveys. The training included: (a) philosophy and goals for CBPR research project, (b) the research process, (c) human subject protections, (d) the SHOTS instrument and explanation of the each item, (e) importance of reading verbatim from the Hmong version if any assistance is needed, and (f) protocols for survey administration. They were each paid for time spent in data collection. The research associates were involved throughout the CBPR process; their level of participation varied depending on other work assignments.
Description of the Sample

Sample Size

The CBPR team calculated the number needed for the sample using G*Power3 software. The maximum number of participants required for chi-square, \(t\)-test, Pearson product-moment correlation coefficient, analysis of variance, or regression with main effects and interactions sufficient power was determined to be 220 (power .9 level, large effect size 0.5 (alpha 0.05) (Faul, 2007). To create the most accurate view of the community demographics to plan for future social marketing regarding immunizations, the maximum number of surveys possible, given the constraints of the study timeline, were collected.

Recruitment

The research associates invited participants to complete the SHOTS instrument and demographic questionnaire at Hmong cultural events. Participants were recruited from naturalistic settings that have historically attracted a high attendance of Hmong families. These settings included a Hmong New Years’ celebration, which is the largest social event in the Hmong community attracting well over 10,000 Hmong individuals at the Sacramento Cal Expo event (Yang, 2008), school events at schools with a high percentage of Hmong students, social events at community-based organizations, and Hmong-attended sports events. Because data collection occurred at community events, there was not any additional burden for child care or transportation required to participate in this study. Each participant was given a $5 gratuity for his or her time. Data collection occurred in 2008.
Inclusion Criteria

Eligible participants included Hmong parents, foster care parents, or primary care grandparents over 18 who had resided in the United States for at least one year, and had at least one child age 8 or younger. Participants reported literacy levels adequate to complete the written survey in Hmong or English depending on their preference.

Exclusion Criteria

Newer Hmong refugees with less than one year residency in the U.S. were excluded because they may not have had enough experience to identify local barriers to IZs for their children and may have been receiving supplemental transitional health services not generally available to the community. Participants who were not able to read in either Hmong or English were excluded from participating in the study. Research associates provided interpretation for participants who needed very minimal assistance with completing the questionnaire. However, if the researcher and/or associates who assisted with the study determined that the participant was not able to complete the survey independently, then the participant was excluded from the study. Only one family member per household was asked to complete the survey.

Data Collection and Storage

There were no identifiers connecting the survey instrument with any one individual. Only aggregated data was reported so that no individual data were identifiable. Privacy was maintained in each setting and participants sealed their completed surveys in an envelope that was opened only by the research partners. Surveys were held in a secure locked drawer. Electronic results recorded into SPSS software were password protected.
Instrumentation:

Searching for Hardships and Obstacles to Shots (SHOTS) Instrument

A self-report 23-item instrument, Searching for Hardship and Obstacles to Shots Survey (SHOTS), was used to capture the perceived barriers to immunization. The instrument demonstrates excellent reliability and validity with test-retest stability and internal reliability (Pearson's r = .85, Cronbach's alpha = .95) (Niederhauser, 2009). The instrument was based on the Trandis adaption of the theory of reasoned action (TM-TRA). It can be further grouped into three subscales that consider how facilitating conditions, empowerment, habits, cognitive analysis, and social norms influence perception of barriers. Each subscale represents common factors for perceived barriers that relate to (a) access in obtaining immunization (e.g. "The clinic/facility wasn't open at the time I could go"), (b) concerns about getting immunization (e.g. "I worry what is in the shots"), and (c) perception that immunization is not important (e.g. "I don't think kids' shots are important"). The scales range from 0 as "Not Being a Problem" to 4 as being "Very Big Problem." A higher score on the instrument reflects a perception of more barriers to IZ than a lower score. The SHOTS instrument has been validated in the Hmong language (Baker, 2008).

After this instrument was validated for English speaking populations, the SHOTS instrument was translated into Hmong and tested for cultural responsiveness and linguistic appropriateness in the Hmong community with both English and Hmong versions (see chapter two).
Data Analysis

Survey data from this study was entered into Statistical Package for the Social Sciences (SPSS) 15.0 for Windows and every fourth survey was rechecked for data accuracy. The maximum number of missing data from any one of the dependent variables was three responses representing less than 0.7% of the sample, and the independent variables contained no more than 3 % missing data (maximum n = 13). Missing data were excluded case by case from each analysis through the SPSS (Field, 2005).

Reliability Analysis

For this study, Cronbach’s alpha coefficient was obtained for the overall scale and each subscale to demonstrate internal consistency reliability. Cronbach’s alpha should be analyzed each time an instrument is used for data collection (Aday & Cornelius, 2006; DeVon et al., 2007). Cronbach’s alpha above .7 indicates adequate reliability (Field, 2005). Cronbach’s alpha for the SHOTS survey (total scale) was .931 signifying excellent internal reliability. The subscale Cronbach’s alphas were: Subscale One: Access (.912), Subscale Two: Concerns (.873), and Subscale Three: Importance (.839). The subscale to subscale coefficients of greater than .3 indicate that the subscale makes a unique contribution and that scores of .7 or below mean that the contribution is not redundant (Field, 2005). The subscale coefficients all fell within this range. The total scale to subscale and subscale to subscale correlations are shown in Table 1, Appendix A.
Variable Specification

The variables were selected to address the specific aims of the study. The independent variables are presented in Table 2; the dependent variables in Table 3. Both tables are located in the appendixes.

The specific aim #1: Determine the parental perceptions of barriers to immunization among the Hmong community.

Analyses included descriptive examination of frequency, percentage, mean, standard error, standard deviation, range, and variance of each of the 23 items on the SHOTS instrument and the total scale and each of the three subscales.

Specific aim #2: Identify the demographic and socio-ecological factors associated with parental perception of barriers to immunization.

The research team explored patterns in barriers to immunization across independent variables such as age of parent, number of children, generational status in the U.S., preferred language usage, type of healthcare provider preferred, lack of or type of health insurance, geography living area (see Table 2). In addition, five items were included related to future social marketing and health communication with the Hmong community regarding immunizations. This included language used for reading and writing and channels for health communication.

The partnership felt that questions about income may be too personal and participants might be reluctant to answer questions that would reveal their financial and possible welfare status. However, several studies have linked income to IZ status (see Table 2) and it was felt that this information was essential to understanding patterns in barriers to IZ. After discussion about these concerns with both the partnership and the
executive director of the Committee on Human Subjects at the University of Hawai‘i at Mānoa, it was agreed that an ordinal rank response along with the wording, “if you are comfortable sharing your income, please indicate your yearly household income” would be acceptable to explore the income variable. This wording resulted in a 97% response rate.

Statistical Analysis

Each independent variable was analyzed to determine the significant relationships with the dependent variable (i.e. total scale). Statistical analysis included t-test, Pearson’s product movement correlation, Kruskal-Wallis one-way analysis of variance (Mann-Whitney U with a Bonferroni correction for post hoc analysis), and analysis of variance (ANOVA) (Games-Howell post hoc analysis). Games-Howell post hoc was selected due to unequal groups sizes (Field, 2005; Tabachnick & Fidell, 2007) (see Table 2).

Variables that demonstrated significant correlation ($p < .05$) with an effect size of $r, r^2$ of .2 or greater or strength of association of $\omega^2 .06$ or greater with barriers to IZ were entered stepwise into a regression model until no significant correlations remained ($p < .05$) (Field, 2005; Kirk, 2007; Munro, 2005). Because there was no a priori theory, backward stepwise regression was used to determine which variables best predicted perceived barriers. Interactions involving the variables were tested and those interactions were kept in the model if they were significant at the $p < .05$ level (Tabachnick & Fidell, 2007).
Protection of Human Subjects

This study was approved by the Institutional Review Board at University of Hawai‘i at Mānoa (CHS #16555). All participants received an approved information document in their preferred language, either Hmong or English. The SHOTS instrument (Appendix B) has been field tested in both English and Hmong and found to be culturally responsive and appropriate for use in the Hmong community.

Participant Risk and Protections

Protection against Risk

Participants were asked to complete a parent survey about personal beliefs or issues that might make it hard for parents to obtain shots for the child or children. They were also asked demographic questions such as age, child’s age, where the child receives health care, ethnicity and personal beliefs regarding shots and self-identified barriers to shots. Participants received $5 for their time in completing the study and were informed that they could withdraw from the study at any time without penalty and still receive the $5. Individual participant responses to questions were not reported; only aggregate results are reported. Participants received an information letter in English and/or Hmong that stated the purpose of the study and their rights.

Risks for Participants

The risks from participating in this study were minimal. Participants may have experienced feelings of discomfort or guilt when recalling their experience in either obtaining or not obtaining shots for their child. The amount of information gained was necessary to complete the study and the minimal risk was determined to be acceptable.
Potential Benefit of Proposed Research and Inclusion of Women and Minorities

The Hmong in California face rates of cervical and liver cancer three times higher than those of other A&PIA groups. In addition, the Hmong are much less likely than other ethnic groups in California to have their cancers diagnosed at an early, treatable stage, making prevention one key to reducing cancer burden in the population (UCDMC, 2004). Up to 60% of liver cancer and nearly 100% of cervical cancer can be prevented by adequate immunization. The Hmong represent the least likely among Asian Pacific Island Americans to have obtained cancer-preventable immunizations for their children.

There were no valid and reliable data to delineate barriers to immunization among the Hmong community. Information from such an instrument could be used to conduct community-based intervention studies that may help to improve IZ rates. Using the data obtained from this study, the long-term goal for this project was to continue a CBPR approach to develop and implement intervention plans designed to improve IZ rates. Improving IZ rates employs secondary prevention efforts in reducing the burden of chronic hepatitis B, liver, and cervical cancer. The minimal risk of possible discomfort in thinking about shots for a child was more than offset by the goal of reducing cancer burden and risk of serious infection in the Hmong population. There is no expected benefit for any individual who participated in the study. This pilot study included only the Asian and Pacific Islander American subgroup of Hmong because the Hmong version of the SHOTS instrument is only relevant to this one ethnic group.
CHAPTER 4
RESULTS

This chapter describes the results of the study. A description of the study participants' demographics and a comparison of the study sample to the general Hmong community are presented. This is followed by the results for each of the specific aims of the study. The specific results for the demographics are located in the appendixes, Table 4 and the results for SHOTS total scale and subscales are located in appendixes, Table 5.

Number of Participants

There were 453 surveys collected; ten surveys were not used in the analysis due to incomplete demographic data (3), no children listed as age 8 or under (4), and participants were not from the greater Sacramento/San Joaquin Valley regions (3). Therefore 443 surveys were included in the final analysis.

Demographics

The majority of the participants were born outside the U.S. \( n = 335 \); 75.6%. Seventy-one percent \( (n = 314) \) were female and married/or living with a partner \( n = 394 \); 85.2%; the average age was 32 years \( (SD = 8.46) \). Sixty-six percent \( n = 291 \) of the participants took the survey in English, and 34.3% \( n = 152 \) preferred the Hmong language version of the SHOTS instrument. Only 5.6% \( n = 25 \) of the sample reported not having any health insurance or that they did not know the status of their health insurance. The most common type of health insurance cited was MediCal (a public funded health coverage for families with low-income) \( n = 220 \); 49.7% and private insurance was noted as the second most common type of health insurance \( n = 198 \); 44.7% (See Table 4 for the demographics describing the participants in the study).
Comparison of Sample to General Hmong Population

The sample for this study was based a cross-sectional convenience enrollment at various locations, including Hmong New Year events in Central California. Hmong New Year events attract a wide representation of the Hmong community and are the social events of the year (Yang, 2008). When the sample was compared to the data from the Hmong 2004 census track data most characteristics of the sample reflected the larger Hmong population (Asian and Pacific Islander American Health Forum, 2006).

Only two variables, gender and age, were not reflective of the general population. This can be explained by the inclusion criteria of being age 18 or older and have at least one child age 8 or under, and being expected to know about their children’s immunization experiences. This provided for a younger study sample with more females than described in the general population census track report. The sample’s close alignment with general population demographics on all other characteristics indicates that the study sample is consistent with the general Hmong population.

Specific Aim #1: Determine the Parental Perceptions of Barriers to Immunization among the Hmong Community

Parents in the Hmong community do perceive barriers to immunization; the adjusted mean (mean divided by number of items) for the total was 1.07. The SHOTS instrument was based on the Trandis adaption of the theory of reasoned action (TRA). It can be further grouped into three subscales that consider how facilitating conditions, empowerment, habits (subscale one), cognitive analysis, and social norms (subscales two and three) influence perception of barriers. Each subscale represents common factors for perceived barriers that relate to (a) access in obtaining immunization
(e.g., "The clinic/facility wasn’t open at the time I could go"), (b) concerns about getting immunization (e.g., "I worry what is in the shots"), and (c) importance of shots (i.e. perception that immunization may not important for health) (e.g., "I don’t think kids’ shots are important"). Overall, parents demonstrated the greatest barriers related to Subscale Two: Concerns about Shots, with the highest adjusted mean of any subscale at 1.40, and the lowest barriers were Subscale Three: Less Importance of Shots, with an adjusted mean of .82. Participants indicated the full range of possible responses for each item in the survey (0 to 4, 0 = not a problem, 4 = very big problem) (see Table 5, Appendix A for detailed results regarding each scale and each item on the survey).

Specific Aim #2: Identify the Demographic and Socio-ecological Factors associated with Parental Perception of Barriers to Immunization

The demographic and socio-ecological variables were explored as independent variables with the total scale of the perception of barriers as the dependent variable to determine the relationship. Eight independent variables were associated with the perception of barriers: language, income, healthcare provider, transportation, nativity, education, type of health insurance, and employment status (see Table 7, Appendix A)

Eight variables were not found to be associated with perception of barriers. These included: (a) gender, (b) age, (c) geographic region, (d) country of birth, (e) generational status, (f) new wave refugee arrival, (g) number of children, and (h) marital status.
Variables Associated with the Perception of Barriers to Immunization

Type of Non-emergency Healthcare Provider

A one-way analysis of variance (ANOVA) was performed with total scale as the dependent variable to determine if there were any differences in non-emergency use of healthcare provider. Participants that indicated that they did not have a healthcare provider represented 1% (n = 5) of the sample and were not considered in the analysis. Levene’s Test for Equality of Variances was computed and found to be non-significant; therefore equal variance values are reported (p = .9). There was a significant difference in the perception of barriers among the 3 groups (use of Western healthcare only (n = 346), use of both Western plus shaman/herbalist (n = 35), or use of shaman/herbalist only (n = 44) (F(2,422) = 20.48, p = .00, $\omega^2 = .29$). Because sample sizes were different, post-hoc comparisons were conducted using the Games-Howell test (Field, 2005). Participants using a shaman either alone (p = .001, r = .24) or shaman/herbalist with Western healthcare (p = .00, r = .27) had significantly more perceptions of barriers. There was no significant difference found between the use of a shaman/herbalist alone or a shaman/herbalist in combination with Western healthcare (p = .57). This indicates that there are perceptions of barriers to immunization related to the use of healthcare providers and that any inclusion of a shaman/herbalist with or without use of Western healthcare increases the perception of barriers.
Preferred Language for Survey

The survey was available in Hmong and English. Those participants who selected to complete the survey in the Hmong language \( (n = 145) \) were compared to those who completed the survey in English \( (n = 281) \). Group means were compared using independent sample \( t \)-test. Participants preferring to use the Hmong language version for survey completion reported increased barriers. Levene’s Test for Equality of Variances was computed and found to be significant; therefore equal variance not assumed values are reported \( (p = .03) \). A significant difference was found between participants who completed the survey in Hmong and English version \( (t (263) = 6.31, p = .00, 2\text{-}tailed) \). Spearman’s rank correlation coefficient was calculated and a negative medium effect size was found \( (r = -.3, p = .00, 2\text{-}tailed) \). Participants completing the survey in the Hmong language perceived significantly more barriers to immunization than those completing the English version of the SHOTS instrument.

Income

The income variable was recoded into three groups to determine the relationship between the perceptions of barriers to immunization and income (Group 1: 0 to $20,000 \( (n = 146) \); Group 2: $20,001 to $50,000 \( (n = 167) \), and Group 3: >$50,000 \( (n = 113) \). Because both normality and analysis of variance were violated, a nonparametric equivalent to the Analysis of Variance test was selected. The Kruskal-Wallis one-way analysis of variance was used to compare the difference between the 3 groups, and post-hoc testing was done using the Mann-Whitney \( U \) with a Bonferroni correction \( (.05/3 = .01 \text{ accepted as significant}) \).
A significant relationship was found between income levels and the perception of barriers to immunization (Kruskal-Wallis $H(2) = 18.54, p = .00$). A Mann-Whitney $U$ test was used and a significant effect was found between Groups 1 and 3 ($U = 7382, p = .002, r = -.26$) and between Groups 2 and 3 ($U = 5692, p = .00, r = -.18$), but not between Groups 1 and 2 ($U = 11203, p = .22$). Participants with incomes of more than $50,000 perceived fewer barriers to immunization than those with incomes of less than $50,000.

Transportation to Health Care

A one-way analysis of variance (ANOVA) was performed with total scale as the dependant variable to determine if there were any differences in types of transportation used to see a healthcare provider. Levene’s Test for Equality of Variances was computed and found to be non-significant; therefore equal variance values are reported ($p = .97$). There was a significant difference with medium effect size in the perception of barriers among the 3 groups (use of a private car, $n = 370$), use of public transportation/ride with friend ($n = 17$), or walking ($n = 30$) ($F(2,414) = 15.94, p = .00, \omega^2 = .3$). Because sample sizes were different, post-hoc comparisons were conducted using the Games-Howell test. Participants who walked to healthcare providers had significantly more perceptions of barriers than those using a private car ($p = .00, r = .3$) or those using public transportation/friend ($p = .03, r = .26$). There was no significant difference found between use of private vs. public transportation or riding with a friend ($p = .68$).
There was no significant correlation between the walking group and the non-walking group across any of the demographic or socio-ecological variables except for a significant negative effect for inclusion of a shaman for healthcare ($n = 434, r^2 = - .81, p = .00, 2$-tailed). Those that walk to healthcare have a perception of increased barriers at a significant level compared to those that rely on public transportation or riding with a friend to visit healthcare providers.

**Nativity**

Nativity (i.e. more years in the U.S. and age of arrival) is recognized as one marker for acculturation (Chun, Organista, & Marin, 2003). Nativity may influence factors such as income levels, rates of immunization, the ability to access healthcare, and health status for refugee populations (Buelow & VanHook, 2008; Hao, 2004; Schwartz, Pantin, & Sullivan, 2006).

*Years living in the U.S. (if born outside the U.S.)*. Pearson’s correlation coefficient was calculated to determine the correlations between the number of years living in the U.S. and total scale of perception of barriers to immunization. There was a negative significant correlation between the variables; however, an insignificant negative effect was found ($r = - .16, p = .004, 2$-tailed). There was a decrease in perception of barriers to immunization the longer the participants lived in the U.S.
Age of arrival in the U.S. (if born outside the U.S.). Pearson’s correlation coefficient was calculated to determine the correlations between age of arrival and total scale of perception of barriers to immunization. There was a significant correlation between the variables, a moderate effect was found \((r = .24, p = .00, 2\text{-tailed})\). Older age of arrival in the U.S. (i.e., less nativity) was correlated with the increased perception of barriers to immunization.

Education Level

There was a significant difference with small effect size in the perception of barriers among the three educational levels (up to some high school \((n = 198)\), high school graduate \((n = 95)\), or some college and beyond \((n = 132)\) \((F(2,422) = 4.25, p = .015, \omega^2 = .12)\). Levene’s Test for Equality of Variances was computed and found to be non-significant; therefore equal variance values are reported \((p = .331)\). Because sample sizes were different, post-hoc comparisons were conducted using the Games-Howell test. Participants who had less formal education and some high school had significantly more perceptions of barriers than with some college or more \((p = .008, r = .18)\), but not with high school graduates \((p = .52)\). There was no significant difference found between participants who were high school graduates and those who had up to some college \((p = .38)\). Those participants having a high school education or more perceived having fewer barriers to immunization than those with less than a high school diploma.
Type of Health Care Insurance

There was a significant difference in the type of health care insurance (private/HMO (n = 185), MediCaid/ Cal (n = 217), or did not know/ or had no health insurance (n = 24) \( F(2,423) = 11.19, p = .00, \omega^2 = .2 \). Levene’s Test for Equality of Variances was computed and found to be non-significant; therefore equal variance values are reported \( (p = .385) \). Because sample sizes were different, post-hoc comparisons were conducted using the Games-Howell test. There were significant differences between participants who had private and MediCaid/Cal health insurance \( (p = .00, r = .18) \). There was also a significant difference found between participants with private insurance and those who did not know/ no health insurance \( (p = .006, r = .27) \). There was no significant difference found between those participants who had MediCaid/Cal and those that did not know/ or had no health insurance \( (p = .343) \). Participants who have insurance provided by a public provider (i.e. MediCaid/Cal) perceived more barriers to immunization.

Employment Status

Employment status was explored using the independent t-test. Two categories were used: employed \( (n = 272) \) or not employed/ student status \( (n = 168) \). Levene’s Test for Equality of Variances was computed and found to be non-significant; therefore equal variance values are reported \( (p = .631) \). A significant differences was found between the two groups \( (t (421) = -.3.1, p = .002, 2 \text{-tailed}) \). Spearman’s rank correlation coefficient was calculated and a small effect size was found \( (r_2 = .16, p < .001, 2\text{-tailed}) \). Those that are employed reported fewer perceptions of barriers to immunization than those that were unemployed or were students.
Factors that Best Predict Barriers to Immunization

The relative effectiveness of each significant predictor (i.e. independent variable) was explored through linear multiple regression to further refine the factors that best predict barriers to immunization. Because there have not been any studies specific to the Hmong population regarding barriers to immunization, a backward stepwise regression was used to determine which variables best predict barriers. Independent variables that demonstrated significant correlation \((p < .05)\) with an effect size of \(r, r^2 \) of .2 or greater or strength of association of \(\omega^2 .06\) or greater with barriers to Iz were entered stepwise into a regression model until no significant correlations remained \( (p < .05) \) (Field, 2005; Kirk, 2007; Monroe, 2005). The factors included in the final model were: (a) those that completed the survey in Hmong vs. English, (b) Western only healthcare vs. shaman included in healthcare, (c) income: poverty (i.e. $20,000 or less) vs. above $50,000, and above poverty but below $50,000, (d) walking to health care vs. private or public transportation or riding with a friend. The income variables were dummy coded according to a 0, 1 code, with poverty level as the reference group. Interactions involving the variables were tested and those interactions were kept in the model that were significant at the \( p < .05 \) level.

The overall fit of the model was significant with the addition of five predictors, preferred use of the Hmong language for completion of the survey, healthcare provider type (i.e. shaman included in healthcare vs. Western healthcare only), walking to health care, and annual household income accounting for 22% of the total variance \((F(5,420) = 22.96, p < .001)\). The remainder of the entered variables were not significant and were
excluded from the model (nativity ($p = .61$), type of healthcare insurance ($p = .79$); private vs. public transportation ($p = .89$). The results are shown in Table 8, Appendix A.

The model was explored to ensure that assumptions were not violated. If the assumptions had been violated then there may be elements that were not accounted for in the model. The residuals in the model should be independent. The Dubin-Watson statistic was 2.01 indicating that any errors in the model are independent and did not demonstrate heteroscedasticity (Munro, 2005).

Normality of residuals was checked by examining the frequency histogram and normal probability plot. The regression standardized residual plot demonstrated a symmetrical bell shaped curve without any excessive kurtosis or skewness. Cook's distance was less than one (.002) indicating little to no influence from outliers.

Linearity and homoscedasticity were examined by ZPRED vs. ZREDID graph examining regression standardized predicted values and normal P-P plot. Linearity means that the data should be based on a straight or nearly straight line otherwise the findings can not be generalized. Each variable demonstrated acceptable scatter throughout the graph and the P-P plot demonstrated a linear distribution; this also indicated normality. Multicollinearity, meaning that predictors are too closely correlated, was ruled out by a variance inflation factor (VIF) of 1.63 (value should be less than 10, Fields, 2005). Very closely related to linearity is homoscedasticity, meanings that at each predictor variable's residual terms should be constant and fairly evenly spread.
Variables Not Associated with Perception of Barriers to Immunization

Gender

Gender was compared using the independent sample $t$-test. Levene's Test for Equality of Variances was computed and found to be significant; therefore equal variance not assumed values are reported ($p = .05$). There was no significant difference found between male ($n = 128$) and female ($n = 314$) participants ($t (213) = 1.45, p = .15$, 2-tailed) regarding their perception of barriers to immunization.

Age

Pearson's correlation coefficient was calculated to determine the correlations between the age (range 18-59) and total scale. There was no significant correlation between the variables ($r = .54, p = .26$, 2-tailed). Because Lumen (2004) found that mothers' age of 25 and under had children with fewer on time immunizations, age was regrouped into two variables (Group 1: age 25 and under ($n = 85$) and Group 2: age over 25 ($n = 216$), and males were not considered in the analysis. Independent sample $t$-test did not demonstrate any significant differences between the female age groups ($t (148) = .83, p = .40$, 2-tailed), indicating that being a younger mother was not a factor in the total score regarding their perception of barriers to immunization.

Geographic Region of Residence

One way analysis of variance found no significant differences in total scale scores and geographic regions (Sacramento, $n = 272$; San Joaquin, $n = 117$; and Merced, $n = 33$) ($F(2, 419) = .33, p = .72$).
Country of Birth

One way analysis of variance found no significant differences in total scale scores and country of birth (Laos, n = 235; Thailand, n = 89; U.S., n = 97) \( (F(2, 418) = .65, p = .52) \). The four participants born in France were not considered in the analysis as they represented <0.9% of the sample.

Generation in the United States

Participants indicated whether they were 1\textsuperscript{st} generation \( (n = 338) \) (i.e. born outside the U.S) or 2\textsuperscript{nd} generation \( (n =104) \) (born in the U.S., with parents born outside the U.S.). Using the independent sample \( t \)-test, there was no significant difference found between the two groups \( (t (213) = -.78, p = .44, 2 \text{-tailed}) \).

New Wave Refugee Arrival 2004 or later

There was a wave of new refugees from the WAT camp in Thailand starting in 2004. An independent sample \( t \)-test was conducted to determine if there were differences in perception of barriers to immunization between this group \( (n = 72) \) and earlier refugee migration \( (n = 371) \), there was no significant difference found between the two groups \( (t (424) = -1.6, p = .11, 2 \text{-tailed}) \).

Number of Children

Pearson's correlation coefficient was calculated to determine the correlations between perception of barriers to immunization and the number of children and total scale. There was no significant correlation between the variables \( (r = .03, p = .50, 2\text{-tailed}) \).
**Marital Status**

There was no significant relationship found between marital status (married/living with partner, \( n = 382 \), divorced, separated, widowed, \( n = 21 \), single, \( n = 17 \)) and perception of barriers to immunization \( (F(2, 417) = .39, p = .68) \).

**Summary**

The demographic and descriptive analyses of the study sample were representative of the general population of the Hmong community. The SHOTS total scale produced a corrected mean of 1.04 (0 to 4 scale). Study participants reported the highest level of perception of barriers on the subscale concerns, followed by access, and the importance. The results of the exploratory bivariate analysis indicated that eight independent variables were associated with parental perceptions of barriers to immunization, and that eight independent variables were not associated. A multiple regression using the significant variables was entered in a model. Study participants who perceived barriers to immunization at a significant level in the sample included those who used the Hmong language to complete the survey, include a shaman for provision of healthcare, walk to healthcare, and have an annual income of less than $50,000.
CHAPTER 5
DISCUSSION

The purpose of this exploratory study was to determine the barriers to immunization that are perceived by parents in the Hmong community and to describe the demographic and socio-ecological factors associated with those perceptions with the goal of reducing inequities in immunization rates experienced by the Hmong population. In this chapter, an analysis of study findings are related to prior immunization studies, and implications of the study for future research and nursing practice are discussed.

Perceived Barriers to Immunization

The study participants perceived several barriers to immunization. Ninety-three percent of parents perceived barriers to immunization; therefore, further identification of barriers may be important in reducing differences in the immunization rates for the Hmong population in Central California. In contrast, the majority of parents in the U.S. do not report any problems in obtaining immunizations (Bates & Wolinsky, 1998; Hambidge et al., 2006; Taylor et al., 2002). Taylor et al. (2002) collected data from 13,516 parents and found that 74% of the participants reported no difficulty in obtaining immunizations for their children. Very few participants in this study of Hmong parents (6.5%) reported no barriers to immunization. The high rates of perceived barriers, past outbreaks of measles in the Hmong community, and the significant risks of under-immunization among the new wave of refugees all indicate that the Hmong community may benefit from intervention and further study directed at reducing barriers to immunization.
The Three SHOTS Subscales of SHOTS Instrument:
Access, Concerns, and Importance

The SHOTS instrument subscales offer a further refinement in capturing defined barriers to immunization. The instrument based on the Triandis adaptation of the theory of reasoned action (TM-TRA) has three subscales: (a) access to immunization, (b) concerns about immunization, and (c) importance of immunization (i.e. higher scores indicate perceptions that shots are not important to health and wellness). The subscale of access includes facilitating conditions, empowerment, and habits. The subscales of concerns about immunization and importance of immunization include cognitive analysis of consequences, social norms, and influences. The participants in this study reported the highest subscale score for subscale two—concerns about immunization, second highest for subscale one—access, and the lowest score for subscale three—importance. Findings are presented in this order.

Subscale Two—Concerns

The study participants reported the highest subscale scores regarding concerns about immunization. According to the TM-TRA model, this may indicate that the Hmong have social norming influences within the community that interface with their cognitive analysis to produce concerns and worries about immunization. Social norming is a complex dynamic interaction between an individual and a group that influences values, beliefs, attitudes, and behavior (Bicchieri, 2006; Triandis, 2001). Culhane-Pera and Thao (2003) describe a rapid spreading communication network in the Hmong community regarding adverse reaction to immunization that has substantial influence on health care practices in the Hmong community. In addition to a strong collectivistic value, the
Hmong are also a recent immigrant group to the U.S. with 46% having less than a high school diploma (Hein, 2006). Social norming, collectivistic values, and lower levels of education are all factors that may contribute to concerns regarding immunizations (Gust et al., 2004).

Subscale One-Access

The total score related to subscale one, access to immunization, was also high and demonstrated perceived barriers for the study participants. Even those with high rates of access to health insurance (95%) reported barriers. These findings were supported by the research team. The research team reported that from their experience with the Hmong community, long clinic waits, forgetting about shots or not knowing when they were needed, inability to get time off work, not having anyone to take care of other children, and healthcare facilities not being open at accessible times create socio-ecological conditions that limit access. According to the TM-TRA model, access issues intertwine with socio-ecological influences and the conditions that facilitate access to immunizations. Healthcare systems may also not be providing adequate culturally responsive health education about immunizations. Furthermore, the complexity of the number and timing of immunization in the series can impede access as indicated by parents’ responses of not understanding when to go in for shots. Healthcare clinics’ operational procedures such as long clinic lines and hours of operation may also impede access.
Subscale Three-Importance

Subscale three, importance of immunization to health and wellness, was not as significant a barrier to immunization for the study participants. This is in contrast to other studies that found that parents’ determination of the value of immunization for their children’s health predicted immunization rates, with a determination of immunization being of lower value resulting in lower immunization rates (Kimmel, Burns, Wolfe, & Zimmerman, 2007; Mills, Jadad, Ross, & Wilson, 2005). Subscale three, importance, represented fewer barriers for the Hmong community than subscales two and one, concerns and access.

The total score and the subscale score ranking with concerns, access, and importance describe a unique set of barriers for the Hmong community. While some of the findings from this study align with past immunization studies (e.g., inconvenient clinic hours of operation), there are a distinct set of barriers described by the Hmong community. Based on the TM-TRA model, these findings suggest that social norms and influences in conjunction with cognitive analysis influence the perception of barriers to immunization by the study participants. In addition, socio-ecological factors and a lack of facilitating conditions in their community also contribute to immunization barriers.
Social Determinants of Health and Barriers to Immunization

Healthy People 2010 set out as one of two overarching goals, the elimination of health disparities in the United States (HP 2010, n.d.). Immunizations are a powerful public health intervention to prevent serious infection and infectious-disease related cancers. Immunization is a cost-effective tool that prevents disability and death, yet despite the recent success in reaching HP 2010 goals for immunization rates in the 24 month and under age range, these benefits as a result of immunization have not been equitably distributed (Smith & Stevenson, 2008; Wooten, Luman, & Barker, 2007). The vaccines for children and immunization grant programs are among national efforts to improve immunization rates in the U.S. (California Legislature Informational Hearing, 2009).

Despite these efforts, inequities remain for some communities regarding access to immunization. The Hmong community is among these groups with 93.5% reporting at least some barriers to immunizations. This finding is particularly significant because the Hmong community has very high rates of health insurance (95%) indicating that other factors influence barriers to care. Models that include the social determinants of health often cite lack of health insurance as the major barrier to care (IOM, 2009; Moniz & Gorin, 2003). However, several researchers have found that health insurance alone did not result in equal access because groups that continue to experience poverty, language and transportation barriers encounter challenges in accessing care (DeVoe et al., 2007; Marmot & Wilkinson, 2005). This study supports the latter finding because even with health insurance, study participants with lower incomes, less English fluency, and/or lack of transportation are more likely to perceive barriers to immunization.
Language, Income, and Transportation

The most robust predictors of barriers to immunization in the regression model were completion of the survey in the Hmong language, followed by inclusion of a shaman for healthcare usage, income, and transportation. Study participants who completed the survey in the Hmong language reported perceived barriers to immunization at a significant level. Federal law (Title VI Civil Rights Order 13166 of 2000) requires that all federally qualified health clinics provide trained interpreters. California law requires acute care hospitals to provide interpreters but does not regulate clinical services (California Endowment, 2003). Despite this legislation, healthcare systems may not have appropriate mechanisms to adequately address language and cultural barriers (Cheng, Chen, & Cunningham, 2007; French, Gilkey, & Earp, 2009; National Association of Community Health Centers, 2008). The members of the research partnership also described multiple instances of long waits for interpreters, or interpreters were not available and families were sent away or asked to come back with an English-speaking family member (PK Vang, personal communication, May 1, 2009).

Lower levels of income have long been associated with barriers to healthcare, healthcare quality, and health status (Asian and Pacific Islander American Health Forum, 2006; IOM, 2002; Galea, Sisco, & Vlabor, 2005; Williams & Jackson, 2005). Socioeconomic resources are associated with position in society; socioeconomic position is a powerful determinant of access to healthcare resources and also predicts environmental risks to health (Lynch & Wilkinson, 2000). In this study, participants with annual household incomes of $50,000 or less reported significantly more perception of barriers to immunization.
A complex dynamic between income, education, and language contributes to barriers. A surprising finding from this study was that education lost its significance in the regression model. Given the frequency of visits during the child's first year and the multiple immunizations administered at very specific intervals, educational attainment may not be enough to reduce barriers. These findings are consistent with findings from Bates and Wolinsky's (1998) study that education lost its predictive importance when other factors such as income were considered. Lieu et al. (1994) found in their study that the majority of parents who were college educated did not know when their child's next immunization was due. The complexity of the immunization schedule itself may combine with other factors to create substantial barriers for the Hmong community and denotes the importance of culturally responsive health communication and appropriately trained healthcare interpreters.

Transportation barriers are closely related to income and education. Private car ownership is expensive and educational levels can contribute to the ability to use public transportation. The research partnership reviewed and investigated these findings. They described situations in which family members in the clan would help with transportation but that family members may be reluctant to ask for a ride more than once a month. Individuals try to avoid being a burden to others and this can outweigh the healthcare need. The lack of knowledge regarding how to access public transportation and fear of riding on the bus may also be factors. Challenges related to walking and not using family or public transportation define a unique subgroup among the Hmong community regarding health access behaviors.
This may be closely related to the only variable correlated to this finding, inclusion of a shaman as a healthcare provider, as a shaman will come to the home. A lack of transportation and shaman who make home visits may influence health seeking behaviors.

*Inclusion of a Shaman for Healthcare*

The barriers to immunization perceived by the study participants were correlated with the type of healthcare provider sought. Parents who reported using shamans and herbalists, including those that used Western medical providers together with shamans/herbalists, were more likely to perceive barriers to immunization. The research partnership included a shaman who was surprised at this finding. He stated that shamans generally support immunization or at least have no objection to immunization. “Shaman work on the spirit, we ask our clients to go to their doctor for preventions like shots” (Tong Sia Her, personal communication, March 23, 2009).

In further discussion with the research partnership, two possible explanations were explored. First, it is feasible that Hmong parents who seek services from shamans and herbalists may have a different perception about the efficacy and safety of interventions, such as immunization, in preventing disease. Henry (1999) found in interviews with Hmong parents after an outbreak of measles that Hmong parents used metaphors of agricultural seasons to explain body processes and mingled natural and supernatural causes to explain the outbreak. They blended and adapted traditional animism with Western medicine to interpret the role and possible failure of immunization in the outbreak. Hickman (2007) conducted a series of in depth interviews with Hmong adults living in Anchorage, Alaska regarding their health beliefs. He described an
intricate system of combining spiritual and physical diagnoses that determine healthcare seeking behaviors. He concluded that the Hmong often use a multifaceted, hybrid pathway in seeking healthcare that includes Western medicine when acute physical illness erupts. The Hmong may also consult a shaman for illnesses that are thought to be spiritual, or when Western medicine has failed to provide an adequate cure or explanation. Despite shamans' endorsement of immunization, Hmong parents that include a shaman as a source of health care, may be blending causal explanations to understand health and remain concerned with aspects of Western medicine including immunizations (Kleinman, 2004).

Another possible reason is that parents who seek services from shamans and herbalists may not seek (or seek it less often) routine medical care from a Western healthcare provider. As a result, they may experience barriers due to inconsistent healthcare and/or a lack of a trusting relationship with a primary care provider. Alessandrini, Shaw, Bilker, Schwarz, and Bell (2001) found that parents without a primary care provider were more likely to be under immunized or late in receiving immunization. Transportation barriers for the numerous well-child care visits recommended in the first two years of life may limit establishment of a primary care provider and development of comfort and trust required to accept advice regarding immunization.
Nativity

Nativity (i.e. more years in the U.S. and age of arrival) is recognized as one marker for acculturation (Chun, Organista, & Marin, 2003). Refugees that arrive at age 12 or younger have school as their primary socialization outside the family. They obtain and understand English and Western culture and values at a faster pace than the refugees that arrive at a later age (Chun, Suh, & Tukeuchi, 2000). Nativity may influence factors such as income levels and the ability to access healthcare and health status for refugee populations (Hao, 2004; Salant & Lauderdale, 2003; Schwartz, Pantin, & Sullivan, 2006).

In addition, nativity has been examined as an important indicator in the rate of immunization completion (Buelow & VanHook, 2008). Study participants born in the U.S. did not report significant differences as compared to foreign-born in their perception of barriers to immunization. Generation status alone also did not predict barriers. For those who were born outside the U.S., older age at time of arrival in the U.S. predicted an increase in barriers. Buelow and VanHook explored the relationship between immunization and nativity. They did not include language usage as a variable. Their study indicated that foreign-born mothers who resided in the U.S. for five years or less were not as likely to have children with timely immunization completion when compared with foreign-born mothers who lived in the U.S. longer than five years.

In the current study, when language and income were included in the regression model, the effect of nativity was no longer significant as a predictor of perceived barriers to immunization. This may imply that different immigrant groups have unique experiences that place them at different risk patterns in successfully navigating the healthcare system.
A surprising finding was that the new wave of Hmong refugees fleeing Thailand since 2004 did not report differences in their perception of barriers to immunization as compared to early refugee groups with more time in the U.S. This may be due to the robustness of language use and income in the current study as predictors of perceived barriers to immunization. Healthcare professionals, therefore, need to carefully consider other factors that may pose barriers to immunization for refugees groups and not assume that nativity-related factors mitigate access or health.

*Family Demographics and Geographic Region*

Lyman (2008) and others (Baker et al., 2007; Luman, 2004) found that single parenthood, increased numbers of children, and young maternal age increased perceived barriers and lowered immunization rates, especially among families with younger children. In contrast, the current study participants did not report any significant increase in perceived barriers to immunization related to marital status, age, or numbers of children. This may be because the majority of Hmong parents reported being married or having a live-in relationship (85%), and that relatively large intergenerational families are common in the Hmong community. Intergenerational family management and shared care-giving are adjusted to accommodate large family size in the Hmong community (Cha, 2003; Hein, 2006).

Communities vary as to the degree of healthcare access and support for refugees and English as second language learners in their healthcare system. Lynch and Wilkinson (2000) explored the relationship between socioeconomic position and access to health resources and found that each community creates its own structural access to healthcare resources. Bundt (2002) found significant differences in access and immunization in
different geographic regions across the U.S. This study considered three large regions within the central valley of California, the Sacramento Valley, the San Joaquin Valley, and the Merced area. There were no differences in barriers between the three regions.

The findings in this study were consistent with Wang’s (2005) findings that different groups have unique experiences and socio-ecological variables that create different patterns in their barriers to immunization. Understanding the Hmong community’s unique challenges to obtaining healthcare resources will assist in advocacy and may be the basis for new policies and resources to improve access and decrease inequities in immunization.

Strengths and Limitations

Participatory involvement of the Hmong community through CBPR brings in-depth understanding of how members of the Hmong community may utilize the SHOTS instrument not only for cancer prevention (e.g. through vaccination programs), but also for other vaccine-preventable diseases, thus broadening its usefulness for the community. Community-based participatory research has a track record of reducing childhood immunization inequities. It is a potent approach that empowers hard to reach communities in addressing health inequities (Findley et al., 2006). Provision of a reliable psychometric instrument assists the Hmong community and healthcare professionals in understanding the barriers to immunization perceived by Hmong parents. This information provides an opportunity for the Hmong community to further explore perceived barriers to immunizations and to use the information for advocacy, policy action, and further research to test intervention strategies.
Limitations of this study include the possible lack of generalization of results due to use of a convenience sample rather than a random sample. While non-random sampling may introduce bias, use of community sampling has shown to be effective in recruitment of hidden populations (Faugier & Sargent, 1997). Notwithstanding this limitation, the sample population did reflect the demographic profile of the general Hmong community indicating a diverse sampling of the population (see chapter four). An additional factor to consider is that input from each community will vary and therefore the specific circumstances of the population and healthcare utilization within the specific community may vary.

Immunization for the adolescent population (12 and up) has expanded in recent years and there are unique considerations regarding perceived barriers to immunization (e.g. less routine and sick visits with the HCP). This study focused on childhood immunization and therefore the results may not apply directly to issues related to adolescent immunization. However, children’s ages in this study ranged from 2 months to 18 years, and parents were not asked to only consider their immunization experience with their younger children; therefore, the results do reflect perception of barriers to immunization across a broad age range of children and youth.

The issue of the Hmong language dialect (e.g. White and Green Hmong) was considered during each phase of the study. The CBPR partnership concluded that the differences in dialect did not represent a barrier to accurate survey completion.
Because literacy in either Hmong or English was required to participate, the results may have underestimated perceived barriers to immunization in the overall Hmong community, and in particular for those without the ability to read or write. Community-based interventions based on this study should address this limitation.

Implications for Nursing Practice

Based on findings from this study, Hmong children, despite having healthcare insurance, are at-risk for under-immunization due to the increased perceived barriers reported by their parents. Multiple factors such as language, source of healthcare, and socioeconomic position all contribute to the barriers. At least 66% of participants in this study reported having incomes below the medium level based on the U.S. Census; Hmong Americans have the highest poverty rate of all A&PIA groups and the highest rates for unemployment (Reeves & Bennett, 2004). Stevens, Seid, Mistry, and Halfon (2006) describe three essential components necessary for the reduction of inequities in health among immigrant groups: (a) financial access to care, (b) potential access (having a regular primary care provider) and (c) realized access (care is actually received when needed). The removal of the financial burden of health care through health insurance is necessary but insufficient in removing barriers for the Hmong community. In partnership with the Hmong community, nurses can advocate to increase educational outreach through adult educational programs, meaningful employment services, and culturally responsive healthcare systems that include better language accessibility.

Concerns about immunizations may be addressed with specific social marketing campaigns delivered via key channels within the Hmong community (Abrams, Schiavo, & Lefebvre, 2008; Evans & Haider, 2008). The research team advises that the Hmong
community be empowered to ask, "Is my child up-to-date?" when they visit their healthcare providers including shaman. Any social marketing campaign should include advocacy and endorsement of Hmong shamans.

Social marketing campaigns may specifically address language barriers as people learning to use the English language continue to report barriers to immunization (CDC, 2008). In discussion with the CBPR partnership, language barriers were explored. The team described limited written materials in Hmong at community clinics, overly complex medical jargon used in English materials at clinics, and immunization materials that are difficult to read due to poorly defined fonts and repeated copying. Appointment cards are sent out in English only, and do not clearly indicate which provider sent the card. In addition to improvements in the availability and training of Hmong interpreters, the team reported that improvements are needed in readability, visual attraction, and clarity of messages regarding immunization.

While outreach to the entire Hmong community is indicated based on language and cultural sensitivity, there are certain subgroups that require more specific attention and outreach. For example, the lack of transportation for a small but important segment of the community requires consideration in any social marketing plan. Strine and colleagues (2003) reported a successful immunization campaign that addressed under immunization in the Native American communities in the U.S. through a comprehensive, culturally responsive, and community-based approach. Key components of this strategy included public health nursing home visits, outreach through the Women, Infants, and Children (WIC) nutrition program, a specific program for tracking immunization, and improving access through school and community center clinics. Comprehensive,
ongoing, and integrated approaches such as these are more likely to be effective than single, targeted interventions due to the complexity of socio-ecological factors that contribute to perceived barriers to immunization. Nurses are in an ideal position to advocate for multidimensional improvements across socio-ecological barriers and to support community-based social marketing campaigns to improve accessibility to care.

**Directions for Future Research**

Immunizations are essential to the public’s health; however inequities in immunization rates remain for some communities, creating risk for both the specific community and the general public (Omer, Salmon, Orenstein, deHart, & Halsey, 2009). There is currently a substantial focus on the reduction of inequities through the provision of universal health insurance. Health insurance alone is not sufficient to create access for marginalized groups that lack social capital such as English language use, fiscal resources, transportation, and understanding of the complexity of Western biomedicine. Further research is indicated to determine how socio-ecological factors influence healthcare access and health seeking behaviors for immigrant groups that have health insurance, and more specifically what interventions are necessary to improve immunization rates.

This study used a CBPR approach to conduct this research with the Hmong community. There is limited information available on CBPR studies that demonstrate their effectiveness in intervention with the Southeast Asian communities. The CBPR approach was well received with the Hmong population. Joint capacity and direction were provided throughout the research process laying the ground work for future CBPR research to reduce barriers to immunization.
In 2005, The California Endowment funded a statewide effort to address health inequities among the Hmong community. The first project undertaken in this effort was shaman education and facilitation regarding access to Western medicine and the ability of shamans to provide spiritual care in hospitals. The research team for this study suggested that shamans also be engaged in social marketing regarding immunization and health prevention efforts. The use of social marketing campaigns and involvement of shamans is an unexplored area for health promotion research with the Hmong community.

The complexity of the immunization schedule and the arrival of new vaccines annually make a centralized tracking system essential to provide for individual and public health assessment of immunization status (Stephan, 2007). The California Immunization Registry (CAIR) was created to maintain access to immunization records across the healthcare system and to share information between states for mobile families. The CAIR is effective when utilized; however only 43% of children age 6 and under are registered (California Legislature Informational Hearing, 2009). For example, the CAIR may be helpful in sending language-specific and culturally responsive reminder cards, notifying clinics when immunizations are due and avoiding duplicate immunization, among other interventions. While this registry has potential to reduce inequities in immigrant communities, the knowledge, attitudes, and values of such registries are not known. Further studies could examine the potential application of such registries, especially when combined with social marketing, in reduction of immunization barriers.
Conclusion

Health inequities related to immunization impact both the individual’s and the public’s health. Resolution of health inequities rests on principles of social justice and necessitates examination of the social determinants of health. Nursing has a long history of research and action built on principles of social justice. Lillian Wald and the Henry Street Settlement and Margaret Sanger and her campaign for women’s health are just a few examples (Anderson & McFarlane, 2008). Consistent with this tradition in nursing, this study sought to explore socio-ecological factors related to perception of barriers to immunization among the Hmong community in Central California. A community-based participatory approach to the research led to shared governance and distribution of power and knowledge from design to dissemination of findings from this research. Findings included identification of subgroups among the Hmong community that may have unique perceptions of barriers to immunization that require thoughtful community-designed interventions.

The social determinant of health model suggests that access to care is a substantial source of inequities (Marmot & Bell, 2009). Current U.S. governmental policy is aimed at improving access through health insurance. However, in this study, high rates of health insurance did not predict a reduction in the perception of barriers to immunization; rather issues related to socioeconomic position, selection of a healthcare provider, language usage, and transportation determined perceptions of barriers. The implications for nursing are vast. Outreach to marginalized communities necessitate comprehensive, community-based approaches aimed at improvements in education leading to improved social capital, substantial improvements in culturally and linguistically responsive healthcare, and
healthcare delivery systems that are inclusive of complementary and alternative medicine approaches. Reliance on health insurance alone will not reduce health inequities. Immunization is an essential underpinning of public health; therefore, immunization rates of subgroups such as the Hmong population should be monitored. Policies and interventions should put into place that reduce inequities based on each individual’s and each population’s unique requirements that include the social determinants of health.
Appendix A
Tables

Table 1. Cronbach’s Alpha, Subscale to Subscale Correlations, and Subscale to Total Scale Correlation

Table 2. Descriptions of Independent Variables, Analysis Method, Demographics and Socio-ecological Factors association with Immunization

Table 3. Dependent Variables: SHOTS Instrument Items and Scales and Relationship to Triandis Model Adaption of the Theory of Reasoned Action (TM-TRA)

Table 4. Demographics

Table 5. Parental Perceptions of Barriers to Immunization by Subscale

Table 6. Comparison of the Study Sample with the General Hmong Population

Table 7. Significant Independent Variables and their Effect Size

Table 8. Selected Regression Model for Prediction of Barriers to Immunization
Table 1.

*Cronbach’s Alpha, Subscale to Subscale Correlations, and Subscale to Total Scale Correlation*

<table>
<thead>
<tr>
<th></th>
<th>Cronbach Alpha</th>
<th>Total Scale</th>
<th>Access</th>
<th>Concerns</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Scale</td>
<td>.931</td>
<td>1</td>
<td>.913</td>
<td>.822</td>
<td>.714</td>
</tr>
<tr>
<td>Subscale 1:</td>
<td>.912</td>
<td>.913</td>
<td>1</td>
<td>.592</td>
<td>.477</td>
</tr>
<tr>
<td>Access</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subscale 2:</td>
<td>.873</td>
<td>.822</td>
<td>.592</td>
<td>1</td>
<td>.522</td>
</tr>
<tr>
<td>Concerns</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subscale 3:</td>
<td>.839</td>
<td>.714</td>
<td>.477</td>
<td>.522</td>
<td>1</td>
</tr>
<tr>
<td>Importance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2.

**Descriptions of Independent Variables, Analysis Method, Demographics and Socio-ecological Factors association with Immunization**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Demographic and/or Socio-ecological Factor</th>
<th>Data Type</th>
<th>Label</th>
<th>Method Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Demographic description of population</td>
<td>Nominal</td>
<td>0= Male 1= Female</td>
<td>t-test</td>
</tr>
<tr>
<td></td>
<td>Young mothers’ (&lt;26 years of age) fewer on time immunizations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language of Survey</td>
<td>Primary language use affects access to care and IZ status</td>
<td>Nominal</td>
<td>0= English 1= Hmong</td>
<td>t-test</td>
</tr>
<tr>
<td>Age</td>
<td>Mother’s age associated with IZ status</td>
<td>Scale</td>
<td></td>
<td>Pearson’s Correlation</td>
</tr>
<tr>
<td></td>
<td>Younger persons (18-29 years) had differences in health beliefs and practices when compared to older (&gt;30 years) Hmong</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>County of Residence in CA</td>
<td>Geographic location associated with differences in IZ status</td>
<td>Nominal</td>
<td>0= Sacramento Region 1= San Joaquin 2= Merced</td>
<td>ANOVA Games- Howell Post Hoc if significant results</td>
</tr>
<tr>
<td>Birth County</td>
<td>Born outside of U.S., immigrant status associated with access to healthcare and health promoting behavior &amp; IZ status</td>
<td>Nominal</td>
<td>0= Laos 1= Thailand 2= US 3 = other</td>
<td>ANOVA Games- Howell Post Hoc if significant results</td>
</tr>
<tr>
<td>Characteristic</td>
<td>Demographic and/or Socio-ecological Factor</td>
<td>Data Type</td>
<td>Label</td>
<td>Method Analysis</td>
</tr>
<tr>
<td>---------------</td>
<td>------------------------------------------</td>
<td>-----------</td>
<td>-------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Nativity: Two measurements</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years in US</td>
<td>If born outside U.S. related to IZ status</td>
<td>Scale</td>
<td>Pearson’s Correlation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Foreign born, residence &lt;5 years less timely IZ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age arrive in US</td>
<td>If born outside U.S. related to IZ status; age of arrival influences healthcare practices. Arrival over 12 years of age with schools as principal socialization experience different socioecological influences</td>
<td>Scale</td>
<td>Pearson’s Correlation</td>
<td></td>
</tr>
<tr>
<td>Martial Status</td>
<td>Single parenthood related to lower IZ rates</td>
<td>Nominal</td>
<td>ANOVA Games-Howell</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 =Married,</td>
<td></td>
<td>Post Hoc if significant results</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Living</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Partner</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 = Single</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 =Separated,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Divorced,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Widowed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Educational Level</td>
<td>Education level of parents related to IZ status</td>
<td>Nominal</td>
<td>ANOVA Games-Howell</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 =Up to some high school</td>
<td></td>
<td>Post Hoc if significant results</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 =High School Graduate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 = Some college and above</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment Status</td>
<td>Employment status is related to health insurance status.</td>
<td>Nominal</td>
<td>t-test</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 = Employed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 = Unemploy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Characteristic</td>
<td>Demographic and/or Socio-ecological Factor</td>
<td>Data Type</td>
<td>Label</td>
<td>Method Analysis</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>--------------------------------------------</td>
<td>-----------</td>
<td>---------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>Annual Household Income</td>
<td>Income and poverty levels related to disparities in IZ status</td>
<td>Ordinal</td>
<td>0 = 0 to 20,000</td>
<td>ANOVA Games-Howell</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 = 20,001 to 50,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 = 50,001 and above</td>
<td></td>
</tr>
<tr>
<td>Health Insurance</td>
<td>Lack of health insurance and type of insurance is related to IZ status</td>
<td>Nominal</td>
<td>0 = Medicaid/MediCal</td>
<td>ANOVA Games-Howell</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 = Private Insurance</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 = Not insured/does not know</td>
<td></td>
</tr>
<tr>
<td>Generation in the US</td>
<td>If born outside U.S. related to IZ status</td>
<td>Nominal</td>
<td>0 = 1st generation—born outside the US</td>
<td>t-test</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 = 2nd—born in the US</td>
<td></td>
</tr>
<tr>
<td>Travel to Medical Care for Children</td>
<td>Lack of transportation, lack of personal vehicle</td>
<td>Nominal</td>
<td>0 = Private car</td>
<td>ANOVA Games-Howell</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 = Public Bus/Taxi/Friend</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 = Walk</td>
<td></td>
</tr>
<tr>
<td>Number of Children</td>
<td>Increased number of children is associated with lower rates of IZ</td>
<td>Scale</td>
<td></td>
<td>Pearson’s Correlation</td>
</tr>
</tbody>
</table>

12 Income and poverty levels related to disparities in IZ status
13 Lack of health insurance and type of insurance is related to IZ status
14 If born outside U.S. related to IZ status
15 Lack of transportation, lack of personal vehicle
16 Increased number of children is associated with lower rates of IZ
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Demographic and/or Socio-ecological Factor</th>
<th>Data Type</th>
<th>Label</th>
<th>Method Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of non-emergency healthcare</td>
<td>Type of healthcare provider affects IZ status(^\text{17})</td>
<td>Nominal</td>
<td>0 = Private MD, HMO, Clinic 1 = shaman and/or Herbalist 2 = Both MD+ and shaman 3 = No HCP identified</td>
<td>ANOVA Games-Howell Post Hoc if significant results</td>
</tr>
</tbody>
</table>

*Note: Levene’s Test for Equality of Variances was computed for all t-tests and ANOVAs*

1. Luman, McCauley, Shefer, & Chu, 2003;
2. Cheng, Chen, & Cunningham, 2007; Galea, Sisco, & Vlakov, 2005; Henry, 1999; Luman, 2004; Pulido et al., 2001; Vryheid, 2001;
3. Luman et al., 2003; Baker, Wilson, Nordstrom, & Legwand, 2007;
4. Detjen, 2008;
5. Bundt, 2002;
8. Brown, 2006; Chu, Barker, & Smith, 2004; Henry, 1999; Prislin et al., 1998;
10. Brown, 2006; Luman, 2003; Lyman, 2008;
11. Dombkowski, 2001; Marin, Johanson, & Sala-Lopez, 2002; Luman, 2003; Lyman, 2008;
13. Alessandri, Shaw, Bilker, Schwarz, & Bell, 2001; Lyman, 2008; Ogundimu, 2008; Molinari, Kolasa, Messonnier, & Scieber, 2007; Roberts, Dixon-Woods, Fitzpatrick, Abrams, & Jones, 2002;
14. Brown, 2006; Chu et al., 2004; Henry, 1999; Prislin et al., 1998;
15. Kim, Frimpong, Rivers, & Kronenfeld, 2007; Niederhauser & Markowitz, 2007; Vryheid, 2001;
16. Luman, 2004; Luman et al. 2003;
17. Allred, Wooten, & Kong, 2007; Molinari et al., 2008; Kim et al., 2007; Wroe, Turner, & Salkovskis, 2004;
18. Cheng et al., 2007; Galea et al., 2005; Henry, 1999; Luman, 2004; Pulido et al., 2001; Vryheid, 2001
Table 3.

**Dependent Variables: SHOTS Instrument Items and Scales and Relationship to Triandis Model Adaption of the Theory of Reasoned Action (TM-TRA)**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Scale Number and Related Components of the TM-TRA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subscale 1: Access</td>
<td><strong>TM-TRA</strong>: facilitating conditions; empowerment; habits</td>
</tr>
<tr>
<td>1. I didn’t know when my child needed to get his/her shots</td>
<td></td>
</tr>
<tr>
<td>2. I didn’t know where to take my child to get his/her shots</td>
<td></td>
</tr>
<tr>
<td>3. There were no appointments available at the clinic for shots</td>
<td></td>
</tr>
<tr>
<td>4. The shots cost too much</td>
<td></td>
</tr>
<tr>
<td>5. The clinic/facility wasn’t open at a time I could go</td>
<td></td>
</tr>
<tr>
<td>6. I didn’t have a ride to the clinic</td>
<td></td>
</tr>
<tr>
<td>7. I didn’t have someone to take care of my other children</td>
<td></td>
</tr>
<tr>
<td>8. My child was sick and could not get his/her shots</td>
<td></td>
</tr>
<tr>
<td>9. The clinic wait was too long</td>
<td></td>
</tr>
<tr>
<td>10. I couldn’t get time off from work</td>
<td></td>
</tr>
<tr>
<td>11. Getting my child in for shots is too much trouble</td>
<td></td>
</tr>
<tr>
<td>12. I just forgot</td>
<td></td>
</tr>
<tr>
<td>Scale</td>
<td>Scale Number and Related Components of the TM-TRA</td>
</tr>
<tr>
<td>-------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td><strong>Subscale 2: Concerns</strong></td>
</tr>
<tr>
<td></td>
<td><strong>TM-TRA:</strong> cognitive analysis, social norms, and influences</td>
</tr>
<tr>
<td></td>
<td>13. I’m scared of the side effects of the shots</td>
</tr>
<tr>
<td></td>
<td>15. I worry about the number of shots my child gets at one time</td>
</tr>
<tr>
<td></td>
<td>16. I worry about what is in the shots</td>
</tr>
<tr>
<td></td>
<td>19. I worry my child might get sick from the shot</td>
</tr>
<tr>
<td></td>
<td>21. If something bad happened to my child after a shot,</td>
</tr>
<tr>
<td></td>
<td>I would feel like it was my fault</td>
</tr>
<tr>
<td></td>
<td>22. I worry about how safe shots are</td>
</tr>
<tr>
<td></td>
<td><strong>Subscale 3: Importance</strong></td>
</tr>
<tr>
<td></td>
<td><strong>TM-TRA:</strong> cognitive analysis, social norms and influences</td>
</tr>
<tr>
<td></td>
<td>14. I don’t believe in getting kids shots</td>
</tr>
<tr>
<td></td>
<td>17. I don’t think keeping my child up-to-date on shots is important</td>
</tr>
<tr>
<td></td>
<td>18. I don’t think the shots work to prevent diseases</td>
</tr>
<tr>
<td></td>
<td>20. My health care provider told me NOT to get my child his/her shots</td>
</tr>
<tr>
<td></td>
<td>23. I don’t think kids shots are important</td>
</tr>
</tbody>
</table>
Table 4.

Demographics: $N = 443$

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Label</th>
<th>$N$</th>
<th>%</th>
<th>Mean</th>
<th>S.D.</th>
<th>Range</th>
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<tbody>
<tr>
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<td>Male</td>
<td>128</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>314</td>
<td>71</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preferred Language for Survey</td>
<td>English</td>
<td>291</td>
<td>66</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Hmong</td>
<td>152</td>
<td>34</td>
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<tr>
<td>Region</td>
<td>Sacramento</td>
<td>286</td>
<td>65</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>San Joaquin</td>
<td>119</td>
<td>27</td>
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<td>Marital Status</td>
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<td>89</td>
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<td>%</td>
<td>Mean</td>
<td>S.D.</td>
<td>Range</td>
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<td>------</td>
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<td><strong>Education</strong></td>
<td>Up to some high school</td>
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<td>47</td>
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<td>Some college and above</td>
<td>138</td>
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<td>20,001 to 50,000</td>
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<td></td>
<td>50,001 and above</td>
<td>113</td>
<td>26</td>
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<td>Did not answer</td>
<td>17</td>
<td>3</td>
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<td><strong>Health Insurance</strong></td>
<td>MediCaid/MediCal</td>
<td>220</td>
<td>50</td>
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<td>Private Insurance/HMO</td>
<td>198</td>
<td>45</td>
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<tr>
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<td>Not insured/does not know</td>
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<td>5</td>
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<td><strong>Generational Status</strong></td>
<td>1st – born outside the U.S.</td>
<td>338</td>
<td>76</td>
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<tr>
<td></td>
<td>2nd – born in the US</td>
<td>105</td>
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<tr>
<td>Characteristic</td>
<td>Label</td>
<td>N</td>
<td>%</td>
<td>Mean</td>
<td>S.D.</td>
<td>Range</td>
</tr>
<tr>
<td>--------------------------------</td>
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<td>-----</td>
<td>-------</td>
<td>-------</td>
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<tr>
<td>Transportation</td>
<td>Private car</td>
<td>385</td>
<td>87</td>
<td></td>
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<td></td>
<td>Public:</td>
<td>18</td>
<td>4</td>
<td></td>
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<tr>
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<td>Bus/ Taxi/ Friend</td>
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<td>Walk</td>
<td>31</td>
<td>7</td>
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<td>Missing</td>
<td>9</td>
<td>2</td>
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<tr>
<td>Type of healthcare/ not an emergency</td>
<td>Private MD. HMO, Clinic</td>
<td>357</td>
<td>81</td>
<td></td>
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<td>Shaman and/or herbalist</td>
<td>42</td>
<td>10</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Both MD+ and shaman</td>
<td>38</td>
<td>8</td>
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<tr>
<td></td>
<td>No HCP identified</td>
<td>5</td>
<td>1</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Number of Children</td>
<td></td>
<td>441</td>
<td></td>
<td>3.61</td>
<td>2.47</td>
<td>1-12</td>
</tr>
<tr>
<td>If born outside U.S. - years in the U.S. (75.6% born outside U.S.)</td>
<td></td>
<td>332</td>
<td></td>
<td>16.08</td>
<td>9.54</td>
<td>1 – 32 years in US</td>
</tr>
<tr>
<td>If born outside U.S. – age of arrival</td>
<td></td>
<td>332</td>
<td></td>
<td>18.08</td>
<td>10.44</td>
<td>&lt;1 to 53 years of age</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td>442</td>
<td></td>
<td>32.29</td>
<td>8.46</td>
<td>18-59</td>
</tr>
</tbody>
</table>

Note: Not all numbers add up to 443 due to participant(s) that did not respond to a specific question; percentages are rounded. Missing percentages > 1 are reported.
Table 5.

**Parental Perceptions of Barriers to Immunization by Subscale**

<table>
<thead>
<tr>
<th>Subscale</th>
<th>N</th>
<th>Sum</th>
<th>Mean</th>
<th>SE</th>
<th>SD</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Scale</strong></td>
<td>426</td>
<td>10564</td>
<td>24.79</td>
<td>.95</td>
<td>19.5</td>
<td>380.8</td>
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</tr>
<tr>
<td></td>
<td></td>
<td><strong>27% of adjusted possible</strong></td>
<td>1.07</td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Subscale 1: Access</strong></td>
<td>432</td>
<td>5306</td>
<td>12.28</td>
<td>.56</td>
<td>11.57</td>
<td>133.9</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td><strong>26% of adjusted possible</strong></td>
<td>1.02</td>
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</tr>
<tr>
<td><strong>Subscale 2: Concerns</strong></td>
<td>432</td>
<td>3641</td>
<td>8.43</td>
<td>.32</td>
<td>6.61</td>
<td>43.65</td>
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</tr>
<tr>
<td></td>
<td></td>
<td><strong>35% of adjusted possible</strong></td>
<td>1.40</td>
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</tr>
<tr>
<td><strong>Subscale 3: Importance</strong></td>
<td>435</td>
<td>1781</td>
<td>4.1</td>
<td>.24</td>
<td>5.07</td>
<td>35.68</td>
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</tr>
<tr>
<td></td>
<td></td>
<td><strong>20% of adjusted possible</strong></td>
<td>.82</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Subscale 1: Access</strong></td>
<td>443</td>
<td>462</td>
<td>1.04</td>
<td>.06</td>
<td>1.37</td>
<td>1.88</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. I didn’t know when my child needed to get his/her shots</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>443</td>
<td>316</td>
<td>.71</td>
<td>.06</td>
<td>1.20</td>
<td>1.45</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. I didn’t know where to take my child to get his/her shots</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>440</td>
<td>381</td>
<td>.87</td>
<td>.06</td>
<td>1.27</td>
<td>1.61</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. There were no appointments available at the clinic for shots</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>( N )</td>
<td>( Sum )</td>
<td>( Mean )</td>
<td>( SE )</td>
<td>( SD )</td>
<td>Variance</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>4. The shots cost too much</td>
<td>443</td>
<td>418</td>
<td>.94</td>
<td>.06</td>
<td>1.42</td>
<td>2.01</td>
</tr>
<tr>
<td>5. The clinic/facility wasn’t open at a time I could go</td>
<td>443</td>
<td>461</td>
<td>1.04</td>
<td>.06</td>
<td>1.38</td>
<td>1.92</td>
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<td>6. I didn’t have a ride to the clinic</td>
<td>443</td>
<td>389</td>
<td>.88</td>
<td>.06</td>
<td>1.42</td>
<td>2.01</td>
</tr>
<tr>
<td>7. I didn’t have someone to take care of my other children</td>
<td>442</td>
<td>460</td>
<td>1.04</td>
<td>.06</td>
<td>1.39</td>
<td>1.94</td>
</tr>
<tr>
<td>8. My child was sick and could not get his/her shots</td>
<td>443</td>
<td>495</td>
<td>1.12</td>
<td>.06</td>
<td>1.32</td>
<td>1.74</td>
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<tr>
<td>9. The clinic wait was too long</td>
<td>442</td>
<td>755</td>
<td>1.71</td>
<td>.07</td>
<td>1.54</td>
<td>2.38</td>
</tr>
<tr>
<td>10. I couldn’t get time off from work</td>
<td>443</td>
<td>476</td>
<td>1.07</td>
<td>.06</td>
<td>1.40</td>
<td>1.96</td>
</tr>
<tr>
<td>11. Getting my child in for shots is too much trouble</td>
<td>443</td>
<td>373</td>
<td>.84</td>
<td>.06</td>
<td>1.21</td>
<td>1.48</td>
</tr>
<tr>
<td>Subscale 2: Concerns</td>
<td>$N$</td>
<td>$Sum$</td>
<td>$Mean$</td>
<td>$SE$</td>
<td>$SD$</td>
<td>Variance</td>
</tr>
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<td>---------------------</td>
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<td>-------</td>
<td>--------</td>
<td>------</td>
<td>------</td>
<td>----------</td>
</tr>
<tr>
<td>12. I just forgot</td>
<td>443</td>
<td>501</td>
<td>1.13</td>
<td>.06</td>
<td>1.32</td>
<td>1.76</td>
</tr>
<tr>
<td>13. I'm scared of the side effects of the shots</td>
<td>443</td>
<td>673</td>
<td>1.52</td>
<td>.36</td>
<td>1.46</td>
<td>2.12</td>
</tr>
<tr>
<td>15. I worry about the number of shots my child gets at one time</td>
<td>443</td>
<td>674</td>
<td>1.52</td>
<td>.07</td>
<td>1.48</td>
<td>2.18</td>
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<tr>
<td>16. I worry about what is in the shots</td>
<td>440</td>
<td>698</td>
<td>1.59</td>
<td>.07</td>
<td>1.48</td>
<td>2.18</td>
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<tr>
<td>19. I worry my child might get sick from the shot</td>
<td>443</td>
<td>591</td>
<td>1.33</td>
<td>.06</td>
<td>1.37</td>
<td>1.86</td>
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<tr>
<td>21. If something bad happened to my child after a shot, I would feel like it was my fault</td>
<td>442</td>
<td>584</td>
<td>1.32</td>
<td>.06</td>
<td>1.39</td>
<td>1.95</td>
</tr>
<tr>
<td>22. I worry about how safe shots are</td>
<td>442</td>
<td>540</td>
<td>1.22</td>
<td>.06</td>
<td>1.39</td>
<td>1.95</td>
</tr>
<tr>
<td>Subscale 3: Importance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>14. I don’t believe in getting kids shots</td>
<td>443</td>
<td>303</td>
<td>.68</td>
<td>.05</td>
<td>1.12</td>
<td>1.30</td>
</tr>
<tr>
<td>17. I don’t think keeping my child up-to-date on shots is important</td>
<td>443</td>
<td>370</td>
<td>.84</td>
<td>.06</td>
<td>1.35</td>
<td>1.71</td>
</tr>
<tr>
<td>18. I don’t think the shots work to prevent diseases</td>
<td>442</td>
<td>406</td>
<td>.92</td>
<td>.06</td>
<td>1.80</td>
<td>1.71</td>
</tr>
<tr>
<td>20. My health care provider told me NOT to get my child his/her shots</td>
<td>442</td>
<td>253</td>
<td>.57</td>
<td>.05</td>
<td>1.12</td>
<td>1.26</td>
</tr>
<tr>
<td>23. I don’t think kids shots are important</td>
<td>443</td>
<td>480</td>
<td>1.08</td>
<td>.07</td>
<td>1.51</td>
<td>2.30</td>
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</table>
Table 6.

*Comparison of the Study Sample with the General Hmong Population*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Study Sample</th>
<th>General Hmong Population①</th>
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</thead>
<tbody>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to some high school</td>
<td>46%</td>
<td>46%</td>
</tr>
<tr>
<td>High school graduate</td>
<td>22%</td>
<td>20%</td>
</tr>
<tr>
<td>College and above</td>
<td>31%</td>
<td>34%</td>
</tr>
<tr>
<td>Employed</td>
<td>61%</td>
<td>56%</td>
</tr>
<tr>
<td>Unemployed</td>
<td>36%</td>
<td>43%</td>
</tr>
<tr>
<td>Annual Income ≤ $30,000</td>
<td>38%</td>
<td>31%</td>
</tr>
<tr>
<td>Household size</td>
<td>5.61</td>
<td>5.58</td>
</tr>
<tr>
<td>Speak only English</td>
<td>5.9%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Table 7.

*Significant Independent Variables and their Effect Size*

<table>
<thead>
<tr>
<th>Significant Variable</th>
<th>Results</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare Provider &lt;a&gt; &lt;sup&gt;a&lt;/sup&gt; Western/ Shaman/ Both</td>
<td>$F(2,422) = 20.48^*$</td>
<td>$\omega^2 = .29$</td>
</tr>
<tr>
<td>Language &lt;b&gt; &lt;sup&gt;b&lt;/sup&gt; Hmong/ English</td>
<td>$t (263) = 6.31^*$</td>
<td>$r^2 = -.3$</td>
</tr>
<tr>
<td>Income &lt;c&gt; &lt;sup&gt;c&lt;/sup&gt; 0 to 20,000+ 20,001 to 50,000 50,001 and above</td>
<td>$H (2) = 18.54^*$</td>
<td>$r = -.26$</td>
</tr>
<tr>
<td>Transportation &lt;a&gt; &lt;sup&gt;a&lt;/sup&gt;</td>
<td>$F(2,414) = 15.94^*$</td>
<td>$\omega^2 = .3$</td>
</tr>
<tr>
<td>Nativity &lt;d&gt; &lt;sup&gt;d&lt;/sup&gt; 2 measurements Years Living if U.S.</td>
<td>$r = -.16^{**}$</td>
<td>$r = -.16$</td>
</tr>
<tr>
<td>(if born outside U.S.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nativity: Age of arrival (if born outside U.S.)</td>
<td>$r = .24^*$</td>
<td>$r = .24$</td>
</tr>
<tr>
<td>Education Level &lt;a&gt; &lt;sup&gt;a&lt;/sup&gt; Up to High School High Diploma Some college and beyond</td>
<td>$F(2,422) = 4.25^*$</td>
<td>$\omega^2 = .12$</td>
</tr>
<tr>
<td>Type of Health Insurance &lt;a&gt; &lt;sup&gt;a&lt;/sup&gt; Medicaid/Cal/ Private/ No insurance</td>
<td>$F(2,423) = 11.19^*$</td>
<td>$\omega^2 = .2$</td>
</tr>
<tr>
<td>Employment &lt;b&gt; &lt;sup&gt;b&lt;/sup&gt; Employed or not</td>
<td>$t (421) = -3.18^*$</td>
<td>$r^2 = .16$</td>
</tr>
</tbody>
</table>

*Note: a = ANOVA; b = t-test; c = Krusal-Wallis; d = Pearson’s correlation coefficient + An annual household income of $20,000 represents significant poverty (Hein, 2006). * $p \leq .01$; ** $p \leq .001$*
Table 8.
Selected Regression Model for Prediction of Barriers to Immunization
n = 426 (96% of sample included in regression)

<table>
<thead>
<tr>
<th>Included</th>
<th>B(SE)</th>
<th>(β)</th>
<th>95% CI for B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>23.88</td>
<td>.24</td>
<td>-13.56</td>
</tr>
<tr>
<td>Preferred Language</td>
<td>-9.88*</td>
<td>-.24</td>
<td>-13.56</td>
</tr>
<tr>
<td>Healthcare provider type</td>
<td>12.58*</td>
<td>.25</td>
<td>8.29</td>
</tr>
<tr>
<td>Poverty vs. above $50,000</td>
<td>5.46**</td>
<td>.13</td>
<td>.99</td>
</tr>
<tr>
<td>Above poverty but below $50,000</td>
<td>5.74***</td>
<td>.14</td>
<td>1.55</td>
</tr>
<tr>
<td>Walk vs. Private car</td>
<td>13.60*</td>
<td>.18</td>
<td>6.95</td>
</tr>
</tbody>
</table>

Note. R² = .22; *p < .001; ** p = .017; *** p = .007
Appendix B

SHOTS Instrument and Demographic Questionnaire in Hmong and English
Kev isawub isaw nhav menyamam kev awy am mus tshaj tshuaj (SHOTS)

1. Kuv isis paub kev tus menyam amaw tsum tshaj tshuaj hub sij hawn
   urg…………………………………………………………………………………………………………………….0…1…2…3…4
2. Kuv isis paub ahov chaw yuav kej menyamam mus tshaj
   tshuaj…………………………………………………………………………………………………………………0…1…2…3…4
3. Laww isis tshuav sijhawen tecmajam mus tshaj tshuaj……………0…1…2…3…4
4. Cov nojap tshaj tshuaj mawd kim
   heev………………………………………………………………………………………………………………………0…1…2…3…4
5. Chaw kho mob tsis qibub si sijhawen kuv koehm…………………0…1…2…3…4
6. Tsis muaj neeg thajy kev tuaj rau pem chaw kho mob……………………………………………………………………………………………………………………………………0…1…2…3…4
7. Kuv isis muaj neeg paeh kuv kev tsum menyamam……………………………………………………………………………………………………………………………………0…1…2…3…4
8. Kuv tus menyamam tsis tu tuah tshujy vir awv tsi isis nhob……………………………………………………………………………………………………………………………………0…1…2…3…4
9. Kuv tes nhuuj diaw nhob hawn chaw yuov……………………………………………………………………………………………………………………………………0…1…2…3…4
10. Kuv chaw tsis tuhau sa pem koeh hwm……………………………………………………………………………………………………………………………………0…1…2…3…4
11. Nws nhob heev rau kev coj kev tus menyamam mus tshaj tshuaj…………………………………………………………………………………………………………………………………………………………………0…1…2…3…4
12. Kuv tsis zoo qab lawm zhwa……………………………………………………………………………………………………………………………………0…1…2…3…4
13. Kuv nshai tsum muaj tej yam tsis zoo tshuam sim los lawm cov kooh
   tshuaj…………………………………………………………………………………………………………………..0…1…2…3…4
14. Kuv tsis nshaj tuaj kev koob menyamam tshaj tshuaj…………0…1…2…3…4
15. Kuv tshuajy tisih baw yuaw kuv tus menyamam yuav skauw ntau koob tshuaj yu ke………………………………………………………………………………………………………………………………………………………………0…1…2…3…4
16. Kuv tshuajy tisih tej yam tshuaj yuwb rau nh koob tshuaj………………………………………………………………………………………………………………………………………………………………0…1…2…3…4
17. Kuv tsiis xav hais tis kev tshaj tshuaj nws coj zyceg yuaw yuog baw yam tseem eeh……………………………………………………………………………………………………………………………………………………………………………………0…1…2…3…4
18. Kuv tsiis xav tis cov koob tshuaj no yuav paeh tiv sithaw keb
   mob………………………………………………………………………………………………………………………………………………………………………………………………………………0…1…2…3…4

Tsis menaj

Teodunem

Teodsenem

Lej heer
19. Kuv txhajj tia: yeg kuv tus menyam tuaj koob txhajj no ib tsem tew na

20. Kuv tus lewa kho moob hais kun kev tsi tshob oej kuv tus menyam nus txhaj

21. Yog muaj lej yam tsi zoo tshwa sim nu kuv tus menyam tuaj qun txhaj tshuaj tag,

22. Kuv tsi tao siab now tsoj kev txhaj tshuaj

23. Kuv xav tias kev txhaj tshuaj rau menyam tsi tsem oooob
Demographics in Hmong

Txij no mus peb xav nug me ntsis txog koj

1. Koj muaj pes tsawg xyoo? ____________________________

1a. Koj nyob rau lub County twg? ____________________________

2. Koj yug nyob lub tebchaws twg?
   a. Nplog teb
   b. Thaib teb
   c. USA (Asmeslivkas)
   d. Lwm lub tebchaws ____________________________

3. Xyoo twg kuv tuaj rau teb chaws U.S? ____________________________

4. Koj yog txiv neej los yog pojniam? ____________________________

5. Koj puas muaj txij nkawm:
   a. Muaj txij nkawm (sib yuav raws li Hmoob kevcai los yog kev cai lij choj)
   b. Tsis muaj txij nkawm
   c. Sib cais
   d. Sib nrauj
   e. Poj ntsuam / yawg ntsuag
   f. Nrog lwm tus nyob
   g. Lwm yam __________
   h. Tsis paub

6. Koj kawm ntawv mus txog qib twg?
   a. Tsis tau kawm ntawv
   b. Mus txog qib 5
   c. Mus txog qi 8
   d. Qib 9-12 tiam sis tsis tau tiav
   e. Tiav qib 9-12
   f. Kawm me ntsis tsev kawm ntawv qib siab
   g. Kawm tiav tsev kawm ntawv qib siab los yog siab tshaj no
   h. Lwm yam (Thov piav) ____________________________
7. Tam sim no koj puas ua haujlwm?
   a. Ua haujlwm
   b. Tsis ua haujlwm
   c. Tub kawm ntawv / Ntxhais kawm ntawv
   d. Niam tsev / nyob zov tsev
   e. So haujlwm lawm (retired)
   f. Lwm yam __________________________

8. Yog koj ua hauj lwm, koj txoj hauj lwm yog ua dabtsi?

9. Yog koj tsis xav li cas no, thov qhia seb ib xyoos no koj tsev tau nyiaj npaum li cas?
   a. 0 to 10,000
   b. 10,001 to 15,000
   c. 15,001 to 20,000
   d. 20,001 to 30,000
   e. 30,001 to 40,000
   f. 50,001 to 60,000
   g. 60,001

10. Koj puas muaj ntawv kho mob? (health insurance)
    a. Muaj
    b. Tsis muaj
    c. Tsis paub

11. Koj muaj daim ntawv kho mob zoo li cas?
    a. Medicaid los sis Medi-cal
    b. Medicare
    c. Private insurance
    d. Lwm yam __________________________
    e. Kuv tsis muaj ntawv kho mob
    f. Kuv tsis paub
12. Koj tus kheej, koj niam thiab txiv, los yog pog yawg nej puas yog neeg tuaj lwm lub tebchaws tuaj?

Thov **KHIJ** lub voj voos rau kab lus teb uas raug koj tshaj:

<table>
<thead>
<tr>
<th>Generation</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1st generation: (Tiam ib) | Kuv yug nyob rau Esxias / los yog yug rau lwm qhov chaw tsis yog tebchaws Asmeslivkas
Lub tebchaws twg? |
| 2nd generation: (Tiam ob) | Kuv yug rau tebchaws Asmeslivkas; kuv niam nkawv ob leeg, los yog ib tug yug rau tebchaws Esxias / los sis yug nyob lwm lub tebchaws tsis nyob Asmeslivkas. |
| 3rd generation: (Tiam peb) | Kuv yug rau tebchaws Asmeslivkas; kuv niam thiab txiv nkawv yug rau tebchaws Asmeslivkas thiab kuv pog yawg thiab niam tais yawm txiv lawv yug rau tebchaws Esxias / los sis yug nyob lwm lub teb chaws tsis nyob Asmeslivkas |
| 4th generation: (Tiam plaub) | Kuv yug hauv tebchaws Asmeslivkas; kuv niam thiab kuv txiv nkawd, kuv pog kuv yawg nkawd ib tug yeej yug rau tebchaws Asmeslivkas no. |
| 5th generation: (Tiam tsib) | Kuv yug hauv tebchaws Asmeslivkas; kuv niam thiab kuv txiv nkawd yug rau tebchaws Asmeslivkas thiab kuv pog koob yawg koob nkawd ib tug los tseem yug hauv tebchaws Asmeslivkas no. |
| Tsis paub: | Kuv tsis paub zoo kuv yog tiam neeg twg vim kuv tsis paub peb caj ces los yog peb li keeb kwm txaus. |
| Indigenous: | Kuv pog koob yawg koob lawv ib txwm nyob hauv Hawaii los sis lub tebchaws Asmeslivkas. |
13. Koj ib txwm mus cuag tus kws kho mob los yog chaw kho mob uas koj tus menyuam mus txhaj tshuaj ntawd li cas? (Thov KHIJ voj voos rau kab lus koj teb.)

a. Koj lub tsheb  
b. Mus kev taw  
c. Caij npav  
d. Phoojywq los yog tsev neeg thauj koj  
e. Tsheb ntiav  
f. Lwm yam (Thov piav) ____________________________________________________________________________

Ntxiv no mus peb xav nug koj ntsig txog koj tus menyuam los yog (cov menyuam) lawv kev txhaj tshuaj.

14. Koj muaj pes tsawg tus menyuam? __________

15. Koj cov menyuam muaj noob nyoog li cas?

__________________________________________________________________________

Thov teb cov lus nug rau txhua txhua tus menyuam.

16. Koj tus menyuam puas txhaj tshuaj raws nws lub noob nyoog?

Thov pib tus menyuam yau mus rau tus menyuam hlob.

<table>
<thead>
<tr>
<th>Menyuam 1</th>
<th>Noob Nyoog</th>
<th>(hlis)</th>
<th>(xyoos)</th>
<th>Tau txhaj</th>
<th>Tsis tau</th>
<th>Tsis paub</th>
</tr>
</thead>
<tbody>
<tr>
<td>Menyuam 2</td>
<td>Noob Nyoog</td>
<td>(hlis)</td>
<td>(xyoos)</td>
<td>Tau txhaj</td>
<td>Tsis tau</td>
<td>Tsis paub</td>
</tr>
<tr>
<td>Menyuam 3</td>
<td>Noob Nyoog</td>
<td>(hlis)</td>
<td>(xyoos)</td>
<td>Tau txhaj</td>
<td>Tsis tau</td>
<td>Tsis paub</td>
</tr>
<tr>
<td>Menyuam 4</td>
<td>Noob Nyoog</td>
<td>(hlis)</td>
<td>(xyoos)</td>
<td>Tau txhaj</td>
<td>Tsis tau</td>
<td>Tsis paub</td>
</tr>
<tr>
<td>Menyuam 5</td>
<td>Noob Nyoog</td>
<td>(hlis)</td>
<td>(xyoos)</td>
<td>Tau txhaj</td>
<td>Tsis tau</td>
<td>Tsis paub</td>
</tr>
<tr>
<td>Menyuam 6</td>
<td>Noob Nyoog</td>
<td>(hlis)</td>
<td>(xyoos)</td>
<td>Tau txhaj</td>
<td>Tsis tau</td>
<td>Tsis paub</td>
</tr>
<tr>
<td>Menyuam 7</td>
<td>Noob Nyoog</td>
<td>(hlis)</td>
<td>(xyoos)</td>
<td>Tau txhaj</td>
<td>Tsis tau</td>
<td>Tsis paub</td>
</tr>
</tbody>
</table>
17. Koj tus menyuam los yog / koj cov menyuam mus kuaj mob qhov twg yog thaum tsis tau muaj mob loj?

**Khij txhua yam uas koj siv.**

b. Kws kho mob chaw kuaj mob  
c. Hauv zos tej chaw kho mob  
   (piv txvv – Paul Hob Clinic, Sacramento County Clinic)  
d. Tsev kho mob loj  
   (piv txvv – Kaiser, Sutter, UC Davis Medical Center)  
e. Txiv Neeb  
f. Kuv tus menyuam tsis muaj ib tus kws kho mob  
g. Lwm yam (Thov piav)

---

**Ntxiv no mus peb xav paub seb koj hnov txog tej yam xos xwm ntawm koj lub jez zos los qhov twg los.**

18. Feem ntau koj txawj nyeem thiab hais hom lus twg?

a. Hmoob xwb  
b. Feem ntau yog Hmoob, ib txhia Askiv  
c. Hmoob thiab Askiv sib npaug zog  
d. Feem ntau yog Askiv, ib txhia Hmoob  
e. Askiv xwb

19. Feem ntau yog koj xav paub txog tej xov xwm, lus qhuab qhia, los yog tej yam kev ua si yuav muaj tshwm sim txog cov Hmoob, koj mus nrhiav qhov twg?

a. TV  
b. Xov tooj cua  
c. Ntawv xov xwm  
d. Tej phau ntawv me  
e. Hnov los ntawm lwm tus neeg

20. Feem ntau koj saib TV uas hais hom lus twg?

a. Hmoob xwb  
b. Feem ntau yog Hmoob, ib txhia Askiv  
c. Hmoob thiab Askiv sib npaug zog  
d. Feem ntau yog Askiv, ib txhia Hmoob  
e. Askiv xwb
21. Feem ntau køj mloog xov tooj cua uas hais hom lus twg?

a. Hmoob xwb
b. Feem ntau yog Hmoob, ib txhia Askiv
c. Hmoob thiab Askiv sib npaug zog
d. Feem ntau yog Askiv, ib txhia Hmoob
e. Askiv xwb

22. Tej ntawv xov xwm thiab tej phau ntawv me uas køj nyeem yog hais ua hom lus twg?

a. Hmoob xwb
b. Feem ntau yog Hmoob, ib txhia Askiv
c. Hmoob thiab Askiv sib npaug zog
d. Feem ntau yog Askiv, ib txhia Hmoob
e. Askiv xwb

COV LUS NUG MUAJ LI NO XWB

UA TSAUG NTAU RAU KOJ TXOJ KEV PAB PEB HNUB NO
Searching for Hardships and Obstacles to Shots (SHOTS) Survey

Below is a list of things that may cause problems for parents getting their children shots. On a scale of 0 to 4, with 0 being "not a problem at all" to 4 being a "very big problem", please circle your answers. Note: In this survey, "clinic" refers to the place you get your child his or her shots.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Not a Problem</th>
<th>Very Big Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>I didn't know when my child needed to get his/her shots</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>I didn't know where to take my child to get his/her shots</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>There were no appointments available at the clinic for shots</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>The shots cost too much</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>The clinic facility wasn't open at a time I could go</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>I didn't have a ride to the clinic</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>I didn't have someone to take care of my other children</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>My child was sick and couldn't get his/her shots</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>The clinic wait was too long</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>I couldn't get time off from work</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Getting my child in for shots is too much trouble</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>I just forgot</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>I'm scared of the side effects of the shots</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>I don't believe in getting kids shots</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>I worry about the number of shots my child gets at one time</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>I worry about what is in the shots</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>I don't think keeping my child up-to-date on shots is important</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>I don't think the shots work to prevent diseases</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>I worry my child might get sick from the shot</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>My health care provider told me NOT to get my child his/her shots</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>If something bad happened to my child after a shot</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>I would feel like it was my fault</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>I worry about how safe shots are</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>I don't think kids shots are important</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

VPN © 2003
Now we would like to ask some questions about you

1. How old are you, please? ______________________

1a. What is the name of the County in California where you live?

__________________

2. In what country were you born?
   a. Laos
   b. Thailand
   c. USA
   d. Other ______________

3. If you were born outside the U.S., what year did you arrive in the U.S.?

__________________

4. Are you a _________ male OR _________ female?

5. Please describe your marital status:
   a. Currently married (culturally or legally)
   b. Single
   c. Separated
   d. Divorced
   e. Widowed
   f. Living with partner
   g. Other __________
   h. Don’t know

6. What is the highest level of education that you have completed?
   a. No formal education
   b. Up to grade 5
   c. Up to grade 8
   d. Some high school
   e. High school graduate
   f. Some college
   g. College graduate or more
   h. Other (please explain) ________________
7. What is your current employment status?
   a. Employed
   b. Unemployed
   c. Student
   d. Homemaker
   e. Retired
   f. Other

8. If you are employed outside the home, what is your job?

9. If you are comfortable with sharing your income, please indicate your yearly household income?
   h. 0 to 10,000
   i. 10,001 to 15,000
   j. 15,001 to 20,000
   k. 20,001 to 30,000
   l. 30,001 to 40,000
   m. 50,001 to 60,000
   n. Above 60,000

10. Do you have health insurance?
    a. Yes
    b. No
    b. Don’t know

11. What type of insurance do you have?
    a. Medicaid or Medi-cal
    b. Medicare
    c. Private insurance
    d. Other
    e. I don’t have insurance
    f. I don’t know

Please go to the next page
12. Do you, your parents or grandparents come from another country?  
CIRCLE the answer that best fits you

<table>
<thead>
<tr>
<th>Generation</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1st generation: | I was born in Asia/Pacific or country other than U.S.  
|               | What country?                                                               |
| 2nd generation: | I was born in U.S.; one or both parents born in Asia/Pacific or non-U.S. country. |
| 3rd generation: | I was born in U.S.; both parents born in U.S., and all grandparents born in Asia/Pacific or non-U.S. country. |
| 4th generation: | I was born in U.S.; both parents and at least 1 grandparent born in U.S. |
| 5th generation: | I was born in U.S., both parents were born in U.S., and at least 1 great grandparent also born in U.S. |
| Don’t know:    | Don’t know what generation best fits since I lack some information.          |
| Indigenous:    | My family’s ancestors are originally from Hawaii or the continental United States. |

Please go to the next page
13. How do you usually get to the doctor’s office or clinic where your child gets his/her immunizations? (Circle all that apply)

   a. private car
   b. walk
   c. bus
   d. ride from a friend or family member
   e. taxi
   f. Other (please explain) __________________________

Now we would like to ask you about your child (children’s) shots.

14. How many children do you have? ______________

15. What are the ages of your children?

Please answer these specific questions about each child you have.

Please start with your youngest child

<table>
<thead>
<tr>
<th>Child</th>
<th>Age</th>
<th>Yes</th>
<th>No</th>
<th>Don’t Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>___ (months) ___ (years)</td>
<td>___</td>
<td>___</td>
<td>Don’t Know</td>
</tr>
<tr>
<td>#2</td>
<td>___ (months) ___ (years)</td>
<td>___</td>
<td>___</td>
<td>Don’t Know</td>
</tr>
<tr>
<td>#3</td>
<td>___ (months) ___ (years)</td>
<td>___</td>
<td>___</td>
<td>Don’t Know</td>
</tr>
<tr>
<td>#4</td>
<td>___ (months) ___ (years)</td>
<td>___</td>
<td>___</td>
<td>Don’t Know</td>
</tr>
<tr>
<td>#5</td>
<td>___ (months) ___ (years)</td>
<td>___</td>
<td>___</td>
<td>Don’t Know</td>
</tr>
<tr>
<td>#6</td>
<td>___ (months) ___ (years)</td>
<td>___</td>
<td>___</td>
<td>Don’t Know</td>
</tr>
<tr>
<td>#7</td>
<td>___ (months) ___ (years)</td>
<td>___</td>
<td>___</td>
<td>Don’t Know</td>
</tr>
</tbody>
</table>

Please go to the next page
17. Where does your child/children go for health care when it is NOT an emergency? 

Circle all that apply.

a. Private doctor’s office
b. Community Health Clinic
   (example - Paul Hob Clinic, Sacramento County Clinic)
c. Medical group
   (example - Kaiser, Sutter, UC Davis Medical Center)
d. Shaman or healer
e. herbalists
f. My child doesn’t have a doctor or health care provider
g. Other (please explain) ________________________________

Now we would like to know how you learn information about what is happening in your community

18. In general, what language do you read and speak?
   a. Only Hmong
   b. Mostly Hmong, some English
   c. Hmong and English equally
   d. Mostly English, some Hmong
   e. Only English

19. How do you typically find out about news, information, or upcoming activities within the Hmong community?
   a. television
   b. radio
   c. newspaper
   d. pamphlets
   e. word of mouth

20. In what language are the television programs you usually watch?
   a. Only Hmong
   b. Mostly Hmong, some English
   c. Hmong and English equally
   d. Mostly English, some Hmong
   e. Only English

21. In what language are the radio programs you usually listen to?
   a. Only Hmong
   b. Mostly Hmong, some English
   c. Hmong and English equally
   d. Mostly English, some Hmong
   e. Only English
22. In what language are the newspapers and pamphlets you read printed in?
   a. Only Hmong
   b. Mostly Hmong, some English
   c. Hmong and English equally
   d. Mostly English, some Hmong
   e. Only English

END OF THIS SURVEY

THANK YOU VERY MUCH FOR HELPING US TODAY.
Appendix C

Information Letters in English and Hmong
Information Letter

Parental Perceptions of Barriers to Shots

The purpose of this study is to learn what parents say about barriers to shots for their children in the Hmong community. We would like you to participate in this study. You may take this survey in either English or Hmong. The choice is up to you.

By having read this information and completing the survey you are providing consent to participate in this study. You may skip any question or stop taking the survey anytime you like.

If you choose to participate, you will be asked to complete a parent survey about personal beliefs or things that might make it hard for you to get your child or children their shots.

In addition, we will ask you some questions about you and your child such as your age, your child’s age, where your child receives healthcare, and personal beliefs.

Participation in this study is voluntary. By filling out the survey, you will help us understand the barriers to shots in the Hmong community. This information may be useful to plan for community outreach and to work to improve the number of children that receive their shots.

All information that is gathered will be kept confidential and in a locked cabinet. Only the research team will have access to this information. Only information about the survey will be reported. No individual responses to the survey will be studied or reported.

The risks from participating in this study are minimal. No procedures or interventions will be performed. You will not be asked to report any sensitive information.

If you have any questions about this study you can contact Dian Baker at 916-278-7243. If you have any concerns about the way this study is being conducted, please contact the University of Hawaii Committee on Human Subjects at (808) 956-5007 or contact UHIRB@hawaii.edu.
Information Letter in Hmong

Daim Ntawv Qhia thiab Ntawv Pom Zoo Koom Tes

Niam txiv kev xav txog ntawm tej yam uas nyuab mus txhaj tshuaj


Raws li cov lus koj tau nyeem tag los no thiab koj kev koom tes rau qhov kev tshawb fawb no koj qhia tias koj pom zoo koom tes nrog rau qhov kev tshawb fawb no.

Yog koj txiav txim koom tes nrog rau qhov kev tshawb fawb no, koj yuav raug nug ib co lus hais txog koj txoj kev ntseeg los sis tej yam uas nyuab rau koj koj tus menyuam los yog koj cov menyuam mus txhaj tshuaj. Koj yuav tau txais $5 ua dej siab dej ntsws rau koj lub sijhawm pab teb cov lus nug no.

Ntxiv no, peb tseem yuav nug txog koj thiab koj tus menyuam xws li koj lub noob nyoog, koj tus menyuam lub noob nyoog, koj tus menyuam mus kuaj mob qhov twg, thiab lwm yam kev xav los yog kev ntseeg ntawm koj tus kheej.

Kev koom tes rau qhov kev tshawb fawb no yog koj pom zoo ua. Los ntawm koj txoj kev pab teb cov lus nug no, koj yuav pab peb to taub txog cov kev nyuab ntawm kev txhaj tshuaj nyob rau ntawm hain neeg Hmoob.


Tej yam xwm txheej muaj los ntawm kev koom tes nrog rau qhov kev tshawb fawb no me heev. Yuav tsis muaj kev cuam tsuam los yog kab ke twg koj yuav tsum ua. Peb yuav tsis nug koj txog tej yam tseem ceeb ntawm koj. Koj tseem yuav tau txais $5 ua dej siab dej ntsws rau koj lub sijhawm txawm tias koj txiav txim tsis kam teb cov lus nug no ntxiv lawm.

Yog koj muaj lus nug dab tsi txog qhov kev tshawb fawb no, koj hu tau rau Dian Baker ntawm tus xov tooj (916) 278-7243. Yog koj muaj lus dab tsi txog ntawm qhov kev tshawb fawb no, thov hu rau University of Hawaii Committee on Human Subjects ntawm tus xov tooj (808) 956-5007 los sis UHIRB@hawaii.edu.
Appendix D

Human Subjects Approval Letter
MEMORANDUM

November 6, 2006

TO:  
Dian Bales, MA, WSN, CPNP, RN  
Principal Investigator  
School of Nursing & Dental Hygiene

FROM:  
William H. Doudle  
Executive Secretary

SUBJECT:  
CHS #16555, "Pneumococcal Pneumonia in Immunization within the Hmong Community in Central California"

Your project identified above was reviewed and has been determined to be exempt from Department of Health and Human Services (DHHS) regulations, 45 CFR Part 46. Specifically, the authority for this exemption is section 46.101(b)(2). Your certificate of exemption (Optional Form 310) is enclosed. This certificate is your record of CHS review of this study and will be effective as of the date shown on the certificate.

An exempt status signifies that you will not be required to submit renewal applications for full Committee review as long as full portion of your project involving human subjects remains unchanged. If, during the course of your project, you intend to make changes which may significantly affect the human subjects involved, you should contact the office for guidance prior to implementing these changes.

Any unanticipated problems related to the use of human subjects in this project must be promptly reported to the CHS through this office. This is required so that the CHS can institute or update protective measures for human subjects as may be necessary. In addition, under the University's Assurance with the U.S. Department of Health and Human Services, the University must report certain situations to the federal government. Examples of these reportable situations include deaths, injuries, adverse reactions or unforeseen risks to human subjects. These reports must be made regardless of the source funding or exempt status of your project.

University policy requires you to maintain as an essential part of your project records, any documents pertaining to the use of human subjects in your research. This includes any information or materials conveyed to, and received from, the subjects, as well as any records consent forms, data and analysis results. These records must be maintained for at least three years after project completion or termination. If this is a funded project, you should be aware that these records are subject to inspection and review by authorized representatives of the University, State and Federal governments.

Please notify this office when your project is completed. We may ask that you provide information regarding your experiences with human subjects and with the CHS review process. Upon notification, we will close out files pertaining to your project. Any subsequent reactivation of the project will require a new CHS application. Please be aware that unless we are notified otherwise, this will automatically expire 5 years from the approval date.

Please do not hesitate to contact me if you have any questions or require assistance. I will be happy to assist you in any way I can.

Thank you for your cooperation and efforts throughout the review process. I wish you success in this endeavor.

Enclosure
Protection of Human Subjects
Assurance Identification/IRB Certification/Declaration of Exemption
(Common Rule)

Federal Regulations relating to the protection of human subjects may not be the culmination of efforts by the
Department of Health and Human Services (DHHS) in the absence of an assurance statement that is
appropriate in the absence of any public comments. An assurance statement is appropriate in the absence of
any public comments when the assurance is not subject to any public comment procedures. Such assurance
statements are approved by the Department of Health and Human Services (DHHS) in the absence of
any public comment procedures. The DHHS Assurance Number is awarded to the applicant and approved
by the Department of Health and Human Services (DHHS) in the absence of any public comments.

1. Request Type
   [ ] EXEMPTION [ ] COOPERATIVE AGREEMENT [ ] FELLOWSHIP [ ] CONTRACT
   [ ] CONTINUATION [ ] GRANT

2. Type of Agreement
   [ ] EXEMPTION [ ] COOPERATIVE AGREEMENT [ ] FELLOWSHIP
   [ ] CONTRACT [ ] CONTINUATION

3. Name of Federal Department or Agency and Number
   [ ] Application or Proposed Ind. Number No.

4. Title of Application or Activity
   "Potential Perceptions of Chinese Immigrants in the Oregon Community in Central California"
   [ ] Title of Principal Investigator, Program Director, Fellow, or Other
   Door Raker, MA, M.S., CCRP, R.A.

5. Assurance Status of this Project (Please list one of the following):
   [ ] This Assurance, on the will of the Department of Health and Human Services, covers this activity:
     Assurance Identification: [ ] Exempt [ ] Exceptional [ ] Confidential
     Assurance No.: [ ] Exempt [ ] Exceptional [ ] Confidential
     The expiration date: [ ] Exempt [ ] Exceptional [ ] Confidential
     IRB Registration or Registration: [ ] Exempt [ ] Exceptional [ ] Confidential

   [ ] This Assurance, on the will of the Department of Health and Human Services, covers this activity:
     Assurance No.: [ ] Exempt [ ] Exceptional [ ] Confidential
     The expiration date: [ ] Exempt [ ] Exceptional [ ] Confidential
     IRB Registration or Registration No.: [ ] Exempt [ ] Exceptional [ ] Confidential

   [ ] This assurance has been filed for this institution. The institution declared that it will provide an Assurance and Certification of IRB review and approval upon request.

   [ ] Exemption Status: Human subjects are involved, but this activity qualifies for exemption under Section 45 CFR 46.104(b) as group(s) 2.

7. Certification of IRB Review (Please list one of the following if you have an Assurance on file)
   [ ] This activity has been reviewed and approved by the IRB in accordance with the Common Rule and any other governing regulations.
     IRB: [ ] Federal IRB [ ] Other IRB (Please list IRB name or number) [ ] Other (Please list)

   [ ] This activity has not been reviewed by the IRB. No assurance has been granted or approved.

8. Comments
   [ ] This activity includes multiple projects, some of which have not been reviewed. The IRB has granted approval on condition that all projects covered by the Common Rule will be reviewed and approved before they are initiated and that appropriate further certification will be obtained.

9. Name and Address of Institution
   University of Hawaii at Manoa
   2444 Dole Street, Warren Hall
   Honolulu, HI 96822

10. Name of Official
    [ ] Title
    Compliance Officer

11. Phone No. (Area code) (503) 653-5007
12. Fax No. (Area code) (503) 653-2004
13. Email
    candia@hawaii.edu

14. Name of Official
    [ ] Title
    Compliance Officer

15. Date
    10/20/20

16. Signature
    [ ] Signature

17. Date
    10/20/20

18. Authorization to Use Information
    [ ] Authorization to Use Information

DHHS Assurance Number (Compliance Agreement) Sponsoring by HHS

Note: This assurance is intended only to avoid the need for an assurance statement that is appropriate for the project. An assurance statement is appropriate in the absence of any public comment procedures. Such assurance statements are approved by the Department of Health and Human Services (DHHS) in the absence of any public comment procedures. The DHHS Assurance Number is awarded to the applicant and approved by the Department of Health and Human Services (DHHS) in the absence of any public comments.

Public reporting burden for this collection of information is estimated to average 1 hour per response. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. Send comments regarding this burden estimate, the accuracy of the time estimate, or suggestions for reducing the burden to the Office of Information and Regulatory Affairs, OMB, Washington, DC 20503. The submission is considered fully as a response to this notice.
References


